

Causal effect of health belief model constructs in predicting anxiety in health workers: An insight from Indonesia during COVID-19 pandemic

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ABSTRACT

Health workers are a vulnerable group to the psychosocial effects during the COVID-19 pandemic. The purpose of this study is to assess the constructs of health belief model (HBM) to predict anxiety during the pandemic among health workers using a path analysis model. It was an analytic observational study with a cross-sectional design. The data were collected through an online questionnaire, from May to July 2020. The study population was health workers in Indonesia. A sample of 508 health workers was selected for this study. The dependent variable was anxiety. The independent variables were gender, age, education, income, perceived susceptibility, perceived seriousness, perceived benefit, perceived barrier, self-efficacy, number of family members, and daily need fulfillment. The selected data were analyzed by a path analysis run on Stata 13. This study found that anxiety was directly increased by high perceived susceptibility ($b = 0.41$; 95% CI= 0.01 to 0.80; $p = 0.044$), high perceived seriousness ($b = 0.99$; 95% CI= 0.59 to 1.40; $p < 0.001$), and high perceived barrier ($b = 0.84$; 95% CI= 0.42 to 1.25; $p < 0.001$). Anxiety was directly decreased by high perceived benefit ($b = -12.24$; 95% CI= -1211.64 to 1187.16; $p = 0.984$), being male ($b = -0.18$; 95% CI= -0.63 to 0.27; $p = 0.430$), sufficient daily needs fulfillment ($b = -1.10$ 95% CI= -1.49 to -0.70; $p < 0.001$), and strong self-efficacy ($b = -0.16$; 95% CI= -0.58 to 0.26; $p = 0.467$). Anxiety was indirectly affected by age, number of family members, income, and education. It can be concluded that the health belief model can be used to predict anxiety in health workers during the pandemic.

Key words:

anxiety; Covid-19; pandemics; health belief model; health personnel

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INTRODUCTION

As the Coronavirus (COVID-19) pandemic sweeps across the world, it is causing widespread concern, fear, and stress, all of which are natural and normal reactions to the changing and uncertain situation that everyone finds themselves in.¹ The COVID-19 pandemic has alarming implications for individual and collective health and emotional and social functioning.² The World Health Organization takes the impact of the crisis on people's mental health seriously and is monitoring the situation together with national authorities while providing information and guidance to governments and the public.³

A previous study suggested that specific infectious diseases are associated with a significantly increased prevalence of anxiety and other mental health issues.⁴ Some groups of people may be more susceptible than others to the psychosocial effects of the COVID-19 pandemic. Healthcare providers, especially physicians and nurses, are also particularly vulnerable to emotional distress during the current pandemic, given their risk of exposure to the virus, concern about infecting and caring for their relatives, shortages of personal protective equipment (PPE), longer work hours, and involvement in emotionally and ethically fraught resource-allocation decisions.^{2,5}

American Psychiatric Association in the Diagnostic and Statistical Manual of Mental Disorders-5 (DSM-5) stated that anxiety is defined as the anticipation of future threats; it is distinguished from fear, the emotional response to real or perceived imminent threats.⁶ The health belief model (HBM) is a socio-cognitive approach that proposes that people are likely to engage in a given health-related behavior when they believe the problem could have serious effects on daily activities, effective intervention, and perceived barriers to

taking action. Previous studies laid the HBM constructs as a framework for understanding mental health care utilization for all populations.⁷ HBM provides a framework to explain perceptions and attitudes that one has toward illness and the negative outcomes of certain actions. It assumes individual beliefs about the risk of contracting a disease or health problem, perceived effectiveness of preventive behavior, and cues to action determine the behaviors.⁸

The risk factors contributing to poor mental health are multifaceted, encompassing genetic, sociocultural, demographic, social, and psychological elements.^{9,10} To our knowledge, anxiety among healthcare workers during the pandemic is influenced not only by the direct impact of the disease's emergence but also by the indirect effects of individuals' demographic characteristics and their perceptions within the HBM construct. Many studies have indicated that sociodemographic factors such as gender,¹¹ employment status,¹² educational attainment,^{13,14} and income level^{13,15} influence mental health status. However, their specific relationship with anxiety was previously only explained simultaneously. Investigating whether these factors have a direct, moderating, or mediating influence on anxiety during the pandemic is important.¹⁶ As a consequence, investigations using demographic factors and HBM framework are required to identify factors related to anxiety among health workers during the COVID-19 pandemic. It is expected that this investigation will provide suggestions to ensure health personnel are able to take actions to prevent deteriorating mental health in those at risk of a future pandemic. We hypothesized that anxiety among healthcare workers during the pandemic may be influenced not only by the direct impact of the disease's emergence but also by the indirect effects of individuals' demographic characteristics

and their perceptions within the HBM construct. This study aimed to investigate the potential causal effect of HBM constructs and demographic characteristics in anxiety during the COVID-19 pandemic among health workers using a path analysis model.

METHODS

Study design

A cross-sectional study was carried out in Indonesia from May to June 2020.

Population and sample

The study population was health workers in Indonesia. This study applied the rule of thumb of sample size, by recommending 5 or 10 observations per estimated parameter to determine the minimum sample size for structural equation modeling (SEM). As a reference, Wolf et al.¹⁷ revealed a range of sample size requirements (i.e., from 30 to 460 cases) for SEM. Samples were collected using random sampling through web-based survey. Participant's criteria: healthcare workers who are highly likely to interact with patients or medical equipment used to treat COVID-19 patients. As many as 551 people who worked in healthcare facilities (hospitals, community health centers, clinics, or medical laboratories) filled out the online questionnaire. Study participants were recruited from 30 out of the 34 provinces in Indonesia. Around 43 participants were excluded for the following reasons: duplicate data, filled out incomplete data, non-health worker, or not working in a hospital/ other healthcare facilities. A sample of 508 health workers was selected and analyzed for this study.

Study variables

The dependent variable was anxiety. The independent variables were gender, age, education, income, perceived susceptibility, perceived seriousness, perceived benefit, perceived barrier, self-

efficacy, number of family members, and daily need fulfillment.

Operational definition of variables

Anxiety was defined as a health worker's reaction to stress caused by fear during COVID-19 pandemic, which is characterized by feelings of tension, worried thoughts, and physical changes. A 27-item modified Depression Anxiety Stress Scale (DASS) from the Psychology Foundation of Australia was used to assess anxiety in health workers. 4-scales response options (0= "never" to 4= "very often") were provided for each item. The measurement scale was continuous, but for the purpose of data analysis, it was transformed into dichotomous, coded 0 for low (score <38) and 1 for high (score ≥38).

Perceived susceptibility was defined as an individual perception of his/her chances of getting infected with the coronavirus (COVID-19). The data were collected by questionnaire. The measurement scale was continuous, but it was transformed into dichotomous, coded 0 for low (score <14) and 1 for high (score ≥14).

Perceived seriousness was defined as individual knowledge related to the severity of the COVID-19 infection. The data were collected by questionnaire. The measurement scale was continuous, but it was transformed into dichotomous, coded 0 for low (score <22) and 1 for high (score ≥22).

Perceived benefit was defined as an individual's opinion of desirable behavioral health beliefs necessary to prevent health workers from being infected by COVID-19 during the pandemic. The data were collected by questionnaire. The measurement scale was continuous, but it was transformed into dichotomous, coded 0 for low (score <14) and 1 for high (score ≥14).

Perceived barrier was defined as an individual's opinion as to what will inhibit health workers from taking preventive actions (e.g. barriers to obtaining personal protection equipment to provide health services during COVID-19 pandemic). The

data were collected by questionnaire. The measurement scale was continuous, but it was transformed into dichotomous, coded 0 for low (score <13) and 1 for high (score \geq 13).

Self-efficacy was defined as a health worker's belief that they can prevent themselves from experiencing anxiety during COVID-19 pandemic. The data were collected by a 5-item questionnaire. The measurement scale was continuous, but for the purpose of data analysis, it was transformed into dichotomous, coded 0 for weak (score <13) and 1 for strong (score \geq 13).

Gender was defined as the biological characteristics of a health worker as female or male. The data were collected by a questionnaire. The measurement scale was categorical, coded 0 for female and 1 for male.

Age was defined as the length of time (years) a health worker has lived. The data were collected by a questionnaire. The measurement scale was continuous, but it was transformed into dichotomous, coded 0 for age <50 years and 1 for age \geq 50 years.

Education was defined as the highest education level attained by the health worker. The data were collected by a questionnaire. The measurement scale was categorical.

Income was defined as the amount of money that is earned from working as a health worker per month. The data were

collected by a questionnaire. The measurement scale was continuous, but it was transformed into dichotomous, coded 0 for low income (<Rp 6,800,000) and 1 for high income (\geq Rp 6,800,000).

Fulfillment of daily needs was defined as health worker's perceived ability to meet their current living expenses during the Covid-19 pandemic. The data were collected by a questionnaire with response options on a 3-point scale: 0= "insufficient", 1= "doubt", and 2= "sufficient".

Number of family members was defined as the number of persons who lived together with the health worker in a household. The data were collected by a questionnaire. The measurement scale was continuous, but for the purpose of data analysis, it was transformed into dichotomous, coded 0 for <3 people and 1 for \geq 3 people.

Face and content validity were evaluated by a doctor, nurse, and public health expert to ensure the questionnaire's acceptability. Face validity evaluates the appearance of the questionnaire in terms of feasibility, readability, consistency of style and formatting, and the clarity of the language used.¹⁸ The reliability of the questionnaire was assessed, using internal consistency. Cronbach's alpha coefficients > 0.7 represented acceptable reliability.¹⁹

Table 1. The results of reliability tests

Variables	N sample	Number of items in the scale:	Scale reliability coefficient
Anxiety	20	27	0.92
Perceived susceptibility	20	10	0.81
Perceived seriousness	20	10	0.87
Perceived benefit	20	10	0.90
Perceived barrier	20	10	0.73
Self-efficacy	20	5	0.60

Data analysis

A set of structured questionnaires was developed to collect data on participant characteristics (gender, age, education, income, type of work), the health belief model constructs (perceived susceptibility, seriousness, benefit, and barrier), and the outcome (anxiety). The questionnaire was shared with the participants through an internet-based survey using Google Forms, from April to July 2020. Selected data were described on frequency, percent, mean, standard deviation (SD), minimum, and maximum for continuous data. Sample characteristics of categorical data were described as frequency (n) and percent (%). Path analysis was conducted to examine the relationships between demographic characteristics, HBM constructs and anxiety. It is commonly used to analyze models that are more complex (and realistic) than multiple regression. Path analysis enables the simultaneous examination of both direct and indirect multivariable effects. Path analysis proceeded in 5 steps: (1) Model specification; (2) Model identification; (3) Model fit; (4) Coefficient estimates; (5) Model re-specification (if necessary).

Research Ethics

Informed consent has been inserted on the home page (this part will appear when participants open the Google Forms link). After reading the description of the contents of the informed consent and stating their agreement, participants can proceed to the next page to start answering the questions in the questionnaire form completely. Participants can refuse to participate by ignoring and not proceeding to the next stage. The authors ensured that the gathered personal information was managed in a manner that protects individual's privacy rights. This study was approved by the research ethics committee from the Faculty of Medicine, Universitas Islam Al-Azhar, Mataram, East Nusa Tenggara, Indonesia, with ethical clearance number 21/EC/FK-06/UNIZAR/VI/2020.

RESULTS

Sample characteristics

Table 2 shows the sample characteristics for categorical data. Two-thirds of the sample were female (76.64%), one-third of the sample was working as nurses (36.50%), and half of the sample had sufficient perceived daily needs fulfillment (54.88%).

Table 2. Sample characteristics (categorical data)

Sample characteristics	n	%
Gender		
Female	338	76.38
Male	120	23.62
Education level		
Diploma III	212	41.73
Diploma IV	69	13.58
Undergraduate	163	32.09
Magister	61	12.01
Doctoral	3	0.59
Fulfillment of daily needs		
Insufficient	148	29.13
Doubtful	86	16.93
Sufficient	274	53.94
Type of health workers		
Nutritionist	15	3.0

Sample characteristics	n	%
Pharmacist	20	3.9
Midwifery	91	17.9
Dentist	10	2.0
Medical specialist	15	3.0
Medical practitioner	40	7.9
Epidemiologist	8	1.6
Physiotherapist	27	5.3
Occupational therapist	1	0.2
Public health counselor	10	2.0
Nurse	178	35.0
Dental nurse	1	0.2
Central sterile supply department staff	1	0.2
Laboratory staff	43	8.5
Radiologist	7	1.4
Psychologist	6	1.2
Medical record staff	28	5.5
Sanitarian	5	1.0
Patient support team	1	0.2
Covid-19 team	1	0.2

Table 3 shows the sample characteristics for continuous data. Table 2 shows that the average age of health workers was 34 years (Mean= 34.42; SD=

10.02). The average score of anxiety was 38.85 (Mean= 38.83; SD= 13.36), with the highest score being 80.

Table 3. Sample characteristics (continous data)

Sample characteristics	n	Mean	SD	Minimum	Maximum
Age (year)	508	34.02	9.92	21	95
Income (Rupiah)	508	6,406,352	8,896,932	150,000	75,000,000
Number of family members	508	3.60	1.86	0	14
Anxiety (score)	508	38.94	13.41	8	80
Perceived susceptibility (score)	508	12.78	4.49	0	26
Perceived seriousness (score)	508	21.34	4.20	5	30
Perceived benefit (score)	508	25.41	3.66	11	30
Perceived barrier (score)	508	10.36	4.54	0	25
Self-efficacy (score)	508	11.96	2.18	6	15

Bivariate analysis

Table 4 shows the results of bivariate analysis on the determinants of anxiety in health workers during the COVID-19 pandemic using Health Belief Model constructs. Male health workers (OR= 0.97; p= 0.890), low income (OR= 0.64; p= 0.044), older age (OR= 0.86; p= 0.705), high number of family members (OR= 0.72; p= 0.136), high perceived

benefit (OR= 0.76; p= 0.308), and self-efficacy (OR= 0.43; p= 0.168) decreased the risk of anxiety. Meanwhile, high perceived susceptibility (OR= 1.98; p<0.001), high perceived seriousness (OR= 2.27; p<0.001), and high perceived barrier (OR= 4.07; p<0.001) increased the risk of anxiety

Table 4. The results of bivariate analysis on the determinants of anxiety in health workers during the COVID-19 pandemic using Health Belief Model constructs

Independent variables	Anxiety				OR	p
	Low		High			
	n	%	n	%		
Gender						
Female	191	49.23	197	50.77		0.531
Male	63	52.50	57	47.50		
Income						
<Rp 6,800,000	180	46.39	208	53.61		0.003
≥Rp 6,800,000	74	61.67	46	38.33		
Age						
<50 years	236	49.68	239	50.32		0.589
≥50 years	18	54.55	15	45.45		
Number of family member						
<3 people	179	47.99	194	52.01		0.132
≥3 people	75	55.56	60	44.44		
Daily need fulfillment						
Insufficient	82	35.04	152	64.96		<0.001
Sufficient	172	62.77	102	37.23		
Perceived susceptibility						
Low (score <14)	157	59.02	109	40.98		<0.001
High (score ≥14)	97	40.08	145	59.92		
Perceived seriousness of disease						
Low (score <22)	155	61.02	99	38.98		<0.001
High (score ≥22)	99	38.98	155	61.02		
Perceived benefit						
Low (score <14)	0	0.00	1	100		0.317
High (score ≥14)	254	50.10	253	49.90		
Perceived barrier						
Low (score <13)	140	64.22	78	35.78		<0.001
High (score ≥13)	114	39.31	176	60.69		
Self-efficacy						
Weak (score <13)	134	46.21	156	53.79		0.049
Strong (score ≥13)	120	55.05	98	44.95		

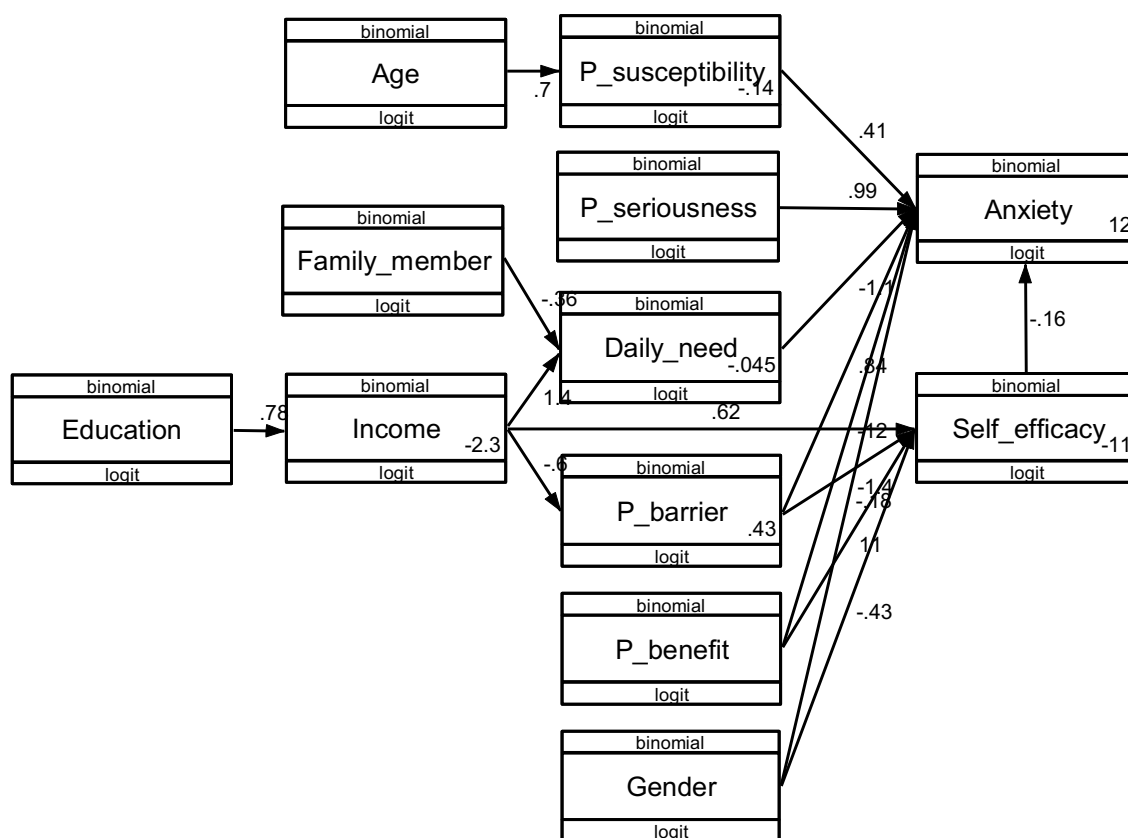
Path analysis**a. Model specification**

Figure 1. Path analysis model of health belief constructs on the incidence of anxiety in health workers during the COVID-19 pandemic

Figure 1 depicts the path analysis model of health belief constructs on the incidence of anxiety in health workers during the COVID-19 pandemic, using primary data from 508 health workers.

b. Model identification

Figure 1 shows that health belief model constructs were associated with anxiety in health workers during the Covid-19 pandemic. Figure 1 shows that anxiety was directly affected by gender, perceived susceptibility, perceived seriousness, perceived benefit, perceived barrier, self-efficacy, and daily needs fulfillment. Anxiety was indirectly affected by age, number of family, income, and education.

c. Model fit

The Log-likelihood value of the final model was -1884.82. Log-likelihood measures the goodness of fit of a statistical model to a sample of data for given values of the unknown parameters.

d. Coefficient estimates

Table 5 reports the results of the path analysis coefficient from each correlation. Table 5 showed that health workers with high perceived susceptibility had logodds (possibility) to experience anxiety 0.41 units higher than those with low perceived susceptibility ($b = 0.41$; 95% CI = 0.01 to 0.80; $p = 0.044$). High perceived seriousness ($b = 0.99$; 95% CI = 0.59 to 1.40; $p < 0.001$) and high perceived barriers directly and significantly increased the

logodd of anxiety (b= 0.84; 95% CI= 0.42 to 1.25; p<0.001).

Males (b= -0.18; 95% CI= -0.63 to 0.27; p= 0.430) and high perceived benefit (b= -12.24; 95% CI= -1211.64 to 1187.16; p= 0.984), sufficient daily needs fulfillment

(b= -1.10 95% CI= -1.49 to -0.70; p<0.001), and strong self-efficacy (b= -0.16; 95% CI= -0.58 to 0.26; p= 0.467) directly lowered the logodd of anxiety, but they were statistically non-significant.

Table 5. The results of path analysis on the determinants of anxiety in health workers during the Covid-19 pandemic using the Health Belief Model

Dependent variable	Independent variable	Path analysis coefficient (b)	95% CI		p
			Lower limit	Upper limit	
Direct effect					
Anxiety (high)	← Gender (male)	-0.18	-0.63	0.27	0.430
	← Perceived susceptibility (high)	0.41	0.01	0.80	0.044
	← Perceived seriousness (high)	0.99	0.59	1.40	<0.001
	← Perceived benefit (high)	-12.24	-1211.64	1187.16	0.984
	← Perceived barrier (high)	0.84	0.42	1.25	<0.001
	← Self-efficacy (strong)	-0.16	-0.58	0.26	0.467
	← Daily need fulfillment (sufficient)	-1.10	-1.49	-0.70	<0.001
Indirect effect					
Perceived susceptibility (high)	← Age (≥50 years)	0.70	-0.03	1.43	0.061
Perceived barrier (high)	← Income (high)	-0.60	-1.01	-0.18	0.005
Self-efficacy (strong)	← Perceived barriers (high)	-1.39	-1.76	-1.00	<0.001
	← Perceived benefit (high)	11.44	-1187.95	1210.85	0.985
	← Gender (male)	-0.43	-0.89	0.02	0.061
Daily need fulfillment (sufficient)	← Income (high)	0.62	0.18	1.06	0.006
	← Income (high)	1.40	0.92	1.87	<0.001
Income (high)	← Number of family members ≥5 people	-0.36	-0.77	0.06	0.091
	← Education (high)	0.78	0.57	0.98	<0.001

N observation= 508
Log likelihood= -1884.82

e. Model re-specification

Model re-specification was not carried out because it was considered in accordance with the theory and data sample.

DISCUSSION

The association between gender and anxiety

The results of path analysis showed that gender was directly and negatively associated with anxiety. Male health workers decreased the risk of anxiety during the COVID-19 pandemic. A previous study demonstrated that women are approximately twice as likely to have generalized anxiety disorder (GAD).²⁰ Evidence from various studies has suggested that genetic factors and female reproductive hormones may play important roles in the expression of these gender differences. The result of this study was in line with Fallan and Opstad,²¹ indicating that females have significantly lower self-efficacy than males.

In this study, gender refers to sex, an immutable inherent state that classifies individuals as male or female determined by biological factors.²² There are still inconsistent studies concerning the differences in anxiety expression between men and women. A study reported that there was no difference between the levels of COVID-19 related fear and anxiety in terms of gender.²³

While gender itself may not exhibit a significant direct impact on anxiety, our study found that gender influences anxiety through indirect pathways. Specifically, perceived vulnerability emerges as a mediating variable between gender and anxiety. Our findings suggest that males had lower levels of perceived susceptibility, whereas it is significantly correlated with higher levels of anxiety (Table 1). Sasaki²⁴ clarified that males had lower perceived

susceptibility to COVID-19 and anxiety. This is supported by a survey conducted in March–April 2020, which indicated that men are more reluctant than women to engage in preventive behavior (wearing protective masks and respecting social distancing).^{25,26}

The association between perceived susceptibility and anxiety

The results of this study indicated that high perceived susceptibility increased anxiety in health workers. Health workers (mostly doctors and nurses) are at the forefront of the COVID-19 outbreak response and are thus exposed to hazards that put them at risk of infection^{27,28,29,30}, considering most healthcare workers are unable to work remotely.^{31,32} Health workers who are highly exposed to the airways and the oral cavity of patients for longer working hours and higher workloads may increase their perceived susceptibility and lead to higher anxiety^{27,33}. Fear of infection also led to employment discrimination, including health workers, even when few people in those groups are infected or contagious³⁴. Another existing study suggested that perceived susceptibility to COVID-19 is related to anxiety based on gender differences³⁵, however, this correlation was not explored in this study.

The association between perceived seriousness and anxiety

The results of path analysis showed that perceived seriousness was directly and positively associated with anxiety. Lin et al.³⁴ stated that psychological and behavioral responses to COVID-19 have been dramatic during the rising phase of the outbreak. Since the Indonesian government first acknowledged the outbreak on 2 March, at least 24 Indonesian doctors have died from COVID-19.³⁵ The high number of mortality cases among health workers

due to COVID-19 prompts perceived seriousness as a predictor of anxiety. During the pandemic, the media attention to this topic increased. Previous studies found that an increasing trend in perceived susceptibility and severity as the number of new infections increased may lead to their anxiety.³⁶

The association between perceived benefit and anxiety

Path analysis model showed that perceived benefit toward PPE use was directly and negatively associated with anxiety. Perceived benefit of stressful events is identified as cognitive reappraisal strategies that promote personal well-being. Benefits from the COVID-19 pandemic may include personal and relational levels, such as improved personal hygiene.³⁷ The safety of health workers is an absolute priority at all times, especially during the current COVID-19 situation. Based on the evidence, the COVID-19 virus is transmitted between people through close contact and droplets.³⁸ PPE is an important component, but only one part, of a system protecting staff and other patients from COVID-19 cross-infection. Appropriate use significantly reduces the risk of viral transmission and anxiety toward contracting COVID-19.³⁹ In contrast, the current study revealed a non-significant relationship between perceived benefit and anxiety. The perception of benefits indicates that health workers recognize the effectiveness of using PPE, washing hands with soap, and practicing social distancing in preventing transmission and exposure to the SARS-COV-2 virus. However, this awareness still impacts their anxiety levels. Hence, within this model, we have incorporated the impact of self-efficacy as a mediating variable on anxiety. Further elucidation regarding the extent of this correlation's influence is provided in the subsequent section.

A path model revealed an indirect association between perceived benefits and

anxiety, mediated by self-efficacy. This study defined perceived benefit as beliefs about the advantages of methods to reduce the risk or severity of illness or harmful conditions as a result of COVID-19 pandemic. Meanwhile, perceived self-efficacy is a person's confidence in his or her ability to avoid exposure to COVID-19 infection⁴⁰. Greater perceived self-efficacy can result from high perceived benefit.

The association between perceived barrier and anxiety

A recent study reported that the perceived barrier toward PPE use was directly and positively associated with anxiety. PPE used in healthcare were gloves, aprons, long-sleeved gowns, goggles, fluid-repellent surgical masks, eye, nose, and mouth protection, face visors, and respirator masks. Healthcare workers should wear protective clothing when there is a risk of contact with COVID-19 patients.⁴¹ PPE shortages endanger both patients and healthcare workers during the COVID-19 pandemic, including in Indonesia.^{1,42,43} In some reported cases, British doctors have threatened to resign over the lack of PPE.⁴⁴

The COVID-19 pandemic causes an increase in the disease spread with fluctuating patient demand that may affect the capacity and overall functioning of the hospitals and risks arising.⁴⁵ However, at the beginning of the pandemic, there was a PPE shortage due to the high need for PPE. Policymakers and experts worldwide have called for donations of existing PPE, increased production by manufacturers, and novel fabrication strategies.⁴⁶ In Indonesia, the government directed healthcare workers to wear plastic raincoats to work, while stories emerged of nurses pooling resources to buy protective masks to share amongst themselves.⁴⁷ Barriers to obtaining PPE during the COVID-19 pandemic triggered anxiety in health workers, due to increased susceptibility to infection in health service.⁴⁸

Another pathway suggests that perceived barriers are associated with anxiety, albeit through an indirect mechanism, through self-efficacy. This outcome reflects the fact that high perceived barriers, such as difficulty in acquiring personal protective equipment, discomfort while using hazmat suits during work, or experiencing challenges in performing daily activities, could decrease self-efficacy and increase anxiety levels.⁴⁹

The association between self-efficacy and anxiety

This study showed that strong self-efficacy directly decreased anxiety, however this association was statistically non-significant. Bults et al.⁵⁰ demonstrated that high self-efficacy was associated with having a strong intention to comply with government-advised preventive measures and taking protective measures. A study was developed to ascertain the effects of the COVID-19 pandemic on health workers' efficacy and absenteeism in the United States (US) and the United Kingdom (UK) during the first 100 days after the first confirmed cases of COVID-19. Efficacy is defined as the ability to produce an intended result or the ability to perform a job to a satisfactory degree. Absenteeism is defined as an employee's intentional absence from work. Low levels of health workers' efficacy or high levels of absenteeism in the US or the UK would adversely affect the inflicted healthcare system's ability to operate at an optimum level during the COVID-19 pandemic. The findings of the study indicate that approximately half of the HCWs in the US and the UK were unable to perform their jobs to an acceptable standard during the first 100 days after the first confirmed cases of COVID-19. The data show that the fear of contracting COVID-19 due to a perceived lack of personal protective equipment (PPE) is the primary factor

contributing to the high percentage of HCWs unable to perform their jobs to an acceptable standard.⁵¹

The association between daily need fulfillment and anxiety

A recent study reported that daily need fulfillment was directly and negatively associated with anxiety in health workers during the COVID-19 pandemic. Kiyamaz and Öztürkkal reported that households' daily concerns during the COVID-19 pandemic caused by loss of income including the inability to meet short-term expenses including healthcare, daily living expenses (food and utilities), daily personal protective equipment (mask and hand sanitizer), and the inability to maintain the existing living standard.⁵²

The association between age and anxiety

The results of this study indicated that age was indirectly and positively associated with anxiety through perceived susceptibility. A previous study conducted by Jordan et al.⁵³ and CDC COVID-19 Response Team,⁵⁴ reported that older health workers have had to join as frontline workers and some have to come out of retirement to offer experience, expertise, and leadership, and boost the morale of younger professionals. Old age alongside preexisting health conditions such as hypertension, diabetes mellitus, cardiovascular disease, chronic lung disease, and immunosuppression were identified as susceptible to COVID-19 risk factors.

The association between education and anxiety

The results of this study reported that education was indirectly associated with anxiety through income. Higher education increased individual salaries. Health workers with a high income had a higher possibility to fulfill the daily needs

of themselves and their family members during the pandemic. Education (especially a program that is intended to improve self-management) is positively associated with improvement in patient regularity toward medical treatment plans and preventive behavior, and lowering anxiety.^{55,56}

The association between income and anxiety

This study reported that income was indirectly associated with anxiety through daily need fulfillment, perceived barriers, and self-efficacy. Quarantine has the potential effort for limit the spread of COVID-19 infection. The major obstacles to compliance for those asked to enter quarantine include loss of income during quarantine and loss of employment after quarantine.⁵⁷ When individuals are quarantined in their own homes, they are effectively isolated from the outside world, and their livelihoods may be jeopardized. Quarantined individuals not only risk the loss of income if they become infected and unable to work, but they also risk losing their employment entirely because of absence or stigma related to the disease, regardless of whether they become infected. Loss of income heads the list of most frequently cited major obstacles to compliance with quarantine.⁵⁷

The association between the number of family members and anxiety

The findings of this study revealed that an increased number of family members led to elevated anxiety levels due to heightened daily fulfillment needs. Health workers are worried about being exposed to Coronavirus in the hospital and transmitting it to their families. At the family level, the pandemic has led to a re-organization of everyday life. Health workers as parents have experienced increased pressure to keep work running as well as to take care of online schooling children at home at the same time. It is compounded by the increasing fear of

losing family members who belong to a risk group.^{58,59}

Data collection is carried out through online surveys, which can only be filled out by people who have internet access and are sufficiently biased to be interested in the research topic. However, this study includes study populations that were generated with few exclusion criteria, resulting in them being relatively similar to the general population. The effect of unmeasured or unknown confounders in this study was controlled by structural equation modeling.

RECOMMENDATION

The findings of this study suggest that constructs within the Health Belief Model directly influence anxiety levels, while sociodemographic factors indirectly contribute to reducing anxiety among healthcare personnel during the pandemic. This study can be used to implement future recommendations to prevent high anxiety and fear of illness during a pandemic. The findings of this study can serve as valuable recommendations for government or health department policymakers. When crafting preventive interventions or strategies to alleviate anxiety during a pandemic, it is crucial to strengthen sociodemographic factors and take into account the constructs within the Health Belief Model, particularly among healthcare workers.

AUTHOR CONTRIBUTION

Ika Yuli Ayuningrum conceived the study design and methodology, collected the data, developed the questionnaire, developed the path model, performed data analysis, and drafted the manuscript. Wahyu Tri Sudaryanto made a substantive intellectual contribution to enrich the discussion section.

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CONFLICT OF INTEREST

We declare that there was no conflict of interest.

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