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Knowledge, Attitude, and Behavior Related to COVID-19 Vaccine Acceptance: A Cross-Sectional Study

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Abstract:

Objective: According to World Health Organization (WHO) recommendations, vaccination can save millions of lives, and it is widely known as one of the most successful and cost-effective health interventions. Nevertheless, some people are reluctant to be vaccinated because of potential side effects. This study aimed to analyze the effects of knowledge, attitudes, and behavior related to the coronavirus disease 2019 (COVID-19) vaccine acceptance.

Material and Methods: This is a quantitative study that employed the cross-sectional approach and was conducted from December 2021 to February 2022. Data were collected from 520 samples aged 22-64 years chosen via simple random sampling. The data collection was carried out using a questionnaire via Google Forms. To analyze the acceptance of the COVID-19 vaccination program in the community, multiple linear regressions using the SPSS software version 25 were employed.

Results: Knowledge (b=0.11, SE=0.05, 95% CI=0.01 to 0.21, p-value=0.030), attitude (b=0.08, SE=0.03, 95% CI=0.03 to 0.13, p-value=0.003), and behavior (b=0.07, SE=0.02, 95% CI=0.03 to 0.10, p-value<0.001) affected the COVID-19 vaccine acceptance. The higher the knowledge about the COVID-19 vaccine, the higher the public acceptance of the vaccination program. Likewise, the more positive the public's attitude towards the COVID-19 vaccine, the higher its acceptance of the vaccination. The better the public's behavior related to COVID-19 vaccination, the higher the level of acceptance of the COVID-19 vaccine.

Conclusion: Comprehensive knowledge, positive attitudes, and good behavior related to the COVID-19 vaccination affect the acceptance of COVID-19 vaccine by the public of Indonesia. Even when people have received a complete COVID-19 vaccination, they should remain disciplined in implementing the recommended health protocols of the relevant institutions and organizations.

Keywords: attitude, behavior, COVID-19 vaccine, knowledge

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Introduction

Coronavirus disease 2019 (COVID-19) vaccination programs are government policies that have been adopted around the world with the aim of reducing the transmission of the COVID-19 virus, reducing the morbidity and mortality related to COVID-19, and achieving herd immunity. These measures have been implemented in order to protect people and help them remain socially and economically productive in spite of the pandemic[1]. Herd immunity can only be established if vaccination coverage is high and evenly distributed throughout a given region[2,3]. Prevention through vaccination programs, as assessed from the economic perspective, is much more cost-effective compared to treatment efforts[4,5].

High vaccination coverage globally is indispensable to the control of the COVID-19 pandemic[6]. However, there are both pros and cons related to the ongoing COVID-19 vaccination program in many countries, including Indonesia. Some studies have suggested several factors that are responsible for vaccine acceptance; they are vaccine efficacy, adverse health outcomes, misunderstanding the need for vaccination, a lack of trust in the health system, and a lack of knowledge regarding vaccine-preventable diseases. Doubts about vaccines can put public health at risk in light of the current COVID-19 pandemic crisis[7,8].

To break the chain of the COVID-19 spread, on December 16, 2020, 1.2 million doses of COVID-19 vaccine were imported to Indonesia[9]. In our country, the vaccination program was enforced in order to prevent the spread of the COVID-19 outbreak. The people allowed eligible to receive the vaccine were healthy adults aged 18-59 years. Before being vaccinated, they received a detailed explanation related to the COVID-19 vaccine and signed a letter of approval that also stated their willingness to follow the rules and schedule of immunization set forth by the relevant government agencies and institutions. However, there were several conditions under which the COVID-19 vaccine could not be administered to someone. They consisted of the following: high blood pressure (over 140/90); confirmed current COVID-19 infection; being pregnant or breastfeeding; experiencing symptoms of ISPA such as cough, runny nose, and shortness of breath within the previous 7 days; being in close contact with family members that were either suspected of being infected or that were confirmed to be receiving treatment for COVID-19 infection; undergoing long-term active therapy for blood disorders; heart disease (heart failure or coronary heart disease); systemic autoimmune diseases (SLE/lupus, Sjogren's syndrome, vasculitis); kidney disease; autoimmune rheumatic disease or rheumatoid arthritis; chronic gastrointestinal disease; hyperthyroid or hypothyroid disease due to an autoimmune disorder; cancer; blood loss; being immunocompromised or having immune deficiency; being a recipient of blood products/transfusion, and being HIV+ with a CD4 count of less than 200 or unknown[10].

For the implementation of the COVID-19 vaccination program among the target groups of the elderly, comorbid patients, COVID-19 survivors, and delayed targets, the Immunization Expert Advisory Committee submitted a study that recommended that the COVID-19 vaccination could be given to the age group of 60 years and over, people with comorbidities (hypertensive patients were vaccinable unless the blood pressure was over 180/110 MmHg; diabetics could also be vaccinated as long as there were no acute complications; and cancer survivors were also vaccinable), COVID-19 survivors (they vaccinable if they were infected over 3 months prior to the COVID-19 vaccination), and breastfeeding mothers with additional anamnesis in the first place[11].

The first stage of vaccination was carried out on January 13, 2021, and the second stage was on January 27, 2021. Based on data from the Ministry of Health of Indonesia, up to March 2023, the number of recipients of one dose of the COVID-19 vaccine in Indonesia was

212,034,794 people or 90.36% of the total target vaccine population of 234,666,020. Meanwhile, the recipients of the second dose of the vaccine were 175,385,832 people or 74.74%. People who received the vaccine experienced diverse reactions, such as headaches or fever, yet no serious health problems related to the vaccination have been reported among receipients[12,13]. In terms of the vaccine types for the COVID-19 disease 2019, apart from the Sinovac vaccine, those produced by PT Bio Farma (Persero), AstraZeneca, China National Pharmaceutical Group Corporation (Sinopharm), Moderna, Pfizer Inc. and BioNTech were approved for usage in Indonesia. The abovementioned vaccines are still in the third phase of clinical trials or have completed the third phase. Although vaccination has been administered since January 2021, there are still a lot of people who are hesitant to take part in the vaccination program up to now. Some are apprehensive about side effects, whereas others believe in hoax news that discourages vaccination.

Material and Methods

This is a quantitative study that followed the cross-sectional approach. The population of the study refers to the whole community living in Kediri, East Java, and it was conducted from December 2021 to February 2022. To determine the appropriate number of samples, the Lemeshow formula was employed because the number of the target population was not certain due to the effects of the COVID-19 pandemic.

The following is the Lemeshow formula:

$$n = \frac{z^2 p(1-p)}{d^2}$$

In the equation, n=sample size, z=standard value of 1.96 (at a 5% level of significance, p=maximum estimate of 50% or 0.5, and d=alpha (0.05) or sampling error (5%). Based on the calculations, the minimum number of samples needed in this study was 384 respondents. Data were obtained from 520 samples selected using simple random sampling. The data collection tool was a questionnaire administered via Google Forms, which was distributed through social media. In the first part, the questionnaire enquired about the characteristics of the respondents such as their age, sex, education, and recent work. The second part explored the respondents' knowledge regarding the COVID-19 vaccination, the third part concerned their attitude toward the COVID-19 vaccine, the fourth part asked about their behavior related to the COVID-19 vaccination, and the last part enquired about the acceptance of the COVID-19 vaccination program in the community. The scoring for the knowledge variable used two answer options, true (with a value of 1) and false (with a value of 0). To measure the attitude variable, a 5-point Likert scale was used, where 1 signified 'strongly disagree' and 5 'strongly agree'. Similarly, for the behavior variable a 5-point Likert scale was also used—1=never and 5=always. The data relating to the participants' vaccination was obtained by enquiring in the online questionnaire whether the sample had received the COVID-19 vaccination or not. To analyze the data, the multiple linear regression analysis was adopted using the SPSS software version 25. The multiple linear regression analysis was used to determine the effect of two or more independent variables with one dependent variable. In the table of the results of the multiple linear regression analysis, the authors report the results of the statistical tests like unstandardized coefficients (b), standard error of the estimate (SE), 95% CI, t, and p. Unstandardized coefficients (b) are coefficient values that are not standardized. Coefficient β on the unstandardized coefficients consisted of constant values and the regression coefficient (here, it showed an increase or decrease in variable Y based on variable X). The standard error of the estimate (SE) was used to see if the regression equation was formed right or not quite right, which served the purpose of estimating or predicting the response of variable Y. The confidence

interval was employed to determine the range of values that are likely to contain the true population mean based on the sample. The confidence level used was the 95% one, meaning that the level of certainty for the sample statistics to correctly estimate the population parameter was 95%, or the confidence level to reject or accept the hypothesis was 95%. The paired t-test was used to find out whether partially independent variables had a significant effect on the dependent variable or not. Finally, the p-value was used to measure the significance of the regression testing. This study was approved by the Health Research Ethics Committee of the Institute of Health Science STRADA Indonesia (ethics approval number: 2459/KEPK/XI/2021).

Results

Table 1 shows that early adulthood (ages 22-34) was the predominant age (64.8%) of our study's respondents. The majority of the participants that completed the questionnaire were female (74.8%). Secondary education was the educational level attainment with the highest percentage among our respondents (50.2%). Most participants worked in the private sector (43.5%) and earned a monthly income of 67–204 USD (60.6%).

Table 2 contains the results related to questions about knowledge regarding vaccines in general and the COVID-19 vaccine in particular from the 520 respondents. Most respondents seemed to know that: vaccines can boost the immune system (a correct answer rate of 89.0%); the body forms antibodies to fight a given pathogen after inoculation (99.6%); the administration of vaccines helps the handling of the COVID-19 pandemic (96.9%); the main goal of the vaccination program is to reduce the transmission of the virus as well as morbidity and mortality rates due to the COVID-19 infection (87.5%); vaccination aims to achieve group immunity (also referred to as herd immunity) in the society (98.7%); the benefits of vaccination in the long term can reduce the social and economic impacts of the disease (78.8%); the COVID-19 vaccine is given in two stages (91.0%); people who have taken the first shot of the vaccination must also take the second shot in order

Table 1 Demographic characteristics of the research participants (n=520)

Demographics	Age groups	Frequency	Percentage
Age	Early adulthood (ages 22-34)	337	64.8
	Early middle age (ages 35-44)	135	26.0
	Late middle age (ages 45-64)	48	9.2
Sex	Male	131	25.2
	Female	389	74.8
Education	Primary school/elementary	49	9.4
	Secondary education	261	50.2
	High school diploma	181	34.8
	University degree	26	5.0
	Post-graduate degree	3	0.6
Employment	Unemployed	74	14.2
	Government sector	88	16.9
	Private sector	226	43.5
	Self-employed	132	25.4
Monthly family income (in IDR)	<67 USD	108	20.8
	67–204 USD	315	60.6
	>204 USD	97	18.6

IDR=Indonesian Rupiah

for the vaccination to be complete (95.6%); the CoronaVac vaccine produced by SINOVAC is a vaccine that is widely used in Indonesia (98.8%); common side effects that can occur after vaccination for COVID-19 are fever, body aches, and redness or rash at the injection site (97.1%); everyone should get the COVID-19 vaccine (99.0%); even after receiving the vaccine, one must still comply with the health protocols in effect (94.2%); the government provides only vaccines that are proven safe and have passed clinical trials for the general population (96.0%); and that vulnerable groups are prioritized as vaccine recipients (93.1%).

Table 3 shows the results regarding the questions about the attitudes of the 520 respondents toward the COVID-19 vaccine. Most of the respondents stated that they strongly agreed that the COVID-19 vaccination was important in helping the body recognize the virus once infected as well as reducing the risk of getting infected by the COVID-19 virus (59.0%); the COVID-19 vaccination can prevent death from infection with the COVID-19 virus (44.6%); the COVID-19 vaccination is not only for people who have risk factors for severe illness or death caused by the COVID-19 virus (46.2%); the COVID-19 vaccination is offered to people who have not been exposed to the virus (45.8%); a detailed explanation of the benefits of the COVID-19 vaccine prior to being inoculated is very necessary (64.2%); the COVID-19 vaccines are very safe for the public, and this has been scientifically proven (52.3%); the COVID-19 vaccination is an effective method of preventing the transmission of COVID-19 (56.3%); the COVID-19 vaccination is being carried out concurrently with the implementation of other strict health protocols by relevant authorities (58.7%); getting the COVID-19 vaccine protects against the COVID-19 viral infection (46.2%); after being informed about the COVID-19 vaccination, I will immediately get the vaccine (51.5%); before receiving the COVID-19 vaccine, one must undergo screening (65.2%); and information about the COVID-19 vaccination can be easily found (60.0%).

Table 2 Participants' knowledge about the COVID-19 vaccine

Knowledge	True (%)	False (%)
-Vaccines can boost the immune system	463 (89.0)	57 (11.0)
-The COVID-19 vaccine will help the body form antibodies to fight the virus	518 (99.6)	2 (0.4)
-The administration of vaccines helps the handling of the COVID-19 pandemic	504 (96.9)	16 (3.1)
-The main goal of vaccination is to reduce the transmission of the virus as well as the morbidity and mortality rates associated with COVID-19 infection	455 (87.5)	65 (12.5)
-Vaccination aims to achieve group immunity in the society (herd immunity)	513 (98.7)	7 (1.3)
-The benefits of vaccination in the long term can reduce the social and economic impacts of the disease	410 (78.8)	110 (21.2)
-The COVID-19 vaccine is given in two stages	473 (91.0)	47 (9.0)
-People who have taken the first phase of the vaccination must also take the second phase of the vaccination at the appropriate time	497 (95.6)	23 (4.4)
-The CoronaVac vaccine produced by SINOVAC is a vaccine that is widely used in Indonesia	514 (98.8)	6 (1.2)
-Common side effects that can occur after vaccination are fever, body aches, redness or rash at the injection site	505 (97.1)	15 (2.9)
-Everyone should get the vaccine	515 (99.0)	5 (1.0)
-Even after receiving the vaccine, we must comply with the health protocols in effect	490 (94.2)	30 (5.8)
-The government provides only vaccines that have been proven to be safe and have passed clinical trials	499 (96.0)	21 (4.0)
-Vulnerable groups are prioritized to be vaccine recipients	484 (93.1)	36 (6.9)

Table 3 Participants' attitudes toward the COVID-19 vaccine

Attitude	Strongly disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly agree (%)
-COVID-19 vaccination is important in helping the body recognize the virus after infection and reducing the risk of getting infected by the COVID-19 virus	10 (1.9)	28 (5.4)	15 (2.9)	160 (30.8)	307 (59.0)
-COVID-19 vaccination can prevent death from the COVID-19 virus	5 (1.0)	29 (5.6)	45 (8.7)	209 (40.2)	232 (44.6)
-COVID-19 vaccination is not only for people who have risk factors for severe illness and/or death caused by the virus	1 (0.2)	6 (1.2)	42 (8.1)	231 (44.4)	240 (46.2)
-COVID-19 vaccination is offered to people who have not been exposed (after 1 month declared cured) to the virus	2 (0.4)	11 (2.1)	36 (6.9)	233 (44.8)	238 (45.8)
-Thorough explanation concerning the benefits of the COVID-19 vaccine is very necessary	2 (0.4)	6 (1.2)	12 (2.3)	166 (31.9)	334 (64.2)
-COVID-19 vaccination is very safe for the public, and this has been proven scientifically	3 (0.6)	3 (0.6)	9 (1.7)	233 (44.8)	272 (52.3)
-COVID-19 vaccination is an effective method of preventing the transmission of COVID-19	2 (0.4)	4 (0.8)	16 (3.1)	205 (39.4)	293 (56.3)
-COVID-19 vaccination is being carried out concurrently with the implementation of other strict health protocols	2 (0.4)	13 (2.5)	22 (4.2)	178 (34.2)	305 (58.7)
-Getting the COVID-19 vaccine protects against infection from the COVID-19 virus	6 (1.2)	14 (2.7)	51 (9.8)	209 (40.2)	240 (46.2)
-After being informed about the COVID-19 vaccination, I will immediately get the vaccine	0 (0.0)	5 (1.0)	23 (4.4)	224 (43.1)	268 (51.5)
-Before getting the COVID-19 vaccine, one must undergo screening	1 (0.2)	5 (1.0)	11 (2.1)	164 (31.5)	339 (65.2)
-Information about the COVID-19 vaccination can be easily found	0 (0.0)	17 (3.3)	5 (1.0)	186 (35.8)	312 (60.0)

Table 4 presents each question concerning the behaviors of the 520 respondents in relation to the COVID-19 vaccination. The majority of respondents claimed they sometimes looked for information about the various types of COVID-19 vaccines (78.7%); always looked for information about the vaccines' side effects and the way to deal with them (56.9%); always sought to be in good health by consuming nutritious food (47.1%); always took medicines when experiencing symptoms such cough or runny nose after receiving the COVID-19 vaccination (47.3%); sometimes stretched their arm muscles (81.9%); always adhered to the health protocols after getting the COVID-19 vaccine (89.6%); very often did light activities after the COVID-19 vaccination (54.4%); always visited the vaccine service site in good health (81.3%); always followed the doctor's recommendations when symptoms appeared after the COVID-19 vaccination (46.9%); always adhered to the schedule for receiving the second dose of the vaccine (45.6%); always looked for information about the effectiveness of COVID-19 vaccines (53.5%); always looked for information on the COVID-19 vaccine scheduling (62.7%); and always underwent health screening before receiving the COVID-19 vaccine (42.2%).

Table 5 shows the findings of the multiple linear regression analysis for the COVID-19 vaccine acceptance among our participants. It was found that the variables of knowledge (b=0.11, SE=0.05, 95% CI=0.01 to 0.21, p-value=0.030), attitude (b=0.08, SE=0.03, 95% CI=0.03 to 0.13, p-value=0.003), and behavior (b=0.07, SE=0.02, 95% CI=0.03 to 0.10, p-value<0.001) affected the

COVID-19 vaccine acceptance of our study population. The unstandardized (b) value of 0.11 indicated that a shift of 1 unit in knowledge was associated with an increase of 0.11 in the COVID-19 vaccine acceptance. Similarly, the unstandardized (b) value of 0.08 indicated that a shift of 1 unit in attitude was associated with an increase of 0.11 in the COVID-19 vaccine acceptance. Meanwhile, the unstandardized (b) value of 0.07 indicated that a shift of 1 unit in behavior related to the COVID-19 vaccination was associated with an increase of 0.07 in the acceptance of the COVID-19 vaccine among our participants.

Table 4 Participants' behaviors related to the COVID-19 vaccine

Behavior	Never (%)	Rarely (%)	Sometimes (%)	Very often (%)	Always (%)
-Looking for information about the various types of COVID-19 vaccines	10 (1.9)	12 (2.3)	409 (78.7)	56 (10.8)	33 (6.3)
-Looking for information about COVID-19 vaccine side effects and the way to deal with them	19 (1.7)	30 (5.8)	42 (8.1)	133 (25.6)	296 (56.9)
-Maintaining good health by consuming nutritious food	10 (1.9)	21 (4.0)	20 (3.8)	224 (43.1)	245 (47.1)
-Taking medicines when experiencing symptoms such as cough or runny nose after receiving the COVID-19 vaccination	18 (3.5)	10 (1.9)	34 (6.5)	212 (40.8)	246 (47.3)
-Stretching arm muscles, so they don't hurt	14 (2.7)	27 (5.2)	426 (81.9)	24 (4.6)	29 (5.6)
-Adhering to health protocols even after getting the COVID-19 vaccine	8 (1.5)	10 (1.9)	14 (2.7)	22 (4.2)	466 (89.6)
-Doing light activities after receiving the COVID-19 vaccine	16 (3.1)	31 (6.0)	19 (3.7)	283 (54.4)	171 (32.9)
-Visiting the vaccine service site in good health	7 (1.4)	19 (3.7)	11 (2.1)	60 (11.5)	423 (81.3)
-Following the doctor's recommendations when symptoms appear after receiving the COVID-19 vaccine	5 (1.0)	18 (3.5)	31 (6.0)	222 (42.7)	244 (46.9)
-Adhering to the schedule for getting the second dose of the vaccine	9 (1.7)	24 (4.6)	49 (9.4)	201 (38.7)	237 (45.6)
-Looking for information about the effectiveness of COVID-19 vaccines	7 (1.4)	25 (4.8)	29 (5.6)	181 (34.8)	278 (53.5)
-Looking for information on the COVID-19 vaccine scheduling	14 (2.7)	6 (1.1)	26 (5.0)	148 (28.5)	326 (62.7)
-Undergoing health screening before receiving the COVID-19 vaccine	33 (6.4)	59 (11.3)	72 (13.8)	137 (26.3)	219 (42.2)

Table 5 Multiple linear regression analysis results

Independent variables	Unstandardized (b)	SE	95% CI		t	p-value
			Lower	Upper		
Knowledge	0.11	0.05	0.01	0.21	2.17	0.030
Attitude	0.08	0.03	0.03	0.13	2.99	0.003
Behavior	0.07	0.02	0.03	0.10	4.00	<0.001

SE=standard error, CI=confidence interval

Discussion

Knowledge is a prominent fundamental factor in health behavior change[14]. However, in some instances, even though people may be aware of the benefits of the COVID-19 vaccination, they may not necessarily want to be vaccinated, which can help prevent COVID-19 infection and combat the COVID-19 pandemic. Knowledge is an idea that arises to obtain information and understand things people know to keep in mind[15,16]. Knowledge is also one of the factors that can affect one's perception upon understanding something[17]. It is possible that knowledge about the COVID-19 vaccine strongly affects an individual's decision to receive the vaccine[18,19]. People one is in contact with and friends also function as an effective message delivery system that helps increase the community's knowledge regarding the COVID-19 vaccination, so an increase in knowledge leads to an increase in the willingness to be vaccinated. Furthermore, encouragement from the surrounding environment, such as community group movements, is also a considerable factor for people to decide in favor of vaccination. This can obviously enhance one's willingness to receive the vaccine[20].

A good attitude affects good behavior as well. Between one's attitude and behavior, there must be a psychological factor in order for both of them to be consistent[21]. Human attitudes can demonstrate something good to make it happen in the form of behavior, thus healthy lifestyle behavior is achieved[22-24]. Attitude consists of the following four stages: receiving, responding, valuing, and being responsible. It means that even though an individual shows a good attitude, the extent to which attitude stage he or she reaches will affect his/her motivation to change. Attitude represents readiness or willingness to act and is not the exercise of a particular motive[25]. In other words, the function of an attitude is not yet an action (open reaction) or activity, but rather it is a predisposition to behavior (action) or closed reaction. A good attitude without good behavior does not prevent an individual from being exposed to COVID-19 infection[26,27]. Attitude is a crucial determinant of behavior; it represents one's behavioral pattern. An individual can guess the responses or actions of others based on the problems or circumstances they face.

Behavior is formulated based 2 factors—external factors, which are environmental, and internal factors such as perception, fantasy, suggestion, attention, and observation[28,29]. People who receive good information will obviously have their perception of the COVID-19 vaccine affected[30,31]. Their perception will, in turn, affect their behavior toward the COVID-19 vaccine. A poor perception of the COVID-19 vaccine will lead to a refusal to participate in the COVID-19 vaccination program. However, our respondents reported receiving good information and were willing to fulfill their role as responsible members of the community by partaking in the COVID-19 vaccination program in order to help achieve herd immunity. A lot of participants referred to COVID-19 using language that has negative connotations such as an infectious, dangerous, and deadly disease[32,33]. This perception could have led them to make behavioral changes toward COVID-19 prevention, one of which is participation in the COVID-19 vaccination program.

Strengths and limitations

A strength of this study is that it can provide information regarding the knowledge, attitudes, and behaviors among a section of the Indonesian population related to receiving the COVID-19 vaccine, which can serve as a reference for improving vaccine acceptance programs in Indonesia in the future. In addition, studies on similar topics are still limited in Indonesia. However, this study suffers from the limitation of the lack of in-depth study of the collected data. This can be attributed to the fact that the authors were not involved directly in the data collection and that in certain communities, only a few had internet access or were willing to respond to our online questionnaire.

Conclusion

The respondents' knowledge of the COVID-19 vaccine influenced their willingness to participate in the vaccination program. The participants were found to be well-informed about the safety, side effects, and effectiveness of the vaccines for the prevention of COVID-19 infection. The positive attitude of the community members towards the COVID-19 vaccination affected their willingness to be vaccinated since attitude affects one's willingness to act. Positive behaviors related to the COVID-19 vaccine program would help achieve herd immunity, which would provide indirect protection or group immunity for those who are not immune to the COVID-19 virus.

Conflict of interest

None

References

1. Wong RSY. COVID-19 vaccines and herd immunity: Perspectives, challenges and prospects. Malays J Pathol 2021; 43:203–17.
2. Hodgson D, Flasche S, Jit M, Kucharski AJ, CMMID COVID-19 Working Group. The potential for vaccination-induced herd immunity against SARS-CoV-2 B.1.1.7 variant. Euro Surveill 2021;26:2100428. doi: 10.2807/1560-7917.ES.2021.26.20.2100428.
3. Chen Z, Zheng W, Wu Q, Chen X, Peng C, Tian Y, et al. Global diversity of policy, coverage, and demand of COVID-19 vaccines: a descriptive study. BMC Med 2022;20:1–14.
4. Liu K, Lou Y. Optimizing COVID-19 vaccination programs during vaccine shortages. Infect Dis Model 2022;7:286–98.
5. Zhou L, Yan W, Li S, Yang H, Zhang X, Lu W, et al. Cost-effectiveness of interventions for the prevention and control of COVID-19: Systematic review of 85 modelling studies. J Glob Health 2022;12:05022.
6. Yu JH, Jeong HJ, Kim SJ, Lee JY, Choe YJ, Choi EH, et al. Sustained Vaccination Coverage during the Coronavirus Disease 2019 Epidemic in the Republic of Korea. Vaccines 2021;9:1–8.
7. Guljaš S, Bosnić Z, Salha T, Berecki M, Krivdić Dupan Z, Rudan S, et al. Lack of informations about COVID-19 vaccine: From implications to intervention for supporting public health communications in COVID-19 pandemic. Int J Environ Res Public Health 2021;18:6141. doi: 10.3390/ijerph18116141.
8. Bardosh K, De Figueiredo A, Gur-Arie R, Jamrozik E, Doidge J, Lemmens T, et al. The unintended consequences of COVID-19 vaccine policy: why mandates, passports and restrictions may cause more harm than good. BMJ Glob Heal 2022;7:1–14.
9. Azikin A, Thahir B, Masrich A, Zulaika S, Dwi Asri J, Risnawati Soerya Putri A, et al. The Indonesian Government Strategy of Herd Immunity in Handling of Pandemic COVID 19. Syst Rev Pharm 2021;12:640–7.
10. Tavilani A, Abbasi E, Kian Ara F, Darini A, Asefy Z. COVID-19 vaccines: current evidence and considerations. Metab Open 2021;12:100124. doi: 10.1016/j.metop.2021.100124.
11. Yanto TA, Octavius GS, Heriyanto RS, Ienawi C, Nisa H, Pasai HE. Psychological factors affecting COVID-19 vaccine acceptance in Indonesia. Egypt J Neurol Psychiatry Neurosurg 2021;57. doi: 10.1186/s41983-021-00436-8.
12. Silvestro M, Tessitore A, Orologio I, Sozio P, Napolitano G, Siciliano M, et al. Headache worsening after COVID-19 vaccination: an online questionnaire-based study on 841 patients with migraine. J Clin Med 2021;10:5914. doi: 10.3390/jcm10245914.
13. Kaur RJ, Dutta S, Bhardwaj P, Charan J, Dhingra S, Mitra P, et al. Adverse events reported from COVID-19 vaccine trials: a systematic review. Indian J Clin Biochem 2021;36:427–39. doi: 10.1007/s12291-021-00968-z.
14. Rincón Uribe FA, Godinho RC de S, Machado MAS, Oliveira KR da SG, Neira Espejo CA, de Sousa NCV, et al. Health knowledge, health behaviors and attitudes during pandemic emergencies: a systematic review. PLoS One 2021;16:e0256731.
15. Sturmberg JP. Knowledge translation in healthcare – towards understanding its true complexities: comment on using complexity and network concepts to inform healthcare knowledge translation. Int J Heal Policy Manag 2018;7:455–8. doi: 10.15171/ijhpm.2017.111.
16. Yazdani S, Bayazidi S, Mafi AA. The current understanding of knowledge management concepts: a critical review. Med J Islam Repub Iran 2020;34:127. doi: 10.34171/mjiri.34.127.
17. Greven IM, Downing PE, Ramsey R. Linking person perception

and person knowledge in the human brain. Soc Cogn Affect Neurosci 2016;11:641–51.

18. Li H, Cheng L, Tao J, Chen D, Zeng C. Knowledge and willingness to receive a COVID-19 vaccine: a survey from Anhui Province, China. Hum Vaccines Immunother 2022;18:1–8. doi: 10.1080/21645515.2021.2024064.
19. Al Awaidy ST, Khatiwada M, Castillo S, Al Siyabi H, Al Siyabi A, Al Mukhaini S, et al. Knowledge, attitude, and acceptability of covid-19 vaccine in Oman: a cross-sectional study. Oman Med J 2022;37:e380. doi: 10.5001/omj.2022.70.
20. Jung H, Albarracín D. Concerns for others increases the likelihood of vaccination against influenza and COVID-19 more in sparsely rather than densely populated areas. Proc Natl Acad Sci USA 2020;118:e2007538118. doi: 10.1073/pnas.2007538118.
21. Brügger A, Höchli B. The role of attitude strength in behavioral spillover: attitude matters-but not necessarily as a moderator. Front Psychol 2019;10:1–24.
22. Conner M, Norman P. Understanding the intention-behavior gap: the role of intention strength. Front Psychol 2022;13:1–16.
23. Blankenship KL, Kane KA, Machacek MG. Think unique: perceptions of uniqueness increases resistance to persuasion and attitude-intention relations. Front Psychol 2021;12:653031. doi: 10.3389/fpsyg.2021.653031.
24. Wieber F, Thürmer LJ, Gollwitzer PM. Promoting the translation of intentions into action by implementation intentions: Behavioral effects and physiological correlates. Front Hum Neurosci 2015;9:1–18.
25. Luderer C, Donat M, Baum U, Kirsten A, Jahn P, Stoevesandt D. Measuring attitudes towards interprofessional learning. Testing two German versions of the tool "Readiness for interprofessional learning scale" on interprofessional students of health and nursing sciences and of human medicine. GMS J Med Educ 2017;34:1–18.
26. Kundu S, Al Banna MH, Sayeed A, Begum MR, Brazendale K, Hasan MT, et al. Knowledge, attitudes, and preventive practices toward the COVID-19 pandemic: an online survey among Bangladeshi residents. Z Gesundh Wiss 2021. doi: 10.1007/s10389-021-01636-5.
27. Muslih M, Susanti HD, Rias YA, Chung MH. Knowledge, attitude, and practice of indonesian residents toward COVID-19: A cross-sectional survey. Int J Environ Res Public Health 2021;18:4473. doi: 10.3390/ijerph18094473.
28. Fink L, Strassner C, Ploeger A. Exploring external factors affecting the intention-behavior gap when trying to adopt a sustainable diet: a think aloud study. Front Nutr 2021;8:1–20.
29. Chang L, Lu HJ, Lansford JE, Bornstein MH, Steinberg L, Chen B Bin, et al. External environment and internal state in relation to life-history behavioural profiles of adolescents in nine countries. Proc R Soc B Biol Sci 2019;286. doi: 10.1098/rspb.2019.2097.
30. Al-Zalfawi SM, Rabbani SI, Asdaq SMB, Alamri AS, Alsanie WF, Alhomrani M, et al. Public knowledge, attitude, and perception towards COVID-19 vaccination in Saudi Arabia. Int J Environ Res Public Health 2021;18:10081. doi: 10.3390/ijerph181910081.
31. Al-Hanawi MK, Keetile M, Kadasah NA, Alshareef N, Qattan AMN, Alsharqi O. Side effects and perceptions of COVID-19 vaccination in Saudi Arabia: a cross-sectional study. Front Med 2022;9:1–14.
32. Shaikh Mohammed Aslam S, Mohammed Suhail K, Ashwin Kulkarni. Clinical and epidemiological characteristics of elderly patients with coronavirus disease-19 at a tertiary care center in South India. J Health Sci Med Res 2023. doi: 10.31584/jhsmr.2023963.
33. Suebsarn Ruksakulpiwat, Wendie Zhou, Chantira Chiaranai, Phongthon Saengchut, Jane E. Vonck. Age, sex, population density and COVID-19 pandemic in Thailand: a nationwide descriptive correlational study. J Health Sci Med Res 2022;40:281–91.