ORIGINAL ARTICLE

Factors related to anxiety among resident doctors assigned to emergency room during the COVID-19 pandemic: a multivariate study at Sumatera Utara Affiliated Teaching Hospital

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ABSTRACT

Aim To evaluate and assess knowledge and perception, as well as factors related to the occurrence of anxiety among frontliners, especially resident doctors working in emergency room (ER).

Methods This multivariate study was conducted with cross-sectional approach involving 80 eligible subjects (based on inclusion and exclusion criteria) that are consecutively assigned and assessed with GAD-7 questionnaire. The study was held in ER of Universitas Sumatera Utara affiliated teaching hospital from May to August 2020.

Results Our study found that variables such as nuptial status (p=0.032), seniority level (p=0.037), history of direct exposure to COVID-19 patients (p=0.001) and weekly work duration (p=0.002) were all statistically significant to correlate with the occurrence of anxiety among resident doctors assigned to work in ER.

Conclusion Acknowledgement of these factors might lead to proper and targeted support system strategies to address the anxiety issues among doctors, particularly those who work in ER during COVID-19 pandemic.

Key words: anxiety, mental health, physicians

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INTRODUCTION

Severe Acute Respiratory Syndrome-Corona Virus 2 (SARS-Cov-2) has spread worldwide and escalated to become world's pandemic as announced by the WHO on 30 January 2020. COVID-19 is known to affect respiratory system, and is transmitted from man to man rapidly. The infection can be asymptomatic and may involve multiple organs that intensifies its complexity. The spread of this virus for the first time was in Tiongkok, China in December 2019 and has spread to countries in Europe, America, and Asia ever since finally on 11 March 2020, the WHO declared COVID-19 as a global pandemic (1-3).

This pandemic leads into intense fear in society, which may affect mental health. Front liners, including doctors, nurses, and paramedics are even more vulnerable of getting infected as they are exposed directly to COVID-19 infection. Insufficient health care system, social isolation, uncertainty (as a number of developed countries, even those with prominent and great health care system failed to survive and ended up in collapsing) are possible factors related to the occurrence of mental issues among health care workers. To make matters worse, illogical and misuse of personal protective equipment (PPE) by society results in even greater anxiety among health care workers as they are worried of not having enough equipment (4).

A previous study also reported that junior resident doctors, trainees, and interns are the ones that get even heavier pressure because most of immediate or emergency cases are put on them (5). This causes not only physical burden because they have to work overtime, but also result in psychological problems. Issues related to confirmation of COVID-19, difficult ethical decisions for the patients, and uncertainty in terms of working rotation, contribute to even greater risk of mental problem among those health care workers (5). Stress reaction such as anxiety, depression, somatization as well as hostility have been reported in 10% of health care workers during this pandemic. A study form Taiwan reported that hospital staff experienced acute stress (5%), stigma (20%), worked reluctancy (9%) and even considered resigning (2). During the pandemic in China, depression, anxiety and stress were found to reach 50.7%, 44.7% and 73.4%, respectively (2).

Therefore, doctors, nurses, paramedics and other health care workers are actually the real fighters and heros to combat this pandemic. Thus, mental and physical health of these people should have been a concern to ensure that they are able to carry their responsibility appropriately. Unfortunately, there are only few studies particularly in developing countries to investigate and assess factors related to psychological problems that may affect health care workers. Acknowledgement of these factors may lead to proper and targeted support system strategies to address the anxiety issues among doctors, particularly those who work in emergency room (ER) during the COVID-19 pandemic. Therefore, we believe that our study is necessarily important to address this issue.

The aim of this study was to evaluate and assess knowledge and perception, as well as factors related to the occurrence of anxiety among front liners, especially resident doctors working in emergency room.

EXAMINEES AND METHODS

Population and study design

This multivariate study was conducted with cross-sectional approach involving 80 eligible doctors (based on inclusion and exclusion criteria) that are consecutively assigned and assessed with Generalized Anxiety Disorder 7-item (GAD-7) questionnaire (after informed consent is given). The study was conducted in the ER of Universitas Sumatera Utara (USU) affiliated teaching hospital from May to August 2020. Inclusion criteria were resident doctors who were 25 – 40 years of age, cooperative, and were able to understand the Indonesian language. Exclusion criteria were any resident doctors with psychiatry disorders or any comorbidity. In this context, comorbidity was defined as any medical history that may expose the subjects to a greater risk of experiencing anxiety. Subjects with psychosis were already initially excluded from the study. In addition, work duration was measured as total hours spent on duty for a week.

Methods

The GAD-7 (6) was used to assess anxiety level as well as other types of anxiety, including panic

disorder, social anxiety, and post-traumatic stress disorder. It exerts reliability and adequate internal consistence, as well as good criteria, factorial, and procedural validity (7).

The determination of the minimum sample size was based on a preliminary study, and the number of subjects was also in accordance with the minimum sample size and the appropriate analysis test was carried out (analysis validity). This study also managed to get 80 research subjects (external validity 1b), therefore, at least the results of this study could be generalized to the target population. Restriction for confounding variables were also applied so that internal validity could be fulfilled.

Statistical analysis

Linear regression model was used in this study after ensuring that each acquirement of using linear regression model was achieved. As for the independent variable, it had no multicollinearity (as proved with Pearson correlation and tolerance test). Both independent and dependent variables showed linearity (as proved with scatter graph). Categorical independent variables were analyzed by using descriptive statistics and normality test. Bivariate analysis using t test independent and Mann Whitney U test were also conducted and Pearson test was used for numerical independent variables. Multivariate analysis was also carried out for both variables. Kolmogorov-Smirnov was carried out to test the normality of data distribution in both dependent and independent variables, and Pearson test was used if the distribution of the data was found to be abnormal. Variables that were allowed to be analyzed with linear regression model were those with $p<0.25$ (8).

The total of 11 independent variables in our study consisted of 8 continuous and 3 categorical variables, hence we used linear regression to conduct the multivariate analysis. Prior to multivariate analysis, we conducted bivariate analysis only variables with $p<0.25$ that would be eligible for further analysis with linear regression model. When multivariate regression linear analysis was applied with a predictive conceptual framework, it was suggested to use backward method, which means that the SPSS program would filter the multicollinearity value of independent variable and the ones that were statistically not significant until the statistically fittest model (fit model) was found (8).

RESULTS

Median age of 80 eligible doctors was 31 (26-38) years. The variables such as resident's nuptial status ($p<0.001$), seniority level of resident ($p=0.037$), history of direct contact with COVID-19 sufferers ($p<0.001$) and the duration of work week ($p=0.02$) were related to the GAD-7 score of residents serving in ER. Therefore, these variables deserve to be considered as a factor that can cause anxiety disorders in residents serving in ER (Table 1).

A total of 42 (52.5%) doctors were male resident; 48 (60%) were already married. Most were found to live along with family, 42 (52.5%), and admitted not to have any comorbidity, 61 (76.3%). Junior residents were represented with 42 (52.5%); 54 (67.5%) had no family member infected with COVID-19. More than a half, 41 (51.2%), showed no sign and symptoms related to COVID-19 and 42 (52.5%) admitted not having any direct contact with COVID-19 patients (Table 1).

Table 1. Demographic characteristics of study participants

Variable	No (%)
Gender	
Male	42 (52.5)
Female	38 (47.5)
Nuptial status	
Married	48 (60)
Not married	32 (40)
Living with	
Alone	38 (47.5)
With Family	42 (52.5)
Physical comorbidity	
Present	19 (23.8)
Not Present	61 (76.3)
History of family infected with COVID-19	
Present	26 (32.5)
Not Present	54 (67.5)
Residency Level	
Senior	38 (47.5)
Junior	42 (52.5)
COVID-19 related sign or symptoms	
Present	39 (48.8)
Not Present	41 (51.2)
Median sleep duration (hours) / (min-max)	38 (47.5)
Median work duration/week (hours) / (min-max)	42 (52.5)

Maximum and minimum age of residents was 38 and 26 years old, respectively. Multivariate analysis for age was not significant ($p> 0.05$) (Table 2).

Table 2. Bivariate analysis of categorical independent variables

Variable	Number of participants	Mean±SD	Median	p
Gender				
Male	42	6.76 ± 3.77		0.016
Female	38	9.13 ± 473		
Nuptial Status				
Married	48		9 (3-19)	<0.001
Not married	32		5 (2-17)	
Living With				
Alone	38	6.16 ± 3.28		<0.001
With family	42	9.45 ± 4.71		
Comorbidity				
YES	19	11.05 ± 4.62		<0.001
NO	61	6.90 ± 3.85		
History of family infected with COVID-19				
YES	26		12 (2-19)	<0.001
NO	54		6.5 (2-14)	
Residency level				
Senior	38	5.39 ± 2.90		<0.001
Junior	42	10.14 ± 4.31		
COVID-19 related signs and symptoms				
YES	39		12 (2-19)	<0.001
NO	41		6 (2-13)	
History of direct contact with COVID-19 patients				
YES	38		11 (5-19)	<0.001
NO	42		2 (2-12)	

In this study, median sleep duration was 4 hours (min. of 4 hours, max. of 8 hours) and median work duration was 36 hours (min. of 16 hours and max. of 68 hours) (Table 3).

Table 3. Bivariate analysis of numerical independent variables according to Generalized Anxiety Disorder 7-item (GAD-7) scale

Variable	Value	r	p
Age (years)	31 (26-38)	0.182	0.106
Median sleep duration per day (hours) (min-max)	4 (4-8)	-0.363	0.001
Median working duration/week (hours) (min-max)	36 (6-15)	0.747	< 0.001

r, correlation coefficient

By using backward analysis method, GAD-7 score of 4.51 –2.31 was found for married vs not married, +1.35 for junior vs senior residents +0.29 for working duration per week, –0.22 for history of direct contact. Our study confirmed that all variables had a significant correlation with GAD-7 score ($p<0.05$) (Table 4).

Table 4. Multivariate analysis summary

Variable	Correlation coefficients	Regression multivariate β	p
Constant		4.51	0.032
Married compared to not married	– 0.259	-2.31	<0.001
Junior resident compared to senior resident	0.154	1.35	0.037
History of direct contact with COVID-19 patient compared to no history of contact	0.489	0.29	<0.001
Resident's duration of work per week	– 0.251	-0.22	0.002

Adjusted R^2 71.4 %

DISCUSSION

The results of multivariate analysis for age of our doctors were found not to be significantly related to GAD 7 scores. This result is different from the study conducted by Pieh et al., in which 19% of patients who experienced symptoms of anxiety and lock-down during the COVID-19 pandemic appeared especially stressful for younger adults (<35 years) (9). It is known that getting older, the risk for anxiety is getting smaller (10).

In terms of living with family members, the result of this study contradicted with the study by Liu et al. showing that there was a relationship between anxiety symptoms reported by the subject themselves and the status of not living alone (11). In addition, resident gender was found different from a Pakistani study suggesting that female residents were at more risk of experiencing symptoms of depression, anxiety and acute stress (5), which is also in contrast to the US study in which females experienced more stress (12).

Family history of COVID-19 infection in our study is in accordance with a study conducted in China using the self-rating anxiety scale, self-rating depression scale and Pittsburgh sleep quality index measuring instruments: for 307 COVID-19 patients, in the multivariate analysis there was no relationship between family history of confirmed COVID-19 and anxiety scores (13).

The results of COVID-19 related symptoms analysis in our study were in contrast to a study conducted by Wathelet et al. which suggested that those who had symptoms similar to COVID-19 reported mental health complaints (14). In addition, a study by Badahdah et al. showed about a third of healthcare workers caring for COVID-19 patients who were hospitalized experienced moderate to severe symptoms of anxiety caused by poor sleep quality (15).

In this study, only comorbidities had the result of multivariate analysis (not significant). It was different from a study by Galindo-Vázquez et al. in Spain, which found that history of comorbidities had a relationship with anxiety and depression

scores. Patients who had two physical symptoms were more likely to experience symptoms of depression and/or anxiety related to the severity of the disease (16).

Resident nuptial status and history of direct contact with COVID-19 patients showed significant results, which is consistent with a study conducted by Liu et al., which stated that nuptial status was associated with symptoms of anxiety related to family burdens including responsibility and finance (11). In addition, Kannampallil et al. in the United States reported that residents who had direct contact with COVID-19 patient reported significantly higher level of stress and were more likely to burn out (12). The fear of being unprotected contributes to the anxiety score of those who work in the front lines and direct contact with COVID-19 patients, which is even worse when PPE is insufficient (5).

Seniors were represented with 47.5% and juniors with 52.5% in this study, and resulted in a relationship between the seniority level variable and the GAD-7 score (very weak correlation strength and positive direction). In our study, being junior residents showed a positive correlation to higher GAD 7 scores, which means that junior residents were more at risk of experiencing symptoms of anxiety. In this study, the high level of anxiety among junior residents may be caused by lack of knowledge and experience when dealing with patients, as well as new working environment that they have to adjust to. In contrast to our results, in the Pakistani study senior staff reported more symptoms of depression, anxiety and acute stress (4).

The results of multivariate analysis for the duration of work per week showed that there was a significant relationship for the duration of work per week with an anxiety score, which is in accordance with Giusti et al. study that showed that the working hours, which caused burn out to 330 health professionals on duty, resulted in score state anxiety that became significantly above the cut-off (17). Furthermore, a study conducted by Amin et al. in Pakistan also found that subjects who even worked 20 hours /week or less were exposed to an increased risk of anxiety and depression levels in physicians (4).

Our study suggests that nuptial status, seniority level, history of direct contact, and duration of work per week are contributing factors of anxiety among resident doctors working in emergency room. During COVID-19 pandemic similar studies may be abundant, but vast majority of studies are focusing only on the patients. Meanwhile, our study put healthcare workers as the focus of the study. This study is currently the first one in Medan that used GAD 7 as an instrument. By knowing contributing risk factors for anxiety, preventive strategies can be taken as early as possible.

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