

Model of protective behavior during the COVID-19 pandemic in Indonesia

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ABSTRACT

To prevent coronavirus disease 2019 (COVID-19) from spreading extensively and rapidly during the pandemic, protective behaviors are crucial. This study aimed to determine the influence of risk perceptions, health care, social influences, and intentions on the improvement of protective behaviors during the COVID-19 pandemic. There were 325 participants consisting of 74 men and 251 women (mean age (M)=21.47, SD=6.8). Based on previous studies, measurements were conducted using a variety of questionnaires. The hypotheses were examined by data analysis using structural equation modeling (SEM). The results show that the proposed model met the established criteria. It is interesting to note that risk perceptions influence how protective behaviors are improved through health care and intentions. The social influences on protective behaviors, meanwhile, are both directly and partially mediated by intentions. In conclusion, health care and intentions serve as mediators between risk perceptions and protective behaviors rather than being directly associated. Health care, however, is unrelated to intentions. Furthermore, social influences are the most dominant factor in improving protective behaviors during COVID-19 pandemic. Therefore, it may serve as a preliminary justification for the government to promote for a policy that addresses social influences in order to improve protective behaviors.

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1. INTRODUCTION

The coronavirus disease 2019 (COVID-19) has had a significant impact on the world's economy, politics, society, and human behaviors. Global economic activity has decreased as a result of COVID-19; some countries have even experienced recession; in Indonesia, many company's workers had been laid off. [1]. The COVID-19 pandemic has also had an impact on mental health, cognitive functions, and social behaviors [2]–[4]. Eventually, the pandemic has altered the global community's lives in all social aspects [4], [5].

One of the obstacles in dealing with COVID-19 is changing people's behaviour. It is difficult to change people's behavior so that they are aware of and attentive to the risk of COVID-19 transmission. The Indonesian government took several measures to prevent the spread of COVID-19 by the end of 2020, one of which was to advise the people to continue implementing health protocols and social restrictions [6]. They must implement the "3M" protocols: *memakai masker* (wearing mask), *mencuci tangan* (handwashing), and *menjaga jarak* (physical distancing) [7]. The government policy is intended to raise public awareness of

COVID-19 protection. The community is expected to adapt and respond positively to the COVID-19 pandemic.

Self-protection awareness is essential in dealing with COVID-19 [8]. Nonetheless, the level of awareness among Indonesian people regarding self-protection in the early phase of the pandemic is still low [9]. The results show that people's awareness of wearing masks, keeping their distance, and washing their hands was remained low [10]. Study In Gianyar Bali, data shows that the majority of participants (58.4, 59%) do not comply with health protocols, such as wearing masks and keeping a distance [10]. People's behaviors and habits are crucial in dealing with the spread of COVID-19.

Self-protective behavior is an individual's attempt to protect oneself from something unsafe in the environment or from a disaster [11]. During the COVID-19 pandemic, protective behaviors included healthy behaviors and physical distancing [12]. Wearing masks and handwashing are examples of healthy behaviors that attempt to prevent the virus's potential transmission. Keeping distance is more about how people interact with each other at certain boundaries and avoid large crowds [13]. Some studies show that those who wear masks had a lower percentage of COVID-19 than those who do not [14], [15]. A policy implemented by the Indonesian government that imposed social restrictions, namely large-scale social restrictions or the imposition of restrictions on community activities, had an impact on reducing the number of individuals affected by COVID-19 [7], [9].

The community's protective behaviors are determined by two aspects: external factors such as policy, leadership, social influences, media, trust in government [5], [7], [17], [18], and internal factors such as personality, personal values, knowledge, cognitive judgment, and demographics. During COVID-19, these two variables determine public compliance with health regulations. One of the variables that has been extensively studied is risk perceptions. Previous studies show that risk perceptions could improve preventive behaviors during COVID-19 [2], [8], [18]. Notwithstanding the fact that the risk perceptions variable is very vulnerable to pandemic dynamics and situational factors. This implies that the relationship between risk perceptions and protective behaviors is affected by situational factors like social influences. In Indonesia, a nation with collectivistic culture, social influences (values, rules, and norms) continue to play an essential role in determining behaviors [7], [19]. Moreover, few studies have related internal factors (risk perceptions, health care, and intentions) and social influences in determining individual protective behaviors during COVID-19 in Indonesia. As a result, the focus of this study will be on internal factors such as risk perceptions and health care, as well as external factors such as social influences in determining protective behaviors. The study also examines how health care and intentions play a role in mediating the relationship between risk perceptions and social influences on protective behaviors.

Risk perceptions are crucial for improving self-protective behaviors during the COVID-19 pandemic. An important factor in determining protective behaviors is risk perceptions, i.e., how individuals think and feel about the risks they confront [20]. The study results show that those with high risk perceptions prefer to behave protectively [2], [17], [18], [21], [22]. Individuals who perceive COVID-19 as a risk or threat prefer to behave healthily (handwashing and wearing mask) and keep physical distance when interacting with each other [5], [12], [23]. In addition, risk perceptions are related to the intentions to comply with the government in preventing the spread of COVID-19. Individuals with high risk perceptions of the pandemic generally have higher intentions to be self-protective [12], [24], [25]. Likewise, risk perceptions affected health awareness or concern. Those who perceive COVID-19 to be a risk tend to be more concerned about their health.

Social influences factor is essential in determining self-protective behaviors during the COVID-19 pandemic. There are two types of social influences: normative influences which occur when individuals behave to maintain social acceptance, and informative influences which occur when people base their behaviors on information from others [26]. In addition, when a request comes from a close person, individuals are more likely to comply [27]. The results of previous studies show that social influences, such as physical distancing, can alter people's behaviors during the COVID-19 pandemic [28]. In Indonesia, the study results show that perceived social norms influence the compliance in preventing the COVID-19 [19]. Furthermore, social influences including social norms are related to individual or personal health choices as well as complying to government recommendations in preventing the COVID-19 [29], [30].

Protective behaviors during the COVID-19 pandemic do not appear out of nowhere. An individual must have a willingness (intention) to comply with the government's appeal. One of the predictors of behavior is intention [31]. A number of studies have discovered that intentions influence healthy behaviors [24], [25]. Protective behaviour intention is determined by individuals' perceptions of the risks of COVID-19 [12] and individuals' health concerns [32]. Meanwhile, social influences are crucial for improving self-protective behaviors during the COVID-19. Social influences such as family and community norms, as well as information on dealing with the COVID-19 pandemic, help to raise awareness or concern for individual

health. Furthermore, it will influence individuals' intentions to comply with government recommendations in preventing COVID-19.

Based on the above reasoning, we develop a model of protective behaviors during the COVID-19 as shown in Figure 1. Based on previous studies, this study aims to put the model to a test. As a result, we provide several hypotheses. The first hypothesis is that 1: there is a correlation between risk perceptions, health care, intentions and protective behaviors. The second hypothesis is that social influences are correlated with health care, intentions and protective behaviors. The third hypothesis is that health care and intentions are correlated with protective behaviors during the COVID-19. The last hypothesis is that the correlation between risk perceptions, social influences, and self-protective behaviors is sequentially mediated by health care and intentions.

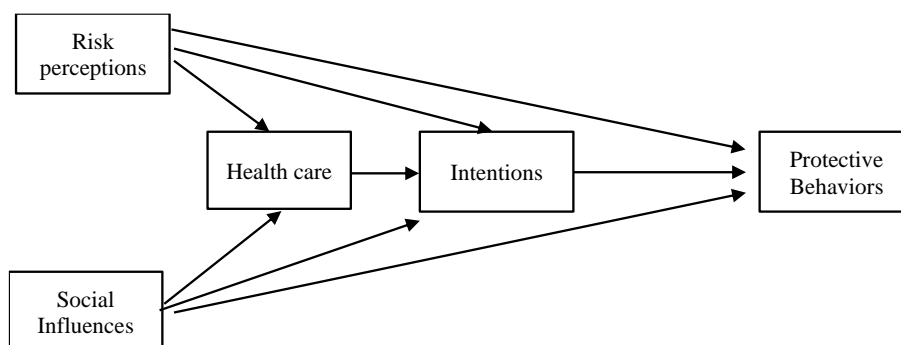


Figure 1. A model of risk perceptions, social influences, health care, intentions and protective behaviours

2. METHOD

2.1. Participants

This study used a cross-sectional method and non-random sampling technique. The data were collected by means of online survey using Google forms, conducted in April and May 2020. There were 325 participants in the study (median age (M)=21.47, SD=6.8). It was found that the majority of the survey participants were female, unemployed, unmarried and secondary school graduate, see Table 1. Participants' involvement in this study was voluntary. Participants read the questionnaire first and agreed to participate in this study before filling it out.

Table 1. Demographic characteristics of the participants

Variables	n (%)
Sex	
Male	74 (22.8)
Female	251(77.2)
Education	
Secondary school	245 (75.4)
Bachelor degree	65 (20)
Postgraduate	15 (4)
Occupation	
Employee	279 (85.8)
Unemployed/student	46 (14.2)
Status	
Married	32 (9.8)
Unmarried/not yet	293 (90.2)

2.2. Measurements

The data were obtained from an online survey through social media. Participants filled out a questionnaire about COVID-19 consisting of two parts: i) filling in a set of questions about demographic characteristics including sex, age, status, and education and ii) filling in a set of questions to measure perceptions, attitudes and behaviors, namely protective behaviors, towards COVID-19 consisting of several measurements. The scale used was 1—5 (1=never up to 5=always) adapted and modified from previous research [2] with Cronbach's reliability $\alpha=.70$. Three items of the questionnaire are to measure physical

distancing, e.g., “I keep my distance from others”, and 2 items are about healthy behaviour e.g., “I wash my hands every day with soap”.

Next, the measures of risk perceptions, health care, intentions, and social influences used response scales from 1 (strongly disagree) to 4 (strongly agree) with Cronbach's reliability $\alpha=0.64$ which is adapted from several studies such as from [2], [24], [33]. Risk perception measures were just a single item i.e., “Currently, there is a serious risk/threat of COVID-19 pandemic in Indonesia”. Similarly, health care measures, to measure individuals' concern for their health, were one item too i.e. “I care about health conditions during Covid-19”. Social influences include normative influence and informative influence. The normative influence measures were 2 items e.g. “my family emphasizes healthy behaviors (wearing masks, handwashing, and physical distancing) during the COVID-19”. Similarly, the informative influence measures were 2 items too e.g. “I frequently collect information concerning the COVID-19's effects and prevention”. Last, intentions were measured by a single item i.e., “I am willing to accept decisions made by the government in handling and preventing COVID-19”.

2.3. Data analysis

The data were analyzed statistically by means of Jamovi and AMOS 26 software. In the beginning, the Jamovi program was used to conduct descriptive and correlational analysis. After that, structural equation modelling analysis in AMOS 26 was conducted to determine the fit of the model with the Maximum Likelihood Estimation procedure. There are several measures of model fit assessment (goodness of fit model): i) Chi-square to measure probability level: the p-value which is close to zero or smaller ($p \text{ value} > 0.05$) indicates that there is no difference between the model and the empirical data; ii) other than the chi-square, four structural equation modeling indices were used in order to avoid biased results: i) comparative fit index (CFI); ii) Tucker-Lewis index (TLI); iii) root mean square error of approximation (RMSEA); and iv) root mean square residual (SRMR). According to [34] CFI and TLI values larger than 0.95 indicate good model fit and the values larger than 0.90 suggest that it is acceptable. A good model fit is also indicated by RMSEA and SRMR values smaller than 0.06 and 0.08 respectively; iii) Additional measures include goodness of fit index (GFI), adjusted goodness of fit (AGFI), normed fit index (NFI), and comparative fit index (CFI). When the index is larger than 0.90, the model is considered to be fit. 5,000 resamplings of bias-corrected bootstrap confidence intervals were used to determine the significance of indirect effects.

3. RESULTS

The correlation results show that risk perceptions, health care and social influences are all positively and significantly correlated with intentions ($p < 0.001$). Meanwhile, health care, social influences and intentions are all significantly correlated with self-protective behaviors ($p < 0.001$), implying that the higher individuals' health care, social influences and intentions to comply with the government, the higher individuals' protective behaviors during the COVID-19 pandemic. On the other hand, risk perceptions are not directly correlated with self-protective behaviors ($p > 0.05$) (see Table 2).

Table 2. Descriptive statistics and correlation between research variables

Variabel	1	2	3	4	5
1.Risk perceptions	-				
2.Health care	0.350***	-			
3.Social influences	0.267***	0.471***	-		
4.Intentions	0.182***	0.290***	0.426***	-	
5.Protective behaviors	0.099	0.164***	0.389***	0.267***	-
M	3.51	3.70	13.50	3.27	20.26
SD	0.63	0.46	1.50	0.53	3.16

Before testing the hypothesis, a goodness of fit model test was conducted based on specified criteria. The obtained results were $\chi^2=0.402$, $df=1$, $p=0.526$, $CFI=1.000$, $TLI=1.024$, $SRMR=0.010$, $RMSEA=0.000$, $GFI=1.000$, $AGFI=0.993$, and $NFI=0.998$). The results show that the proposed model meets the established criteria of a good model fit and it can be therefore accepted (see figure 2). Next, in this study the hypotheses were tested in two steps: first, the relationship between risk perceptions, social influences, health care, intentions and protective behaviors were analysed with unstandardised coefficients, t-values (CR=critical ratio), and p-values using Amos 26, as shown in Table 2.

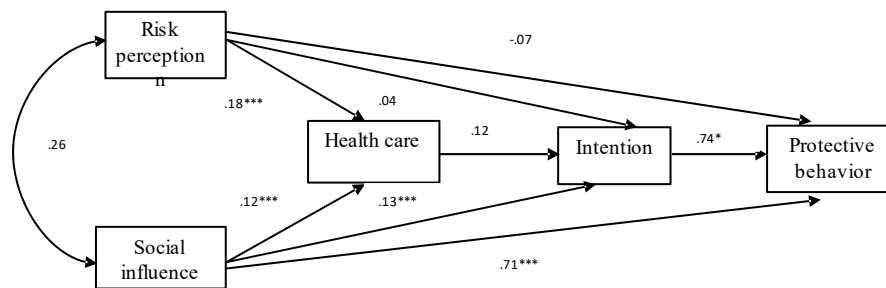


Figure 2. Protective behaviors model during the COVID-19 pandemic N=325 * $p < .05$, ** $p < .01$, *** $p < .001$

The results show that risk perceptions were not significantly correlated with protective behaviors ($b = 0.18$, $t = -0.264$, $p > 0.05$) and intentions ($b = 0.041$, $t = -0.916$, $p > 0.05$). On the other hand, risk perceptions were significantly correlated with health care ($b = 0.176$, $t = 4.933$, $p < 0.001$). Then, social influences were significantly correlated with protective behaviors ($b = 0.714$, $t = 5.917$, $p < 0.001$), intentions ($b = 0.129$, $t = 6.418$, $p < 0.001$) and health care ($b = 0.124$, $t = 8.276$, $p < 0.001$). Health care was not significantly correlated with intentions. Finally, intentions were significantly correlated with protective behaviors ($b = 0.742$, $t = 0.916$, $p < 0.05$) (see Table 3). Overall, the model explains 27.6% of the variance of health care, 19.4% of the variance of intentions to comply with government recommendations, and 16.4% of the variance of self-protective behaviors.

Table 3. Hypothesis testing (path analysis)

Path	B	t-value	CI 95%		
			Smaller	Larger	
H1a: risk perceptions of COVID-19 are related to self-protective behaviour	-0.70	-0.264	0.492	0.358	Rejected
H1b: risk perceptions of COVID-19 are related to the intentions to comply with the government in preventing COVID-19	0.041	0.916	0.042	0.140	Rejected
H1c risk perceptions of COVID-19 are related to health care	0.176	4.933***	0.114	0.245	Accepted
H2a: social influences are related to self-protective behaviors	0.714	5.917***	0.523	0.899	Accepted
H2b: social influences are related to the intentions to comply with the government in preventing COVID-19	0.129	6.418***	0.089	1.69	Accepted
H2c: social influences are related to health care	0.124	8.276***	0.097	0.149	Accepted
H3a: intentions are related to protective behaviors during COVID-19	0.742	.916*	0.213	1.246	Accepted
H3b: health care is related to the intentions to comply with the government in preventing COVID-19	0.117	1.726	0.000	0.231	Rejected

In the second step, 5,000 samples of bootstrap were used to test the mediation effect by means of AMOS 26. The results show that the relationship between risk perceptions and protective behaviors was not mediated by intentions (H4a). It was found that the indirect effect = -0.070, 95% CI [-0.019, 0.143]. On the contrary, the relationship between social influence and protective behaviors is mediated by intention (H4b). The indirect effect = 0.095, 95% CI [0.029, 0.181]. Then, the relationship between risk perceptions and self-protective behaviors was respectively mediated by health care and intentions. It was found that the indirect effect = 0.015, 95% CI [0.002, 0.048]. On the contrary, the relationship between social influences and self-protective behaviors was not respectively mediated by health care and intentions (H4d). It was found that the indirect effect = 0.011, 95% CI [0.001, 0.031] (see Table 4).

Table 4. Mediation analysis

Hypothesis	Direct effect	Indirect effect	CI 95%		p-value	
			smaller	Larger		
H4a: the influence of risk perceptions on intentions-mediated self-protective behaviors	-0.070	0.031	-0.019	0.143	0.307	Rejected
H4b: the influence of social influences on self-protective behaviors mediated by intentions	0.714	0.095	0.029	0.181	0.015	Accepted
H4c: the relationship between risk perceptions and self-protective behaviors mediated respectively by health care and intentions	-0.070	0.015	0.002	0.047	0.048	Accepted
H4d: the relationship between social influences and self-protective behaviors mediated respectively by health care and intentions	0.714	0.011	0.001	0.031	0.053	Rejected

4. DISCUSSION

This study examined the influence of risk perceptions and social influences on the improvement of self-protective behaviors during the COVID-19 pandemic. Furthermore, this study also examined health care and intentions as mediators in determining self-protective behaviors. Tables 2 and 3 provide an overview of the hypotheses and results.

The empirical model of the study shows that the relationship between the risk perceptions and the protective behaviors was not statistically significant (H1). The result is different from previous studies such as [2], [18]. However, the relationship between risk perceptions and protective behaviors, when examined in further detail, is occasionally unstable and is influenced by a variety of social circumstances [35]. Individuals who perceive COVID-19 as a threat or high risk do not necessarily have self-protective behaviors, in particular young people who assume they have little chance of getting COVID-19 and therefore they don't comply to the government's recommendations [36]. The result is in line with Franzen and Wöhner's research [37] stating that risk perceptions are not correlated with protective behaviors. Similarly, hypothesis H1b does not support the notion that risk perceptions have no effect on individual intentions to comply with the government in preventing the spread of COVID-19. Risk perceptions only affect those who are concerned about their health (H1c).

Besides, using only that small a sample, the risk perceptions are insufficient to influence the intentions and self-protective behaviors during the COVID-19 pandemic directly. The results explain and confirm the phenomena in Indonesia where protective behaviors such as handwashing, wearing masks and physical distancing were not effectively carried out by the community at the beginning of the pandemic. Furthermore, the majority of participants in this study are young individuals (mean age=21) who are less compliant in preventing COVID-19 [38]. These findings may not be applicable in the future, depending on how the situation develops throughout the pandemic [8].

On the contrary, social influences were the dominant factor in improving self-protective behaviors during the COVID-19. The results show that social influences affect health care (H2a), intentions (H2b) and protective behaviors (H2c). Social Influences are defined as individuals' perceptions of social norms, rules and knowledge related to the handling of COVID-19. The culture of Indonesian society as a whole, which emphasizes social norms as a foundation for behavior, may be to blame for this. Social norms are crucial in determining healthy behaviors [30]. According to study findings from Bali, Indonesia, people's perception of norms have an impact on whether or not they comply with health recommendations during COVID-19 [39]. Prevailing norms influence individuals' protective behaviors during the COVID-19 [39]. By adhering to the norms of their closest surroundings, such as family, friends or community, Indonesians find it easier to comply with government recommendations in preventing COVID-19 [19].

The findings of the mediation test show that the influence of risk perceptions on protective behaviors is not merely mediated by intentions but it is respectively mediated by health care and intentions to comply with COVID-19 prevention recommendations. Individuals who perceive COVID-19 to be a high risk have a tendency to have access to health care and the intention to comply with government recommendations in preventing COVID-19. Moreover, they ultimately engage in protective behaviors such as wearing masks, handwashing and physical distancing. Then, the effect of social influences on protective behaviors was merely mediated by intentions, but It was not respectively mediated by health care and intentions. This implies that social influences directly affect intentions and protective behaviors during the pandemic. The study has a number of limitations. Firstly, this cross-sectional study just yield correlational results; causality is not produced [18]. Secondly, the study results can not be generalized since the online data collection technique was not randomised. Thirdly, many self-report measurements use a single measurement that has the potential for bias, measurement errors [39] and measurement bias, namely social desirability.

5. CONCLUSION

During the COVID-19 pandemic, risk perceptions indirectly determine protective behaviors through health care and intentions. Those who perceive themselves to be at high-risk frequently care about their health and would like to comply with government recommendations in preventing COVID-19. On the other hand, social influences (normative or informative) were crucial in determining self-protective behaviors. The intentions to comply with government recommendations may be increased by social influences from the family or surrounding group which may then lead to an improvement of self-protective behaviors namely handwashing, wearing masks and physical distancing.

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