

The Association between Health Protocol Compliance and Understanding of Vaccines with COVID-19 Immunization Status

Arnya Farmalarissa Annis^a, Fariani Syahrul^{b*}, Djazuly Chalidyanto^c, Erni Astutik^b, Karlina^d,
Rosita Dwi Yuliandari^e

^aFaculty of Medicine, Universitas Airlangga, Surabaya, Indonesia

^bDivision of Epidemiology, Faculty of Public Health, Universitas Airlangga, Surabaya, Indonesia

^cDepartement of Health Administration and Policy, Faculty of Public Health, Universitas Airlangga, Indonesia

^dPublic Health Undergraduate Study Program, Faculty of Public Health, Universitas Airlangga, Indonesia

^eDepartment of Surveillance and Immunization, Field of Disease Prevention and Control, Surabaya City Health Office, Indonesia

*Corresponding author: arnya.farmalarissa.annis-2019@fk.unair.ac.id

Abstract

COVID-19 case data as of January 16, 2021, in Indonesia reached 882,418 cases and in East Java reached 98,403 cases. In Surabaya, the total number of confirmed cases was 18,974 with 200 active cases, 17,500 recovered cases, and 1,274 deaths. Meanwhile, the level of community vulnerability is increasing due to the lack of community discipline toward the implementation of health protocols. It is critical to develop tailored strategies to reduce community vulnerability, namely through vaccination. We aimed to analyze the association between health protocol compliance and understanding of vaccines with COVID-19 immunization status. This cross-sectional study was conducted in Fishing Village, Kenjeran, Surabaya, East Java, Indonesia. The study was carried out in 2021 in people aged ≥ 18 years old and who lived in Fishing Village. Respondents were selected by simple random sampling. The chi-square test was used to analyze the data. The results showed health protocol compliance ($p=0.785$) and understanding of COVID-19 vaccination ($p=0.819$) did not have an association with COVID-19 immunization status. There was a significant association between understanding COVID-19 immunization and COVID-19 immunization status. Meanwhile, there was no significant association between health protocol compliance and COVID-19 immunization status.

Keywords: COVID-19; Immunizations; Vaccines; Health Protocols

1. Introduction

The coronavirus disease (COVID-19) caused by SARS-COV2 had become a global public health concern (Megatsari et al., 2020; Rothan & Byrareddy, 2020; Yamani & Syahrul, 2020). Not only major impact on public health, but the COVID-19 pandemic also had an impact on social, economic, and political problems. Public places such as schools and universities were closed, shopping areas were deserted, public transportation was restricted, and so on. This condition had shown how the current situation was very worrying. The results of the study also prove that the COVID-19 pandemic also has an impact on mental health (Megatsari et al., 2020) where mental health is also closely related to a person's human capital (Astutik et al., 2021; Tama et al., 2021). Therefore, a joint strategy is needed to control the COVID-19 pandemic (Masrul et al., 2020).

By data from East Java Provincial Government, COVID-19 case data on January 16, 2021, reached 882,418 cases in Indonesia and reached 98,403 cases in East Java. Of the 18,974 confirmed cases, 200 cases are active cases, 17500 cases have recovered and 1,274 cases have died. Therefore, the fatality rate was 6.71% in Surabaya city (East Java Provincial Government, 2021). Meanwhile, public awareness of implementing health protocols is still quite low. The results of a study in East Java showed that public compliance with the COVID-19 health protocol was still relatively low (Angin & Astutik, 2022). To overcome the impact of the COVID-19 pandemic, raising public awareness to mitigate transmission is the most basic effort that must always be considered (Adriana & Miftahussurur, 2020).

The level of community vulnerability will increase if people are not disciplined in implementing health protocols such as wearing masks, washing hands, and maintaining a minimum distance of 1-2 meters as well as reducing mobility and preventing crowds. Without prompt and appropriate public health intervention, it is estimated that as many as 2.5 million cases of COVID-

19 will require hospitalization in Indonesia with an estimated death toll of 250,000. Therefore, it is necessary to immediately intervene not only in terms of implementing health protocols but also in other effective interventions to break the chain of disease transmission, namely through vaccination efforts (Ministry of Health Republic of Indonesia, 2021).

Vaccination is a very important activity to tackle COVID-19 cases. Immunization programs are only successful if there are high levels of acceptance and coverage. To achieve this, it is very important to understand the public's perception of risk regarding COVID-19, acceptance of the COVID-19 vaccine, and trust in media sources, particularly those used to obtain information about the COVID-19 pandemic (Malik et al., 2020).

Vaccination has been shown to play a major role in treating several infectious diseases such as including polio, influenza, pneumonia, measles, mumps, rubella, hepatitis virus, pertussis, and oncogenic human papillomavirus (Center for Disease Control, 2011). The COVID-19 vaccination aimed to reduce transmission, reduce morbidity, and mortality due to COVID-19 and achieve herd immunity. Vaccination was not only aimed at breaking the chain of disease transmission and stopping the outbreak but also in the long term to eliminate and even eradicate the disease itself (Ministry of Health Republic of Indonesia, n.d.). Increasing public understanding of vaccines was important, but the biggest challenge facing vaccine literacy efforts was the spread of misinformation (Vanderpool et al., 2020). Not only that, valid information also supports someone to have awareness about this COVID-19 pandemic (Aurizki, 2021). The public must be wise in choosing reliable information, including information about the COVID-19 vaccine. Therefore, this study aims to analyze the association between health protocol compliance and understanding of vaccines with COVID-19 immunization status during the pandemic in Surabaya, Indonesia in 2021.

2. Methodology

This study used a cross-sectional study research design. The research was conducted in the area of Fishing Village, Kenjeran, Surabaya Indonesia, in June-November 2021. Ethical permission was approved by the Ethical Committee of the Faculty of Public Health, Universitas Airlangga in Surabaya, with the number: 12/EA/KEPK/2021.

The population of this study was an adult community aged ≥ 18 years old and lived in Fishing Village, Kenjeran, Surabaya. Participating respondents were randomly selected using a simple random sampling from a list of registered in the ward, namely 170 respondents. We also conducted an in-depth interview with 6 informants consisting of 2 government officials (Kenjeran Village staff), 1 health center staff, 1 staff of the Village Resilience Institute (LKMK), 1 religious figure, and 1 community leader. The selected participants were invited to participate in this study and the informed consent process was conducted prior to testing. Data was collected by enumerators trained before the survey. Data collection was done by interviewing respondents using questionnaires and in-depth interviews with informants.

The outcome variable was COVID-19 immunization status. COVID-19 immunization status was measured by asking respondents whether they have received the vaccine or not. The independent variables were the implementation of health protocols and understanding of COVID-19 immunization. Implementation of health protocols was measured by asking respondents. The questions consisted of 6 questions, namely wearing a mask, washing hands with soap, avoiding handshakes, keeping your distance from others, avoiding the crowd, and frequency of leaving the house/to public places. Each question would be graded with always, often, seldom, and never. The score would be categorized into 2 categories, namely obedient and disobedient. The understanding of COVID-19 immunization was measured by asking respondents whether strongly believe, enough to believe, lack trust, and don't believe.

The characteristics of respondents, including age, sex (male or female), tribe (Javanese or Madura), resident (original Surabaya or immigrants), education (lower, medium, higher), occupation (student/housewife, PNS/TNI/POLRI/BUMD/SOE, private/professional employees, self-employed, farmer/fisherman/labor, other) and source of information (television, newspaper/magazines, online media, WhatsApp, community leaders, announcement from the local government) were measured in this study. The educational characteristics are categorized into 3 types namely lower, medium, and high. The lower category is not schooling and graduating from elementary school. The medium category is graduates of junior high school and senior high school. While the high category is graduates with a diploma, bachelor, and postgraduate.

Data processing begins with cleaning to ensure the completeness and correctness of the data. Data were analyzed using descriptive and inferential analysis. A Chi-square test was done to show the inferential, t with a significance value of 0.05

3. Findings

The data collection showed that the average age of respondents was 38.25 years with a range of 18-69 years. Most of the respondents were female (71.8%), originally from Surabaya (91.8%), Javanese (95.3%), had medium education (70.6%), and as students/housewives (42.4%). In addition, 41.2% of respondents got information about COVID-19 from television (Table 1).

Table 1. Characteristics and Sources of Respondent Information about COVID-19 in Kenjeran-Surabaya, Indonesia, in 2021

Characteristic		Frequency: n (%) or mean (min-max)
Age (yr)		38.35 (18-69)
Sex	Male	48 (28.20)
	Female	122 (71.8)
Resident	Original Surabaya	156 (91.8)
	Immigrants	14 (8.2)
Tribe	Javanese	162 (95.3)
	Madura	8 (4.7)
Education	Lower	34 (20.0)
	Medium	120 (70.6)
	Higher	16 (9.4)
Occupation	Student/housewife	72 (42.4)
	PNS/TNI/Polri/BUMD/SOE	2 (1.2)
	Private/Professional employees	31 (18.2)
	Self employed	33 (19.4)
	Farmer/Fisherman/Labor	18 (10.6)
	Other	14 (8.2)
Source of information	Social media	42 (24.7)
	Television	70 (41.2)
	Newspapers/magazines	2 (1.2)
	Online media	2 (1.2)
	WhatsApp	10 (5.9)
	Community leaders	8 (4.7)
	Announcement from the local government	36 (21.2)

Health protocols identified by respondents were to use masks, wash hands with soap, maintain distance, reduce mobility and avoid crowds. Table 2 presented that the most of respondents had carried out health protocols in all aspects. Although there were still people who were ignorant of health protocols they never implemented health protocols during this pandemic.

Implementation of the Health Protocol	Frequency: n (%)
Wearing a mask	
Always	79 (46.5)
Often	51 (30.0)
Seldom	35 (20.6)
Never	5 (2.9)
Washing hands with soap	
Always	74 (43.5)
Often	52 (30.6)
Seldom	38 (22.4)
Never	6 (3.5)
Avoiding handshakes	
Always	92 (54.1)
Often	45 (26.5)
Seldom	27 (15.9)
Never	6 (3.5)
Keep your distance from others	
Always	98 (57.6)
Often	37 (21.8)
Seldom	26 (15.3)
Never	9 (5.3)
Avoiding the crowd	
Always	103 (60.6)
Often	26 (15.3)
Seldom	31 (18.2)
Never	10 (5.9)
Frequency of leaving the house/to public places	
Less often	124 (72.9)
Same	16 (9.4)
More often	30 (17.7)

Understanding the COVID-19 Vaccine	Frequency: n (%)
Strongly believe	98 (57.6)
Enough to believe	64 (37.6)
Lack of trust	4 (2.4)
Don't believe it at all	4 (2.4)

In table 3, most respondents had faith in the COVID-19 vaccine, but there were still 2.4% who do not believe in the COVID-19 vaccine at all. Meanwhile, 42.9% of respondents had not gotten the COVID-19 immunization yet (Table 4).

Table 4. COVID-19 Immunization Status for Respondents in Kenjeran-Surabaya, Indonesia, in 2021

Immunization Status	Frequency: n (%)
Already getting the vaccine doses 1 and 2	57 (33.5)
Already getting the vaccine doses 1	40 (23.5)
Haven't gotten the vaccine yet	73 (42.9)

Table 5. The Association between Health Protocol Compliance and Understanding of COVID-19 Immunization with COVID-19 Immunization Status in Kenjeran-Surabaya, Indonesia, in 2021

Variables	COVID-19 Immunization Status		Total	p-value
	Got Immunization: n (%)	Have Not Received Immunization: n (%)		
Health protocol compliance				
Obedient	86 (57.7)	63 (42.3)	149 (100)	0.820
Disobedient	11 (52.4)	10 (47.6)	21 (100)	
Understanding the COVID-19 immunization				
Strongly believe and enough to believe	97 (59.9)	65 (40.1)	162 (100)	0.001
Lack of trust and don't believe at all	0 (0)	8 (100)	8 (100)	

Table 5 showed that there was no significant association between health protocol compliance and COVID-19 immunization status ($p=0.820$). In addition, there was a significant association between understanding COVID-19 immunization and COVID-19 immunization status ($p\text{-value}=0.001$).

The respondent who believed the immunization had already gotten COVID-19 immunization status. In addition, there was a significant association between understanding COVID-19 immunization and COVID-19 immunization status ($p\text{-value}=0.001$).

The results of in-depth interviews with religious leaders and community leaders are that most of the public already understands COVID-19 and how it is transmitted. However, there are still some people in fishing villages, especially those who are poorly educated, who do not believe and consider that COVID-19 is just engineering. Public awareness is still lacking in carrying out complete health protocols. The masks they use are not something that reminds them of the dangers of COVID-19, but rather so as not to be sanctioned. Informants who are health workers said that as cases soared, many people were disciplined in health protocols. However, as cases declined, the community began to ignore them.

Informants of religious leaders said that at the beginning of the implementation of vaccination, there were people who were pros and cons related to the COVID-19 vaccine, especially the halalness of the vaccine. Over time, the government massively conducted socialization by collaborating with religious leaders and community leaders, so that the public has begun to realize the

importance of vaccination. However, there are still some people who still do not want vaccines even though there is a government policy that requires citizens to be vaccinated when going somewhere or taking care of something.

The result showed that most of the respondents had carried out health protocols in all aspects. Although there were still people who were ignorant of health protocols they never implemented health protocols during this pandemic. This was in line with the WHO recommendation to keep the community safe, namely maintaining physical distance, wearing masks, maintaining a well-ventilated room, and following health protocols such as avoiding crowds, cleaning hands, and coughing into bent elbows or tissues (WHO, 2021). In addition, this was also reinforced by research that finds that taking health precautions will be effective to avoid COVID-19 (Clark et al., 2020). Implementation of health protocols such as wearing a mask may not eliminate the transmission of COVID-19, but this is a simple mechanism that can protect oneself from infected or asymptomatic people (Aloui-Zarrouk et al., 2020).

Most respondents believed in the COVID-19 vaccine, but there were still many who had not received the vaccine. This is because they were not willing to be vaccinated. The results of in-depth interviews also supported this finding. The people in the research area were people who were thick with religion. They believed that vaccines contain ingredients that were haram. Although the vaccine could not provide 100% protection, it has been proven to reduce the risk of a person's severity when exposed to the COVID-19 virus (Bernal et al., 2021). Other research also proved that people who had been vaccinated would have mild symptoms when experiencing COVID-19 (Angel et al., 2021).

The result showed that there was no significant association between health protocol compliance and COVID-19 immunization status. This might be because COVID-19 immunization is a mandatory system by the government. These results might also be explained that public knowledge of health protocols was still low. People perceive COVID-19 as political and religious propaganda (Saba, C.K.S.; Nzeh, J.; Addy, F.; Karikari, 2020). This finding was also in line with the in-depth interview conducted by the researcher. However, these results were different from those found in Ethiopia in that understanding and preventive behavior had a relationship with public acceptance of the COVID-19 vaccine (Handebo et al., 2021). Whereas other studies had also proven that the fear of being infected with COVID-19 encourages a person to comply with health protocols (Harper et al., 2020).

There was a significant association between understanding of COVID-19 immunization and COVID-19 immunization status. The results of this study are in line with research found in Iran. This may be because trust plays an important role in influencing someone to get the COVID-19 vaccine (Ahorsu et al., 2021). Therefore, building public trust in vaccine quality is very important (Atouf et al., 2021). The results of a survey conducted in 19 countries found different results regarding the receipt of COVID-19 immunization (Lazarus et al., 2021).

These findings highlight that public understanding of vaccine quality, vaccine halalness, and vaccine risk needs to be increased. Therefore, the dissemination of information about COVID-19 immunization needs to be carried out massively and accurately. In addition, the government needs to oblige all people to get dose 2 vaccines and even booster vaccines. Furthermore, the government needs to strengthen the rules regarding the use of health protocols.

The weakness of this research is that research was conducted using a cross-sectional study design. In addition, this research was only conducted on fishing communities which may not be represented in other communities

4. Conclusion

There was a significant association between understanding of COVID-19 immunization and COVID-19 immunization status. Meanwhile, there was no significant association between health protocol compliance and COVID-19 immunization status. These findings highlight that dissemination of information about COVID-19 immunization needs to be carried out massively and accurately. In addition, the government needs to oblige all people to get dose 2 vaccines and even booster vaccines.

Acknowledgments

The authors thanked all those who helped in writing this article. The great hope of author is that this article can be useful for many people.

References

- Adriana, D. N., & Miftahussurur, M. 2020. Current strategy to combat COVID-19 in Indonesia. *The New Armenian Medical Journal*, 14(4), 16–28.
- Ahorsu, D. K., Lin, C. Y., Yahaghai, R., Alimoradi, Z., Broström, A., Griffiths, M. D., & Pakpour, A. H. 2021. The mediational role of trust in the healthcare system in the association between generalized trust and willingness to get COVID-19 vaccination in Iran. *Human Vaccines and Immunotherapeutics*. <https://doi.org/10.1080/21645515.2021.1993689>
- Aloui-Zarrouk, Z., El Youssfi, L., Badu, K., Fagbamigbe, A. F., Matoke-Muhia, D., Ngugi, C., Dukhi, N., & Mwaura, G. 2020. The wearing of face masks in African countries under the COVID-19 crisis: luxury or necessity? *AAS Open Research*, 3(36), 36.
- Angel, Y., Spitzer, A., Henig, O., Saiag, E., Sprecher, E., Padova, H., & Ben-Ami, R. 2021. Association between vaccination with BNT162b2 and incidence of symptomatic and asymptomatic SARS-CoV-2 infections among health care workers. *Jama*, 325(24), 2457–2465.
- Angin, S. R. A. P., & Astutik, E. 2022. Knowledge, attitude, and perception of people in compliance with the covid-19 health protocol. *Jurnal Berkala Epidemiologi*, 10(1), 103–110.
- Astutik, E., Hidajah, A. C., Tama, T. D., Efendi, F., & Li, C. 2021. Prevalence and determinants of depressive symptoms among adults in Indonesia: A cross-sectional population-based national survey. *Nursing Forum*, 56(1), 37–44.
- Atouf, F., Chakrabarti, R., & Uppal, A. 2021. Building trust in the quality of vaccines. *Human Vaccines and Immunotherapeutics*. <https://doi.org/10.1080/21645515.2021.1929035>
- Aurizki, G. E. 2021. Combatting Pseudoscience Amidst the COVID-19 Pandemic. *Jurnal Ners*, 16(2).
- Bernal, J. L., Andrews, N., Gower, C., Gallagher, E., Simmons, R., Thelwall, S., Stowe, J., Tessier, E., Groves, N., & Dabrera, G. 2021. Effectiveness of Covid-19 vaccines against the B. 1.617. 2 (Delta) variant. *New England Journal of Medicine*.
- Center for Disease Control. 2011. Ten Great Public Health Achievements-Worldwide, 2001-2010. *MMW Morb Mortal Wkly Rep* 2011.
- Clark, C., Davila, A., Regis, M., & Kraus, S. 2020. Predictors of COVID-19 voluntary compliance behaviors: An international investigation. *Global Transitions*, 2, 76–82. <https://doi.org/https://doi.org/10.1016/j.glt.2020.06.003>
- East Java Provincial Government. 2021. Data Kasus Covid-19 per 16 Januari 2021 di Indonesia.
- Handebo, S., Wolde, M., Shitu, K., & Kassie, A. 2021. Determinant of intention to receive COVID-19 vaccine among school teachers in Gondar City, Northwest Ethiopia. *Plos One*, 16(6), e0253499.
- Harper, C. A., Satchell, L. P., Fido, D., & Latzman, R. D. 2020. Functional Fear Predicts Public Health Compliance in the COVID-19 Pandemic. *International Journal of Mental Health and Addiction*. <https://doi.org/10.1007/s11469-020-00281-5>
- Lazarus, J. V., Ratzan, S. C., Palayew, A., Gostin, L. O., Larson, H. J., Rabin, K., Kimball, S., & El-Mohandes, A. 2021. A global survey of potential acceptance of a COVID-19 vaccine. *Nature Medicine*, 27(2), 225–228. <https://doi.org/10.1038/s41591-020-1124-9>
- Malik, A. A., McFadden, S. M., Elharake, J., & Omer, S. B. 2020. Determinants of COVID-19 vaccine acceptance in the US. *EClinicalMedicine*, 26, 100495. <https://doi.org/https://doi.org/10.1016/j.eclinm.2020.100495>
- Masrul, M., Abdillah, L. A., Tasnim, T., Simarmata, J., Daud, D., Sulaiman, O. K., Prianto, C., Iqbal, M., Purnomo, A., & Febrianty, F. 2020. Pandemi COVID-19: Persoalan dan Refleksi di Indonesia. *Yayasan Kita Menulis*.
- Megatsari, H., Laksono, A. D., Ibad, M., Herwanto, Y. T., Sarweni, K. P., Geno, R. A. P., & Nugraheni, E. 2020. The community psychosocial burden during the COVID-19 pandemic in Indonesia. *Heliyon*, 6(10), e05136.
- Ministry of Health Republic of Indonesia. (n.d.). Frequently asked questions: Seputar Pelaksanaan Vaksinasi Covid-19.
- Ministry of Health Republic of Indonesia. 2021. Keputusan Direktur Jenderal Pencegahan dan Pengendalian Penyakit Nomor Hk.02.02/4/ 1 /2021 Tentang Petunjuk Teknis Pelaksanaan Vaksinasi dalam Rangka Penanggulangan Pandemi Corona Virus Disease 2019 (Covid-19).
- Rothan, H. A., & Byrareddy, S. N. 2020. The epidemiology and pathogenesis of coronavirus disease (COVID-19) outbreak. *Journal of Autoimmunity*, 109(February), 102433. <https://doi.org/10.1016/j.jaut.2020.102433>
- Saba, C.K.S.; Nzeh, J.; Addy, F.; Karikari, A. B. 2020. COVID-19: Knowledge, Perceptions and Attitudes of Residents in the Northern Region of Ghana, West Africa. *Preprints 2020*, 2020080060.
- Tama, T. D., Astutik, E., & Reuwpassa, J. O. 2021. Predictors of Depressive Symptoms Based on the Human Capital Model Approach: Findings From the Indonesia Family Life Survey. *The Yale Journal of Biology and Medicine*, 94(3), 395–406.
- Vanderpool, R. C., Gaysynsky, A., & Sylvia Chou, W.-Y. 2020. Using a global pandemic as a teachable moment to promote vaccine literacy and build resilience to misinformation. In *American Journal of Public Health* (Vol. 110, Issue S3, pp. S284–S285). American Public Health Association.
- WHO. 2021. Coronavirus disease (COVID-19) advice for the public. 2021. <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public>
- Yamani, L. N., & Syahrul, F. 2020. Public health perspective of the COVID19 pandemic: host characteristics and prevention of COVID19 in the community. *World Academy of Sciences Journal*, 2(6), 1.