

## ORIGINAL ARTICLE

# Work-related Stress Among Nurses During Covid-19 Pandemic and Its Correlation with Workload, Working Environment, Shift Work and Working Period

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Health and Safety Department, Fac.Public Health, Mulawarman University, Jl. Sambaliung, Main Campus of Gunung Kelua, Samarinda, Indonesia **ABSTRACT**

**Introduction:** The increase in physical and mental workload due to the Covid-19 pandemic has increased the risk of work-related stress (WRS) in nurses. WRS may also impact on the health of individuals, organizations, and national economies. The objective of this study was to examine WRS on nurses and analyze its correlation with the workload, work shifts, work environment, age, gender, educational background, and working period. **Methods:** An analytical survey with a cross-sectional design was conducted on 139 nurses in the medical, surgical, maternity, pediatrics, polyclinics, and medical check-up unit, using a cluster random sampling method. WRS was assessed by the Hamilton Anxiety Rating Scale, the workload was measured by the time-motion study. Age, gender, educational background, working period, shift work, and physical work environment were measured using a questionnaire. Data analysis used Pearson product-moment and Cramer's V. **Results:** Most of the nurses experienced WRS within severe (0.7%), moderate (24.5%), and mild (29.5%) categories. WRS was significantly related to workload ( $p=0.000$ ), shift work ( $p=0.045$ ), work environment ( $p=0.000$ ), and working period ( $p=0.016$ ). **Conclusion:** The WRS that occurs in nurses during the Covid-19 pandemic is quite high. Immediate countermeasures are needed to prevent prolonged stress and to reduce such negative impacts among nurses.

**Keywords:** Covid-19, Environment, Nurses, Workload, Work-related stress, Working period

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**INTRODUCTION**

The COVID-19 pandemic has had a devastating impact on the economy, social life and health system around the world (1). On the economic aspect, losses arise due to the decline in trade related to the collapse of specific supply-chains (2), in social life and psychological well-being, COVID-19 has caused high levels of post-traumatic stress disorder, anxiety, depression, and other distress symptoms, and reduced the quality and quantity of social relationships, and reduced perceptions of empathy for others (3), in the health care system, Covid 19 has dramatically increased the demand for health services (4-6).

Facing this health crisis, health workers are the frontline in tracing, testing, and treatment of COVID-19 patients. The ever-increasing number of Covid-19 cases, an increasing workload, limited supply of personal

protective equipment, massive media news, shortage of certain drugs, and lack of social support, all have increased psychological stress on healthcare workers (7). Another report states that Covid-19 has caused adverse effects on the psychological conditions of health workers, including anxiety, depression, and sleep disturbance (4-6).

Nurses are health workers with the largest percentage who are on the frontline in handling Covid-19 patients. They are the most vulnerable and at high risk of infections (10). The high mortality rate of nurses while treating Covid-19 patients, as well as concerns about contracting and transmitting Covid-19 to family members, friends, and colleagues, have increased the psychological pressure on nurses (3,10,12,13). This condition can lead to work-related stress (WRS). WRS on nurses if not recognized and addressed early on can harm individual nurses as well as on organizations/hospitals. WRS on nurses can have a negative impact on the health of the nurses themselves and can reduce the quality of nursing services (14).

Several studies have reported on the psychological condition of health workers (including nurses), but not

in the condition of the covid-19. These studies include the psychological health condition of health workers (15), role conflict, ambiguity and stress of healthcare professional (16), perceived impact, preparedness to the pandemic, worries and stress in nurses (17), nursing resilience, mental health, work-related stress, and anxiety (18), psychological stress and burnout among healthcare workers (17,18).

This study aims to investigate WRS in nurses who worked during the Covid-19 pandemic, and related factors (age, gender, education, workload, working environment, rotating shift work, and working period), with the research hypothesis that we propose, there is a correlation between WRS in nurses with age, gender, education background, workload, working environment, rotating shift work, and working period.

**MATERIALS AND METHODS**

**Study design**

An analytical survey with a cross-sectional approach has been carried out on 139 nurses at a private hospital in Samarinda Indonesia.

**Participant and setting**

By using a cluster random sampling technique, respondents were recruited from the the medical, surgical, maternity, pediatrics, polyclinics, and medical check-up unit.

**Ethical considerations**

The ethical approval was obtained from the Ethical Commission of Health and Medical Research, Faculty of Medicine, Mulawarman University Indonesia (AN:75/2020).

**Data collection**

The Hamilton Anxiety Rating Scale (HARS) (21,22) was used to determine the WRS of nurses. In general, HARS consisting of anxious feelings, strained, scared, hard to sleep, intellectual impairment, feel depression, muscular and sensory somatic, symptoms of cardiovascular, respiratory, gastrointestinal, genitourinary and autonomic, and behavior changes. The HARS score ranges from 0-56, with mild (<17), moderate (18-24), and moderate-severe (25-30) anxiety categories.

Nurses' workload was measured by time-motion study (19), which has dimensions on the completion of main tasks, administrative tasks, other tasks, and personal needs. The workload criteria consists of Overload (workload >90% of total working time), moderate/ideal (workload=85-90% of total working time), Under load (workload <85% of total working time). Work environment of nurses was evaluated using a nurse's perception questionnaire which refers to the Indonesia's Health Minister Regulation (1204/2004). This ministry of health regulation contains hospital environmental

health standards (23). This questionnaire consists of an assessment of color, cleanliness, air exchange, temperature, lighting, and noise of the nurse room. Age, gender, educational background, working period and shift work of nurses were measured using a questionnaire.

**Data Analysis**

Data analysis was conducted using Pearson product-moment and Cramer's V test.

**RESULTS**

Most of the respondents were aged between 22-25 years old (82; 59%) and >25-30 years old (45; 32.4%), most of the respondents were female nurses (127; 91.4%), the educational background of nurses were mostly Diploma III in Nursing graduates (99; 71.2%), the others graduated from Strata 1 in Nursing (40; 28.8%). Most of the nurses' working period is less than 5 years (125; 89.9%), 120 of nurses (86%) work in rotating shifts work, the workload of nurses is almost balanced between low workloads (70; 50.4%) and high workloads (69; 49.6%), most of the working environment conditions are quite good (128; 92.1%). 76 of nurses (54.7%) experienced WRS in the categories of mild (41; 29.5%), moderate (34; 24.5%) and severe work-related stress (1; 0.7%) respectively. Pearson test results show that working period (p=0.016), workload (p=0.000), and working environment (p=0.000) are significantly related to WRS. Cramer's V test show that shift work is significantly related to WRS with a p-value of 0.045 (Table I).

**Table I: Characteristics of nurses (n=139) and association between it's variables and work-related stress prevalence**

Variables	Σ	%	p	r
<b>Age (Years)</b>			0.088*	0.023*
22-25	82	59.0		
>25-30	45	32.4		
>30-35	9	6.5		
>35-40	2	1.4		
>40-45	1	0.7		
<b>Gender</b>			0.712**	0.032**
Male	12	8.6		
Female	127	91.4		
<b>Education</b>			0.093**	0.279**
Diploma 3 in Nursing	99	71.2		
Bachelor in Nursing	40	28.8		
<b>Working period (Years)</b>			0.016*	0.204*
≤ 5	125	89.9		
> 5	24	10.1		
<b>Shift work</b>			0.045**	0.963**
Yes	120	86.3		
No	19	13.7		
<b>Work load</b>			0.000*	0.365*
Low	70	50.4		
High	69	49.6		
<b>Working environment</b>			0.000*	0.378*
Poor	11	7.9		
Good	128	92.1		
<b>Work-related stress</b>				
Normal	63	45.3		
Mild	41	29.5		
Moderate	34	24.5		
Severe	1	0.7		

\*Pearson test, \*\* Cramer's V test

The worst symptoms of work-related stress (all of the symptoms felt by nurses) were difficulty in falling asleep (5; 3.6%), and feeling scared (3; 2.2%). More than half of the symptoms most frequently experienced by nurses were Anxious feelings (5;3.6%) and Gastrointestinal symptoms (5;3.6%). Other quite bad symptoms (half of the symptoms) which are most often experienced by nurses are difficulty in falling asleep (27; 19.4%), and gastrointestinal symptoms (21; 15.1%) (Table II).

## DISCUSSION

### WRS prevalence

We found a fairly high incidence of WRS in nurses. These results are quite worrying and need serious attention from hospital management, especially nursing management. WRS management on nurses aims to prevent the occurrence of adverse impacts on the individual nurses themselves, patients and hospitals

**Table II: Dimensions of work-related stress symptoms experienced by nurses (n=139)**

No.	Symptom	No symptom		One of the available options		Half of the symptoms		More than half of the symptoms		All of the symptoms		Total	
		n	%	n	%	n	%	n	%	N	%	n	%
1.	Anxious mood (Worries, an anticipation of the worst, fearful anticipation, irritability)	66	47.5	46	33.1	20	14.4	5	3.6	2	1.4	139	100
2.	Tension (Feelings of tension, fatigability, startle response, moved to tears easily, trembling, feelings of restlessness, inability to relax)	64	46	50	36	19	13.7	4	2.9	2	1.4	139	100
3.	Fears (Of dark, of strangers, of being left alone, of animals, of traffic, of crowds)	67	48.2	46	33.1	19	13.7	4	2.9	3	2.2	139	100
4.	Insomnia (Difficulty in falling asleep, broken sleep, unsatisfying sleep and fatigue on waking, dreams, nightmares, night terrors)	60	43.2	44	31.7	27	19.4	3	2.2	5	3.6	139	100
5.	Intellectual (Difficulty in concentration, poor memory)	73	52.5	48	34.5	12	8.6	4	2.9	2	1.4	139	100
6.	Depressed mood (Loss of interest, lack of pleasure in hobbies, depression, early waking, diurnal swing)	73	52.5	51	36.7	12	8.6	1	0.7	2	1.4	139	100
7.	Somatic (muscular) (Pains and aches, twitching, stiffness, myoclonic jerks, grinding of teeth, unsteady voice, increased muscular tone)	71	51.1	52	37.4	13	9.4	2	1.4	1	0.7	139	100
8.	Somatic (sensory) (Tinnitus, blurring of vision, hot and cold flushes, feelings of weakness, pricking sensation)	76	54.7	52	37.4	10	7.2	1	0.7	0	0	139	100
9.	Cardiovascular symptoms (Tachycardia, palpitations, pain in chest, throbbing of vessels, fainting feelings, missing beat)	95	68.3	36	25.9	8	5.8	0	0	0	0	139	100
10.	Respiratory symptoms (Pressure or constriction in chest, choking feelings, sighing, dyspnea)	99	71.2	34	24.5	6	4.3	0	0	0	0	139	100
11.	Gastrointestinal symptoms (Difficulty in swallowing, wind abdominal pain, burning sensations, abdominal fullness, nausea, vomiting, borborygmi, looseness of bowels, loss of weight, constipation)	70	50.4	43	30.9	21	15.1	5	3.6	0	0	139	100
12.	Genitourinary symptoms (Frequency of micturition, urgency of micturition, amenorrhea, menorrhagia, development of frigidity, premature ejaculation, loss of libido, impotence)	80	57.6	47	33.8	12	8.6	0	0	0	0	139	100
13.	Autonomic symptoms (Dry mouth, flushing, pallor, tendency to sweat, giddiness, tension headache, raising of hair)	72	51.8	51	36.7	14	10.1	1	0.7	1	0.7	139	100
14.	Behavior (Fidgeting, restlessness or pacing, tremor of hands, furrowed brow, strained face, sighing or rapid respiration, facial pallor, swallowing, etc.)	92	66.2	37	26.6	8	5.8	1	0.7	1	0.7	139	100

(10,14,15). The results are in line with studies in other countries which conclude that COVID-19 has increased the incidence of work-related stress in nurses, such as work-related stressors increase among the Healthcare Professionals in the Fever Clinic Centers for Individuals with Symptoms of COVID-19 (16), increased the perceived impact and worries about the pandemic affect nurses' mental health (17), work-related stress and anxiety induced by a viral epidemic has increased during the pandemic Covid-19 era (18), and increased work-related stress on nurses (mild and moderate stress) during the Covid-19 pandemic (19).

### **Working period and WRS**

We conclude that there is a significant correlation between the working period of nurses and job stress. The higher the working period, the higher WRS. These results indicate dissatisfaction or unpleasant conditions for nurses during work. We assume that nurses are most likely to experience work-related boredom or monotonous work, and this requires further research. Several studies have shown that there is a correlation between work-related stress and working period, such as WRS on nurses in Goa are related to work tenure, younger nurses were more stressed in dealing with the death of a patient (20), working period is one of a predictor of WRS among nurses working in primary and secondary health care (27).

### **Shift work and WRS**

We found a significant correlation the shift working and nurses' WRS. Nurses who work in shifts experience higher work stress. Due to the nature of the nurse's job, which has to interact with patients for 24 hours, a rotation shift is applied. Nurses who work with rotation systems experience changes in circadian patterns and work environments for a long time. Therefore, rotational work can cause work stress, especially for nurses who have not been able to adapted successfully (28). These findings are following the conclusions of previous studies which concluded that work shifts are significantly related to work-related stress (24,25,26). To reduce the adverse effects of implementing shift work, nurse managers are suggested to rearrange the shift work pattern, provide adequate supports and develop sense of collegiality among staff nurses (31).

### **Nurses workload and WRS**

The results of the study concluded that nurses' work-related stress was significantly related to workload. This result is reasonable, because the high bed occupancy rate (BOR) during the Covid-19 outbreak has increased the nursing workload (32), The COVID-19 pandemic which has an impact on increasing the bed occupancy rate has increased the mental workload and has reduced the quality of life for nurses (33). This condition which is exacerbated by psychological workloads that increases

WRS (34). To reduce the workload, it is recommended to ensure that there are sufficient numbers of nurses, provide supportive physical and psychological environment, help nurses to prioritize various types of nursing work, establish consistent work procedures, and good time management practices.

### **Working environment and work-related stress**

The work environment in this study is a physical environment with indicators of room lighting, room temperature, and noise exposure. The results showed that most of the working environment conditions were in good condition (92.1%), only a small portion was in bad condition (7.9%), and the physical work environment was significantly related to work stress. A good physical work environment will increase work comfort, otherwise, a bad physical work environment can trigger work stress (28,30). The implication of this result is that to prevent the occurrence of work stress on nurses, the bad physical work environment needs to be improved. In this study, the physical work environment variables that still need to be improved are air exchange, temperature, lighting in the patient care room.

### **Limitations**

This study found a relationship between working periods and WRS, the higher the working period, the higher the WRS. This condition is unique, but we have not explored and analyzed this phenomenon in depth. Measurement of the nurse's work environment in this study used a subjective questionnaire, for further research, it is recommended to use objective measurement tools such as sound level meters, lux meters, heat stress monitors, and vibration meters.

### **Implications for Practice**

Various efforts are needed to anticipate the adverse effects that arise due to work-related stress experienced by nurses. Nursing management needs to immediately take various actions to reduce work-related stress. This research found that the work-related stress experienced by nurses was related to workload, working environment, working period, and rotation shift work. Therefore it is necessary to make efforts to reduce the workload of nurses, improve the quality of the physical work environment, increase psychosocial support, and rearrange the shift system.

### **CONCLUSION**

Most of the nurses (54.7%) experienced work-related stress within severe (0.7%), moderate (24.5%), and mild (29.5%) categories respectively. Work-related stress was significantly associated with workload ( $p=0.000$ ), shift work ( $p=0.045$ ), work environment ( $p=0.000$ ), and working period ( $p=0.016$ ). Immediate countermeasures are needed to prevent prolonged stress and to reduce

such negative impacts among nurses.

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