Editor/Author Correspondence

Editor

2020-11-13 03:33 AM

Subject: [IJPHS] Editor Decision

The following message is being delivered on behalf of International Journal of Public Health Science (IJPHS).

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Dear Prof/Dr/Mr/Mrs: Mrs Lolita Lolita,

We have reached a decision regarding your submission entitled "COVID-19 Risk Perception among Indonesians in Early Stage of the Outbreak" to International Journal of Public Health Science (IJPHS), a peer-reviewed and an OPEN ACCESS journal that makes significant contributions to major areas of public health science.

Our decision is to ACCEPT with revisions
The goal of your revised paper is to describe novel technical results.
A high quality paper MUST has:
(1) a clear statement of the problem the paper is addressing --> explain in "Introduction" section
(2) the proposed solution(s)/method(s)/approach(es)/framework(s)/ ....
(3) results achieved. It describes clearly what has been done before on the problem, and what is new.

In preparing your revised paper, you should pay attention to:
1. Please ensure that: all references have been cited in your text; Each citation should be written in the order of appearance in the text; The references must be presented in numbering and CITATION ORDER is SEQUENTIAL [1], [2], [3], [4], ...
Please download & study our published papers for your references:
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(Please use "Search" menu under "JOURNAL CONTENT" menu in right side of the site)

2 An Introduction should contain the following three (3) parts:
- Background: Authors have to make clear what the context is. Ideally, authors should give an idea of the state-of-the art of the field the report is about.
- The Problem: If there was no problem, there would be no reason for writing a manuscript, and definitely no reason for reading it. So, please tell readers why they should proceed reading. Experience shows that for this part a few lines are often sufficient.
- The Proposed Solution: Now and only now! - authors may outline the contribution of the manuscript. Here authors have to make sure readers point out what are the novel aspects of authors work. Authors should place the paper in proper context by citing

relevant papers. At least, 5 references (recently journal articles) are used in this section.

3. Results and discussion section: The presentation of results should be simple and straightforward in style. This section report the most important findings, including results of statistical analyses as appropriate. You should present the comparison between performance of your approach and other researches. Results given in figures should not be repeated in tables. It is very important to prove that your manuscript has a significant value and not trivial.

Please submit your revised paper within 6 weeks.

I look forward for hearing from you

Thank you

Best Regards,
Dr. Lina Handayani
Universitas Ahmad Dahlan
ijphs@iaescore.com

Update your metadata in our online system when you submit your revised paper through our online system, included:
- Authors name are presented without salutation
- Authors Name are presented Title Case (ex: Michael Lankan, and NOT written--> michael lankan or MICHAEL LANKAN). Add all authors of your paper as per your revised paper
- Title of revised paper (ex: Application of space vector .... , NOT --> APPLICATION OF SPACE VECTOR ....)
- Your abstract

Reviewer A:

Does the paper contain an original contribution to the field?:
Yes

Is the paper technically sound?:
Yes

Does the title of the paper accurately reflect the major focus contribution of this paper?:
Yes

Please suggest change of the title as appropriate within 10 words:
the title is appropriate

Is the abstract a clear description of the paper?

:
Yes

Please suggest change of the abstract
:
the abstract is adequate

Is the paper well written (clear, concise, and well organized)?:
No

Are the equations, figures and tables in this journal style, clear, relevant, and are the captions adequate?:
Yes

Please score the paper on a scale of 0 - 10 as per the directions below:

9-10 Excellent - Outstanding
7-8 Good
5-6 Average
3-4 Poor
0-2 Very Poor
:
6

Comments to the Authors (how to improve this paper)::
The paper is a bit too simple in presentation and synthetic in the conclusions. you didn't evaluate the high educational level of respondents, for example. The conclusions and use of results must be reinforced and better explained. a reference to the circulation of information in different parts of the country can be useful, as well as a reference to the circulation of official or non official (social media) information and its reliability

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Reviewer F:

see files
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DELETE
Subject: COVID-19 Risk Perception among Indonesians in Early Stage of the Outbreak

The following message is being delivered on behalf of International Journal of Public Health Science (IJPHS).

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November 19th, 2020

Dear Editor-in-Chief
International Journal of Public Health Science (IJPHS)

We would like to appreciate the time and effort that the reviewers dedicated to providing feedback on our manuscript and are grateful for the insightful comments on and valuable improvements to our paper. We have attached a revised manuscript of "COVID-19 Risk Perception among Indonesians in Early Stage of the Outbreak" with Reference ID Number: 20678.

No conflict of interest exits in the submission of this manuscript, and manuscript is approved by all authors for publication. We would like to declare on behalf of my co-authors that the work described was original research which has not been published previously, and not under considerations for publication elsewhere, in whole or in part. All the authors listed have approved the manuscript that is enclosed.

In this work, we have revised our final manuscript according to the reviewer's suggestions. The change is highlighted in yellow color within the manuscript. We hope this revision is suitable for "International Journal of Public Health Science".

We deeply appreciate your consideration of our manuscript. If you have any queries, please don't hesitate to contact us at the address below.

Yours Sincerely,
Corresponding author:
apt. Lolita, M.Sc.,
Assistant Professor, Department of Clinical Pharmacy,
Ahmad Dahlan University
Prof Dr Soepomo Warungboto Umbulharjo, Yogyakarta, Indonesia
Email: lolita_ur@yahoo.com
Telp: +62 89506685859

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Corresponding author:
apt. Lolita, M.Sc.,
Assistant Professor, Department of Clinical Pharmacy,
Ahmad Dahlan University
Prof Dr Soepomo Warungboto Umbulharjo, Yogyakarta, Indonesia
Email: lolita_ur@yahoo.com
Telp: +62 89506685859

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International Journal of Public Health Science (IJPHS)
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Editor   DELETE
2020-   Subject: [IJPHS] Editor Decision
11-25   The following message is being delivered on behalf of International Journal of Public
07:38   Health Science (IJPHS).
AM

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Dear Prof/Dr/Mr/Mrs: Mrs Lolita Lolita,

It is my great pleasure to inform you that your paper entitled "COVID-19 Risk Perception among Indonesians in Early Stage of the Outbreak" is ACCEPTED and will

be published on the International Journal of Public Health Science (IJPHS). This journal is accredited SINTA 1 by Ministry of Research and Technology/National Research and Innovation Agency, Republic of Indonesia (RISTEK-BRIN) and just ACCEPTED for inclusion (indexing) in Scopus (https://suggestor.step.scopus.com/progressTracker/?trackingID=D331D503BA1584BF) . Congratulations!

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I look forward to hearing from you.

Thank you

Best Regards,
Dr. Lina Handayani
Universitas Ahmad Dahlan
ijphs@iaescore.com

Please ensure that all references have been cited in your text. Each citation should be written in the order of appearance in the text in square brackets. For example, the first citation [1], the second citation [2], and the third and fourth citations [3,4]. When citing multiple sources at once, the preferred method is to list each number separately, in its own brackets, using a comma or dash between numbers, as such: [1], [3], [5] or [4-8]. It is not necessary to mention an author's name, pages used, or date of publication in the in-text citation. Instead, refer to the source with a number in a square bracket, e.g. [9], that will then correspond to the full citation in your reference list. Examples of in-text citations:
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Bloom [10] has argued that...
Several recent studies [7], [9], [11-15] have suggested that....
...end of the line for my research [16].......

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- You should submit your payment receipt (along with your camera-ready paper) within 6 weeks to email: ijphs@iaescore.com, cc: linafkm@gmail.com.
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COVID-19 Risk Perception among Indonesians in Early Stage of the Outbreak

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Article Info	ABSTRACT
	Indonesia confirmed its first COVID-19 case on 2nd March 2020, when other countries have already reported several numbers in the previous month. This study aimed to explore the risk perception of Indonesians in the early stage of the COVID-19 outbreak. This cross-sectional study was conducted among 495 participants using a web-based questionnaire. Primary data were collected from 3rd to 27th March 2020 including the perceived severity, vulnerability, threat, self, and response efficacy of the participants. The results showed that the perceived threat of the outbreak in its early stage is the second highest compared to other diseases. The perceived severity among the participants was high. However, they had a low vulnerability. Those in the middle region showed a higher level of self and response efficacy. Meanwhile, people who work as private sector employee (β=0.146, P=0.004), live in the western region (β =-0.184, P=0.000), with a higher knowledge score (β =0.096, P=0.032) had a higher perceived threat. These results found those who had high knowledge, was also had higher perceived risk. The most important of these studies have determined various factors related to risk perception, thus it could be good preliminary evidence for public health authorities to arrange an effective way for epidemic control.

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1. INTRODUCTION

In December 2019, a new infectious outbreak occurred in Wuhan, Hubei Province of China. This disease was found to be caused by a novel coronavirus and subsequently named Severe Acute Respiratory Syndrome 2 (SARS-CoV-2). [1] This virus caused a disease called COVID-19, which is highly contagious and spreads by human-to-human transmission. It spreads rapidly to other countries outside of China and became a global pandemic. More than 30 million COVID-19 cases are registered worldwide until September 2020.[2]

The common symptoms found in the patients are fever, cough, fatigue, and shortness of breath. Older people and those with underlying conditions are more prone to severe outcomes such as acute respiratory distress syndrome (ARDS). [3] Several proposed vaccines for this disease are currently being put into clinical

trials. In the meantime, the public was implored to take self-precautions by practicing basic hygiene and self-quarantine. [4]

In February 2020, COVID-19 had affected several countries, including those in South-east Asia. Meanwhile, the first case in Indonesia was reported on 2nd March 2020. This number increased significantly and reached more than 200,000 cases in September with almost 10,000 deaths. [5] As a country with a large population, with a lack of testing capacity and less strict social distancing measures, there is a tendency of a significant increase in the disease. Hence, understanding how people perceived their likelihood to get the disease, perceived the threat of the disease, and the response at the community and individual level in the early stage is vital as preliminary evidence of a better communication approach during an outbreak of emerging infectious diseases. This could be done by assessing the risk perception of the people.

One of the widely used theories to assess risk perception in health settings is the Protection Motivation Theory (PMT). According to PMT, an individual has to perceive risk or threat before deciding to engage in protective behavior. PMT was used to assess the intention of an individual to engage in preventive behavior in several previous studies. [6-8] However, the main constructs in PMT (perceived vulnerability, perceived severity, and perceived threat) could be used to assess the risk perception. Several other studies used PMT in assessing risk perception in the healthcare setting. [9-11] In this study, we aimed to use PMT for assessing the risk perception of COVID-19, among general Indonesian populations. Additionally, we also aimed to explore COVID-19 related knowledge along with the precautionary actions taken to prevent COVID-19.

2.   RESEARCH METHOD

This study was approved by the Ethics Committee of Aisyiyah University (No. 1305/KEP-UNISA/IV/2020). Furthermore, informed consent and agreement to participate was obtained from each participant. Also, the confidentiality of the obtained data was maintained.

This was an analytic observational study using a cross-sectional design conducted from March 3rd to 27th 2020 among general Indonesian populations. Indonesians aged 17 years and above and currently living in Indonesia are eligible to participate in this study. A foreigner living in Indonesia and Indonesians living overseas are excluded. The survey was conducted using a link shared with online groups and social media. The sample size was determined by the assumption that the probability of the participant's knowledge of COVID-19 was 50%. [12] Using a 95% confidence interval, 5% limit of precision, and 1.0 design effect, the sample size was 384 participants. At the end of the survey, the number of participants exceeded the maximum sample size. Accordingly, 495 responses were further analyzed.

Before distributing the questionnaire, a pilot study was conducted, and the data collected on 30 anonymous samples were first reviewed to determine the reliability of the questionnaire. The questionnaire was then modified accordingly. An online questionnaire through Google Form was used, which collected information on socio-demographic characteristics, knowledge, precautionary actions, perceived vulnerability, and severity, response as well as self-efficacy of COVID-19. Due to the unavailability of the risk perception questionnaire, this particular questionnaire was developed based on previous studies. [13] It was initially written in English and translated into Bahasa Indonesia.

3.   INSTRUMENTS

The questionnaire collected socio-demographic information of participants such as age, sex, education, region, and occupation. Furthermore, their awareness about the pandemic, and whether they have lived or visited affected countries (China, South Korea, Japan, Iran, Italy) in the past six months were also included. Meanwhile, COVID-19 related knowledge was assessed with six items about the main symptoms and transmission of the disease. The total score of this knowledge ranged between 0-6. In addition, the precautionary actions taken by the participants were assessed by whether they had practiced at least one of twelve preventive measures of the disease.

The measurement of risk perception was made according to previous studies, based on the constructs of the Protection Motivation Theory (PMT). [13] The perceived severity assessed the severity of COVID-19 using a 10-point Likert scale, from 1 (not severe) to 10 (very severe). Meanwhile, the perceived vulnerability assessed the likelihood of acquiring this disease using a 5-point Likert scale, from 1 (very unlikely) to 5 (very likely). Furthermore, the perceived threat was used as the overall measure of risk perception, which used the square root of the multiplication of perceived severity divided by 2 and vulnerability. The result was a perceived threat with a scale from 1 (low) to 5 (high). Also, the measure of risk perception was compared to other diseases and accidents such as SARS and MERS. The response-efficacy was assessed by asking how confident the participants think the people around them can take practical actions to prevent contracting COVID-19 using a 4-point Likert scale from 1 (not at all) to 4 (very much). Furthermore, self-efficacy was assessed by asking how confident they think they can prevent contracting the disease. The choices used a 4-point Likert scale, from 1 (not confident) to 4 (very confident).

A descriptive analysis was conducted on the socio-demographic characteristics and the study variables. The Kruskal-Wallis/Mann Whitney U test was used to explore the difference in the perceived threat among socio-demographic characteristics. We did the Kruskal-Wallis Test to see the difference in the perceived threat among the occupation variable. Furthermore, we conducted a Dunn-Bonferroni test for the post-hoc analysis. Also, multiple linear regression was conducted to determine the factors that are associated with perceived vulnerability, severity, and threat, each as a dependent variable. We divided the independent variables into two blocks, the first block consisting of all the sociodemographic variables and knowledge and awareness in the second block. The independent variables were included with socio-demographic variables in the first block, and COVID-19 related knowledge, as well as awareness in the second block. Furthermore, dummy variables were set for the categorical independent variables. All the results are significant when the p-value is < 0.05. All of the statistical analyses were conducted with SPSS 22.0 (IBM Corp., Armonk, NY, USA).

4. RESULTS AND DISCUSSIONS

The majority of the participants were female (74.7%), aged 17-25 (59.6%), and living in the western region (71.5%). Those with a bachelor's degree were 71.1%, and students were 35%. Overall, they were young individuals and students. Furthermore, 97.4% have heard of the disease, and only 4% reported living or visiting COVID-19 affected countries in the last six months. There was a difference in the perceived threat between sex, region, and occupation (Table 1).

Table 1. Demographic characteristic of the participants

No.	Variables	N (%)	Knowledge Range (0-6)		Perceived Threat of COVID-19	
			Mean ± SD	p	Mean ± SD	p
1.	Sex*					
	Male	125 (25.3)	5.40 ± 1.20	0.289	3.15 ± 1.01	0.048
	Female	370 (74.7)	5.57 ± 0.79		2.94 ± 1.03	
2.	Age (years)					
	17-25	295 (59.6)	5.50 ± 0.96	0.676	2.99 ± 1.05	0.882
	26-35	112 (22.6)	5.58 ± 0.74		3.04 ± 1.02	
	36-45	59 (12)	5.58 ± 1.02		3.00 ± 0.97	
	46-55	19 (3.8)	5.63 ± 0.68		2.93 ± 0.85	
	>55	10 (2.0)	5.30 ± 1.05		2.83 ± 1.28	
3.	Region*					
	Western region	354 (71.5)	5.58 ± 0.82	0.149	3.14 ± 0.95	0.000*
	Middle region	141 (28.5)	5.40 ± 1.11		2.64 ± 1.13	
4.	Education					
	Junior High School	3 (0.6)	6.00 ± 0.00	0.189	2.82 ± 0.74	0.246
	Senior High School	84 (17.0)	5.36 ± 1.26		2.83 ± 1.05	
	Bachelor Degree	352 (71.1)	5.53 ± 0.86		3.05 ± 1.03	
	Postgraduate	56 (11.3)	5.73 ± 0.58		2.92 ± 0.95	
5.	Occupation**					
	Student	173 (35)	5.37 ± 1.07	0.016*	2.79 ± 1.08	0.018*
	Private sector employee	164 (33.1)	5.63 ± 0.90		3.18 ± 0.95	
	Government worker	52 (10.5)	5.58 ± 0.69		3.01 ± 0.98	
	Entrepreneur	22 (4.4)	5.59 ± 0.59		3.32 ± 1.09	
	Others	84 (17.0)	5.61 ± 0.76		2.97 ± 0.99	
6.	COVID-19 related awareness*					
	Yes	482 (97.4)	5.55 ± 0.88	0.072	3.01 ± 1.02	0.036*
	No	13 (2.6)	4.43 ± 2.22		2.12 ± 1.03	
7.	Previous visit to COVID-19 affected countries in the last 6 months*					
	Yes	20 (4)	5.55 ± 1.14		2.91 ± 0.88	0.790
	No	475 (96)	5.53 ± 0.91	0.547	3.00 ± 1.03	

*Significant p < 0.05 using Mann Whitney-U Test

**Significant p < 0.05 using Kruskal Wallis test

Among the participants, a higher knowledge was found in females with a mean score of 5.57, aged 46-55 (5.63), living in the western region (5.58), holding a postgraduate degree (5.73), and working in a private sector (5.63). Also, those who have heard of the disease had a higher knowledge with a mean score of 5.55. Furthermore, those who reported a previous visit to COVID-19 affected countries in the last six months had a slightly higher knowledge (5.55).

COVID-19 perceived vulnerability in this study was the third highest with a mean score of 2.44 (range 1-5). Meanwhile, that of the common cold was highest (2.91) and HIV/AIDS was the lowest (1.62). In terms of perceived severity, COVID-19 was seen as one of the most severe problems with a mean score of 8.12 (range 1-10). Other conditions with high severity were cancer (8.21), cardiovascular diseases (8.24), and HIV/AIDS (8.21). However, the common cold had the lowest perceived severity (7.06). After gathering the measurement, the perceived threat of COVID-19 during the outbreak was the second highest with a mean score of 2.99 (range 1-5), after traffic accident (3.05). However, Avian Influenza had the lowest perceived threat (1.99) compared to other diseases and accidents (Table 2).

Table 2. Risk perception of COVID-19 and other diseases/accidents

	Perceived Vulnerability (1-5)	Perceived Severity (1-10)	Perceived Threat (1-5)
	Mean ± SD	Mean ± SD	Mean ± SD
COVID-19	2.44 ± 1.13	8.12 ± 2.77	2.99 ± 1.03
SARS	2.11 ± 1.06	7.99 ±2.84	2.07 ± 0.64
MERS	1.93 ± 1.02	7.91 ± 2.91	2.59 ± 0.93
Avian Influenza	2.01 ± 1.06	7.84 ± 2.86	1.99 ± 0.63
Tuberculosis	2.13 ± 1.15	7.93 ± 9.00	2.73 ± 1.01
Common cold	2.91 ± 1.30	7.06 ± 2.83	3.03 ± 1.08
Cancer	2.06 ± 1.07	8.21 ± 2.92	2.73 ± 0.98
Cardiovascular disease	2.15 ± 1.08	8.24 ± 2.92	2.75 ± 0.98
Traffic accident	2.62 ± 1.23	7.93 ± 2.84	3.05 ± 1.07
Food poisoning	2.41 ± 1.16	7.33 ± 2.91	2.81 ± 1.06
HIV/AIDS	1.62 ± 0.92	8.21 ± 3.03	2.41 ± 0.88

The total average of the precautionary actions taken by the participants was 83.3%. Also, covering mouth when sneezing or coughing showed to be the most practiced precautionary actions (97%). Furthermore, avoiding eating out in the food court or restaurant reported as the least practiced measure (68.7%) (Table 3).

Table 3. Precautionary actions taken to prevent COVID-19

Precautionary actions	Correct answer percentage N (%)
Avoid contact with sick people	444 (89.7)
Avoiding close contact with another person when sick	457(92.3)
Not going out when sick	399 (80.6)
Wearing a mask	372 (75.2)
Covering nose and mouth when sneezing or coughing	480 (97.0)
Washing hands with water and soap for at least 20 seconds	449 (90.7)
Using hand sanitizer when water is not available	419 (84.6)
Avoiding eating out in the food court or restaurant	340 (68.7)
Avoiding public gatherings or crowded place	359 (72.5)
Avoiding traveling to COVID-19 key-epidemic area	479 (96.8)
Avoiding traveling by plane or public transportation	362 (73.1)
Consuming health supplement to improve immunity	392 (79.2)
Total average of correct answers	**83.3%**

The linear regression analysis found that region was significantly associated with perceived severity, vulnerability, and threat. Meanwhile, people who work as a private sector employee (β =0.206, P=0.000), live in the western region (β =-0.170, P=0.000), and had higher knowledge score (β =0.89, P=0.047) had higher perceived severity. In terms of vulnerability, males (β =-0.107, P=0.022), and those who live in the western

region (β =-0.091, P=0.049) had a higher perceived vulnerability. Also, those who work as a private sector employee (β=0.146, P=0.004), live in the western region (β =-0.184, P=0.000), had higher knowledge score (β =0.096, P=0.032) had higher perceived threat (Table 4).

Table 4. Linear regression analysis of COVID-19 perceived severity, vulnerability, and perceived threat

Variables	Perceived Severity		Perceived Vulnerability		Perceived Threat	
	β	P	β	P	β	P
Age	.752	.415	-.376	.547	.057	.963
Sex (male is the reference)	-.026	.568	-.107	.022	-.091	.043
Education						
High School	.128	.557	.092	.680	.121	.578
Bachelor	.219	.399	.141	.597	.203	.431
Postgraduate degree[1]	.064	.222	.047	.807	.065	.723
Occupation						
Private sector employee	.206	.000	.041	.433	.146	.004
Government worker	.656	.512	.003	.947	.036	.465
Entrepreneur	.054	.264	.039	.406	.069	.134
Others[2]	.076	.164	.001	.990	.041	.401
Region (western region is the reference)	-.170	.000	-.091	.049	-.184	.000
COVID-19 awareness (answer "no" is the reference)	.047	.286	.086	.060	.071	.108
COVID-19 knowledge	.089	.047	.022	.626	.096	.032

1) Dummies for education. Reference category is junior high school.
2) Dummies for occupation. Reference category is student.
Age and knowledge were quantitative variable.

Table 5. R^2 of the different steps in the linear regression model of the Risk Perception

	Perceived Severity		Perceived Vulnerability		Perceived Threat	
	R^2	P	R^2	P	R^2	P
R^2 step 1	.088	.000	.041	.089	.086	.000
R^2 step 2 (full model)	.099	.000	.049	.058	.101	.000
Adjusted R^2 full model	.071		.019		.073	

R^2 step 1 for the the socio-demographic variables.
R^2 step 2 for the socio-demographic variables, knowledge and awareness.

The dependent variable models explained less than 10% of the variance, except the model with the perceived threat as the dependent variable. The first model (M1) only included socio-demographic factors, meanwhile, the second (M2) included COVID-19 awareness, and related knowledge, as well as socio-demographic factors. Model for the total population explained 10.1% of the variance in terms of perceived threat when knowledge and awareness were included in M2. In terms of the vulnerability, M1 explained 4.1% of the total population, and M2 explained 4.9%. M1 in perceived severity explained 8.8%, and M2 explained 9.9% of the total variance (Table 5). Furthermore, the proportion of variance was higher when knowledge and awareness were included. No significance was found in the model with perceived vulnerability as the dependent variable.

In terms of response and self-efficacy, participants in the middle region were very confident that people can take practical actions to prevent themselves from acquiring COVID-19. They also reported higher self-efficacy than in the western region (Fig 1).
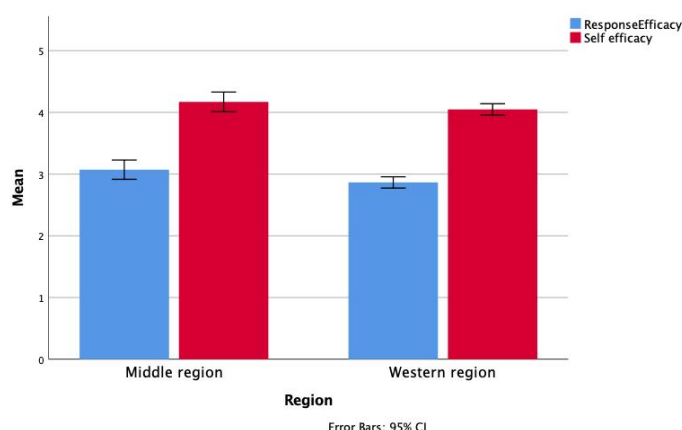
Figure 1. Response efficacy and self-efficacy based on region

4.1. Precautionary Actions

The total average of precautionary actions was 83.3%. The main measures were covering mouth when sneezing or coughing (97%), avoiding close contact with other people when sick (92.3%), and avoiding traveling to high impacted areas (96.8%). This finding is in line with a study in Hong Kong on the Avian Influenza outbreak, which reported that during the onset, 71%-81% of the participants avoided crowded places, going out, and traveling abroad. [14]

Two weeks after the first confirmed cases, "Indonesian president, Joko Widodo, pronounced some social distancing orders including closure of schools and workplaces." [15] Around two weeks after the first two cases confirmed, the government created a Task Force (Gugus Tugas) for accelerating the handling of COVID-19 through a Presidential Decree (Keppres) 7/2020. [16] Only on March 31st, 2020, the president pronounced the large-scale social distancing policy where the local government could limit the mobility of people and goods in and out of the area unless permission is acquired from the Health Ministry. Additionally, the policy mentioned that it includes closure of schools and workplaces, limitation of religious activities, and limitation of public activities. [17] However, these policies were not strictly imposed. Only 14 out of 34 provinces in Indonesia implemented this policy. At the end of the month, the president pronounced the Covid-19 outbreak as a national disaster.

At the early stage, public willingness to comply with the measures was important in controlling the outbreak. [18] The least practiced precautionary measures in this study are related to daily activities, such as gathering and eating in a restaurant. In a study of precautionary behavior during an infectious disease outbreak, the intention to practice safety measures was associated with the government's effectiveness. [19, 20] However, with no strict policy and hesitation in implementing lock-down in the early stage of the outbreak, the public activity outside is unavoidable.

4.2. Risk Perception: Protection Motivation Theory (PMT) Constructs

In this study, the perceived threat of COVID-19 is one of the highest along with road traffic accidents. Therefore, this suggested that the populations consider the disease as a potential health problem, and already perceived it as a threat. Severe Acute Respiratory Syndrome (SARS), Avian Influenza, and other previous emerging infectious diseases were considered similar to COVID-19 in terms of risk perception as a serious health threat to people. Our study finding is in line with a study in Egypt, which demonstrated that in the early stage of the outbreak, the public perceived COVID-19 as a life-threatening danger. [21] Furthermore, a previous study in Vietnam showed that 75% of the participants considered Avian Influenza as a serious threat at the beginning of the outbreak. [22] Among the participants in a study in the UK, SARS was considered a perceived threat in the initial phase before the containment. [23, 24]

Those previous studies have shown that in the early phase of the outbreak, the public was concerned about the disease and thought it could be a danger to their health. The dimension of psychological risk in the psychometric paradigm shows that dread (the feeling of dread and the perceived of a catastrophic potential of the hazard), as well as the risk of the unknown (where the hazard is judged to be unknown or new) shaped risk perception of people. [25] Other diseases mentioned in our study have been previously known-or even contained. However, although COVID-19 is caused by the same group of viruses, which is a novel coronavirus, the disease is still considered new that future exploration and research is still needed. [26] Therefore, in our

study, we reported that compared to other diseases, COVID-19 is considered a public health threat due to the evolving research that still needed to be conducted at the beginning of the outbreak.

In this study, the region was associated with a perceived threat. Meanwhile, in previous research of SARS in a wider area, a similar finding was reported that a region was associated with perceived vulnerability, severity, and threat. [24] At the beginning of the outbreak, the number of cases in the western region is higher than in the middle region. Our study found that the perceived threat of participants in the western region towards COVID-19 is higher than participants in the middle region. This finding is in contrast with an earlier study that showed risk perception is lower in the area where the outbreak is prevalent. [27] Since this study accounted only for two local regions, the finding needs to be interpreted with caution. Furthermore, other factors that are associated with the perceived threat are being a private sector employee and higher COVID-19 related knowledge. This finding is similar to a recent study that showed that personal knowledge of the disease is significantly associated with risk perception. [28]

Elaborating the PMT constructs, it was found that the participants perceived COVID-19 as a serious health problem along with cardiovascular disease and HIV. People who work as private-sector employees who live in the western region with higher knowledge had more perceived severity. However, even though it was considered a serious disease, they perceived themselves as less likely to acquire it, which was slightly lower compared to the perceived threat. A similar finding was observed in a study of previous outbreaks such as A/H7N9 and Avian Influenza, where the participants considered the disease as a serious risk, but perceived that their chance of getting infected is low. [22, 29] This might be influenced by the majority of participants who were not in the high-risk category, or having adequate protection to prevent the disease. Moreover, the majority of the participants in our study are young people, who are not a high-risk category for getting COVID-19.

Also, it was assumed that low perceived vulnerability in the early stage of the outbreak was because the participants had low intention to comply with the government, or the outbreak was anticipated. Meanwhile, a study during the early phase of an infectious disease pandemic in the Netherlands found that the strong intention to comply with government measures was associated with perceived vulnerability However, the lower vulnerability might be because people have anticipated the risk, and practiced the protective behavior before the outbreak occurred. [30]

After an individual evaluates risk as a part of threat appraisal, they will go through a process to cope with it. In this case, response and self-efficacy play a role. [31] The perceived threat was higher in the western region while coping appraisal was found in the middle. Those living in the middle region are confident that they could take preventive actions during the outbreak. Jakarta as the capital and other parts of the western region were surging in terms of the cases at the beginning of the outbreak. In the beginning case of COVID-19 on 2nd March 2020, western region contributed to a higher number of cases than the other regions in Indonesia. These studies found that self and response efficacy among people in the western region was lower than in the the middle region. The majority of participants in the the western region consisted of students and employees. These two groups of people were more affected in social activity directly by the pandemic. In case when the first cases of outbreaks surged, they might still need to go to the school and the office. There still no strict regulations yet for limiting their social activity in the beginning case. Furthermore, the Indonesian government just ruled out the instructions of physical distancing by the end of March. [16] A previous study also reported that in terms of pandemic policy response, Indonesia was one of the countries with the medium case yet having a proportional response towards the pandemic. [32] Therefore, this might lead to a reduced public trust that subsequently decreases the response and self-efficacy of the people in the western region, where the regulations took place earlier. In addition, every job cannot be executed from home or online, therefore people still go out to work, despite the social distancing measure.

China was able to implement strict policies at the beginning, however other countries such as the USA and UK waited for at least a month to apply the same measure. [33] This might be influenced by the nature of the disease, which is a major concern when the effects become visible. [34] In Indonesia, it took more than a month to implement large scales social status due to concern of interfering with the public daily and economic activities. The government must first disburse the stimulus to those affected by the large-scale social restrictions (PSBB) policy. [35-37]

Based on PMT, people will take higher precautionary actions when all of the PMT constructs such as perceived vulnerability, perceived severity, and a coping appraisal are high. In a previous study, perceived severity as one of the PMT constructs was relatively low. Therefore, the focus is needed to manage the pandemic towards the perceived severity. [38] Our study found the lower construct in perceived vulnerability. Therefore, in terms of communicating preparedness strategies, improving the pandemic response, delivering effective communication, and encouraging more precautionary actions, thus the perceived vulnerability needs

more attention. When the public realizes that COVID-19 is a risk that can affect anyone, despite the ages, they will take more precautionary action to avoid getting the disease.

5. CONCLUSION

The knowledge among the participants was satisfactory, and the perceived severity and threat of COVID-19 were high. However, they had low perceived vulnerability. Participants in the middle region showed higher self and response efficacy. Risk perception is known as a trigger for precautionary actions. By knowing and understanding how public perceived COVID-19 in the early stage of the outbreak, the result of our study can be a preliminary approach for the health sector, stakeholders, and the government to provide a better communication in order to encourage the people to take more precautionary actions during a disease outbreak. However, our study emphasized the risk perceptions. Future exploration is needed to see how the risk perception affects the precautionary actions, especially in the early stage of a pandemic setting.

ACKNOWLEDGEMENTS

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	Ratih Oktri Nanda, 23 years old, is a Master of Public Health (MPH) candidate from Nanjing Medical University, Nanjing, China. Her research interests are including the area of social medicine and health education.
	Lolita is a Assisstant Professor of Ahmad Dahlan University, Yogyakarta, Indonesia. She is also a Ph.D candidate from Nanjing Medical University, P.R. China. She has published some scientific articles related to social pharmacy, community health in accredited national journal of Indonesia. Her research interest in the topic of clinical pharmacy, community health, and epidemiology.
	Wiwik Indayati, Indonesian, a master degree of science (MSc) candidate from Nanjing Medical University, Nanjing, China with Maternal, child and adolescent health major. She has published two papers in international journal. Her research interests are in the area of mother, child and adolescent health including education, knowledge and other factors which affect their health.
	Ivong Rusdiyanti, 40 years old living in South Kalimantan, is a Nursing Doctoral candidate from Nanjing Medical University. Her research interests are including the area of community nursing.
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	Silvia Mareti is a lecturer in Academic of Nursing, Pangkalpinang, Indonesia. Her research interests are in the topic of maternal and women health along lifespan. She has published some papers in Indonesian journal.

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Response to reviewers

Reviewer #1 comment:

ABSTRACT
1. Furthermore, Indonesians perceived COVID-19 as a public health risk at the early stage of the outbreak. Therefore, this study could be a preliminary finding for risk communication during the pandemic and other emerging infectious diseases in the future.
   Reviewer's comment: Revise the last sentence thus go along with the previous lines and stated the most important value of your study.

   Author's reply:
   We have revised the last sentence thus go along with the previous lines and also we have stated the most important value of our study.

   The revision statement is:
   These results found those who had a high knowledge, was also had higher perceived risk. The most important of these studies has determined various factors related to risk perception, thus it could be a good preliminary evidence for public health authorities to arrange an effective way for epidemic control."

Reviewer #1 comment:

INTRODUCTION
1. Therefore, up to September 2020, there are more than thirty million cases of COVID-19 worldwide. [2]
   Reviewer's comment: Considered to rephrase.

   Author's Response:
   We have rephrase the sentences.

   The revision statement is: More than 30 million COVID-19 cases are registered worldwide until September 2020. [2]

2. Therefore, in the meantime, public was implored to take self-precautions by practicing basic hygiene and self-quarantine. [4]
   Reviewer's comment: Repetitive phrase

   Author's Response:
   We have deleted the word 'therefore' in the paragraph 1 in the last sentence to make it not repetitive in the paragraph 2.

   The revision statement is*:
   "In the meantime, public was implored to take self-precautions by practicing basic hygiene and self-quarantine." [4]*

3. Understanding the risk perceptions in the early stage is vital as a preliminary evidence of better communication approach during an outbreak of emerging infectious diseases.

Reviewer's comment: Not yet capturing the vulnerability, threat, self and response as the study aims.

Author's Response:
We have revised and elaborated this into *"Hence, understanding the how people perceived their likelihood to get the COVID-19 disease, threat, vulnerability, self and response efficacy in individual and community level in the early stage is vital as a preliminary evidence of better communication approach during an outbreak of emerging infectious diseases. This could be done by assessing the risk perception of the people."*

RESEARCH METHOD

1. This was an analytic observational study using a cross-sectional design conducted from March 3rd to 27th 2020 among general Indonesian populations aged 17 years and above.
   Reviewer's comment: write down the inclusion and exclusion criteria

   Author's Response:
   We have added the inclusion and exclusion criteria in this part. *"Indonesians aged 17 years and above and currently living in Indonesia are eligible to participate in this study. Foreigner living in Indonesia and Indonesians living overseas are excluded."*

2. The sample size was determined by an assumption that the probability of participants knowledge of COVID-19 was 50%.
   Reviewer's comment: needs citation here
   Author's Response:
   We added the citation in our paper.
   [12] Lemeshow, S. et.al., "World Health Organization. Adequacy of sample size in health studies." Wiley. https://apps.who.int/ iris/handle/10665/41607 (accessed May 01, 2020)

3. This study was approved by the Ethics Committee of Aisyiyah University (No. 1305/KEP-UNISA/IV/2020). Furthermore, informed consent and agreement to participate was obtained from each participant. Also, the confidentiality of the obtained data was maintained.
   Reviewer's comment: These should be in the first lines instead.

   Author's Response:
   We agreed and have revised that the sentence regarding the ethical consideration has been moved to the first paragraph of the research method.

4. It was initially written in English and translated to Indonesian.
   Reviewer's comment: Bahasa Indonesia/ Indonesian language

   Author's Response:
   The word 'Indonesian' has been changed into Bahasa Indonesia as suggested.
   "It was initially written in English and translated to Bahasa Indonesia."

5. Meanwhile, a pilot study was conducted, and the data collected on 30 anonymous samples were first reviewed to determine the reliability of the questionnaire. The questionnaire was modified accordingly.
Reviewer's comment: The statements about pilot study should be put prior to the Google Form, and needs to be elaborated on the further details.

Author's Response

We moved the pilot study statement to the first line of third paragraph in research method and elaborated it as suggested. *"Before distributing the questionnaire, a pilot study was conducted, and the data collected on 30 anonymous samples were first reviewed to determine the reliability of the questionnaire. The questionnaire was then modified accordingly."*

6. The Kruskal-Wallis/Mann Whitney U Test was used to explore the difference in the perceived threat among socio-demographic characteristics
Reviewer's comment: Should be explained which variables tested using which, what was the post-hoc test used in the KW test.

Author's Response:

We did Kruskall-Wallis Test to see the difference in the perceived threat among the occupation variable. Furthermore, we conducted a Dunn-Bonferroni test for the post-hoc analysis. We found that there is a difference between the student and employee in term of the perceived threat.

7. The independent variables were included with socio-demographic variables in the first block, and COVID-19 related knowledge, as well as awareness in the second block.
Reviewer's comment: explain what the 1st and 2nd blocks are.

Author's Response:

We have already included the explanation of the 1st and 2nd block, in which as a part of the multiple linear regression where we included two models. *"Also, multiple linear regression was conducted to determine the factors that are associated with perceived vulnerability, severity, and threat, each as a dependent variable. We divided the independent variables into two blocks, the first block consisting all of the sociodemographic variables and knowledge and awareness in the second block. The independent variables were included with socio-demographic variables in the first block, and COVID-19 related knowledge, as well as awareness in the second block."*

8. Meanwhile, all of the statistical analyses were conducted with SPSS 22.0 (IBM Corp., Armonk, NY, USA).
Reviewer's comment: Delete meanwhile

Author's response: We agreed and have deleted meanwhile.
"All of the statistical analyses were conducted with SPSS 22.0 (IBM Corp., Armonk, NY, USA)."

RESULTS

1.

Table 1. Demographic characteristic of the participants

Variables	N (%)	Knowledge Range (0-6)		Perceived Threat of COVID-19	
		Mean ± SD	P	Mean ± SD	P
Sex*					
Male	125 (25.3)	5.40 ± 1.20	0.289	3.15 ± 1.01	0.048
Female	370 (74.7)	5.57 ± 0.79		2.94 ± 1.03	
Age (years)					
17-25	295 (59.6)	5.50 ± 0.96	0.676	2.99 ± 1.05	0.882
26-35	112 (22.6)	5.58 ± 0.74		3.04 ± 1.02	
36-45	59 (12)	5.58 ± 1.02		3.00 ± 0.97	
46-55	19 (3.8)	5.63 ± 0.68		2.93 ± 0.85	
>55	10 (2.0)	5.30 ± 1.05		2.83 ± 1.28	
Region*					

SM-A715F
put in numbers

SM-A715F
p or P?

Reviewer's comment: Put variables in numbers.

Author's response:
We agree and have put the variables in number

No.		Variables	N (%)	Knowledge Range (0-6)		Perceived Threat of COVID-19	
				Mean ± SD	p	Mean ± SD	p
1		Sex*					
	a.	Male	125 (25.3)	5.40 ± 1.20	0.289	3.15 ± 1.01	0.048
	b.	Female	370 (74.7)	5.57 ± 0.79		2.94 ± 1.03	
2		Age (years)					
	a.	17-25	295 (59.6)	5.50 ± 0.96	0.676	2.99 ± 1.05	0.882
	b.	26-35	112 (22.6)	5.58 ± 0.74		3.04 ± 1.02	
	c.	36-45	59 (12)	5.58 ± 1.02		3.00 ± 0.97	
	d.	46-55	19 (3.8)	5.63 ± 0.68		2.93 ± 0.85	
	e.	>55	10 (2.0)	5.30 ± 1.05		2.83 ± 1.28	
3		Region*					
	a.	Western region	354 (71.5)	5.58 ± 0.82	0.149	3.14 ± 0.95	0.000*
	b.	Middle region	141 (28.5)	5.40 ± 1.11		2.64 ± 1.13	
4	a.	Education					
	b.	Junior High School	3 (0.6)	6.00 ± 0.00	0.189	2.82 ± 0.74	0.246
	c.	Senior High School	84 (17.0)	5.36 ± 1.26		2.83 ± 1.05	
	d.	Bachelor Degree	352 (71.1)	5.53 ± 0.86		3.05 ± 1.03	
	e.	Postgraduate	56 (11.3)	5.73 ± 0.58		2.92 ± 0.95	
5		Occupation**					
	a.	Student	173 (35)	5.37 ± 1.07	0.016*	2.79 ± 1.08	0.018*
	b.	Private sector employee	164 (33.1)	5.63 ± 0.90		3.18 ± 0.95	
	c.	Government worker	52 (10.5)	5.58 ± 0.69		3.01 ± 0.98	
	d.	Entrepreneur	22 (4.4)	5.59 ± 0.59		3.32 ± 1.09	
	e.	Others	84 (17.0)	5.61 ± 0.76		2.97 ± 0.99	
6		COVID-19 related awareness*					
	a.	Yes	482 (97.4)	5.55 ± 0.88	0.072	3.01 ± 1.02	0.036*
	b.	No	13 (2.6)	4.43 ± 2.22		2.12 ± 1.03	
7		Previous visit to COVID-19 affected countries in the last 6 months*					
	a.	Yes	20 (4)	5.55 ± 1.14		2.91 ± 0.88	0.790
	b.	No	475 (96)	5.53 ± 0.91	0.547	3.00 ± 1.03	

2. Reviewer's comment: Is it p or P value?
   Author's Response:
   It's p as in p-value. We have revised it in the table above.

3. Table 2. Risk perception of COVID-19 and other diseases/accidents

	Perceived Vulnerability (1-5)	Perceived Severity (1-10)	Perceived Threat (1-5)
	Mean ± SD	Mean ± SD	Mean ± SD
COVID-19	2.44 ± 1.13	8.12 ± 2.77	2.99 ± 1.03
SARS	2.11 ± 1.06	7.99 ±2.84	2.07 ± 0.64
MERS	1.93 ± 1.02	7.91 ± 2.91	2.59 ± 0.93
Avian Influenza	2.01 ± 1.06	7.84 ± 2.86	1.99 ± 0.63
Tuberculosis	2.13 ± 1.15	7.93 ± 9.00	2.73 ± 1.01
Common cold	2.91 ± 1.30	7.06 ± 2.83	3.03 ± 1.08
Cancer	2.06 ± 1.07	8.21 ± 2.92	2.73 ± 0.98
Cardiovascular disease	2.15 ± 1.08	8.24 ± 2.92	2.75 ± 0.98
Traffic accident	2.62 ± 1.23	7.93 ± 2.84	3.05 ± 1.07
Food poisoning	2.41 ± 1.16	7.33 ± 2.91	2.81 ± 1.06
HIV/AIDS	1.62 ± 0.92	8.21 ± 3.03	2.41 ± 0.88

Reviewer's comment: Are there any stats differences amongst these item perceptions?

Author's Response:
We did not explore statistical differences among each item of risk perceptions. We only included the differences of the perceived threat among the socio-demographic variables, as the focus of our study here.

4. Table 5. R^2 of the different steps in the linear regression model

	Perceived Severity		Perceived Vulnerability		Perceived Threat	
	R^2	*P*	R^2	*P*	R^2	*P*
R^2 step 1	.088	.000	.041	.089	.086	.000
R^2 step 2 (full model)	.099	.000	.049	.058	.101	.000
Adjusted R^2 full model	.071		.019		.073	

Reviewer's comment: Table 5: R^2 of the different steps in the linear regression model, this is of what variables?

Author's Response:
The R^2 step 1 was for the variable in the first block (socio-demographic variables). Meanwhile, R^2 step 2 was for all variable in the first block and second block altogether (socio-demographic variables, knowledge, and awareness). We have revised and stated in the table revision below.

Table 5. R^2 of the different steps in the linear regression model

	Perceived Severity		Perceived Vulnerability		Perceived Threat	
	R²	P	R²	P	R²	P
R² step 1	.088	.000	.041	.089	.086	.000
R² step 2 (full model)	.099	.000	.049	.058	.101	.000
Adjusted R² full model	.071		.019		.073	

Note:
R² step 1 for the the socio-demographic variables.
R² step 2 for the socio-demographic variables, knowledge and awareness.

5. Figure 1. Response efficacy and self-efficacy based on region.

Reviewer's comment: Figure 1. Stats represented what? What is blue and red is?

Author's Response:
The legend is available in the figure. Blue represents the response efficacy, and red one represents the self-efficacy.
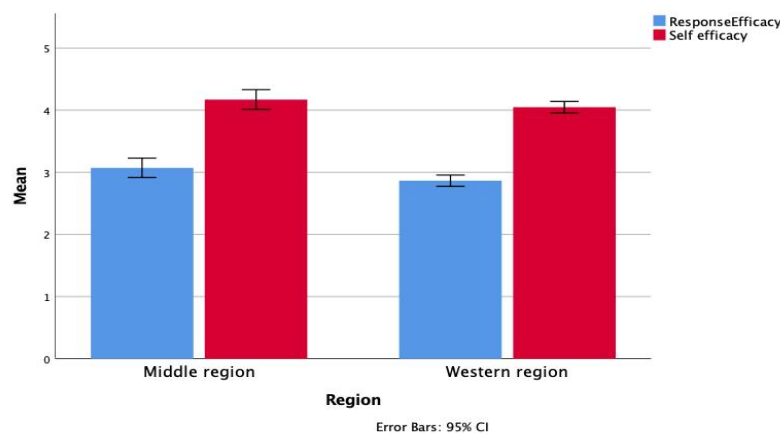
6. Two weeks after the first confirmed cases, the president pronounced some social distancing orders including closure of schools and workplaces. [14]
   Reviewer's comment: More explanation of the president mentioned.

   Author's Response:
   We added the name of the president, therefore, we changed the statement into *"Indonesian president, Joko Widodo, pronounced some social distancing orders including closure of schools and workplaces."*

7. Only on March 31st 2020, the president pronounced the large-scale social distancing policy where the local government could limit the mobility of people and goods in and out of the area unless the permission is acquired from the Health Ministry. Additionally, the policy mentioned that it includes closure of schools and workplaces, limitation of religious activities, and limitation of public activities. [15]

Reviewer's comment: Where is the Gugus Tugas (later on become the Satgas) of Covid-19?

Author's Response:
Thank you for pointing this out. We revise the statements into:

"Around two weeks after the first two cases confirmed, the government created a Task Force (Gugus Tugas) for the accelerating the handling of COVID-19 through a Presidential Decree (Keppres) 7/2020. [16] On March 31st 2020, the president pronounced the large-scale social distancing policy where the local government could limit the mobility of people and goods in and out of the area unless the permission is acquired from the Health Ministry. Additionally, the policy mentioned that it includes closure of schools and workplaces, limitation of religious activities, and limitation of public activities. [17] However, these policies were not strictly imposed. Only 14 out of 34 provinces in Indonesia implemented this policy. In the end of the month, the president pronounced the Covid-19 outbreak as a national disaster."

8. Our study finding is in line with a study in Egypt, which demonstrated that in early stage of the outbreak, public perceived COVID-19 as a life-threatening danger. [20] Furthermore, previous study in Vietnam showed that 75% of the participants considered Avian Influenza as a serious threat at the beginning of outbreak. [21] Among the participants in a study in UK resumed that SARS was considered a perceived threat in the initial phase before the containment. [22, 23]

Reviewer's comment: Thus bring what consequences? How does Covid-19 differs from SARS etc?

Author's Response:
We accepted the reviewer comment and added this statement for further explanation that was:

"Severe Acure Respiratory Syndrome (SARS), Avian Influenza, and other previous emerging infectious diseases was considered similar to COVID-19 in term of the risk perception as a serious health threat to people. Our study finding is in line with a study in Egypt, which demonstrated that in early stage of the outbreak, public perceived COVID-19 as a life-threatening danger. [21] Furthermore, previous study in Vietnam showed that 75% of the participants considered Avian Influenza as a serious threat at the beginning of outbreak. [22] Among the participants in a study in UK resumed that SARS was considered a perceived threat in the initial phase before the containment. [23, 24].

Those previous studies shown that in the early phase of the outbreak, public was concerned of the disease and thought it could be a danger to their health. The dimension of psychological risk in the psychometric paradigm show that dread (the feeling of dread and the perceived of a catastrophic potential of the hazard), as well as risk of the unknown (where the hazard is judged to be unknown or new) shaped risk perception of people. [25] Other diseases mentioned in our study has been previously known-or even contained. However, although COVID-19 is caused by the same group of viruses, which is novel coronavirus, the disease is still considered new that future exploration and research is still

needed. [26] Therefore, in our study we reported that compared to other diseases, COVID-19 is considered as a public health threat due to the evolving research that were still need to be conducted in the beginning of the outbreak."

9. "People who live in western region where there are higher number of cases perceived COVID-19 more as health threat compared to those in middle region."
Reviewer's comment: What does it mean?

Author's Response:
We have revised the sentences by:
"In the beginning of the outbreak, the number of cases in western region is higher than in middle region. Our study found that perceived threat of participants in western region towards COVID-19 is higher than participants in the middle region."

10. "Similar finding was observed in a study of previous outbreaks such as A/H7N9 and Avian Influenza, where the participants considered the disease as a serious risk, but perceived that their chance of getting infected is low."
Reviewer's comment: Why these occur likely?

Author's Response:
We revised and added this confirmation statement:
"This might be influenced by the majority of participants who were not in the high-risk category, or having adequate protection to prevent the disease. Moreover, majority of the participants in our study is young people, which apparently are not a high-risk category for getting COVID-19."

11. "Meanwhile, Jakarta as the capital and other part of the western region were surging in terms of the cases at the beginning of the outbreak. This study assumed that the lower self and response efficacy among people in western region might be due to the uncoordinated action from the government. Furthermore, contradictory information from the government could be associated with a reduced public trust."
Reviewer's comment: These are vaguely presented. Based on what reference?

Author's Response:
Thank you for pointing this out. We accepted this reviewer's comment. We would like to change those statements into these statements below:

"Jakarta as the capital and other part of the western region were surging in terms of the cases at the beginning of the outbreak. In the beginning case of COVID-19 at 2nd March 2020, western region contributed to higher number of cases than the other regions in Indonesia. These studies found that self and response efficacy among people in western region was lower than in the middle region. Majority of participants in western region consisted of students and employees. These two groups of people were more affected in social activity directly by the pandemic. In case when the first cases of outbreaks surged, they might still need to go to the school and the office. There still no strict regulations yet for limiting their social activity in the beginning case. Furthermore, the Indonesian

government just ruled out the instructions of physical distancing by the end of March. [16].
A previous study also reported that in terms of pandemic policy response, Indonesia was one of the countries with medium case yet having a proportional response towards the pandemic. [32] Therefore, this might lead to a reduced public trust that subsequently decrease the response and self-efficacy of the people in the western region, where the regulations took place earlier."

12. "In Indonesia, it evidently took more than a month to implement a social distancing measure, which is still far from a total lockdown, due to concern of interfering the public daily activities."
   Reviewer's comment: Need a reference here.

   Author's Response:
   "We have revised the statement and give the reference.
   In Indonesia, it evidently took more than a month to implement a large scales social status due to concern of interfering the public daily and economy activities. The government must first disburse the stimulus to those affected by the the large-scale social restrictions (PSBB) policy. [35-37]"

[35]   Ramadhani, M. W., "Lockdown Policy as a Corona Desease (Covid19) Management Efforts Asked from The Environmental Aspect of Life Based on Law Act No. 32 of 2009 Concerning Protection and Management of Environment," *Veteran Law Review,* vol. 3, no. 1, pp. 22-36, 2020.
[36]   Naryono, E., " Impact Of National Disaster Covid-19, Indonesia Towards Economic Recession," vol. Center for Open Science, 2020.
[37]   Muzakki, F., "The Global Political Economy Impact of COVID-19 and The Implication to Indonesia " *Journal of Social Political Sciences,* vol. 1, no. 2, pp. 76-92, 2020.

13. "However, this study results showed otherwise. Therefore, risk communication needs to pay more attention to the perceived vulnerability." Does not match with the whole study results.
   Reviewer's comment: Needs heavy revisions here.

   Author's Response:
   We have revised it with this statement:
   "Based on PMT, people will take higher precautionary actions when all of the PMT constructs such as perceived vulnerability, perceived severity, and coping appraisal are high. In a previous study, perceived severity as one of the PMT constructs were relatively low. Therefore, the focus needed to manage the pandemic towards the perceived severity. [38]

   Our study found the lower construct in perceived vulnerability. Therefore, in terms of communicating preparedness strategies, improving the pandemic response, delivering effective communication and encouraging more precautionary actions, thus the perceived vulnerability needs more attention. When the public realizes that COVID-19 is a risk that can affect anyone, despite the ages, they will take more precautionary action to avoid getting the disease."

14. "Therefore, this result could be used to ensure effective delivery of risk communication to the population during a disease outbreak."

Reviewer's comment: Revisions here to present the value of your study.

Author's Response:
We have revised to present the value of our study with this statement below:

"Risk perception is known as a trigger for precautionary actions. By knowing and understanding how public perceived COVID-19 in the early stage of the outbreak, the result of our study can be a preliminary approach for the health sector, stakeholders, and the government to provide a better communication in order to encourage the people to take more precautionary actions during a disease outbreak. However, our study emphasized the risk perceptions. Future exploration is needed to see how the risk perception affects the precautionary actions, especially in the early stage of a pandemic setting."

❐   101

COVID-19 Risk Perception among Indonesians in Early Stage of the Outbreak

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Article Info

ABSTRACT

Indonesia confirmed its first COVID-19 case on 2nd March 2020, when other countries have already reported several numbers in the previous month. This study aimed to explore the risk perception of Indonesians in the early stage of the COVID-19 outbreak. This cross-sectional study was conducted among 495 participants using a web-based questionnaire. Primary data were collected from 3rd to 27th March 2020 including the perceived severity, vulnerability, threat, self and response efficacy of the participants. The results showed that the perceived threat of the outbreak in its early stage is the second highest compared to other diseases. The perceived severity among the participants was high. However, they had low vulnerability. Those in the middle region showed higher level of self and response efficacy. Meanwhile, people who work as private sector employee (β=0.146, *P*=0.004), live in the western region (β =-0.184, *P*=0.000), with a higher knowledge score (β =0.096, *P*=0.032) had higher perceived threat. Furthermore, Indonesians perceived COVID-19 as a public health risk at the early stage of the outbreak. Therefore, this study could be a preliminary finding for risk communication during the pandemic and other emerging infectious diseases in the future.

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1. INTRODUCTION

In December 2019, a new infectious outbreak occurred in Wuhan, Hubei Province of China. This disease was found to be caused by a novel coronavirus and subsequently named Severe Acute Respiratory Syndrome 2 (SARS-CoV-2). [1] This virus caused a disease called COVID-19, which is highly contagious and spreads by human-to-human transmission. It spreads rapidly to other countries outside of China and became a global pandemic. Therefore, up to September 2020, there are more than thirty million cases of COVID-19 worldwide. [2]

The common symptoms found in the patients are fever, cough, fatigue, and shortness of breath. Older people and those with underlying conditions are more prone to severe outcomes such as acute respiratory distress syndrome (ARDS). [3] Several proposed vaccines for this disease are currently being put into clinical trials. Therefore, in the meantime, public was implored to take self-precautions by practicing basic hygiene and self-quarantine. [4]

In February 2020, COVID-19 had affected several countries, including those in South-east Asia. Meanwhile, the first case in Indonesia was reported on 2nd March 2020. This number increased significantly and reached more than 200,000 cases in September with almost 10,000 deaths. [5] As a country with large population, with lack of testing capacity and less strict social distancing measures, there is a tendency of significant increase of the disease. Therefore, understanding the risk perceptions in the early stage is vital as a preliminary evidence of better communication approach during an outbreak of emerging infectious diseases.

One of the widely used theories to assess the risk perception in health settings is Protection Motivation Theory (PMT). According to PMT, an individual has to perceive a risk or threat before deciding to engage in a protective behavior. Basically, PMT was used to assess the intention of an individual to engage in a preventive behavior in several previous studies. [6-8] However, the main constructs in PMT (perceived vulnerability, perceived severity, and perceived threat) could be used to assess the risk perception. There were several other studies that used PMT in assessing risk perception in the healthcare setting. [9-11] In this study, we aimed to use PMT for assessing the risk perception of COVID-19, among general Indonesian populations. Additionally, we also aimed to explore COVID-19 related knowledge along with the precautionary actions taken to prevent COVID-19.

2. RESEARCH METHOD

This was an analytic observational study using a cross-sectional design conducted from March 3rd to 27th 2020 among general Indonesian populations aged 17 years and above. The survey was conducted using a link shared to online groups and social media. The sample size was determined by an assumption that the probability of participants knowledge of COVID-19 was 50%. Using a 95% confidence interval, 5% limit of precision, and 1.0 design effect, the sample size was 384 participants. At the end of the survey, the number of participants exceeded the maximum sample size. Accordingly, 495 responses were further analyzed. This study was approved by the Ethics Committee of Aisiyah University (No. 1305/KEP-UNISA/IV/2020). Furthermore, informed consent and agreement to participate was obtained from each participant. Also, the confidentiality of the obtained data was maintained.

An online questionnaire through Google Form was used, which collected information on socio-demographic characteristics, knowledge, precautionary actions, perceived vulnerability and severity, response as well as self-efficacy of COVID-19. Due to the unavailability of the risk perception questionnaire, this particular questionnaire was developed based on previous studies. [12] It was initially written in English and translated to Indonesian. Meanwhile, a pilot study was conducted, and the data collected on 30 anonymous samples were first reviewed to determine the reliability of the questionnaire. The questionnaire was modified accordingly.

3. INSTRUMENTS

The questionnaire collected socio-demographic information of participants such as age, sex, education, region, and occupation. Furthermore, their awareness about the pandemic, and whether they have lived or visited affected countries (China, South Korea, Japan, Iran, Italy) in the past six months were also included. Meanwhile, COVID-19 related knowledge was assessed with six items about the main symptoms and transmission of the disease. The total score of this knowledge ranged between 0-6. In addition, the precautionary actions taken by the participants were assessed by whether they had practiced at least one of twelve preventive measures of the disease.

The measurement of risk perception was made according to previous studies, which based on the constructs of Protection Motivation Theory (PMT). [12] The perceived severity assessed the severity of COVID-19 using a 10-point Likert scale, from 1 (not severe) to 10 (very severe). Meanwhile, the perceived vulnerability assessed the likelihood of acquiring this disease using a 5-point Likert scale, from 1 (very unlikely) to 5 (very likely). Furthermore, the perceived threat was used as the overall measure of risk perception, which used the square root of the multiplication of perceived severity divided by 2 and vulnerability. The result was a perceived threat with a scale from 1 (low) to 5 (high). Also, the measure of risk perception was compared to other diseases and accidents such as SARS and MERS. The response-efficacy was assessed by asking how confident the participants think the people around them can take practical actions to prevent contracting COVID-19 using a 4-point Likert scale from 1 (not at all) to 4 (very much). Furthermore, self-efficacy was assessed by asking how confident they think they can prevent contracting the disease. The choices used a 4-point Likert scale, from 1 (not confident) to 4 (very confident).

A descriptive analysis was conducted on the socio-demographic characteristics and the study variables. The Kruskal-Wallis/Mann Whitney U Test was used to explore the difference in the perceived threat among socio-demographic characteristics. Also, multiple linear regression was conducted to determine the factors that are associated with perceived vulnerability, severity, and threat, each as a dependent variable. The independent variables were included with socio-demographic variables in the first block, and COVID-19 related knowledge, as well as awareness in the second block. Furthermore, dummy variables were set for the categorical independent variables. All the results are significant when the p-value is < 0.05. Meanwhile, all of the statistical analyses were conducted with SPSS 22.0 (IBM Corp., Armonk, NY, USA).

4. RESULTS AND DISCUSSIONS

The majority of the participants were female (74.7%), aged 17-25 (59.6%), and living in the western region (71.5%). Those with bachelor's degree were 71.1%, and students were 35%. Overall, they were young individuals and students. Furthermore, 97.4% have heard of the disease, and only 4% reported living or visiting COVID-19 affected countries in the last six months. There was a difference in the perceived threat between sex, region, and occupation (Table 1).

Table 1. Demographic characteristic of the participants

Variables	N (%)	Knowledge Range (0-6)		Perceived Threat of COVID-19	
		Mean ± SD	P	Mean ± SD	P
Sex*					
Male	125 (25.3)	5.40 ± 1.20	0.289	3.15 ± 1.01	0.048
Female	370 (74.7)	5.57 ± 0.79		2.94 ± 1.03	
Age (years)					
17-25	295 (59.6)	5.50 ± 0.96	0.676	2.99 ± 1.05	0.882
26-35	112 (22.6)	5.58 ± 0.74		3.04 ± 1.02	
36-45	59 (12)	5.58 ± 1.02		3.00 ± 0.97	
46-55	19 (3.8)	5.63 ± 0.68		2.93 ± 0.85	
>55	10 (2.0)	5.30 ± 1.05		2.83 ± 1.28	
Region*					
Western region	354 (71.5)	5.58 ± 0.82	0.149	3.14 ± 0.95	0.000*
Middle region	141 (28.5)	5.40 ± 1.11		2.64 ± 1.13	
Education					
Junior High School	3 (0.6)	6.00 ± 0.00	0.189	2.82 ± 0.74	0.246
Senior High School	84 (17.0)	5.36 ± 1.26		2.83 ± 1.05	
Bachelor Degree	352 (71.1)	5.53 ± 0.86		3.05 ± 1.03	
Postgraduate	56 (11.3)	5.73 ± 0.58		2.92 ± 0.95	
Occupation**					
Student	173 (35)	5.37 ± 1.07	0.016*	2.79 ± 1.08	0.018*
Private sector employee	164 (33.1)	5.63 ± 0.90		3.18 ± 0.95	
Government worker	52 (10.5)	5.58 ± 0.69		3.01 ± 0.98	
Entrepreneur	22 (4.4)	5.59 ± 0.59		3.32 ± 1.09	
Others	84 (17.0)	5.61 ± 0.76		2.97 ± 0.99	
COVID-19 related awareness*					
Yes	482 (97.4)	5.55 ± 0.88	0.072	3.01 ± 1.02	0.036*
No	13 (2.6)	4.43 ± 2.22		2.12 ± 1.03	
Previous visit to COVID-19 affected countries in the last 6 months*					
Yes	20 (4)	5.55 ± 1.14		2.91 ± 0.88	0.790
No	475 (96)	5.53 ± 0.91	0.547	3.00 ± 1.03	

*Significant p < 0.05 using Mann Whitney-U Test
**Significant p < 0.05 using Kruskal Wallis Test

Among the participants, a higher knowledge was found in females with a mean score of 5.57, aged 46-55 (5.63), living in the western region (5.58), holding a postgraduate degree (5.73), and working in a private sector (5.63). Also, those who have heard of the disease had a higher knowledge with a mean score of 5.55. Furthermore, those who reported previous visit to COVID-19 affected countries in the last six months had a slightly higher knowledge (5.55).

COVID-19 perceived vulnerability in this study was the third highest with a mean score of 2.44 (range 1-5). Meanwhile that of common cold was highest (2.91) and HIV/AIDS was the lowest (1.62). In terms of perceived severity, COVID-19 was seen as one of the most severe problems with a mean score of 8.12 (range 1-10). Other conditions with high severity were cancer (8.21), cardiovascular diseases (8.24), and HIV/AIDS (8.21). However, common cold had the lowest perceived severity (7.06). After gathering the measurement, the perceived threat of COVID-19 during the outbreak was the second highest with a mean score of 2.99 (range 1-5), after traffic accident (3.05). However, Avian Influenza had the lowest perceived threat (1.99) compared to other diseases and accidents (Table 2).

Table 2. Risk perception of COVID-19 and other diseases/accidents

	Perceived Vulnerability (1-5)	Perceived Severity (1-10)	Perceived Threat (1-5)
	Mean ± SD	Mean ± SD	Mean ± SD
COVID-19	2.44 ± 1.13	8.12 ± 2.77	2.99 ± 1.03
SARS	2.11 ± 1.06	7.99 ± 2.84	2.07 ± 0.64
MERS	1.93 ± 1.02	7.91 ± 2.91	2.59 ± 0.93
Avian Influenza	2.01 ± 1.06	7.84 ± 2.86	1.99 ± 0.63
Tuberculosis	2.13 ± 1.15	7.93 ± 9.00	2.73 ± 1.01
Common cold	2.91 ± 1.30	7.06 ± 2.83	3.03 ± 1.08
Cancer	2.06 ± 1.07	8.21 ± 2.92	2.73 ± 0.98
Cardiovascular disease	2.15 ± 1.08	8.24 ± 2.92	2.75 ± 0.98
Traffic accident	2.62 ± 1.23	7.93 ± 2.84	3.05 ± 1.07
Food poisoning	2.41 ± 1.16	7.33 ± 2.91	2.81 ± 1.06
HIV/AIDS	1.62 ± 0.92	8.21 ± 3.03	2.41 ± 0.88

The total average of the precautionary actions taken by the participants was 83.3%. Also, covering mouth when sneezing or coughing showed to be the most practiced precautionary actions (97%). Furthermore, avoiding eating out in the food court or restaurant reported as the least practiced measure (68.7%) (Table 3).

Table 3. Precautionary actions taken to prevent COVID-19

Precautionary actions	Correct answer percentage N (%)
Avoid contact with sick people	444 (89.7)
Avoiding close contact with another person when sick	457 (92.3)
Not going out when sick	399 (80.6)
Wearing a mask	372 (75.2)
Covering nose and mouth when sneezing or coughing	480 (97.0)
Washing hands with water and soap for at least 20 seconds	449 (90.7)
Using hand sanitizer when water is not available	419 (84.6)
Avoiding eating out in the food court or restaurant	340 (68.7)
Avoiding public gatherings or crowded place	359 (72.5)
Avoiding traveling to COVID-19 key-epidemic area	479 (96.8)
Avoiding traveling by plane or public transportation	362 (73.1)
Consuming health supplement to improve immunity	392 (79.2)
Total average of correct answers	**83.3%**

The linear regression analysis found that region was significantly associated with perceived severity, vulnerability, and threat. Meanwhile, people who work as a private sector employee (β =0.206, P=0.000), live in the western region (β =-0.170, P=0.000), and had higher knowledge score (β =0.89, P=0.047) had higher perceived severity. In terms of vulnerability, males (β =-0.107, P=0.022), and those who live in western region (β =-0.091, P=0.049) had a higher perceived vulnerability. Also, those who work as a private sector employee (β=0.146, P=0.004), live in western region (β =-0.184, P=0.000), had higher knowledge score (β =0.096, P=0.032) had higher perceived threat (Table 4).

Table 4. Linear regression analyses of COVID-19 perceived severity, vulnerability, and perceived threat

Variables	Perceived Severity		Perceived Vulnerability		Perceived Threat	
	β	P	β	P	β	P
Age	.752	.415	-.376	.547	.057	.963
Sex (male is the reference)	-.026	.568	-.107	.022	-.091	.043
Education						
High School	.128	.557	.092	.680	.121	.578
Bachelor	.219	.399	.141	.597	.203	.431
Postgraduate degree[1]	.064	.222	.047	.807	.065	.723
Occupation						
Private sector employee	.206	.000	.041	.433	.146	.004
Government worker	.656	.512	.003	.947	.036	.465
Entrepreneur	.054	.264	.039	.406	.069	.134
Others[2]	.076	.164	.001	.990	.041	.401
Region (western region is the reference)	-.170	.000	-.091	.049	-.184	.000
COVID-19 awareness (answer "no" is the reference)	.047	.286	.086	.060	.071	.108
COVID-19 knowledge	.089	.047	.022	.626	.096	.032

1) Dummies for education. Reference category is junior high school.
2) Dummies for occupation. Reference category is student.
Age and knowledge were quantitative variable.

Table 5. R^2 of the different steps in the linear regression model

	Perceived Severity		Perceived Vulnerability		Perceived Threat	
	R²	P	R²	P	R²	P
R² step 1	.088	.000	.041	.089	.086	.000
R² step 2 (full model)	.099	.000	.049	.058	.101	.000
Adjusted R² full model	.071		.019		.073	

The dependent variable models explained less than 10% of the variance, except the model with perceived threat as the dependent variable. The first model (M1) only included socio-demographic factors, meanwhile, the second (M2) included COVID-19 awareness, and related knowledge, as well as socio-demographic factors. Model for the total population explained 10.1% of the variance in terms of perceived threat when knowledge and awareness were included in M2. In terms of the vulnerability, M1 explained 4.1% of the total population, and M2 explained 4.9%. M1 in perceived severity explained 8.8%, and M2 explained 9.9% of the total variance (Table 5). Furthermore, the proportion of variance was higher when knowledge and awareness were included. No significance was found in the model with perceived vulnerability as the dependent variable.

In terms of response and self-efficacy, participants in the middle region were very confident that people can take practical actions to prevent themselves from acquiring COVID-19. They also reported higher self-efficacy than in the western region (Fig 1).
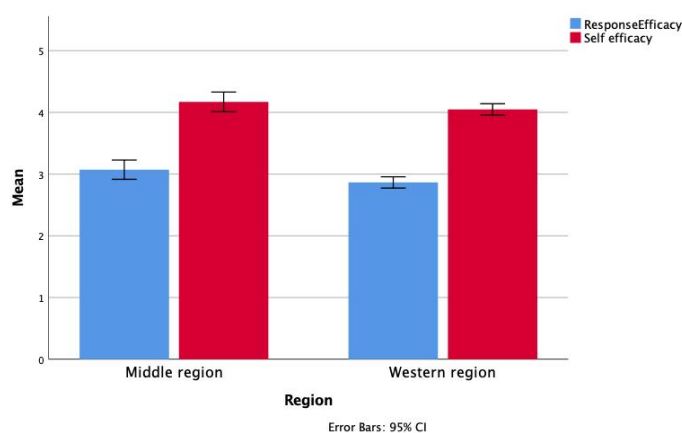
Figure 1. Response efficacy and self-efficacy based on region

4.1. Precautionary Actions

The total average of precautionary actions was 83.3%. The main measures were covering mouth when sneezing or coughing (97%), avoiding close contact with other people when sick (92.3%), and avoiding traveling to high impacted areas (96.8%). This finding is in line with a study in Hong Kong on Avian Influenza outbreak, which reported that during the onset, 71%-81% of the participants avoided crowded places, going out, and traveling abroad. [13]

Two weeks after the first confirmed cases, the president pronounced some social distancing orders including closure of schools and workplaces. [14] Only on March 31st 2020, the president pronounced the large-scale social distancing policy where the local government could limit the mobility of people and goods in and out of the area unless the permission is acquired from the Health Ministry. Additionally, the policy mentioned that it includes closure of schools and workplaces, limitation of religious activities, and limitation of public activities. [15] However, these policies were not strictly imposed. Only 14 out of 34 provinces in Indonesia implemented this policy. In the end of the month, the president pronounced the Covid-19 outbreak as a national disaster.

At the early stage, public willingness to comply with the measures was important in controlling the outbreak. [16] The least practiced precautionary measures in this study are related to daily activities, such as gathering, and eating in a restaurant. In a study of precautionary behavior during an infectious disease outbreak, the intention to practice safety measures was associated with the government's effectiveness. [17, 18] However, with no strict policy and hesitation in implementing lock-down in the early stage of the outbreak, the public activity outside is unavoidable.

4.2. Risk Perception: Protection Motivation Theory (PMT) Constructs

In this study, the perceived threat of COVID-19 is one of the highest along with road traffic accident. Therefore, this suggested that the populations consider the disease as a potential health problem, and already perceived it as a threat. [19] This finding is in line with a study in Egypt, which demonstrated that in early stage of the outbreak, public perceived COVID-19 as a life-threatening danger. [20] Furthermore, previous study in Vietnam showed that 75% of the participants considered Avian Influenza as a serious threat at the beginning of outbreak. [21] Among the participants in a study in UK, SARS was considered a perceived threat in the initial phase before the containment. [22, 23]

In this study, region was associated with perceived threat. Meanwhile, in previous research of SARS in a wider area, similar finding was reported that a region was associated with perceived vulnerability, severity, and threat. [23]. People who live in western region where there are higher number of cases perceived COVID-19 more as health threat compared to those in middle region. This finding is in contrast with an earlier study that showed risk perception is lower in area where the outbreak is prevalent. [24] Since this study accounted only for two local regions, the finding needs to be interpreted with caution. Furthermore, other factors that are associated with perceived threat are being a private sector employee and higher COVID-19 related knowledge. This finding is similar to a recent study which showed that personal knowledge of the disease is significantly associated with the risk perception. [25]

Elaborating the PMT constructs, it was found that the participants perceived COVID-19 as a serious health problem along with cardiovascular disease and HIV. People who work as a private sector employee, live in western region with higher knowledge had more perceived severity. However, even though it was considered a serious disease, they perceived themselves less likely to acquire it, which was slightly lower compared to the perceived threat. Similar finding was observed in a study of previous outbreaks such as A/H7N9 and Avian Influenza, where the participants considered the disease as a serious risk, but perceived that their chance of getting infected is low. [21, 26]

Also, it was assumed that low perceived vulnerability in the early stage of the outbreak was because the participants had low intention to comply with the government, or the outbreak was anticipated. Meanwhile, a study during the early phase of an infectious disease pandemic in Netherlands found that the strong intention to comply with government measures was associated with perceived vulnerability [27]. However, the lower vulnerability might be because people have anticipated the risk, and practiced the protective behavior before the outbreak occurred. [28]

After an individual evaluates risk as a part of threat appraisal, they will go through a process to cope with it. In this case, response and self-efficacy plays a role. [29] The perceived threat was higher in western region, while coping appraisal was found in the middle. Those living in the middle region are confident that they could take preventive actions during the outbreak. Meanwhile, Jakarta as the capital and other part of the western region were surging in terms of the cases at the beginning of the outbreak. This study assumed that the lower self and response efficacy among people in western region might be due to the uncoordinated action from the government. Furthermore, contradictory information from the government could be associated with a reduced public trust. [30] In addition, every job cannot be executed from home or online, therefore people still go out to work, despite the social distancing measure.

China was able to implement strict policies at the beginning, however other countries such as USA and UK waited for at least a month to apply the same measure. [31] This might be influenced by the nature of the disease, which is a major concern when the effects become visible. [32] In Indonesia, it evidently took more than a month to implement a social distancing measure, which is still far from a total lockdown, due to concern of interfering the public daily activities.

Based on the PMT, people will take higher precautionary actions when the perceived severity, vulnerability, and coping appraisal is high. Therefore, this study assumed that knowledge, perceived severity, and coping appraisal are high among the participants. Earlier research on SARS showed the perceived severity was low. [33] However, this study results showed otherwise. Therefore, risk communication needs to pay more attention to the perceived vulnerability.

5. CONCLUSION

The knowledge among the participants was satisfactory, and the perceived severity and threat of COVID-19 were high. However, they had low perceived vulnerability. Participants in the middle region showed higher self and response efficacy. Therefore, this result could be used to ensure effective delivery of risk communication to the population during a disease outbreak.

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COVID-19 Risk Perception among Indonesians in Early Stage of the Outbreak

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Article Info

ABSTRACT

Indonesia confirmed its first COVID-19 case on 2nd March 2020, when other countries have already reported several numbers in the previous month. This study aimed to explore the risk perception of Indonesians in the early stage of the COVID-19 outbreak. This cross-sectional study was conducted among 495 participants using a web-based questionnaire. Primary data were collected from 3rd to 27th March 2020 including the perceived severity, vulnerability, threat, self and response efficacy of the participants. The results showed that the perceived threat of the outbreak in its early stage is the second highest compared to other diseases. The perceived severity among the participants was high. However, they had low vulnerability. Those in the middle region showed higher level of self and response efficacy. Meanwhile, people who work as private sector employee (β=0.146, *P*=0.004), live in the western region (β =-0.184, *P*=0.000), with a higher knowledge score (β =0.096, *P*=0.032) had higher perceived threat. Furthermore, Indonesians perceived COVID-19 as a public health risk at the early stage of the outbreak. Therefore, this study could be a preliminary finding for risk communication during the pandemic and other emerging infectious diseases in the future.

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3. INTRODUCTION

In December 2019, a new infectious outbreak occurred in Wuhan, Hubei Province of China. This disease was found to be caused by a novel coronavirus and subsequently named Severe Acute Respiratory Syndrome 2 (SARS-CoV-2). [1] This virus caused a disease called COVID-19, which is highly contagious and spreads by human-to-human transmission. It spreads rapidly to other countries outside of China and became a global pandemic. Therefore, up to September 2020, there are more than thirty million cases of COVID-19 worldwide. [2]

The common symptoms found in the patients are fever, cough, fatigue, and shortness of breath. Older people and those with underlying conditions are more prone to severe outcomes such as acute respiratory distress syndrome (ARDS). [3] Several proposed vaccines for this disease are currently being put into clinical trials. Therefore, in the meantime, public was implored to take self-precautions by practicing basic hygiene and self-quarantine. [4]

In February 2020, COVID-19 had affected several countries, including those in South-east Asia. Meanwhile, the first case in Indonesia was reported on 2nd March 2020. This number increased significantly and reached more than 200,000 cases in September with almost 10,000 deaths. [5] As a country with large population, with lack of testing capacity and less strict social distancing measures, there is a tendency of significant increase of the disease. Therefore, understanding the risk perceptions in the early stage is vital as a preliminary evidence of better communication approach during an outbreak of emerging infectious diseases.

One of the widely used theories to assess the risk perception in health settings is Protection Motivation Theory (PMT). According to PMT, an individual has to perceive a risk or threat before deciding to engage in a protective behavior. Basically, PMT was used to assess the intention of an individual to engage in a preventive behavior in several previous studies. [6-8] However, the main constructs in PMT (perceived vulnerability, perceived severity, and perceived threat) could be used to assess the risk perception. There were several other studies that used PMT in assessing risk perception in the healthcare setting. [9-11] In this study, we aimed to use PMT for assessing the risk perception of COVID-19, among general Indonesian populations. Additionally, we also aimed to explore COVID-19 related knowledge along with the precautionary actions taken to prevent COVID-19.

4.   RESEARCH METHOD

This was an analytic observational study using a cross-sectional design conducted from March 3rd to 27th 2020 among general Indonesian populations aged 17 years and above. The survey was conducted using a link shared to online groups and social media. The sample size was determined by an assumption that the probability of participants knowledge of COVID-19 was 50%. Using a 95% confidence interval, 5% limit of precision, and 1.0 design effect, the sample size was 384 participants. At the end of the survey, the number of participants exceeded the maximum sample size. Accordingly, 495 responses were further analyzed. This study was approved by the Ethics Committee of Aisyiyah University (No. 1305/KEP-UNISA/IV/2020). Furthermore, informed consent and agreement to participate was obtained from each participant. Also, the confidentiality of the obtained data was maintained.

An online questionnaire through Google Form was used, which collected information on socio-demographic characteristics, knowledge, precautionary actions, perceived vulnerability and severity, response as well as self-efficacy of COVID-19. Due to the unavailability of the risk perception questionnaire, this particular questionnaire was developed based on previous studies. [12] It was initially written in English and translated to Indonesian. Meanwhile, a pilot study was conducted, and the data collected on 30 anonymous samples were first reviewed to determine the reliability of the questionnaire. The questionnaire was modified accordingly.

3.   INSTRUMENTS

The questionnaire collected socio-demographic information of participants such as age, sex, education, region, and occupation. Furthermore, their awareness about the pandemic, and whether they have lived or visited affected countries (China, South Korea, Japan, Iran, Italy) in the past six months were also included. Meanwhile, COVID-19 related knowledge was assessed with six items about the main symptoms and transmission of the disease. The total score of this knowledge ranged between 0-6. In addition, the precautionary actions taken by the participants were assessed by whether they had practiced at least one of twelve preventive measures of the disease.

The measurement of risk perception was made according to previous studies, which based on the constructs of Protection Motivation Theory (PMT). [12] The perceived severity assessed the severity of COVID-19 using a 10-point Likert scale, from 1 (not severe) to 10 (very severe). Meanwhile, the perceived vulnerability assessed the likelihood of acquiring this disease using a 5-point Likert scale, from 1 (very unlikely) to 5 (very likely). Furthermore, the perceived threat was used as the overall measure of risk perception, which used the square root of the multiplication of perceived severity divided by 2 and vulnerability. The result was a perceived threat with a scale from 1 (low) to 5 (high). Also, the measure of risk perception was compared to other diseases and accidents such as SARS and MERS. The response-efficacy was assessed by asking how confident the participants think the people around them can take practical actions to prevent contracting COVID-19 using a 4-point Likert scale from 1 (not at all) to 4 (very much). Furthermore, self-efficacy was assessed by asking how confident they think they can prevent contracting the disease. The choices used a 4-point Likert scale, from 1 (not confident) to 4 (very confident).

A descriptive analysis was conducted on the socio-demographic characteristics and the study variables. The Kruskal-Wallis/Mann Whitney U Test was used to explore the difference in the perceived threat among socio-demographic characteristics. Also, multiple linear regression was conducted to determine the factors that are associated with perceived vulnerability, severity, and threat, each as a dependent variable. The independent variables were included with socio-demographic variables in the first block, and COVID-19 related knowledge, as well as awareness in the second block. Furthermore, dummy variables were set for the categorical independent variables. All the results are significant when the p-value is < 0.05. Meanwhile, all of the statistical analyses were conducted with SPSS 22.0 (IBM Corp., Armonk, NY, USA).

4. RESULTS AND DISCUSSIONS

The majority of the participants were female (74.7%), aged 17-25 (59.6%), and living in the western region (71.5%). Those with bachelor's degree were 71.1%, and students were 35%. Overall, they were young individuals and students. Furthermore, 97.4% have heard of the disease, and only 4% reported living or visiting COVID-19 affected countries in the last six months. There was a difference in the perceived threat between sex, region, and occupation (Table 1).

Table 1. Demographic characteristic of the participants

Variables	N (%)	Knowledge Range (0-6)		Perceived Threat of COVID-19	
		Mean ± SD	P	Mean ± SD	P
Sex*					
Male	125 (25.3)	5.40 ± 1.20	0.289	3.15 ± 1.01	0.048
Female	370 (74.7)	5.57 ± 0.79		2.94 ± 1.03	
Age (years)					
17-25	295 (59.6)	5.50 ± 0.96	0.676	2.99 ± 1.05	0.882
26-35	112 (22.6)	5.58 ± 0.74		3.04 ± 1.02	
36-45	59 (12)	5.58 ± 1.02		3.00 ± 0.97	
46-55	19 (3.8)	5.63 ± 0.68		2.93 ± 0.85	
>55	10 (2.0)	5.30 ± 1.05		2.83 ± 1.28	
Region*					
Western region	354 (71.5)	5.58 ± 0.82	0.149	3.14 ± 0.95	0.000*
Middle region	141 (28.5)	5.40 ± 1.11		2.64 ± 1.13	
Education					
Junior High School	3 (0.6)	6.00 ± 0.00	0.189	2.82 ± 0.74	0.246
Senior High School	84 (17.0)	5.36 ± 1.26		2.83 ± 1.05	
Bachelor Degree	352 (71.1)	5.53 ± 0.86		3.05 ± 1.03	
Postgraduate	56 (11.3)	5.73 ± 0.58		2.92 ± 0.95	
Occupation**					
Student	173 (35)	5.37 ± 1.07	0.016*	2.79 ± 1.08	0.018*
Private sector employee	164 (33.1)	5.63 ± 0.90		3.18 ± 0.95	
Government worker	52 (10.5)	5.58 ± 0.69		3.01 ± 0.98	
Entrepreneur	22 (4.4)	5.59 ± 0.59		3.32 ± 1.09	
Others	84 (17.0)	5.61 ± 0.76		2.97 ± 0.99	
COVID-19 related awareness*					
Yes	482 (97.4)	5.55 ± 0.88	0.072	3.01 ± 1.02	0.036*
No	13 (2.6)	4.43 ± 2.22		2.12 ± 1.03	
Previous visit to COVID-19 affected countries in the last 6 months*					
Yes	20 (4)	5.55 ± 1.14		2.91 ± 0.88	0.790
No	475 (96)	5.53 ± 0.91	0.547	3.00 ± 1.03	

*Significant p < 0.05 using Mann Whitney-U Test
**Significant p < 0.05 using Kruskal Wallis Test

Among the participants, a higher knowledge was found in females with a mean score of 5.57, aged 46-55 (5.63), living in the western region (5.58), holding a postgraduate degree (5.73), and working in a private sector (5.63). Also, those who have heard of the disease had a higher knowledge with a mean score of 5.55. Furthermore, those who reported previous visit to COVID-19 affected countries in the last six months had a slightly higher knowledge (5.55).

COVID-19 perceived vulnerability in this study was the third highest with a mean score of 2.44 (range 1-5). Meanwhile that of common cold was highest (2.91) and HIV/AIDS was the lowest (1.62). In terms of perceived severity, COVID-19 was seen as one of the most severe problems with a mean score of 8.12 (range 1-10). Other conditions with high severity were cancer (8.21), cardiovascular diseases (8.24), and HIV/AIDS (8.21). However, common cold had the lowest perceived severity (7.06). After gathering the measurement, the perceived threat of COVID-19 during the outbreak was the second highest with a mean score of 2.99 (range 1-5), after traffic accident (3.05). However, Avian Influenza had the lowest perceived threat (1.99) compared to other diseases and accidents (Table 2).

Table 2. Risk perception of COVID-19 and other diseases/accidents

	Perceived Vulnerability (1-5)	Perceived Severity (1-10)	Perceived Threat (1-5)
	Mean ± SD	Mean ± SD	Mean ± SD
COVID-19	2.44 ± 1.13	8.12 ± 2.77	2.99 ± 1.03
SARS	2.11 ± 1.06	7.99 ± 2.84	2.07 ± 0.64
MERS	1.93 ± 1.02	7.91 ± 2.91	2.59 ± 0.93
Avian Influenza	2.01 ± 1.06	7.84 ± 2.86	1.99 ± 0.63
Tuberculosis	2.13 ± 1.15	7.93 ± 9.00	2.73 ± 1.01
Common cold	2.91 ± 1.30	7.06 ± 2.83	3.03 ± 1.08
Cancer	2.06 ± 1.07	8.21 ± 2.92	2.73 ± 0.98
Cardiovascular disease	2.15 ± 1.08	8.24 ± 2.92	2.75 ± 0.98
Traffic accident	2.62 ± 1.23	7.93 ± 2.84	3.05 ± 1.07
Food poisoning	2.41 ± 1.16	7.33 ± 2.91	2.81 ± 1.06
HIV/AIDS	1.62 ± 0.92	8.21 ± 3.03	2.41 ± 0.88

The total average of the precautionary actions taken by the participants was 83.3%. Also, covering mouth when sneezing or coughing showed to be the most practiced precautionary actions (97%). Furthermore, avoiding eating out in the food court or restaurant reported as the least practiced measure (68.7%) (Table 3).

Table 3. Precautionary actions taken to prevent COVID-19

Precautionary actions	Correct answer percentage N (%)
Avoid contact with sick people	444 (89.7)
Avoiding close contact with another person when sick	457 (92.3)
Not going out when sick	399 (80.6)
Wearing a mask	372 (75.2)
Covering nose and mouth when sneezing or coughing	480 (97.0)
Washing hands with water and soap for at least 20 seconds	449 (90.7)
Using hand sanitizer when water is not available	419 (84.6)
Avoiding eating out in the food court or restaurant	340 (68.7)
Avoiding public gatherings or crowded place	359 (72.5)
Avoiding traveling to COVID-19 key-epidemic area	479 (96.8)
Avoiding traveling by plane or public transportation	362 (73.1)
Consuming health supplement to improve immunity	392 (79.2)
Total average of correct answers	**83.3%**

The linear regression analysis found that region was significantly associated with perceived severity, vulnerability, and threat. Meanwhile, people who work as a private sector employee (β =0.206, P=0.000), live in the western region (β =-0.170, P=0.000), and had higher knowledge score (β =0.89, P=0.047) had higher perceived severity. In terms of vulnerability, males (β =-0.107, P=0.022), and those who live in western region (β =-0.091, P=0.049) had a higher perceived vulnerability. Also, those who work as a private sector employee (β=0.146, P=0.004), live in western region (β =-0.184, P=0.000), had higher knowledge score (β =0.096, P=0.032) had higher perceived threat (Table 4).

Table 4. Linear regression analyses of COVID-19 perceived severity, vulnerability, and perceived threat

Variables	Perceived Severity		Perceived Vulnerability		Perceived Threat	
	β	P	β	P	β	P
Age	.752	.415	-.376	.547	.057	.963
Sex (male is the reference)	-.026	.568	-.107	.022	-.091	.043
Education						
High School	.128	.557	.092	.680	.121	.578
Bachelor	.219	.399	.141	.597	.203	.431
Postgraduate degree[1]	.064	.222	.047	.807	.065	.723
Occupation						
Private sector employee	.206	.000	.041	.433	.146	.004
Government worker	.656	.512	.003	.947	.036	.465
Entrepreneur	.054	.264	.039	.406	.069	.134
Others[2]	.076	.164	.001	.990	.041	.401
Region (western region is the reference)	-.170	.000	-.091	.049	-.184	.000
COVID-19 awareness (answer "no" is the reference)	.047	.286	.086	.060	.071	.108
COVID-19 knowledge	.089	.047	.022	.626	.096	.032

1) Dummies for education. Reference category is junior high school.
2) Dummies for occupation. Reference category is student.
Age and knowledge were quantitative variable.

Table 5. R^2 of the different steps in the linear regression model

	Perceived Severity		Perceived Vulnerability		Perceived Threat	
	R²	P	R²	P	R²	P
R² step 1	.088	.000	.041	.089	.086	.000
R² step 2 (full model)	.099	.000	.049	.058	.101	.000
Adjusted R² full model	.071		.019		.073	

The dependent variable models explained less than 10% of the variance, except the model with perceived threat as the dependent variable. The first model (M1) only included socio-demographic factors, meanwhile, the second (M2) included COVID-19 awareness, and related knowledge, as well as socio-demographic factors. Model for the total population explained 10.1% of the variance in terms of perceived threat when knowledge and awareness were included in M2. In terms of the vulnerability, M1 explained 4.1% of the total population, and M2 explained 4.9%. M1 in perceived severity explained 8.8%, and M2 explained 9.9% of the total variance (Table 5). Furthermore, the proportion of variance was higher when knowledge and awareness were included. No significance was found in the model with perceived vulnerability as the dependent variable.

In terms of response and self-efficacy, participants in the middle region were very confident that people can take practical actions to prevent themselves from acquiring COVID-19. They also reported higher self-efficacy than in the western region (Fig 1).
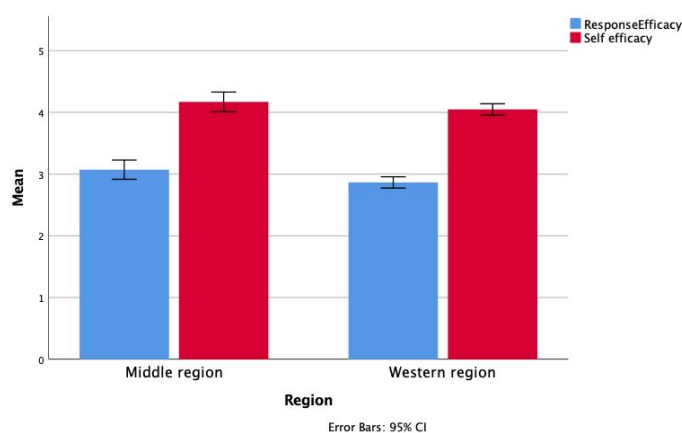
Figure 1. Response efficacy and self-efficacy based on region

4.1. Precautionary Actions

The total average of precautionary actions was 83.3%. The main measures were covering mouth when sneezing or coughing (97%), avoiding close contact with other people when sick (92.3%), and avoiding traveling to high impacted areas (96.8%). This finding is in line with a study in Hong Kong on Avian Influenza outbreak, which reported that during the onset, 71%-81% of the participants avoided crowded places, going out, and traveling abroad. [13]

Two weeks after the first confirmed cases, the president pronounced some social distancing orders including closure of schools and workplaces. [14] Only on March 31st 2020, the president pronounced the large-scale social distancing policy where the local government could limit the mobility of people and goods in and out of the area unless the permission is acquired from the Health Ministry. Additionally, the policy mentioned that it includes closure of schools and workplaces, limitation of religious activities, and limitation of public activities. [15] However, these policies were not strictly imposed. Only 14 out of 34 provinces in Indonesia implemented this policy. In the end of the month, the president pronounced the Covid-19 outbreak as a national disaster.

At the early stage, public willingness to comply with the measures was important in controlling the outbreak. [16] The least practiced precautionary measures in this study are related to daily activities, such as gathering, and eating in a restaurant. In a study of precautionary behavior during an infectious disease outbreak, the intention to practice safety measures was associated with the government's effectiveness. [17, 18] However, with no strict policy and hesitation in implementing lock-down in the early stage of the outbreak, the public activity outside is unavoidable.

4.2. Risk Perception: Protection Motivation Theory (PMT) Constructs

In this study, the perceived threat of COVID-19 is one of the highest along with road traffic accident. Therefore, this suggested that the populations consider the disease as a potential health problem, and already perceived it as a threat. [19] This finding is in line with a study in Egypt, which demonstrated that in early stage of the outbreak, public perceived COVID-19 as a life-threatening danger. [20] Furthermore, previous study in Vietnam showed that 75% of the participants considered Avian Influenza as a serious threat at the beginning of outbreak. [21] Among the participants in a study in UK, SARS was considered a perceived threat in the initial phase before the containment. [22, 23]

In this study, region was associated with perceived threat. Meanwhile, in previous research of SARS in a wider area, similar finding was reported that a region was associated with perceived vulnerability, severity, and threat. [23]. People who live in western region where there are higher number of cases perceived COVID-19 more as health threat compared to those in middle region. This finding is in contrast with an earlier study that showed risk perception is lower in area where the outbreak is prevalent. [24] Since this study accounted only for two local regions, the finding needs to be interpreted with caution. Furthermore, other factors that are associated with perceived threat are being a private sector employee and higher COVID-19 related knowledge. This finding is similar to a recent study which showed that personal knowledge of the disease is significantly associated with the risk perception. [25]

Elaborating the PMT constructs, it was found that the participants perceived COVID-19 as a serious health problem along with cardiovascular disease and HIV. People who work as a private sector employee, live in western region with higher knowledge had more perceived severity. However, even though it was considered a serious disease, they perceived themselves less likely to acquire it, which was slightly lower compared to the perceived threat. Similar finding was observed in a study of previous outbreaks such as A/H7N9 and Avian Influenza, where the participants considered the disease as a serious risk, but perceived that their chance of getting infected is low. [21, 26]

Also, it was assumed that low perceived vulnerability in the early stage of the outbreak was because the participants had low intention to comply with the government, or the outbreak was anticipated. Meanwhile, a study during the early phase of an infectious disease pandemic in Netherlands found that the strong intention to comply with government measures was associated with perceived vulnerability [27]. However, the lower vulnerability might be because people have anticipated the risk, and practiced the protective behavior before the outbreak occurred. [28]

After an individual evaluates risk as a part of threat appraisal, they will go through a process to cope with it. In this case, response and self-efficacy plays a role. [29] The perceived threat was higher in western region, while coping appraisal was found in the middle. Those living in the middle region are confident that they could take preventive actions during the outbreak. Meanwhile, Jakarta as the capital and other part of the western region were surging in terms of the cases at the beginning of the outbreak. This study assumed that the lower self and response efficacy among people in western region might be due to the uncoordinated action from the government. Furthermore, contradictory information from the government could be associated with a reduced public trust. [30] In addition, every job cannot be executed from home or online, therefore people still go out to work, despite the social distancing measure.

China was able to implement strict policies at the beginning, however other countries such as USA and UK waited for at least a month to apply the same measure. [31] This might be influenced by the nature of the disease, which is a major concern when the effects become visible. [32] In Indonesia, it evidently took more than a month to implement a social distancing measure, which is still far from a total lockdown, due to concern of interfering the public daily activities.

Based on the PMT, people will take higher precautionary actions when the perceived severity, vulnerability, and coping appraisal is high. Therefore, this study assumed that knowledge, perceived severity, and coping appraisal are high among the participants. Earlier research on SARS showed the perceived severity was low. [33] However, this study results showed otherwise. Therefore, risk communication needs to pay more attention to the perceived vulnerability.

5. CONCLUSION

The knowledge among the participants was satisfactory, and the perceived severity and threat of COVID-19 were high. However, they had low perceived vulnerability. Participants in the middle region showed higher self and response efficacy. Therefore, this result could be used to ensure effective delivery of risk communication to the population during a disease outbreak.

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COVID-19 Risk Perception among Indonesians in Early Stage of the Outbreak

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Article Info	ABSTRACT
	Indonesia confirmed its first COVID-19 case on 2nd March 2020, when other countries have already reported several numbers in the previous month. This study aimed to explore the risk perception of Indonesians in the early stage of the COVID-19 outbreak. This cross-sectional study was conducted among 495 participants using a web-based questionnaire. Primary data were collected from 3rd to 27th March 2020 including the perceived severity, vulnerability, threat, self, and response efficacy of the participants. The results showed that the perceived threat of the outbreak in its early stage is the second highest compared to other diseases. The perceived severity among the participants was high. However, they had a low vulnerability. Those in the middle region showed a higher level of self and response efficacy. Meanwhile, people who work as private sector employee (β=0.146, P=0.004), live in the western region (β =-0.184, P=0.000), with a higher knowledge score (β =0.096, P=0.032) had a higher perceived threat. These results found those who had high knowledge, was also had higher perceived risk. The most important of these studies have determined various factors related to risk perception, thus it could be good preliminary evidence for public health authorities to arrange an effective way for epidemic control.

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5. INTRODUCTION

In December 2019, a new infectious outbreak occurred in Wuhan, Hubei Province of China. This disease was found to be caused by a novel coronavirus and subsequently named Severe Acute Respiratory Syndrome 2 (SARS-CoV-2). [1] This virus caused a disease called COVID-19, which is highly contagious and spreads by human-to-human transmission. It spreads rapidly to other countries outside of China and became a global pandemic. More than 30 million COVID-19 cases are registered worldwide until September 2020.[2]

The common symptoms found in the patients are fever, cough, fatigue, and shortness of breath. Older people and those with underlying conditions are more prone to severe outcomes such as acute respiratory distress syndrome (ARDS). [3] Several proposed vaccines for this disease are currently being put into clinical

trials. In the meantime, the public was implored to take self-precautions by practicing basic hygiene and self-quarantine. [4]

In February 2020, COVID-19 had affected several countries, including those in South-east Asia. Meanwhile, the first case in Indonesia was reported on 2nd March 2020. This number increased significantly and reached more than 200,000 cases in September with almost 10,000 deaths. [5] As a country with a large population, with a lack of testing capacity and less strict social distancing measures, there is a tendency of a significant increase in the disease. Hence, understanding how people perceived their likelihood to get the disease, perceived the threat of the disease, and the response at the community and individual level in the early stage is vital as preliminary evidence of a better communication approach during an outbreak of emerging infectious diseases. This could be done by assessing the risk perception of the people.

One of the widely used theories to assess risk perception in health settings is the Protection Motivation Theory (PMT). According to PMT, an individual has to perceive risk or threat before deciding to engage in protective behavior. PMT was used to assess the intention of an individual to engage in preventive behavior in several previous studies. [6-8] However, the main constructs in PMT (perceived vulnerability, perceived severity, and perceived threat) could be used to assess the risk perception. Several other studies used PMT in assessing risk perception in the healthcare setting. [9-11] In this study, we aimed to use PMT for assessing the risk perception of COVID-19, among general Indonesian populations. Additionally, we also aimed to explore COVID-19 related knowledge along with the precautionary actions taken to prevent COVID-19.

6. RESEARCH METHOD

This study was approved by the Ethics Committee of Aisyiyah University (No. 1305/KEP-UNISA/IV/2020). Furthermore, informed consent and agreement to participate was obtained from each participant. Also, the confidentiality of the obtained data was maintained.

This was an analytic observational study using a cross-sectional design conducted from March 3rd to 27th 2020 among general Indonesian populations. Indonesians aged 17 years and above and currently living in Indonesia are eligible to participate in this study. A foreigner living in Indonesia and Indonesians living overseas are excluded. The survey was conducted using a link shared with online groups and social media. The sample size was determined by the assumption that the probability of the participant's knowledge of COVID-19 was 50%. [12] Using a 95% confidence interval, 5% limit of precision, and 1.0 design effect, the sample size was 384 participants. At the end of the survey, the number of participants exceeded the maximum sample size. Accordingly, 495 responses were further analyzed.

Before distributing the questionnaire, a pilot study was conducted, and the data collected on 30 anonymous samples were first reviewed to determine the reliability of the questionnaire. The questionnaire was then modified accordingly. An online questionnaire through Google Form was used, which collected information on socio-demographic characteristics, knowledge, precautionary actions, perceived vulnerability, and severity, response as well as self-efficacy of COVID-19. Due to the unavailability of the risk perception questionnaire, this particular questionnaire was developed based on previous studies. [13] It was initially written in English and translated into Bahasa Indonesia.

3. INSTRUMENTS

The questionnaire collected socio-demographic information of participants such as age, sex, education, region, and occupation. Furthermore, their awareness about the pandemic, and whether they have lived or visited affected countries (China, South Korea, Japan, Iran, Italy) in the past six months were also included. Meanwhile, COVID-19 related knowledge was assessed with six items about the main symptoms and transmission of the disease. The total score of this knowledge ranged between 0-6. In addition, the precautionary actions taken by the participants were assessed by whether they had practiced at least one of twelve preventive measures of the disease.

The measurement of risk perception was made according to previous studies, based on the constructs of the Protection Motivation Theory (PMT). [13] The perceived severity assessed the severity of COVID-19 using a 10-point Likert scale, from 1 (not severe) to 10 (very severe). Meanwhile, the perceived vulnerability assessed the likelihood of acquiring this disease using a 5-point Likert scale, from 1 (very unlikely) to 5 (very likely). Furthermore, the perceived threat was used as the overall measure of risk perception, which used the square root of the multiplication of perceived severity divided by 2 and vulnerability. The result was a perceived threat with a scale from 1 (low) to 5 (high). Also, the measure of risk perception was compared to other diseases and accidents such as SARS and MERS. The response-efficacy was assessed by asking how confident the participants think the people around them can take practical actions to prevent contracting COVID-19 using a 4-point Likert scale from 1 (not at all) to 4 (very much). Furthermore, self-efficacy was assessed by asking how confident they think they can prevent contracting the disease. The choices used a 4-point Likert scale, from 1 (not confident) to 4 (very confident).

A descriptive analysis was conducted on the socio-demographic characteristics and the study variables. The Kruskal-Wallis/Mann Whitney U test was used to explore the difference in the perceived threat among socio-demographic characteristics. We did the Kruskal-Wallis Test to see the difference in the perceived threat among the occupation variable. Furthermore, we conducted a Dunn-Bonferroni test for the post-hoc analysis. Also, multiple linear regression was conducted to determine the factors that are associated with perceived vulnerability, severity, and threat, each as a dependent variable. We divided the independent variables into two blocks, the first block consisting of all the sociodemographic variables and knowledge and awareness in the second block. The independent variables were included with socio-demographic variables in the first block, and COVID-19 related knowledge, as well as awareness in the second block. Furthermore, dummy variables were set for the categorical independent variables. All the results are significant when the p-value is < 0.05. All of the statistical analyses were conducted with SPSS 22.0 (IBM Corp., Armonk, NY, USA).

4. RESULTS AND DISCUSSIONS

The majority of the participants were female (74.7%), aged 17-25 (59.6%), and living in the western region (71.5%). Those with a bachelor's degree were 71.1%, and students were 35%. Overall, they were young individuals and students. Furthermore, 97.4% have heard of the disease, and only 4% reported living or visiting COVID-19 affected countries in the last six months. There was a difference in the perceived threat between sex, region, and occupation (Table 1).

Table 1. Demographic characteristic of the participants

No.	Variables	N (%)	Knowledge Range (0-6)		Perceived Threat of COVID-19	
			Mean ± SD	p	Mean ± SD	p
1.	Sex*					
	Male	125 (25.3)	5.40 ± 1.20	0.289	3.15 ± 1.01	0.048
	Female	370 (74.7)	5.57 ± 0.79		2.94 ± 1.03	
2.	Age (years)					
	17-25	295 (59.6)	5.50 ± 0.96	0.676	2.99 ± 1.05	0.882
	26-35	112 (22.6)	5.58 ± 0.74		3.04 ± 1.02	
	36-45	59 (12)	5.58 ± 1.02		3.00 ± 0.97	
	46-55	19 (3.8)	5.63 ± 0.68		2.93 ± 0.85	
	>55	10 (2.0)	5.30 ± 1.05		2.83 ± 1.28	
3.	Region*					
	Western region	354 (71.5)	5.58 ± 0.82	0.149	3.14 ± 0.95	0.000*
	Middle region	141 (28.5)	5.40 ± 1.11		2.64 ± 1.13	
4.	Education					
	Junior High School	3 (0.6)	6.00 ± 0.00	0.189	2.82 ± 0.74	0.246
	Senior High School	84 (17.0)	5.36 ± 1.26		2.83 ± 1.05	
	Bachelor Degree	352 (71.1)	5.53 ± 0.86		3.05 ± 1.03	
	Postgraduate	56 (11.3)	5.73 ± 0.58		2.92 ± 0.95	
5.	Occupation**					
	Student	173 (35)	5.37 ± 1.07	0.016*	2.79 ± 1.08	0.018*
	Private sector employee	164 (33.1)	5.63 ± 0.90		3.18 ± 0.95	
	Government worker	52 (10.5)	5.58 ± 0.69		3.01 ± 0.98	
	Entrepreneur	22 (4.4)	5.59 ± 0.59		3.32 ± 1.09	
	Others	84 (17.0)	5.61 ± 0.76		2.97 ± 0.99	
6.	COVID-19 related awareness*					
	Yes	482 (97.4)	5.55 ± 0.88	0.072	3.01 ± 1.02	0.036*
	No	13 (2.6)	4.43 ± 2.22		2.12 ± 1.03	
7.	Previous visit to COVID-19 affected countries in the last 6 months*					
	Yes	20 (4)	5.55 ± 1.14		2.91 ± 0.88	0.790
	No	475 (96)	5.53 ± 0.91	0.547	3.00 ± 1.03	

*Significant p < 0.05 using Mann Whitney-U Test
**Significant p < 0.05 using Kruskal Wallis test

Among the participants, a higher knowledge was found in females with a mean score of 5.57, aged 46-55 (5.63), living in the western region (5.58), holding a postgraduate degree (5.73), and working in a private sector (5.63). Also, those who have heard of the disease had a higher knowledge with a mean score of 5.55. Furthermore, those who reported a previous visit to COVID-19 affected countries in the last six months had a slightly higher knowledge (5.55).

COVID-19 perceived vulnerability in this study was the third highest with a mean score of 2.44 (range 1-5). Meanwhile, that of the common cold was highest (2.91) and HIV/AIDS was the lowest (1.62). In terms of perceived severity, COVID-19 was seen as one of the most severe problems with a mean score of 8.12 (range 1-10). Other conditions with high severity were cancer (8.21), cardiovascular diseases (8.24), and HIV/AIDS (8.21). However, the common cold had the lowest perceived severity (7.06). After gathering the measurement, the perceived threat of COVID-19 during the outbreak was the second highest with a mean score of 2.99 (range 1-5), after traffic accident (3.05). However, Avian Influenza had the lowest perceived threat (1.99) compared to other diseases and accidents (Table 2).

Table 2. Risk perception of COVID-19 and other diseases/accidents

	Perceived Vulnerability (1-5)	Perceived Severity (1-10)	Perceived Threat (1-5)
	Mean ± SD	Mean ± SD	Mean ± SD
COVID-19	2.44 ± 1.13	8.12 ± 2.77	2.99 ± 1.03
SARS	2.11 ± 1.06	7.99 ± 2.84	2.07 ± 0.64
MERS	1.93 ± 1.02	7.91 ± 2.91	2.59 ± 0.93
Avian Influenza	2.01 ± 1.06	7.84 ± 2.86	1.99 ± 0.63
Tuberculosis	2.13 ± 1.15	7.93 ± 9.00	2.73 ± 1.01
Common cold	2.91 ± 1.30	7.06 ± 2.83	3.03 ± 1.08
Cancer	2.06 ± 1.07	8.21 ± 2.92	2.73 ± 0.98
Cardiovascular disease	2.15 ± 1.08	8.24 ± 2.92	2.75 ± 0.98
Traffic accident	2.62 ± 1.23	7.93 ± 2.84	3.05 ± 1.07
Food poisoning	2.41 ± 1.16	7.33 ± 2.91	2.81 ± 1.06
HIV/AIDS	1.62 ± 0.92	8.21 ± 3.03	2.41 ± 0.88

The total average of the precautionary actions taken by the participants was 83.3%. Also, covering mouth when sneezing or coughing showed to be the most practiced precautionary actions (97%). Furthermore, avoiding eating out in the food court or restaurant reported as the least practiced measure (68.7%) (Table 3).

Table 3. Precautionary actions taken to prevent COVID-19

Precautionary actions	Correct answer percentage N (%)
Avoid contact with sick people	444 (89.7)
Avoiding close contact with another person when sick	457 (92.3)
Not going out when sick	399 (80.6)
Wearing a mask	372 (75.2)
Covering nose and mouth when sneezing or coughing	480 (97.0)
Washing hands with water and soap for at least 20 seconds	449 (90.7)
Using hand sanitizer when water is not available	419 (84.6)
Avoiding eating out in the food court or restaurant	340 (68.7)
Avoiding public gatherings or crowded place	359 (72.5)
Avoiding traveling to COVID-19 key-epidemic area	479 (96.8)
Avoiding traveling by plane or public transportation	362 (73.1)
Consuming health supplement to improve immunity	392 (79.2)
Total average of correct answers	**83.3%**

The linear regression analysis found that region was significantly associated with perceived severity, vulnerability, and threat. Meanwhile, people who work as a private sector employee (β =0.206, P=0.000), live in the western region (β =-0.170, P=0.000), and had higher knowledge score (β =0.89, P=0.047) had higher perceived severity. In terms of vulnerability, males (β =-0.107, P=0.022), and those who live in the western region (β =-0.091, P=0.049) had a higher perceived vulnerability. Also, those who work as a private sector employee (β=0.146, P=0.004), live in the western region (β =-0.184, P=0.000), had higher knowledge score (β =0.096, P=0.032) had higher perceived threat (Table 4).

Table 4. Linear regression analysis of COVID-19 perceived severity, vulnerability, and perceived threat

Variables	Perceived Severity		Perceived Vulnerability		Perceived Threat	
	β	P	β	P	β	P
Age	.752	.415	-.376	.547	.057	.963
Sex (male is the reference)	-.026	.568	-.107	.022	-.091	.043
Education						
High School	.128	.557	.092	.680	.121	.578
Bachelor	.219	.399	.141	.597	.203	.431
Postgraduate degree[1]	.064	.222	.047	.807	.065	.723
Occupation						
Private sector employee	.206	.000	.041	.433	.146	.004
Government worker	.656	.512	.003	.947	.036	.465
Entrepreneur	.054	.264	.039	.406	.069	.134
Others[2]	.076	.164	.001	.990	.041	.401
Region (western region is the reference)	-.170	.000	-.091	.049	-.184	.000
COVID-19 awareness (answer "no" is the reference)	.047	.286	.086	.060	.071	.108
COVID-19 knowledge	.089	.047	.022	.626	.096	.032

3)   Dummies for education. Reference category is junior high school.
4)   Dummies for occupation. Reference category is student.
Age and knowledge were quantitative variable.

Table 5. R^2 of the different steps in the linear regression model of the Risk Perception

	Perceived Severity		Perceived Vulnerability		Perceived Threat	
	R^2	P	R^2	P	R^2	P
R^2 step 1	.088	.000	.041	.089	.086	.000
R^2 step 2 (full model)	.099	.000	.049	.058	.101	.000
Adjusted R^2 full model	.071		.019		.073	

R^2 step 1 for the the socio-demographic variables.
R^2 step 2 for the socio-demographic variables, knowledge and awareness.

The dependent variable models explained less than 10% of the variance, except the model with the perceived threat as the dependent variable. The first model (M1) only included socio-demographic factors, meanwhile, the second (M2) included COVID-19 awareness, and related knowledge, as well as socio-demographic factors. Model for the total population explained 10.1% of the variance in terms of perceived threat when knowledge and awareness were included in M2. In terms of the vulnerability, M1 explained 4.1% of the total population, and M2 explained 4.9%. M1 in perceived severity explained 8.8%, and M2 explained 9.9% of the total variance (Table 5). Furthermore, the proportion of variance was higher when knowledge and awareness were included. No significance was found in the model with perceived vulnerability as the dependent variable.

In terms of response and self-efficacy, participants in the middle region were very confident that people can take practical actions to prevent themselves from acquiring COVID-19. They also reported higher self-efficacy than in the western region (Fig 1).
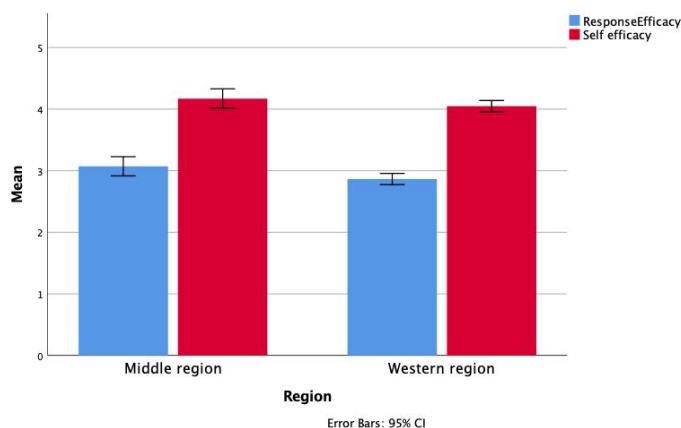
Figure 1. Response efficacy and self-efficacy based on region

4.1. Precautionary Actions

The total average of precautionary actions was 83.3%. The main measures were covering mouth when sneezing or coughing (97%), avoiding close contact with other people when sick (92.3%), and avoiding traveling to high impacted areas (96.8%). This finding is in line with a study in Hong Kong on the Avian Influenza outbreak, which reported that during the onset, 71%-81% of the participants avoided crowded places, going out, and traveling abroad. [14]

Two weeks after the first confirmed cases, "Indonesian president, Joko Widodo, pronounced some social distancing orders including closure of schools and workplaces." [15] Around two weeks after the first two cases confirmed, the government created a Task Force (Gugus Tugas) for accelerating the handling of COVID-19 through a Presidential Decree (Keppres) 7/2020. [16] Only on March 31st, 2020, the president pronounced the large-scale social distancing policy where the local government could limit the mobility of people and goods in and out of the area unless permission is acquired from the Health Ministry. Additionally, the policy mentioned that it includes closure of schools and workplaces, limitation of religious activities, and limitation of public activities. [17] However, these policies were not strictly imposed. Only 14 out of 34 provinces in Indonesia implemented this policy. At the end of the month, the president pronounced the Covid-19 outbreak as a national disaster.

At the early stage, public willingness to comply with the measures was important in controlling the outbreak. [18] The least practiced precautionary measures in this study are related to daily activities, such as gathering and eating in a restaurant. In a study of precautionary behavior during an infectious disease outbreak, the intention to practice safety measures was associated with the government's effectiveness. [19, 20] However, with no strict policy and hesitation in implementing lock-down in the early stage of the outbreak, the public activity outside is unavoidable.

4.2. Risk Perception: Protection Motivation Theory (PMT) Constructs

In this study, the perceived threat of COVID-19 is one of the highest along with road traffic accidents. Therefore, this suggested that the populations consider the disease as a potential health problem, and already perceived it as a threat. Severe Acute Respiratory Syndrome (SARS), Avian Influenza, and other previous emerging infectious diseases were considered similar to COVID-19 in terms of risk perception as a serious health threat to people. Our study finding is in line with a study in Egypt, which demonstrated that in the early stage of the outbreak, the public perceived COVID-19 as a life-threatening danger. [21] Furthermore, a previous study in Vietnam showed that 75% of the participants considered Avian Influenza as a serious threat at the beginning of the outbreak. [22] Among the participants in a study in the UK, SARS was considered a perceived threat in the initial phase before the containment. [23, 24]

Those previous studies have shown that in the early phase of the outbreak, the public was concerned about the disease and thought it could be a danger to their health. The dimension of psychological risk in the psychometric paradigm shows that dread (the feeling of dread and the perceived of a catastrophic potential of the hazard), as well as the risk of the unknown (where the hazard is judged to be unknown or new) shaped risk perception of people. [25] Other diseases mentioned in our study have been previously known-or even

contained. However, although COVID-19 is caused by the same group of viruses, which is a novel coronavirus, the disease is still considered new that future exploration and research is still needed. [26] Therefore, in our study, we reported that compared to other diseases, COVID-19 is considered a public health threat due to the evolving research that still needed to be conducted at the beginning of the outbreak.

In this study, the region was associated with a perceived threat. Meanwhile, in previous research of SARS in a wider area, a similar finding was reported that a region was associated with perceived vulnerability, severity, and threat. [24] At the beginning of the outbreak, the number of cases in the western region is higher than in the middle region. Our study found that the perceived threat of participants in the western region towards COVID-19 is higher than participants in the middle region. This finding is in contrast with an earlier study that showed risk perception is lower in the area where the outbreak is prevalent. [27] Since this study accounted only for two local regions, the finding needs to be interpreted with caution. Furthermore, other factors that are associated with the perceived threat are being a private sector employee and higher COVID-19 related knowledge. This finding is similar to a recent study that showed that personal knowledge of the disease is significantly associated with risk perception. [28]

Elaborating the PMT constructs, it was found that the participants perceived COVID-19 as a serious health problem along with cardiovascular disease and HIV. People who work as private-sector employees who live in the western region with higher knowledge had more perceived severity. However, even though it was considered a serious disease, they perceived themselves as less likely to acquire it, which was slightly lower compared to the perceived threat. A similar finding was observed in a study of previous outbreaks such as A/H7N9 and Avian Influenza, where the participants considered the disease as a serious risk, but perceived that their chance of getting infected is low. [22, 29] This might be influenced by the majority of participants who were not in the high-risk category, or having adequate protection to prevent the disease. Moreover, the majority of the participants in our study are young people, who are not a high-risk category for getting COVID-19.

Also, it was assumed that low perceived vulnerability in the early stage of the outbreak was because the participants had low intention to comply with the government, or the outbreak was anticipated. Meanwhile, a study during the early phase of an infectious disease pandemic in the Netherlands found that the strong intention to comply with government measures was associated with perceived vulnerability However, the lower vulnerability might be because people have anticipated the risk, and practiced the protective behavior before the outbreak occurred. [30]

After an individual evaluates risk as a part of threat appraisal, they will go through a process to cope with it. In this case, response and self-efficacy play a role. [31] The perceived threat was higher in the western region while coping appraisal was found in the middle. Those living in the middle region are confident that they could take preventive actions during the outbreak. Jakarta as the capital and other parts of the western region were surging in terms of the cases at the beginning of the outbreak. In the beginning case of COVID-19 on 2nd March 2020, western region contributed to a higher number of cases than the other regions in Indonesia. These studies found that self and response efficacy among people in the western region was lower than in the the middle region. The majority of participants in the the western region consisted of students and employees. These two groups of people were more affected in social activity directly by the pandemic. In case when the first cases of outbreaks surged, they might still need to go to the school and the office. There still no strict regulations yet for limiting their social activity in the beginning case. Furthermore, the Indonesian government just ruled out the instructions of physical distancing by the end of March. [16] A previous study also reported that in terms of pandemic policy response, Indonesia was one of the countries with the medium case yet having a proportional response towards the pandemic. [32] Therefore, this might lead to a reduced public trust that subsequently decreases the response and self-efficacy of the people in the western region, where the regulations took place earlier. In addition, every job cannot be executed from home or online, therefore people still go out to work, despite the social distancing measure.

China was able to implement strict policies at the beginning, however other countries such as the USA and UK waited for at least a month to apply the same measure. [33] This might be influenced by the nature of the disease, which is a major concern when the effects become visible. [34] In Indonesia, it took more than a month to implement large scales social status due to concern of interfering with the public daily and economic activities. The government must first disburse the stimulus to those affected by the large-scale social restrictions (PSBB) policy. [35-37]

Based on PMT, people will take higher precautionary actions when all of the PMT constructs such as perceived vulnerability, perceived severity, and a coping appraisal are high. In a previous study, perceived severity as one of the PMT constructs was relatively low. Therefore, the focus is needed to manage the pandemic towards the perceived severity. [38] Our study found the lower construct in perceived vulnerability.

Therefore, in terms of communicating preparedness strategies, improving the pandemic response, delivering effective communication, and encouraging more precautionary actions, thus the perceived vulnerability needs more attention. When the public realizes that COVID-19 is a risk that can affect anyone, despite the ages, they will take more precautionary action to avoid getting the disease.

5. CONCLUSION

The knowledge among the participants was satisfactory, and the perceived severity and threat of COVID-19 were high. However, they had low perceived vulnerability. Participants in the middle region showed higher self and response efficacy. Risk perception is known as a trigger for precautionary actions. By knowing and understanding how public perceived COVID-19 in the early stage of the outbreak, the result of our study can be a preliminary approach for the health sector, stakeholders, and the government to provide a better communication in order to encourage the people to take more precautionary actions during a disease outbreak. However, our study emphasized the risk perceptions. Future exploration is needed to see how the risk perception affects the precautionary actions, especially in the early stage of a pandemic setting.

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