

Original Research Article

An overview of Indonesian doctors in combating COVID-19

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Received: 01 July 2022

Revised: 14 July 2022

Accepted: 15 July 2022

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ABSTRACT

Background: Indonesia's COVID-19 pandemic is putting a strain on the ability of health systems around the world to adapt and maintain sustainable performance. Indonesia has had more than four million cases of the disease and more than 141 thousand deaths in Indonesia. The hospital, along with other healthcare facilities, contributes to providing comprehensive individual health care in outpatient, inpatient, and emergency settings. Changes in facilities for patient accommodation, and acquisition of personal protective equipment (PPE) are all going through substantial changes. As doctors and health workers continue to work on this case every day while out in the field, many of their colleagues become ill and some die as a result. The aim of the study was intended to provide an overview of the conditions faced by doctors in Indonesia in dealing with COVID-19.

Methods: The researchers surveyed the situation of 270 Indonesian doctors and specialists working during the COVID-19 pandemic. The questionnaires adapted from the WHO risk assessment tool for healthcare workers were translated into Bahasa Indonesia and distributed from April 2021 to May 2021 using a retrospective study.

Results: Most respondents were female (61.5%) with an average age of 27.7. Forty respondents (14.8%) had a history of COVID-19.

Conclusions: Based on compliance with using PPE and compliance with washing hands, doctors in Indonesia had a low risk of contracting COVID-19 from the healthcare facility environment. Even so, a correlation was found between the history of COVID-19 and happiness at work.

Keywords: COVID-19, Doctor, Healthcare facilities, Hand hygiene, Personal protective equipment

INTRODUCTION

The global spread of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has profoundly influenced daily life and health care systems worldwide, including in Indonesia. Compared to the 2003 severe acute respiratory syndrome (SARS) epidemic, the disease's effects and manifestations are more severe, with more than four million cases of corona virus disease 2019 (COVID-19) and more than 141 thousand deaths in Indonesia.^{1,2} Data from COVID-19 mitigation teams of the Indonesian doctors association (IDI)'s social media stated that 730

doctors died until 07 September 2021.³ This figure is among the highest in the world. The hospital, along with other healthcare facilities, contributes to providing comprehensive individual health care in outpatient, inpatient, and emergency settings.⁴

In the early stages of the pandemic, nearly all medical facilities, from primary care to private and public tertiary services, undertook various preparations and adaptations and carried out a variety of pandemic survival measures. It appears that the pandemic is putting a strain on the ability of health systems around the world to adapt and maintain

sustainable performance.⁵ Operations, logistics, organizational management capabilities with morality, health workers and all elements linked to health workers, trained health worker organizations for emergency conditions, changes in facilities for patient accommodation, acquisition of personal protective equipment (PPE), management information and communication, continuous monitoring of the health service system, and more are all going through substantial changes.⁶ The Hospital Accreditation Standards declare that hand hygiene, barrier strategies, and disinfection supplies are key tools for effective infection prevention and control.⁷

In the middle of the fast-escalating COVID-19 outbreak, numerous frontline healthcare professionals contracted the disease, with several falling gravely ill. While some management guidelines for COVID-19 patients incorporate psychological and emotional care for patients and their families, there is little information on caring for co-workers who catch the disease. Local and international medical literature indicated frequent accounts of healthcare workers (HCW) suffering from anxiety, stress, and depression owing to COVID-19.⁸⁻¹¹ For doctors, healthcare workers, and the general public in Indonesia, this issue has become a new source of concern. As doctors and healthcare workers continue to work on this case every day while out in the field, many of their colleagues become ill, and some die as a result. The aim of the study was to overview Indonesian doctors working during the COVID-19 pandemic.

METHODS

Participant characteristics and research design

There was a total of 463 respondents in this survey. The inclusion criteria were physicians who actively worked in a health facility for at least one year during a COVID-19 epidemic. Meanwhile, the exclusion criterion consisted of physicians who refused to complete the questionnaire. This research is a descriptive study with a quantitative method approach. This study employed a descriptive survey using an online form to describe the risk of exposure to COVID-19 among Indonesian HCWs. The survey collected information regarding the general characteristic of respondents, professional and workplace characteristics, infection prevention and control compliance, and social characteristic of the respondents. The survey focused on the comorbidities of the respondents, the availabilities of infection prevention and control (IPC) programs and PPE across healthcare facilities, and whether the respondents had any risk of getting infected outside workplaces.

Sampling procedures

This study employed purposive sampling. Settings and locations were all over Indonesia from 05 April 2021 until 19 July 2021.

Sample size, power, and precision

The sampling was all over Indonesia. The instrument in this study used a questionnaire adopted from the WHO which had been translated. This study uses a research instrument in the form of a questionnaire with a Microsoft form.

Measures and data collection

The researchers conducted retrospective cohort studies among all HCWs who worked during the COVID-19 pandemic across all healthcare facilities in Indonesia using the Microsoft Forms platform from 05 April to 19 July 2021 through online social media. Social media such as WhatsApp, Line, Telegram, Instagram, Twitter, and Facebook are used to reach HCWs all over Indonesia. Questionnaires were adapted from the WHO risk assessment tool for HCWs and translated into Bahasa Indonesia.¹²

Data analysis

To identify the tendency of each score for behaviors on PPE and hand hygiene, the average ideal score of all research subjects was used as a comparison criterion. The tendency of each variable was then divided into four categories based on the normal curve using the ideal score. The 1.5 SD interval distance determination was based on the theoretical normal distribution, which is 6 SD apart. By determining the grouping into four categories, the distance of each group became 6:4=1.5 SD.

Personal protective equipment (PPE) usage variable

$$\begin{aligned} \text{Average ideal score (Mi)} \\ &= 1/2 \{ \text{max score} + \text{min score} \} \\ &= 1/2 \{ 20 + 4 \} = 12.0 \end{aligned}$$

$$\begin{aligned} \text{Ideal standard deviation (SDi)} \\ &= 1/6 \{ \text{max score} - \text{min score} \} \\ &= 1/6 \{ 20 - 4 \} = 2.7 \end{aligned}$$

$$\text{Ideal class length (Pi)} = 1.5 \text{ SDi} = 1.5 \times 2.7 \approx 4.0$$

Based on these ideal average and standard deviation values, the score for the use of PPE is divided into four categories (Table 1).

Hand hygiene variable

$$\begin{aligned} \text{Average ideal score (Mi)} \\ &= 1/2 \{ \text{max score} + \text{min score} \} \\ &= 1/2 \{ 25 + 5 \} = 15.0. \end{aligned}$$

$$\begin{aligned} \text{Ideal standard deviation (SDi)} \\ &= 1/6 \{ \text{max score} - \text{min score} \} \\ &= 1/6 \{ 25 - 5 \} = 3.3 \end{aligned}$$

Table 1: Scoring criterion for doctor's behavior on personal protective equipment usage.

SD	Score	Score	Category
$\geq M+1.5 SD$	$\geq 12+4$	≥ 16	High
$M-M+1.5 SD$	$12 - 12+4$	$12-16$	Sufficient
$M-1.5 SD-M$	$12-4 - 12$	$8-12$	Less
$\leq M-1.5 SD$	$\leq 12-4$	≤ 8	Low

$$Seam\ length\ (Pi) = 1.5\ SDi = 1.5 \times 3.3 \approx 5.0$$

Based on these ideal average and standard deviation values, hand washing scores are divided into four categories (Table 2).

Table 2: Scoring criterion for doctor's behavior on hand hygiene.

SD	Score	Score	Category
$\geq M+1.5 SD$	$\geq 15+5$	≥ 20	High
$M-M+1.5 SD$	$15 - 15+5$	$15-20$	Sufficient
$M-1.5 SD-M$	$15-5 - 15$	$10-20$	Less
$\leq M-1.5 SD$	$\leq 15-5$	≤ 10	Low

Also, survey findings were exported to IBM statistical package for the social sciences (SPSS) statistics version 28 and evaluated. This study employed univariate and bivariate analysis. The univariate analysis used frequency distribution tables to explain all variables. The bivariate analysis used Pearson's correlation test to measure the strength and direction of association between two variables. $P < 0.05$ was considered to be statistically significant. All participants were guaranteed confidentiality.

RESULTS

Study population characteristics

Two hundred seventy (270) doctors answered the questionnaire. Among them, 40 (14.8%) have been diagnosed with COVID-19, and 230 (85.2%) have never been diagnosed with COVID-19 during the pandemic. There were 104 (38.5%) men and 166 (61.5%) women who responded. Among them, 14 (5.5%) men and 26 (9.6%) women have been diagnosed with COVID-19. The average age of the respondents is 37.7 years, with the lowest age being 21 years and the highest age being 73 years. The most age range ever suffered from COVID-19 is 31 to 40 years with 14 (5.2%) respondents (Table 3). Thirteen (4.8%) people who had suffered from COVID-19 had a level I obesity status, followed by 12 (4.4%) people who had overweight status. Of the 270 doctors, 37 (12.5%) suffered from hypertension, and 9 doctors (3.0%) suffered from COVID-19. A total of 234 (86.7%) doctors had received the full dose of the vaccine, followed by 25 (9.3%) who had not received the vaccine, and 11 (4.1%) had just received the first dose.

One hundred and thirty-nine (139) (51.5%) had bachelor's degrees or professional education, 118 (43.7%) had master's degrees or specialist 1, and 13 (4.8%) had doctoral degrees or specialist 2. The group with the most people who had suffered from COVID-19 was the group of respondents with the most recent education of master's degree or specialist 1, with a total of 21 (7.8%). Most survey respondents work as doctors with 105 (38.9%), followed by specialists with 100 (37.0%). Of this number, doctors and specialists have the same number of respondents who suffered from COVID-19, 17 (6.3%) (Table 3).

Doctor's comorbidity

Of 270 respondents, 99 (36.7%) had comorbid, mostly 31 to 40 years old (11.5%). Eighty (80) (29.6%) of them had one comorbid, 12 (4.4%) had two comorbid, 6 (2.2%) had three comorbid, and 1 (0.4%) had more than three comorbid. The most common comorbidity suffered by respondents was obesity, with 122 respondents (45.2%). Thirty-seven (37) respondents (13.7%) had hypertension, and 10 (3.7%) of them admitted that they had diabetes mellitus. Thirteen (4.8%) respondents had a smoking history.

Healthcare facilities

Most respondents work in Daerah Istimewa Yogyakarta 95 (35.2%) and Central Java 95 (35.2%) (Figure 1). Most respondents work in one healthcare facility, with 128 (47.4%) respondents, with the most workplaces being three health facilities. Most of them were in type C hospitals, with 139 respondents from a total of 485 healthcare facilities (29.0%), and 22 (5.0%) of them had suffered from COVID-19 (Figure 2). The respondents mostly work in outpatient unit, with 181 (35.1%) respondents from 516 units.

Also, most of the respondents that had suffered from COVID-19 were from outpatient unit, with 32 (6.2%) respondents. The second most employed place is the emergency room with 112 (21.7%). Among them, 15 respondents (2.9%) had suffered from COVID-19 (Figure 3).

Doctor's behaviour on personal protective equipment usage

Among 270 respondents, 189 (70.0%) replaced their protective equipment during their work shift. Most of the 101 (53.0%) respondents replaced their protective equipment every 4 until 8 hours. However, 32 (12.0%) of them had suffered from COVID-19.

Using and removing personal protective equipment or donning and doffing personal equipment training had been attended by 183 (68.0%) respondents, with 28 (10.0%) diagnosed with COVID-19 (Table 4).

Table 3: Respondents' characteristics.

Variables	COVID-19		Non-COVID-19		Total	
	N	%	N	%	N	%
Gender						
Men	14	5.2	90	33.3	104	38.5
Women	26	9.6	140	51.9	166	61.5
Age (years)						
21-30	12	4.4	77	28.5	88	32.6
31-40	14	5.2	81	30.0	95	35.2
41-50	10	3.7	35	13.0	46	17.0
51-60	1	0.4	21	7.8	22	8.1
61-70	3	1.1	15	5.6	18	6.7
71-80	0	0.0	1	0.4	1	0.4
Recent education						
Bachelor or profession	17	6.3	122	45.2	139	51.5
Magister or specialization 1	21	7.8	97	35.9	118	43.7
Doctoral or specialization 2	2	0.7	11	4.1	13	4.8
Profession						
Clerkship	1	0.4	18	6.7	19	7.0
Internship	2	0.7	7	2.6	9	3.3
General practitioner	17	6.3	88	32.6	105	38.9
Residency	3	1.1	34	12.6	37	13.7
Specialist	17	6.3	83	30.7	100	37.0

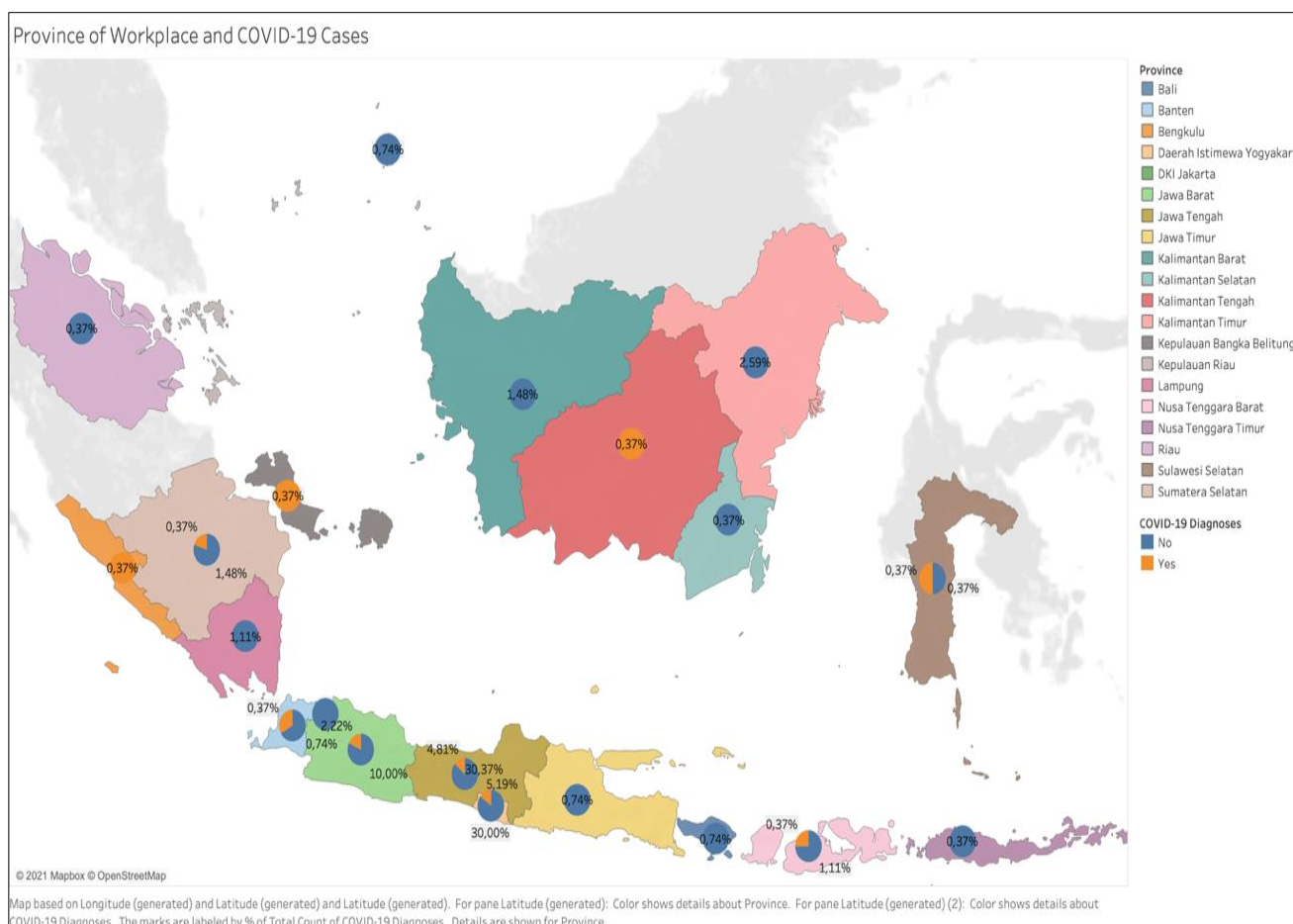


Figure 1: Map of COVID-19 infections on doctors based on province in Indonesia (the figure is made based on the respondent's history of COVID-19 infection using the Tableau tool).

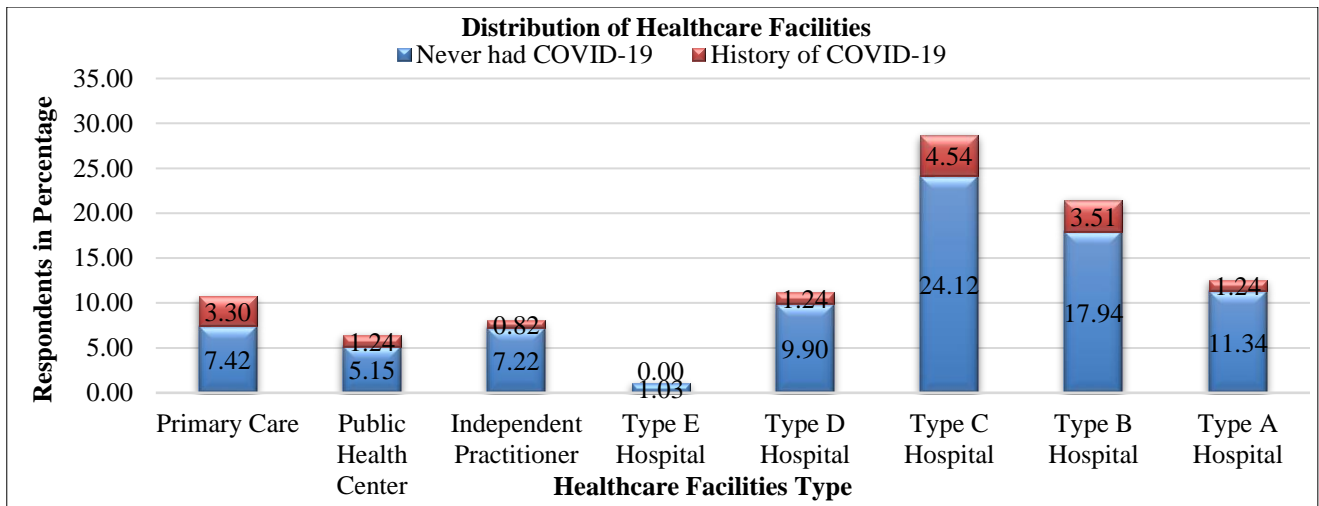


Figure 2: Distribution of healthcare facilities.

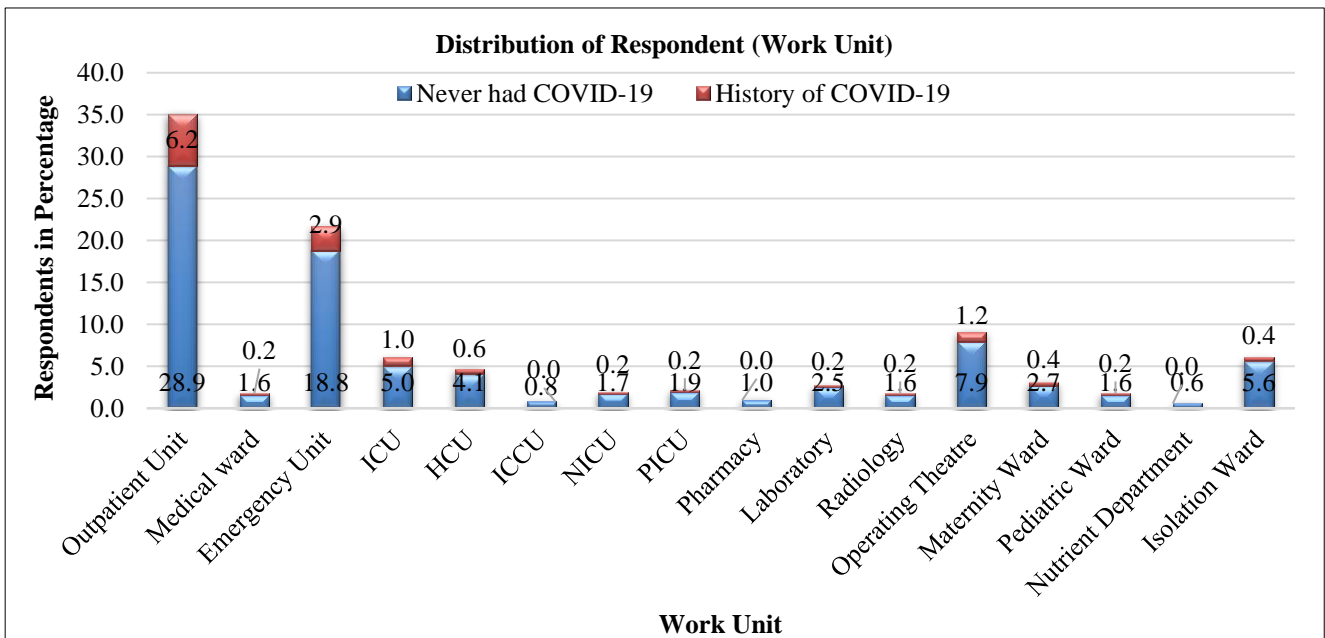


Figure 3: Distribution of respondents' work unit.

Table 4: Personal protective equipment (PPE) behaviour on respondents.

Variable	COVID-19		Non-COVID-19		Total	
	Frequency	(%)	Frequency	(%)	Frequency	(%)
Replace PPE	(N=40)		(N=230)		(N=270)	
Yes	32	11.9	157	58.1	189	70.0
No	8	3.0	73	27.0	81	30.0
Replace PPE every hour	(N=32)		(N=157)		(N=189)	
<2	2	1.1	10	5.3	12	6.3
2-4	10	5.3	41	21.7	51	27.0
4-8	15	7.9	86	45.5	101	53.4
>8	5	2.6	20	10.6	25	13.2
Training on procedures for using and removing (donning and doffing) and disposal of PPE	(N=40)		(N=230)		(N=270)	
Yes	28	10.4	155	57.4	183	67.8
No	12	4.4	75	27.8	87	32.2

Average scores for PPE usage on respondents are 16.8. This result indicated that, generally, doctors had high compliance with using PPE in the COVID-19 setting. No respondent was in the low compliance category based on the predetermined category. Five (1.9%) respondents were included in the less compliance category, 67 (24.8%) respondents were included in the sufficient compliance category, and 198 (73.3%) respondents had a high compliance category (Table 5). The correlation test with the chi-square test showed no correlation ($r=-0.013$ $p=0.837$) between the risk of contracting COVID-19 based on PPE usage with a history of COVID-19 infection.

Table 5: Frequency distribution of personal protective equipment (PPE) usage score.

No	Category (score)	Total	Percentage (%)
1	High (16-20)	198	73.3
2	Sufficient (12-16)	67	24.8
3	Less (8-12)	5	1.9
4	Low (4-8)	0	0.0

Doctor's behaviour on hand hygiene

All the respondents said that alcohol-based hand rub was provided in their workplaces. According to the WHO recommendation, most respondents admit that they mostly wash their hands. 196 (72.6%) of respondents always wash their hands following the recommendation, 64 (23.7%) frequently wash their hands following the recommendation, and 10 (3.7%) occasionally wash their hands following the recommendation. 32 (11.9%) of those who always wash their hands according to the WHO recommendation and 8 (2.9%) of those who occasionally wash their hands according to the WHO recommendation have a history of COVID-19. The average scores for hand hygiene among respondents are 24.1. This result indicates that doctors had high compliance with hand hygiene in the COVID-19 setting generally. Based on the predetermined

category, there was no respondent in the low and less compliance category. 4 (1.5%) respondents were included in the sufficient category, and 266 (98.5%) respondents had a high compliance category (Table 6). No correlation was found ($r=0.051$ $p=0.403$) between hand hygiene behaviour and history of COVID-19 diagnosis.

Table 6: Frequency distribution of hand hygiene score.

No	Category (score)	Total	Percentage (%)
1	High (20-25)	266	98.5
2	Sufficient (15-20)	4	1.5
3	Less (10-15)	0	0.0
4	Low (5-10)	0	0.0

Doctor's comfort, happiness, anxiety, fear, and stress when working in pandemics era

The majority of the respondents, 193 (71.5%), felt discomfort when working during the pandemic. Thirty-two (32) (11.9%) of them had a history of COVID-19. One hundred and eighty-one (181) (67.0%) felt anxious at work, and 26 (9.6%) had a history of COVID-19. One hundred and fifty-seven (157) (58.1%) felt afraid when working, and 21 (7.8%) had a history of COVID-19. One hundred and eighty-six (186) (68.9%) were unhappy when working during the pandemic, and 33 (12.2%) had ever been diagnosed with positive COVID-19. However, most respondents were not stressed at work, with 173 (64.1%) respondents answering they did not feel stressed at work. Twenty-seven respondents (1.0%) had a history of COVID-19 (Table 7). No correlation was found between work discomfort ($r=-0.079$ $p=0.196$), anxiety ($r=-0.018$ $p=0.767$), fear ($r=-0.048$ $p=0.433$), and stress ($r=-0.030$ $p=0.625$) with history of COVID-19. However, a correlation was found between work happiness ($r=-0.123$ $p=0.044$) and with history of COVID-19.

Table 7: Psychological aspects of doctors when working in pandemics era.

Variables	COVID-19		Non-COVID-19		Total	
	Frequency total	N=40 (%)	N total	N=230 (%)	n total	N=270 (%)
Working comfort						
Yes	8	3.0	69	25.6	77	28.5
No	32	11.9	161	59.6	193	71.5
Happiness at work						
Yes	7	2.6	77	28.5	84	31.1
No	33	12.2	153	56.7	186	68.9
Anxiety at work						
Yes	26	9.6	155	57.4	181	67.0
No	14	5.2	75	27.8	89	33.0
Scared at work						
Yes	21	7.8	136	50.4	157	58.1
No	19	7.0	94	34.8	113	41.9
Stressed at work						
Yes	13	4.8	84	31.1	97	35.9
No	27	10.0	146	54.1	173	64.1

DISCUSSION

From demographic data, most respondents of this study were women (61.5%). The majority of doctors in Indonesia are more likely female. The Indonesian Medical Association data showed that Indonesia had more female doctors than male doctors, 1.4 to 1.¹³ The researchers also found that more females got infected with COVID-19 (9.6%) than males (5.2%). However, the early report in China showed imbalanced data between males and females. A more recent study showed that the number of COVID-19 cases between males and females worldwide is relatively the same.¹⁴⁻¹⁷ In contrast, a study from China showed that the severity and mortality of COVID-19 were both higher in males than females, and COVID-19 claimed the lives of nearly twice as many men as it did women.¹⁸ Also, increased estrogen levels in female COVID-19 patients are expected to boost innate and humoral responses, lowering COVID-19 deaths severity and mortality.¹⁹

In terms of age, most respondents in this study ranged from 31 to 40 years old (35.2%). The majority of doctors in Indonesia are between 31 and 40 years old, as supported by the data from the Indonesian Medical Association.¹³ However, this age group had the most comorbidities, such as hypertension or diabetes mellitus. The researchers found no studies related to comorbidities and increased risk of being infected with COVID-19. However, comorbidities are related to an increased risk of getting a severe case of COVID-19 and mortality, especially in age-related diseases such as hypertension, diabetes mellitus, and cardiovascular disease.²⁰ The death of doctors in Indonesia itself has reached an alarming level. It was recorded that until 03 December 2021, 730 doctors died due to COVID-19.²¹ This situation is quite worrying, considering no sign of the end of the pandemic yet. Doctors and other healthcare workers become vital because they must care for COVID-19 patients.

On the other hand, younger doctors tend to demonstrate higher rates of burnout, especially within the first ten years of their career compared with doctors with more than 30 years of experience.²²⁻²⁴ Burnout is linked to job satisfaction, relationships with co-workers, clinical treatment quality, control over the work environment, and poor career fit in the early-career group.²⁵ This burnout, combined with stress and anxiety due to an increase in the weekly working hours, can affect their quality of life.²⁶

Although Indonesian doctors are permitted to work in a maximum of three healthcare facilities, most respondents only work in one healthcare facility (47.4%). More workplaces mean more working hours for the doctors, making them prone to being overworked. Long shifts, limited resources, demanding patients, medicolegal concerns, fear of disease transmission to family members, insufficient emotional support from family members, and less family time are all factors that contribute to burnout, anxiety, and depression which could affect their quality of

life.^{26,27} The researchers observed that most respondents felt many negative emotions, such as stress, anxiety, fear, discomfort, and unhappiness while working during the pandemic. These feelings are natural because of working during the pandemic. Doctors will feel anxious about their health, fears of infecting family members, fearing social contact, and uncertainty about the outbreak's future path are also common concerns. This research backs up prior research that suggested a sense of loss of control over one's career and personal life is a key factor in starting global psychological distress.²⁸ The fears of infection were well-founded, given the enormous number of frontline healthcare professionals who had been infected with SARS, H1N1, MERS, Ebola, and COVID-19.²⁹⁻³³ However, the researchers found no correlation between stress, anxiety, fear, and comfort with the history of COVID-19 in the respondents. A correlation was found between happiness and the history of COVID-19 infection in respondents.

In general, according to the WHO questionnaire for COVID-19 risk assessment for health professionals, all health workers exposed to COVID-19 patients are at risk of contracting the virus.¹² This danger increases when health personnel do not use PPE to protect themselves against the SARS-CoV-2 virus and do not practice proper hand hygiene. The WHO and the CDC continue to recommend a social distancing program, mask-wearing, and frequent hand washing as the primary methods of preventing COVID-19 infection. Hand hygiene has been practiced in health care settings for a long time, even before COVID-19 was discovered. As a result, while some respondents have not implemented full hand hygiene practices in the five moments of WHO handwashing in health facilities, the overall obedience rate of respondents in this study in washing their hands is quite high, implying that the risk of contracting COVID-19 from poor hand hygiene is very low. In terms of PPE, some first responders still do not use it to protect their patients' health, whether it's masks, gloves, gowns, or face shields. As a result of public panic stockpiling and a lower supply than demand, Indonesia, like most other countries, faced a scarcity of PPE at the start of the pandemic.³³⁻³⁵ However, the situation has improved significantly, with most health facilities providing PPE to doctors and other healthcare employees.

Most respondents worked in a hospital (75.0%), while Indonesia has hospital classification based on its capacity and resources. This classification helps divide the referral system so that the higher type of hospital does not get crowded. Patients with national health insurance can only go to secondary or tertiary hospitals after acquiring a reference letter from their primary care provider and lower-tier hospital. There are various sorts of secondary and tertiary hospitals, including type E, type D, type C, type B, and type A (order from lowest to highest). This sector is based on the hospital's structures and infrastructure and equipment, human resources, and services. Most respondents worked in type C hospitals

(29.0%) due to the highest number of hospitals in Indonesia being type C hospitals.³⁶ Type C hospitals must provide emergency services 24 hours a day, have general medical services like basic medical, oral dentistry, maternal and child health, and family planning, and have basic specialist medical services like internal medicine, child health, surgery, and obstetrics and gynecology, and support specialists' medical services like anesthesiology, radiology, and clinical pathology. At least six general practitioners, two specialists for each basic specialty, and four specialists are present in this class C institution.^{4,37} Also, most of the respondents diagnosed with COVID-19 worked in type C hospitals (5.0%). The majority of them worked in the outpatient unit and emergency department. Probably they had an increased risk of contracting with COVID-19 patients as they had to face most of the patients without proper screening.

During the pandemic, primary health centers' roles focus more on gatekeeping, epidemiological mapping, and prevention than treating COVID-19 cases while providing health services for other diseases.³⁸ If patients have significant COVID-19 symptoms, their primary care physician will be referred to a COVID-19 referral hospital. Patients who do not have COVID-19 symptoms may be referred for other conditions and pass the COVID-19 screening test, putting the health workers in the outpatient unit at risk. In the emergency room, current screening focuses on the patient's temperature and questions that the patient may not answer truthfully to pass the screening causing more exposure to health workers working in outpatient and emergency units.³⁹

This situation happened to the respondents who worked in outpatient and emergency units having a history of being infected with COVID-19. Other units have a lower risk. On average, COVID-19 patients have been screened properly because hospitalized patients need to be tested for a COVID-19 diagnosis so that other health workers can protect themselves properly according to their work unit. Similarly, health workers who treat COVID-19 patients will use better PPE to reduce the infection risk.

This study had several limitations. As conducted via an online survey, the researchers could not confirm the validity of the respondents' answers. Also, due to limited time, the researchers could only cover small portions of doctors in Indonesia. However, this study could hopefully provide an overview of Indonesian doctors working during the COVID-19 pandemic and help reduce the risk of infection in healthcare facilities.

CONCLUSION

In general, doctors in Indonesia had high compliance with using PPE and hand hygiene when working in the COVID-19 pandemic setting. However, as COVID-19 infection is not only when working in healthcare facilities, doctors can be infected in other setting such as their own homes or other public facilities. On the other hand, doctors had a

huge burden in combating this COVID-19 pandemic. This will affect their mental health and will lead to burnout. As this study did not cover this topic in detail, we recommend to the next researcher examine the effects of the COVID pandemic on mental health and fatigue for both doctors and other health workers.

ACKNOWLEDGEMENTS

Authors would like to thank HCWs for their dedication to the patients during the pandemic and for participating in this study.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Yudanto AV, Ulfa M, Wening DL, Azuma M. An overview of Indonesian doctors in combating COVID-19. *Int J Res Med Sci* 2022;10:1572-81.