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Knowledge, precautionary actions, and perceived risk of COVID-19 among Indonesian people

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ABSTRACT

Novel coronavirus was first identified in China in December 2019, causing several cases of the new type of pneumonia. The exported cases were found in other countries, including countries in the Southeast Asia region. At the same time, no cases were confirmed in Indonesia. We aimed to assess COVID-19 related knowledge, precautionary actions, and perceived risk among general Indonesian population when there were no confirmed cases in Indonesia. This study was a descriptive cross-sectional study involving 382 participants aged 17 years and above residing in Indonesia. The data was collected through the online questionnaire from February 19th to February 29th 2020. The average score of COVID-19 related knowledge was 88.0%, whereas 83.8% of the participants had a high level of knowledge. The average score of taking precautionary actions was 77.4% and 65.7% had a high level of performance. In terms of the perceived risk of COVID-19, only 11.3% of the participants perceived themselves likely to acquire COVID-19 when compared with other diseases or accidents. The perceived risk of COVID-19 was significantly associated with precautionary action ($p < 0.05$). Perceived risk of COVID-19 was at a low level when there were no confirmed cases. Effective strategies of risk communication are needed to improve precautionary actions to prevent COVID-19.

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1. INTRODUCTION

Novel coronavirus, recently named SARS-CoV-2, is the new strain of coronaviruses that have been identified as the cause of several cases of a new type of pneumonia in Wuhan, Hubei province, China, in December 2019 [1]. The SARS-CoV-2 found to have some similarities with SARS-CoV, which caused severe acute respiratory syndrome (SARS) outbreak in 2004. The estimated fatality of the SARS-CoV-2 is 2%, and it is found to be lower than the SARS-CoV [2]. However, this virus causing coronavirus disease

(COVID-19) spread rapidly and caused the pandemic in more than 200 countries worldwide with 25,602,665 confirmed cases per September 3rd, 2020 [3].

SARS-CoV-2 is transmitted through respiratory droplets and close contact between people with incubation time within three to seven days and up to two weeks [4, 5]. The symptoms of SARS-CoV-2 are fever, cough, and shortness of breathing, sore throat, and diarrheal. Even though the majority of patients had an opportune prognosis, patients with other comorbidities such as cardiovascular diseases, chronic obstructive pulmonary disease, and acute respiratory syndrome could have severe outcomes [6].

There is no antiviral treatment that is specifically recommended for the patients. In the meantime, the vaccine for COVID-19 has been developed and currently is being put into clinical trials [7]. Therefore, precautionary actions were highly advised to the public to prevent the increased risk of acquiring COVID-19. People were warned with basic preventive hygiene measures such as avoiding close contact with sick people, covering nose and mouth when coughing or sneezing, and washing hands with soap and water or using alcohol-based hand rub [8].

The novel coronavirus outbreak led to the World Health Organization (WHO) declaring COVID-19 as the Public Health Emergency of International Concern on January 30th, 2020 [9]. In that time until the end of February 2020, Indonesia remained as one of the COVID-19 unaffected countries while some nearby countries, including Malaysia and Singapore, have reported at least one case. As a country with the fourth-largest population in the world, the possibility of an emerging infectious outbreak seemed concerning. However, less is known about how Indonesians perceived COVID-19 when there were no confirmed cases and what this meant for their behavior during that time. At times when there are no possible available treatments or vaccination in a new epidemic of infectious disease, precautionary actions of the population play a big role to ensure the effective management. Knowledge is important to the effective control of a pandemic, as it has been shown that knowledge could improve people's performance in preventing the disease [10, 11]. Furthermore, promoting the precautionary actions is largely dependent on the knowledge or determinants of such behavior.

Perceived risk is an important aspect in health and risk communication, aiming to see how people care and deal with the risk. There are various theories used to assess perceived risk, however during a new epidemic of infectious disease, using a not specified model is unavoidable. In this study, COVID-19 pandemic has not yet confirmed in Indonesia. Therefore, we used the perceived vulnerability construct of Health Belief Model to explore the likelihood people perceived themselves acquiring the disease. Perceived risk also may influence people's willingness to comply with precautionary actions to prevent the disease. [12]

Previous studies conducted in the unaffected areas during SARS outbreak showed that the public in the unaffected area were more likely to be aware of the disease, less worried but has taken the precautionary actions to prevent the disease [13]. Several studies have been conducted in assessing public risk perception of COVID-19, such as in China, that it has been observed that improving perceived risk is a great way to encourage people to take more preventive actions during the pandemic situation [14]. Therefore, this study aimed to explore the knowledge of the Indonesians towards COVID-19; perceived risks of COVID-19 compared with other emerging infectious diseases, and examine the precautionary actions taken to prevent COVID-19.

2. RESEARCH METHOD

This cross-sectional study was carried out using an online questionnaire from February 19th, 2020 to February 29th 2020. The population of this study were the general Indonesians aged 17 years and above residing in Indonesia. The sample size was calculated online (Qualtrics.com), using 95% confidence level and 5% of margin error, the minimum required sample size was 385. After excluding the incomplete questionnaire, the total of the complete questionnaire analyzed in this study was 382. This study was approved by the Ethics Committee of Aisyiyah University (No. 1305/KEP-UNISA/IV/2020). Informed consent, agreement of the respondent to participate in the study was obtained from each participant after the study introduction.

The questionnaire was developed according to the previous study of SARS; however some adjustments were made [13]. The original questionnaire has been developed in English and translated and validated into Indonesian to assure that the respondent understood the questions correctly. The questionnaire started with the introduction of the involved researchers and given information regarding the topic of the study. The questionnaire was divided into five sections: socio-demographic characteristics, knowledge of COVID-19, precautionary actions, perceived risk, and preferred source of information. Pilot study was conducted on 35 anonymous samples to determine the reliability of the questionnaire. The questionnaire was reviewed and revised by all authors.

3. INSTRUMENTS

The socio-demographic characteristics information collected in this study included age, gender, region, education, and occupation. The region was divided according to the time zone classification; therefore it includes western region (provinces in Sumatra, Java, and some provinces in Kalimantan) and middle region (Bali, East Timor, provinces in Sulawesi, and some provinces in Kalimantan). Awareness of the participants about COVID-19 was assessed by a question "Have you ever heard of COVID-19? And the participants were also asked whether they have lived or visited COVID-19 affected countries in the last six months.

Knowledge of the participants was assessed with six items about the symptoms and transmission of COVID-19. The measurements of knowledge consisted of the total correct score of major symptoms of COVID-19 (fever, cough, and shortness of breath) and the mode of transmission of COVID-19 (respiratory droplets produced when an infected person coughs or sneezes, close contact with the infected person, and using the same utensils with the infected person). This was based on the available publication about COVID-19 information from WHO and CDC at that time [3, 15]. Participants who answered "Yes" were given 1 point while "No/I don't know" was given 0 points. The range of the total answer is 0-6. A cut-off value of five was set based on the mean of the total score. Therefore, those with an overall score of less than five were categorized in a low level of knowledge. Meanwhile, those with a total score of more and equal to five were categorized at a high level of knowledge. The reliability of this measure is 0.760 (Cronbach's alpha).

Precautionary actions of participants assessed with 12 items such as avoiding contact with sick people, avoiding contact with other people when sick, wearing a mask, covering mouth and nose when sneezing/coughing. These items were assessed by three choices, "Yes," "No," and "Not sure." Every precautionary action took or answered "Yes" given 1 point, and the answer "No/I don't know" was given 0 points. The range of the total answer is 0-12. A cut-off value of nine was set based on the mean of the total score. Therefore, those with an overall score of less than nine were categorized in a low-level performance of precautionary actions. Meanwhile, those with a total score of more and equal to nine were categorized at a high level of precautionary action performance. The reliability of this measure was 0.717 (Cronbach's alpha).

The perceived risk of COVID-19 was assessed by the strength of the likelihood (perceived vulnerability) of suffering COVID-19 compared with other diseases, and accidents such as SARS, MERS, etc., based on the previous study [16]. These questions used a five-point Likert scale, where (1) is very unlikely, too (5) very likely. The perceived risk among participants was divided into two categories based on the answer; very unlikely/unlikely/neutral and likely/very likely. The reliability of this measure was 0.806 (Cronbach's alpha). The preferred sources of information were assessed by asking the participants with some items of information sources related to the outbreak of COVID-19, such as television, official websites, social media, etc. This question was assessed by three choices, "Yes," "No," "Not sure".

The data were analyzed using SPSS version 22.0 (IBM Corp., Armonk, NY, USA). A descriptive analysis conducted to the socio-demographic characteristics, knowledge, precautionary actions, the perceived risk of COVID-19, and preferred sources of information. After conducting the Kolmogorov-Smirnov to assess the normality of the distribution, none of the variables showed a normal distribution. Therefore, Spearman's correlation test was conducted to identify the association between the perceived risk of COVID-19 with knowledge and precautionary actions. Value of p was less than 0.05; it was considered as a statistical significance.

4. RESULTS AND DISCUSSION

The majority of the participants were female (70%), people aged 17-25 (65.7%), living in the western region (68.6%), holding bachelor degrees (70.4%), and students (39.5). Overall, the participant in this study comprised young people. In terms of awareness, 92.9% of the participants have heard about COVID-19. Only 9.7% had lived or visited the COVID-19 affected countries in the last few months as shown in Table 1.

4.1. COVID-19 related knowledge

The majority of the participants have a good knowledge of the main symptoms of COVID-19, such as fever (94%), cough (88%), and shortness of breath (89.2%). In terms of the transmission of COVID-19, most of the participants knew that COVID-19 transmitted through respiratory droplets (95.5%) as shown in Table 2. In this section, 83.8% of the participants had a high level of knowledge, while 16.2% had a low level of knowledge. The average score of the total correct answers of knowledge was 88%.

Table 1. Demographic characteristic of the participants

Variables	Total n (%)	Knowledge		Precautionary actions		Perceived risk	
		Mean	SD	Mean	SD	Mean	SD
Gender							
Male	115 (30)	5.24	1.09	9.02	2.53	2.13	1.04
Female	267 (70)	5.34	1.10	9.41	2.22	2.29	1.14
Age (years)							
17-25	251 (65.7)	5.25	1.14	9.04	2.38	2.31	1.11
26-35	80 (20.9)	5.53	0.87	9.74	2.25	2.25	1.19
36-45	42 (11)	5.29	1.04	10.10	1.91	1.95	0.96
46-55	9 (2.4)	4.88	1.72	8.88	2.1	1.50	0.75
Region							
Western region	262 (68.6)	5.25	1.18	9.15	2.34	2.23	1.10
Middle region	120 (31.4)	5.43	0.88	9.63	2.26	2.26	1.15
Education							
Junior high school	4 (1.0)	4.50	1.29	9.50	2.64	2.00	0.81
Senior high school	60 (15.7)	5.25	1.00	8.90	2.50	2.38	1.09
Bachelor Degree	269 (70.4)	5.30	1.16	9.11	2.26	2.20	1.11
Postgraduate	49 (12.9)	5.49	0.76	9.29	2.43	2.33	1.19
Occupation							
Student	151 (39.5)	5.28	1.10	9.11	2.56	2.26	1.14
Private sector employee	120 (31.4)	5.42	0.87	9.53	2.17	2.30	1.08
Government worker	30 (7.9)	5.13	1.13	8.87	2.17	2.13	1.22
Entrepreneur	22 (5.8)	5.09	1.23	9.27	2.3	1.86	0.88
Others	59 (15.4)	5.32	1.40	9.51	2.05	2.27	1.11
COVID-19 related awareness							
Yes	355 (92.9)	5.34	1.03	9.28	2.30	2.24	1.25
No	27 (7.1)	4.85	1.74	9.52	2.62	2.30	1.26
Previous visit to COVID-19 affected countries in the last 6 months*							
Yes	37 (9.7)	5.32	1.00	10.03	2.44	2.26	1.09
No	345 (90.3)	5.31	1.12	9.22	2.30	2.14	1.27

*China, South Korea, Japan, Italy, Iran (up to February 29, 2020)

Table 2. Participants knowledge of COVID-19 symptoms and transmission

Variables	Knowledge		
	Yes n (%)	No n (%)	Do not know n (%)
Symptoms			
Fever	359 (94.0)	9 (2.4)	14 (3.7)
Cough	336 (88.0)	12 (3.1)	34 (8.9)
Shortness of breath	342 (89.2)	11 (2.9)	29 (7.6)
Mode of transmission			
Through respiratory droplets produced when an infected person coughs or sneezes	365 (95.5)	5 (1.3)	12 (3.1)
Close contact with the infected person	333 (87.2)	22 (5.8)	27 (7.1)
Using the same utensils with the infected person	285 (74.6)	35 (9.2)	62 (16.2)

4.2. Precautionary actions

Every respondent took at least one of the precautionary actions, which majority reported covering nose and mouth when sneezing or coughing (97.1%), avoiding traveling to COVID-19 affected area (95.5%), and avoiding close contact with another person when sick (91.4%). However, only around half of the participants avoided eating out in the food courts or restaurants (53.9%) and avoided public gatherings (49%) as shown in Table 3.

Table 3. Participants' precautionary actions to prevent COVID-19

Precautionary actions	Yes n (%)
Avoiding close contact with sick people	333 (87.2)
Avoiding close contact with another person when sick	349 (91.4)
Not going out when sick	290 (75.9)
Wearing a mask	336 (88.0)
Covering nose and mouth when sneezing or coughing	371 (97.1)
Washing hands with water and soap for at least 20 seconds	320 (83.8)
Using hand sanitizer when water is not available	301 (78.8)
Avoiding eating out in the food court or restaurant	206 (53.9)
Avoiding public gatherings or crowded place	189 (49.0)
Avoiding traveling to COVID-19 affected areas	365 (95.5)
Avoiding traveling by plane or public transportation	202 (52.9)
Consuming health supplement to improve immunity	291 (76.2)

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The average score of total correct answers of precautionary actions was 77.4%. In this section, 65.7% of the participants showed to have a high performance of precautionary actions. Meanwhile, 34.3% reported low performance of precautionary actions. In term of precautionary actions, the group who took more precautionary actions based on the mean score are female (9.41), people aged 36-45 (10.10), living in the middle region (9.63), junior high school (9.50), and private sector employee (9.53) as shown in Table 1.

4.3. COVID-19 perceived risk

Only a few participants (11.3%) thought it likely or very likely that they might acquire COVID-19. Compared with the other diseases and accidents, the perceived risk of suffering COVID-19 was lower than acquiring common cold as shown in Table 4.

Table 4. Participants' perceived risk of COVID-19 and other diseases/accidents

	Likely, very likely n (%)
COVID-19	43 (11.3)
SARS	35 (9.2)
MERS	33 (8.6)
Common cold	148 (38.7)
Cancer	47 (12.3)
Cardiovascular disease	45 (11.8)
Traffic accident	89 (23.3)
Food poisoning	78 (20.4)
HIV	26 (6.8)

4.4. Trusted source of information

The main trusted media for disseminating COVID-19 related information among the participants were websites (84.8%), physicians/health workers (83.2%), and social media (81.7%). Less than half (46.3%) chose magazines as a trusted source of information as shown in Figure 1.

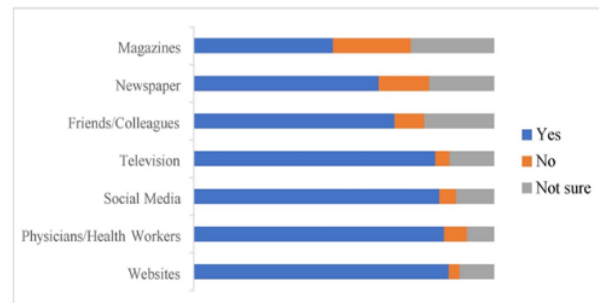


Figure 1. Participants' preferred source of information related to COVID-19

4.5. Perceived risk of COVID-19 and other variables

Table 5 indicates that the perceived risk of acquiring COVID-19 was positively associated with precautionary actions to prevent COVID-19 ($p < 0.05$). Precautionary actions to prevent COVID-19 and awareness were further positively associated with knowledge ($p < 0.01$).

Table 5. Spearman's correlation between perceived risk of COVID-19 and other independent variables

	1	2	3
Perceived risk of COVID-19	1		
Knowledge	-.006	1	
Precautionary actions	.107*	.243**	1

* correlation is significant at the 0.05 (2-tailed)
** correlation is significant at the 0.01 level (2-tailed)

To our knowledge, this was the first study from Indonesia to examine the knowledge, precautionary actions, and perceived risk of COVID-19 before the outbreak occurred locally. The results revealed that Indonesians in this study are aware of COVID-19, had sufficient knowledge about the symptoms and mode of transmissions, performed satisfactory level of precautionary actions to prevent COVID-19, but reported to have low perceived risk of acquiring COVID-19. The participants reported to have more trust in websites (official websites such as WHO, CDC, Indonesian Ministry of Health), physician/health-workers, and social media to disseminate information about COVID-19.

4.6. COVID-19 related knowledge

In this study, the majority of the participants know the main symptoms and transmission of COVID-19 based on the total average of correct answers (88%). This finding is in line with a study previously conducted during the SARS outbreak, which found that despite the country is not unaffected of the outbreak; the population had a relatively good knowledge of the disease [13]. The COVID-19 outbreak has caught the attention of local and international media. Hence, it might contribute to the knowledge of the population. Furthermore, in early February, the Ministry of Health has spread some relevant information on various platforms (Twitter, Instagram, and official websites) about COVID-19 symptoms and the transmission that might lead to the familiarity of the public with the new disease. The Ministry of Health has also declared previously named 2019-nCoV as a disease that can cause plague and its response measure at the same time [17].

4.7. Precautionary actions taken to prevent COVID-19

In terms of precautionary measures, slightly more than half of the participants had a high level of precautionary actions to prevent COVID-19. The majority of participants reported high importance to cover mouth and nose while sneezing or coughing. This is similar to the previous study that reported paying close attention while coughing as the mostly taken behavior to prevent an infectious disease [13]. A study in Hong Kong showed that majority of the participants would perform preventive behavior such as wearing face masks in public (73.8%) and increasing the frequency of handwashing (86.7%) if human-to-human transmission of Avian Influenza would occur [18]. In this study, where human-to-human transmission of COVID-19 were confirmed but yet to cause a local outbreak, it was observed that 88% of participants performed the action of wearing face masks to prevent the disease.

Meanwhile, the precautionary actions less likely to take were not going out while sick, avoiding crowds and gathering, and avoiding going out by public transportation. This finding may be partly due to no COVID-19 cases confirmed during the time of the study, so performing these precautionary actions was not necessary, as people were still allowed to carry on their normal life (working, going to school, etc.). There were no strict regulations set by the government for limiting the mobility of the people, and such public service announcement was not available. Additionally, the travel restriction from Hubei province to Indonesia was implemented at the end of January. This has been previously explained in the health belief model (HBM), that such external trigger could prompt individual to engage in a preventive behavior [15]. Earlier study in Singapore revealed that when the government is capable in gaining public trust in halting SARS outbreak by implementing effective measure, the public compliance is high [19]. Despite the lacking of travel restriction, avoiding traveling to COVID-19 impacted areas was one of the most taken precautionary actions to prevent COVID-19 among the participants when there were no confirmed cases.

4.8. Perceived risk towards COVID-19

Compared with other diseases or accidents, only a few participants thought it likely or very likely that they might be infected by COVID-19. Female reported to have higher perception of COVID-19 risk. However, the perceived risk of the common cold was reported higher than COVID-19. This finding is in line with the previous study that found risk perception of common cold among a population was the highest when compared with other diseases or accidents [16]. Overall, Indonesians in this study have low perceived risk of COVID-19 and it was somewhat concerning in the current situation of the outbreak. Earlier study reported that there was a possibility of underreporting number of cases in Indonesia, as the model predicted at least there should have been five cases of COVID-19 in Indonesia in the early February [20]. This finding suggests that the lower risk perception might be influenced by a knowledge that no COVID-19 cases were reported in Indonesia and an additional assumption that the novel coronavirus had a low survival in tropical regions, as similarly found in the previous study [21]. This supports the psychometric paradigm, where psychological factors such as fear and familiarity with the risk influenced individual risk perception [22]. Additionally, since no significant responses taken by the government during that time, it might add a contribution to the lower level of perceived risk among the participants in this study.

One of the notable findings of this study is a positive correlation between precautionary actions and perceived risk. Previous studies showed that perceived risk is associated with preventive behaviour's [23, 24]. In this study, the participants who had a higher perceived risk of COVID-19 perform higher precautionary actions as the preventive measure. This finding is somewhat similar to the previous study that found as precautionary actions increased, perceived risk or risk perception of the disease also increased [13, 25]. Meanwhile, this finding also supported the assumption in the Health Belief Model, that precautionary actions are most likely taken when the perceived severity and vulnerability are high [26]. An earlier study found that people with high risk perception of SARS were more likely to perform precautionary actions to prevent themselves from acquiring SARS [27]. However, no significant association between socio-demographic groups and the perceived vulnerability of COVID-19 was observed before the outbreak. This finding is somewhat in line with a recent study of risk perception of COVID-19 in Hong Kong, which found that except for age, no socio-demographic factors were associated with the concern of acquiring the disease [28].

Furthermore, the precautionary actions further reported having an association with knowledge, suggesting that the participants who had a higher level of knowledge took more precautionary actions. This finding is similar to the previous study on SARS that individuals with better knowledge also had a better performance of precautionary actions [29]. A similar finding also revealed that infectious disease-related knowledge can influence people to engage in preventive behavior [30]. People aged 36-45 years reported to take higher precautionary actions to prevent COVID-19. However, no significant association was observed between other socio-demographic factors and precautionary actions. Therefore, factors determining the engagement to take precautionary actions are necessary to be explored in future studies.

Effective strategies of risk communication are necessary in case of outbreak, even when there were still no confirmed cases. This issue could be addressed by improving the knowledge of the public; increasing their familiarity by disseminating knowledge about the disease in hope it could lead to the improvement of their performance in taking precautionary actions to prevent the disease. Meanwhile, the government should focus more on the early response of the outbreak that might influence higher perceived risk among the public.

However, this study has several limitations. Due to the small sample gathered in this study, the findings in this study need to be interpreted with cautions. Meanwhile, none of the participants live in the eastern area and the number of women in this study is larger than men. Furthermore, this study was gathered using online questionnaire, allowing only people with good access of the internet to participate in this study.

5. CONCLUSION

When there was no confirmed case in Indonesia, the participants in this study were aware and had sufficient knowledge about COVID-19. However, the concerning thing was the low perceived risk of COVID-19 among Indonesians that influenced their precautionary actions to prevent COVID-19. The result in this present study could be used as valuable information among health communicators and policymakers to ensure that risk communication is effectively delivered to the population before and in case of a local outbreak, also to strengthen the early response to prevent COVID-19 outbreak and other emerging infectious diseases in the future.

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