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The Influence of Efficacy and Threat Messages on the Intention to Complete the Covid-19 Booster Vaccination: Experimental Study of University Students

Victoria Kesha Ayunarendra[1], Siko Wiyanto[1], Ivan Nurdin[1]

[1]*Universitas Indonesia, Jakarta, Indonesia*

**Corresponding Author: Victoria Kesha Ayunarendra*
E-mail: victoriakeshaayunarendra@gmail.com

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Abstract

The COVID-19 pandemic that has occurred since 2020 has not ended until now. The government has made various countermeasures, one of which is accelerating the third or booster vaccine program. However, research results show that the number of people who have received the booster vaccine is still very far from the government's target. One of the reasons why the number of booster vaccine recipients is far from the target is due to people's reluctance to receive booster vaccines. Therefore, effective communication is needed to overcome this problem. Based on previous research, the fear approach is considered an effective way to promote health messages. So, this research tries to use the Extended Parallel Processing Model (EPPM) theory to see the influence of efficacy and threat messages on intentions to take a booster vaccine. The results of this study were that there was no change in intention to carry out booster vaccination in respondents who were given a high threat or a low threat.

Introduction

In 2019, the world community was shocked by the spread of the corona virus (Covid-19). Until 2022, it seems that the virus that has claimed millions of human lives will still be present in our midst. However, after 10 months of Covid-19 infecting the world community, at the end of 2020 several countries had implemented vaccinations to obtain herd immunity *against* Covid-19. According to Armani, in a Kompas.com report, there were 29 countries that had started their first vaccination at the end of 2020, one of which was England on December 8 2020 (Armani, 2020). The Indonesian state did something similar, after Indonesia announced its first case in early March 2020, and millions of people were infected and even died, the Ministry of Health of the Republic of Indonesia (Kemenkes RI) immediately carried out its first Covid-19 vaccination on January 13 2021 which must followed 14 days later with the second dose. A total of 429.2 million doses were received by the Indonesian government, including CoronaVac, Covid Bio, Astra Zeneca, Sinopharm, Moderna, Pfizer, Janssen and Novavax and vaccination coverage has reached 79.4% for the first dose and 54.68% for the second dose. The Indonesian Ministry of Health claims that its plan has exceeded the WHO target of 40% of the population receiving complete vaccination by the end of 2021 (Setditjen Falmalkes, 2022)

After the first and second vaccinations were implemented, Covid-19 cases in Indonesia experienced a significant decline. Although in the statistical data on the number of Covid-19 cases released by Google, on January 28 2021 it reached the highest number, 13,695 new cases,

with a 7-day average of 12,335. With so much public interest in carrying out the first and second vaccinations, Indonesia experienced a quite surprising decline in numbers. On May 17 2021, the emergence of new cases was not as serious as the previous figures, namely only 4,295 new cases with a 7-day average of 3,639 cases. Covid-19 had slowed down, people carried out their activities as usual. However, it turns out that on July 18 2021 the number of Covid-19 in Indonesia experienced a quite high increase compared to the previous few months. On July 18 2021, 44,721 new cases were recorded, with a 7-day average of 50,039, followed on February 20 2022 with 48,484 new cases with a 7-day average of 55,675 cases. The increase in numbers in Indonesia was initially detected as an increase in testing and tracing carried out by the Indonesian government (Widyawati (Kepala Biro Komunikasi dan Pelayanan Masyarakat), 2022)However, this is apart from the result of massive testing and tracing carried out by the government. The highest spike occurred in July as reported by the Covid-19 Security Task Force according to *World Health Organization (WHO) data* on July 30 2021, receiving almost 4 million reports of global Covid-19 cases or an increase of 80% from the previous month. According to him, this is due to the existence of a new variant called Delta. Sari in his report on Kompas.com, according to the Indonesian Ministry of Health, the Delta variant is six times faster than *the variants of concern (VoC)* that have entered Indonesia, such as the Alpha variant and the Beta variant (Sari, 2021).

The dynamics of the increase in Covid-19 numbers until 2021 has not deterred WHO and the Indonesian government from continuing to increase people's immunity. By carrying out the first and second vaccinations, the policy announced by the Indonesian government was to carry out the third dose of vaccine as a booster or additional vaccine. In January 2021, the government held a limited meeting to tackle Covid-19 by implementing a booster vaccine aimed at the general public aged 18 years and over, which was realized on January 12 2022 (Kominfo, 2022). This booster vaccination aims to protect and prevent people from serious symptoms caused by Covid-19. However, it was reported that by August 2022, only 25.78% of Indonesian people had received the third or booster vaccine. This percentage is very small compared to the Indonesian government's target. Although in July 2022, the Government, through the Coordinating Minister for Maritime Affairs and Investment (Menko Marves) Luhut Binsar Pandjaitan, will implement a booster vaccine as a requirement for travel mobility (Karunia, 2022).

According to the Ministry of Health in a report by CNN Indonesia, one of the reasons for the small number of Indonesians taking booster vaccinations is people's reluctance to take booster vaccines (CNNIndonesia, 2022)To overcome this reluctance, policies planned by the government were previously implemented. Through a policy prohibiting the use of public transportation facilities, one of which is *the commuter line* for people who have not had a booster vaccination, this policy will begin to be implemented on August 15 2022. The government's program to increase the number of booster vaccine recipients will be realized more quickly with community compliance with the program the vaccination.

Efforts by the world and the Indonesian government to restore the pandemic situation continue to be intensified. The thing that is in the spotlight is how the public responds to communication messages made by the government, whether through appeals through the media, online media, or advertising posters about vaccination. As in Figure 1, which was quoted from the Indonesian Ministry of Health's Twitter social media, which distributed an appeal for vaccination on February 12 2022. The appeal was made by the government as a form of effective health communication policy, in terms of recovering from the pandemic situation. and includes strategies that can be proven to create large-scale *protective behavior* against disasters that have occurred (Tsoy et al., 2022). The Indonesian Ministry of Health in its message conveys fear, which according to Harper, functional fear *is* defined as a negative emotion which helps

protective functions in certain contexts, has supported public health compliance during the Covid-19 pandemic (Harper et al., 2021).

The fact is that communication using a fear approach is considered an effective way to promote health messages and has been widely researched to promote awareness of various health topics, including AIDS, alcohol use and smoking (Yang et al., 2021). One theory that uses a fear approach is the *Extended Parallel Process Model theory (EPPM)* which was first coined by Kim Witte. EPPM is one of the newest and most popular theories regarding the fear approach (Witte, 1992). In this theory, according to Witte, there are four main factors that influence the prediction of a particular communication output: *perceived susceptibility* and *severity* which create *perceived threat*; *self-efficacy* and *response efficacy* create *perceived efficacy* (recommendation).

This theory illustrates how individuals react to messages that contain threats. EPPM predicts the message process which will determine whether persuasion will be processed into a danger control response *or* fear control *response* . The EPPM model is an integration model between *the Parallel Process Model* (PPM) and *Protection Motivation Theory* (PMT). Danger control is an external stimulus, while fear is an internal condition within the individual. From PPM, ideas about two message processing processes are taken, namely danger control and fear control (Witte, 1992). In EPPM theory, there are four message components, namely the scale of danger (*severity*), the possibility of someone being exposed to danger (*susceptibility*), response efficacy (*response efficacy*) and self-efficacy (*self-efficacy*) (Witte, 1992).

Witte explained in detail about External Stimulus (Persuasion Messages), which is related to persuasion, how threats form in persuasion messages. *Severity* , is how big the threat is described in the persuasion message (significance). For example, a persuasive message with a low - high threat. *Susceptibility* is the extent to which the depiction of danger or threat applies to everyone. For example, Covid-19 can attack anyone who has not had the Covid-19 *booster vaccine* . Witte also explained *Response efficacy* , which is the process of describing whether the recommended alternative action can overcome the danger or threat. For example, a message recommendation in the form of a *booster vaccine action* which, if followed, can completely prevent individuals from the danger of contracting Covid-19. It is also possible that the alternative actions offered cannot fully overcome the existing threat. *Self-efficacy* , namely a description of an individual's abilities, whether the individual is depicted as being able to carry out the recommendations offered (booster vaccine) or vice versa (no booster vaccine). This is seen in the individual's message processing, namely the individual's emotional response when receiving a persuasion message containing a fearful approach. *Severity* , how individuals perceive the level of danger. For example, after receiving an external stimulus, individuals may perceive whether the *booster vaccine* has a very high danger (for example, causing symptoms of lung disease) or whether the scale of danger is small (causing coughs and colds).

In the *susceptibility aspect* , individuals can perceive that danger or threat can affect everyone or only certain people. For example, the perception that not taking a *booster vaccine* will have an impact on oneself, or other people, or other people who have congenital diseases. Meanwhile, *Response efficacy* , namely this component, is related to the individual's perception of recommended actions to overcome threats or dangers. Whether the individual perceives the action as being able to overcome the threat completely or not. *Self efficacy* , this aspect is related to the perception of one's ability to follow recommendations to avoid threats or danger. A person can perceive himself as being able to avoid threats, or vice versa. Prediction of Information Processing Results.

Hazard control process, in this process, individuals will attempt to reduce or eliminate dangers by following the recommendations offered. Individuals have the motivation to carry out protection to avoid danger or threats. Fear control process - defensive, in this process, the

individual does not try to overcome the danger but overcomes fear. Individuals are afraid of the dangers of smoking in the form of lung disease, but this fear is reduced or eliminated by being defensive.

In the process of predicting the results of information processing. The advantage of the EPPM theory compared to other fear *appeals* persuasion theories is that it places changes in attitudes or behavior as a result of message processing. EPPM theory predicts that message processing will determine whether persuasion will be processed into a danger control *or* fear control *response* . The threat level is how individuals perceive threats in persuasion messages, whether high, medium or low. For example, persuasive messages about not vaccinating can be perceived by individuals as having a very high threat (for example, not having a vaccine can cause death) to a low threat (not having a *booster vaccine)* that could cause health problems.

The level of efficacy is how an individual perceives his or her ability to avoid danger. Individuals perceive that danger will happen to everyone or only certain people. Everyone or only certain people. For the level of threat, individuals can perceive efficacy from high, medium to low levels. Efficacy is a synonym for effectiveness. Efficacy is always related to the recommended behavior/action, or part of the response suggested in a message (Witte, 1992).

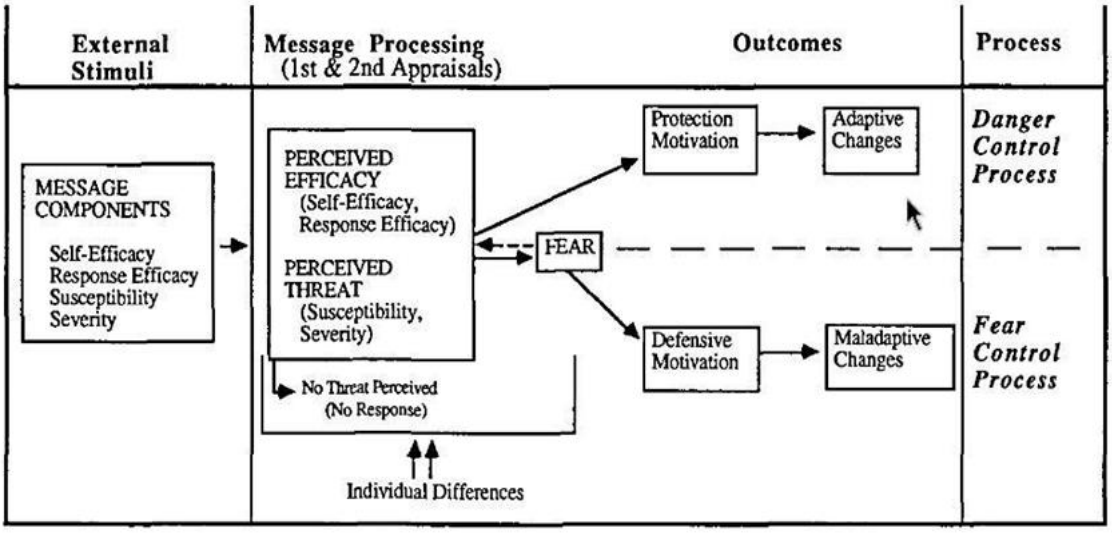

Figure 1EPPM Theory (Witte, 1992)

This research focuses on how people's intentions are regarding booster vaccine intentions. This can be seen from the efficacy messages, threat messages, and how people's intentions see advertising posters calling for booster vaccination. *First,* the Efficacy Message, which consists of *self-efficacy* and *response efficacy,* is created and shown to the public (Popova, 2012)*Response-efficacy* refers to the extent to which individuals believe that the recommended action steps are effective for avoiding threats. Meanwhile, *self-efficacy* refers to the extent to which individuals believe that they are able to overcome these threats (Zhang et al., 2022) *Second,* Threat Messages, which are defined as risks or dangers that exist around society. Here, threat focuses on the subjective perception of a risk (Chen & Yang, 2019). Threat as a message component consists of a message function that provides factual or visual information about the severity of the threat and the vulnerability of the target population to the threat (Popova, 2012). *Third,* Intention, according to Asarnow (2020) intention is a mental condition. More specifically intentions are plans that assign actions or outcomes to which agents commit themselves. These plans represent, cause and explain an action or course of action (Fridland, 2021).

Previous studies focused on discussing the influence of efficacy messages on Covid-19 booster vaccination intentions **.** Research conducted by Lambert explains that efficacy messages have a level of influence on people's intentions to take the Covid19 Booster vaccine. Initial findings from this pilot study suggest that efficacy messages are capable of carrying out an effective message promotion process. The study to see the level of efficacy was seen from the results of a study using the *Ecological Momentay Assessment* (EMA) theory to see the level of efficacy messages on an individual's desire to stop smoking (Lambert et al., 2018). Ward in his research looked at the influence of threat messages on Covid-19 booster vaccination intentions. Apart from that, the findings of threat messages regarding individual intentions to take the Covid19 Booster vaccine also have strong results, that threat messages can be more effective. To increase safe behavior may be ineffective or even increase undesirable behavior. Designing persuasive messages is a complex process (Ward et al., 2021). In this research, we try to see how the interaction of efficacy and threat messages affects Covid-19 booster vaccination intentions. The influence of efficacy and threat on Covid19 booster vaccination intentions is seen from the findings used to assess the effect of threat and efficacy on Individuals' intentions to carry out testing on compliance which is influenced by the presentation of information by first responders about the severity and possibility of contamination (threat) and the health protection efficacy of the procedure (Symons et al., 2021).

Methods

This research paradigm uses a positivistic paradigm. Positivism is in line with the deductive hypothesis model of science which builds on the verification of previous hypotheses and experiments by operationalizing variables and measurements, the results of hypothesis testing are used to inform and advance science (Park et al., 2020). If the test results are the same as the hypothesis, This means it can strengthen previous research. However, if the test results are different from the previous hypothesis, it will enrich knowledge in the field of the object being studied.

This study uses a quantitative approach. Quantitative research is in line with the positivism paradigm. Quantitative research aims to produce findings using statistical techniques by focusing on phenomena found in human life in the form of variables through objective theory (Jaya, 2020)

The method used is experimental, because it is built on the principles of the positivist paradigm. Apart from that, this method carries out the process of modifying certain situations and comparing them with those before modification (Neuman, 2011). In practice, this research was carried out using a stimulus in the form of a digital poster with a combination of high-low levels of efficacy and threat messages. This experiment aims to predict volunteers' intentions towards the combination of efficacy and threat messages. This research is using experimental method.

In experimental research there are several important aspects that determine the type of experimental research design. First, there is treatment . To measure the influence of the independent variable on the dependent variable, the researcher created a second *treatment* , using randomization in selecting the sample group *(random assignment).* Whether the experiment was carried out using random assignment, that is, placing research subjects into the experimental group in a random manner *or* not. Third, the use of a control group. Did the experiment divide between groups that were given treatment and those that were not given treatment *(control).* Fourth, the number of independent variables tested. Does the experiment only test one independent variable (which means there is only one treatment) or more than one independent variable?

This experimental design uses a Static Group design. Static Group is done by dividing two groups. Researchers strive to minimize uncontrolled external factors so that the experimental

results are objective enough. Among the efforts made include distributing volunteers from various campuses by not gathering students from the same campus on one campus. This is an effort to prevent each other from getting to know each other.

Table 1. Volunteer Distribution

Experimental Group Campus		Control Group Campus Origin	
PKN STAN	8	PGRI Yogyakarta	5
Muhammadiyah University of Klaten	1	President University	2
Unisba	3	PKN STAN	4
UGM	1	Unisba	2
President University	1	Univ. Muhammadiyah Magelang	1
PGRI Yogyakarta	1	IKJ	1

Groups of subjects who were given treatment, and who were not given treatment. These two groups were tested to test the independent variable / VB (X), by carrying out two comparisons. The test is in the form of a pretest (O1), namely before, and a posttest (O2) after treatment is given. The first comparison was in group 1 before and after being given treatment. The second comparison is the posttest results between the treatment group and the control group. VB is said to have an influence not only in terms of the difference between O2 and O1 in the treatment group but also the difference between O2 in the treatment and control groups. Through this design we can ensure that the observed effects are truly due to VB and not due to other unobserved variables.

Result and Discussion

Experimental research conducted on 30 students spread across several cities in Indonesia (Jakarta, Bandung, Yogyakarta) was carried out by dividing them into two different groups. 15 students were gathered as the first group who were given messages of high efficacy and threat, and 15 other students were gathered in the second group who were given messages of low efficacy and threat. As can be seen in Figure 3 in the poster made by the researcher. Poster Figure 3 (a) contains a high threat message with a written narrative. *At least 5 people die and 100 people experience shortness of breath every day due to Covid-19.* Meanwhile, Figure 3 (b) contains a low threat message with a written narrative. *The rate of transmission of Covid-19 is still high, currently thousands of people are experiencing coughs and colds due to Covid 19.*

The static group design carries out experiments by providing questions presented in *the pretest* and *posttest* , interspersed with providing stimulus in the form of posters that have been made. So there is a different average value for each question answer given to students. The results are as described in Table 1. In Table 1, a score of 1 is strongly disagree and a score of 4 is strongly agree.

Table 1. Descriptive Research Results. Average Score *(Mean)*

Statement	Average
Pretest	
I will not get the Covid-19 booster vaccine	3.3
I will have a Covid-19 booster vaccine sometime	2.17
I will get a Covid-19 booster vaccine if the conditions are easy	2.6
I will get a Covid-19 booster vaccine if allowed	2.6
I will get the Covid-19 booster vaccine whatever happens	2.8
Posttest	
I will not get the Covid-19 booster vaccine	3.6
I will have a Covid-19 booster vaccine sometime	2.1

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I will get a Covid-19 booster vaccine if the conditions are easy	2.6
I will get a Covid-19 booster vaccine if allowed	2.8
I will get the Covid-19 booster vaccine whatever happens	2.9

After students are given a trial through a series of experiments. Then the author carried out an analysis of the data that had been obtained. The research data consisted of an initial test *(pre-test)* then stimulants were carried out on high and low threat posters after which a final test *(post-test) was carried out* . The research was carried out on November 27 2022 via the Zoom application by emphasizing external variables for using the same device, namely a cellphone. This research raises the research variable, namely the independent variable of the influence of threat messages and the dependent variable, namely the intention to get a Covid-19 booster vaccine. Data obtained using a Google form is distributed by selecting one answer. In this study, researchers obtained data from the results of *the pre-test* and *post-test* conducted in the experimental class and control class. *The pre-test* is an ability test given to students before being given treatment, while *the post-test* is carried out after students receive treatment. These two tests function to measure the effectiveness of the message's influence. This is described in Table 2 *of descriptive statistics* which researchers processed the data using the SPSS version 26 application.

Table 2. Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Pre-Test Experiment	15	10.00	19.00	14.0667	2.46306
Post-Test Experiment	15	11.00	18.00	14.3333	1.98806
Control Pre-Test	15	7.00	19.00	13.8667	2.58752
Control Post-Test	15	8.00	17.00	13.8667	2.09989
Valid N (listwise)	15				

In experimental research, the results of descriptive statistical analysis calculations are useful for presenting and describing research data, including the amount of data, maximum value, minimum value, average value, and so on. The analysis was divided into two groups, namely the experimental group and the control group. The results of the *pre-test* experimental group . The results of calculations using SPSS on data before treatment (*pre-test)* in the experimental group obtained a valid sample size of 15, average value = 14.0667, minimum value = 10 and maximum value = 19. As for the results of the *post-test experimental group.* The results of calculations using SPSS on the data after treatment (*post-test)* in the experimental group showed that the number of valid samples was 15, the average value = 14.3333, the minimum value = 11 and the maximum value = 18. Furthermore, in the control group the results were found that the *pre-test* control . The results of calculations using SPSS on data before treatment (*pre-test)* in the control group obtained a valid sample size of 15, average value = 13.8667, minimum value = 7 and maximum value = 19. Meanwhile for the *post-test control group.* The results of calculations using SPSS on data after treatment (*pre-test)* in the control group obtained a valid sample size of 15, average value = 13.8667, minimum value = 8 and maximum value = 17.

Before getting the results or hypotheses in this research. This research must be tested for normality. This is to see whether the research data that the author conducted is normally distributed or not. The normality test uses the *Kolmogorov-Smirnov formula* in calculations using the SPSS 26 program. To find out whether it is normal or not, if sig > 0.05 then it is normal and if sig < 0.05 it can be said to be abnormal. Based on the table above, it can be seen that the *pre-test* and *post-test data* on learning outcomes in the experimental group had a sig value > 0.05, while in the post test the control group had a value < 0.05. So it can be concluded that the data group is not normally distributed. This is as explained in table 3 of the normality test. So it can be found in the experimental pre-test group data with a sig value of 0.748,

meaning normally distributed, for the experimental post-test group, a sig value of 0.806, meaning normal distribution, for the control group pre-test, a sig value of 0.073, meaning normal distribution, while in the data for the control post-test group, the sig value 0.041 means it is not normally distributed.

Table 3. Normality Test

No.	Group	sig	Conclusion
1.	Pre-test Experimental group	0.748	Normal
2.	Post-test Experimental group	0.806	Normal
3.	Pre-test Control group	0.073	Normal
4.	Post-test Control group	0.041	Abnormal

Because after carrying out the normality test the data is not normally distributed, the next step is to carry out the Wilcoxon test. The Wilcoxon test aims to determine whether there is a difference in the averages of two paired samples. The research data used in the Wilcoxon test should ideally be ordinal or interval scale data. The Wilcoxon test is part of non-parametric statistics, so the Wilcoxon test does not require normally distributed research data. The Wilcoxon test is used as an alternative to the paired sample t test, if research data is found that is not normally distributed.

Table 4. Wilcoxon test

		N	Mean Rank	Sum of Ranks
Post Test Experiment - Pre Test Experiment	Negative Ranks	6 [a]	5.17	31.00
	Positive Ranks	5 [b]	7.00	35.00
	Ties	4 [c]		
	Total	15		
Post Control Test - Pre Control Test	Negative Ranks	2 [d]	5.00	10.00
	Positive Ranks	4 [e]	2.75	11.00
	Ties	g [f]		
	Total	15		

The Wilcoxon test was used to test the hypothesis in this research. As with the hypothesis in this study, namely to test whether there is an influence of efficacy and threat messages on the intention to complete the Covid-19 booster vaccination among students. As is the basis for decision making in the Wilcoxon test, namely (a) If the Asymp.Sig value is <0.05, then the Hypothesis is accepted, (b) If the Asymp.SIg value is >0.05 then the Hypothesis is rejected. Based on *the Test Statistics* output , it is known that Asymp.Sig (2-tailed) has a value of 0.915. Because the value of 0.915 is > 0.05, it can be concluded that the hypothesis is rejected. This means that there is no influence of threatening messages on intentions to complete the Covid-19 booster vaccination among students.

Conclusion

The results of this study state that there is no change in intention to carry out a COVID-19 *booster vaccine* based on different threat levels. The absence of a difference in intention between receiving a high threat and receiving a low threat could be influenced by the fact that most of the respondents who took part in the experiment in this study had already received a booster vaccine. Only a few of the respondents had not received the booster vaccine. Apparently, in carrying out this experimental research test, this can influence the intention to take a booster vaccine. Efficacy and threat messages apparently had little influence on respondents who had completed the vaccine because they felt protected. Apart from that, things that could influence the vaccine intentions of the students being studied are the distance between the research and the booster vaccine appeal from the government which was made on January 12 2022 and the threat of limiting people's mobility in carrying out activities in July

and August 2022, which has been too long. Another factor that could cause no change in intentions for booster vaccination is that when this research was conducted, the latest Covid-19 variants that were emerging were XBB and BN.1, where both variants had a very much lower severity level than the Delta variant which had high level of spread last year.

There is a possibility that people who see a threatening message will reject the threat, especially from the people closest to the threat (Ruiter, Kessels, Peters, & Kok, 2014). For example, because Indonesia has experienced the Covid-19 pandemic for 2 years, people are starting to feel that death and other symptoms are normal, so they reject the threat because they feel that Covid-19 will only cause coughing symptoms like the usual flu. just. This is also supported by the fact that people are reluctant to take booster vaccines because people think that the symptoms of Covid-19 are now much milder than at the beginning of the pandemic, so people feel reluctant to take booster vaccines. Threat messages used in experimental media may also be a factor in not changing intentions. Previous research suggests that threat messages to increase safe behavior may be ineffective or even increase undesirable behavior. Designing persuasive messages is a complex process (Ward et al., 2021).

One of the limitations of this study is that there was no screening for the volunteers whether they had received the booster vaccine or not. Apart from that, research needs to be carried out using other methods such as surveys to explore what factors the public considers for booster vaccines. Moreover, other research such as the use of video media as an experimental stimulant also needs to be carried out to complete the conclusions of this research.

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