Medical students and doctors' perceptions toward COVID-19 health communication on social media

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Abstract:

BACKGROUND: Ineffective health communication could cause the increase of COVID-19 cases in Indonesia. Medical students can involve in efforts in health communication on social media to positively impact prevention behaviors during a pandemic. This study aims to identify and analyze medical students' and internship doctors' perceptions toward health communication related to COVID-19 through social media.

MATERIALS AND METHODS: A mixed method with exploratory sequential used. A qualitative study was done using phenomenology approach through deep and semi-structured interviewing. After data analysis, the draft of the instrument prepared. Items in the draft selected based on the respondents' answer. Then, a quantitative cross-sectional study was used. The data obtained from 399 medical students and doctors at a University in Indonesia using Google Form on October 14 to October 20, 2020 through media social. Data were analyzed using Pearson Correlation and Chi-square (alternative: Fisher's exact test) and logistic regression analysis with $P < 0.05$ and 95% confidence interval, respectively.

RESULTS: Based on interview, respondents communicate health on social media because the condition of COVID-19 in Indonesia is dangerous, feel vulnerable to COVID-19, understand the benefits, obligations, or responsibilities as a candidate and/or medical personnel and believe they can create content/find valid sources. Meanwhile, the perception of limited knowledge is their biggest obstacle in conducting health communication. There were a relationship between gender ($P = 0.028$, PR = 0.657), perceived severity ($P = 0.044$, PR (Prevalence Ratio) =4.844 [0.725–32,354]), perceived susceptibility ($P = 0.005$, PR = 1.803 [1.182–2.750]), perceived barrier ($P < 0.001$, PR = 2.543 [1.908–3.388]), and self-efficacy ($P = 0.012$, PR = 1.810 [1.120–2.926]) with health communication behavior. The perceived barrier ($P < 0.001$, RR = 4.278 [2.709–6.754]) and perceived susceptibility ($P = 0.004$, PR = 2.304 [1.302–4.077]) were the most influenced behavior.

CONCLUSIONS: This study showed that perceived severity, perceived susceptibility, perceived barrier, and self-efficacy are predictor factors of health communication behavior related to COVID-19 on social media with perceptions of susceptibility and perceived barriers as the most influential variables. It is necessary to provide communication learning on social media as effectively and applied directly to reduce perceived barriers and increase self-efficacy.

Keywords:
COVID-19, health behavior, health communication, medical, students

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Introduction

The first case of COVID-19 in Indonesia was recorded on March 2, 2020 and has increased to reach 353,461 confirmed cases with 12,347 deaths as of October 17, 2020.[1,2] The increasing number of cases is due to the lack of role of the community in carrying out predetermined efforts to prevent COVID-19 such as washing hands regularly, maintaining (physical) distance, not touching eyes, nose and mouth, and implementing cough etiquette. This might happen because a misinformed in the community and do not know both transmission and preventive

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measures of COVID-19.[3] The Ministry of Communication and Information (Kemenkominfo) recorded 1387 hoaxes spread on various social media platforms related to disinformation about the coronavirus (COVID-19) from March 2020 to January 2021.[4] The spread of COVID-19 misinformation and disinformation needs to be stopped with massive clarification and education, because misinformation circulating on social media tends to get an algorithm boost from social media platforms, and its content tends to be easy to believe because it uses provocative words. Therefore, the distribution of correct information related to COVID-19 has not yet reached all levels of society, so the health communication is still needed.

Health communication used to positively influence individuals, populations, and organizations for the purpose of promoting conditions conducive to humans and the environment[5] as directly or indirectly, like social media. A survey conducted in Indonesia found that the public was more informed about COVID-19 through social media such as WhatsApp.[6] The use of social media has a positive impact in community prevention behaviors during the COVID-19 pandemic in China. This is an important indicator of health promotion which encourages people to take over more health measures during a state of emergency. Compared with mass media, social media provide a safe space for the public to obtain news or knowledge of a disease and deliver information effectively. Thus, the social media can be an effective strategy for health promotion in the community, especially in the pandemic.[7] In line with the effectiveness of social media are the challenges of fake news that spread faster than real news in social media.[8] As the vanguard, medical students and doctors equipped with promotive and preventive competencies, according to their professionalism.[9] They are central in reducing the gap between public knowledge about correct information about COVID-19, stopping the spread of misinformation and disinformation, also inviting the public to carry out health protocols and steps that have been taken by the government to make a pandemic ending soon. For this reason, medical students can be involved in efforts to increase public knowledge about health by doing health communication according to their competence on social media. For this reason, medical students can be involved in efforts to increase public knowledge about health by doing health communication according to their competence on social media. Previous research has shown that there are significant differences in the effect of health communication and changes in people's behavior.[10]

The implementation of health communication on social media is included in carrying out health behaviors because one of the objectives of this activity is health education action against a disease, namely, COVID-19. According to Conner and Norman, health behavior is an action taken with the aim of preventing/detecting a disease or improving health and well-being. A psychological theory model that deals with health, individual perceptions, and can predict behavior is called the *Health-Belief Model* or HBM.[11,12] Thus, this study aims to analyze the perceptions of medical students and internship doctors toward health communication related to COVID-19 through social media.

Material and Methods

Study design and setting
A mixed method with exploratory sequential used on the two stages: in the first phase, a qualitative descriptive approach using phenomenology approach through deep and written interviews. This aims to identify the medical students' and internship doctors' perceptions toward health communication related to COVID-19 through social media. Quantitative methods by observational analytic with a cross-sectional design were used to analyzed between the variables. The data were obtained from September 30 to October 20, 2020 [Figure 1].

Study participants and sampling
The population of this study involved all medical students and internship doctors in Indonesia and medical students and internship doctors at a specific university in Indonesia as the sample. The respondents were active as students and duty as internship doctors and willing to participate in this study. According to selection criteria, both studies used consecutive sampling as a sampling technique until the sample size met. A total of 307 respondents participated to semi-structured interviewing with open-ended questions, then 12 respondents deep interviewed, and in the quantitative study, a total of 399 respondents participated to fill a closed-ended questionnaire.

Data collection tool and technique
An online written interview questionnaire that distributed using Google Form on September 30 to October 6, 2020, to assessed the respondents' behavior and perspective regarding COVID-19 in social media. Then, the answer grouped in categories, frequently (minimum once a week), and rarely (less than once a week or never). Then, the interviews conducting with 12 representatives from each classification through long distance communication media, namely, Zoom meeting, WhatsApp call, and telephone. The instrument using semi-structured interview technique with a theoretical framework of HBM, to obtain data according to the framework and in line with the objectives, but interviews can develop according to the answers of participants.
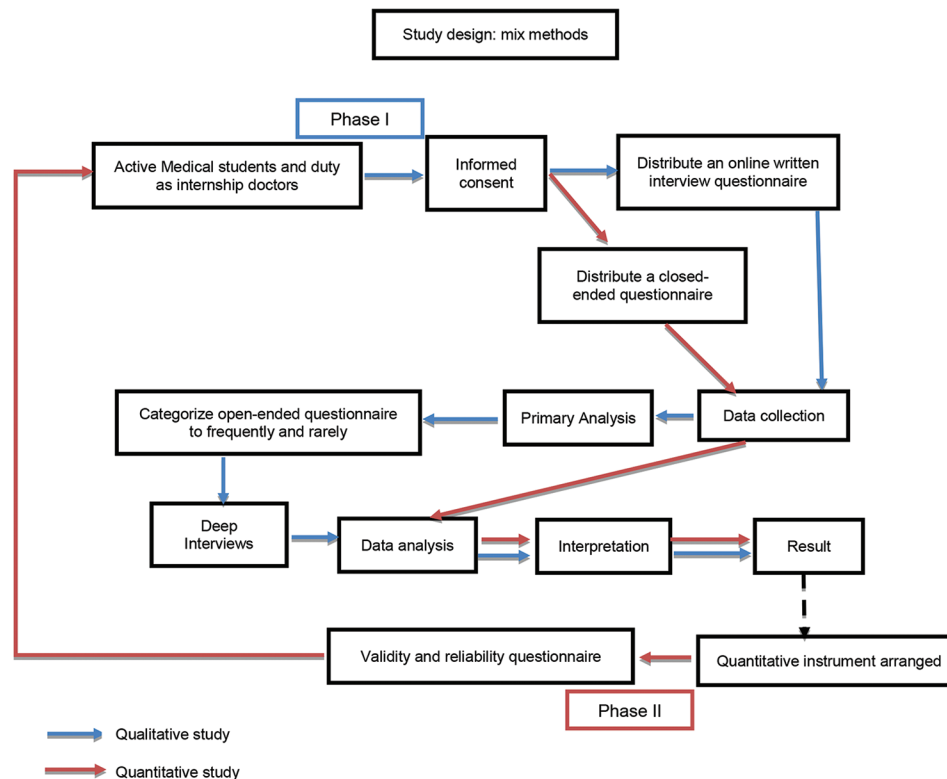
Figure 1: Description of overview of the study design

Based on interview result, the quantitative research instrument arranged. The questionnaire consists of informed consent, characteristics respondents, perceived severity, perceived susceptibility, perceived benefit, perceived barrier, cues to action, and self-efficacy amounted to 31 statement. The variable dependent is the frequency of conducting health communication related to COVID-19 on social media. The questionnaire rated with Likert scale by giving a score of 1–4 in the statement "Strongly Disagree" to "Strongly Agree," a good perception if the value is ≥50% and less good perception if the value <50%. The validity and reliability were done by 60 respondents from 18 different Universities' Faculty of Medicine in Indonesia. As much 60 respondents from 18 different Universities' Faculty of Medicine in Indonesia did the validity and reliability, with r value > r table (0.254) and the Cronbach alpha 0.864.

The data were obtained from 399 respondents using Google Form on October 14 to October 20, 2020, through media social. Data were analyzed using Pearson correlation and Chi-square (alternative: Fisher exact test) and logistic regression analysis with the enter method by IBM SPSS Statistics 25.0 (IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp.) statistical program. The significance at $P < 0.05$ and 95% confidence interval (CI), respectively.

Ethical consideration

This research was approved by Health Research Ethics Committee, Faculty of Public Health Sriwijaya University, with Protocol No: 177/UN9.FKM/TU.KKE/2021. All participants were informed of the study and provided consent before enrolling. Attribute codes were given to the participants to maintain anonymity.

Results

Based on interview result, there were some reasons of respondent to conducting health communication behavior on social media regarding the perceived seriousness such as the COVID-19 pandemic in Indonesia is difficult to control, health workers have died of COVID-19, society increasingly indifferent to the health protocol COVID-19, and hoaxes spread in society need to be clarified, public figures/role models do not provide health behavior. The perceived susceptibility to conduct health communication behavior on social media such as have a risk factor for COVID-19, they own/family have risk factors, and no family has been affected by COVID-19. Respondents have satisfaction and as a reminder for self, religious aspect, give a positive impact to other, additional knowledge, and as a discussion material for the perceived benefits to health communication. While limited knowledge, lack of interest and time, less active on social media, having a bad experience, and worrying makes other uncomfortable, a lot of people do

were the barriers to conducted health communication. Respondents have cues to action, because of experienced medical events, pure fad, get a similar assignment, responsibility, influence of others, pissed off society and colleagues, and direct contact with patients. The self-efficacy who influence respondents to conducted health communication behavior on social media have, such as unable to create content/find valid sources, can create content/find valid sources but not conduct health communication, can create content/find valid sources and conduct health communication [Table 1].

Figure 2 shows effective social media for conducting health communication related to COVID-19. Instagram and WhatsApp are the most preferred social media as convenient and effective media for health communication.

From Table 2, most of the HBM components have a strong and positive significant relationship with each other, except for perceived benefits which do not have a significant relationship with perceived barriers and behavior. In addition, the perception of barrier also did not have a significant relationship with the perception of severity and perception of susceptibility. The triggers for action simply do not have a significant relationship with behavior. A strong and positive correlation shows that if there is an increase or decrease in one of the variables, it will affect the increase or decrease in other variables.

Table 3 presents the characteristics of the respondents in the study. Out of the 399 respondents, the average age of the respondents was 20.58 years, female (71.4%), and still in preclinical education (63.7%). Gender, perceived severity, perceived susceptibility, perceived barrier, and perceived self-efficacy have significant with health communication behavior ($P < 0.05$).

While perceived barrier ($P = 0.004$, odds ratio [OR] =2.304, 95% CI = 1.032 < OR < 4.077) and perceived susceptibility ($P = 0.000$, OR = 4.278, 95% CI = 2.709 < OR < 6.754) were the most factors in influencing health communication behavior on social media [Table 4].
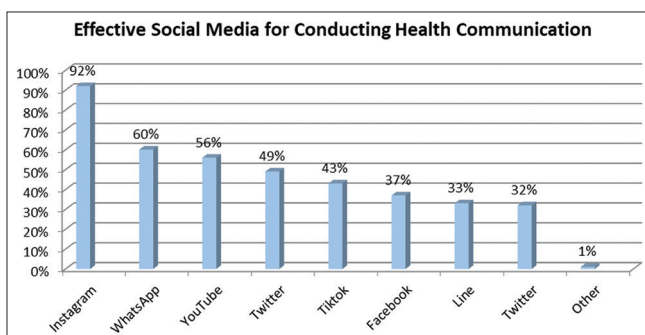

Figure 2: The social media that effective for health communication

Discussion

The aim of the present study was to determine the perceptions of medical students and internship doctors toward health communication related to COVID-19 through social media. Out of the six structures, perceived susceptibility and perceived barriers significantly influence the health communication related to COVID-19 through social media by medical students and internship doctors after controlled other variables. Previous studies had explained the HBM construct to the preventive behaviors against infectious diseases include SARS-CoV.[13]

Respondent characteristics and health communication behavior

Social media are a communication medium that is almost always used in the implementation of health communication.[14] In January 2020, it is estimated that there are more than 175 million Internet users in Indonesia. This number increased by about 17% from the previous year.[15] Based on the answers from respondents, Instagram (92%) and WhatsApp (60%) were mostly chosen as media deemed effective for health communication. Health communication behavior through these two social media needs to be considered given the large number of social media users in Indonesia. The top five social media used by Indonesians are YouTube (88%), WhatsApp (84%), Facebook (82%), Instagram (79%), and Twitter (56%).[16] Several studies have discussed the effectiveness and implications of using social media and other digital media in health promotion and disease prevention efforts.[17,18] The main benefit of using social media for health communication is it makes health-related information more available, shareable, and tailored to recipients of information.[19] In addition, there are studies which report that the public is generally receptive to health messages through social media.[6,7,20]

There was a significant relationship between gender and health communication behavior on social media ($P < 0.05$). This is line with a study on social media and women, which found that most dominant social media users are women, because they are like to socialize more, one of which is by sharing information to communicate through social media and spend more time to use social media.[21] In addition, women use it more for e-mail and get information about health and religion and men use the Internet more for information such as reading news and sports.[15] There was no significant relationship between profession and health communication behavior on social media. This shows that the status of being a student or a doctor is not an obstacle in carrying out health communication behavior on social media.

Table 1: Perceived severity, susceptibility, benefits, barriers, cues to action, and self-efficacy of respondents to conduct health communication about COVID-19 on social media

Statement	Source	Interpretation
Perceived severity		
"… Because the COVID-19 cases in Indonesia are not yet resolved, whereas in other countries many cases have already been resolved"-A, female, clinical student	Written interview	Conducting health communication on social media because the COVID-19 pandemic in Indonesia is difficult to control
"The condition in Indonesia is quite sad and dangerous. The number of confirmed cases continues to fluctuate from 3000 to 4000 cases per day." -C, male, clinical student		
"The number of cases of COVID-19 in Indonesia is increasing, the number of cases is getting faster, the number of deaths is also increasing … so there is a need for education on social media." -F, female, clinical student	Deep interview	
"Already many doctors and health workers have to fight hard on the front lines and even die." -C, male, clinic student	Written interview	Conducting health communication on social media because they are concerned about health workers who have become victims of COVID-19
"The death toll of health care workers due to the COVID-19 pandemic is quite high." -A, female, clinical student		
"There are so many health workers who died. One of the doctors said he was very concerned because of this condition, because he thinks that health workers are this country's assets, right … well, so I thought, "Yes, it's like our health workers are in a crisis, so what can I do … I guess I can post about it … "-S, female, clinical student	Deep interview	
"People are getting bored and don't care anymore about the situation. In fact, they tend to "normalize" the actual situation that is far from normal. So they need to be told again and again "-I, female, clinical student	Written interview	Conducting health communication on social media because the public is increasingly ignorant of the COVID-19 health protocol
"The people are already bored, so they don't obey anymore, but if they are careless, the cases might increase … "A, male, preclinical student	Deep interview	
"There are many misunderstandings and misinformation, many people are careless and have a low risk perception, many people believe in hoaxes so they need correct information"-M, female, clinical student	Written interview	Conduct health communication on social media because there are many hoaxes circulating in the community that need clarification
"I once found a video" distributed through social media containing information without a valid source, where the video tends to lead to the spread of wrong perceptions (COVID infections are intentional, vaccines are a way to get money)." -C, male, clinical student		
"… we are easily pitted against each other by hoax news, sometimes we think, "*how come it's so easy to believe hoaxes?*" I mean we are in the habit of sharing news directly and believing it right away, not like, "*Oh where is this from? Oh, how is this like?*" or think from another point of view. My habit when getting news is thinking "*Is it for real? From what point of view?*" so when people don't get used to it like me, I'm a little annoyed, so I just want to clarify what's right to them." -S, female, clinical student	Deep interview	
"… I'm very irritated with unqualified content creators or public figures with the excuse of "I do not believe COVID-19, it's just a conspiracy etc." because they really influenced the public's views. I want to show people what is the truth." -S, women, clinical student	Written interview	Conduct health communication on social media because many public figures/role models do not model health behavior
"I also regret that some of my colleagues (co-assistants and preclinical students) still like to hang out in crowded public places and take photos together without wearing masks, even though they may be considered role models because they are considered to "understand" the pandemic conditions, so I reprimand them as well		
Perceived susceptibility		
"I clearly have a high risk of contracting COVID, a lot of us that work shifts in hospital have COVID. That's why I share all those things, it's up to you if you say it's so stiff or what"-K, female, doctor	Deep interview	Conducting health communication on social media because they have a risk factor for COVID-19
"In my opinion, I admit it's quite risky for me because my parents are trading in the market, traveling around, and trade to other areas. Well, I don't know where are they going, but as much as possible I make them implement health protocols by sharing … "-S, female, clinical student	Deep interview	Conduct health communication on social media because family/loved ones have risk factors for COVID-19
"From the comorbid factor and the closest infected family/person, there is no risk (so I don't often give information)." -M, female, preclinical student	Deep interview	Do not conduct health communication on social media because they do not have a risk factor for COVID-19

Contd...

Table 1: Contd...

Statement	Source	Interpretation
"A distant family member has COVID but lives far away. I hardly ever meet them, never even. So in sha Allah I'm safe … I don't share anything to my family either, hehe"-C, female, clinical student	Deep interview	Not doing health communication on social media because no family has been affected by COVID-19
Perceived benefit		
"(Sharing educational content) of course as a way to relieve stress when I am at home"-L, female, preclinical student	Written interview	Satisfaction for self
"… I feel like there is a feeling of relief in my heart, after telling people. yes, it brings satisfaction … "-S, female, clinical student	Deep interview	
Personal satisfaction, like there is a sense of "everyone should know this, it shouldn't be just me," so I want to tell other people too, that's how it is. So the benefit is a sense of satisfaction because you have conveyed that feeling. -F, female, clinic student		
"As a reminder to myself," I share this, how come I still don't follow it? Shame on me""-S, female, preclinical student	Written interview	As a reminder to oneself
"As motivation for me to apply it to myself"-W, male, preclinical student		
"Reminder for ourselves to obey what we post. Imagine telling people to do things you don't even do yourself? embarrassing." -K, woman, doctor	Deep interview	
"I feel that giving information is a good deed"-I, male, preclinical student	Written interview	Religious aspect
"By sharing educational content, hopefully it will become a form of charity"-D, male, preclinical student		
"People around me are more compliant with health protocols"-U, female, preclinical student	Written interview	Give a positive impact to others
"People around me are starting to understand more about the dangers of COVID-19 and ways of preventing the spread"-G, male, preclinical student		
"There are some people who start practicing what I told them, and report back to me, like, "I've been doing this sis, I've been practicing like this." After I share information to them and educate them"-S, female, clinical student	Deep interview	
"I feel that I always get new information related to COVID-19 … doing health communication on social media also helps me stay updated on news"-S, female, preclinical student	Written interview	As additional knowledge
"If we want to post, we will definitely read it first, so I'm more updated about COVID-19 now"-A, male, preclinical student	Deep interview	
"I can exchange ideas about COVID-19 from various fields"-F, female, preclinical student	Written interview	As a discussion material
"Sometimes when sharing there are shortcomings and I'll get additional information from friends. -R, male, preclinical student		
Perceived barriers		
"As a medical student, you certainly feel still incapable to explain COVID-19 in detail. My knowledge about COVID is still lacking. Besides that, my ability to communicate is still far from good"-D, female, clinical student	Written interview	Limited knowledge
"I'm not confident yet to educate because there is still a lot of knowledge to be learned related to COVID-19 (which is still being updated) and I want to get proper training in educating the community as preclinical students"-T, male, preclinical student		
"I'm actually kind of interested, for example, after reading information about COVID, I want to share but … I feel like I lack knowledge and I'm afraid someone will ask me … I'm afraid I won't be able to answer"-Z, female, clinical student	Deep interview	
"The material is absent and uninteresting and I'm too tired to design anything because assignments and organizations still pile up along with my theses"-C, male, preclinical student	Written interview	Lack of interest and time
"Busy, I don't have time to look for content like that"-D, female, clinical student	Deep interview	
"I'm not really active on social media. I rarely open it." -A, male, preclinical student	Written interview	Less active on social media
"It's rare for me to use social media to share something … "-S, female, preclinical student		
"I don't really like it. I haven't been active on social media for a while actually … now I rarely open it, I only open it to see some of people's posts or read messages and then log off"-C, female, clinical student	Deep interview	

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Table 1: Contd...

Statement	Source	Interpretation
"Sometimes people ridicule me, saying "don't be too scared," "Stop sharing this too often, it makes people anxious," or the belief of friends and family that COVID is not dangerous, for example" "The news said it's not dangerous," "COVID is just a conspiracy," "don't be so paranoid, all you need is strong immunity," sometimes even though I've educated them, they still won't listen. In the end I'm tired of educating them myself …"-H, Female, Clinical Student	Written interview	Having a bad experience
"Friends think I'm "pretentious." Got ostracized by the community because they think I'm spreading something that makes people worry"-S, female clinical student		
"I don't want to spam on social media … I want to maintain my social media privacy …"-R, female, clinical student	Written interview	Worry of making others uncomfortable
"… I think if I posttoo often people will think it is spam. -A, male, preclinic student		
"Let's say there are many people who can do that first, if someone already do it I think it will be okay even if I don't. -A. women, preclinical students	Written interview	A lot of people do
"I think many people around have done it, it remains the reader's awareness to apply what has been seen"-M, female, preclinical student		
"Because besides us, the community already has many sources of information. We're not the only ones, … "-D, woman, doctor	Deep interview	
Cues to action		
"I start sharing because a friend of mine has died from COVID 19"-H, female, preclinical student	Written Interview	Experienced medical events
"There are families who have contracted COVID-19, so I start sharing educational content"-Y, female, preclinical student		
"I just want to share information and remind people close to me"-A, female, preclinical student	Written interview	No triggers: Pure fad
"Because only with social media, I can connect with family, friends, and people I used to know." -H, female, preclinical student		
"At first … I share because I felt it needed to be shared … But then it became a habit after entering IKM (department)"-F, female, clinic student	Deep interview	Since getting the task of conducting health communication on social media
"Because I feel the obligation of a future doctor"-M, female, preclinical student	Written interview	A sense of duty or responsibility
"When I first share… I feel responsible, you know, there is no way someone who studied healthcare has no role in this pandemic, the least we can do is share, I think it's like that initially…"-S, female, clinical student	Deep interview	
"Since seeing people's posts, I have followed suit"-N, female, preclinical student	Written interview	The influence of others
"One of the reasons is because my friends are more active … "-S, female, clinical student	Deep interview	
"At first I was furious to see how people underestimate COVID"-A, male, preclinical student	Written interview	Resentment towards society
"I'm so annoyed to see how people are not that smart in Indonesia, especially Palembang where everyone is still having fun outside and not using mask. Especially when medical students do it, it's like HEY YOU KNOW YOU'RE A MEDICAL STUDENT, a medical co-assistant in fact, and you still don't use mask, and hang out, etc., I'm so exasperated so I indirectly call them out while on social media"	Written interview	Feelings of annoyance with colleagues
"There are a lot of COVID patients, some even accuse doctors for deliberately claiming COVID on patients, even though it's true that the patient came because they had an accident, but when they're being checked, they have infiltrate in their lungs. That still needs to be informed to the public"	Deep interview	Direct contact with patients
Self-efficacy		
"I don't know where to find the source … so I'm afraid it's not valid"-D, female, clinical student	Deep interview	Unable to create content/find valid sources
'I don't know a source that specializes in information about COVID …"-D, female, preclinical student	Written interview	
"I know that we can search for info in WHO, WHO Indonesia, the Ministry of Health, CDC, or from posts from active lecturers … but I'm afraid (to share)"-C, female, clinical student	Deep interview	Can create content/find valid sources but not conduct health communication

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Table 1: Contd...

Statement	Source	Interpretation
"I have created the source myself… concluding from some other sources so it's easy to read. I have also shared directly from the ministry of health or from accounts about health that are easy to read for the public. Or from WHO Indo and also from WHO in the english version … I just choose the language that is easy to understand, that's all." -S, female, clinical student	Deep interview	Can create content/find valid sources and conduct health communication
"Almost all of the sources I share are from the existing ones, but some I made myself, especially at the beginning, but after I saw that people prefer the ones that were already made, for example from WHO, I made a little adjustment such as I edit and then made a caption then I share it"-T, male, clinical student		

COVID-19=Coronavirus disease 2019, IKM=Ilmu Kesehatan Masyarakat (Public Health Sciences), CDC=Centers of Disease Control and Prevention

Table 2: Pearson correlation test results between perception and behavior variables

Variable	1.SEV	2.SUS	3.BEN	4.BAR	5.CUE	6.SE	7.B
1. SEV							
r	1	0.307**	0.275**	0.59	0.196**	0.199**	0.105*
P		0.000	0.000	0.242	0.000	0.000	0.036
2. SUS							
r	0.307**	1	0.141**	0.034	0.102*	0.199**	0.148**
P	0.000		0.005	0.504	0.041	0.000	0.003
3. BEN							
r	0.275**	0.141**	1	0.016	0.232**	0.173**	0.049
P	0.000	0.005		0.757	0.000	0.001	0.328
4. BAR							
r	0.059	0.034	0.016	1	−0.150**	0.172**	0.324**
P	0.242	0.504	0.757		0.003	0.001	0.000
5. CUE							
r	0.196**	0.102*	0.232**	−0.150**	1	0.116*	0.031
P	0.000	0.041	0.000	0.003		0.020	0.532
6. SE							
r	0.199**	0.199**	0.173**	0.172**	0.116*	1	0.132**
P	0.000	0.000	0.001	0.001	0.020		0.008
7. B							
r	0.105*	0.148**	0049	0.324**	0.031	0.132**	1
P	0.036	0.003	0.328	0.000	0.532	0.008	

*$P<0.05$, **$P<0.01$. SEV=severity, SUS=susceptibility, BEN=benefits, BAR=barriers, CUE=CUES TO ACTION, SE=SELF-EFFICACY, B=BEHAVIOR

Perceived severity and health communication behavior

The construction of perceived severity relates to the individual's beliefs about the severity or seriousness of the disease. The seriousness or severity that an individual perceives is often based on medical information or knowledge. It can also come from a person's belief that they will be burdened as a result of the disease and their life in general will be affected. The results of this study are also in line with the concept of severity according to the experts. One of them explains that the perception of severity is also included the seriousness of an illness to an individual, family, or society which encourages someone to seek treatment or prevention of the disease.[22]

Some respondents argued that the situation of the COVID-19 pandemic in Indonesia was out of control, even much medical personnel died in overcoming COVID-19. The growth of cases in Indonesia reaches 4000/day and the resources insufficient enough because

many medical workers in Indonesia have passed away from coronavirus (COVID-19).[23] The increasing number of Covid-19 cases that have been occurring in Indonesia shown that risk communication has not been effective.[24] The spreading of hoax news makes worse pandemic conditions in Indonesia. The provocative words used led the people easily to believe and violations of health protocols. The punishment given could not raise people's awareness to comply with the rules. Disobedience has made the transmission spread more rapidly, not only increasing the number of positive rates but also increasing the number of mortality. This study showed that respondents who had a severe perception are more likely to conduct health communication than respondents who had a nonsevere perception. This is in line with the concept of severity according to the experts that the perception of severity is also included the seriousness of an illness to an individual, family, or society which encourages someone to seek treatment or prevention of the disease.[25]

Table 3: Respondent characteristics and health communication behavior

Respondent characteristics	Total, n (%)	Health communication behavior		P	OR (95% CI)
		Yes (n=125; 31.3%), n (%)	No (n=274; 68.7%), n (%)		
Age, mean±SD	20.58±2.078			0.116	0.922 (0.833-1.020)
Gender					
Male	114 (28.6)	26 (6.5)	88 (22.1)	0.028	0.657 (0.452-0.954)
Female	285 (71 0.4)	99 (24.8)	186 (46.6)		
Profession				0.637	1.159 (0.751-1.790)
Preclinical students	42 (10.5)	15 (3.8)	27 (6.8)		
Clinical students	357 (89.5)	110 (27.6)	247 (61.9)		
Perceived severity					
Severe	384 (96.2)	124 (31.0)	260 (65.2)	0.044	4.844 (0.725-32.354)
Not severe	15 (3.8)	1 (0.3)	14 (3.5)		
Perceived susceptibility					
Susceptible	297 (74.4)	105 (26.3)	192 (48.1)	0.005	1.803 (1.182-2.750)
Not susceptible	102 (25.6)	20 (32.0)	82 (70.0)		
Perceived benefits					
Yes	392 (98.2)	124 (31.1)	268 (67.2)	0.442	2.214 (0.359-13.672)
No	7 (1.8)	1 (0.3)	6 (1.5)		
Perceived barrier					
Yes	136 (34.1)	54 (13.5)	209 (52.4)	0.000	2.543 (1.908-3.388)
No	263 (65.9)	71 (17.8)	65 (16.3)		
Cues to action					
Yes	397 (95.0)	120 (30.1)	259 (64.9)	0.705	1.266 (0.584-2.745)
No	20 (5.0)	5 (1.3)	15 (3.8)		
Perceived self-efficacy					
Good	320 (80.2)	110 (27.6)	210 (52.6)	0.012	1.810 (1.120-2.926)
Poor	79 (19.8)	15 (3.8)	64 (16.0)		

While, perceived barrier (P=0.004, OR=2.304, 95% CI=1.032<OR<4.077) and perceived susceptibility (P=0.000, OR=4.278, 95% CI=2.709<OR<6.754) were the most factor in influencing health communication behavior on social media. CI=Confidence interval, OR=Odds ratio, SD=Standard deviation

Table 4: Multivariate analysis toward health communication behavior on social media

Variable	B	Significant	Exp (B)	95% CI for Exp (B)	
				Lower	Upper
Perceived susceptibility	0.835	0.004	2.304	1.302	4.077
Perceived barrier	1.453	0.000	4.278	2.709	6.754

CI=Confidence interval

Perceived susceptibility and health communication behavior

When people believe they are not at risk or have a low risk of susceptibility, they are more likely to engage in unhealthy behavior.[19-26] In this study, the susceptibility factor to COVID-19 likes of whether they self or people around them have a comorbid disease, influencing to conducting health communication-related COVID-19 on social media. The spread of the virus from human to human occurs due to close contact with an infected person, well exposed to coughing, sneezing, or aerosols.[27] Medical students and doctors as health workers have a high risk of being exposed to COVID-19, being infected and possibly infecting their loved ones because they are in a high-risk environment. The concern about transmission is very reasonable. Apart from the lack of supplies of personal protective equipment (PPE) in some areas, the use of PPE that is not careful can have the potential to enter the virus.[28,29] As students, they have general knowledge of COVID-19 because of their background and level of education. Previous research stated that university students and health backgrounds had sufficient knowledge about COVID-19, amounting to 79.8% and 84.6%.[30] Knowledge is one of the demographic factors to make perceptions thus influence to conduct health communication. In line with this, Rosenstock argues that a person with a high perception of vulnerability feels threatened by a condition or disease and therefore takes certain actions to prevent the disease threatens them.[26]

Perceived benefits and health communication behavior

When someone adopts a certain behavior, they believe the behavior will benefit.[31,32] In this study, respondents mostly as psychological benefits such as feelings of satisfaction or relief, aspects of religiosity, and reminders for themselves. The benefits of conducting health communication related to COVID-19 on social media are not tangible. The respondent indirectly felt the impact of implementing this behavior, thus the perception likely insignificant to influence the behavior.

The results showed perceived benefits insignificantly related to health communication behavior. Although the perception of benefits of respondents is high, it does not affect well behavior in health communication, and if the perception of benefits is low, it does not automatically mean that the respondent will not conduct health communication. The previous study shows that not all dimensions of the health belief model have the same relationship or influence on a person's behavior.[33,34]

Perceived benefits have a significant relationship with perceived severity, perceived susceptibility, cue to action, and self-efficacy. That means the higher the perception of severity, the perception of seriousness, cue to action, and self-efficacy, the higher the perceived benefits, the contrary the lower perception of severity, perception of seriousness, cue to action, and self-efficacy, the lower the perceived benefits.

Perceived barrier and health communication behavior

Of all constructs, perceived barriers perceived barriers have influence to likely four times in determining behavior and a significant relationship with health communication behavior on social media. This can be seen from half of the respondents who do not carry out health communication on social media and various reasons put forward. The results are in line with other studies that refer to the opinion according to Conner and Norman that the inversely proportional relationship between perceived barriers and well-behavior is negative. This means that if the high perception of barriers, the well-behavior will not carry out.[11,35] In this context, the number of barriers experienced by respondents, it means will not carry out health communication.

Respondents have obstacles to conduct health communication, namely, knowledge related to COVID-19 and communication skill. In principle, to communicate effectively, medical students or doctors must equip with communication knowledge including the communication media.[36] Effective communication is a competency that doctor graduates must have based on the 2019 Indonesian Doctor Competency Standards (SKDI).[37] While the knowledge of COVID-19, majority respondents admitted they were not actively seeking information related to COVID-19 except in the class and insufficient reading information regarding COVID-19 updates. Besides, the lack of time and interest also has the obstacles of conducting health communication on social media. Interest is a motivational state or a set of motivations that guide behavior toward certain goals.[38] Internal motivating factors, social motive, and emotional are factors that can influence a person's interest.[39] Respondents also perceived that social media are only used to communicate or to share daily activities,

causing feelings of worry that they will make others uncomfortable with the information provided by them and worry about getting a poor response.

Perceived cues to action and health communication behavior

Behavior influenced by the knowledge and experience of the individual.[35] From the research, it found that the respondents' knowledge was in the form the community or colleagues who were increasingly indifferent to the health protocols around them, making them conduct health communication on social media. Respondents' experience in dealing with the large number of COVID-19 patients directly or experienced medical events such as relatives or loved one's suffering or dying from COVID-19 also made them more incessant in communicating health on social media.

In the study, it was also found that the trigger for health communication behavior was because of mere fad. Paradoxically, boredom or mischief could be a powerful motivator for individuals to perform tasks or actions that are useful but not unpleasant rather than fun but useless tasks or actions.[40] The pandemic that has been going on since March 2020 in Indonesia made people spent most of their time at home, so people will look for fun activities to reduce boredom.[41] For medical students and doctors, health communication related to COVID-19 on social media can be the solution. The habits of peers can also influence health communication on social media, namely, as a reinforcing factor for someone to adopt healthy habits.[42] In the previous study, cues to action were one of the strongest predictors of preventive behaviors.[43]

As previously explained, not all dimensions of the health belief model have the same relationship or influence on a person's behavior; the cue variable for action also does not have a significant influence on health communication behavior on social media. The higher the perception of severity, perception of susceptibility, the perception of benefits, and self-efficacy, the higher the cues to act, otherwise The lower perception of severity, perception of susceptibility, the perception of benefits, and self-efficacy, the lower cues to act.

Perceived self-efficacy and health communication behavior

Self-efficacy related to self-confidence in carrying out a health behavior.[25] In this study, self-efficacy assessed from the ability to find valid sources of information and self-confidence in conducting health communication on social media. Some student respondents felt they could find valid sources but not confident enough because they felt they were not yet competent, were still students, or fixated on other obstacles.

In this study, good self-efficacy related to health communication behavior on social media. A study suggests that high perceived self-efficacy matters in overcoming perceived barriers and is an effective variable in carrying out healthy behaviors. This finding explained through the social cognitive theory put forward by Bandura. According to social cognitive theory, self-efficacy refers to an individual's belief in their ability to control a problem.[22] In the current pandemic, the high self-efficacy is necessary to maintain long preventive behaviors time against COVID-19.[13]

We have not found similar research related to the perceptions of medical students and doctors by identifying and analyzing variables in conducting health communication, especially during the COVID-19 pandemic using a mix method.

Limitation and recommendation

The potential limitation in this study is the use of long-distance communication media to avoid the transmission of COVID-19 infection which causes the interview to be less effective due to the influence of the network signal used. Researchers also cannot assess nonverbal communication by respondents. In addition, due to time constraints, the research subjects only came from one medical university so that it could not be generalized. For further research, it is expected to involve more samples and also students of general health.

Conclusions

This study showed that perceived severity, perceived susceptibility, perceived barrier, and self-efficacy are predictor factors of health communication behavior related to COVID-19 on social media with perceptions of susceptibility and perceived barriers as the most influential variables. Interventions can be focused on increasing the variable perceived severity, perceived susceptibility, and self-efficacy, as well as reducing the perceived barrier variable. One form of intervention that can be done is to provide communication learning on social media that is effective and can be applied directly to reduce perceived barriers and increase self-efficacy.

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Conflicts of interest

There are no conflicts of interest.

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