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Exploring Community Readiness to Participate in COVID-19 Vaccination: A Study from Urban and Rural Areas of Sub-districts in Aceh, Indonesia

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Abstract

Community readiness to receive the COVID-19 vaccination will determine the government's success in preventing the spread of COVID-19. Community readiness to participate in vaccination is closely related to information on vaccine ingredients (halal) and the positive and negative effects of the COVID-19 vaccine. Several factors related to the community's readiness to participate in the COVID-19 vaccination, namely: confidence, complacency, constraints, calculation, collective responsibility, compliance, and conspiracy. The aim of this study was to identify the differences in community readiness for COVID-19 vaccination in two sub-districts in Aceh, Indonesia. A comparative study with a retrospective design was used in this study. The sampling was 200 people who had carried out the COVID-19 vaccination for two sub-districts. The samples were obtained by using a purposive sampling method. The data were collected using a standardized questionnaire, "the 7C Vaccination Readiness Scale Questionnaire". The Mann-Whitney u-test revealed that, generally, the community readiness in two sub-districts to participate in COVID-19 vaccination was different ($p=0.003$). The sub-scales of community readiness in COVID-19 vaccination of complacency ($p=0.003$), constraints ($p=0.000$), calculation ($p=0.012$), and collective responsibility ($p=0.000$) showed significant differences. However, no difference in readiness on confidence ($p=0.053$), compliance ($p=0.051$), and conspiracy ($p=0.419$). The results of this study found sociodemographic factors such as religion and belief, highest education level, support systems, and information about the COVID-19 vaccination could be related to the research findings.

Keywords: community, readiness, participate, vaccination, COVID-19

Introduction

Coronavirus disease 2019 (COVID-19) is a type of infectious disease originating from the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) virus, which attacks the respiratory system and can be transmitted by droplets with an incubation period of 1-14 days, characterized by the appearance of signs and symptoms of high fever, respiratory problems, and can cause death in severe cases (Sukmana & Yuniarti, 2020). The virus spread to all countries, including Indonesia (reported in March 2020), showing the highest case data in Southeast Asia (Susilo et al., 2020). The prevalence of COVID-19 continues to increase, reaching 6.02 million people in Indonesia confirmed positive for COVID-19, and 155,164 people died (Worldometer, 2022). WHO has established COVID-19 as a global infectious disease with a swift rate of spread through contact with people infected with COVID-19 infection (Octafia, 2021). The possible risk factors for the deterioration of the COVID-19 infection, identified older age as the main factor followed by comorbidities such as arterial hypertension, cardiovascular diseases, and blood counts problems also had significant contribution (Djurdjevic et al., 2023). The COVID-19 pandemic impacted the community's physical, psychological, psychosocial, and spiritual conditions worldwide (Husna, Safitri, et al., 2022),



and also affected educational opportunities, job prospects, mental health well-being, economic and financial stabilities (Turkmen & Tekedere, 2022).

The government has attempted various ways to reduce the spread of COVID-19 by limiting physical distancing, requiring wearing masks, implementing personal hygiene, and conducting vaccination efforts (Tetteh et al., 2021). Based on data from Our World in Data for 2022, as of March 2022, 64.5% of the world's population and 58.2% of Indonesia's population had received the COVID-19 vaccination. According to data from the Aceh Health Service, as of September 2021, Banda Aceh is the highest area participating in vaccination, with 62.8% and 42.0% of the community vaccinated with doses 1 and 2, respectively. Meanwhile, Aceh Besar District is the lowest area receiving vaccination, with only around 12.6% and 7.1% vaccinated with doses 1 and 2 (Rengganis, 2021).

Readiness to take the COVID-19 vaccination can vary between individuals and regions. Vaccination programs can be carried out voluntarily if individuals have a good level of readiness in their willingness to receive vaccines which can be influenced by the level of awareness and belief regarding the effectiveness of vaccination (Samanta et al., 2022). Readiness to participate in the COVID-19 vaccination can be influenced by various factors that have the potential to either increase or decrease individual intentions toward receiving vaccines. These factors include confidence, compliance, constraints, calculation, collective responsibility, compliance, and conspiracy (Geiger et al., 2022). Those factors related to readiness to participate in vaccination program as main variables conducted in this study. Confidence relates to trust in the effectiveness and safety of the COVID-19 vaccine and the institutions or parties tasked with managing the safety of the vaccine (Endarwati, S., R et al., 2022). Compliance relates to behavior in limiting oneself to reduce the impact of COVID-19 transmission, such as compliance in maintaining physical distance or avoiding crowds, behavior shown will have an impact on readiness to receive COVID-19 vaccination (Lachowicz-Tabaczek & Kozłowska, 2021). Constraints are barriers that can be influenced by psychological conditions that reduce the intention to vaccinate, and structural barriers that can make access difficult for implementing COVID-19 vaccination. Calculation involves community involvement in calculating the risk of infection and the risks of COVID-19 vaccination that can arise from both formal and non-formal sources. Collective responsibility related to individual responsibility and willingness to vaccinate against COVID-19 to protect society through a group immune system or herd immunity. Therefore, the responsibility of the community in forming herd immunity can be further increased to protect other people from transmission of the COVID-19 (Endarwati, S., R et al., 2022). Lastly, conspiracy related to a positive and negative information received by the community regarding the COVID-19 vaccine, thus influencing their attitudes and behavior in accepting or refusing to vaccinate against COVID-19 (Khotimah & Fauzia, 2022).

Moreover, data obtained from the Aceh Health Service in September 2021 revealed that the urban area of Banda Aceh exhibited the highest vaccination participation rates, with percentages of 62.8% and 42.0% recorded for the first and second vaccine doses, respectively. In contrast, the rural district of Aceh Besar demonstrated the lowest engagement in vaccination, accounting for merely 12.6% and 7.1% for the first and second doses (Rengganis, 2021). Reported that selection of research sites where a vaccination coverage gap existed in two specific sub-districts: Syiah Kuala in Banda Aceh and Baitussalam in Aceh Besar. This choice was informed by the need to address the vaccination coverage deficiency in the Syiah Kuala sub-district, as it was imperative to enhance participation to realize the objective of collective responsibility against COVID-19 exposure. Moreover, the geographical proximity and shared characteristics of these strategically situated coastal sub-districts in Aceh Province influenced their selection. As of July 2022, the data indicates that 7,765 individuals in the Syiah Kuala sub-district have received vaccinations. Local authorities are actively engaging stakeholders within the sub-districts to increase vaccination rates. This concerted effort is being facilitated through the implementation of mandatory vaccination policies (Saman, 2021).

Based on data from Aceh Besar District Health Office in September 2022, the vaccination coverage in the Baitussalam sub-district, Aceh Besar, encompassed 6,970 individuals (Razali, 2021). Furthermore, a survey by the Ministry of Health in October 2021 reported that Aceh is an area in Indonesia with the lowest willingness to receive vaccines. Several factors are interrelated in the attitudes prevalent among the people of Aceh, encompassing concerns about vaccine safety and efficacy, the level of confidence associated with vaccines, and the dissemination of vaccine-related conspiracy theories and misinformation about ingredient sources. The government has enacted policies to incentivize community-wide vaccine uptake by mandating vaccinations as a prerequisite for accessing education, engaging in employment, and participating in various other activities.

This research was conducted in two sub-districts, namely the urban and rural areas of Aceh, Indonesia. Urban areas facilitate quicker and more accessible information dissemination, particularly concerning the efficacy and components of the COVID-19 vaccination, in contrast to rural regions. This situation has prompted this research to identify differences in community readiness for engaging in COVID-19 vaccination initiatives. The findings of this study hold the potential to inform the formulation of policies by the government and policymakers. These policies can subsequently enhance community involvement in local and national governmental programs. The study aimed to identify the community readiness to participate in the COVID-19 vaccination in two sub-districts (urban dan rural areas) of Aceh, Indonesia by using the 7 C factors related to vaccination readiness of COVID-19.

Methods

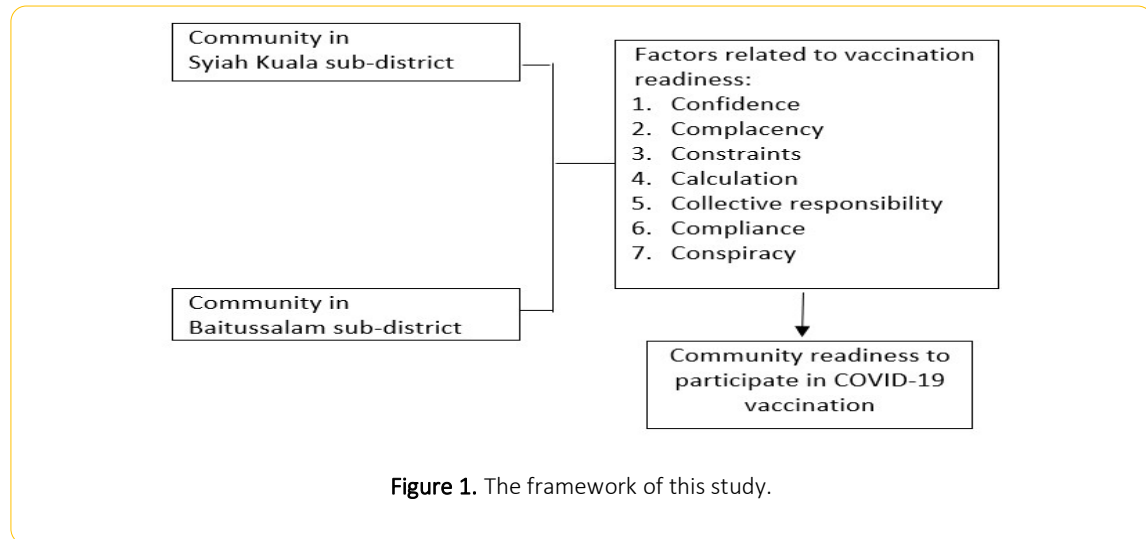
Study design

This study employed a retrospective comparative design. The retrospective research was the study in the form of an evaluation of events that have occurred and aims to look for factors related to the causes (Sugiyono, 2017). According to this design, the study is suitable for the research objective was to evaluate the difference in community readiness to participate in COVID-19 vaccination which was carried out in 2021 in two different sub-districts in the Banda Aceh (urban area) and Aceh Besar (rural area). The research was carried out in 2022 across two sub-districts in Aceh, Indonesia. The sample size using a Slovin formula to identify the sampling technique. The simple random sampling used in this study with a total of 200 individuals who had undergone COVID-19 vaccination in two sub-districts with each sample size being 100 people in each sub-district. For Syiah Kuala sub-district there were 10 villages involved in this study (Jeulingke, Tibang, Deah Raya, Tibang, le Masen Kayee Adang, Kampung Pineung, Lamgugob, Kopelma Darussalam, Rukoh, and Peurada). Furthermore, in Baitussalam sub-district there were 13 villages involved (Blang Krueng, Baet, Cadek, Kajhu, Cot Paya, Lambada Lhok, Klieng Cot Aron, Miruek Lamreudep, Klieng Meuria, Lampineung, Lam Asan, Labuy, and Lam Ujong). These villages have been selected using proportional sampling according to data obtained from the Community Health Center and were representative of the two sub-districts.

Study location: The selection of these two sub-districts have represented the rural and urban areas in term of geographically (distance to the downtown), population density, socio-demographic, socio-economic, cultural, and infrastructure have significant differences. For urban area accessibility to the downtown and other facilities, education attainment, occupations, socio-cultural, and the availability of infrastructure such as health care and public facilities that are reachable compared to rural area.

The sampling criteria included: 1) Respondent is ≥ 18 years old, 2) Domiciled in the working area of the Syiah Kuala, Banda Aceh (urban area) and Baitussalam, Aceh Besar sub-districts (rural area), Indonesia, and 3) Vaccinated at least one dose of the COVID-19 vaccination.

The framework of this study showed as a follow:



Data Collections

Data collection was carried out in November 2022. The instrument was "The 7C Vaccination Readiness Scale (VRS)," which consisted of 21 items on a 7-point Likert scale to measure the community readiness to participate in the COVID-19 vaccination. The instrument consisted of seven sub-scales: confidence, complacency, constraints, calculation, collective responsibility, compliance, and conspiracy. VRS measured eight domains of community readiness to vaccinate, namely: 1) confidence, to measure vaccine side effects, scientific safety of vaccine tests, and government policy to protect of vaccines, 2) complacency, to measure the urgency of COVID-19 vaccination, the target group for COVID-19 vaccination 19, 3) constraints, measuring acceptance, rejection and benefits of vaccination, 4) calculation, measuring the positive and negative effects of vaccines, and considering the need for vaccination, 5) collective responsibility, measuring behaviour to protect vulnerable groups and other people from vaccinating, and fighting the spread of COVID-19, 6) compliance, measuring compliance in carrying out vaccinations, and prohibitions or sanctions for people who do not vaccinate, and 7) conspiracy, measuring positive and negative information obtained by the public about the complications and composition of vaccines. Each sub-scale consisted of 3 items.

The data consists of demographics: age, gender, last education, occupation, marital status, information about COVID-19 vaccination, and COVID-19 vaccination status. Demographic data in this study was only used for frequency and percentage of data respondents, however, detailed analysis was not carried out to assess the relationship between these variables and COVID-19 vaccination readiness factors. Hopefully future research could be considered for detailed analysis. Data on respondents who had vaccinated doses 1 and 2 were obtained from medical records at the Community Health Centers (Puskesmas) of these two sub-districts.

The assessment was obtained from the cut-off point calculation. The 7C Vaccination Readiness is a standardized questionnaire tested for validity and reliability, with the Cronbach alpha coefficient ranging between 0.84 and 0.92, respectively. The 7C Vaccination Readiness Scale (VRS) is in the original English version and has been tested for validity and reliability by Geiger et al., (2022). Each item from the VRS has not been changed/modified because in the Acehnese context all these items could be used to measure the community's readiness to vaccinate against

COVID-19. This instrument has been back translated by English experts and Indonesian language (Bahasa) to determine the accuracy and suitability of the appropriate context for use.

Statistical analysis

The statistical analysis in the study employed a univariate frequency distribution test to identify demographic data and COVID-19 vaccination readiness among the community. Meanwhile, bivariate analysis was done by the Mann-Whitney u-test to identify mean differences in community readiness to participate in COVID-19 vaccination.

Ethical Consideration

This study is consistent with the Declaration of Helsinki. The study has approved by the Nursing Ethics Committee from the Faculty of Nursing, Universitas Syiah Kuala, Banda Aceh, Indonesia (Ref. 111049131022).

Results

The study results showed differences in the community readiness to participate in COVID-19 vaccination in two sub-districts. There were differences in complacency, constraints, calculation, and collective responsibility factors in readiness to participate in COVID-19 vaccination. However, there were no differences in the compliance and conspiracy factors. Sociodemographic of the respondents are shown in Table 1.

Table 1. The Socio-demographic Data of the Respondents (n=200).

Characteristics of respondents	Sub-district			
	Syiah Kuala sub-districts		Baitussalam sub-districts	
	f	%	f	%
Age (M ± SD)	28,15±11,58			
Gender				
Male	42	42.0	40	40.0
Female	58	58.0	60	60.0
Religion				
Islam	99	99.0	100	100.0
Christian	1	1.0		
Highest Education Level				
Primary and secondary school	1	1.0	1	1.0
High school	70	70.0	84	84.0
University	29	29.0	15	15.0

Characteristics of respondents	Sub-district			
	Syiah Kuala sub-districts		Baitussalam sub-districts	
	f	%	f	%
Occupation				
Unemployed	12	12.0	31	31.0
Student	49	49.0	41	41.0
Self-employed	25	25.0	25	25.0
Farmer/fisherman	2	2.0	1	1.0
Civil Servant	11	11.0	2	2.0
Retired	1	1.0	0	0
Marital Status				
Single	58	58.0	54	54.0
Married	38	38.0	43	43.0
Widower	4	4.0	3	3.0
Information on COVID-19 vaccination				
Printed Media	19	19.0	21	21.0
Social Media	81	81.0	79	79.0
COVID-19 vaccination				
Dose 1	28	28.0	30	30.0
Dose 2	72	72.0	70	70.0

Table 1 presented the mean and standard deviation of respondents' age, which averaged 28.15 ± 11.58 years, at a very productive age to internalize information to make the right decision in receiving vaccination. In both sub-districts, the majority of respondents were female (>58%), where female is more confident and quicker in making decisions in receiving positive information than male. Also, adherents of the Muslim faith (99%) where religion and belief could be the basis for making protective efforts (*ikhtiar* in Muslim perspective) against dangerous disease infections, and possessed a high school education (>70%) where they can accept and reject the receipt of information about COVID-19 based on reality/condition. Approximately 40% of respondents were students, with around 80% receiving information about COVID-19 vaccination through social media. Moreover, more than 70% of respondents had completed both doses of the COVID-19 vaccination, where they have been vaccinated based on consideration of government policies, information about the benefits of vaccines, the dangers posed if they do not vaccinate, and the desire not to endanger other people/society from COVID-19 infection through the formation of herd communities.

The community readiness to participate in the COVID-19 vaccination in two sub-districts are shown in Table 2.

Table 2. The Community Readiness to Participate in the COVID-19 Vaccination (n=200).

No	Sub-district	COVID-19 vaccination readiness			Mean Rank	p-value
		Not ready	Ready	Fully ready		
1	Syiah Kuala (urban area)	1	57	42	110.86	0.003
2	Baitussalam (rural area)	6	70	24	90.14	

Table 2 showed there are differences in the community readiness to participate in COVID-19 vaccination at the two sub-districts, with the mean readiness in urban areas (110.86) being higher than in rural areas (90.14) ($p=0.003$). The data interpreted that community are living in Syiah Kuala sub-districts (urban area) have a higher readiness to vaccinate against COVID-19 than they are living in Baitussalam sub-districts. These two areas have differences in terms of population density, socio-economic status, education levels, availability of healthcare facilities, public services and transportation, and economic activities or occupations.

The sub-variables the community readiness to participate in COVID-19 vaccination in two sub-districts are shown in Table 3.

Table 3. Sub-variables the Community Readiness to Participate in COVID-19 Vaccination (n=200).

Table 3: Sub-variables and community readiness to participate in COVID-19 Vaccination (N=200).										
No	Sub-variable	Sub-district								p-value
		Syiah Kuala sub-districts (Urban area)				Baitussalam sub-districts (Rural area)				
		Not ready	Ready	Fully ready	Mean rank	Not ready	Ready	Fully ready	Mean rank	
1	Confidence	2	30	68	107.25	14	28	58	93.75	0.053
2	Complacency	4	49	47	111.16	10	62	28	89.84	0.003
3	Constraints	4	43	53	114.11	19	49	32	86.90	0.000
4	Collective responsibility	2	10	88	115.56	8	34	58	85.44	0.000
5	Compliance	5	46	49	107.70	13	49	38	93.30	0.051
6	Conspiracy	7	68	25	103.33	16	58	26	97.67	0.419
7	Calculation	0	73	27	91.59	0	57	43	109.4	0.012

Table 3 illustrated the disparities in community readiness between the two sub-districts concerning complacency, constraints, collective responsibility, and calculation toward COVID-19 vaccination participation. Conversely, no significant differences were observed regarding confidence, compliance, and conspiracy sub-variables of community readiness in both sub-districts for COVID-19 vaccination. Furthermore, the table underscores that the urban area exhibited higher levels of readiness for participating in COVID-19 vaccination compared to the rural area. Socio-demographic conditions (age, gender, educational attainment, financial, employment sector, government trust, availability and affordability of healthcare facilities, public transportation, and knowing someone with severe COVID-19 symptoms are several factors could be contributed to the results of this study.

Table 3 showed that most of the urban and rural community are classified as ready to participate in the COVID-19 vaccination (57% and 70%, respectively).

Discussion

Community readiness to participate in vaccinations is influenced by positive perceptions of the vaccination program, fostering a strong sense of confidence in participating in COVID-19 vaccination efforts (Khotimah & Fauzia, 2022). The readiness for COVID-19 vaccination varies widely across individuals and regions. Vaccination readiness is determined by various factors that either augment or diminish an individual's inclination toward receiving vaccinations. The factors include vaccination readiness, comprising confidence, complacency, constraints, calculation, collective responsibility, compliance, and conspiracy (Geiger et al., 2022).

Overall, the results of the study on 200 respondents in two sub-districts showed that the community indicates a prevailing readiness within the community for the COVID-19 vaccination. According to sociodemographic data find reinforcement in specific demographic parameters, such as the average age of respondents at 28 years. This age group is recognized as productive and often associated with making well-informed decisions concerning personal health, particularly when averting COVID-19 infection (Farina, 2021). Education also plays a significant role in shaping individual readiness for vaccination. Higher levels of education tend to facilitate the comprehension and assimilation of provided information. Additionally, social media is a prominent platform frequently used by the community for sharing health-related insights regarding COVID-19 prevention strategies. This pervasive presence of health information on social media significantly impacts community perspectives, potentially increasing perceptions of readiness for vaccination (Ririansyah & Efendy, 2022). The predominant readiness within the community to undergone COVID-19 vaccination, a state influenced by positive perceptions that cultivate a heightened willingness to participate in the vaccination program (Khotimah & Fauzia, 2022). The urban area showcases a higher percentage of individuals classified as "fully ready" – comprising 42% of the respondents, as opposed to the rural area, where this proportion is 24%. From a broader perspective, this study's outcomes underscore the positive state of readiness among the community to engage in COVID-19 vaccination. Furthermore, demographic data such as age, religion, educational background, occupation, marital status, and exposure to information regarding COVID-19 vaccination are identified as several factors may be influence the community readiness for vaccination across both sub-districts.

The average age of respondents who have carried out the COVID-19 vaccination in the two sub-districts was 28 years. It is a productive age where individuals can choose and make the right decisions regarding their health. This is in line with the study reported that a more mature or productive age can influence individuals in their attitude toward decision-making; a more mature age has maturity in thinking so they can make good decisions concerning their health in preventing COVID-19. Furthermore, the majority of respondents were Muslim (99.5%). Infectious diseases, such as COVID-19, are acknowledged as epidemics within Islam, and the Qur'an addresses such occurrences. This recognition often leads to widespread acceptance and concerted efforts to counteract the disease, one of which is through vaccination (Isnaini et al., 2021). It is in line with study explained that most people consider spiritual beliefs to be the best way to deal with illness; religious leaders also suggest that the community can play an active role in preventing COVID-19 disease (Ririansyah & Efendy, 2022).

Concerning marital status, most respondents were classified as single and lived with their parents (56.0%). The existence of social support from family, friends, partners, and health workers can influence individual behavior in preventing COVID-19. The family is the closest environment for individuals who can provide strong influence and support. The family also has a role and responsibility for their health and other family members. Families can also be a source of information to motivate individuals to implement COVID-19 prevention behaviors, including encouraging family members to be ready to participate in the COVID-19 vaccination (Kundari et al., 2020). This notion agrees with the study stated that family members need family support when participating in the COVID-

19 vaccination. In addition to information and motivation, families extend support by arranging transportation and facilitating convenient access to COVID-19 vaccination sites for their members (Yuniarti et al., 2022). Also, most respondents had received information about the COVID-19 vaccination through social media, with 80.0% and 71.0% taking the first and second vaccination doses. Social media is a medium for sharing and exchanging health information, including those related to the prevention of COVID-19. The public generally obtains information about COVID-19 through social media, influencing their views and forming perceptions of readiness to participate in the COVID-19 vaccination program (Ririansyah & Efendy, 2022).

Confidence is related to trust in the effectiveness and safety of the COVID-19 vaccine and trust in institutions and authorities administering the vaccines (Endarwati, S., R et al., 2022). A study in Switzerland found that several countries in Asia have a higher level of trust in governments that run effective COVID-19 vaccination programs, leading to a more positive attitude toward accepting vaccines (Lin et al., 2021). This study found no significant difference in the confidence levels of community readiness for COVID-19 vaccination between the two sub-districts. This finding can be attributed to demographic data affecting individual confidence in taking the COVID-19 vaccination. In both sub-districts, most respondents were female, with female generally exhibiting a higher confidence in their willingness to receive the COVID-19 vaccine than male. In addition, the highest education level of the respondents is high school. It is observed that a higher level of education facilitates a smoother acceptance of COVID-19 vaccination recommendations provided by authorities or the government (Lazarus et al., 2020).

Complacency or self-satisfaction is related to the perceived risk of disease transmission; if an individual perceives COVID-19 as non-infectious and can be prevented without vaccine administration, undertaking COVID-19 vaccination activities may be deemed unnecessary (Endarwati, S., R et al., 2022). There are differences in complacency in community readiness to participate in the COVID-19 vaccination in the two sub-districts, which can be related to their sociodemographic conditions affecting individual satisfaction in the COVID-19 vaccination. The living conditions of urban individuals who engage in more frequent interactions with the external environment necessitate a greater adherence to health protocols to prevent COVID-19 transmission. This contrasts the rural community, where daily activities often entail less exposure to crowded environments outside their immediate surroundings. This is confirmed by study stated that the urban population demonstrates a higher degree of vigilance in safeguarding themselves and adhering to health protocols for COVID-19 prevention compared to their rural counterparts. This inclination is attributable to the more active lifestyle in urban settings, characterized by frequent outdoor engagements and exposure to crowded situations, rendering them more susceptible to COVID-19 transmission risks. In contrast, rural communities typically spend limited time outside their homes due to the proximity of their residences to their workplaces (Surtimanah et al., 2021).

Constraints encompass barriers that can be influenced by psychological factors, diminishing the inclination towards vaccination. These constraints can manifest as structural obstacles, impeding smooth access to COVID-19 vaccination implementation. Constraints are related to obstacles that can be influenced by psychological conditions, reducing the intention to be vaccinated. These constraints can manifest as structural obstacles, impeding smooth access to COVID-19 vaccination implementation (Endarwati, S., R et al., 2022). In this study, respondents exhibited good readiness to engage in COVID-19 vaccination, as evidenced by their perception of constraints. Respondents regarded timely COVID-19 vaccination as significant and recognized vaccines as a crucial concern, prompting them to prioritize the acquisition of COVID-19 vaccinations.

The two sub-districts had different constraints on community readiness for the COVID-19 vaccination. This finding may also be related to sociodemographic conditions. The limited access to transportation for people in rural areas can prevent them from going to the COVID-19 vaccination location. In contrast, urban communities living in areas with a larger population and working in offices use public transportation more often, benefiting from more accessible access to COVID-19 vaccination locations (Surtimanah et al., 2021).

Calculations are related to community involvement in calculating the risk of infection and the risk of COVID-19 vaccination (Endarwati, S., R et al., 2022). In this study, respondents had low readiness to participate in the COVID-19 vaccination due to the perceived high level of calculation, where respondents took the vaccine because the benefits or advantages were far greater than the disadvantages and risks

This study revealed the differences in calculations on community readiness to participate in the COVID-19 vaccination between the two sub-districts. Sociodemographic conditions can influence the level of calculation individuals feel when considering participation in the COVID-19 vaccination. Regarding the mobility of people in urban areas, characterized by frequent activities outside the home and office work, the necessity for a vaccine card to facilitate these engagements becomes pronounced. Consequently, urban communities use vaccines more as an administrative requirement, especially for activities traveling outside the region and abroad. This is in line with study highlighted the impact of policies mandating vaccine cards as a prerequisite for accessing public places can affect people's readiness to participate in the COVID-19 vaccination, where the public views vaccines as a means to gain the advantage of unrestricted movement (El Darman, 2021).

Collective responsibility is related to the willingness of individuals to vaccinate against COVID-19 to protect others through forming a group immune system (herd immunity) (Endarwati, S., R et al., 2022). In this study, respondents had high readiness to participate in the COVID-19 vaccination due to their high level of collective responsibility. The respondents took part in the COVID-19 vaccination because they considered that the COVID-19 vaccine could protect vulnerable/at-risk groups; the COVID-19 vaccine as a joint task in fighting the spread of disease, and the COVID-19 vaccine can protect others through herd immunity.

The collective responsibility in the community's readiness to participate in the COVID-19 vaccination in the two sub-districts showed a significant difference, which can also be influenced by sociodemographic conditions. The higher population size in urban areas compared to rural areas forces the community to pay more attention to the risk of transmission of COVID-19 disease, so prevention must be further enhanced by establishing a herd immunity system through COVID-19 vaccination. The previous study argued that high population density in an area could increase the exposure of relationships between individuals, increasing the risk of transmission of COVID-19 (Edriani et al., 2021; Ernawati, 2021) Therefore, the responsibility of community groups in forming herd immunity can be further enhanced to protect others from the transmission of COVID-19 disease.

The mitigating the COVID-19 pandemic requires personal and collective efforts, fostering a sense of shared responsibility in protecting both individual well-being and the health of the broader community (Lachowicz-Tabaczek & Kozłowska, 2021). The vaccination rate of approximately 67% to 95%, known as herd immunity, protects individuals who cannot receive the vaccine due to medical considerations. This safeguard is essential for individuals with medical conditions or a history of illnesses that render them ineligible for vaccination (Anderson et al., 2020). Furthermore, there is a high sense of collective responsibility for the COVID-19 vaccination, forming herd immunity to help protect others, especially those vulnerable/at risk of transmission of COVID-19 (Maglica & Šincek, 2022).

Compliance is related to self-limiting behavior to reduce the impact of transmission of COVID-19, such as adherence to physical distancing or avoiding crowds (Lachowicz-Tabaczek & Kozłowska, 2021). In this study, research respondents had high readiness to participate in the COVID-19 vaccination due to their high level of compliance, where respondents agreed to the imposition of a ban on crowds in public activities when people did not vaccinate against COVID-19 and imposed sanctions when people do not comply with the recommendations of the authorized health agency.

The finding showed no difference in compliance of the community to take the COVID-19 vaccination between the two sub-districts. Due to access to COVID-19 information, residents in urban and rural areas complied with

government recommendations regarding COVID-19 prevention behavior. In addition to social media, indicated that the public availed themselves of information sources provided by community leaders and local government announcements, and they demonstrated compliance with penalties and sanctions concerning COVID-19 prevention measures (Lalot et al., 2021). Adherence to health-protecting behaviors, such as maintaining social distancing and implementing hygiene behaviors, will reduce the possibility of transmitting COVID-19 disease to others (Lachowicz-Tabaczek & Kozłowska, 2021; Wise et al., 2020). Individuals' attitudes and behaviors can impact community readiness for vaccination towards adhering to government regulations for COVID-19 prevention. This association is linked to heightened public awareness, fostering motivation to diligently adopt COVID-19 preventive behaviors (Lalot et al., 2021).

Conspiracy is related to information circulating about the COVID-19 vaccine; accurate information about vaccines will influence people's attitudes and behavior in accepting or rejecting the COVID-19 vaccine (Khotimah & Fauzia, 2022). In this study, the respondents demonstrated high readiness to participate in the COVID-19 vaccination due to limited adherence to conspiracy beliefs. They disagreed with the statements "COVID-19 vaccination causes more serious illness and allergies" and "The COVID-19 vaccine contains ingredients toxic chemicals". This observation aligns with the findings indicated that the COVID-19 vaccine contributes to enhanced protection through reduced susceptibility to infection, effectively prevents the transmission of COVID-19 infections, and may reduce the severity of other diseases (Liu & Lou, 2022).

On the other hand, rejection of the COVID-19 vaccine can stem from prevailing concerns about vaccines allegedly containing hazardous components that could trigger other diseases. Previous study also mentioned that the reasons for refusing a COVID-19 vaccination might be related to the low perceived benefit of vaccination, low perceived risk of contracting COVID-19, health concerns, lack of information, systemic mistrust, and spiritual or religious reasons (Fieselmann et al., 2022). Moreover, beliefs about the effectiveness of COVID-19 vaccination may impact an individual's attitudes, subjective norms, and acceptance. Individual awareness has a strong positive influence on COVID-19 vaccine acceptance. The perceived usefulness of vaccination and the perceived ease of obtaining the vaccine impact attitude and the acceptance of vaccination. Individuals' positive attitudes toward vaccination positively impact vaccine acceptance in the community (Akther & Nur, 2022). In addition, vaccine willingness was significantly associated with respondents' characteristics such as age, gender, educational attainment, household size, financial situation, employment sector, underlying medical conditions, mental well-being, government trust, knowing someone with severe COVID-19 symptoms, and compliance with restrictive measures (Valckx et al., 2020).

Concerning conspiracy beliefs, this study found no difference in a conspiracy in the readiness of the community to participate in the COVID-19 vaccination across the two sub-districts. Educational attainment, particularly at the high school level, can enable the community to access information that augments their comprehension of COVID-19 vaccination. Profound understanding, in turn, affects community readiness to participate in the COVID-19 vaccination. Acquiring substantial knowledge concerning health conditions can heighten individuals' inclination toward COVID-19 vaccination. This assertion aligns with study insights indicating that solid health awareness amplifies interest in receiving the COVID-19 vaccine, whereas a lack thereof diminishes readiness for vaccination (Isnaini et al., 2021). Finally, implementing several health protocols underscores prioritizing the control and containment of COVID-19 transmission. These include 1) prevention efforts (promote and protect; vaccination), 2) case-finding efforts (detect), and 3) fast and effective handling (response) (Husna, Furqan, et al., 2022).

In general, the results of the study showed there are differences in community readiness to participate in COVID-19 vaccination in both urban and rural areas. Several factors contributed to the results, such as: population density, socio-economic status, education levels, availability of healthcare facilities, public services, and transportation, Economic activities or occupations in each area. The community who lives in urban areas have

access to healthcare facilities and public transportation as well as better availability, adequacy and access to information related to COVID-19 vaccination compared to rural areas. Apart from that, factors of trust and values held by community in rural areas, such as vaccination, are not very useful in overcoming the spread of COVID-19 and the side effects caused by obstacles in receiving accurate information. Therefore, it is very necessary to build communication and trust between the community and health care workers in providing appropriate and accurate information to increase participation in the vaccination program. This is in line with previous study by Moucheraud et al., (2024) reported that there is a need to develop strategies for health care workers on how to address safety concerns about vaccines, and building trust in the health care system, health workers and the community. The other study, also mentioned that it is crucial to involve healthcare professionals and governmental entities to promote the health benefits and efficacy of the COVID-19 vaccine. These efforts should prioritize the enhancement of community trust and the broader acceptance of vaccination (Husna et al., 2023).

The implications of the results of this study showed there are 3 sub-variables that are significantly different between these two sub-districts, namely in terms of: 1) confidence or different levels of public trust in the benefits and advantages and side effects of the COVID-19 vaccine, 2) compliance, namely the level of community adherence in receiving the COVID-19 vaccination by considering the negative impacts that will arise if they do not vaccinate, and 3) conspiracy, which is related to information and the composition of the vaccine, both positive and negative, these two areas receive different information regarding the benefits of vaccines, their dangers and side effects of vaccine, could be accessed from several formal and informal sources and social media. It is important to involve and build trust in health care workers and the community regarding information on the effectiveness of vaccine injections which can form better immunity in fighting the spread of COVID-19. This is in line with previous study reported that people who received two booster shots reduced the risk of fever during the omicron surge and those who received a booster shot within six months may delay the time of infection when weathering an outbreak (Feng et al., 2024). Furthermore, it is important to increase public trust and participation in this vaccination activity through the preparation of information and educational media. This is in line with the opinion stated that importance of educational efforts, enhanced accessibility, and motivational incentives to improve vaccination rates within the healthcare providers, especially when mandatory vaccination is controversial (de Koning et al., 2024).

Considering that there are still significant gaps in several sub-variables regarding the community's readiness to participate in COVID-19 vaccination in these two areas. It is necessary to build cooperation with leading sectors and the local government in providing accurate access to information, easily accessible health facilities and availability of public transportation, especially in rural areas, as well as increasing public understanding through periodic education programs about the importance of maintaining health conditions through readiness and participation in COVID-19 vaccination in protecting the community and building herd immunity. A future study is needed through a qualitative study design to explore the obstacles and opportunities for community in carrying out COVID-19 vaccination in these two areas.

Conclusions

This study unveiled distinct variations in community readiness for COVID-19 vaccination in urban and rural regions in Aceh, Indonesia. The factors of complacency, constraints, calculation, and collective responsibility exhibited notable differences. On the other hand, confidence, compliance, and conspiracy factors did not demonstrate significant differences. The research findings further linked sociodemographic factors such as age, highest education level, information regarding COVID-19 vaccination, and prior experience with COVID-19 vaccination to the observed disparities. It is advisable that healthcare practitioners, especially nurses, intensify their efforts to promote and educate the community about the significance and benefits of COVID-19 vaccination and infectious

disease control initiatives. This proactive approach can foster voluntary and enthusiastic community participation in vaccination efforts, enhancing their readiness.

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Conflict of interests

All authors declared no conflict of interests.

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