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Covid-19 Vaccine Acceptance and its Influencing Factors Through a Cross-Sectional Study

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ABSTRACT

Background: The rise in Covid-19 related deaths has led to the implementation of vaccination. Despite this effort, some of the population remains reluctant to get vaccinated, citing various reasons for their hesitation. The objective of this research was to examine the various factors affecting covid-19 vaccination acceptance.
Methods: This study adopted a cross-sectional design and was conducted between October and December 2022. This study looked at various independent variables such as sex, education, occupation, family income, health insurance, social assistance, history of Covid-19 infection, and information from the health worker. The main variable of interest was vaccination acceptance. The research involved a group of 133 people. Research data is collected by sending surveys to participants while adhering to Covid-19 health guidelines. The research data was examined using chi square test and logistic regression. This study received ethical approval from the Ethics Committee at Palu Health Polytechnic, Ministry of Health in Indonesia number: 0089/KEPK-KPK/VI/2022.
Results: Most of the individuals were involved in favor of accepting the Covid-19 vaccine, with a percentage of 83.5%, whereas only 16.5% declined it. Among the different factors considered, age was found to be the most significant in determining vaccine acceptance compared to having social assistance and information from health workers.
Conclusion: Vaccine acceptance varied by age, prioritizing older individuals due to their heightened vulnerability to the Covid-19 virus. It is crucial to further investigate how different factors such as socio-demographic characteristics, vaccine' knowledge, and trust in the healthcare system interact with each other.

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INTRODUCTION

The rapid transmission of Covid-19 virus has sparked a global pandemic, causing widespread panic among people around the world. The origin of this virus can be traced back to Wuhan, China, where it was initially identified in December 2019 (1–4). The resulting Covid-19 pandemic quickly evolved into a worldwide public health emergency, leading to nearly 2 million fatalities and 89 million confirmed cases by January 2021 (5,6). Indonesia has been particularly hard-hit by the virus, experiencing over one million infections and a death toll of 39,550. Apart

from presenting a significant risk to both life and health, Covid-19 has also had a profound effect on every facet of human existence and has placed immense strain on the global economy (7). The escalation in cases of the virus has prompted various nations to focus on the development and distribution of vaccines for both healthcare professionals and the wider population (8). Several nations were initiated vaccination efforts by placing priority on vaccinating older demographics following the immunization of healthcare workers and other essential personnel (9).

Vaccines have been an essential part of public health efforts for numerous years. They are instrumental in preventing or reducing serious medical issues, reducing healthcare costs, mitigating and eliminating the effects of Covid-19, and illustrating its affordability and beneficial influence (10–12). It is crucial to maintain our stamina and strengthen our immune system to effectively protect ourselves against Covid-19 (13,14). Individuals possessing not inoculated against Covid-19 are at a higher chance of getting infected with the virus when compared to individuals who have received the vaccine. This suggests that getting vaccinated provides significant protection against Covid-19 infection (15). The optimal way to achieve herd immunity and manage the dissemination of the pandemic over time is by ensuring a high vaccination rate. Despite this, many countries have only achieved vaccination rates ranging from 15.3% to 77.1%, falling far below the necessary level to reach a point where a majority of the population is immune (16).

The efficacy of the Covid-19 vaccine not only relies on the accessibility of vaccines but also on widespread acceptance among the general public. Despite the presence of multiple Covid-19 vaccine choices, there remains reluctance and rejection among the general population, which is slowing down the progress towards achieving herd immunity. Vaccine hesitancy, as per the guidance of the World Health Organization (WHO), is when individuals are hesitant or unwilling to receive vaccines even though they are readily available. This behavior is identified as a significant concern for global health, being included as one of the top 10 threats (3,10,17). During the outbreak of Covid-19, a noticeable hesitancy towards receiving vaccinations emerged as a prominent influence on the uptake of vaccine doses (18).

The results of a study carried out by the World Health Organization (WHO), the Ministry of Health in Indonesia, the Indonesian Technical Advisory Group on Immunization (ITAGI), and the United Nations Children's Fund (UNICEF) showed that in Indonesia in 2020, 65% of participants were open to receiving the vaccine, while 8% declined and others were uncertain (8). Achieving herd immunity requires 70% of the population to be vaccinated. A study conducted in Tebing Tinggi City revealed that only 51% of participants were open to getting the COVID-19 vaccine, suggesting a notable level of uncertainty within the community (19). Acceptance of vaccines is impacted by numerous factors, such as individuals' personal beliefs and social influences, as well as specific characteristics of the vaccines themselves (20). There are numerous factors that play a role in how willing individuals are to accept vaccines. These can include their age, socioeconomic standing, religious and cultural values, gender, access to healthcare coverage, marital status, vaccination history, religion, educational attainment, current job situation, and occupation in the medical industry (6,8,10,17,18,21).

The findings from the research in India indicated that hesitancy towards the vaccine included worries about potential side effects (9.2%), individuals who were 60 years old and older were considered elderly (1.6%), and 1.1% with underlying health conditions (22). Additional studies conducted in Senegal revealed that various factors were found to contribute to this vaccine hesitancy, including gender differences, residing in urban areas, negative perceptions of vaccines, skepticism about the effectiveness of vaccines in preventing illness, being swayed by influential individuals, and a lack of accurate information provided by healthcare professionals (23). Various variables have been pinpointed as significant indicators of hesitancy towards vaccines, including marital status, past experience with influenza vaccines, history of Covid-19 infection or testing, adherence to Covid-19 preventive measures, beliefs about the advantages and disadvantages of Covid-19 vaccinations, and people’s perspectives on towards vaccination regulations and customs in Japan (24). A separate study found that the desire to get vaccinated was associated with various factors including age, occupation, marital status, and monthly earnings (25).

Through this study, we delved into the different elements that impact a community's readiness to receive the Covid-19 vaccination. Despite efforts to increase vaccination rates, there are still individuals who remain hesitant. One particular aspect we focused on was the link between receiving government social assistance and vaccine acceptance. In Indonesia, local authorities have implemented a requirement stating that individuals receiving social assistance must be vaccinated before receiving aid. We also investigated other factors such as personal characteristics, socioeconomic status, prior Covid-19 infection history, possession of social security, and information received from

healthcare worker. Through analysis of these components, our goal was to enhance comprehension of the general reception of the Covid-19 vaccine among community. In addition, we aimed to reveal insights into the factors that sway individuals towards accepting or rejecting the Covid-19 vaccine.

METHOD

The research took place in the Parigi Moutong District during the period of October to December in the year 2022, using a cross-sectional research approach. A group of 133 individuals took part in the study, with 43.6% of participants being female and 56.4% male. The participants were selected through the multistage random sampling technique.

The research delved into how different factors like age, sex, education, occupation, family income, having health insurance, having social assistance, history of Covid-19 infection, and information from health worker influenced people's acceptance to get vaccinated. Education was classified as either low (below elementary school level) or medium-high (above elementary school level). Occupation was categorized into two groups: unemployed (housewife, student) and employed (other than housewife and student). Family income was divided into two groups based on whether it exceeded one million or not. Having health insurance coverage and having social assistance were categorized as either yes or not. History of Covid-19 infection and information from health worker were also separate into two groups: yes and no. The main focus of the study was on vaccination acceptance, which was defined as whether the participant had received vaccine I, II, and booster or not. The results of the questionnaire validity test show that the calculated value of r for all question items is greater than the table value of r (0.361), indicating that the research instrument is valid. Meanwhile, the Cronbach Alpha value is greater than 0.60, indicating that the research questionnaire is reliable.

The study examined how different factors, including age, sex, education, occupation, family income, having health insurance, having social assistance, a history of Covid-19 infection, and information from health worker, impacted whether someone accepted a vaccination. This study used the chi-square test to examine how the independent variables are related to the dependent variable of vaccination acceptance. Logistic regression was then employed in the data analysis software to compare these relationships. A statistical significance level of 5% was set to determine the strength of the relationships.

During the study, all individuals who took part were given a thorough explanation about the goals and purposes of the research. All individuals who agreed to take part in the research project were requested to sign a consent document. Each individual voluntarily gave their written informed consent to participate in this research, acknowledging their willingness with a signed statement on the form. The researcher guarantees that the confidentiality of all data shared by the individuals involved and commits to not revealing any identifying details.

Ethical Approval

This research has been carefully examined and endorsed by the Ethics Committee at Palu Health Polytechnic, Ministry of Health in Indonesia. Approval code 0089/KEPK-KPK/VI/2022 has been granted.

RESULTS

Data in Table 1 reveals that the mean age of individuals surveyed was 36.1 years, with a standard deviation of 12.5. Most of respondents were male (56.4%), had limited educational attainment (69.9%), were employed (76.7%), had a family income below 1 million, had health insurance coverage (73.7%), had social assistance (66.2%), experienced a previous COVID-19 infection (77.4%), and did not receive guidance from healthcare professionals (72.7%). Additionally, the findings of the research demonstrated that 83.5% of individuals were accepting to get vaccinated against Covid-19, while only 16.5% declined.

Table 1. Participants Demographics (n=133)

Demographics variable	Mean (SD)/N (%)
Age	36.1 (12.5)
Sex	
Female	68 (43.6)
Male	75 (56.4)

Education	
Low	93 (69.9)
Middle-High	40 (30.1)
Occupation	
Unemployed	31 (23.3)
Employed	102 (76.7)
Family Income	
< 1 million	95 (71.4)
≥ 1 million	38 (28.6)
Having Health Insurance	
No	35 (26.3)
Yes	98 (73.7)
Having Social Assistance	
No	45 (33.8)
Yes	88 (66.2)
History of COVID-19 infection	
Yes	30 (22.6)
No	103 (77.4)
Information from health worker	
No	96 (72.2)
Yes	37 (27.8)
Vaccination Acceptance	
No	22 (16.5)
Yes	111 (83.5)

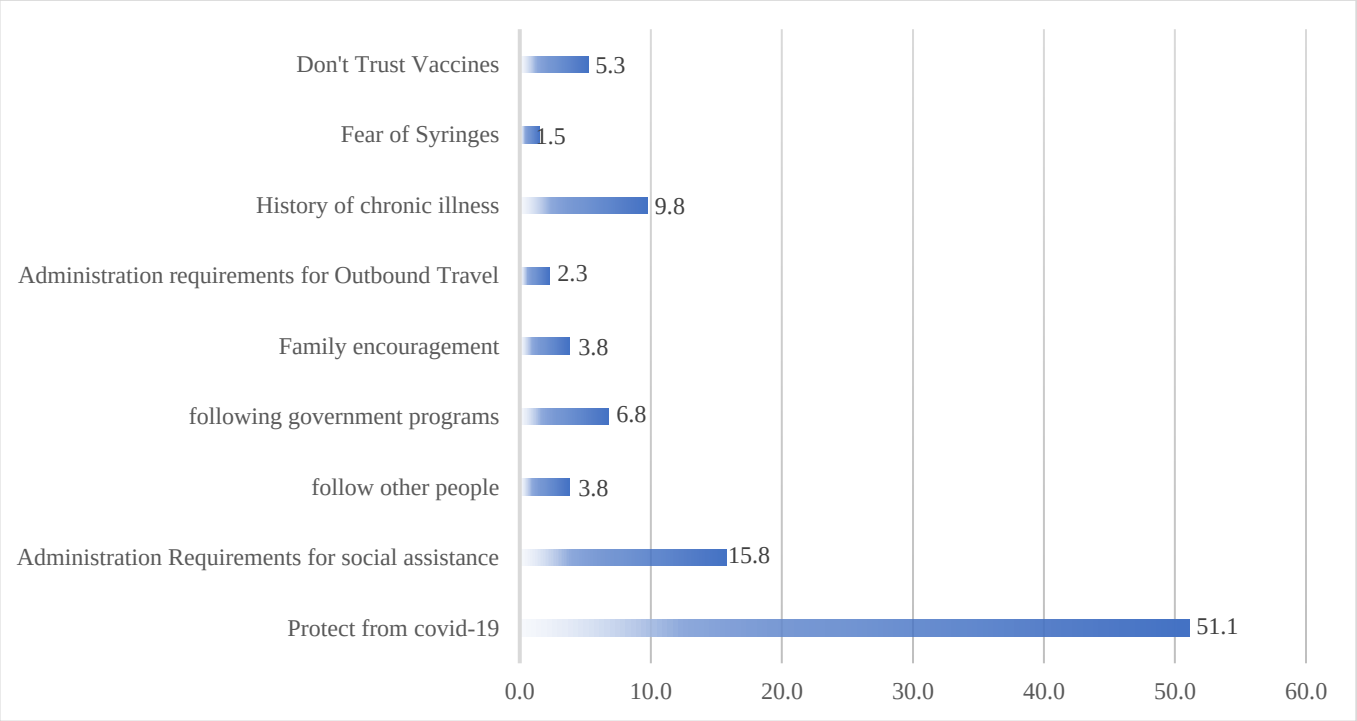

Figure 1. Percentage of reasons for taking/refusing vaccine at Parigi Moutong District Population

Figure 1 illustrates that the main driving force for people in Parigi Moutong to receive the Covid-19 vaccination is to protect themselves against the Covid-19 virus, with 51.1% of respondents citing this reason. Additionally, 15.8% mentioned that they were getting vaccinated because it was a requirement for receiving social assistance, while 6.8% stated that they were following government guidelines. Conversely, individuals who opted against getting the Covid-

19 vaccine had a multitude of rationales for their choice. 9.8% cited a history of chronic illness as the main factor, with 5.3% expressing a lack of trust in vaccines, and 1.5% stating a fear of needles as the reason for their reluctance to get vaccinated.

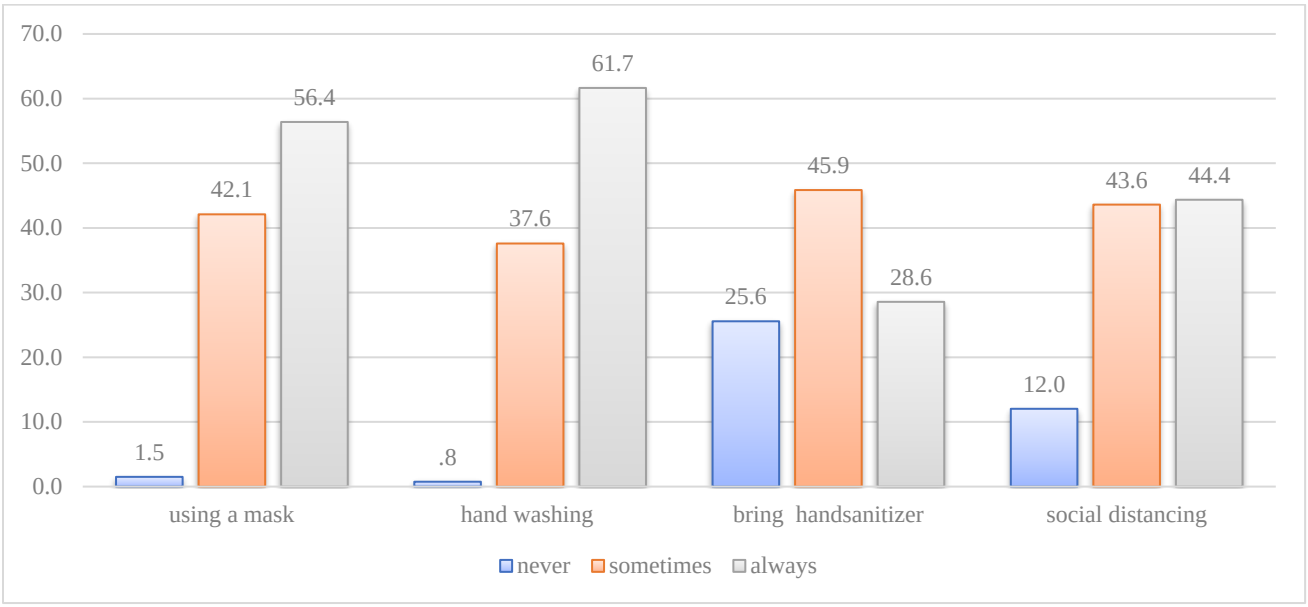

Figure 2. Percentage of behaviour to prevent Covid-19

In Figure 2 provided evident that a majority of respondents, approximately 56.4%, consistently wear masks as a preventive measure against Covid-19. Furthermore, 61.7% of participants reported always washing their hands, while 45.9% admitted to occasionally carrying hand sanitizers. Additionally, the statistic showed that 44.4% of respondents consistently practice social distancing to reduce the risk of virus transmission.

Table 2. Binary logistic regression analyses for Covid-19 vaccination acceptance (n=133)

Variables	Vaccination Acceptance		P-value
	No (%)	Yes (%)	
Age			0.001*
30 – 49 years	5 (8.3)	55 (91.7)	
More than 49 years	10 (45.5)	12 (54.9)	
18 – 29 years	7 (13.7)	44 (86.3)	
Sex			0.780
Female	9 (15.5)	49 (84.5)	
Male	13 (17.3)	62 (82.7)	
Education			0.413
Low	17 (18.3)	76 (81.7)	
Middle-High	5 (12.5)	35 (87.5)	
Occupation			0.944
Unemployed	5 (16.1)	26 (83.9)	
Employed	17 (16.7)	85 (83.3)	
Family Income			0.712
< 1 million	15 (15.8)	80 (84.2)	
≥ 1 million	7 (18.4)	31 (81.6)	
Having Health Insurance			0.390
No	3 (8.6)	32 (91.4)	
Yes	19 (19.4)	79 (80.6)	
Having Social Assistance			0.099*

No	4 (8.9)	41 (91.1)	
Yes	18 (20.5)	70 (79.5)	
History of COVID-19 infection			0.563
Yes	6 (20.0)	24 (80.0)	
No	16 (15.5)	87 (84.5)	
Information from health worker			0.116*
No	19 (19.8)	77 (80.2)	
Yes	3 (8.1)	34 (91.1)	

*Candidate for multivariate analysis

Based on table 2 showed that three variables (age, having social assistance and information from health worker) are the candidate for multivariate analysis (p value < 0.25). Another variable does not include to next analysis (p-value > 0.25).

Table 3. Multivariate predictors for Covid-19 vaccination acceptance

Variables	P-value	OR	95% CI
Age			
30 – 49 years	0.332	0.54	0.158 – 1.866
More than 49 years	0.010	4.76	1.450 – 15.602
18 – 29 years	Reff.		
Having Social Assistance			
No	0.134	0.39	0.117 – 1.333
Yes	Reff.		
Information from health worker			
No	0.243	2.23	0.580 – 8.567
Yes	Reff.		

Based on Table 3 showed that only Age variable (more than 49 years) significant with Covid 19 vaccination acceptance (p-value < 0.05). Age more than 49 years have 4.76 for acceptance vaccination than age 18–29 years.

DISCUSSION

The findings from the binary logistic regression analysis indicated that three factors age, having social assistance, and receiving information from health worker were identified as potential variables for further investigation in the multivariate analysis. During the investigation of factors influencing readiness to accept the Covid-19 vaccination, the investigation unveiled that only age engaged a significant contribution to the vaccine acceptance. People aged 49 and elder individuals were less likely to receive the vaccine compared to the 18-29 age bracket. Elderly individuals tend to have greater access to the vaccine compared to younger populations due to their placement in the priority list, resulting in a quicker vaccination rate among seniors. This suggests a greater level of eagerness among older adults to get vaccinated (9,26). The findings from a study conducted at Undata Hospital revealed that individuals over the age of 45 had a higher mortality rate from Covid-19 as a result of underlying health conditions that hindered their recovery. The incidence of Covid-19 cases and fatalities among the elderly is on the rise due to their weakened immune systems (27). The majority of individuals have raised apprehensions regarding the safety and efficacy of the vaccine. The primary reasons for declining vaccines include worries about their safety, skepticism about their effectiveness, fears of potential side effects like fever and discomfort, and religious considerations concerning the vaccine's halal status (28). The findings from studies conducted at Rawalo Health Center and in Anhui Province have revealed that elderly individuals who possess adequate knowledge about the advantages and possible drawbacks of vaccines are more inclined to engage in vaccination initiatives (29,30).

Immunization plays a crucial role in lowering severe sickness and death rates. Hence, it is essential to prioritize vaccinating the elderly. Despite this fact, a significant number of older individuals in China, especially the older individuals and individuals possessing enduring medical disorders or disabilities are lacking full vaccination coverage, including both initial doses and follow-up boosters, leaving them susceptible to infections (31). Active involvement of individuals in good health during trials of the Covid-19 vaccine could be affected by their social

connections and relationship (32). The results of the study carried out in Sudan revealed that 55.8% of the participants were open to receiving the vaccine, whereas 44.2% expressed hesitancy towards it. The primary reason mentioned for accepting the vaccine was to safeguard oneself and others from getting infected with Covid-19. Various factors, including a prior history of Covid-19 infection, individual attitudes towards vaccines, and recent vaccination experience in the last five years, have been found to be related to increased openness towards accepting vaccination. Interestingly, no specific demographic traits were found to be associated with vaccine acceptance (33). Studies indicate that people from low-income backgrounds are getting Covid-19 vaccines at lower rates, despite being disproportionately affected by the virus. Research indicates that vaccination rates are significantly different based on income levels. For example, only 44% of individuals with annual household incomes under $25,000 have been administered receiving at least one dose of vaccine for Covid-19 (34).

The findings of a study carried out in Brazil contrast with earlier research that discovered no notable connection around age and readiness to accept the Covid-19 vaccination. It was noted that a higher proportion of individuals who were hesitant about accepting the Covid-19 vaccination were female, with lower income and educational backgrounds, as opposed to those who were not hesitant. Additionally, people with existing health issues such as persistent kidney ailment, carcinoma, and fibromyalgia had a higher propensity to show reluctance towards getting the vaccine (35). Various research has demonstrated that individuals with post-secondary education, owning a home, having pre-existing health conditions, and being slightly older or having a higher income are all linked to reduced levels of hesitation towards vaccines, resulting in a decrease of 2-4.5 percentage points (36).

Authorities in Indonesia have implemented rules requiring individuals who require vaccination for protection against Covid-19 so as to qualify for social benefits. The findings of the research indicated that there was no consistent link between receiving social assistance and getting vaccinated. Interestingly, a significant proportion (15.8%) of individuals expressed their willingness to receive the Covid-19 vaccine because it was mandatory to do so in order to receive government-issued financial aid. Research conducted in the United States and Brazil have emphasized the influence of government policies, political determination, and various political aspects on the Covid-19 vaccine distribution. The primary goal of governmental efforts and strategies related to Covid-19 immunization is to reduce the effects of the current pandemic (17,37–40). In Donggala District, researchers discovered that there remained individuals who were not adhering to health guidelines, despite efforts by the Donggala Police to urge compliance and issue warnings (41).

Research conducted in Indonesia using the Technology Acceptance Model (TAM) revealed that a firm conviction in the Covid-19 vaccine advantages resulted in a noticeable rise in its adoption. Moreover, variables like age, employment status, status of relationship, and total monthly earnings were found to have a certain level of association with vaccine acceptance (42,43). The findings of a survey conducted in Saudi Arabia indicated that individuals who had completed university studies and pregnant women in advanced stages of gestation were significantly more willing to receive vaccination. The likelihood of accepting vaccination among this group was found to be 6.120 times higher compared to others, with a significance level of $p = 0.009$. Additionally, individuals who expressed confidence in the safety of vaccines were also more likely to accept vaccination, with an odds ratio of 3.431 and a significance level of $p = 0.001$ (44).

Individuals tending to the plants in the garden willingness to get the Covid-19 vaccine is greatly impacted by the information they receive from health service providers and community organizations (45–49). Unfortunately, there is a prevalent spread of misinformation in relation to the safety and effectiveness of vaccinations within the agricultural worker community. This has resulted in many individuals developing unfounded fears of potential side effects and holding mistaken beliefs that vaccines are unsafe or part of a conspiracy. Furthermore, economic considerations contribute to the level of acceptance of vaccines. Despite the fact that the vaccine of Covid-19 comes at no cost, issues like foregone earnings due to missing work days may serve as obstacles for agricultural workers in obtaining the vaccine (27,50–54).

The researcher acknowledges the constraints in this study, specifically the utilization of a cross-sectional research design which hinders the researcher's ability to establish a direct cause-and-effect relationship between the independent and dependent variables. Furthermore, the implementation of the study during the ongoing Covid-19 outbreak and adherence to health protocols restricted the number of participants. The limited sample size may impact the accuracy of the analysis tests. Therefore, it is suggested that future studies involve a larger sample size and utilize alternative research designs to better identify the causal relationships between variables.

CONCLUSION

The researchers analysed three different variables to determine their potential influence on the readiness of people to embrace the vaccine of Covid-19. Out of these variables, it was discovered that age was the only factor that had a notable effect on vaccine acceptance. The variables related to social assistance and information from health workers showed no effect on vaccine acceptance. Exploring the impact of social support ownership on vaccine acceptance is crucial, as it ranks as the second most influential factor in people's willingness to receive the COVID-19 vaccine. Other factors that warrant additional research include the interplay between socio-demographic characteristics, vaccine knowledge, and trust in the healthcare system. By doing so, we can develop a more comprehensive understanding of the various dynamics that influence vaccination acceptance within the community. It is possible to enforce the mandate for Covid-19 vaccination as a pre-requisite for receiving social assistance, however, it should be done alongside educational campaigns conducted by healthcare professionals to inform the public about the significance of getting vaccinated against Covid-19. This can help build trust and confidence among the public in embracing the Covid-19 vaccine.

AUTHOR'S CONTRIBUTION STATEMENT

IKW was responsible for coming up with the concept and designing the article, collecting and analysing the data, interpreting the results, drafting and revising the article, and giving the final approval for publication. G, MAN, and HA collaborated to develop the article concept, process' the data, critically review the article, and provide final approval for publication. ELM, NDPS, F, and ASR were involved in developing the data analysis and interpretation, and gave final approval for the publication version.

CONFLICTS OF INTEREST

Authors affirm that we are free from any competing interests.

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BIBLIOGRAPHY

1. Terry E, Cartledge S, Damery S, Greenfield S. Factors associated with COVID-19 vaccine intentions during the COVID-19 pandemic; a systematic review and meta-analysis of cross-sectional studies. BMC Public Health. 2022;22(1):1667.
2. Albatineh AN, Dalvand P, Aslani M, Saritas S, Baghi V, Ghanei Gheshlagh R. Prevalence and factors associated with COVID-19 vaccine acceptance among the general population in Asadabad, Iran: a cross-sectional study. Trop Med Health. 2022;50(1):59.
3. Wong CL, Leung AWY, Chung OMH, Chien WT. Factors influencing COVID-19 vaccination uptake among community members in Hong Kong: a cross-sectional online survey. BMJ Open. 2022 Feb;12(2):e058416.
4. Bashirian S, Khazaie S, Barati M, Jenabi E, Soltanian A, Shirahmadi S, et al. COVID-19 Prevention Behaviors among Health Staff: Data from a Large Survey in the West of Iran. J Res Health Sci. 2021 Feb;21(1):e00509.
5. Burggraf C, Milazzo L, Raffle H, Courser MW. Commentary: Stronger Together: The Role of a Rural Community of Practice in Implementing a Culturally Relevant Response to the Opioid Epidemic During the COVID-19 Pandemic. Fam Community Health. 2021;44(3).

6. Soares P, Rocha JV, Moniz M, Gama A, Laires PA, Pedro AR, et al. Factors Associated with COVID-19 Vaccine Hesitancy. Vaccines. 2021;9(3).
7. Khatiwada M, Nugraha RR, Dochez C, Harapan H, Mutyara K, Rahayuwati L, et al. Understanding COVID-19 Vaccine Acceptance among Healthcare Workers in Indonesia: Lessons from Multi-Site Survey. Vaccines. 2024 Jun;12(6).
8. Sidarta C, Kurniawan A, Lugito NPH, Siregar JI, Sungono V, StevenHeriyanto R, et al. The Determinants of COVID-19 Vaccine Acceptance inSumatra. Kesmas. 2022;17(1):32–9.
9. Basta NE, Sohel N, Sulis G, Wolfson C, Maimon G, Griffith LE, et al. Factors Associated With Willingness to Receive a COVID-19 Vaccine Among 23,819 Adults Aged 50 Years or Older: An Analysis of the Canadian Longitudinal Study on Aging. Am J Epidemiol. 2022;191(6):987–98.
10. Yupari-Azabache IL, Díaz-Ortega JL, Bardales-Aguirre LB, Barros-Sevillano S, Paredes-Díaz SE. Factors Associated with the Acceptance of COVID-19 Vaccines in Citizens of Northern Peru: Cross-Sectional Study. Risk Manag Healthc Policy. 2022;15:1705–15.
11. Larki M, Manouchehri E. Dispelling Fake News and Infodemic Management about COVID-19 Vaccination: A Literature Review NewsandInfodem. J Heal Lit. 2022;7(3):91–105.
12. Pullis BC, Hekel PhD RN,Barbara E. MPH, Pullis JD Robert M. LLM. Addressing Vaccine Hesitancy: A Nursing Perspective. J Community Health Nurs. 2024 Apr;41(2):138–44.
13. Hasni Yaturramadhan, Anwar Syahdat. Processing of Red Ginger Powder Drink to Improve the Immune System During the Covid-19 Pandemic . J Public Heal Pharm. 2021 Nov;1(3 SE-Articles):46–8.
14. Susi Yanti, Cory Linda Futri. Correlation between Understanding Covid-19 and Use of Supplements, Pharmacy Study Program Students at Aufa Royhan University in Padangsidimpuan City . J Public Heal Pharm. 2022 Mar;2(1 SE-Articles):4–9.
15. Vanlalduhsaki, Roy S, Laldinmawii G, Patki SM, Sundaram SP. Vaccination and COVID-19 infection among adults aged 45 years and above in a North-Eastern state of India. J Fam Med Prim care. 2022 Oct;11(10):6375–9.
16. Kwok KO, Lai F, Wei WI, Wong SYS, Tang JWT. Herd immunity - estimating the level required to halt the COVID-19 epidemics in affected countries. Vol. 80, The Journal of infection. England; 2020. p. e32–3.
17. Roy DN, Biswas M, Islam E, Azam MS. Potential factors influencing COVID-19 vaccine acceptance and hesitancy: A systematic review. PLoS One. 2022;17(3 March):1–20.
18. Testa A, Sharma BB. Food Insecurity and COVID-19 Vaccination Status and Vaccination Hesitancy in the United States. Fam Community Health. 2023;46(2).
19. Ashar YK, Sari ADP, Ananda D, Utari K. ANALISIS FAKTOR PENERIMAAN MASYARAKAT TERHADAP VAKSIN COVID-19 DI KOTA TEBING TINGGI SELAMA PANDEMI COVID-19. PREPOTIF J Kesehat Masy. 2023 Dec;6(1 SE-Articles):886–93.
20. Romate J, Rajkumar E, Gopi A, Abraham J, Rages J, Lakshmi R, et al. What Contributes to COVID-19 Vaccine Hesitancy? A Systematic Review of the Psychological Factors Associated with COVID-19 Vaccine Hesitancy. Vaccines. 2022 Oct;10(11).
21. Çelik I, Akkaya G. Covid-19 vaccine literacy status of individuals without completed covid-19 vaccine period and implementation of covid-19 vaccine in Turkey: descriptive study. J Heal Lit. 2024;8(4):27–42.
22. Marathe SD, Bassi S, Thapliyal N, Prakshale B, Shah VG, Salunke S, et al. Factors associated with COVID-19 vaccine hesitancy: A community-based household survey in Pune district of Maharashtra, India. J Glob Heal Reports. 2022;6(January 2021):1–9.
23. Ba MF, Faye A, Kane B, Diallo AI, Junot A, Gaye I, et al. Factors associated with COVID-19 vaccine hesitancy in Senegal: A mixed study. Hum Vaccin Immunother. 2022 Nov;18(5):2060020.
24. Ghaznavi C, Yoneoka D, Kawashima T, Eguchi A, Murakami M, Gilmour S, et al. Factors associated with reversals of COVID-19 vaccination willingness: Results from two longitudinal, national surveys in Japan 2021-2022. Lancet Reg Heal – West Pacific. 2022 Oct;27.
25. Oliveira BLCA de, Campos MAG, Queiroz RC de S, Britto e Alves MTSS de, Souza BF de, Santos AM dos, et al. Prevalência e fatores associados à hesitação vacinal contra a covid-19 no Maranhão, Brasil. Rev Saude Publica. 2021 Apr;55 SE-A:12.
26. Parker EP, Tazare J, Hulme WJ, Bates C, Carr EJ, Cockburn J, et al. Factors associated with COVID-19

vaccine uptake in people with kidney disease: an OpenSAFELY cohort study. BMJ Open. 2023 Jan;13(1):e066164.
27. Afni N, Rahayu S. Analysis of risk factors for death of COVID-19 patients at Undata Hospital Palu. J Public Heal Pharm. 2022;2(2):24–9.
28. Herawati, Eka Prasetia Hati Baculu. Correlation of Knowledge and Public Attitude With Vaccination Covid-19 Injection at Sub-Discrit Tuwelei of Tolitoli Regency . J Public Heal Pharm. 2022 Nov;2(3 SE-Articles):55–8.
29. Gunanto G, Septo Pawelas Arso, Rani Tiyas Budiyanti. Evaluation of The COVID-19 Vaccination Program for the Elderly in the Rawalo Health Center With the CIPP (Context, Input, Process, and Product) Model. J Ilmu Kesehat Masy. 2023 Mar;14(1 SE-Articles):98–111.
30. 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 Vaccin Immunother. 2022 Dec;18(1):2024064.
31. Wang G, Yao Y, Wang Y, Gong J, Meng Q, Wang H, et al. COVID-19 non-vaccination among older adults in China: a nationwide survey based on the China Health and Retirement Longitudinal Study (CHARLS). Research square. United States; 2022.
32. Terraneo M, Quaglia V, Nuvolati G, Bani M, Russo S, Strepparava MG, et al. Social capital and willingness to participate in COVID-19 vaccine trials: an Italian case-control study. BMC Public Health. 2022 Nov;22(1):2137.
33. Raja SM, Osman ME, Musa AO, Hussien AA, Yusuf K. COVID-19 vaccine acceptance, hesitancy, and associated factors among medical students in Sudan. PLoS One. 2022;17(4):e0266670.
34. Lalika M, Woods C, Patel A, Scott C, Lee A, Weis J, et al. Factors Associated With COVID-19 Vaccine Acceptance Among Patients Receiving Care at a Federally Qualified Health Center. J Prim Care Community Health. 2023;14:21501319231181880.
35. Vieira Rezende RP, Braz AS, Guimarães MFB, Ribeiro SLE, Abreu Vieira RMR, Bica BE, et al. Characteristics associated with COVID-19 vaccine hesitancy: A nationwide survey of 1000 patients with immune-mediated inflammatory diseases. Vaccine. 2021;39(44):6454–9.
36. Borga LG, Clark AE, D'Ambrosio C, Lepinteur A. Characteristics associated with COVID-19 vaccine hesitancy. Sci Rep. 2022;12(1):12435.
37. Kreps S, Prasad S, Brownstein JS, Hswen Y, Garibaldi BT, Zhang B, et al. Factors Associated With US Adults' Likelihood of Accepting COVID-19 Vaccination. JAMA Netw Open. 2020;3(10):1–13.
38. Kasting ML, Macy JT, Grannis SJ, Wiensch AJ, Lavista Ferres JM, Dixon BE. Factors Associated With the Intention to Receive the COVID-19 Vaccine: Cross-sectional National Study. JMIR Public Heal Surveill. 2022;8(11):1–10.
39. Albrecht D. Vaccination, politics and COVID-19 impacts. BMC Public Health. 2022;22(1):1–12.
40. Seara-Morais GJ, Avelino-Silva TJ, Couto M, Avelino-Silva VI. The pervasive association between political ideology and COVID-19 vaccine uptake in Brazil: an ecologic study. BMC Public Health. 2023;23(1):1–8.
41. Wafika Nur Romadhani. Effectiveness of Donggala Police Socialization in Preventing the Spread of Covid-19 . J Public Heal Pharm. 2023 Nov;3(3 SE-Articles):58–60.
42. Faturohman T, Kengsiswoyo GAN, Harapan H, Zailani S, Rahadi RA, Arief NN. Factors influencing COVID-19 vaccine acceptance in Indonesia: An adoption of Technology Acceptance Model. F1000Research. 2021;10:1–23.
43. Naidoo D, Meyer-Weitz A, Govender K. Factors Influencing the Intention and Uptake of COVID-19 Vaccines on the African Continent: A Scoping Review. Vaccines. 2023 Apr;11(4).
44. Habbash AS, Siddiqui AF. Factors Affecting COVID-19 Vaccine Acceptance among Pregnant Women: A Cross Sectional Study from Abha City, Saudi Arabia. Vol. 11, Vaccines. 2023.
45. Kaur R, Pandey P. Air Pollution, Climate Change, and Human Health in Indian Cities: A Brief Review. Front Sustain Cities. 2021;3(August).
46. Kesetyaningsih TW, Suryanto, Astuti Y. Pelatihan Skrining Penyakit Tidak Menular dan Pencegahannya Bagi Kader Kesehatan. Kaibon Abhinaya J Pengabdi Masy. 2022;4(1):109–14.
47. Melnyk BM, Kelly SA, Stephens J, Dhakal K, McGovern C, Tucker S, et al. Interventions to Improve Mental Health, Well-Being, Physical Health, and Lifestyle Behaviors in Physicians and Nurses: A Systematic

Review. Am J Health Promot. 2020 Nov;34(8):929–41.
48. Sufyan DL, Nurdiantami Y. Peer Influence and Dating as Predictors of Pre-Marital Sexual Behavior Among Indonesia Unmarried Youth. In: International Conference of Health Development Covid-19 and the Role of Healthcare Workers in the Industrial Era (ICHD 2020) [Internet]. Atlantis Press; 2020. p. 235–41. Available from: https://www.atlantis-press.com/article/125946605.pdf
49. Yaturramadhan H, Syahdat A. Processing of Red Ginger Powder Drink to Improve the Immune System During the Covid-19 Pandemic. J Public Heal Pharm. 2021;1(3):46–8.
50. Wartana IK, Kolupe VM, Fajrah S, Rikwan, Gustini. Community Behavior to Prevent Covid-19 and its Associated Factors in North Parigi District. J Public Heal Pharm. 2024;4(1):90–7.
51. Herawati, Baculu EPH. Correlation of Knowledge and Public Attitude With Vaccination Covid-19 Injection at Sub-Discrit Tuwelei of Tolitoli Regency. J Public Heal Pharm. 2022;2(3):55–8.
52. Paul KT, Zimmermann BM, Corsico P, Fiske A, Geiger S, Johnson S, et al. Anticipating hopes, fears and expectations towards COVID-19 vaccines: A qualitative interview study in seven European countries. SSM-Qualitative Res Heal. 2022;2:100035.
53. Suran M. Why parents still hesitate to vaccinate their children against COVID-19. Jama. 2022;327(1):23–5.
54. Garcia de Avila MA, Hamamoto Filho PT, Jacob FL da S, Alcantara LRS, Berghammer M, Jenholt Nolbris M, et al. Children's anxiety and factors related to the COVID-19 pandemic: an exploratory study using the children's anxiety questionnaire and the numerical rating scale. Int J Environ Res Public Health. 2020;17(16):5757.