



Risk of COVID-19 Morbidity on Government Public Health Center's Doctors

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Abstract. Deaths from COVID-19 in doctors are the highest of any other type of health worker. Ensuring the protection of health workers is an important thing of every country as a strategic response to the Covid-19 crisis. Tracing the cause of death and the assessment of the risk of Covid-19 morbidity in doctors became an important thing to do. Research aims to assess the risk of morbidity of doctors who work in government's public health center (GPHC). Cross-sectional survey, using blast mail surveys targeting the GPHC doctor's WhatsApp application across Indonesia, by sending messages containing online questionnaire links that can then be filled out independently (self-administered questioner). The filling time is set to January 25, 2021. The WHO's "Risk assessment and management of exposure of health care workers in the context of Covid-19" was used and translated into Indonesian with adding some questions. Variables studied included the use of personal protective equipment (PPE), behaviour, biological accidents, medical practices, handling COVID-19, risks from family and friends, social behaviour, tracking and isolation tests, shifts and workloads, and incentives related to Covid-19. There were 2268 respondents who filled out and sent back their responses from 6628 sent numbers (34.22%). The results showed the index of the risk level of exposure to COVID-19 on GPHC doctors in Indonesia was 0.7003, with a range of 0.35–0.94. Generally, GPHC doctors in Indonesia are in the category of high exposure risk (84.5%). It is recommended that health care doctors always be aware and protect themselves and apply strict protocols: keep distance from patients, always wash hands, use personal protective equipment, and limit social activities. District/City Health Office and GPHC should complement and meet the needs of quantity and quality of PPE, as well as routine decontamination.

Keywords: risk · morbidity · doctor · COVID-19 · blast

1 Background

On December 31, 2019 the WHO China Country Office reported a case of pneumonia of unknown aetiology in Wuhan City, Hubei Province, China. On January 7, 2020, China identified the case as a new type of coronavirus. Then on January 30, 2020 WHO declared

the incident a Public Health Emergency of International Concern (PHEIC) and on March 11, 2020, WHO had declared COVID-19 a pandemic. COVID-19 has spread to almost all countries, including Indonesia.

Indonesia reported its first case of COVID-19 on March 2, 2020 and the number continues to grow. Judging from the situation where the spread of Covid-19 has become so widespread and/or the number of deaths is increasing, this disease has had an impact on the political, economic, social, cultural, defence and security aspects, as well as the welfare of the people in Indonesia. Taking this into account, the Government of Indonesia has issued Presidential Decree No. 11 of 2020 concerning the Establishment of a Corona Virus Disease 2019 (COVID-19) Public Health Emergency. Presidential Decree No. 12 of 2020 has also been issued regarding the Determination of Non-Natural Disasters for the Spread of Corona Virus Disease 2019 (COVID-19) as National Disasters.

Health workers who are at the forefront of handling COVID-19 cases have a high risk of contracting it. The WHO defines a health worker as all those involved in action whose primary purpose is to improve health, this includes doctors, nurses, midwives, paramedical staff, health care facility administrators, support staff and community workers, who currently all face occupational risks of contracting COVID-19, and even death [2]. In one of the first cohorts of Covid-19 patients from Wuhan, 40 of the 138 cases (29%) were health workers. In the United States, 19% of patients have been identified as healthcare professionals. These figures are reminiscent of the 2002 to 2004 Severe Acute Respiratory Syndrome (SARS) outbreak, between 11–57% of the total cases in SARS-affected countries were health workers, or the equivalent of one in five patients overall [2].

Deaths due to COVID-19 in doctors are the highest among other types of health workers. Several studies have shown that COVID-19 infections are more common in nurses, although death is more common in doctors [2–4]. General practitioners are the group of doctors who have died from COVID-19 more than other types of doctors. Especially for Indonesia, data from the Indonesian Medical Association (IDI) as of September 7, 2021, there were 730 doctor deaths due to COVID-19, with the most doctor deaths occurring in July 2021 (216 people), and the most in the 56–60 age group. Years (107 people). Ensuring the protection of health workers is important for every country as a strategic response to the COVID-19 crisis, especially when the government intends to increase the capacity of health services to cope with the surge in patients requiring treatment. Searching for COVID-19 illness among doctors is an important thing to do in terms of understanding more deeply about the conditions at hand, as well as improving conditions and policies to minimize the incidence of illness and death of doctors due to COVID-19.

2 Methods

The study design used is quantitative with a cross-sectional approach. The population in this study were all government public health centre's (GPHC) doctors in Indonesia, either their act as giving practice and at managerial level. According to 2020 data, there are 10.203 GPHC throughout Indonesia and a number of 24.750 doctors who serve in GPHC [7]. Because the design is in the form of a census, the sample of this study is the

entire study population. We used a blast mail survey or survey by targeting a person's online address then be filled out independently (self-administered questionnaire), in this case the online address used is the WhatsApp application number from GPHC doctors across Indonesia. The delivery of messages starts from January 4 to January 6, 2021, then resumes from January 15 to 19, 2021. The filling time is set to January 25, 2021. A total of 6628 mobile phones were successfully sent, and 2629 numbers were returned to fill out the questionnaire. In the cleaning process, multiple numbers are issued (only choose the one with the most complete filling), non-doctor respondents, and respondents who do not include their title. In the end, there were 2268 data processed.

The WHO questionnaire "Risk assessment and management of exposure of health care workers in the context of COVID-19" from WHO was used which was translated into Indonesian and added several questions. The essence of the WHO questionnaire is to classify respondents into high risk and low risk variables from the use of PPE, hand washing behaviour and PPE removal and biological accidents. In addition, several questions were added related to the topic of medical practice and handling COVID-19, risks from family and friends, social behaviour, tracking and isolation tests, shifts and workloads, as well as incentives COVID-19 handling. According to WHO, a high risk is if the respondent does not answer 'always' on the question of the use of PPE and preventive behaviour and/or answers 'yes' on the question of biological accidents, while low risk is other than those mentioned.

3 Results

We identified 30 variables taken from the "Risk assessment and management of exposure of health care workers in the context of Covid-19" from WHO plus several social variables, behaviour, physical and mental fatigue, workload, and financial incentives, which were used to assess the risk of exposure of GPHC doctors to COVID-19. Then, the weight of each variable is determined by considering its effect on exposure to Covid-19, as well as assigning a value to the respondent's answers as shown in Table 1. From the calculation results, the average respondents' answers for each variable were obtained. The higher the value obtained, the lower the risk faced by doctors for exposure to Covid-19. For example, the variable "Have been exposed to body fluids/respiratory secretions" gets a value of 0.87, this means that in general the risk of respondents being exposed to body fluids/respiratory secretions is relatively minor.

Using this concept, an index of the level of risk of exposure to COVID-19 was compiled for GPHC doctors in Indonesia. The calculation is done by adding up the value of each respondent's answer, and then dividing it by the maximum possible value. Nationally, the risk level index of exposure to COVID-19 for GPHC doctors in Indonesia is 0.7003. There are 14 provinces that have index scores above the National index and 20 provinces otherwise. Riau Islands Province is the highest average index value, and Central Sulawesi Province with the lowest average index value. The lowest individual risk index value is in Central Java Province, which is 0.35. The highest individual risk index value is in West Sumatra Province, with a value of 0.94 (Table 2).

Table 1. Variables, measuring results, and average calculation results

NO	VARIABLE	WEIGHT	Measuring results	Average count
1	Practice	5	Yes = 0; No = 1	0,000
2	Dealing with Covid-19 patients	5	Yes = 0; No = 1	0,040
3	Face-to-face contact < 1 m	4	Yes = 0; No = 1	0,280
4	Aerosol's procedure	5	Yes = 0; Don't know = 0,5; No = 1	0,718
5	Environmental contacts	4	Yes = 0; Don't know = 0,5; No = 1	0,688
6	Wearing gloves	5	Always = 1; Frequent = 0.75; Sometimes = 0.5; Rare = 0.25; No = 0	0,854
7	Wearing mask	5	Always = 1; Frequent = 0.75; Sometimes = 0.5; Rare = 0.25; No = 0	0,99
8	Wearing face shield or goggles	5	Always = 1; Frequent = 0.75; Sometimes = 0.5; Rare = 0.25; No = 0	0,81
9	Wearing gown	5	Always = 1; Frequent = 0.75; Sometimes = 0.5; Rare = 0.25; No = 0	0,75
10	Replace PPE according to protocol	5	Always = 1; Frequent = 0.75; Sometimes = 0.5; Rare = 0.25; No = 0	0,92
11	Hand hygiene before and after touching the patient	5	Always = 1; Frequent = 0.75; Sometimes = 0.5; Rare = 0.25; No = 0	0,98
12	Perform hand hygiene before and after aseptic procedures	5	Always = 1; Frequent = 0.75; Sometimes = 0.5; Rare = 0.25; No = 0	0,95
13	Doing hand hygiene after exposure to body fluids	5	Always = 1; Frequent = 0.75; Sometimes = 0.5; Rare = 0.25; No = 0	0,98
14	Perform hand hygiene after touching any object around the patient	5	Always = 1; Frequent = 0.75; Sometimes = 0.5; Rare = 0.25; No = 0	0,94
15	Frequent decontamination (at least 3x a day) of frequently touched surfaces	5	Always = 1; Frequent = 0.75; Sometimes = 0.5; Rare = 0.25; No = 0	0,78

(continued)

Table 1. (continued)

NO	VARIABLE	WEIGHT	Measuring results	Average count
16	Have been exposed to body fluids/respiratory secretions	5	No = 1; Don't know = 0,5; Yes = 0	0,87
17	There are members of the core family who work as health workers and actively handle Covid-19 who live at home.	5	No = 1; Yes = 0	0,75
18	There are other family members who work as health workers and actively handle Covid-19.	5	No = 1; Yes = 0	0,88
19	Often follow professional scientific activities face-to-face that are not carried out in accordance with health protocols	3	Often = 0; Rare = 0.25 Sometimes = 0.5 Not at all = 1	0,77
20	Frequently participate in face-to-face religious activities that are not carried out in accordance with health protocols	3	Often = 0; Rare = 0.25 Sometimes = 0.5 Not at all = 1	0,68
21	Often follow golf activities, to the mall face-to-face that is not implemented in accordance with health protocols	3	Often = 0; Rare = 0.25 Sometimes = 0.5 Not at all = 1	0,69
22	Often BECOME CLOSE CONTACT in order to track/surveillance Covid-19 inspection	5	No = 0; Yes = 1	0,7
23	Work hour	4	$\leq 8 \text{ h} = 1$; $> 8 \text{ h} = 0$	0,54
24	Conformity of the number of HUMAN RESOURCES and workloads in health facilities	5	No = 0; Yes = 1	0,54
25	Often happens replacing shift	3	No = 1; Yes = 0	0,78

(continued)

Table 1. (continued)

NO	VARIABLE	WEIGHT	Measuring results	Average count
26	The day feels very exhausted (physical)	3	Never feeling tired = 1 1 - 2 days = 0.5; 3 - 4 days = 0.25 Every day tired = 0	0,52
27	Never seen family for a long time related to your duties as a doctor	3	No = 1 Yes = 0	0,79
28	The quantity of PPE from office	5	Good = 1; Enough = 0,75 Less = 0.25; Very Less = 0	0,6
29	The quantity of PPE from office	5	Good = 1; Enough = 0,75 Less = 0.25; Very Less = 0	0,64
30	Amount of incentives as expected	3	1 = Yes 0 = No	0,32

Table 2. The risk index for Covid-19 exposure of GPHC doctors per province.

Province	Sample		Mean (95% CI)	Min	Max	SD
	N	%				
Aceh	68	3	0,6852 (0,6618–0,7086)	0,48	0,90	0,09675
North Sumatera	90	4	0,7070 (0,6896–0,7244)	0,51	0,92	0,08310
West Sumatera	55	2,4	0,6633 (0,6384–0,6881)	0,42	0,94	0,09197
Riau	71	31	0,6816 (0,6697–0,7034)	0,49	0,90	0,09224
Jambi	47	21	0,7038 (0,6715–0,7360)	0,44	0,90	0,10978
South Sumatera	69	3	0,6924 (0,6717–0,7130)	0,45	0,83	0,08599
Bengkulu	31	1,4	0,6963 (0,6663–0,7263)	0,56	0,86	0,08183
Lampung	54	2,4	0,6970 (0,6723–0,7216)	0,36	0,85	0,09015
Bangka Belitung	20	0,9	0,7128 (0,6844–0,7411)	0,59	0,83	0,06054
Riau Islands	21	0,9	0,7464 (0,7167–0,7761)	0,61	0,89	0,06524
Jakarta	116	5,1	0,7128 (0,6962–0,7295)	0,44	0,86	0,09047
West Java	301	13,2	0,7055 (0,6964–0,7146)	0,39	0,91	0,07996
Central Java	250	11	0,7086 (0,6984–0,7188)	0,35	0,89	0,08201
Yogyakarta	65	2,9	0,7284 (0,7107–0,7461)	0,55	0,86	0,07144
East Java	183	8,1	0,7139 (0,7016–0,7261)	0,49	0,91	0,08402

(continued)

Table 2. (continued)

Province	Sample		Mean (95% CI)	Min	Max	SD
	N	%				
Banten	102	4,5	0,7001 (0,6823–0,7178)	0,40	0,87	0,09038
Bali	34	1,5	0,7255 (0,7031–0,7478)	0,59	0,88	0,06417
West Nusa Tenggara	33	1,5	0,6988 (0,6723–0,7254)	0,55	0,87	0,07477
East Nusa Tenggara	77	3,4	0,6657 (0,6427–0,6887)	0,46	0,92	0,10135
West Kalimantan	57	2,5	0,6863 (0,6595–0,7131)	0,44	0,93	0,10107
Central Kalimantan	53	2,3	0,6972 (0,6712–0,7232)	0,52	0,90	0,09425
South Kalimantan	56	2,5	0,7163 (0,6943–0,7383)	0,45	0,88	0,08202
East Kalimantan	67	3,0	0,7113 (0,6904–0,7322)	0,53	0,86	0,08568
North Kalimantan	14	0,6	0,6862 (0,6478–0,7246)	0,56	0,81	0,06654
North Sulawesi	31	1,4	0,6678 (0,6438–0,7318)	0,42	0,88	0,11992
Central Sulawesi	30	1,3	0,6332 (0,5916–0,6748)	0,36	0,81	0,11142
South Sulawesi	130	5,7	0,6920 (0,6759–0,7081)	0,41	0,88	0,09257
Southeast Sulawesi	37	1,6	0,6998 (0,6743–0,7254)	0,58	0,81	0,07662
Gorontalo	18	0,8	0,6862 (0,6155–0,7568)	0,36	0,92	0,14207
West Sulawesi	19	0,8	0,6751 (0,6354–0,7149)	0,55	0,77	0,08247
Maluku	28	1,2	0,7029 (0,6736–0,7323)	0,57	0,89	0,07578
North Maluku	13	0,6	0,6564 (0,5895–0,7234)	0,52	0,86	0,11078
Papua	15	0,7	0,6742 (0,6204–0,7280)	0,48	0,79	0,09715
West Papua	13	0,6	0,7311 (0,6811–0,7811)	0,60	0,88	0,09273
Indonesia	2268	100	0,7003	0,35	0,94	0,08887

Measuring the Risk Level of GPHC Doctors Based on the WHO Concept

WHO in the interim guidance: Risk Assessment and management of exposure of health care workers in the context of COVID-19, divides the category of exposure to the COVID-19 virus in health workers into 2 categories, the high risk and low risk category. Categorized as high risk if health workers do not answer “always, as recommended” or respond “yes” to the question “have you ever had an accident during your interaction with a COVID-19 patient in the form of splashing body fluids or respiratory secretions?”. Categorized as low risk if health workers answer other answers. Calculations on Table 3 showed that generally GPHC doctors in Indonesia are in the category of high exposure risk (84.5%).

Following the same pattern, on Table 4 it can be seen that the proportion of risk categories for COVID-19 exposure to doctors for each based on GPHC per province. The proportion of doctors with the highest risk category of COVID-19 exposure is Southeast Sulawesi (97.3%) and the proportion of doctors with the highest low risk category of COVID-19 exposure is Yogyakarta.

Table 3. The overall risk category for COVID-19 exposure assessment to GPHC doctors based on the WHO concept

Level exposure risk	N	%
High exposure risk	1916	84.5
Low exposure risk	352	15.5
Total	2268	100.0

Table 4. The overall risk category for COVID-19 exposure assessment to GPHC doctors per province

Province	Level exposure risk		Total
	High	Low	
Aceh	64 (94,1%)	4 (5,9%)	68 (100%)
North Sumatera	71 (78,9%)	19 (21,1%)	90 (100%)
West Sumatera	49 (89,1%)	6 (10,9%)	55 (100%)
Riau	64 (90,1%)	7 (9,9%)	71 (100%)
Jambi	43 (91,5%)	4 (8,5%)	47 (100%)
South Sumatera	60 (87,0%)	9 (13,0%)	69 (100%)
Bengkulu	28 (90,3%)	3 (9,7%)	31 (100%)
Lampung	48 (88,9%)	6 (11,1%)	54 (100%)
Bangka Belitung	19 (95,0%)	1 (5,0%)	20 (100,0%)
Riau Islands	20 (95,2%)	1 (4,8%)	21 (100%)
Jakarta	87 (75,0%)	29 (25,0%)	116 (100%)
West Java	237 (78,7%)	64 (21,3%)	301 (100%)
Central Java	218 (87,2%)	32 (12,8%)	250 (100,0%)
Yogyakarta	48 (73,8%)	17 (26,2%)	65 (100,0%)
East Java	143 (78,1%)	40 (21,9%)	183 (100,0%)
Banten	80 (78,4%)	22 (21,6%)	102 (100%)
Bali	30 (88,2%)	4 (11,8%)	34 (100%)
West Nusa Tenggara	29 (87,9%)	4 (12,1)	33 (100%)
East Nusa Tenggara	70 (90,9%)	7 (9,1%)	77 (100%)
West Kalimantan	47 (82,5%)	10 (17,5%)	57 (100%)
Central Kalimantan	47 (88,7%)	6 (11,3%)	53 (100%)
South Kalimantan	50 (89,3%)	6 (10,7%)	56 (100%)
East Kalimantan	54 (80,6%)	13 (19,4%)	67 (100%)
North Kalimantan	13 (92,9%)	1 (7,1%)	14 (100%)

(continued)

Table 4. (continued)

Province	Level exposure risk		Total
	High	Low	
North Sulawesi	28 (90,3%)	3 (9,7%)	31 (100%)
Central Sulawesi	24 (80,0%)	6 (20,0%)	30 (100,0%)
South Sulawesi	119 (91,5%)	11 (8,5%)	130 (100,0%)
Southeast Sulawesi	36 (97,3%)	1 (2,7%)	37 (100%)
Gorontalo	15 (83,3%)	3 (16,7%)	18 (100%)
West Sulawesi	15 (78,9%)	4 (21,1%)	19 (100,0%)
Maluku	26 (92,9%)	2 (7,1%)	28 (100,0%)
North Maluku	12 (92,3%)	1 (7,7%)	13 (100,0%)
Papua	13 (86,7%)	2 (13,3%)	15 (100,0%)
Papua Barat	9 (69,2%)	4 (30,8%)	13 (100,0%)
Indonesia	1916 (84,5%)	352 (15,5%)	2268 (100%)

Table 5. Listed risk of exposure to COVID-19 in GPHC doctors

Listed risk of exposure to COVID-19	n	%
Always wear disposable gloves	1450	63,9
Always wear a medical mask	2187	96,4
Always wear a face shield and or googles	1207	53,2
Always wear disposable gowns	1071	47,2
Always replace PPE according to protocol	1738	76,6
Always do hand hygiene before and after touching a COVID-19 patient	2080	91,7
Always perform hand hygiene before and after aseptic procedures	2013	88,9
Always do hand hygiene after exposure to body fluids	2128	93,8
Always perform hand hygiene after touching any object around the patient	1848	81,5
Decontaminate (at least 3 times a day) on frequently touched surfaces	991	43,7
Never had an accident exposed to body fluids/respiratory secretions	1814	80,0

Further investigation of the exposure risk variable showed that decontamination efforts on frequently touched surfaces (at least 3 times a day) were the things most respondents stated as not being carried out (43.7%) (Table 5). On the other hand, the use of medical masks in GPHC is common among respondents from GPHC doctors (96.4%).

4 Discussion

The COVID-19 pandemic has brought healthcare workers to a very important role, and placed them at the forefront of a risk-laden war. This global crisis presents healthcare workers with important tasks in terms of promotion and prevention, as well as in diagnosing and treating patients. This condition then causes health workers to also become infected, and even cause many deaths. Ensuring the protection of health workers is an important element for every country as a strategic response to the COVID-19 crisis. Increased transmission and death of health workers will not only cripple the country's COVID-19 response, but will also have a significant long-term impact on health care delivery, particularly in a system that is already experiencing problems with labour shortages due to a lack of trained personnel, skilled labour migration, and geographic maldistribution which existed even before the pandemic.

Failure to address infections and deaths among health workers has the potential to further increase the transmission of COVID-19 in health facilities and the wider community. The shortage of health workers can affect the quality of health service provision nationally, both during the acute phase of the pandemic, and in the long term. Occupational risks in the workplace should be minimized if not eliminated altogether [2]. The shortage and PPE inadequacy are believed to be the cause of COVID-19 illness. Health workers on the front line are in a precarious position due to limited access to proper PPE and training. In Brazil, there have been thousands of reports that nurses lacking PPE since the pandemic, and during the same time period there were also thousands of cases with influenza-like symptoms and deaths among nurses, a number that is significantly higher than the general trend. [12]. The infection of these medical personnel may be due to inadequate preventive and protective measures especially in the early stages of the epidemic. In conditions of shortage and limited PPE in health care facilities, many health workers use substandard ones, for example by using daily plastic products to make simple PPE (photographic film, plastic wrap, file bags, etc.). (Zhou, 2020) Potential exposure to SARS-CoV-2 can be prevented only by excellent adherence to all preventive measures, including the use of appropriate PPE. Strict application of PPE standards can dramatically reduce nosocomial transmission. The effect of the use of PPE on the death of health workers is often confirmed by the absence or infrequent cases of death from health workers who work in the infectious disease section of hospitals or work in hospitals that specialize in infectious diseases. The reason for the absence of deaths in these groups could be partly due to the strict use of PPE and the habitual use of PPE among these specialties. [10]. This shows that adequate preventive measures with strict enforcement can prevent health workers from becoming infected with SARS-CoV-2 and the risk of death.

The carelessness and unpreparedness of self-protection from health workers can cause a rapid increase in the number of infected health workers. Experience in China and Malaysia, COVID-19 infections in health workers occur when patients are not suspected of having COVID-19 come for treatment, and are supported by the limitations of adequate PPE worn. At the beginning of the pandemic, there was a minimal and insufficient supply of PPE for health workers on the front lines, especially in primary health care. [9–14] At the beginning of the pandemic, there was a minimal and insufficient supply of PPE for health workers on the front lines, especially in primary health care

[14] Improved protective measures and increased use of PPE appear to have substantially reduced the risk of infection over time. In Malaysia, since the use of PPE has improved, the risk of infection for health workers has decreased [9]. Regarding to environmental control, WHO guidelines explain that the control of SARS-CoV-2 transmission can be done by implementing environmental and engineering controls and disinfection. Engineering control is a basic infrastructure in health facilities, for example by ensuring adequate ventilation, separating patient beds at least 1 m, to cleaning and disinfecting rooms consistently and correctly [6–13]. The virus is spread through human-to-human interactions and exposure to coughs, sneezes, respiratory droplets and aerosols from an infected person, in addition, interaction with contaminated surfaces. On contaminated surfaces such as metal, glass, and plastic, human coronavirus can persist from a few hours to 9 days, highlighting the need to effectively disinfect surfaces [11]. Transmission often occurs by close and unprotected contact of secretions or excretions from infected patients, mainly through droplets of saliva. Other bodily fluids are not clearly involved in the transmission of the virus, but it is thought that unprotected contact with blood, faeces, vomit and urine can put healthcare workers at risk for disease [5]. Surface cleaning and disinfection should be carried out on a regular basis. The US CDC recommends cleaning and disinfection by using a disinfectant for health care facilities listed on the EPA website (US Environmental Protection Agency) (CDC, 2019). Several factors that need to be considered in disinfection are the type of disinfectant, concentration, and contact time. Actions or activities that generate aerosols must be carried out in a negative pressure isolation room, or a room with good ventilation and apply contact and airborne precautions.

During this outbreak, doctors, nurses, and other health workers take the risk of dealing with the transmission of Covid-19, the long duration of work, limited PPE, prolonged pandemic conditions, high morbidity and mortality of medical personnel, the increase in Covid-19 patient visits, tensions and concerns. All the time, the distance from the family, causes physical and mental fatigue, and makes the stress of health workers, especially doctors, increases. The main causes of this stress are increased workload, sleep disturbances, fatigue and the possibility of infection. In addition to stress, fatigue, and an increase in workload can cause various negative consequences, such as musculoskeletal disorders, one of the negative consequences of this condition is an increase in burnout in health workers [1]. At least some doctors died from exhaustion, without viral infections, as well as doctors who committed suicide. The doctors who work under extreme pressure for long hours without breaks or days off, can reduce their attention to protection, and become more dramatic the first time the doctor becomes ill, thus making their colleagues on duty work harder to replace staff who reduced [8]. Hospitals must change doctor's shifts, with the obligation to rest and eat. It is necessary to establish an online support network to keep doctors in touch with their colleagues for informational and social support. The government can also help doctor care for their families by providing lodging close to hospitals and providing increased life insurance [12].

Health workers in Malaysia have reported feeling stressed, tired, burnout and sad that some of them have not seen their family for months. They also report discrimination from the public as health workers are considered infected people or carriers of infection, because they work in hospitals or health centers. Along with the risk of infection,

the COVID-19 pandemic is causing a further source of stress for healthcare workers. Fully stocked intensive care wards, fully stocked emergency wards, long working hours as a consequence of compensating for absent colleagues who are sick or quarantined, wearing PPE for periods of time, patient isolation, additional administrative duties due to reporting obligations, task force meetings, and contact tracing, limited contact with co-workers, and the fear of transmitting the disease to their own families are factors that can cause burnout and excessive psychological stress for workers. Sleep disturbances and even suicidal thoughts can be caused by exposure to COVID-19 patients and the increased workload, as well as concerns about one's own safety and health. These aspects should also be considered, in addition to protection against infection, and support services. For this reason, WHO working group has called for attention that the pandemic cannot be allowed to lead to deteriorating working conditions or failure to comply with occupational safety standards. Health authorities, stakeholders and health policy makers should make a concerted effort to provide social support services and professional counselling if they show signs of fatigue, anxiety and/or depression to minimize the risk of developing psychiatry [14]. This service is staffed by psychiatrists, clinical psychologists, and counsellors to help healthcare professionals deal with depression, anxiety, insomnia, distress, and stigmatization they face during the Covid-19 pandemic.

Our study results indicate there are still many respondents who participate in scientific, religious, and other social activities without implementing good health protocols, such as offline activities, gathering without keeping a distance, and so on. Reports from Malaysia stated that 80.0% of cases that occurred in health workers were obtained from the community. They are infected by joining mass gatherings such as religious, congregational, and attending weddings.

5 Conclusion

The COVID19 exposure risk index for GPHC doctors in Indonesia was 0.703. The 14 provinces have index values that exceed the national index. In general, Indonesia's GPHC doctors belong to the high exposure risk category (84.5%). The percentage of doctors in the category with the highest risk of COVID19 exposure was Southeast Sulawesi (97.3%) while Yogyakarta was the lowest risk category with COVID19 exposure. Decontamination endeavours on habitually touched surfaces (at least 3 times a day) were the things most expressed as not being carried out (43.7%). On the other hand, the utilize of medical masks are common among GPHC doctors (96.4%). Some of the identified COVID-19 exposure risk conditions for GPHC doctors, such as PPE quantity and quality, hand hygiene behaviour, biological mishaps events, social activities and crowds, physical and mental fatigue. We recommend that GPHC doctors always be vigilant and apply strict personal protection including decontaminating the surface on a regular basis, keeping distance from patients, wearing full PPE, washing hands regularly, as well as limiting social activities, and implementing health protocols. Aerosol-producing interventions that are normally performed in PHC, such as nebulizers, sputum collection, and cardiopulmonary resuscitation, should be performed in high-preventive locations or do it in higher health facilities.

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