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Research Paper

Mental health problems in Indonesian internship doctors during the COVID-19 pandemic

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ABSTRACT

Background: All new graduate medical doctors in Indonesia will work in government healthcare facilities for one year as internship doctors. Problems such as the shortage of PPE, no specific treatment guidelines, and inadequate support from authorities, contributed to mental health problems. This study aimed to determine mental health problems and associated demographics and concerns of Indonesian internship doctors in the COVID-19 pandemic era.

Methods: This cross-sectional study was performed from 1–31 Januari 2021 via Google Form questionnaire to collect data. Logistic regression analysis was used to identify the association between demographic data, concerns in internship doctors' working place, and mental health using Depression Anxiety Stress Scale 21.

Results: Depression, anxiety, and stress in internship doctors were 32.6, 44.1, and 19.5% consecutively. Multivariate analysis showed that the only demographic factor associated with depression was female sex. Concerns of internship doctors were the most factors associated with mental health. Working in triage was associated with depression and stress. Donning and doffing training of PPE, difficulty to practice physical distancing and hesitancy to attend patients were associated with depression and anxiety. Difficulty to practice physical distancing in hospital w associated with anxiety and stress.

Limitation: Firstly, some difficulties in data collection. Secondly, the self-reported tools of mental health are not always aligned with the psychiatric assessment. Lastly, possibility of recall biases from each batch.

Conclusions: To minimize mental health problems of internship doctors, their concerns must be tackled. Medical schools have an important role to manage concerns of these internship doctors.

1. Introduction

In Indonesia, all new graduate medical doctors have to attend an internship program for one year as internship doctors. The internship program is aimed to increase the skill of new graduate medical students and support the health care services system for Indonesian society using the family medicine approach. These internship doctors are placed in Indonesian government healthcare facilities in all provinces based on their needs. Every February, May, August, and November, fresh batches of internship doctors are dispatched (Kementerian Kesehatan Republik Indonesia, 2021). In the 2019 and 2020 period, each batch accommodated approximately 3500 internship doctors to health care facilities in 34 provinces of the Indonesia archipelago.

The COVID-19 pandemic was announced by WHO on 11 March 2020. Indonesia reported the first confirmed COVID-19 case on 2 March 2020 (WHO, 2021). The COVID-19 is a new disease. Much is unknown about the disease, among others, such as mechanisms and pathogenesis of the disease, risk factors, methods and prevention of transmission, high case fatality rate, rapid spreading, and standard treatment protocols or vaccines. New knowledge of the disease is snowballing each day, sometimes contradicting supporting data that confuse the health care workers in the front line (Xing et al., 2020). The pandemic has also changed the health care workers' working situation. The need to wear uncomfortable personal protective equipment (PPE), the fear of being infected and infecting others, has increased the risk of mental health problems among health care workers (Buselli et al., 2020; Ramaci et al., 2020). Health care workers also faced issues such as the shortage of PPE, no specific treatment guidelines, and inadequate support from authorities, contributing to their mental health problems (Rajkumar, 2020; Liu et al., 2020).

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There were seven internship doctors batches in May, August, November 2019, and February, May, August, November 2020, consisted of 24,500 doctors during the COVID-19 pandemic. As recent graduates, the internship doctors have to face this pandemic in cooperation with the much experienced health care workers. Health care workers are the frontline in providing care for patients in this COVID-19 pandemic and caring for patients with other diseases. As the next generation of health care workers, the recent medical graduates will decide the continuity of health care. It is vital to address their mental health in this pandemic to avoid burnout and prepare recent medical graduates' subsequent batches to join the battle. A study in Israel showed that resident doctors compared to senior doctors had a higher level of anxiety, which might reflect senior doctors' experience in facing life crises and probably less direct contact in caring for patients (Milgrom et al., 2020).

We aimed to determine the mental health problems and their association with internship doctors' demographic and concerns as new graduate medical doctors in Indonesia in the COVID-19 pandemic era.

2. Methods

2.1. Study design

This study was a web-based cross-sectional study performed from 1–31 January 2021 on Indonesian internship doctor batches of May, August, November 2019, and February, May, August, November 2020.

2.2. Participants

Indonesian internship doctor batches of May, August, November 2019, and February, May, August, November 2020 were invited to participate in the study via online recruitment social media. Participants were informed about the aims of study and the needed information on mental health problems and internship doctors' demographic and concerns as new graduate medical doctors in Indonesia in the COVID-19 pandemic era. Data were collected via Google Form questionnaire, consisting of demographic data, workplace concerns, and mental health evaluation starting from 1 January 2021. Data was collected until the completion of the required sample on 31 Januari 2021. All participants provided their online informed consent.

2.3. Workplace concerns

The participants were asked items about their concerns in working place on preventive and precautionary measures, and choose the most appropriate condition they experienced from the alternatives given. Items about personal protective equipment availability and N95 masker availability were answered as not available at all; available for suspected positive patients; available for invasive procedure only; available sometimes for invasice procedure only; or available whenver required. Items about training in donning and doffing of PPE, confidence in donning and doffing of PPE, difficulty to practice physical distancing at the workplace, hesitancy to attend patients, and needs for all admitted patients to undergo COVID-19 testing were answered as yes or no.

2.4. Mental health evaluation

The Depression Anxiety Stress Scale 21 (DASS 21) is the short version of the Depression Anxiety Stress Scale consisted of 7 items for each subscale of depression, anxiety, and stress. Each item was classified into four Likert responses of 0, which means "never", 1 which means "sometimes", 2 which means "often," and 3, which means "most of the time." Scores for each subscale are totalled and categorized into five severity ranges of normal, mild, moderate, severe, and extremely severe. Depressive symptoms score is classified as normal (0–9), mild (10–13), moderate (14–20), severe (21–27), and extremely severe (> 27), anxiety symptoms score is classified as normal (0–7), mild (8–9), moderate (10–14), severe (15–19), and extremely severe (> 19), stress score is classified as normal (0–14), mild (15–18), moderate (19–25), severe (26–33), and extremely severe (> 33). For bivariate and multivariate analysis, depressive symptoms was classified as no (normal) and yes (mild, moderate, severe, and extremely severe depressive symptoms), anxiety symptoms was classified as no (normal), and yes (mild, moderate, severe, and extremely severe anxiety symptoms), and stress was classified as no (normal) and yes (mild, moderate, severe and extremely severe stress). DASS-21 has been translated and adapted in Bahasa Indonesia in a study by Oei et al. (2013) and the Cronbach α coefficient of the scale in this study was 0.91. Other study has also demonstrated good internal consistency of the DASS-21 in the three scales: depression (0.91–0.97); anxiety (0.81–0.92); and stress (0.88–0.95) (Gloster et al., 2008).

2.5. Statistical analysis

Categorical data were presented as numbers and percentages. Continuous data were presented as mean and standard deviation. The independent variables were demographic data and internship doctors' workplace concerns, while the dependent variables were depressive symptoms, anxiety symptoms, and stress. The association between independent and dependent variables was assessed initially using bivariat analysis. Association between categorical independent variables with dependent variables were assessed using chi-square test. Association between continuous independent variables with dependent variables were assessed using T-test and Mann–Whitney *U* test for normally and non-normally distributed continuous variables, respectively. Backward stepwise logistic regression analysis was used to identify the association between independent and dependent variables found to be significant in bivariate analysis (p-value < 0.25). Results reported were shown as odds ratio (OR) and 95% confidence interval (CI), while p-value < 0.05 was considered statistically significant. Multicollinearity in the model was investigated to assess the relationship between the independent factors. Data was analyzed using Statistical Package for Social Sciences (SPSS), version 25.

2.6. Ethics

The study was approved by the Medical Ethics Committee of Faculty of Medicine, Pelita Harapan University no. 175\/K-LKJ/ETIK/XII/2020.

3. Results

3.1. Characteristics of participants

Out of 750 internship doctors which were contacted, a total of 478 internship doctors participate in the study, 316 (66.1%) were female, and mean + SD age was 24.71 + 1.15 years. The majority of internship doctors 284 (59.4%) were living with their parents, 76 (15.9%) were living alone. Out of 100 (20.9%) internship doctors that suffered from COVID-19, 90 were admitted to the hospital. Out of 188 (39.3%) internship doctors that had family members who suffered from COVID-19, 41 (8.6%) deceased, and 110 (23.0%) recovered. Three hundred forty six (72.4%) internship doctors were stationed in both hospital and primary health care, and 422 (88.3%) did the night shifts. Demographic characteristics data were shown in Table 1.

3.2. Concerns and mental health of internship doctors

Personal protective equipment (PPE) availability was different in hospital and primary health care, PPE was not available at all in 10 (2.1%) and 31 (6.5%), and it was available whenever required in 291 (60.9%) and 239 (50.0%) in hospital and primary health care, respectively. Similarly, the N95 masks availability was also different in hospital and primary health care. It was not available at all in 51 (10.7%)

Table 1
Demographic characteristics of internship doctors.

Demographic characteristics	n	(%)
Sex		
Female	316	(66.1%)
Male	162	(33.9%)
Age (mean ± SD)	24.71	± 1.15
Status		
Married	40	(8.4%)
Single	438	(91.6%)
Living with		
Parents	284	(59.4%)
Grand parents	2	(0.4%)
Spouse	38	(7.9%)
Child	1	(0.2%)
Relative	8	(1.7%)
Household assistant	3	(0.6%)
Alone	76	(15.9%)
Friend	64	(13.4%)
Other	2	(0.4%)
Family member working as health care worker		
No.	327	(68.4%)
Yes	151	(31.6%)
COVID-19 history		
No	378	(79.1%)
Yes, recovered	84	(17.6%)
Yes, in admission	16	(3.3%)
Admitted due to COVID-19		
<6 days	25	(5.2%)
6 - 10 days	37	(7.7%)
11 - 15 days	17	(3.6%)
15 - 25 days	8	(1.7%)
25 - 30 days	3	(0.6%)
Never	388	(81.2%)
Family member admitted due to COVID-19		
No.	270	(56.5%)
Yes, recovered	110	(23.0%)
Yes, deceased	41	(8.6%)
Yes, in admission	37	(7.7%)
Do not know	20	(4.2%)
Province of internship		
Aceh	5	(1.0%)
Sumatra Utara	9	(1.9%)
Riau	3	(0.6%)
Kep. Riau	13	(2.7%)
Sumatra Barat	2	(0.4%)
Jambi	4	(0.8%)
Sumatra Selatan	13	(2.7%)
Bengkulu	7	(1.5%)
Lampung	8	(1.7%)
Kep. Belitung	13	(2.7%)
DKI Jakarta	52	(10.9%)
Banten	113	(23.6%)
Jawa Barat	44	(9.2%)
Jawa Tengah	47	(9.8%)
Jawa Timur	24	(5.0%)
DI Yogyakarta	8	(1.7%)
Bali	16	(3.3%)
Nusa Tenggara Barat	4	(0.8%)
Nusa Tenggara Timur	21	(4.4%)
Kalimantan Barat	1	(0.2%)
Kalimantan Tengah	3	(0.6%)
Kalimantan Timur	9	(1.9%)
Kalimantan Utara	2	(0.4%)
Kalimantan Selatan	2	(0.4%)
Sulawesi Selatan	13	(2.7%)
Sulawesi Barat	1	(0.2%)
Sulawesi Tengah	2	(0.4%)
Gorontalo	3	(0.6%)
Sulawesi Utara	5	(1.0%)
Maluku Utara	5	(1.0%)
Maluku	6	(1.3%)
Papua Barat	5	(1.0%)
Papua	9	(1.9%)
Sulawesi Tenggara	4	(0.8%)
Province of internship		
Java Bali	304	(63.6%)
Other than Java Bali	174	(36.4%)
Health care facilities		
Primary health care	76	(15.9%)
Hospital	56	(11.7%)
Both		
	346	(72.4%)
Type of hospital		
Type A	12	(2.5%)
Type B	173	(36.2%)
Type C	262	(54.8%)
Type D	31	(6.5%)
Night Shift		
No	56	(11.7%)
Yes	422	(88.3%)
Working place		
Ward	318	(66.5%)
Emergency	453	(94.8%)
COVID-19 ward	80	(16.8%)
ICU	76	(15.9%)
Outpatient clinic	10	(2.1%)
Triage	112	(23.5%)

and 103 (21.5%), and it was available whenever required in 235 (49.2%) and 129 (27.0%) in hospital and primary health care, respectively. Training in donning and doffing of PPE was not provided in 288 (60.3%) and 329 (68.8%) in hospital and primary health care, respectively. Internship doctors were having difficulty to practice physical distancing in 226 (47.3%) and 209 (43.7%) in hospital and primary health care, respectively. Albeit all these concerns, 317 (66.3%) and 327 (68.4%) of internship doctors were not hesitant to attend patients in hospital and primary health care, respectively. Concerns of internship doctors were shown in Table 2.

Internship doctors who had depressive symptoms were 32.6%, anxiety symptoms was 44.1%, and stress was 19.5%, whereas 6.9% and 12.3% experienced severe and extremely severe anxiety symptoms, respectively. Mental health of internship doctors was shown in Table 3.

Table 2
Concerns of internship doctors in health care facilities.

Concerns	Hospital		Primary health care	
	n	(%)	n	(%)
Personal protective equipment availability				
Not available at all	10	(2.1%)	31	(6.5%)
Available for suspected positive patients	75	(15.7%)	98	(20.5%)
Available for invasive procedure only	28	(5.9%)	35	(7.3%)
Available sometimes for invasive procedure only	32	(6.7%)	30	(6.3%)
Available whenever required	291	(60.9%)	239	(50.0%)
N95 masker availability				
Not available at all	51	(10.7%)	103	(21.5%)
Available for suspected positive patients	84	(17.6%)	137	(28.7%)
Available for invasive procedure only	33	(6.9%)	39	(8.2%)
Available sometimes for invasive procedure only	35	(7.3%)	25	(5.2%)
Available whenever required	235	(49.2%)	129	(27.0%)
Training in donning and doffing of PPE				
No.	288	(60.3%)	329	(68.8%)
Yes	149	(31.2%)	104	(21.8%)
Difficulty to practice physical distancing at work place				
Not difficult	212	(44.4%)	224	(46.9%)
Difficult	226	(47.3%)	209	(43.7%)
Hesitancy to attend patients				
No.	317	((66.3%)	327	(68.4%)
Yes	118	(24.7%)	105	(22.0%)
Needs for all admitted patients to undergo COVID-19 testing				
No.	89	(18.6%)	117	(24.5%)
Yes	340	(71.1%)	311	(65.1%)

Table 3
Depressive symptoms, anxiety symptoms, and stress of internship doctors.

Variables	n	(%)
Depressive symptoms		
Normal	322	(67.4%)
Mild	48	(10.0%)
Moderate	54	(11.3%)
Severe	29	(6.1%)
Extremely severe	24	(5.0%)
Anxiety symptoms		
Normal	267	(55.9%)
Mild	55	(11.5%)
Moderate	63	(13.2%)
Severe	33	(6.9%)
Extremely severe	59	(12.3%)
Stress		
Normal	385	(80.5%)
Mild	29	(6.1%)
Moderate	35	(7.3%)
Severe	11	(2.3%)
Extremely severe	17	(3.6%)

3.3. Factors associated with mental health of internship doctors

On bivariate analysis, internship doctors with no history of COVID-19 compared to those with a history of COVID-19 were likely to have depressive and stress symptoms. Internship doctors who did not have compared to those who had family members admitted due to COVID-19 were likely to have depressive symptoms, anxiety symptoms, and stress. Those who worked in hospitals were likely to have depressive symptoms than those who worked in primary health care. Working in ICU and triage were significantly associated with less depressive symptoms and less stress, but working in the COVID-19 ward, ICU, and triage was significantly associated with higher anxiety symptoms. Shortage of personal protective equipment and N95 mask, difficulty to practice physical distancing in hospital and primary health care were significantly associated with all three mental health disorders symptoms. Needs for all admitted patients to undergo COVID-19 testing were significantly associated with all three mental health disorders symptoms in primary health care. Other bivariate analysis is shown in Table 4.

Independent variables associated with depressive symptoms with p-value < 0.25 were female sex, single status, no COVID-19 history, no family members that was admitted due to COVID-19, internship program in Jawa Bali, hospital based internship, working in ICU, triage, and work place concerns in hospital and primary health care. Independent variables associated with anxiety symptoms with p-value < 0.25 were female sex, single status, no COVID-19 history, no family members that was admitted due to COVID-19, internship program in Jawa Bali, hospital based internship, working in the ward, COVID-19 ward, ICU, triage, and work place concerns in hospital and primary health care except hesitancy to attend patients in primary health care. Independent variables associated with stress with p-value < 0.25 were female sex, no COVID-19 history, no family members that was admitted due to COVID-19, internship program in Jawa Bali, type A hospital based internship, working in ICU, triage, and work place concerns in hospital and primary health care. Multivariate analysis using backward stepwise logistic regression analysis were done to all of the independent variables with p-value < 0.25 on bivariate analysis.

In Table 5, logistic regression analysis showed that factors associated with depressive symptoms were female sex, working in triage, training in donning and doffing of PPE, difficulty to practice physical distancing, and hesitancy to attend patients in the hospital, and difficulty to practice physical distancing in primary health care. Factors associated with anxiety symptoms were working in ICU, training in donning and doffing of PPE, difficulty to practice physical distancing in hospital and primary health care. Factors associated with stress were working in triage and difficulty to practice physical distancing in hospital.

4. Discussion

The infection rate of health care workers in this study was 20.9%, which is similar to a study in Dharmais Hospital, Indonesia that showed that the prevalence rate of COVID-19 in health care workers, in April-December 2020 period was 18% (Adelina and Dwijayanti, 2021). The result of the present study was lower than a study in Jakarta, Indonesia and China which showed an infection rates in healthcare workers of 1.73% (Bella et al., 2021) and 2.10% (Zheng et al., 2020). The hospitalization rate in this study was 18.8%, which is higher than a study in Scotland which showed that the risk of admission to hospital with COVID-19 was 0.20 and 0.07% for healthcare workers in contact and not in contact with patients (Shah et al., 2020). The indication for hospitalization of COVID-19 patients in Indonesia is moderate and severe COVID-19. It is very unlikely that internship doctors, which majority should be healthy young people would suffer moderate or severe COVID-19. The period of internship program of new graduate medical doctors in Indonesia this study is May 2019–November 2020. The first batch internship program ended in May 2020, while the last batch will end the program in November 2021. This study collected the data in Januari 2021, when the incidence of COVID-19 in Indonesia was still quite low, and hospitals were not overloaded with COVID-19 patients. It was possible that internship doctors with mild COVID-19 are also hospitalized to isolate them and minimize contact with other family members as majority of them were still lliving with their family. Other possibility was to provide close observation as little was known about the COVID-19 natural history in the beginning of pandemic.

There are concerns of health care workers that they would get infected and suffered from COVID-19 or that they transmit the infection to their family in the era of pandemic COVID-19. The PPE was not available at all in 2.1 and 6.5% of hospital and primary health care where the internship doctors worked, and it was available whenever required in 60.9 and 50.0% of hospital and primary health care. Shortage of PPE is a problem in many health care facilities all over the world, especially in the early period of the pandemic (Sarma et al., 2020). Training in donning and doffing of PPE was not provided in 60.3 and 68.8% in hospital and primary health care, respectively. Many health care workers were not trained in donning and doffing of PPE (Sarma et al., 2020). A study in India found that 43.63% of health care workers were not trained in donning and doffing of PPE. This would result in improper donning and doffing of PPE that will increase the risk of infection (Herron et al., 2020). Physical distancing is a crucial part of the prevention of COVID-19 spread. According to WHO, individuals should keep a distance of at least 1 m from each other and avoid spending time in crowded places or in groups (WHO, 2021). However, it is often difficult to practice physical distancing in health care facilities. Approximately 47.3 and 43.7% of internship doctors in the hospital and primary health care were having difficulty to practice physical distancing. Sarma et al. (2020) found that 56.36% of health care workers in India were having the same difficulty in their workplace. In the difficult situation of physical distancing in providing health care, 66.3 and 68.4% of internship doctors were not hesitant to attend patients in hospital and primary health care.

Internship doctors who had depressive symptoms were 32.6%, anxiety symptoms was 44.1%, and stress was 19.5%. A study in China reported that among the 309 health care workers, 56.0% had depression, and 28.5% had anxiety (Xing et al., 2020). Another study in China found health care workers treating COVID-19 patients had symptoms of depression (50.5%), anxiety (44.6%), insomnia (34.0%), and distress (71.5%) (Jianbo et al., 2020). A study involving Singapore and India found that depression among health care workers was 9 and 12.4%, anxiety was 14.4 and 17.1%, stress was 6.5 and 3.8% consecutively (Chew et al., 2020). A study on health care workers in Spain found that 51.3% had depression, 79.3% had anxiety, 83% had posttraumatic stress (Luceño-Moreno et al., 2020), while a repeated cross-sectional study in young workers in Italy also found high prevalence of mental disorders

Table 4
Factors associated with depressive symptoms, anxiety symptoms, and stress of internship doctors.

Variables	Depressive symptoms			Anxiety symptoms			Stress		
	Yes	No	*p*	Yes	No.	*p*	Yes	No	*p*
Sex									
Female	110 (34.9%)	205 (65.1%)	0.115*	147 (46.7%)	168 (53.3%)	0.105*	68 (21.6%)	247 (78.4%)	0.076*
Male	45 (27.8%)	117 (72.2%)		63 (38.9%)	99 (61.1%)		24 (14.8%)	138 (85.2%)	
Status									
Married	8 (20.0%)	32 (80.0%)	0.075*	13 (32.5%)	27 (67.5%)	0.122*	5 (12.5%)	35 (87.5%)	0.246
Single	148 (33.8%)	290 (66.2%)		198 (45.2%)	240 (54.8%)		88 (20.1%)	350 (79.9%)	
Living with									
Alone	29 (38.2%)	47 (61.8%)	0.263	38 (50.0%)	38 (50.0%)	0.263	17 (22.4%)	59 (77.6%)	0.485
Not alone	127 (31.6%)	275 (68.4%)		173 (43.0%)	229 (57.0%)		76 (18.9%)	326 (81.1%)	
Family member working as health care worker									
No	109 (33.4%)	217 (66.6%)	0.520	147 (45.1%)	179 (54.9%)	0.491	68 (20.9%)	258 (79.1%)	0.202
Yes	46 (30.5%)	105 (69.5%)		63 (41.7%)	88 (58.3%)		24 (15.9%)	127 (84.1%)	
COVID-19 history									
No	132 (35.0%)	245 (65.0%)	0.032*	174 (46.2%)	203 (53.8%)	0.087*	82 (21.8%)	295 (78.2%)	0.014*
Yes	24 (23.8%)	77 (76.2%)		37 (36.6%)	64 (63.4%)		11 (10.9%)	90 (89.1%)	
Family member admitted due to COVID-19									
No	108 (40.1%)	161 (59.9%)	0.000*	141 (52.4%)	128 (47.6%)	0.000*	67 ((24.9%)	202 (75.1%)	0.001*
Yes	48 (23.0%)	161 (77.0%)		70 (33.5%)	139 (66.5%)		26 (12.4%)	183 (87.6%)	
Province of internship									
Java Bali	113 (37.3%)	190 (62.7%)	0.004*	145 (47.9%)	158 (52.1%)	0.032*	70 (23.1%)	233 (60.5%)	0.008*
Other than Java Bali	43 (24.6%)	132 (75.4%)		66 (37.7%)	109 (62.3%)		23 (13.1%)	152 (86.9%)	
Health care facilities									
Primary health care	28 (36.8%)	48 (63.2%)	0.020*	33 (43.4%)	43 (56.8%)	0.144*	17 (22.4%)	59 (77.6%)	0.161*
Hospital	26 (47.3%)	29 (52.7%)		31 (56.4%)	24 (43.6%)		15 (27.3%)	40 (72.7%)	
Both	101 (29.2%)	245 (70.8%)		146 (42.2%)	200 (57.8%)		60 (17.3%)	286 (82.7%)	
Type of hospital									
Type A	7 (58.3%)	5 (41.7%)	0.058*	8 (66.7%)	4 (33.3%)	0.072*	4 (33.3%)	8 (66.7%)	0.169*
Type B	46 (26.7%)	126 (73.3%)		65 (37.8%)	107 (62.2%)		25 (14.5%)	147 (85.5%)	
Type C	93 (35.5%)	169 (64.5%)		125 (47.7%)	137 (52.3%)		57 (21.8%)	205 (78.2%)	
Type D	9 (29.0%)	22 (71.0%)		12 (38.7%)	19 (61.3%)		6 (19.4%)	25 (80.6%)	
Night Shift									
No.	16 (29.1%)	39 (70.9%)	0.567	23 (41.8%)	32 (58.2%)	0.726	9 (16.4%)	49 (83.6%)	0.559
Yes	139 (32.9%)	283 (67.1%)		187 (44.3%)	235 (55.7%)		83 (19.7%)	339 (80.3%)	
Working place									
Ward	107 (33.6%)	211 (66.4%)	0.447	46 (45.9%)	172 (54.1%)	0.241*	60 (18.9%)	258 (81.1%)	0.743
Emergency	146 (32.2%)	307 (67.8%)	0.591	199 (43.9%)	254 (56.1%)	0.855	86 (19.0%)	367 (81.0%)	0.467
COVID-19 ward	30 (37.5%)	50 (52.5%)	0.295	47 (58.8%)	33 (41.3%)	0.004*	15 (18,8%)	65 (81.3%)	0.894
ICU	33 (43.4%)	43 (56.6%)	0.027*	48 (63.2%)	28 (36.8%)	0.000*	21 (27.6%)	55 (72.4%)	0.045*
Outpatient clinic	2 (20.0%)	8 (80.0%)	0.609	4 (40.0%)	6 (60.0%)	0.796	2 (20.0%)	8 (80.0%)	0.954
Triage	51 (45.5%)	61 (54.5%)	0.001*	66 (58.9%)	46 (41.1%)	0.000*	33 (29.5%)	79 (70.5%)	0.002*
Concerns in hospital									
Personal protective equipment availability									
Not available at all	6 (60.0%)	4 (40.0%)	0.000*	6 (60.0%)	4 (40.0%)	0.000*	4 (40.0%)	6 (60.0%)	0.000*
Available for suspected positive patients	38 (49.4%)	39 (50.6%)		48 (62.3%)	29 (37.7%)		24 (31.2%)	53 (68.8%)	
Available for invasive procedure only	13 (46.4%)	15 (53.6%)		16 (57.1%)	12 (42.9%)		8 (28.6%)	20 (71.4%)	
Available sometimes for invasive procedure only	15 (46.9%)	17 (53.1%)		21 (65.6%)	11 (34.4%)		11 (34.4%)	21 (65.6%)	
Available whenever required	66 (22.8%)	223 (77.2%)		99 (34.3%)	190 (65.7%)		34 (11.8%)	255 (88.2%)	
N95 masker availability									
Not available at all	27 (52.9%)	24 (47.1%)	0.000*	33 (64.7%)	18 (35.3%)	0.000*	15 (29.4%)	36 (70.8%)	0.000*
Available for suspected positive patients	42 (50.0%)	42 (50.0%)		52 (61.9%)	32 (38.1%)		26 (31.0%)	58 (69.0%)	
Available for invasive procedure only	12 (36.4%)	21 (63.6%)		15 (45.5%)	18 (54.5%)		10 (30.3%)	23 (69.7%)	
Available sometimes for invasive procedure only	16 (45.7%)	19 (54.3%)		22 (62.9%)	13 (37.1%)		8 (22.9%)	27 (77.1%)	
Available whenever required	41 (17.4%)	194 (82.6%)		68 (28.9%)	167 (71.1%)		22 (9.4%)	213 (90.6%)	
Training in donning and doffing of PPE									

(*continued on next page*)

Table 4 (*continued*)

Variables	Depressive symptoms			Anxiety symptoms			Stress		
	Yes	No	*p*	Yes	No.	*p*	Yes	No	*p*
No	71 (24.7%)	217 (75.3%)	0.000*	111 (38.5%)	177 (61.5%)	0.006*	46 (16.0%)	242 (84.0%)	0.056*
Yes	66 (44.3%)	83 (55.7%)		78 (52.3%)	71 (47.7%)		35 (25.3%)	114 (76.5%)	
Difficulty to practice physical distancing at work place									
Not difficult	37 (17.5%)	175 (82.5%)	0.000*	62 (29.2%)	150 (70.8%)	0.000*	23 (10.8%)	189 (89.2%)	0.000*
Difficult	101 (44.7%)	125 (55.3%)		128 (56.6%)	98 (43.4%)		58 (25.7%)	168 (74.3%)	
Hesitancy to attend patients									
No.	90 (28.4%)	227 (71.6%)	0.014*	131 (41.3%)	186 (58.7%)	0.105*	51 (16.1%)	266 (83.9%)	0.026*
Yes	48 (40.7%)	70 (59.3%)		59 (50.0%)	59 (50.0%)		30 (25.4%)	88 (74.6%)	
Needs for all admitted patients to undergo COVID-19 testing									
No.	22 (24.7%)	67 (75.3%)	0.124*	31 (34.8%)	58 (65.2%)	0.076*	12 (13.5%)	77 (86.5%)	0.178*
Yes	113 (33.2%)	227 (66.8%)		154 (45.3%)	186 (94.7%)		67 (19.7%)	273 (80.3%)	
Concerns in primary health care									
Personal protective equipment availability									
Not available at all	14 (45.2%)	17 (54.8%)	0.000*	15 (48.4%)	16 ((51.6%)	0.000*	9 (29.0%)	22 (71.0%)	0.004*
Available for suspected positive patients	39 (39.8%)	59 (60.2%)		47 (48.0%)	51 (52.0%)		23 (23.5%)	75 (76.5%)	
Available for invasive procedure only	13 (37.1%)	22 (62.9%)		18 (51.4%)	17 (48.6%)		8 (22.9%)	27 (77.1%)	
Available sometimes for invasive procedure only	13 (37.1%)	22 (62.9%)		22 (73.3%)	8 (26.7%)		9 (30.0%)	21 (70.0%)	
Available whenever required	17 (56.7%)	13 (43.3%)		80 33.5%)	159 (66.5%)		27 (11.3%)	212 (88.7%)	
N95 masker availability									
Not available at all	48 (46.6%)	55 (53.4%)	0.000*	58 (56.3%)	45 (43.7%)	0.000*	24 (23.3%)	79 (76.7%)	0.005*
Available for suspected positive patients	38 (27.7%)	99 (72.3%)		58 (42.3%)	79 (57.7%)		20 (14.6%)	117 (85.4%)	
Available for invasive procedure only	14 (35.9%)	25 (64.1%)		19 (48.7%)	20 (51.3%)		12 (28.0%)	27 (72.0%)	
Available sometimes for invasive procedure only	12 (48.0%)	13 (52.0%)		15 (60.0%)	10 (40.0%)		7 (28.0%)	18 (72.0%)	
Available whenever required	20 (15.5%)	109 (84.5%)		32 (24.8%)	97 (75.2%)		13 (10.1%)	116 (89.9%)	
Training in donning and doffing of PPE									
No.	87 (26.4%)	242 (73.6%)	0.001*	126 (38.3%)	203 (61.7%)	0.005*	50 (15.2%)	279 (84.8%)	0.022*
Yes	45 (43.3%)	59 (56.7%)		56 (53.8%)	48 (46.2%)		26 (25.0%)	78 (75.0%)	
Difficulty to practice physical distancing at work place									
Not difficult	40 (17.9%)	184 (82.1%)	0.000*	64 (28.6%)	160 (71.4%)	0.000*	23 (10.3%)	201 (89.7%)	0.000*
Difficult	92 (44.0%)	117 (56.0%)		118 (56.5%)	91 (43.5%)		53 (25.4%)	156 (74.6%)	
Hesitancy to attend patients									
No.	92 (28.1%)	234 (71.9%)	0.054*	133 (40.7%)	194 (59.3%)	0.280	49 (15.0%)	278 (85.0%)	0.012*
Yes	40 (38.1%)	65 (61.9%)		49 (46.7%)	56 (53.3%)		27 (25.7%)	78 (74.3%)	
Needs for all admitted patients to undergo COVID-19 testing									
No.	26 (22.2%)	91 (77.8%)	0,021*	39 (33.3%)	78 (66.7%)	0.025*	13 (11.1%)	104 (88.9%)	0.028*
Yes	105 (33.8%)	206 (66.2%)		141 (45.3%)	170 (54.7%)		63 (20.3%)	(79.7%)	

* p-value < 0.25 for variables that will be entered into the logistic regression model.

(Magnavita et al., 2021a).

The frequency of mental health problems in health care workers was different between countries. The frequencies in our study seem to resemble studies in China, Spain and Italy, but they were higher than in Singapore. A review stated that the frequency of mental health problems might not be the same in many countries, depending on the availability of health care workers (Luceño-Moreno et al., 2020; Spoorthya et al., 2020). Indonesia has a ratio of physicians per 1000 population of 0.46, Singapore, on the other hand, has a ratio of physicians per 1000 population of 2.5 (Mahendradhata et al., 2017; Ministry of Health Singapore, 2019). It means that one physician in Indonesia has to provide care for population four times than in Singapore, thus the workload, especially in the era of the pandemic, would be higher.

Many demographic factors and concerns of internship doctors were associated with their mental health on bivariate analysis, such as family member admitted due to COVID-19, working in the COVID-19 ward, ICU, and triage, shortage of PPE and N95 mask, lack of training in donning and doffing of PPE, difficulty to maintain physical distancing, and needs for all admitted patients to undergo COVID-19 testing. After adjusting to covariates in multivariate analysis, we found that female sex was associated with depressive symptoms, working in triage with depressive symptoms and stress, working in ICU with anxiety symptoms. Other significant factors associated with the mental health of internship doctors were mostly their concerns about getting infected with COVID-19, which are training in donning and doffing of PPE, difficulty to practice physical distancing, and hesitancy to attend patients. A study in China found that female health care workers were associated with depression in health care workers (OR 1.94; 95% CI 1.26–2.98; $p =$

Table 5
Factors associated with depressive symptoms, anxiety symptoms, and stress of internship doctors identified by multivariate logistic regression analysis.

Variables	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.
Depressive symptoms							
Female	0.611	0.275	4.960	1	0.026	1.843	1.076–3.156
Working place – Triage	0.577	0.276	4.366	1	0.037	1.780	1.036–3.057
Training in donning and doffing of PPE in hospital	−0.877	0.257	11.612	1	0.001	0.416	0.251–0.689
Difficulty to practice physical distancing at work place in hospital	0.889	0.297	8.960	1	0.003	2.432	1.359–4.353
Hesitancy to attend patients in hospital	0.554	0.271	4.189	1	0.041	1.741	1.024–2.961
Difficulty to practice physical distancing at work place in primary health care	0.805	0.291	7.643	1	0.006	2.236	1.264–3.957
Constant	−2.009	0.342	34.446	1	0.000	0.134	
Anxiety symptoms							
Working place – ICU	0.954	0.291	10.736	1	0.001	2.596	1.467–4.594
Training in donning and doffing of PPE in hospital	−0.565	0.237	5.673	1	0.017	0.568	0.357–0.905
Difficulty to practice physical distancing at work place in hospital	0.865	0.262	10.949	1	0.001	2.376	1.423–3.967
Difficulty to practice physical distancing at work place in primary health care	0.764	0.261	8.575	1	0.003	2.147	1.287–3.579
Constant	−1.313	0.297	19.553	1	0.000	0.269	
Stress							
Working place – Triage	0.676	0.239	7.976	1	0.005	1.965	1.230–3.141
Difficulty to practice physical distancing at work place in hospital	1.099	0.205	28.673	1	0.000	3.001	2.007–4.487
Constant	−1.024	0.160	40.824	1	0.000	0.359	

0.003) (Jianbo et al., 2020). Magnavita et al. (2020a) also found that female sex was significantly associated with depression in health care workers ($p = 0.019$). Our study also showed a similar association between female sex with depressive symptoms. It is suggested that female has a more sensitized hypothalamus-pituitary axis than male (Buselli et al., 2020).

A study in United Kingdom showed that history of COVID-19 is associated with an increased risk of post traumatic stress disorders, depression, and anxiety (Greene et al., 2021). In this study the frequency of depressive symptoms, anxiety symptoms and stress in internship doctors who had no history of COVID-19 were higher compared to those who had history or hospitalized for COVID-19. As COVID-19 vaccination program for health care workers in Indonesia were started in the end of Januari 2021, it is likely that the internship doctors had not been vaccinated at the time of this study. It is possible that internship doctors who no history of COVID-19 might be more anxious compared to those who have sufferred from COVID-19, based on the thought that infection would generate natural antibodies.

A substantial number of health care workers were dedicated to providing care for COVID-19 patients in health care facilities, and the rest of the health care workers would carry more workload in caring for non-COVID-19 patients. Health care workers that provide and did not provide care for COVID-19 patients experienced the same level of mental health problems. Milgrom et al. (2020), in their study in Israel, found that on multivariate analysis, health care workers in COVID-19 treating hospitals had the same level of anxiety compared to health care workers in non-COVID-19 treating hospitals. They suggested that health care workers who did not provide care for COVID-19 patients still have the possibility to be exposed to asymptomatic or undiagnosed COVID-19 patients (Milgrom et al., 2020). A study in China found that 77.5% of health care workers admitted due to COVID-19 were working in general wards, and the source of infection was an asymptomatic COVID-19 patient in the surgical department with abdominal complaints (Wang et al., 2020). These would explain our findings that internship doctors' concerns were the most factors associated with depressive symptoms, anxiety symptoms, and stress. It would also explain the association of working in triage with depressive symptoms and stress, and working in ICU with anxiety symptoms, and not working in the COVID-19 ward.

To address the mental health problems of internship doctors in Indonesia, all of these concerns must be dealt with. To deal with their concerns, we consider two approaches. Firstly, all procedures needed for maximum protection for every health care worker, including internship doctors in the pandemic era, have to be implemented in all health care facilities. To implement those procedures, PPEs have to be available, and health care workers have to be well trained in donning and doffing of PPE. All admitted patients should undergo COVID-19 testing to determine the level of protection for health care workers. To practice physical distancing, health care facilities have to provide sufficient space for COVID-19 and non-COVID-19 patients. To provide these require the nation's massive resources and budget that is difficult in the pandemic era, as the severe global economic crisis has caused a recession in some nations and depression in others. Secondly, the medical schools have to prepare their students such as incorporating SARS-CoV-2 infection and COVID-19 in the curriculum, including the most updated knowledge on the methods and prevention of transmission, the practice of donning and doffing of PPE from the earliest year, providing continuing online educational courses on COVID-19 and also psychological support and peer group support for the new graduates, or facilitating internship in their own medical schools' hospital. Safety training is an important element for the mental health of health care workers, as shown in a study conducted on health care workers on the front lines attending COVID-19 patients (Magnavita et al., 2020b). Moreover, young doctors in training such as internship doctors, having been trained like other health professionals, perceive less informational justice, which can lead to increased occupational stress (Magnavita et al., 2021b). The second approach requires less resources and budget but would help to overcome mental health problems encountered by internship doctors.

4.1. Limitation

Like other cross sectional study, there are limitations in our study. Firstly the modest sample size that could not be generalized to all of the internship doctors in Indonesia, and difficulties to collect data of the internship doctors' mental health previous to the pandemic. The second limitation is the self-reported tools of mental health are not always in alignment with the psychiatric assessment. The third limitation is that the data collection was done in January 2021, 9 months after the pandemic started, so there would be some recall bias to different batches of internship doctors, i.e., May, August, November 2019, and February, May, August, November 2020. Given these limitations, we believe that our study gives valuable data on the mental health of internship doctors in Indonesia in the era of the COVID-19 pandemic. To the best of our knowledge, there has been no national study on mental health and its association with demographic data and concerns of new medical graduates.

5. Conclusion

Internship doctors in Indonesia had a high frequency of depressive symptoms, anxiety symptoms, and stress, and these mental health problems have to be tackled immediately. It is very important to address

their mental health to avoid burnout and prepare next medical graduates batches to join the battle. Mental health problems of internship doctors were associated with their concerns. Medical schools have an important role in preparing medical students for this pandemic and supporting new graduates in overcoming their concerns, thus minimizing the mental health problems of internship doctors.

Author's statement

We follow the Uniform Requirements set out by the International Committee of Medical Journal Editors (www.icmje.org) for authorship. By submitting this manuscript, each of the authors indicates that he or she has had full access to all data in this study and takes complete and public responsibility for the integrity of the data and the accuracy of the data analysis.

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CRediT authorship contribution statement

Nata Pratama Hardjo Lugito: Conceptualization, Visualization, Funding acquisition, Data curation, Writing – original draft, Writing – review & editing, Formal analysis, Supervision. **Andree Kurniawan:** Writing – review & editing, Formal analysis, Supervision. **Jane Olivia Lorens:** Funding acquisition, Data curation, Writing – original draft, Formal analysis. **Novia Lauren Sieto:** Funding acquisition, Data curation, Writing – original draft, Formal analysis.

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