Misperception of Vaccine Acceptance to the COVID-19 Vaccine in Indonesia: A Systematic Review

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Abstract

Vaccination is one of main steps to overcome the continuous increase in the Coronavirus Disease 2019 (COVID-19) pandemic. However, its implementation is hindered by various responses such as acceptance and refusal. This study aimed to describe the perception of the COVID-19 vaccine in Indonesia. A systematic review design was used, and the literature searches were carried out using Google Scholar, PubMed, Science Direct, and WHO COVID-19 databases following the PRISMA guideline process. The keywords used were coronavirus, COVID-19, vaccination, COVID-19 vaccination, vaccine response, vaccine acceptance, vaccine perception, and Indonesia in English or Indonesian articles published in 2020-2021. This study discovered 13 sample articles including six qualitative and seven cross-sectional studies. The responses showed varying results divided into positive, indicating vaccine acceptance, and negative responses that made hesitations to refusal. People with a good response and perception considered the vaccine an antibody to fight the virus. Meanwhile, others who hesitated or rejected were due to their concerns about side effects, safety, and effectiveness. Furthermore, inaccurate information or hoaxes circulating in the community significantly influence people's perceptions.

Keywords: COVID-19 vaccines, Indonesia, perception

Introduction

The first Coronavirus Disease 2019 (COVID-19) case was reported in Wuhan City, Hubei Province, China, in December 2019. From investigations and case identification, some of the initial cases were linked to the food market in Wuhan City indicating that the market played a role to the initial development of the pandemic.[1] Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) was identified in early January 2020. Its complete genetic sequence from ancient human cases and other viruses from China and worldwide suggests that it has an ecological origin in the bat population. All available evidence also indicated that the virus is of natural animal origin and not a manipulated or manufactured virus.[1]

On March 9, 2020, the COVID-19, which was spreading worldwide, was declared a pandemic by World Health Organization (WHO). Currently, 219 million cases have been recorded globally, with approximately 4.55 million death as of October 6, 2021.[2] While, Indonesia has reached 4.22 million positive cases, 142,000 deaths, and the average daily addition of 1,000–2,000 cases.[2]

The initial steps taken to reduce the transmissibility of the disease are preventive measures or Non-Pharmaceutical Interventions (NPI) as implemented in Indonesia by the 5M appeal: wearing masks, washing hands, keeping a safe distance, staying away from crowds, and reducing mobility for the community, and 3T for the government which includes testing, tracing, and treatment. To date, those steps are proven to slow down the infection, but the most promising strategy for limiting the pandemic, reducing mortality and morbidity is still in the capacity of medical technology, including effective, safe, and affordable antiviral agents and vaccines.[3]

Many scientists and pharmaceutical companies develop vaccines from various sources, such as attenuated or inactivated viruses, deoxyribonucleic acid (DNA) or ribonucleic acid (RNA), replicating and non-replicating viral vectors, and sub-protein units combined with virus-like particles. Each vaccine candidate can use one of these mechanisms with details on the outcome.[4] In Indonesia, several COVID-19 vaccine products have been made and used to control the spread of the virus.[5] The vaccination program began on January 13, 2021, after issuing an emergency use authorization by the National Agency of Drug and Food Control (NADFC)/ *Badan Pengawas Obat dan Makanan* (BPOM).[5]

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Based on the Decree of the Minister of Health of the Republic of Indonesia No. H.K.01.07/Menkes/9860/2020 of 2020 on Stipulation of Vaccine Types for the Implementation of Coronavirus Disease 2019 (COVID-19) Vaccination, six vaccine product by PT Bio Farma (Persero), AstraZeneca, China National Pharmaceutical Group Corporation (Sinopharm), Moderna, Pfizer Inc. and BioNTech, and Sinovac Biotech Ltd are permitted to use in Indonesia.[5] The Indonesian Government continues to strive by setting policies, educating, socializing campaigns on the vaccine on social media platforms, and collaborating with various influencer parties for public acceptance. Responses and positive behavior to the COVID-19 vaccination process are very important to achieve a herd immunity and control the pandemic effectively.

Vaccination was carried out in two periods. The first period run from January to April 2021, prioritizing 1.3 million health workers and 17.4 million public officers in 34 provinces. While, the second period expectedly started to start from April 2021 to March 2022 to reach 181.5 million people and achieve the herd immunity.[6] From a survey by the Indonesian Ministry of Health, Technical Advisory Group on Immunization (ITAGI), the United Nations Children's Fund (UNICEF), and the WHO on the receipt of the COVID-19 vaccine in Indonesia, around 65% of respondents were willing to receive vaccines as provided by the government, 8% refused, and 27% expressed hesitations about the government's plan in distribution.[7] The most common reasons for vaccine refusal are safety, effectiveness uncertainty, lack of trust, fear of side effects such as fever and pain, and religious beliefs.[7] Study by Cascini, *et al.*,[8] discovered that vaccination hesitations in some countries vary among different populations. While, various factors contributing to the high level of hesitation include concerns about vaccine efficacy, safety, side effects, convenience, price, and the belief that vaccines are unnecessary and insufficient testing.

Previous studies analyzed the Indonesians' interest, response, perception, and willingness to vaccinate. However, they have not been systematically examined to summarize this topic comprehensively. Policymakers need to consider the fact about the COVID-19 vaccine response in order to expand the COVID-19 vaccine coverage in Indonesia. Thus, this study aimed to describe the perception of the COVID-19 vaccine in Indonesia.

Method

The study used a systematic review following the guidelines of preferred reporting items for systematic review and meta-analysis (PRISMA). A systematic review is a design method to identify, evaluate, and interpret all relevant results related to certain questions, topics, or phenomena of concern.[9]

The search was conducted through Google Scholar, PubMed, Science Direct, and WHO COVID-19 databases. This review used keywords and keyword combinations. The keywords used with Boolean operators (AND, OR) were "coronavirus" OR "COVID-19" AND "vaccination" OR "covid vaccination" OR "vaccine response" OR "vaccine acceptance" OR "vaccine perception" AND "Indonesia". On google scholar, the keywords used were "coronavirus" OR "COVID-19" AND "vaccination" OR "covid vaccine" OR "vaccine response" OR "vaccine acceptance" OR "vaccine perception" AND "Indonesia."

The inclusion criteria were original studies in English and Indonesian language, published in open access journals from 2020 to 2021 in Indonesia to determine the response, acceptance, and public perception of the COVID-19 vaccine, and having qualitative and quantitative methods from analytical or descriptive studies such as case-control, cross-sectional, prospective, and retrospective cohort studies. While, the exclusion criteria were paid articles from non-open access journals and not conducted in Indonesian. After obtaining the results, the total articles obtained were entered into the Mendeley application for duplicate checking, and the articles were selected based on the title and abstract. Subsequently, a full-text assessment is carried out for study feasibility, where successful articles were subjected to a quality assessment until the final was achieved.

Information on the initial screening was done. In case there were differences in the number of articles obtained, the third party's assistance was provided. Any differences in opinion were resolved through discussion, and the final decision was made. The search strategy was based on participants, intervention, comparison, and outcome (PICO) approach.

The quality assessment was carried out using the Joanna Briggs Institute (JBI)'s Critical Appraisal Checklist adapted to this study design. This study had two types of designs: qualitative and cross-sectional. Therefore, the JBI assessment sheet was used. Studies that scored above 50% were included in the sample, while those below were excluded to avoid bias.

The qualitative and quantitative studies were extracted into an Excel table with details, including author and year of publication, title, study site, population size, design, positive response/acceptance, and negative response/refusal of the COVID-19 vaccination. To minimize the biases, the inclusion criteria was clearly described to avoid inconsistent application in study selection.

Data synthesis involves quantitative data presented as textual descriptions and collected with qualitative data. They were collected to determine people's response to the COVID-19 vaccine.

Results

A total of 2,046 studies were obtained; 979 from Google Scholar, 1,000 from Science Direct, 32 from PubMed, and 35 from the WHO COVID-19 database. After checking, 17 were obtained as duplicates. Then, 2,029 studies were screened based on titles and abstracts until 20 studies were left for full-text and feasibility assessment, where two were paid articles, four were not full text, and one was not located in Indonesia. Subsequently, the remaining 13 articles were assessed qualitatively using the JBI's Critical Appraisal Checklist. Of these articles, only 13 obtained an assessment score above 50%. Therefore, they were used as samples (Figure 1).

The characteristics of this study were six articles with qualitative design and seven with cross-sectional design (Table 1). While, the populations in four articles were less than 50; more than 100 in seven articles; and two articles had the general population in one specific area. The average age was in the range of 18-59 years. However, one article focused on the elderly aged 60-74 years, with a majority of females.

The quality assessment using the critical appraisal checklist assessment sheet from the JBI scored above 50%. For the qualitative studies, four scored 80%, one scored 70%, and another was 60%. While, for the cross-sectional study, five scored 100%, one scored 87.5%, and another one was 75%.

After summarizing several studies taken as samples, the positive responses from the people taking the COVID-19 vaccine were as an antibody or immune booster to reduce the virus transmission, morbidity, mortality, and can form a herd immunity (n = 5), the desire to seek valid and reliable information about the vaccine (n = 5), and the belief in the benefits, safety, the effectiveness of vaccines and reduce in worry (n = 4). The government's role also affected the interest of the people in vaccines because they were motivated after seeing the president as the first person to be vaccinated. Moreover, accurate information from the government increased people's willingness to vaccinate and most of them also willing to be vaccinated when it is provided freely (n = 3). People feeling more susceptible to COVID-19 were more likely to receive the vaccine because they perceived the virus as a threat to their health (n = 2).

The negative response results (Table 2) were that people with low interest in vaccination doubted and rejected the COVID-19 vaccine because they worried about the side effects, safety, and effectiveness (n = 7). It is questioning whether the COVID-19 vaccine was halal (n = 3), assuming that the COVID-19 vaccine was a conspiracy, the government's propaganda, and business field (n = 4). To believe that COVID-19 was only a common cold (n = 2) and the vaccines would not suppress the virus spread (n = 2). Furthermore, inaccurate information or hoaxes about the COVID-19 vaccine also affect people's perceptions and willingness to receive vaccines (n = 3).
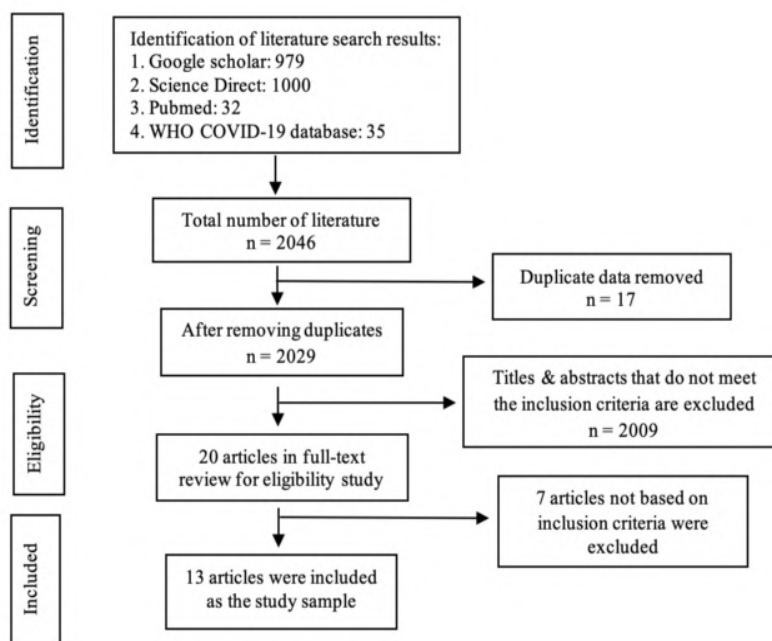

Figure 1. PRISMA Sample Flow Chart

Table 1. Description of Selected Papers with Positive Response

Author	Year	Population	Design	Positive Response
Calista and Shihab,[10]	2021	7 Informants	Qualitative	1. The COVID-19 vaccine as an antibody. 2. Looking for information on the COVID-19 vaccine and educating others. 3. Motivated because the president is the first person to be vaccinated and believes that vaccines are the best solution for preventing the virus in Indonesia.
Indriyanti,[11]	2021	38 Sample informants	Qualitative	1. Vaccines can reduce viral transmission, morbidity, and mortality, and also promote herd immunity. 2. Status as a health worker makes it easier to get vaccines. 3. Good for vaccination after getting information/training.
Izmi, *et al.*,[12]	2021	General	Qualitative	Vaccines can become antibodies or immune boosters to block the COVID-19 from family.
Martini, Kusumawaty and Yunike,[13]	2021	10 Informants	Qualitative	1. Vaccines can protect against the COVID-19. 2. Family and friends support vaccines.
Ganafi and Afrizal,[14]	2021	General	Qualitative	1. High awareness of seeking real information about the vaccine. 2. Vaccination as a form of protection from the pandemic.
Muhammad, *et al.*,[15]	2021	7 Informants	Qualitative	1. Vaccines can form herd immunity. 2. Seek valid information on vaccines and support the government's efforts. 3. 86% of respondents gave a positive response to the distribution of the vaccine.
Arumsari, Desty and Kusumo,[16]	2021	200 Samples	Cross-sectional	1. 52.7% of respondents disagree that the too-short vaccine's clinical trial makes them underestimate the effectiveness. 2. 55.4% do not agree that the COVID-19 vaccine causes side effects such as fever and pain sensation after being injected.
Puspasari and Achadi,[17]	2021	382 Samples	Cross-sectional	1. 93% of Indonesians stated that they were willing to get vaccinated. 2. The vaccine reduces the chance and worry of infection/complications.
Linda Prasetyaning Widayanti,[18]	2021	188 Samples	Cross-sectional	1. 87.2% of respondents have a good perception of vaccine effectiveness. 2. 77.7% agree to take part in the vaccination.
Erawan, *et al.*,[20]	2021	452 Samples	Cross-sectional	1. The perception that COVID-19 is a severe threat to health by assuming that they are very vulnerable and are willing to receive vaccinations. 2. The perceived benefits of the COVID-19 vaccination are also a predictor that makes them interested in vaccination.
Ichsan, *et al.*,[21]	2021	266 Samples	Cross-sectional	79.3% of respondents believe in the safety and effectiveness of the vaccine.
Harapan, *et al.*,[22]	2020	1,068 Samples	Cross-sectional	93.3% of participants want to be vaccinated when it is provided free of charge by the government.

The rest refused to pay for the COVID-19 vaccine (n = 1).

Discussion

Positive Response to Vaccines

Several studies stated that the COVID-19 vaccine was an antibody or immune booster that reduces virus transmission, morbidity, and mortality and also forms herd immunity.[11,12,15,21] These positive factors are needed to achieve the vaccination target in Indonesia because people are aware of its importance in overcoming the pandemic. A study conducted in Jordan by El-Elimat,[3] also discovered that 66.5% of participants stated that vaccine is important to fight the COVID-19. Similarly, a study by Saied, *et al.*,[23] which assessed the perception of Egyptian medical students, stated that approximately 90.5% believed vaccination is important to overcome the pandemic. Meanwhile, antibodies are the soldiers in the body's

defense system trained to recognize one particular antigen. When an antigen enters the body for the first time, it takes time for the immune system to respond and produce specific antibodies against the antigen. The vaccine consists of small and harmless fragments of an attenuated organism, including its antigenic portion, which enables the body to recognize an antigen and form antibodies. Therefore, when the actual organism's antigen enters the body, the body can easily defeat it.[24] It also helps in achieving herd immunity which varies across the country, since not all individuals, such as infants, people with health problems, or those who are unwilling, can be vaccinated. In a study by Cihan,[25] the number of people fully vaccinated against COVID-19 was estimated to analyze the adequacy of herd immunity in the US, Asia, South America, Africa, Europe, and globally. The results showed that the United States reached its highest level of complete vaccination rate on June 1, 2021, while other

Table 2. Description of Selected Papers with Negative Response

Author	Year	Population	Design	Negative Response
Calista and Shihab,[10]	2021	7 Informants	Qualitative	1. Refused to pay for vaccines. 2. Refused because of health/disease.
Indriyanti,[11]	2021	38 Sample informants	Qualitative	1. Worried about adverse event following immunization (AEFI). 2. Hesitation about the benefits of vaccines after reading the news that vaccines are not a guarantee of being COVID-free. 3. Hesitation about the safety of vaccines after traveling long distances.
Izmi, *et al.*,[12]	2021	General	Qualitative	Vaccines are dangerous for the body because they can be deadly; hesitation about the vaccine trials and assume that it is the government's duty.
Martini, Kusumawaty and Yunike,[13]	2021	10 Informants	Qualitative	1. Do not believe in the COVID-19 and assume it is a fabrication of political interests and a common cold. 2. Vaccines are useless. 3. Many died after getting the vaccine.
Ganafi and Afrizal,[14]	2021	General	Qualitative	1. Hesitation about vaccine safety. 2. Hesitations about the effectiveness of the vaccine. 3. Distrust of vaccines. 4. Concerns about side effects such as fever and pain. 5. Questioning the halalness of vaccines. 6. Statement that pandemic is a conspiracy.
Muhammad, *et al.*,[15]	2021	7 Informants	Qualitative	Hesitation because of a lot of confusing news on the COVID-19 vaccine on social media, the remaining 14% are still unsure about the vaccine distribution.
Arumsari, Desty and Kusumo,[16]	2021	200 Samples	Cross-sectional	1. 54.1% of respondents disagree that the vaccine is safe to use. 2. 59.5% feel that vaccines cannot suppress the virus's spread. 3. 42.6% are unsure about the effectiveness of the vaccine. 4. 50% question the halalness of vaccines. 5. 58.1% agree that humans do not need vaccines. 6. 52.0% also agree that the Coronavirus would disappear by itself. 7. 47.3% agree that only 3M can suppress the virus spread. 8. 51.4% agree that the pandemic is a conspiracy. 9. 57.4% do not believe that the government can properly handle the pandemic.
Puspasari and Achadi,[17]	2021	382 Samples	Cross-sectional	Concerns about vaccine side effects.
Linda Prasetyaning Widayanti,[18]	2021	188 Samples	Cross-sectional	24 people (12.8%) stated that the vaccines are ineffective in dealing with the COVID-19, affecting their attitude toward receiving vaccines.
Putri, *et al.*,[19]	2021	399 Samples	Cross-sectional	1. Anxiety about possible side effects after vaccination. 2. Anxiety after receiving inaccurate/hoax information.
Ichsan, *et al.*,[21]	2021	266 Samples	Cross-sectional	1. Most respondents in Central Sulawesi stated that the COVID-19 vaccine was safe and effective, but only 35.3% of respondents were willing to receive the vaccination. 2. 11.7% stated that it was not safe. 3. 4.9% stated that it was not effective. 4. 13.5% expressed fear of side effects. 5. 1.1% stated that it is against religious values.
Harapan, *et al.*,[22]	2020	1,068 Samples	Cross-sectional	Vaccine interest tends to decrease when its efficacy is only 50%.

countries were quite far from the threshold level of herd immunity.

The desire to obtain valid and reliable information on the COVID-19 vaccine is essential because it prevents people from careless absorption of any information they receive. Many inaccurate information circulating in the community affects their perceptions and the implementation of vaccinations carried out by the government. It also creates a negative view and worries, while those who are not easily influenced by information will try to find justified information from reliable sources. In a survey of vaccine acceptance in Indonesia, approximately 54% of respondents chose to receive information about the vaccine through social media such as WhatsApp, Facebook, Instagram, and Twitter, followed by print and mass media such as television and newspapers. While, almost 13% prefer to receive information through telecommunication channels such as short message services and telephone.[7] Therefore, to overcome the spread of hoax news, the government established a positive law regulating the crime of spreading hoax information in Indonesia, which is contained in Articles 14 and 15 of Law No. 1 of 1946 concerning Criminal Law Regulations, Law No. 19 of 2016 regarding Amendments to Law No. 11 of 2008 concerning Information Technology and Electronic Transaction (ITE) is regulated in Article 28 Paragraph (1) in conjunction with Article 45 (A). For those posting hate speech to incite people or participate in cornering a group on their social media platforms, they will be subjected to Article 45A Paragraph 2 of the ITE Law.[26]

Some people also hold onto vaccines' benefits, safety, and effectiveness to reduce their anxiety. This condition also indicated a positive response or belief toward vaccines, whereas some hesitate about its safety and side effects. A previous study showed that the COVID-19 vaccine, which can be accepted in Indonesia, should have three characteristics: effective, safe, and halal. In terms of effectiveness, the efficiency of the Sinovac in Indonesia is only 65.3%, which is lower than Brazil (78%) and Turkey (91.25%). There is no evidence that it can protect a person from the COVID-19 infection. However, clinical trials showed that people vaccinated with the CoronaVac have a three times lower risk of infection. While, the efficiency of Pfizer in Indonesia is significantly greater than Sinovac (95%). This difference is influenced by the host (human), agent (vaccine), and environment (regional conditions). Adverse events after immunization (AEFI) that can occur after the vaccine include pain, swelling, irritation, redness, myalgia, fatigue, arthralgia, fever, and dizziness.[27] Furthermore, there was a relationship between perceived benefits and willingness to vaccinate in a cross-sectional study, including by Puspasari, *et al.,*[17] where vaccination indicators reduce the possibility of infection, complications, and worry. The study by Erawan, *et al.,*[20] reported that perceived benefits and perception of the vaccine effectiveness have a significant relationship with the willingness to be vaccinated.[18]

The government's role also affected the people's interest in vaccines, where some who were willing to receive vaccines were motivated because the president was the first person to be vaccinated. Furthermore, the government's accurate information and free-charge vaccine influenced people's willingness to vaccinate due to their trust and confidence in the government. According to Trent, *et al.,*[28] in Sydney and Melbourne, higher trust and confidence in the government are associated with a greater possibility of being willing to receive the vaccine. This is significantly different from New York and Phoenix, where trust in the government is relatively low, but individuals with higher trust tend to reject the vaccination. This condition is caused by some preventive measures such as masks and vaccines that have been politicized in the US. The willingness to receive vaccines in the US also depends on people's political affiliation with the government in power during the survey. Moreover, responsible governments must promote preventive policies based on ethics to increase public trust and reduce the mistrust of the COVID-19 vaccines. The decision not to be vaccinated is due to their fear and disbelief of its health benefits. Therefore, the government must implement several initiatives to strengthen public confidence.[29]

People more susceptible to the COVID-19 showed a positive response and tended to receive the vaccine more because they assumed the virus poses a threat to health. They also felt that their immune systems were weak or had a higher risk of virus exposure. While, a previous study on the Health Belief Model (HBM) approach also assessed the relationship between perceived susceptibility to vaccine acceptance as stated in study by Puspasari, *et al.,*[17] an indicator of worrying about infecting the COVID-19 and getting infected with the COVID-19 is possible, from the perception of severity with indicators of severe complications and fear of being infected. A study by Harapan, *et al.,*[22] also stated that the relationship between people with a high perceived risk of infection had a twice probability of receiving the vaccine than those who did not have. This result is supported by the study by Hawlader, *et al.,*[31] in four South Asian countries: Bangladesh, India, Pakistan, and Nepal, where participants worrying about infecting the COVID-19 were more willing to receive the vaccine. This showed that participants with perceived susceptibility to disease were significantly more inclined to receive the vaccine. While, the Indonesian Ministry of Health stated that the vulnerable groups targeted for the third phase of vaccination in the Regulation of the Minister of Health of the Republic of Indonesia No. 10 of 2021 are based on the Implementation of Vaccinations against the COVID-19 included vulnerable communities from geospatial, social, and economic aspects.[7] The Spokesperson for the Indonesian Ministry of Health for Vaccination also verbally stated the criteria for vulnerable communities as targets for the third phase of vaccination are 1) living in the COVID-19 red zone, 2) weak socioeconomic condition, 3) less fortunate, 4) capital city marginal groups, 5) persons with disabilities, and 6) people with mental disorders.[31]

Negative Response to Vaccines

Concern on vaccine side effects, safety, and effectiveness is a negative response from most people who doubt and reject to be vaccinated. This is similar to the results from the COVID-19 vaccine acceptance survey in Indonesia, where people concerning on vaccine safety by 30%, doubts about its effectiveness at 22%, low confidence in vaccines at 13%, and fear of side effects such as pain and fever at 12%.[7] Furthermore, a study by Puspasari, *et al.,*[17] stated that concern about vaccine side effects and ineffectiveness with a p-value = 0.0005 had a relationship that hindered vaccine acceptance. This response was responsible for the refusal by most people in several countries due to the less certainty about the safety and the potential for unknown side effects. At the same time, misinformation from social media can also affect their perception.[23] Study on the relationship between general vaccine attitudes and intention to vaccinate discovered that confidence in safety is the most significant determinant of vaccine acceptance.[32] The public trust in

the COVID-19 vaccine can also vary based on the community's sources of information. This is because a vaccine acceptance survey in Indonesia showed that people obtain more information from social media (54%). This indicated that social media greatly influences public perception and trust in the vaccine. Therefore, the government must direct the people to choose reliable sources to obtain information. This also poses a challenge for the government and those with the relevant authority because the information spread in the community varies according to their geographical area and economic status.

The issue of the halal vaccine has become public doubt to get a vaccine in Indonesia. A study by Puspasari, *et al.*,[17] showed that worrying about whether the vaccine is halal or not had a p-value of 0.0005, an obstacle to vaccine acceptance. Since most Indonesians are Muslims, they become more careful in selecting a consumption that does not conflict with religious values, such as questioning whether the production and handling of vaccines are appropriate with Islamic religious rules. For the halal vaccine, there has been a statement from the Indonesian Ulema Council/*Majelis Ulama Indonesia* (MUI) that the vaccine products by Sinovac Life Sciences Co. Ltd. China and PT Bio Farma are halal. At the same time, AstraZeneca is haram because of the pork trypsin content. However, it can be used permissibly due to an urgent need and unavoidable emergency conditions related to the fulfillment of the COVID-19 vaccine to overcome the pandemic.[33]

Many people believe that the COVID-19 infection and its vaccine are conspiracies, propaganda, and a business field for the government. There is also an assumption that it is a fabrication that is deliberately made and exaggerated for political purposes, while some say that it is only a common cold. While, this showed that the belief is generated from hoax information circulating among the community and disseminated through stories told between individuals and groups. The belief in the conspiracy is not only in Indonesian community but also several countries. These groups are more prevalent among individuals from ethnic minority backgrounds, with lower levels of education, annual incomes, poor knowledge, and adherence to the COVID-19 guidelines.[34] A study conducted in Jordan showed that many campaigns launched by anti-vaccines spread on social media with fictitious, false, and misled Arabic translations that gave credence to the conspiracy. However, those who do not believe tend to receive the vaccine.[3]

The perception of people feeling that vaccines cannot suppress the virus spread also reduces their interest in receiving vaccines. One factor that makes people think that the vaccine is useless includes the confirmation of ten positive cases of those vaccinated. Those who do not

believe in vaccines are people with low awareness and incorrect information about vaccines.[35] While, the perception that the public knows about COVID-19 and its vaccine results from the information obtained. This is because the information obtained affected their response due to their education and income level. People with low education and income levels are more easily influenced by information and their behavior to disseminate the information without prior verification. Experience on the internet or social media also determines a person's attitude in disseminating information. Therefore, the more experienced someone has in using the internet, the higher their ability to discover, share, and verify information.[36] According to Juditha,[37] three critical approaches can be taken to anticipate the spread of hoax news in the community: technological, institutional, and literacy approaches. A technological approach using the hoax checker application to determine the truth of the news, the institutional is by continuously promoting the anti-hoax community. The literacy approach is the anti-hoax news movement and socialization that continues to be encouraged by the people.

There is also a response from people refusing to be vaccinated when they have to pay. This statement is supported by the study of Puspasari, *et al.*,[17] This issue was circulating in the community that a paid COVID-19 vaccine was announced by the Indonesian Ministry of Health and borne by the company for all of its employees to receive the vaccine immediately and achieve the herd immunity. However, the government had announced a free vaccine for the public to silence the issue. Similarly, a study by Adigwe,[38] in Nigeria showed that most participants (85.1%) stated that the vaccine needed to be provided free because only a quarter of the participants (26%) were willing to pay. While, the groups that were likely to pay for vaccinations include the elderly and those who had previously been infected. According to Wang, *et al.*, most respondents were willing to pay part of the vaccination, indicating a high demand for vaccinations to control and overcome the pandemic in China.[39]

Other Factors Related to Vaccine Acceptance

The cross-sectional study showed several other factors influencing people's willingness to receive the COVID-19 vaccine. In a study by Harapan, *et al.*,[22] the status as a health worker was twice more likely to receive the vaccine due to their higher risk of exposure. Similarly, Chew, *et al.*,[40] also stated that more than 95% of healthcare workers in Asia were willing to receive the vaccine. While, the main reasons for vaccination are the perceived vulnerability to pandemics and the presence of a pro-social mindset. Age was also associated with receiving the vaccine, as shown in a study by Putri, *et al.*,[19] where the respondents were in the productive age group

and actively working. This made them willing to vaccinate to remain active according to their age. Furthermore, Ichsan, *et al.,*[21] discovered that age was related to willingness to vaccinate. Therefore, the older a person ages, the higher the willingness to receive the vaccination. The younger age group tends not to be vaccinated since age is positively associated with willingness to accept the COVID-19 vaccine.[28] However, willingness tends to be greatest among adults aged 65 years and above and those in 18-24. This indicated that the relationship between age and willingness to be vaccinated is also influenced by other factors based on their need to be vaccinated.

Strength and Limitations

This study tries to summarize the responses to the COVID-19 vaccine in Indonesia comprehensively. The study uses combined data from both qualitative and cross-sectional designs, which makes them the strength of this study. However, the present study has limited selected papers because of the restricted access from the non-open access journal. Nevertheless, this study utilizes the open access journal well to cover the problems.

Conclusion and Recommendation

Some factors related to people's responses to the COVID-19 vaccine are different. The average response of people accepting the vaccine reports that because it is an antibody that fights againstthe virus. Its acceptance also raises among those who already believe in the benefits, safety, and effectiveness. Moreover, the role of the government can affect people's perception and acceptance of vaccines due to the vulnerability feeling among individuals. Other factors such as status as a health worker and age are also related to vaccine acceptance.

People with a negative response to vaccines are concerned about side effects, safety, and effectiveness, which can be due to a lack of information and certainty. The halal status of the vaccine also plays a significant role besides the issues of conspiracy and paid vaccine. The government needs to pay attention to these factors to expand the COVID-19 vaccinations coverage. Further study should explore not only the review in response to the COVID-19 vaccine in Indonesia, but also the reason for people who have positive and negative responses to it.

Abbreviations

COVID-19: Coronavirus Disease 2019; SARS-CoV-2: Severe Acute Respiratory Syndrome Coronavirus 2; WHO: World Health Organization; NPI: Non-Pharmaceutical Interventions; DNA: Deoxyribonucleic Acid; RNA: Ribonucleic Acid; NADFC: the National Agency of Drug and Food Control; BPOM: Badan *Pengawas Obat dan Makanan*; ITAGI: Technical Advisory Group on Immunization; UNICEF: United Nations Children's Fund; PRISMA: Preferred Reporting Items for Systematic Reviews and Meta-Analysis; PICO: Participants, Intervention, Comparison, and Outcome; SMS: short message services; AEFI: Adverse Events After Immunization; HBM: Health Belief Model; MUI: *Majelis Ulama Indonesia.*

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