Original article

Factors associated with preventive behaviors of COVID-19 among Indonesian nursing students: application of Health Belief Model

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Abstract: *Objectives* — This study aimed to examine factors associated with preventive behaviors of COVID-19 among Indonesian nursing students through The Health Belief Model.

Material and Methods — A cross-sectional design was used in this study. This study was conducted in a school of nursing in Malang, Indonesia. A total of 112 undergraduate nursing students were recruited using convenience sampling. Data were collected by online-based questionnaires which were the demographic characteristics, questions about health belief model constructs, and questions about the preventive behaviors from COVID–19 during July 2020. Pearson product-moment was used to analyze the data.

Results — This study found that cues to action have positive and significant correlation to preventive behavior of Covid-19. Perceive self-efficacy and perceive benefit have positive and significant correlation to cues to action. Furthermore, perceive self-efficacy also has positive correlation to perceive severity, perceive benefit, and has negative correlation to perceive barrier. Perceive benefit has negative correlation to perceive barrier.

Conclusion — Cues to action was related to preventive behavior of Covid-19 among nursing student in this study. Therefore, the nursing student should improve their action in preventive behavior of COVID-19.

Keywords: COVID-19, cues to action, Health Belief Model, nursing students, preventive behaviors.

Introduction

According to the World Health Organization [1] on July 1, 2020, Globally, there have been 10,357,662 confirmed cases of COVID-19, including 508,055 deaths. A total of 808,906 confirmed cases in South-East Asia. In Indonesia, A total of 57.770 confirmed cases and 2.876 case deaths on July 1, 2020 [2]. A previous study reported that Malang, one of the education city particularly the school of nursing was announced as the red zone for COVID-19 spread [3, 4].

Currently, there is no specific antiviral treatment or vaccine for COVID-19. Therefore, prevention behavior through doing some health protocols such as washing hands regularly with soap and water, wearing appropriate personal protective equipment (PPE), social distancing is important in COVID-19 prevention [5-7]. Nurses are frontline health providers who work in many settings, including the community. They also have multiple roles and functions which are significant during this COVID-19 pandemic. One of the important roles is providing health education and support for the general public as part of COVID-19 prevention [8]. As a prospective nurse, nursing students need to master this important role.

The Health Belief Model (HBM) is one of the models in health education that can be used as a basis for health promotion programs [9]. HBM is a model that is often used as a support to change a person's behavior related to health. This theory explains that when someone believes in something they will try to do certain actions. This makes HBM a model that explains for someone's consideration before they behave healthily. So that HBM has a function as a model of prevention [10].

Behavior is often influenced by predisposing factors such as knowledge, attitudes, and beliefs. Each individual has an assessment of their respective health beliefs so that they will carry out prevention efforts. HBM causes an increase in healthy behavior than before in a person [11]. The application of the Health Belief Model (HBM) is strongly recommended to reduce behaviors that can trigger anxiety and fear and change individual beliefs from information that has been previously obtained to build their self-efficacy [12]. The perceived benefits in HBM also show confidence in the benefits of the methods suggested to reduce the risk of contracting the disease and their higher involvement in behavior to improve their health [13].

HBM has components that can help to maintain healthy living behaviors, namely: believing susceptible to disease or illness arising from behavior (perceived susceptibility), believing that the disease will be dangerous (perceived severity), believing that there are perceived benefits or benefits of the recommended method (perceived benefit), and perceived obstacles from prevention or treatment (perceived barrier) [14]. Perceived severity, susceptibility, cues to action, and benefits correlated with dengue fever prevention in the working area of Community Health Center Sukorame, Mojoroto, Kediri, Indonesia [11]. The previous study reported that perceived barriers, perceived self-efficacy, fatalistic beliefs, perceived interests, and living in the city had the predictor factors of preventive behaviors from COVID-19 [7].

Therefore, the aims of this study examined factors associated with preventive behaviors of COVID-19 among Indonesian nursing students through The Health Belief Model. This finding can create a proper intervention to prevent Covid-19.

Material and Methods
Design

A cross-sectional study design was applied to the School of Nursing, Faculty of Health Sciences, University of Muhammadiyah Malang, from July 2020.

Participants

A total of 112 undergraduate nursing students participated in this study through purposive sampling. Data were collected from participants who met the following inclusion criteria: (1) During the 2019–2016 academic year, (2) are willing to participate in this study.

Data collection

Data were collected by online-based questionnaires. The questionnaires were self-administered and completed in approximately 30-45 min. The questionnaire was translated into Indonesian and translated back into English. The questionnaire was tested for its validity and reliability.

Demographic characteristics. This part provides questions about age, gender, and academic year.

The preventive behaviors from COVID–19. The preventive behaviors from COVID–19 questionnaire (*Appendix* 1) was adopted from Shahnazi (2020). This question consists of 8 items. The respondents rate each item on a 5-point Likert scale from always to never, and scoring was from 1 to 5 [7]. The reliability of the preventive behaviors from the COVID–19 questionnaire was α=0.72.

Questions about health belief model constructs. Questions about health belief model (*Appendix* 2) constructs were adopted from Shahnazi (2020). This part containing 6 sections i.e. perceived susceptibility (3 questions), perceived severity (3 questions), perceived benefits (3 questions), perceived barriers (8 questions), sense of self-efficacy (1 question), and cues to action (2 questions) [7]. The respondents rate each item on a 5-point Likert scale from always to never, and scoring was from 1 to 5. The reliability of the health belief model constructs questionnaire was α= 0.64.

Data analysis

The descriptive statistics were used to analyze patients' demographic characteristics namely age, gender, and academic year. Pearson product-moment was used to examine the correlation between the variables.

Results
Sample Characteristics

The result of this study was illustrated as descriptive analysis.

As can be seen in *Table* 1, the majority of the participant in this study was female (80,4%). More than half of the participants were in the fourth and third academic years (31,3% and 29,5% respectively). The mean age of participants was 20,8 years, ranged from 17 to 27 years old: mean with standard deviation 20.8±1.4 years.

Based on *table* 2 explained that approximately half of the respondents were placing a tissue paper or bending an elbow in front of my mouth and nose when coughing or sneezing (46.4%) and washing their hands with soap and water without touching anything after entering home (46.2%). Half of the respondents reported that do not touch their eyes, nose, and mouth by hands (56.3) and do not take my cell phone out of my pocket (52.7).

Table 1. Number and percentage of demographic characteristics of participants (n=112)

Demographic characteristics	Number	Percentage
Gender		
Male	22	19.6
Female	90	80.4
Academic Year		
First	12	10.7
Second	32	28.6
Third	33	29.5
Fourth	35	31.3

Table 2. Number and percentage of participant's preventive behavior of Covid-19 (n=112)

No	Question	Number (Percentage)			
		Rarely	Sometimes	Often	Always
1	Place a tissue paper or bending elbow in front of my mouth and nose when coughing or sneezing.	4 (3.6)	21 (18.8)	35 (31.3)	52 (46.4)
2	I keep a distance of at least one meter from others.	4 (3.6)	35 (31.3)	47 (42.0)	26 (23.2)
3	I don't shake hands with others and don't kiss them.	8 (7.1)	36 (32.1)	40 (35.7)	28 (25.0)
4	I don't leave the house unless absolutely necessary.	0 (0)	9 (8.0)	54 (48.2)	49 (43.8)
5	I wash my hands regularly with soap and water for at least 20 seconds every hour.	2 (1.8)	13 (11.6)	50 (44.6)	47 (42.0)
6	I do not touch my eyes, nose, and mouth by hands.	13 (11.6)	63 (56.3)	24 (21.4)	12 (10.7)
7	I do not take my cell phone out of my pocket.	35 (31.3)	59 (52.7)	14 (12.5)	4 (3.6)
8	I wash my hands with soap and water without touching anything after entering home.	5 (4.5)	18 (16.1)	37 (33.0)	52 (46.2)

Table 3. Matrix correlation between independent variables and preventive behavior of Covid-19

		Perceive Susceptibility	Perceive Severity	Perceive Barrier	Perceive Self Efficacy	Perceive Benefit	Cues to action	Preventive Behaviour
Perceive Susceptibility	r	1	0.138	-0.163	0.157	0.089	-0.122	-0.088
	ρ value		0.148	0.085	0.098	0.352	0.201	0.354
	N	112	112	112	112	112	112	112
Perceive Severity	r	0.138	1	-0.107	0.228	0.093	0.114	0.010
	ρ value	0.148		0.261	0.016	0.331	0.233	0.915
	N	112	112	112	112	112	112	112
Perceive Barrier	r	-0.163	-0.107	1	-0.215	-0.191	-0.007	-0.002
	ρ value	0.085	0.261		0.023	0.044	0.938	0.982
	N	112	112	112	112	112	112	112
Perceive Self Efficacy	r	0.157	0.228	-0.215	1	0.422	0.233	0.037
	ρ value	0.098	0.016	0.023		0.000	0.013	0.701
	N	112	112	112	112	112	112	112
Perceive Benefit	r	0.089	0.093	-0.191	0.422	1	0.262	0.004
	ρ value	0.352	0.331	0.044	0.000		0.005	0.965
	N	112	112	112	112	112	112	112
Cues to action	r	-0.122	0.114	-0.007	0.233	0.262	1	0.194
	ρ value	0.201	0.233	0.938	0.013	0.005		0.040
	N	112	112	112	112	112	112	112
Preventive Behaviour	r	-0.088	0.010	-0.002	0.037	0.004	0.194	1
	ρ value	0.354	0.915	0.982	0.701	0.965	0.040	
	N	112	112	112	112	112	112	112

* – Correlation is significant at the 0.05 level (2-tailed); ** – Correlation is significant at the 0.01 level (2-tailed).

Correlation of HBM and preventive behavior of Covid-19

Table 3 provides the result of the analysis correlation between independent variables and the preventive behavior of Covid-19. From the table, it can be seen that cues to action have a positive and significant correlation to the preventive behavior of Covid-19 (r=0.194; ρ=0,040). Closer inspection to the table shows that perceive self-efficacy and perceive benefit have positive and significant correlation to cues to action (r=0.233; ρ=0.013 and r=0.262; ρ=0.005 respectively). Furthermore, perceive self-efficacy also has positive correlation to perceive severity (r=0.288; ρ=0,016), perceive benefit (r=0.422; ρ=0.000) and has negative correlation to perceive barrier (r=-0.215; ρ=0.023). Perceive benefit has negative correlation to perceive barrier (r=-0.191; ρ=0.044).

Discussion

Cues to action as a factor associated with *preventive behavior of Covid-19*

In this study, cues to action are the only factor related to COVID-19 prevention behavior among nursing students in Malang, Indonesia. This is possible because of the information that has been obtained either through the media directly or indirectly. The majority of subjects when there are cues to action will at least make efforts to prevent Covid-19 well. Cues to action can be sourced from trusted programs, information from the closest people, public media, or health care providers [13].

Information contained on social media has the potential to assist individuals in modifying Covid-19 preventive behavior. In particular social media, interventions have several advantages including broad accessibility that brings new opportunities to disseminate public health interventions and can improve health behaviors. Strategies used through social media that discuss Covid-19 education can influence to raise awareness about efforts to deal with and prevent COVID-19 [15].

Based on research from [16], the factors driving families to act (cues to action) include media information about early treatment of DHF. Information on early treatment can be obtained from various sources, including through mass media, such as television, radio, newspapers, magazines, internet, and can also be obtained from explanations or counseling by health workers and information provided by friends who have experience related to the disease.

Cues to action are an event, experience, physical symptoms, or environment that motivates someone to take action [17]. In [18] study, finding that cues to action are effective in preventing or avoiding Covid-19 and the concern that is formed towards a person is also an important predictor of health behavior. So, this research is in line with the concept that cues to action are related to the drive to act. Based on research from [19] explained that co-19 prevention behaviors that are most often done by the public are washing hands frequently, using hand sanitizers, and wearing masks.

Perceive self-efficacy and perceive benefit have positive and significant correlation to cues to action

Factors that correlate with cues to action are perceived self-efficacy and perceived benefit of preventive behavior. This states that perceived self-efficacy and perceived benefit can predict preventive behavior indirectly through cues to action. This is supported by research from [20] that self-efficacy correlates more strongly with perceived benefits through physical distancing, and maintaining hand hygiene (handwashing) for co-19 prevention behavior.

Self-efficacy refers to individual perceptions or individual beliefs about the ability to successfully perform a behavior. This proves that one's belief in making a change is the key to changing health behavior. Individuals feel it is better to avoid infection if they follow the recommendations of the health protocol from the government, this concludes the perceived benefits of health behavior can be applied [13].

The results of [21] state that perceived benefits refer to how effective facial masks are believed to prevent the spread of disease by individuals. A positive correlation was found between the perceived benefits and the likelihood that someone would want to wear a protective mask. The study [22] found that individuals have a strongly perceived self-efficacy to wear protective masks 1.4 times more often to wear during a pandemic.

Based on research from [23] showed that most people have good behavior as indicated by the compliance of the use of masks when outside the home, washing hands with soap or hand sanitizer, and avoiding crowds or physical distancing. Washing hands is an effective way to kill germs, it is known that the spread of the COVID virus can stick to parts of the body especially the hands that touch objects that have been infected by droplets. In this study, it was found that most respondents had washed their hands after touching objects and some of them washed their hands according to WHO protocol.

Perceive self-efficacy also correlates with perceived severity, perceive barrier and perceive the benefit

Perceive self-efficacy is preventive behavior by strengthening positive steps and the belief that someone can overcome certain situations. Effective disease prevention and prevention behavior Covid-19 requires significant efforts to strengthen beliefs about diseases that include severity (perceived severity), and perceived susceptibility eliminating obstacles in acting (perceived barrier) and strengthening beliefs from self-efficacy itself [12].

Self-efficacy is an important factor in obtaining new behaviors in protecting health. Self-efficacy a person can be involved effectively to achieve goals in overcoming a barrier of healthy behavior. Perceived barriers can also act as prevention efforts in carrying out suggested health behaviors so that in health planning, consider ways to reduce these barriers [24]. The perceived severity refers to how much a person is afraid of an illness and how much of that concern arises, especially in a place where he will live as a quarantine place for the virus. The prevalence of mask use increased during the pandemic and believes that the severity (perceived severity) is felt as a threat to the economy and public health. But a lack of knowledge about a disease can also hinder adherence to disease prevention. In other words, it is possible that perceive severity can be a significant predictor of the use of protective masks in increasing awareness of a disease/outbreak [21]. Perceived severity in individuals also leads to their psychological response to fear and anxiety if they are infected with the COVID-19 virus [19].

If someone believes that certain actions can reduce vulnerability to health problems or can reduce the severity of his, then he is likely to be involved in that behavior. Perceived barrier perceived refers to an individual's assessment of the barriers to behavior change. The perceived barrier is largely influenced by differences in information circulating about COVID. Perceived barriers to taking an action such as cost, danger (eg side effects from medical procedures), and discomfort (for example emotional disturbance) involved in behavior. Knowledge about the spread of disease or health behavior related to the disease is needed in overcoming perceived obstacles [13].

According to [16] states that respondents are encouraged to make visits to health facilities in the early treatment of DHF because of the symptoms and severity of dengue that is seen in patients. This is because if the greater the risk of illness and the greater the perceived seriousness of the individual. Individuals will take precautions if they believe that certain diseases have the potential to have serious effects.

The results of this study are in line with the Health Belief Model (HBM) theory itself which states that perceived severity determines the presence or absence of disease prevention. Perceived severity is often based on medical information, knowledge, or a person's belief that he will get into trouble due to an illness that can complicate his life so that he will make efforts to prevent the disease [25]. Perceived severity determines whether or not any preventive action is taken against this disease in this case the individual will be willing to seek information related to the protection or prevention of the COVID virus and apply it in their daily lives.

Perceive benefit also correlates to perceive severity and perceive the barrier

Perceived benefit refers to one's belief in the actions recommended to reduce the risk or the serious impact of an illness. Individuals need to believe that the decision to take a particular action, will help individuals to avoid or prevent problems that occur. This belief gives a person confidence in taking actions as expected [17].

Based on the theory of Health Belief Model (HBM) states that individuals believe in a behavior beneficial to themselves and the environment then the individual will perform the behavior but if the benefits obtained are not appropriate then the behavior will not occur. The perceived benefit is a person's opinion about the use of a new behavior to reduce the risk of disease [25].

Perceived benefits during a COVID-19 pandemic for someone if they take the act of wearing a mask properly are believed by individuals to be able to prevent the spread of the Covid-19 virus [21]. Besides, by doing social distancing, physical distancing, and complying with protocols, the benefits of preventing the spread of the COVID-19 virus are also felt [19].

Conclusion

Cues to action are factors associated with the preventive behavior of Covid-19 among nursing students in this study. Therefore, nursing students should improve their actions in the preventive behavior of COVID-19.

Recommendations

Nursing students should improve their action in preventive behaviors of COVID-19. This action will help the community to follow and comply to do health protocol through preventive behaviors of COVID-19. Further research should find other factors such as social support that related to the preventive behavior of Covid-19.

Ethical approval

All procedures performed in studies involving human participants were following the ethical standards of the institutional and/or national research

committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This study was approved by the Ethical Review Board (ERB) Committee of the University of Muhammadiyah Malang, Indonesia (Number: E.5.a/168/KEPK-UMM/VI/2020).

Conflicts of interest

All contributing authors declare no conflicts of interest in this study.

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Appendix 1. The preventive behaviors from COVID–19 questionnaire

No	Question
1	Place a tissue paper or bending elbow in front of my mouth and nose when coughing or sneezing.
2	I keep a distance of at least one meter from others.
3	I don't shake hands with others and don't kiss them.
4	I don't leave the house unless absolutely necessary.
5	I wash my hands regularly with soap and water for at least 20 seconds every hour.
6	I do not touch my eyes, nose and mouth by hands.
7	I do not take my cell phone out of my pocket.
8	I wash my hands with soap and water without touching anything after entering home.

Appendix 2. Questions about health belief model constructs

No	Variables
	Perceived susceptibility
1	I consider myself to be at risk of coronavirus
2	I am more likely to get the disease
3	I don't care about this disease and do my daily activities like before
	Perceived severity
1	This disease has a high mortality rate
2	This disease is not very dangerous
3	The transmission power of this disease is high
	Perceived barriers
1	It is difficult to follow the instructions to prevent this disease.
2	I don't have the patience to follow preventative instructions
3	It is difficult to wash hands regularly with soap and water.
4	The mask is scarce in the market, and thus I do not wear a mask
5	Disinfectant gels and solutions are scarce and expensive in the market
6	Alcohol pads are scarce in the market
7	It is difficult not to touch hands, mouth, nose and eyes
8	Staying at home to prevent the disease is difficult
	Perceived self-efficacy
1	I have ability to follow every preventive instruction against the disease
	Perceived benefits
1	This disease can be easily prevented by washing hands regularly with soap and water
2	This disease can be easily prevented by personal protective equipment such as masks and disposable gloves
	Cues to action
1	TV and radio information about the disease has been helpful