Factors Associated with Psychological Disturbance among Healthcare Providers during the Early Phase of COVID-19 Pandemic in Kelantan, Malaysia

NORHAYATI MN[1], RUHANA CY[1], MOHD AZMAN Y[2]

[1]Department of Family Medicine, School of Medical Sciences, Universiti Sains Malaysia, Kubang Kerian, Kelantan, Malaysia
[2]Medical Practice Division, Ministry of Health, Level 7, Block E1, Parcel E, Federal Government Administrative Centre, Putrajaya, Malaysia

ABSTRAK

Pandemik COVID-19 mempunyai kesan yang ketara terhadap emosi dan psikologi populasi umum di mana penyedia penjagaan kesihatan juga tidak terkecuali. Kajian ini bertujuan untuk mengenalpasti faktor-faktor yang menyebabkan gangguan psikologi, seperti traumatisasi gantian, kebimbangan dan kemurungan, dalam kalangan penyedia penjagaan kesihatan semasa fasa awal pandemik COVID-19. Kajian keratan rentas ini melibatkan 306 peserta yang memenuhi kriteria kajian dari Mei hingga Julai 2020 di hospital tertiari negeri. Kami menggunakan laporan kes urus sendiri yang mengandungi data sosio-ekonomi dan tiga borang soal selidik dalam versi Bahasa Melayu iaitu Soal Selidik Traumatisasi Gantian versi Bahasa Melayu, Skala Kebimbangan dan Kemurungan Hospital serta Kajian Hasil Perubatan Tinjauan Sokongan Sosial. Analisis deskriptif dan regresi linear digunakan untuk analisis traumatisasi gantian manakala regresi logistik binari digunakan untuk analisis hasil kebimbangan dan kemurungan telah dilakukan. Hasil kajian mencadangkan bahawa peserta yang bekerja di Jabatan Perubatan lebih berkemungkinan mengalami gangguan psikologi berbanding jabatan lain. Petugas kesihatan bukan barisan hadapan (pekali terlaras [95% CI]: -17.04 [-24.77, -9.30]) dan penyedia penjagaan kesihatan wanita (pekali terlaras [95% CI]: 10.73 [2.99, 18.46]) dikaitkan dengan traumatisasi gantian. Petugas kesihatan bukan barisan hadapan (nisbah ganjil terlaras [95% CI]: 0.13 [0.06, 0.29]) juga dikaitkan dengan kebimbangan di samping bekerja secara giliran (nisbah ganjil terlaras [95% CI]: 3.80 [1.04, 13.83]). Sementara itu, pegawai perubatan (nisbah ganjil terlaras [95% CI]: 0.31 [0.10, 0.91]) kurang berkemungkinan melaporkan simptom kemurungan

Address for correspondence and reprint requests: Ruhana Che Yusof. Department of Family Medicine, School of Medical Sciences, Universiti Sains Malaysia, Kubang Kerian, Kelantan, Malaysia. Tel: +6019-9152612 Email: ruhanacyf@gmail.com

berbanding jururawat. Hasil kajian ini boleh membantu birokrasi hospital untuk memberi tumpuan kepada intervensi yang sesuai untuk meningkatkan kesihatan mental dan psikologi penyedia penjagaan kesihatan.

Kata kunci: COVID-19, faktor berkaitan, kebimbangan, kemurungan, traumatisasi gantian

ABSTRACT

COVID-19 pandemic had significant emotional and psychological effects on the general population where healthcare providers were no exception. This study aimed to identify the factors associated with psychological disturbances such as vicarious traumatisation, anxiety and depression among healthcare providers during the early phase of the COVID-19 pandemic. This cross-sectional study included 306 participants who fulfilled the inclusion and exclusion criteria from May to July 2020 in a state tertiary hospital. We employed a self-administered case report form containing socio-economic data and three questionnaires, i.e. Malay version Vicarious Traumatization Questionnaire, Hospital Anxiety and Depression Scale and Medical Outcome Study Social Support Survey. Descriptive analysis and linear regression were applied for vicarious traumatisation while binary logistic regression was applied for anxiety and depression outcomes. The findings suggested that participants worked in the Medical Department were more likely to develop psychological disturbances than other departments. Non-frontline (adjusted coefficient [95% CI]: -17.04 [-24.77, -9.30]) and female healthcare providers (adjusted coefficient [95% CI]: 10.73 [2.99, 18.46]) were associated with vicarious traumatisation. Non-frontline healthcare providers (adjusted odds ratio [95% CI]: 0.13 [0.06, 0.29]) were also associated with anxiety besides shift work (adjusted odds ratio [95% CI]: 3.80 [1.04, 13.83]). Meanwhile, medical officers (adjusted odds ratio [95% CI]: 0.31 [0.10, 0.91]) were less likely to report depression symptoms compared to staff nurses. These findings can assist hospital bureaucracy to focus on necessary interventions to improve the mental and psychological health of healthcare providers.

Keywords: anxiety, associated factor COVID-19, depression, vicarious traumatisation

INTRODUCTION

During COVID-19 pandemic, many studies had discovered that healthcare providers suffered from psychological problems (Cabarkapa et al. 2020; Cai et al. 2020; Chew et al. 2020; Elbay et al. 2020), such as stress, vicarious traumatisation (VT), anxiety, depression, insomnia and somatisation symptoms (Benfante et al. 2020; Zhou et al. 2020). These disturbances affected the performance of the healthcare providers in fighting

the COVID-19 pandemic. During the COVID-19 pandemic, several factors were linked to an elevated risk of psychological disturbances: as a female, nurse, experienced a traumatic event related to COVID-19, had pre-existing psychological issues and had a perceived fear of developing COVID-19 infection (Lasalvia et al. 2020). A recent study concluded that anxiety was associated with new and unexpected changes in hospital routine and protocol and indirectly linked with the frequency of COVID-19 patients and their treatment (Mattila et al. 2021). However, psychological disturbances such as fear and depression of COVID-19 transmission to family members was undeniable (Sakib et al. 2021).

In countries with low COVID-19 cases such as Cyprus, the predictors of increased depressive and post-traumatic stress disorder symptoms were being female, younger age and nurse (Chatzittofis et al. 2021). Meanwhile, a study conducted in a COVID-19-plagued region in north-east Italy discovered that female nurses and those with pre-existing psychological issues were at an elevated risk of psychological disturbances when working directly with COVID-19 patients (Lasalvia et al. 2020). On the contrary, a study in Malaysia found that higher levels of positive religious coping significantly reduced the psychological disturbances of anxiety and depression (Chow et al. 2021).

Malaysia had been struck by three waves of the COVID-19 epidemic. The first wave began on January 25, 2020 and ended on February 15, 2020. The second wave began on February 27, 2020 and the third wave began on September 18, 2020 (Rampal & Liew 2021). In the early stage of the COVID-19 pandemic, the state of Kelantan, Malaysia had a low COVID-19 cases, with only 160 cases reported till July 31, 2020 (Abdullah 2020). All the COVID-19 cases, whether symptomatic or asymptomatic were hospitalised as a standard practise by the Ministry of Health (Rahman 2020). Until July 31, 2020, Malaysia had reported a total of 8,982 COVID-19 cases with 26.6 cases per 100,000 population and 0.6 active case per 100,000 population (UKK-DOSM 2021). The first movement control order by the Malaysia government was implemented on 18 March 2020 (Tang 2020) comprise of effective surveillance and contact tracing, early preparedness and planning, previous pandemics experiences, diagnostics and public health system had successfully slowed down the transmission of COVID-19 (Rahman 2020).

Due to the COVID-19 situation in Malaysia, the study aimed to identify the presence and likelihood of psychological problems such as VT, anxiety and depression among healthcare providers in a setting with low COVID-19 cases. This study aimed to identify the factors associated with psychological disturbances among healthcare providers during the early phase of the COVID-19 pandemic in Kelantan, Malaysia.

MATERIALS AND METHODS

Study Design and Setting

This study was part of a larger project with many aims, data analysis and outcomes. However, this study shared the same methodology and sample participants. Parts of the descriptive data were reported and published such as comparison of anxiety (Norhayati et al. 2021a), depressive symptoms (Norhayati et al. 2021b) and VT levels (Norhayati et al. 2021c). From May to July 2020, a cross-sectional survey was conducted among healthcare providers in the selected COVID-19 hospital in Kelantan, Malaysia.

Participants

Participants were invited via the WhatsApp's group application. In this study, convenient sampling was used. Eligible participants who accepted to take part in the study were asked to fill out a virtual consent form before completing the self-administered questionnaire. Because of this study was conducted during the COVID-19 pandemic, virtual consent was obtained by filling out an online form rather than meeting with participants physically in order to reduce the risk of COVID-19 exposure. Participants were told that their participations in the study were entirely voluntary and they could withdraw at any time. The respondents did not need to have a Google account to complete the Google form survey, so that participants remained anonymous to prevent social desirability biases.

Inclusion and Exclusion Criteria

Staff nurses, medical assistants, medical officers and medical specialists were involved in the study and were divided into frontline and non-frontline groups. Non-frontline healthcare professionals were those who dedicated to routine hospital operations and provided direct care to patients with confirmed or suspected COVID-19, whereas frontline healthcare providers were those who provided direct care to patients with confirmed or suspected COVID-19 (Norhayati et al. 2021c). Participants who had been diagnosed with a psychiatric disorder were excluded.

Sample Size

The findings were part of a bigger research into the psychological effects during the COVID-19 pandemic. Sample size calculation was based on two means of anxiety level and was employed using the Power and Sample Size Calculation software version 3.0.43 (DalePlummer, Tennessee). The standard deviation (SD) of the anxiety score among non-frontline healthcare providers was 10.6 (Poon et al. 2004), and after evaluating its clinical value, a detectable difference of 3.5 was chosen. With an alpha of 0.05, a power of 80% and a non-response rate of 10%, a sample size of 320 healthcare providers were required to reject the null hypothesis (Norhayati et al. 2021a; Norhayati et al. 2021b; Norhayati et al. 2021c).

Outcome Measures

The study survey had four parts; (i) socio-demographic data; (ii) Vicarious Traumatization Questionnaire (VTQ);

(iii) Hospital Anxiety and Depression Scale (HADS); and (iv) Medical Outcome Study (MOS) Social Support Survey. The socio-demographic data included age, race, sex, marital status, number of children, education level and occupational informatio, including types of occupation, years of employment, shift work, and administration involvement (Norhayati et al. 2021a; Norhayati et al. 2021b; Norhayati et al. 2021c).

The VTQ was divided into two domains with a total of 38 items: physiological responses domain (11 items) and psychological responses domain (27 items). The psychological responses were divided into emotional (9 items), behavioral (7 items), cognitive (5 items) and life beliefs responses (6 items) (Li et al. 2020). The total raw scores were calculated and the scores ranged from 0 (never) to 5 (always) for each question. The possible scores ranged 0 to 190, with higher scores suggested more VT. The Malay version questionnaire had a Cronbach's alpha of 0.98 (Norhayati et al. 2021c).

The Hospital Anxiety Depression Scale-Anxiety (HADS-A) and the Hospital Anxiety Depression Scale-Depression (HADS-D) were two subscales of the HADS questionnaire. There were 14 statements in this questionnaire, each with four alternatives. Anxiety scale is represented by the odd number of items, whereas depression scale is represented by the even number of items. Response choices were; never (0), mild (1), moderate (2) and severe (3). The possible anxiety and depression ratings ranged from 0 to 21, indicating different levels of anxiety and depression. More anxiety and depression symptoms were associated with higher scores (Zigmond & Snaith 1983). This study used the Malay version of the HADS, which had sensitivity and specificity of 90.0% and 86.2% for anxiety while 93.2% and 90.8% for depression, respectively (Yahya & Othman 2015). The authors received permission to use this questionnaire from the copyright holders. Depression or anxiety was indicated if the score was eight and above, while no depression or anxiety was apparent if the score was below eight (Norhayati et al. 2021a).

The MOS Social Support Survey consisted four dimensions; (i) emotional/informational support (six items); (ii) tangible support (three items); (iii) affectionate support (three items); and (iv) positive social interaction support (four items) (Norhayati et al. 2015). Items were scored based on a five-point scale that ranged from 1 (none of the time) to 5 (all the time), with higher scores indicated more support. The raw scores for each dimension were transformed into percentages, representing the overall functional social support scores. The composite reliability of the domains varied from 0.65 to 0.90, with an average variance of 0.39 to 0.70 and a Cronbach's alpha of 0.62 to 0.90 (Norhayati et al. 2015). The MOS Social Support Survey scores were included as an important confounding variable in the analyses.

Statistical Analysis

Stata 13.1 (StataCorp LP, Texas) was

used to analyse the data. Before the data was analysed, it was double-checked and cleaned. All continuous variables were given a mean and SD, while categorical variables were given a frequency and percentage. The dependent outcome (VT scores) were applied to linear regression, and the dependent outcomes (anxiety and depression) were subjected to binary logistic regression. A significant level of p-value less than 0.05 was used in the analyses. Social support was considered an important confounder in the study because it could alter the levels of VT, anxiety and depression among healthcare providers (Muller et al. 2020; Qi et al. 2020).

For VT, a simple linear regression was performed for univariable analysis. The forward stepwise method was chosen to obtain a preliminary model in multiple linear regressions. Multiple regression analyses were used to control the effect of confounders in order to determine independent associations of VT scores. The model was checked for multicollinearity and clinically meaningful interaction. The preliminary final model was assessed for the assumptions of normality, overall linearity, equal variance, and outliers by residual scatter plots and histogram of the residuals. The final model of VT was presented and interpreted.

In anxiety and depression, a simple logistic regression was performed for univariable analysis. In multiple logistic regressions, the forward stepwise method was used to obtain the preliminary model. The model was checked for multicollinearity and

clinically meaningful interaction. The model was assessed for model fits using Hosmer–Lemeshow goodness of fits, a classification table (sensitivity, specificity, and predictive values), and an area under the receiver operating characteristic curve. Any extreme outlier was identified. The final model of anxiety and depression was presented and interpreted.

Ethical Consideration

The study was approved by the Human Research Ethics Committee at Universiti Sains Malaysia (USM/JEPeM/COVID19-10) and the Ministry of Health Medical Research Ethics Committee in compliance with the Declaration of Helsinki criteria (NMRR-20-703-54576) (Norhayati et al. 2021a; Norhayati et al. 2021b; Norhayati et al. 2021c).

RESULTS

Overall, 306 healthcare providers took part in the study. The response rate was 95.6% with a post hoc power of 82.1%. Table 1 showed the socio-demographic characteristics of the healthcare providers. The age of the participants ranged from 21 to 59 years old. Most of the participants were Malay (98.4%), female (80.1%), married (86.6%), and staff nurses (71.6%) (Norhayati et al. 2021a; Norhayati et al. 2021b; Norhayati et al. 2021c).

Vicarious Traumatisation

In the Table 1, the mean (SD) of VT scores was 79.3 (27.56), with

Table 1: Socio-demographic characteristics of healthcare providers (n = 306)

Variables	Descriptive	Vicarious traumatization[a]	Anxiety[b]	Depression[b]
	n (%)	Coef. (95% CI)	OR (95% CI)	OR (95% CI)
Age (year)	38.20 (8.66)[c]	0.07 (-0.40, 0.54)	1.00 (0.97, 1.04)	1.00 (0.97, 1.04)
Employment (year)	12.55 (6.42)[c]	-0.32 (-0.81, 0.16)	0.97 (0.93, 1.01)	0.99 (0.95, 1.03)
Number of children	2.37 (1.55)[c]	-0.49 (-2.49, 1.52)	0.96 (0.82, 1.13)	1.02 (0.88, 1.19)
Social support	65.69 (26.05)[c]	-0.04 (-0.16, 0.08)	1.00 (0.99, 1.01)	1.00 (0.99, 1.01)
Types of healthcare provider				
Non-frontline	146 (47.7)	0	1	1
Frontline	160 (52.3)	-11.7 (-17.78, -17.04)*	0.3 (0.18, 0.50)*	0.58 (0.37, 0.93)*
Race				
Malay	301 (98.4)	0		1
non-Malay	5 (1.6)	-6.38 (-30.87, 18.10)	omitted	0.36 (0.04, 3.28)
Sex				
Male	61 (19.9)	0	1	1
Female	245 (80.1)	16.85 (9.31, 24.39)*	3.27 (1.49, 7.21)*	1.16 (0.65, 2.06)
Education				
Diploma	269 (87.9)	0	1	1
Bachelor	27 (8.8)	-14.09 (-24.95, -3.22)*	0.17 (0.04, 0.74)*	0.46 (0.19, 1.13)
Master	10 (3.3)	-4.88 (-22.21, 12.45)	0.24 (0.03, 1.90)	0.15 (0.02, 1.17)
Marital status				
Single	41 (9.5)	0	1	1
Married	265 (86.6)	3.59 (-5.52, 12.69)	1.14 (0.54, 2.38)	1.37 (0.69, 2.73)
Occupation				
Staff nurse	219 (71.6)	0	1	1
Medical assistant	19 (6.2)	-23.37 (-35.83, -10.91)*	0.22 (0.05, 0.96)*	0.33 (0.11, 1.02)
Medical officer	30 (9.8)	-15.63 (-25.77, -5.49)*	0.13 (0.03, 0.57)*	0.25 (0.09, 0.67)*
Other	38 (12.4)	-16.13 (-25.29, -6.98)*	0.49 (0.21, 1.13)	1.00 (0.50, 2.00)
Department				
Medical	78 (25.5)	0	1	1
Emergency	53 (17.3)	-22.83 (-31.50, -14.15)*	0.19 (0.07, 0.51)*	0.43 (0.21, 0.88)*
ICU	67 (21.9)	-20.43 (-28.54, -12.31)*	0.24 (0.10, 0.54)*	0.28 (0.14, 0.58)*
Surgical	70 (22.9)	7.33 (-0.69, 15.35)	1.52 (0.79, 2.91)	1.07 (0.56, 2.05)

Administration	31 (10.1)	-20.27 (-39.49, -1.05)*	0.61 (0.11, 3.32)	0.36 (0.07, 1.97)
Others	26 (8.5)	-18.96 (-29.30, -8.62)*	0.36 (0.13, 0.99)*	0.43 (0.18, 1.03)
Shift work				
No	31 (10.1)	0	1	1
Yes	275 (89.9)	10.29 (0.06, 20.51)*	2.29 (0.85, 6.16)	2.10 (0.91, 4.86)
Administrative work				
No	291 (95.1)	0	1	1
Yes	15 (4.9)	-11.86 (-1.63, -26.18)	0.36 (0.08, 1.63)	0.52 (0.16, 1.67)

OR = Odds ratio   ICU = Intensive care unit
[a]Simple linear regression, [b]Simple logistic regression, [c]Mean (Standard Deviation), *p-value <0.05

scores ranged from 38 to 164. Six variables were significant with VT via simple linear regression analysis. Meanwhile, for multivariable linear regression analysis, three variables were significant; type of healthcare providers, sex and department.

Table 2 shows the associated factors of VT among healthcare providers. Frontline healthcare providers had low VT scores (adj. coef. [95% confidence interval, CI]: -17.04 [-24.77, -9.30]) than non-frontline healthcare providers. Female healthcare providers had higher VT scores (adj. coef. [95% CI]: 10.73 [2.99, 18.46]) than males. Those working in the Emergency Department (ED), intensive care unit (ICU), administration and other departments had lower VT scores than those working in the medical department. There was a significant interaction between sex and type of healthcare providers. Therefore, a split analysis of the final

Table 2: Associated factors of VT among healthcare providers during the early phase of COVID-19 pandemic in Kelantan (n = 306)

Variables	Adj. Coef. (95% CI)	P-value
Types of healthcare provider		
Non-frontline	0.00	
Frontline	-17.04 (-24.77, -9.30)	<0.001***
Sex		
Male	0.00	
Female	10.73 (2.99, 18.46)	0.007
Department		
Medical	0.00	
Emergency	-28.8 (-39.21, -18.54)	<0.001***
ICU	-15.60 (-23.77, -7.42)	<0.001***
Surgical	-1.97 (-10.63, 6.69)	0.655
Administration	-29.47 (-48.48, -10.46)	0.002
Others	-16.92 (-26.97, -6.87)	0.001

***p-value <0.001; Adj Coef = Adjusted coefficient; ICU = Intensive care unit
Model fits for multiple linear regression model: R-squared = 0.27, Adjusted R-squared = 0.25, Root MSE = 23.86. Assumptions for normality, overall linearity and equal variance were met. No outlier was detected.

Table 3: Associated factors of anxiety among healthcare providers during the early phase of COVID-19 pandemic in Kelantan (n = 306).

Variables	Adj. OR (95% CI)	P-value
Types of healthcare provider		
Non-frontline	1.00	
Frontline	0.13 (0.06, 0.29)	<0.001***
Department		
Medical	1.00	
Emergency	0.05 (0.02, 0.16)	<0.001***
ICU	0.45 (0.18, 1.12)	0.085
Surgical	0.53 (0.23, 1.24)	0.141
Administration	0.51 (0.06, 4.06)	0.525
Others	0.48 (0.16, 1.46)	0.196
Shift work		
No	1.00	
Yes	3.80 (1.04, 13.83)	0.043

***p-value <0.001; Adj. OR = Adjusted odds ratio; ICU = Intensive care unit
Model fits for multiple logistic regression model: Pseudo R-squared = 0.19, Hosmer-Lemeshow = 5.70 (p-value=0.222). Sensitivity = 59.6%, specificity = 87.6%, positive predictive value = 66.3%, negative predictive value = 84.1%, correctly classified = 79.4%, area under ROC curve (95% CI) = 0.76 (0.70, 0.83). No outlier was detected.

model was performed to explore the association. Among females, the frontline healthcare providers had lower VT scores (-21.69 [95% CI: -30.63, -12.76]) than non-frontline healthcare providers. Whereas among males, there was no difference in VT scores between frontline and non-frontline healthcare providers.

Anxiety

Among the 306 respondents, 29.1% (n = 89) of the healthcare providers had anxiety. Simple binary logistic regression showed that the type of healthcare providers, sex, bachelor's degree, medical assistants and medical officers, ED, ICU and other departments were significant variables for the anxiety (Table 1). Table 3 showed the associated factors of anxiety among healthcare providers. Multiple binary logistic regression showed

that frontline healthcare provider, ED and shift work were significantly associated with anxiety after controlling other variables. Frontline healthcare providers had 87% less risk of developing anxiety (adj. odds ratio, OR [95% CI]: 0.13 [0.06, 0.29]) than non-frontline healthcare providers. Healthcare providers worked in the ED had 95% lower risk of developing anxiety (adj. OR [95% CI]: 0.05 [0.02, 0.16]) than those working in the Medical Department. Healthcare providers worked in shifts were 3.8 times more likely to develop anxiety (adj. OR [95% CI]: 3.80 [1.04, 13.83]) than those not working in shifts.

Depression

Among the 306 respondents, 40.5% (n = 124) of the healthcare providers had depression. In Table 1, simple binary logistic regression showed that the type

Table 4: Associated factors of depression among healthcare providers during the early phase of COVID-19 pandemic in Kelantan (n = 306).

Variables	Adj. OR (95% CI)	P-value
Occupation		
Staff nurse	1.00	
Medical assistant	0.37 (0.10, 1.40)	0.143
Medical officer	0.31 (0.10, 0.91)	0.034
Others	1.17 (0.51, 2.65)	0.712
Department		
Medical	1.00	
Emergency	0.61 (0.25, 1.46)	0.265
ICU	0.29 (0.14, 0.60)	0.001
Surgical	1.04 (0.54, 2.00)	0.910
Administration	0.36 (0.06, 2.12)	0.257
Others	0.58 (0.22, 1.53)	0.270

Adj. OR = Adjusted odds ratio; ICU = Intensive care unit
Model fits for multiple logistic regression model: Pseudo R-squared = 0.07, Hosmer-Lemeshow = 1.62 (p-value=0.899). Sensitivity = 63.7%, specificity = 64.8%, positive predictive value = 55.2%, negative predictive value = 72.4%, correctly classified = 64.4%, area under ROC curve (95% CI) = 0.67 (0.61, 0.73). No outlier was detected.

of healthcare providers, occupation (medical officers) and department (ED and ICU) were significantly associated with depression among healthcare providers. Table 4 showed the associated factors of depression among healthcare providers. Multiple binary logistic regression showed that medical officers and healthcare providers in ICU were significantly associated with depression. Medical officers were 69% lesser to feel depressed than staff nurses (adj. OR [95%CI]: 0.31 [0.10, 0.91]), and those worked in the ICU were 79% lesser to feel depressed (adj. OR [95% CI]: 0.29 [0.14, 0.60]) than those worked in the Medical Department.

DISCUSSION

According to the findings of this study, the COVID-19 had a profound psychological impact on healthcare providers. During the early phase of the pandemic, they experienced significant trauma, anxiety and depression. In this study, VT was associated with non-frontline and female healthcare providers. Those working in the ED and the ICU experienced less vicarious trauma compared to those in the medical department. For anxiety, the associated factors were non-frontline healthcare providers and shift workers. Those working in the emergency department experienced less vicarious trauma compared to those in the Medical Department. Meanwhile, medical officers and those working in the ICU were less likely to be depressed than staff nurses and those working in the medical department in the state tertiary hospital in Kelantan, Malaysia.

A study proved that frontline healthcare providers experienced higher psychological disturbances than non-frontline healthcare providers (Cai et al. 2020). On the other hand, non-frontline healthcare providers, have

been found to had higher psychological disturbances than frontline healthcare providers in a few studies (Li et al. 2020; Norhayati et al. 2021a; Tan et al. 2020). Non-frontline healthcare providers had higher levels of VT and anxiety When compared to frontline healthcare providers. The findings were comparable to previous studies that had been conducted in China (Li et al. 2020) and Singapore (Tan et al. 2020). Increased VT among non-frontline healthcare providers could be attributed to sympathy and feelings of worry that they felt for their patients with COVID-19 and frontline colleagues (Li et al. 2020). Work reorganisation to replace their colleagues' responsibility who were deployed as frontline staff might contribute to anxiety (Horn et al. 2021). Thus, non-frontline healthcare providers must rapidly modify their working scopes depending on the working requirements in the different working environments. Lack of skills and training (Riaz et al. 2021), insufficient information (Dubey et al. 2020) and psychological support (Conti et al. 2020) worsened this stressful situation, leading to depression.

Non-frontline healthcare providers had been reported to be more anxious than frontline healthcare providers, who were targeted more because they worked directly with COVID-19 patients and had access to more psychological support, first-hand COVID-19 information, and rigorous infection control and personal protective equipment training (Tan et al. 2020). On the contrary, frontline healthcare providers who worked directly with COVID-19 patients had

higher levels of anxiety than those in non-frontline positions in China (Lai et al. 2020).

Female healthcare providers were more vulnerable to psychological disturbances, and the prevalence of these events was higher than their male counterparts (Ahmed et al. 2020; Cabarkapa et al. 2020; Elbay et al. 2020; Farrukh et al. 2020; Muller et al. 2020). This study showed that female healthcare provider was associated with VT but not with anxiety and depression. Research on sex differences suggested several mechanisms in the biological (effect of sex chromosome genes), psychological (emotion-focus coping styles) and sociological (social support and social roles) contexts might explain female's susceptibility toward psychological disturbances (Liu et al. 2021). This finding was parallel with the suggestion that females experienced higher VT which influenced by sympathy and feelings of worry for patients with COVID-19 and their frontline colleagues (Li et al. 2020). Interestingly, VT also differed between sex and the type of healthcare provider. Females who worked as non-frontline healthcare providers had a considerably higher prevalence of VT. However, no association was found in males. Frontline healthcare providers were less traumatised, which might due to better mental preparedness, more working experiences from previous outbreaks and higher voluntariness of the professional responsibility (Benfante et al. 2020).

Working in the departments that provide care for COVID-19 patients exposes employees to a higher risk

of infection than working in other departments. Departments such as medical, surgical, emergency, paediatrics, obstetrics and gynaecology and ICU were significant factors associated with depression (Elhadi et al. 2020). The state tertiary referral centres' medical department in this study has a subspeciality which responsible for organising and managing COVID-19 cases. It was not surprising that it reported higher psychological disturbances of VT, anxiety and depression than other departments. Undeniably, healthcare providers in other departments such as the ED and the ICU, which directly managed COVID-19 cases, also experienced psychological disturbances (Lasalvia et al. 2020).

However, healthcare providers in the ICU were less prone to depression than those working in the Medical Department and several factors may influence this situation. Patients admitted to the ICU need to undergo a COVID-19 screening test. Confirmation of the COVID-19 status made the staff to be more alert and prepared to attend the patients. Meanwhile, in the Medical Department, the staff had to attend the patients with unknown COVID-19 status. Hence, they were at a higer risk of COVID-19 exposure. Therefore, the healthcare providers may feel more depressed with the possible "silent spreaders," and the scenario gets worsened due to a shortage of personal protective equipment (Tan et al. 2021).

The number of patients in the ward may also influent the scenario. In response to the COVID-19 pandemic,

ICU had fewer cases to attend since the management had reduced all non-urgent procedures (Abdullah et al. 2020). Meanwhile, in the Medical Department, a booking appointment system was implemented to limit the number of patients visiting the hospital at the particular time, in order to prevent COVID-19 exposure. On the other hand, Malaysia goverment decided to hospitalise all COVID-19 patients, including asymptomatic patients who claimed close contact with confirmed COVID-19 cases, in the early stages of the pandemic, those who had travelled to high-prevalence areas and those who had severe acute respiratory illness (Rahman 2020). As a result, the number of admitted patients in the wards increased drastically, increasing the workload in the medical wards.

Staff nurses are the backbone of a healthcare system and an asset to any medical team. The job required them to have direct and prolonged contact with patients than other health professionals (Chatzittofis et al. 2021). As a result, this can be physically and psychologically burdened, thus exposing them to increased risk of COVID-19 transmission. If they were infected, they may transmit the disease to others, especially their family members (Mattila et al. 2021). Psychological disturbances exacerbated when there was shortage of nurses and personal protective equipments (Chirico et al. 2020). Staff nurses had been considered to have higher psychological disturbances than other groups (Benfante et al. 2020; Elbay et al. 2020; Farrukh et al.

2020; Mattila et al. 2021). In the current study, staff nurses were more likely to feel depressed compared to medical officers, which was similar to a study conducted in China (Lai et al. 2020). This could be attributed to the fact that nurses had longer and more frequent contact with infected patients, thus exposed them to the highest risk of infection.

Furthermore, the change in shift hours to overcome staff shortages and reduce nosocomial infection might trigger psychological disturbances. In this study, shift work was found to be associated with anxiety. The shift's schedule was changed from 8 to 12 hours per shift. The longer shift hours with the stress of getting infected, were proven to stimulate anxiety (da Silva & Neto 2021; Huang et al. 2021, in press).

This study had some limitations. A cross-sectional study generally had no evidence of a temporal relationship between the associated factors and the psychological disturbance because the exposure and the outcome were assessed simultaneously. Convenient sampling and representativeness sampling bias that occurred in this study were due to limited resources, COVID-19 situation and nature of the study population. The findings might only be applicable in a population with similar characteristics and did not represent the whole study population because of less generalisability. It might underestimate or overestimate if compared to other populations. A self-administered questionnaire was used to abbreviate face-to-face interviews in the COVID-19 circumstance. It might result to methodological and social desirability bias. On the other hand, the anonymous survey, was employed in the hopes of reducing such biases.

CONCLUSION

The COVID-19 pandemic caused VT, anxiety and depression among healthcare providers. Healthcare provides as a female, staff nurse, non-frontline, working in the medical department and working in shifts were the associated factors for psychological disturbances. These identified factors would allow hospital bureaucracy to focus on necessary intervention to reduce and overcome these psychological disturbances.

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