



RISK AND PROTECTIVE FACTORS AFFECTING MENTAL HEALTH OF HEALTHCARE WORKERS DURING COVID-19: A LITERATURE REVIEW

Wahyi Sholehah Erdah Suswati¹, Retno Lestari² M.Elyas Arif Budiman³, Zidni Nuris Yuhbaba⁴,

^{1,2,3}, Faculty of Health Sciences, University of dr. Soebandi

⁴, School of Nursing, Faculty of Medicine, Brawijaya University

SUBMISSION TRACK

Received: September 05, 2022

Final Revision: September 17, 2022

Available Online: September 22, 2022

KEYWORDS

Risk and protective factors, Mental health, Healthcare workers, COVID-19

CORRESPONDENCE

E-mail: elyasarifbudiman@uds.ac.id

A B S T R A C T

Healthcare workers (HCWs) are front-liners who have responsibilities for treating patients with COVID-19, therefore they are at higher risk of suffering mental health problems. This study aimed to analyze factors that contribute to the mental health of healthcare workers. We used three electronic databases from PubMed, EBSCO, and Science Direct published between January-December 2020. The results showed the risk factors related to mental health conditions of HCWs: demographic factors, work-related factors, exposure of infection, health status, personal perceived risk, coping mechanism, uncertain information and procedure about COVID-19, social factors and stigma. We also found the protective factors that contribute to the mental health wellbeing of HCW: positive attitude towards stress, healthy lifestyle, family support, and organizational support. The psychological wellbeing of HCWs could be improved by implementing regular assessment, providing initial therapy and psychological treatment especially for those who were at risk. Further studies are needed to explore specific interventions for HCWs to optimize their mental health during pandemic.

I. INTRODUCTION

The COVID-19 pandemic has caused threats and health crises to populations around the world due to its rapid spread [1], [2]. On March 11, 2020, the World Health Organization (WHO) has announced that COVID-19 has developed into a global pandemic where the transmission rate of the disease is very high and fast, and has increased the incidence of deaths. Everyone is susceptible to contracting infections

because of the severity of the disease, inadequate vaccination programs and the lack of evidence on the effectiveness of pharmacological therapeutic agents [3]-[5].

Healthcare workers are a highly stressful profession and face tremendous pressure during the COVID-19 pandemic compared to the rest of the general population [6], [7]. In fact, the prevalence of confirmed cases of SARS-CoV-2 among health workers, among others, in

China was 4.2%, the United States was 17.8%, and Italy was 9% [8]. The incidence of critical cases of SARS-CoV-2 among health care workers was reported to be lower (9.9% <29.4%), while the mortality rate was also reported to be lesser compared to all confirmed patients (0.3 < 2.3%) [8]. Dealing with these communicable diseases and caring for these confirmed positive patients places health workers under severe physical and psychological stress [8], [9].

A series of recent studies have assessed the impact of COVID-19 on mental disorders in healthcare workers such as anxiety, depression, post-traumatic stress symptoms, and other psychological problems during the COVID-19 pandemic [10]–[15]. The psychological pressures that health workers face are fear due to the high risk of contracting COVID-19, inadequate protection, lack of control over the pandemic situation, excessive workload, frustration, negative feedback, discrimination, fear of quarantine, lack of family support, and burnout [7], [10]–[13]. Other studies show that excessive protective measures using personal protective equipment (PPE) throughout the body also have a lot of psychological effects, such as excessive worry, anxiety, etc. As health workers are considered as essential workers during the COVID-19 outbreak, protecting their psychological condition is a priority [16]–[18]. Thus, additional information is needed regarding the factors that affect the psychological burden of health workers. Therefore, we undertook this systematic review to explore the factors that contribute to the mental health of healthcare workers during the COVID-19 pandemic.

II. METHODS

This literature review was carried out by reviewing relevant studies and conducting a comprehensive synthesis of risk and protective factors that affect the mental health condition of health workers when dealing with patients during a pandemic. We conducted a search strategy and selected published articles from the PubMed, EBSCO, and Science Direct databases published from January to December 2020. We used a combined Boolean literature search of the following terminology: (factor OR factor) AND (mental health OR psychological) AND (health worker OR healthcare team) AND (COVID-19 OR coronavirus pandemic). The articles searched are limited to only original research written in English. The inclusion criteria for the selection of articles included: (1) Risks or protective factors from the impact of mental health on health workers; (2) The type of research that uses quantitative methods. Studies were excluded if: (1) Full text was not available; (2) The study sample involved non-health professionals; (3) Systematic review studies.

We found 963 publications in the initial search. After removing duplicate articles, a total of 896 articles were independently checked for titles and abstracts based on the same criteria. Thereafter, 56 articles were reviewed based on the full text and 37 articles were excluded for various reasons (see Figure 1). The quality of the selected articles was further evaluated using the Joanna Briggs Institute guidelines for cross-sectional and case-control studies (n=19) [19]. The checklist consists of various criteria which are scored as “yes”, “no”, “unclear”, or “not applicable”. We assign one point to

each criterion with a “yes” answer, then the results are calculated. If the research score is at least 50%, the article will be included in the analysis. Low-quality studies were excluded to maintain validity and appropriate recommendations. Finally, the screening process resulted in 19 articles that were selected for further analysis (see Table 1).

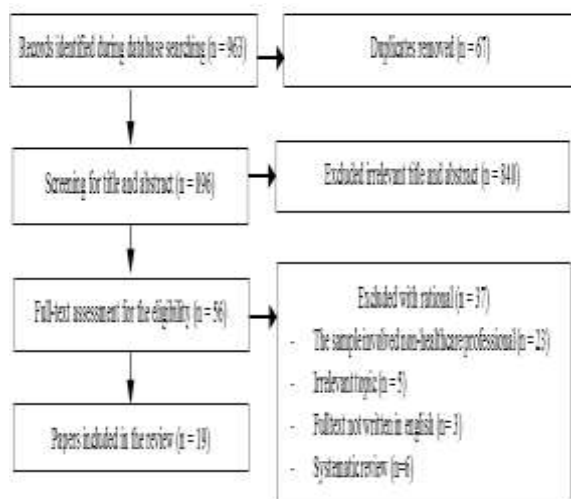


Figure 1. The literature search diagram

III. RESULT

From a total sample of 19 research articles that have been selected, 10 studies were conducted in China, other 3

studies were carried out in Italy, and six studies were conducted in Turkey, Oman, Spain, Poland, Saudi Arabia, and Cameroon. Most of the studies involved more than a thousand respondents, including psychological conditions in health workers and the factors that affect their mental health. Most studies involve multidisciplinary health workers, such as physicians, nurses, technicians, public health practitioners, pharmacists, medical laboratory personnel, dentists, radiologists, physical therapists, respiratory therapists, psychologists, residents, and other health assistants. Based on a systematic review of the 19 articles, common mental health problems that occurred in health workers: anxiety (n=15), depression (n=14), distress (n=8), insomnia (n=7), symptoms of somatization (n=3), mental health disorders and obsessive-compulsive disorder (n=2), symptoms related to poorer general health (n=1), symptoms of post-traumatic stress (PTSS) (n=1), post-traumatic stress disorder (PTSD) (n=1), overall psychological problems (n=1), phobic anxiety (n=1), psychoticism (n=1), and suicidal ideation and self-harm (SSI) (n=1).

Table 1. Details of articles included (n= 19)

Author & Year	Location	Design	Samples	Outcome	Study quality
Şahin, Aker, Şahin, & Karabekiroğlu (2020)	Turkey	Cross-sectional	939	Mental health problems: depression (77.6%), anxiety (60.2%), insomnia (50.4%), and distress (76.4%) Risk factors: female, nurse, working on the front line, history of mental health illness, and being tested for COVID-19	75%
Alshekaili et al. (2020)	Oman	Cross-sectional	1139	Mental health problems: depression (32.3%), anxiety (34.1%), stress (23.8%) and insomnia (18.5%) Risk factor: being a frontline group of HCWs	75%

Author & Year	Location	Design	Samples	Outcome	Study quality
Gonzalo et al. (2020)	Spain	Cross-sectional	1407	Mental health problems: acute stress symptoms (24.7%) and poor general health (53.6%) Risk factors: female, having no access to protective materials, subjects perceived risks, working in a high incidence area of COVID-19, not being noticed by colleagues, having more stress perception at work, risk of transmitting the infection to others	75%
Wańkiewicz, Szylińska, & Rotter (2020)	Poland	Cross-sectional	441	Mental health problems: anxiety (64.4%), depression (70.7%), insomnia (58%) Risk factors: age, female gender, the occurrence of chronic diseases (hypertension, diabetes mellitus, dyslipidemia, asthma, autoimmune), cigarette smoking, exposure to infected patients at emergency unit, infectious unit, and ICU	100%
Di Tella, Romeo, Benfante, & Castelli (2020)	Italy	Cross-sectional	145	Mental health problems: anxiety, depression Risk factors: working in COVID-19 wards, working with COVID-19 patients, female, single, older age	62.5%
Que et al., (2020)	China	Cross-sectional	2285	Mental health problems: anxiety, depression, sleep disorder and the other psychological problems (46.04%, 44.37%, 28.75% and 56.59%) Risk factors: participate in front-line work, attention to negative information about COVID-19, accept negative attitudes from family and friends who join frontline work, reluctant to work in the frontline Protective factors: regular exercise, no drinking alcohol	75%
Xiao et al., (2020)	China	Cross-sectional	958	Mental health problems: anxiety, stress, and depression (54.2%, 55.1%, and 58%) Risk factors: gender, intermediate title, protective measures and contact history	87.5%
Xing, Sun, Xu, Geng, & Li (2020)	China	Cross-sectional	548	Mental health problems: somatization, anxiety, obsessive-compulsive, psychoticism ($p < 0.05$; $p < 0.01$) Risk factors: age, suspicious of being infected of COVID-19 when symptoms appear, worries about getting infected for himself and his family	75%

Author & Year	Location	Design	Samples	Outcome	Study quality
Rossi et al. (2020)	Italy	Cross-sectional	1379	<p>Protective factor: family support</p> <p>Mental health problems: insomnia, anxiety, perceived stress, depression, PTSS (8.27%, 19.80%, 21.90 24.73%, 49.38%)</p> <p>Risk factors: younger age, female, job title, being a frontline, having a colleague deceased, having a colleague hospitalized, having a colleague in quarantine, being exposed to infected patients</p>	100%
Lai et al. (2020)	China	Cross-sectional	1257	<p>Mental health problems: symptoms of depression (50.4%), anxiety (44.6%), insomnia (34.0%), and distress (71.5%)</p> <p>Risk factors: nurses, women, frontline health care workers, working in Wuhan, China</p>	75%
Liu et al. (2021)	China	Cross-sectional	1090	<p>Mental health problems: anxiety, depression and both of the two were 13.3%, 18.4% and 23.9%</p> <p>Risk factors: married status, not living alone, not telling nobody about their problem, often getting care from their neighbors</p>	75%
Zhu et al. (2020)	China	Cross-sectional	5062	<p>Mental health problems: stress, depression and anxiety symptoms (29.8%, 13.5% and 24.1%)</p> <p>Risk factors: women, years of working more than 10 years, having chronic diseases, having past history of mental illness, having family members or friends who confirmed, working in hospital-based</p>	100%
Kang et al. (2020)	China	Cross-sectional	994	<p>Mental health problems: mild, moderate, and severe mental health disturbance (34.4%, 22.4% and 6.2%)</p> <p>Risk factors: young women, exposure to infected people and having psychological assistance</p>	100%
Alenazi et al. (2020)	Saudi Arabia	Cross-sectional	4920	<p>Mental health problems: low, moderate, and high level of anxiety (31.5, 36.1%, and 32.3%)</p> <p>Risk factors: unmarried, living with the elderly, being a nurse, working in radiology or respiratory unit, having a chronic, respiratory or autoimmune disease, working with COVID-19 patients</p>	100%

Author & Year	Location	Design	Samples	Outcome	Study quality
				Protective factor: organizational support	
Keubo et al. (2020)	Cameroon	Cross-sectional	292	Mental health problems: anxiety from mild to severe (42.20%), depression (43.50%) Risk factors: age, feel afraid of being infected and death	75%
Juan et al. (2020)		Cross-sectional	456	Mental health problems: stress reaction (43.2%), obsessive-compulsive (37.5%), somatization (33.3%), anxiety (31.6%), depression (29.6%) Risk factors: female, middle-age, low-income status, working in the isolation unit, reluctant to work, fear of contaminating family member, uncertainty about control procedures of infection, having rejected by their neighbors because working in the hospital	100%
Babore et al. (2020)	Italy	Cross-sectional	595	Mental health problem: perceived stress Protective factor: having a positive attitude in controlling stressful situations Risk factors: female, looking for social support, using avoidance coping mechanisms, working with confirmed people	100%
Cai et al. (2020)	China	Case-control	2346	Mental health problems: frontline groups had a higher level of anxiety, depressed symptoms, and insomnia than non-frontline groups Risk factor: being frontline groups	100%
Xiaoming et al. (2020)	China	Cross-sectional	8817	Mental health problems: depression, anxiety, somatization, and SSI (30.2%, 20.7%, 46.2%, and 6.5%) Risk factors: female, single, low educational background, working in the hospital, need for help from a psychological assistant, unconfident to fight of COVID-19, ignorance strategies, attending the party, having poor health condition status	100%

IV. DISCUSSION

1. The risk factors for mental health of HCWs

The results of this systematic review explain several risk factors that contribute to the mental health of health workers which are grouped into eight themes: demographic characteristic factors, work-related factors, infection exposure, health status, individual perceived risks, coping strategies, information about the uncertainty of the situation and control procedures regarding COVID-19, and factors related to social aspects and stigma. Sixteen studies have explored sociodemographic factors that influence mental health, namely gender, age, marital status, educational background, and economic status. Previous studies revealed that the female gender had a significant correlation with the incidence of anxiety, depression, distress, sleep disturbances, post-traumatic stress disorder, and mental health disorders compared to the male gender [10], [20], [21]. Another study also stated that being female, heavy workload, night shift, and frequent contact with patients were additional factors affecting mental health of HCWs [39].

Recent studies show that aging may increase the risk of experiencing anxiety, depressive symptoms, sleep disturbances, PTSS, somatic symptoms, obsessive-compulsive disorder, phobic anxiety, and psychotic disorders [21]-[27]. Younger age (<40 years) experienced more symptoms of depression and anxiety [24], [25]–[27]. In contrast, middle-aged respondents (≥40 years) tended to experience higher levels of psychological distress and PTSD [22], [23]. The reason is that younger health

workers are less experienced in providing high quality of care to patients. They also find it difficult to cope with stress from their job. Therefore, when a sudden COVID-19 pandemic occurs, they will have difficulty maintaining their psychological condition and easily experience anxiety disorders, fears, and other physical health problems.

The Centers for Disease Control and Prevention (CDC) has announced that anyone at any age can be exposed to the new coronavirus [28]. This study also explained that as many as 71.45% of the 4,021 respondents who confirmed COVID-19 were aged 30-65 years. This indicates that as they age, their risk for infection will increase. If they have a history of respiratory disease, diabetes, hypertension, and heart disease, the risk of infection is higher [29]. Therefore, older healthcare workers have more psychological stress while caring for COVID-19 patients due to burnout [30], [31].

Married status and not living alone are associated with the incidence of anxiety and depression [12]. On the other hand, other studies stated that being single and unmarried had a significant correlation and higher scores of anxieties, and depression, somatic symptoms, and SSI [23], [32], [33]. Additionally, health workers who are not married may easily experience symptoms of anxiety and depression, somatic symptoms, and SSI.

Further, health workers who have lower incomes are more likely to experience psychological stress [21]. In contrast, another study reported that economic status was not correlated with the incidence of stress [34]. Health workers with lower levels of education and income are usually placed in high-risk wards so this will put them in more contact with infected

patients [32]. In addition, they have less ability to cope with their emotions [35]. Another study explained that health workers with secondary education level may face difficult situations due to lack of economic income, and family fatigue [36]. In addition, another risk factor is having a partner who provides less support while working in a risky environment [37]. So, these health workers are the most vulnerable groups to experience psychological stress during the epidemic.

Work-related factors that might affect mental health issues include types of health professionals, work duration, and place of work. HCWs working in areas with high confirmed cases were reported to be at increased risk of experiencing distress and worsening symptoms of general health problems [10], [33]. The current study shows that health workers working in areas with high cases of COVID-19 infection, hospital-based type of care, including the role of work as the front line were identified as factors associated with mental health problems especially in terms of anxiety and depression. The rationale is because of the risk of contamination and the workload when providing care for COVID-19 patients. High-risk environments are places with the highest potential for COVID-19 contamination such as emergency departments, ICUs, and isolation units [10], [12], [21]. Mental health problems experienced by health workers are more severe in secondary hospitals than in tertiary hospitals [32],[33],[38]. Being front-liners is recognized as a possible cause of mental burdens such as sleep disturbances, stress, anxiety, depression, and all sorts of psychological problems [8], [10], [13], [34], [22]-[24], [21], [25], [27], [33], [39], [40]. Working in the front line, especially the nursing profession, is at risk

of being exposed to COVID-19 infection because of their frequent and direct contact with infected patients and the extended working hours [41]. They reported a 1.5-fold of front-line health workers experienced symptoms of insomnia, stress, and anxiety than second-line health workers [36]. In addition, being a nurse and having worked for more than 10 years cause nurses to experience more work burnout and additional family responsibilities [10], [20], [33], [38].

Third, eight other studies also identified the impact of exposure to transmission with infected patients on the mental health status of health workers. Most of these studies conclude that having close contact while caring for infected patients carries a greater risk of developing psychological problems. Health workers who were exposed to patients infected with SARS-CoV-2 showed more severe psychological symptoms while working in the front line than those who did not work in the area [26], [27], [29], [31], [35], [38]. During the COVID-19 pandemic, health workers who did not have self-protection such as current information about the disease, inadequate training, and limited PPE were reported to have symptoms of acute stress. Another study also found that health workers who had a family member or relative with confirmed or suspected COVID-19 also experienced greater symptoms of acute stress, anxiety, PTSD, and depression [11], [25], [38]. Several studies explain that health workers who are placed in a risky environment need to be examined to identify psychological problems at an early stage [26], [27], [29], [31], [35], [38]. We note how important it is to maintain occupational safety and stress management behaviors because they can

affect many people who are close to health workers.

Fourth, five other studies examined symptoms and health status factors, which included: a history of psychiatric illness, having a chronic illness, having respiratory disease, having an autoimmune disease, having a positive result for COVID-19, and having poor personal health. There is clear evidence that having a history of mental disorders is a contributing risk factor for psychological problems [20], [38]. The results showed that the need for psychological assistance before or during the pandemic have correlate with the onset of somatic and depressive symptoms and the larger SSI scale [19], [32]. The occurrence of chronic non-communicable diseases will also increase the risk of anxiety, depression, and sleep disturbances [22], [33], [38]. Health workers who are confirmed positive for COVID-19 experience distress and sleep disturbances [20]. In addition, deteriorating health conditions can be a contributing factor to somatic and depressive symptoms as well as high levels of ILO [32].

The possibility of developing psychological problems will increase in health workers who experience comorbidities associated with hypertension, diabetes mellitus, dyslipidemia, asthma, and autoimmune diseases [26], [42], [43]. These findings indicate that it is important to pay attention to and prioritize the mental health status of health workers by providing supportive measures and psychological interventions for those at high risk. High-risk health workers need to be identified as soon as possible by providing mental health support and interventions with psychological support.

Perceived risk factors that contributed to the mental health status include high perceptions of work stress, fear of infecting others, reluctance to join as front-liners, fear of contamination, fear of death, level of suspicion of whether health workers were infected with COVID-19, perceived stress, and attitudes related to the epidemic. and behavioral factors. Having burnout was associated with acute stress disorder and reported poor health status [41]. Reluctance to work in the front line can cause other psychological issues, such as anxiety, depression, insomnia, and somatization [15], [32]. Fear of contamination and death is associated with anxiety and depression [21], [26]. Being suspicious of COVID-19 and being infected with COVID-19 also affect the mental health status of medical personnel [27]. HCWs who experience higher stress are associated with anxiety and depression [12]. Lack of self-confidence to deal with COVID-19 also affects a high incidence of somatization, depression, and SSI [32].

We documented that healthcare workers who had greater perceptions of stress were more likely to experience acute stress, anxiety, depression, and poor general health status [12], [42]. These conditions happened due to prolonged negative experiences that make them more vulnerable to have psychological problems while working in high-risk environments. Levels of stress felt by health workers can affect the high incidence of mental health problems and their severity [44]. During work at the hospital, health workers may maintain social distancing as a precaution against COVID-19 and fear of contracting the disease to their families [45]. Health workers who do not work on the front lines reported poor mental health status due to limited knowledge and practical skills

related to the epidemic [46]-[48]. Frontline health workers need support such as psychological first aid to improve their psychological condition while treating patients.

Sixth, four other studies investigated the coping strategies of health workers. The study results show that negative coping mechanisms also correlate with greater stress levels. Negative coping mechanisms were found as avoidance strategies, not knowing about the epidemic, and paying attention to negative information about COVID-19 [12], [13], [32], [34]. Health workers who hide their problems from others will also be at risk of developing depressive symptoms [12]. Avoidance strategies also correlate with high levels of distress [34]. Multiple logistical analyzes suggest that ignorance about COVID-19 is a contributing factor to depressive and somatic symptoms, as well as SSI [32]. In addition, too much attention to negative information about COVID-19 is a factor that can increase overall psychological problems include insomnia and depression [13].

Identifying health care worker coping strategies is critical to reducing suffering and other health consequences. Previous research during the SARS epidemic has shown that health care workers with posttraumatic stress and negative coping are at risk of drug abuse [49]. Therefore, there is a need for psychological screening and routine examinations to observe the suffering of health workers and appropriate coping mechanisms to improve the mental well-being of hospital workers [50].

Seventh, one study identified the uncertainty of information and control procedures about COVID-19 as a possible cause of suffering for health workers.

Frequent changes in COVID-19 infection control procedures are a contributing factor to depression and other psychological reactions [21]. We acknowledge that this disease is still challenging, and lack of information related to pandemic affects the perception and ability of all populations in dealing with COVID-19 at the beginning of the epidemic [34], [51]

Eighth, social factors have contributed to creating the risk of psychological problems. For example, being ignored by co-workers, suspected of being positive for COVID-19 by family members and co-workers, co-workers died, never given helped by neighbors or friends, and received negative feedback from other people. Not being listened to by co-workers is also associated with poor health status [42]. In addition to this, suspecting or confirming that family members and colleagues require them to be quarantined or hospitalized can lead to higher levels of acute stress symptoms, PTSS, anxiety, and depression [24], [38]. Similarly, having a co-worker die from COVID-19 is associated with the incidence of PTSS, depressive symptoms, and insomnia [24]. Health workers who hide their problems from others and are never given support by their neighbors are reported to have a higher proportion of symptoms of anxiety and depression [12].

The presence of stigmatization, rejection, and getting negative responses from family, friends, or the environment for joining frontliners during pandemic also increases the level of symptoms of anxiety and depression [13], [21]. Lack of reciprocal communication with co-workers is also likely to worsen general health [42]. Stigma from society has the potential to increase the burden of suffering higher. Previous research has shown that the

stigma experienced by health workers has an impact on three aspects: including job satisfaction, self-motivation, a decline in psychosocial functioning. However, social media itself can reduce stigma by preventing misinformation about COVID-19 [52]. In addition, appropriate public health education can help reduce fear as a basis for stigma [53].

2. The protective factors for mental health of HCWs

An interesting finding from this systematic review study is the presence of protective factors that can reduce psychological problems in health workers. These protective factors include a positive attitude when experiencing work stress, a healthy lifestyle, family support, and organizational support. Of the four factors, the positive attitude of health workers when experiencing work stress is the strongest factor [34], [54], [55]. A positive attitude had a significant correlation with low levels of stress during epidemic crises. Exercising and avoiding drinking alcohol are healthy lifestyles that can protect the mental health of HCWs [13]. Frequent contact with patients, fatigue, stress, lack of sleep, and relaxation increases the possibility of medical errors. Such conditions appear to be responsible for alcohol drinking and smoking attitudes among health workers [56]. Another study stated that drinking alcohol was correlated with sleep disturbances and other psychological problems [57]. Therefore, regular exercise, self-relaxation, and a healthy lifestyle could reduce depression and psychological problems.

Family support is also a protective factor to reduce the psychological burden so that health workers can tell about what they have faced while serving in the

hospital [27]. Another study reported that health workers who have children experience lower levels of stress than those who do not have children [34]. Possible explanations are letting the children let the health care provider rest from fatigue, frustration in dealing with patients, job difficulties, job requirements. So, they can focus on the positive aspects of life [58]. In addition, some hospitals provide facilities related to the COVID-19 pandemic, such as updating information about COVID-19, means of communication, and routine checks on their staff so that the level of anxiety is less [33].

Other evidence also shows that organizational social support is needed to support the psychological well-being of health workers. Such support can also foster positive work attitudes and satisfaction which are important for reducing distress [59]. Organizations should provide some resources to create a safe and comfortable environment and have effective infection control procedures in place [60]. A recent study found that providing PPE, care training, clear health care guidelines, up-to-date information, and infection control protocols help support healthcare workers and increase psychological resilience in a pandemic [61].

This systematic review study has several limitations: 1) most studies use cross-sectional methods that provide an overview of factors without further investigating the potential causal effects with definite follow-up interventions; 2) the studies included in the review process were conducted at the start and peak of the epidemic outbreak when the government had issued a stay-at-home policy; and 3) we have only included systematic review articles without searching through the grey

literature articles. Despite these limitations, this study has several strengths. We describe several risks and protective factors among healthcare workers drawn from several studies focusing on the SARS-CoV-2 outbreak. It is recommended that our study can be developed into a theoretical framework to identify health workers at risk for mental health problems. In addition, the protective factors presented are useful for reducing stress due to stressful situations among health workers during epidemics.

V. CONCLUSION

This study highlights some of the characteristics of health workers who are most at risk by describing some of the variables that contribute to psychological issues during the pandemic. Identification of risk factors and protective factors could be used as initial approach to manage psychological problems that occurred in health workers. Further studies are needed to investigate possible interventions to reduce these issues based on the identification of risk and protective factors.

REFERENCES

- [1] WHO, "Coronavirus disease 2019 (COVID-19) Situation Report – 82," 2020. [Online]. Available: https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200411-sitrep-82-covid-19.pdf?sfvrsn=74a5d15_2.
- [2] C. Wang, P. W. Horby, F. G. Hayden, and G. F. Gao, "A novel coronavirus outbreak of global health concern," *Lancet*, vol. 395, no. 10223, pp. 470–473, 2020.
- [3] A. Shah, R. Kashyap, P. Tosh, P. Sampathkumar, and J. C. O'Horo, "Guide to Understanding the 2019 Novel Coronavirus," *Mayo Clin. Proc.*, vol. 95, no. 4, pp. 646–652, Apr. 2020.
- [4] N. M. Linton *et al.*, "Incubation Period and Other Epidemiological Characteristics of 2019 Novel Coronavirus Infections with Right Truncation: A Statistical Analysis of Publicly Available Case Data," *J. Clin. Med.*, vol. 9, no. 2, p. 538, Feb. 2020.
- [5] ECDC, "Novel coronavirus disease 2019 (COVID-19) pandemic: increased transmission in the EU/EEA and the UK – sixth update," Stockholm, 2020.
- [6] M. Birhanu, B. Gebrekidan, G. Tesefa, and M. Tareke, "Workload Determines Workplace Stress among Health Professionals Working in Felege-Hiwot Referral Hospital, Bahir Dar, Northwest Ethiopia," *J. Environ. Public Health*, vol. 2018, p. 6286010, 2018.
- [7] L. Kang *et al.*, "The mental health of medical workers in Wuhan, China dealing with the 2019 novel coronavirus," *The Lancet Psychiatry*, vol. 7, no. 3, p. e14, 2020.
- [8] A. K. Sahu, V. T. Amrithanand, R. Mathew, P. Aggarwal, J. Nayer, and S. Bhoi, "COVID-19 in health care workers – A systematic review and meta-analysis," *Am. J. Emerg. Med.*, vol. 38, no. 9, pp. 1727–1731, Sep. 2020.
- [9] TribunJogja, "Total Sudah 139 Dokter di Indonesia Gugur Akibat Covid-19 Artikel ini telah tayang di Tribunjogja.com dengan judul Total Sudah 139 Dokter di Indonesia Gugur Akibat Covid-19, <https://jogja.tribunnews.com/2020/10/04/total-sudah-139-dokter-di-indonesia-gugur>," 2020. [Online]. Available: <https://jogja.tribunnews.com/2020/10/04/total-sudah-139-dokter-di-indonesia-gugur-akibat-covid-19>.
- [10] J. Lai *et al.*, "Factors Associated With Mental Health Outcomes Among Health Care Workers Exposed to Coronavirus Disease 2019.," *JAMA Netw. open*, vol. 3, no. 3, p. e203976, Mar. 2020.
- [11] H. Chen *et al.*, "Prevalence of posttraumatic stress symptoms in health care workers after exposure to patients with COVID-19," *Neurobiol. Stress*, p. 100261, 2020.
- [12] Y. Liu *et al.*, "Anxiety and depression symptoms of medical staff under COVID-19 epidemic in China," *J. Affect. Disord.*, vol. 278, no. September 2020, pp. 144–148, 2020.
- [13] J. Que *et al.*, "Psychological impact of the covid-19 pandemic on healthcare workers: A cross-sectional study in China," *Gen. Psychiatry*, vol. 33, no. 3, pp. 1–12, 2020.
- [14] S. Pappa, V. Ntella, T. Giannakas, V. G. Giannakoulis, E. Papoutsis, and P. Katsaounou, "Prevalence of depression, anxiety, and insomnia among healthcare workers during the COVID-19 pandemic: A systematic review and meta-analysis," *Brain. Behav. Immun.*, vol. 88, pp. 901–907, Aug. 2020.

- [15] G. M. McAlonan *et al.*, "Immediate and sustained psychological impact of an emerging infectious disease outbreak on health care workers.," *Can. J. Psychiatry.*, vol. 52, no. 4, pp. 241–247, Apr. 2007.
- [16] Y. Bao, Y. Sun, S. Meng, J. Shi, and L. Lu, "2019-nCoV epidemic: address mental health care to empower society.," *Lancet (London, England)*, vol. 395, no. 10224. pp. e37–e38, Feb-2020.
- [17] Y.-T. Xiang *et al.*, "Timely mental health care for the 2019 novel coronavirus outbreak is urgently needed," *The lancet. Psychiatry*, vol. 7, no. 3, pp. 228–229, Mar. 2020.
- [18] Q. Chen *et al.*, "Mental health care for medical staff in China during the COVID-19 outbreak.," *The lancet. Psychiatry*, vol. 7, no. 4. pp. e15–e16, Apr-2020.
- [19] D. Moher, A. Liberati, J. Tetzlaff, and D. G. Altman, "Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement.," *PLoS Med.*, vol. 6, no. 7, p. e1000097, Jul. 2009.
- [20] M. K. Şahin, S. Aker, G. Şahin, and A. Karabekiroğlu, "Prevalence of Depression, Anxiety, Distress and Insomnia and Related Factors in Healthcare Workers During COVID-19 Pandemic in Turkey," *J. Community Health*, no. 0123456789, 2020.
- [21] Y. Juan *et al.*, "Psychological distress surveillance and related impact analysis of hospital staff during the COVID-19 epidemic in Chongqing, China," *Compr. Psychiatry*, vol. 103, p. 152198, 2020.
- [22] P. Wańkowicz, A. Szylińska, and I. Rotter, "Assessment of mental health factors among health professionals depending on their contact with covid-19 patients," *Int. J. Environ. Res. Public Health*, vol. 17, no. 16, pp. 1–8, 2020.
- [23] M. Di Tella, A. Romeo, A. Benfante, and L. Castelli, "Mental health of healthcare workers during the COVID-19 pandemic in Italy," *J. Eval. Clin. Pract.*, no. May, pp. 1–5, 2020.
- [24] R. Rossi *et al.*, "Mental Health Outcomes Among Frontline and Second-Line Health Care Workers Dur," *JAMA Netw. open*, vol. 3, no. 5, pp. e2010185–e2010185, May 2020.
- [25] L. Kang *et al.*, "Impact on mental health and perceptions of psychological care among medical and nursing staff in Wuhan during the 2019 novel coronavirus disease outbreak: A cross-sectional study.," *Brain. Behav. Immun.*, vol. 87, pp. 11–17, Jul. 2020.
- [26] F. R. N. Keubo *et al.*, "Psychological distress among health care professionals of the three COVID-19 most affected Regions in Cameroon: Prevalence and associated factors," *Ann. Médico-psychologiques, Rev. Psychiatr.*, no. May, 2020.
- [27] J. Xing, N. Sun, J. Xu, S. Geng, and Y. Li, "Study of the mental health status of medical personnel dealing with new coronavirus pneumonia," *PLoS One*, vol. 15, no. 5, pp. 1–10, 2020.
- [28] CDC, "Coronavirus Disease 2019 (COVID-19)); US Department of Health and Human Services, CDC: Atlanta, GA, USA," 2020. [Online]. Available: <https://www.cdc.gov/coronavirus/2019-ncov/index.html>. [Accessed: 04-May-2021].
- [29] WHO, "Novel Coronavirus (2019-nCoV) advice for the public: myth busters," 2020.
- [30] W.-R. Zhang *et al.*, "Mental Health and Psychosocial Problems of Medical Health Workers during the COVID-19 Epidemic in China.," *Psychother. Psychosom.*, vol.

- 89, no. 4, pp. 242–250, 2020.
- [31] Q. Chen *et al.*, “Health anxiety in medical employees: A multicentre study.,” *J. Int. Med. Res.*, vol. 47, no. 10, pp. 4854–4861, Oct. 2019.
- [32] X. Xiaoming *et al.*, “The psychological status of 8817 hospital workers during COVID-19 Epidemic: A cross-sectional study in Chongqing,” *J. Affect. Disord.*, vol. 276, no. July, pp. 555–561, 2020.
- [33] T. H. Alenazi *et al.*, “Prevalence and predictors of anxiety among healthcare workers in Saudi Arabia during the COVID-19 pandemic,” *J. Infect. Public Health*, no. xxxx, 2020.
- [34] A. Babore *et al.*, “Psychological effects of the COVID-2019 pandemic: Perceived stress and coping strategies among healthcare professionals,” *Psychiatry Res.*, vol. 293, no. July, p. 113366, 2020.
- [35] P. Angerer, R. Petru, D. Nowak, and M. Weigl, “[Working conditions and depression in physicians].,” *Dtsch. Med. Wochenschr.*, vol. 133, no. 1–2, pp. 26–29, Jan. 2008.
- [36] J.-N. Wang, W. Sun, T.-S. Chi, H. Wu, and L. Wang, “Prevalence and associated factors of depressive symptoms among Chinese doctors: a cross-sectional survey.,” *Int. Arch. Occup. Environ. Health*, vol. 83, no. 8, pp. 905–911, Dec. 2010.
- [37] Z. Liu *et al.*, “Mental Health Status of Healthcare Workers in China for COVID-19 Epidemic,” *Ann. Glob. Heal.*, vol. 86, no. 1, p. 128, Oct. 2020.
- [38] Z. Zhu *et al.*, “COVID-19 in Wuhan: Sociodemographic characteristics and hospital support measures associated with the immediate psychological impact on healthcare workers,” *EClinicalMedicine*, vol. 24, 2020.
- [39] M. Alshekaili *et al.*, “Factors associated with mental health outcomes across healthcare settings in Oman during COVID-19: frontline versus non-frontline healthcare workers,” *BMJ Open*, vol. 10, no. 10, p. e042030, 2020.
- [40] Q. Cai *et al.*, “The mental health of frontline and non-frontline medical workers during the coronavirus disease 2019 (COVID-19) outbreak in China: A case-control study,” *J. Affect. Disord.*, vol. 275, no. July, pp. 210–215, 2020.
- [41] J. Jang, S. A. Lee, W. Kim, Y. Choi, and E.-C. Park, “Factors associated with mental health consultation in South Korea.,” *BMC Psychiatry*, vol. 18, no. 1, p. 17, Jan. 2018.
- [42] R. M. Gonzalo *et al.*, “Short-term emotional impact of COVID-19 pandemic on Spaniard health workers,” *J. Affect. Disord.*, vol. 278, pp. 390–394, 2021.
- [43] X. Xiao, X. Zhu, S. Fu, Y. Hu, X. Li, and J. Xiao, “Psychological impact of healthcare workers in China during COVID-19 pneumonia epidemic: A multi-center cross-sectional survey investigation,” *J. Affect. Disord.*, vol. 274, no. January, pp. 405–410, 2020.
- [44] N. Schneiderman, G. Ironson, and S. D. Siegel, “Stress and health: psychological, behavioral, and biological determinants,” *Annu. Rev. Clin. Psychol.*, vol. 1, pp. 607–628, 2005.
- [45] Y. Mo *et al.*, “Work stress among Chinese nurses to support Wuhan in fighting against COVID-19 epidemic.,” *J. Nurs. Manag.*, vol. 28, no. 5, pp. 1002–1009, Jul. 2020.
- [46] S. K. Brooks, R. Dunn, R. Amlôt, G. J. Rubin, and N. Greenberg, “A Systematic, Thematic Review of Social and Occupational Factors Associated With Psychological Outcomes in Healthcare Employees During an Infectious Disease Outbreak.,” *J.*

- Occup. Environ. Med.*, vol. 60, no. 3, pp. 248–257, Mar. 2018.
- [47] S. E. Chua *et al.*, “Psychological effects of the SARS outbreak in Hong Kong on high-risk health care workers.,” *Can. J. Psychiatry.*, vol. 49, no. 6, pp. 391–393, Jun. 2004.
- [48] C. W. C. Tam, E. P. F. Pang, L. C. W. Lam, and H. F. K. Chiu, “Severe acute respiratory syndrome (SARS) in Hong Kong in 2003: stress and psychological impact among frontline healthcare workers.,” *Psychol. Med.*, vol. 34, no. 7, pp. 1197–1204, Oct. 2004.
- [49] P. Wu *et al.*, “Alcohol abuse/dependence symptoms among hospital employees exposed to a SARS outbreak.,” *Alcohol Alcohol*, vol. 43, no. 6, pp. 706–712, 2008.
- [50] M. Ito and E. Matsushima, “Presentation of Coping Strategies Associated with Physical and Mental Health During Health Check-ups.,” *Community Ment. Health J.*, vol. 53, no. 3, pp. 297–305, Apr. 2017.
- [51] D. M. Morens and A. S. Fauci, “Emerging Pandemic Diseases: How We Got to COVID-19.,” *Cell*, vol. 182, no. 5, pp. 1077–1092, Sep. 2020.
- [52] T. Ramaci, M. Barattucci, C. Ledda, and V. Rapisarda, “Social stigma during COVID-19 and its impact on HCWs outcomes,” *Sustain.*, vol. 12, no. 9, pp. 1–13, 2020.
- [53] M. G. Weiss, J. Ramakrishna, and D. Somma, “Health-related stigma: rethinking concepts and interventions.,” *Psychol. Health Med.*, vol. 11, no. 3, pp. 277–287, Aug. 2006.
- [54] I. Khalid, T. J. Khalid, M. R. Qabajah, A. G. Barnard, and I. A. Qushmaq, “Healthcare Workers Emotions, Perceived Stressors and Coping Strategies During a MERS-CoV Outbreak.,” *Clin. Med. Res.*, vol. 14, no. 1, pp. 7–14, Mar. 2016.
- [55] H. Cai *et al.*, “Psychological Impact and Coping Strategies of Frontline Medical Staff in Hunan Between January and March 2020 During the Outbreak of Coronavirus Disease 2019 (COVID-19) in Hubei, China.,” *Med. Sci. Monit. Int. Med. J. Exp. Clin. Res.*, vol. 26, p. e924171, Apr. 2020.
- [56] M. G. Ficarra *et al.*, “Tobacco use prevalence, knowledge and attitudes among Italian hospital healthcare professionals.,” *Eur. J. Public Health*, vol. 21, no. 1, pp. 29–34, Feb. 2011.
- [57] S. Chakravorty, N. S. Chaudhary, and K. J. Brower, “Alcohol Dependence and Its Relationship With Insomnia and Other Sleep Disorders.,” *Alcohol. Clin. Exp. Res.*, vol. 40, no. 11, pp. 2271–2282, Nov. 2016.
- [58] M. Walton, E. Murray, and M. D. Christian, “Mental health care for medical staff and affiliated healthcare workers during the COVID-19 pandemic.,” *Eur. Hear. journal. Acute Cardiovasc. care*, vol. 9, no. 3, pp. 241–247, Apr. 2020.
- [59] T. W. H. Ng and K. L. Sorensen, “Toward a Further Understanding of the Relationships Between Perceptions of Support and Work Attitudes: A Meta-Analysis,” *Gr. Organ. Manag.*, vol. 33, no. 3, pp. 243–268, Jun. 2008.
- [60] B. Y. Q. Tan *et al.*, “Psychological Impact of the COVID-19 Pandemic on Health Care Workers in Singapore.,” *Annals of internal medicine*, vol. 173, no. 4, pp. 317–320, Aug-2020.
- [61] C. S. Ho, C. Y. Chee, and R. C. Ho, “Mental Health Strategies to Combat the Psychological Impact of COVID-19 Beyond Paranoia and Panic.,” *Ann. Acad. Med. Singapore*, vol. 49, no. 3, pp. 155–160, Mar. 2020.

BIOGRAFI PENELITI

Peneliti 1

NAMA : Ns. Wahyi Sholehah Erdah Suswati, S.Kep.,
Ns., M.Kep
Institusi : Program Studi Ilmu Keperawatan Fakultas
Ilmu Kesehatan Universitas dr. Soebandi
Pengalaman Penelitian: : Fokus pada penelitian Keperawatan
Kesehatan Jiwa

Peneliti 2

NAMA : Ns. Retno Lestari, S.Kep., M.Nurs
Institusi : Program Studi Profesi Ners Fakultas Ilmu
Kesehatan Universitas dr. Soebandi Jember
Pengalaman Penelitian: : Penelitian Berfokus pada Bidang
Keperawatan Kesehatan Jiwa

Peneliti 3

NAMA : Ns. M.Elyas Arif Budiman, S.Kep., Ns.,
M.Kep
Institusi : Program Studi Profesi Ners Fakultas Ilmu
Kesehatan Universitas dr. Soebandi Jember
Pengalaman Penelitian: : Penelitian Berfokus pada Bidang
Keperawatan Kesehatan Jiwa dan
Keperawatan Komunitas

Peneliti 4

NAMA : Ns. Zidni Nuris Yuhbaba, S.Kep., Ns., M.Kep
Institusi : Program Studi Ilmu Keperawatan Fakultas
Ilmu Kesehatan Universitas dr. Soebandi
Pengalaman Penelitian: : Fokus pada penelitian Keperawatan
Kesehatan Jiwa