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Determinants of factors influencing the utilization of Covid-19 vaccination services at sigli public health center, Pidie Regency, Aceh, Indonesia

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ABSTRACT

This study aims to identify the factors influencing people's utilization of vaccination services at the Sigli City Health Center. This research employed an analytical observational design with a cross-sectional approach. Independent variables included age, occupation, education, knowledge, accessibility, family support, perception, and immunization history, while the dependent variable was the utilization of the Covid-19 vaccine service. The study was conducted in November, with a sample size of 371 respondents selected using random sampling techniques based on the Slovin formula. Data were collected through questionnaires distributed to the respondents. The research findings revealed that approximately 78.71% of the population utilized the vaccine service, while 21.29% did not. Bivariate analysis indicated that out of the eight variables examined, five variables had a significant relationship with the utilization of the Covid-19 vaccine service, namely occupation, knowledge, accessibility, family support, and perception, each with a p-value of 0.000. Multivariate analysis further confirmed that knowledge was the most dominant factor, with a p-value of 0.000 and an Odds Ratio of 23.3 (95% CI = 63.5-85.9). Thus, a lack of knowledge was found to be a significant factor influencing the utilization of the Covid-19 vaccine service.

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INTRODUCTION

Pandemic COVID-19, which has swept the world since 2019, is one of the most significant global health challenges in recent decades. The highly contagious SARS-CoV-2 virus has had serious implications across various sectors of life, including health, economy, and social aspects of communities(Dzhuraev, 2021; Gatto et al., 2023; Liu et al., 2020). Until the end of 2021, the COVID-19 pandemic has shocked the world, with a death toll reaching millions, including over 200 million confirmed cases worldwide and at least 4.2 million lives lost(Ehrenberg et al., 2021; Gatto et al., 2023; Mayer & Lewis, 2020). In Indonesia, our country has experienced a significant impact due to

the COVID-19 pandemic. By the end of 2021, there were more than 4.35 million confirmed cases, and tragically, 144 thousand deaths. (El Bcheraoui et al., 2020; Malik, 2022; Peiris et al., 2021). To address the spread of this virus, the government has taken a series of strict preventive measures. In the early stages of the pandemic, in April 2020, the government implemented lockdown measures involving movement restrictions in certain areas and banned the entry of foreign citizens into Indonesia.(Abdullah, 2020; Mustafa et al., 2021; Senjaya et al., 2022). Later, at the end of 2020, the government introduced the large-scale social restrictions (PSBB) policy, which included practices of social distancing and working from home as additional efforts to curb the spread of the virus (Ozili, 2022; Winarso et al., 2020). Despite various measures taken, the spread of COVID-19 remains challenging to control. Therefore, the government continues its efforts to enhance effectiveness by implementing the 3M health protocols, which include Wearing masks, Washing hands, and Maintaining distance (Widyani et al., 2021). To address this pandemic, vaccination has become one of the primary solutions. Since the first COVID-19 vaccine was discovered and authorized for use, many countries, including Indonesia, have launched massive vaccination programs to achieve herd immunity and control the spread of the virus. However, despite vaccination being a highly effective tool in combating this pandemic, various factors still influence the utilization of COVID-19 vaccination services in the community. COVID-19 vaccines are not a direct form of treatment for this disease. Instead, these vaccines play a role in strengthening the individual's immune system to better fight virus infections and prevent the development of severe illness(Fitriasari, 2020; Ichsan et al., 2021). The COVID-19 vaccination program has several main goals, namely reducing virus transmission, lowering the rates of illness and death caused by COVID-19, achieving herd immunity in the community, and enabling society to continue social and economic activities. Despite the government's diligent efforts in implementing the COVID-19 vaccination program, controversies and uncertainties related to vaccines still persist in society. Several surveys indicate that a portion of the population remains hesitant or refuses to accept the COVID-19 vaccine. These groups become crucial subjects requiring further education to ensure the success of the vaccination program.(Jeyanathan et al., 2020; Thanh Le et al., 2020). The target for COVID-19 vaccination in Indonesia is very extensive, reaching 181,554,465 individuals. However, as of the end of December 2021, only about 49.7% of the total planned doses have been realized, approximately 136 million doses. (Machingaidze & Wiysonge, 2021; Wouters et al., 2021). Risk perceptions, including the perceived severity of and susceptibility to COVID-19, were found to be significantly associated with vaccine uptake(Viswanath et al., 2021). These factors are likely to play a substantial role in targeted vaccination programs, particularly in the context of COVID-19 vaccination. The perception of the severity of COVID-19, including understanding its potential health consequences and the risks posed to oneself and others, can strongly influence an individual's decision to receive the vaccine(Alshurman et al., 2021). Similarly, the perception of personal susceptibility to the virus, considering factors such as age, underlying health conditions, and exposure to high-risk environments, can further motivate individuals to prioritize vaccination(Roy et al., 2022). Addressing and addressing these risk perceptions through effective communication and education campaigns can help in promoting vaccine acceptance and improving overall vaccine uptake rates. The vaccination coverage rates in several regions are still far from the government's recommended targets. For instance, in Aceh, although the first-dose vaccination coverage has reached 42.88%, this figure is still far below the target of 4.03 million people. The second dose has only reached 22.89% of the target. In Pidie Regency, the first-dose vaccination coverage is only 47.16%, and the second dose has reached only 16.85% of the government's recommended target (Dinkes Pidie). The willingness of the community to accept the COVID-19 vaccine depends on the information they receive. Hoax news about side effects and long-term effects of the vaccine has influenced acceptance rates. The Indonesian government has undertaken education initiatives to address this issue. This research holds urgency due to the need to understand the factors that impact the utilization of vaccination services at the Sigli City Health

Center, specifically in the context of the Covid-19 pandemic. Vaccination is crucial for controlling the spread of the virus and minimizing its impact on individuals and communities. Previous research has shown gaps in knowledge regarding factors influencing vaccine utilization, particularly in the Sigli City Health Center. This research aims to understand the factors influencing the community in utilizing the COVID-19 vaccination services at Community Health Center Sigli city.

RESEARCH METHOD

This research adopts a Descriptive Analytic research design using a cross-sectional design, allowing for the exploration of correlations between risk factors and effects at a specific point in time. The study will be conducted at the Sigli City Health Center in November 2021. The population includes the entire community targeted for COVID-19 vaccination in the working area of the Sigli City Health Center in 2021, totaling 5,103 individuals. The sample will be determined using the Slovin formula, considering that a sufficiently large sample will provide good representation. The calculation results in a sample size of 371 respondents, with a tolerable sampling error rate of 0.05.

$$n = \frac{N}{1+Ne2} = \qquad n = \frac{5103}{1 + 5103(0{,}01)} = \qquad \text{n = 371 Sample}$$

Explanation:
n = Sample size/number of respondents
N = Population size
E = Percentage of leeway for the precision of the sampling error that can still be tolerated; e = 0.05

The sample size (n) in this research is determined using the Slovin formula, considering a sampling error rate (E) of 0.05, in a population (N) of 5,103 individuals. The random sampling technique is employed, ensuring equal chances for each individual in the population to be selected. Sampling involves assigning sequential numbers to family cards (KK) in the target population, selecting multiples of 4 (e.g., KK numbers 4, 8, 12, 16, and so on). If the targeted respondent is not available, their neighbor is chosen as a substitute. This method ensures equal opportunities for every population member to be part of the research sample.

Data collection methods include both primary and secondary data. Primary data is obtained through in-depth interviews using questionnaires, covering information on biodata, individual characteristics (age, education, occupation), knowledge, accessibility, family support, community perception, and immunization history. The dependent variable is the utilization of COVID-19 vaccination services at the Sigli City Health Center. Secondary data complements primary data and is obtained from medical records to gather information on community visits that have received vaccination. Instrument validity is assessed using Pearson product-moment correlation with a sample of 30 respondents, comparing the table and calculated correlation values. Data is analyzed using SPSS version 22. Instrument reliability is assessed using Cronbach's alpha method, with values considered good if greater than 0.06. Results show good reliability for all variables: Knowledge (0.714, High), Accessibility (0.826, Very High), Family Support (0.898, Very High), Perception (0.784, High), and Vaccination Service Utilization (0.884, Very High).

Subsequently, data analysis involves various methods, including univariate analysis for data characteristics, bivariate analysis using logistic regression to identify relationships, and multivariate analysis using Multiple Linear Regression to analyze relationships between multiple independent variables and one dependent variable. Research ethics prioritize respecting participant autonomy, preventing harm, avoiding participant risks, and ensuring a fair balance of benefits and risks, including privacy protection and individual values.

RESULTS AND DISCUSSIONS

Community Health Center functions as a primary healthcare provider with a focus on promotion and prevention in its service area. The service area of this Community Health Center consists of 15 villages and 3 hamlets, with a total population of around 22,100 people in 2020. The research was conducted for one month in the service area of Community Health Center Sigli with the assistance of enumerators, who are local cadres actively involved in Community Health Center activities. Some respondents were unwilling to participate in this study Community Health Center Sigli plays a crucial role in supporting health policies in the district.

Univariate Analysis

Table 1. Frequency distribution of independent and dependent variables

No	Variable	F	%
	Independent Variable		
1	Age		
	26-45 years old	114	30.73
	12-25 years	157	42.32
	46-65 years old	100	26.95
2	Work		
	Work	189	50.94
	Doesn't work	182	49.06
3	Education		
	S1/S2	88	23.72
	middle/high school	276	74.39
	Elementary school/ No school	7	1.89
4	Knowledge		
	Good	165	44.47
	Enough	148	39.89
	Not enough	58	15.63
5	Accessibility		
	Easy	306	82.48
	Not easy	65	17.52
6	Family support		
	There is support	261	70.35
	No support	110	29.65
7	Perception		
	Positive	348	93.80
	Negative	23	6.20
8	Immunization history		
	There is	315	84.91
	There isn't any	56	15.09
	Dependent variable		
9	Utilize vaccine services	292	78.71
	Not taking advantage of vaccine services	79	21.29

The data analysis results indicate several factors influencing the utilization of COVID-19 vaccination services at Community Health Center Sigli city. First, the age group of 12-25 years has a lower utilization rate at 26.11% compared to the age groups of 26-45 years (21.05%) and 46-65 years (14%). Although statistically insignificant (p-value = 0.036; OR = 1.3; 95% CI = 0.7-2.3), the 12-25 age group has a 1.3 times higher chance of not utilizing the vaccine services than other age groups. Second, occupation also affects vaccine service utilization. Unemployed individuals have a lower utilization rate at 29.16% compared to those employed (13.76%). Statistically significant (p-value = 0.000; OR = 2.5; 95% CI = 0.7-2.3), meaning unemployed individuals have a 2.5 times higher chance of not utilizing the vaccine services than employed individuals. Third, education level does not affect vaccine service utilization, as there is no significant relationship between education level and vaccine utilization (p-value = 0.785; OR = 0.6; 95% CI = 0.07-6.1). Fourth, limited knowledge about COVID-19 is associated with lower utilization rates. Individuals with

insufficient knowledge have a significantly higher chance of not utilizing vaccine services at 94.83%. Statistically significant (p-value = 0.000; OR = 23.3; 95% CI = 63.5-85.9), indicating individuals with insufficient knowledge have a 23.3 times higher chance of not utilizing vaccine services. Fifth, difficult accessibility is also related to lower utilization rates. Individuals with difficult accessibility have a significantly higher chance of not utilizing vaccine services at 84.62%. Statistically significant (p-value = 0.000; OR = 64.6; 95% CI = 29.2-142.7), indicating individuals with difficult accessibility have a 64.6 times higher chance of not utilizing vaccine services. Sixth, lack of family support also influences utilization rates. Individuals without family support have a significantly higher chance of not utilizing vaccine services at 42.73%. Statistically significant (p-value = 0.000; OR = 5.3; 95% CI = 3.1-9.0), meaning individuals without family support have a 5.3 times higher chance of not utilizing vaccine services. Lastly, negative perceptions of the COVID-19 vaccine are associated with lower utilization rates. Individuals with negative perceptions have a significantly higher chance of not utilizing vaccine services at 69.57%. Statistically significant (p-value = 0,001; OR = 10.3; 95% CI = 4.0-26.1), indicating individuals with negative perceptions have a 10.3 times higher chance of not utilizing vaccine services. Immunization history does not significantly affect the utilization of COVID-19 vaccine services at Community Health Center Sigli city (p-value = 0.694; OR = 1.4; 95% CI = 0.5-2.4). In conclusion, factors such as age, occupation, knowledge, accessibility, family support, and perception have a significant impact on the utilization of COVID-19 vaccine services at Community Health Center Sigli city. Therefore, efforts to improve understanding of the vaccine, enhance accessibility to vaccine services, and provide adequate family support can be crucial strategies in increasing vaccine utilization in this area.

Multivariate Analysis

Table 2. Multivariate analysis of Logistic Regression Model 1 (P<0.25) Determinants of COVID-19 vaccine utilization during the Covid-19 pandemic

Utilization vaccine	OR	95%CI	*P-value*
	Age		
12-25 years	0.3	0.9-1.0	0.052
45-65 years old	0.5	0.1-1.7	0.314
	Work		
Doesn't work	2.2	0.7-6.3	0.129
	Education		
middle/high school	0.7	0.2-2.4	0.687
Elementary school/No school	1.4	0.1-17.4	0.763
	Knowledge		
Enough	1.1	0.4-2.6	0.781
Not enough	179.6	20.2-159.1	0.001
	Accessibility		
Not easy	5.0	1.1-23.1	0.037
	Family support		
No support	0.2	0.5-1.1	0.075
	Perception		
Negative	1.3	0.2-9.1	0.750
Immunization History			
There isn't any	1.5	0.5-4.3	0.395

Based on Table 3, the results of multivariate analysis model 1 still indicate variables with p-values > 0.05, namely age, occupation, education, perception, and immunization history. Therefore, these variables are not included in the multivariate analysis model 2 (p-value < 0.05). Meanwhile, the variables that can be included in the multivariate analysis model 2 are knowledge and accessibility.

Table 3. Multivariate Analysis Logistic Regression Model 2 (P < 0.05) Determinants of COVID-19 Vaccine Utilization during the COVID-19 Pandemic

Utilization Vaccine	OR	95%CI	*P-value*
	Knowledge		
Enough	1.1	0.4-2.5	0.796
Not enough	67.3	12.5-359.9	0.001
	Accessibility		
Not easy	4.3	1.1-16.9	0.035

Source: 2021 primary data

Table 3 explains that based on the results of multivariate analysis model 2, the most dominant factor related to vaccine utilization at Community Health Center Sigli city during the COVID-19 pandemic is the Knowledge factor (OR=67.3; 95% CI=12.5-359.9; p-value=0.001). This means that respondents with insufficient knowledge are potentially 67.3 times more likely not to utilize the COVID-19 vaccine services compared to respondents with good and less knowledge. This study does not align with the findings of Bakri, A., Novia, K., Tangadatu, H., & Pantas, K. C. (2022), which found a relationship between age, education level, employment status, and the perceived benefits of vaccination with the acceptance of COVID-19 vaccination at the Makkasau Health Center in Makassar. Thirdly, the factor of education level in relation to the utilization of COVID-19 vaccine services brings out some nuances that need to be considered. The statistical test results showing no significant relationship between the education level and vaccine utilization (p-value = 0.785; OR = 0.6; 95% CI = 0.07-6.1) in the context of this research may depict the complexity of this relationship. It is important to note that education can influence individuals' perceptions, knowledge, and attitudes toward vaccination. Individuals with higher education levels may tend to have a better understanding of the benefits of vaccination and the risks of diseases, which can increase their likelihood of seeking vaccination. However, contradictory research results suggest that the relationship between education level and the acceptance of COVID-19 vaccine may be influenced by other factors, such as broader social, cultural, and demographic contexts (Tuloli et al., 2023). Fourth, Adequate knowledge about COVID-19 plays a crucial role in promoting the utilization of COVID-19 vaccine services. This finding is supported by statistical test results showing a significant relationship between knowledge and vaccine service utilization (p-value = 0.000; OR = 23.3; 95% CI = 63.5-85.9). In this context, knowledge serves as a predisposing factor that influences individual behavior toward vaccination. Individuals with better knowledge about COVID-19 may be more inclined to understand the risks and benefits of vaccination (Lasmita et al., 2021). They may have a better understanding of the importance of vaccination in reducing the risk of infection, protecting oneself and others, and supporting pandemic control efforts. Therefore, individuals with adequate knowledge are more likely to seek and utilize vaccine services. However, it's important to remember that efforts to increase vaccine utilization are not only about improving knowledge but also addressing other barriers individuals may face, such as accessibility, risk perception, and vaccine trust. Fifth, difficult accessibility is a significant factor influencing the utilization of COVID-19 vaccine services. This research's findings are reinforced by statistical test results showing a significant relationship between accessibility and vaccine service utilization (p-value = 0.000; OR = 64.6; 95% CI = 29.2-142.7). In this context, accessibility serves as a predisposing factor influencing individual behavior toward vaccination. People facing difficulties in reaching vaccine service locations or having poor accessibility are more likely to refrain from utilizing vaccine services. Factors such as physical distance to the community health center or nearest health facility, transportation availability, and travel costs can be significant obstacles to vaccination efforts. Accessibility is considered a predisposing factor influencing vaccine service utilization. Sixth, family support plays a significant role in influencing the utilization of COVID-19 vaccine services. This research's findings are strengthened by statistical test results showing a significant relationship between family support and COVID-19 service utilization (p-value = 0.000; OR = 5.3; 95% CI = 3.1-9.0). Family support, in this context, is considered a predisposing factor

influencing individual behavior toward vaccination. Individuals with strong family support are more likely to utilize COVID-19 vaccine services. Family support can encompass various aspects, including emotional, informational, and practical support. Families that provide emotional support can motivate and instill confidence in individuals to undergo vaccination(Dewi et al., 2022; Putri Wiraini et al., 2021). Families providing accurate and relevant information about vaccination can also assist individuals in making better decisions. Seventh, negative perceptions of the COVID-19 vaccine have a significant impact on the rate of vaccine service utilization. This study indicates that individuals with negative perceptions tend to have lower utilization rates, with as much as 69.57% of those with negative perceptions choosing not to use vaccine services, while only 18.10% of those with positive perceptions do not utilize them. Statistical tests conducted also confirm this relationship with a p-value of 0.001 and an odds ratio (OR) of 10.3, with a confidence interval (95% CI) ranging from 4.0 to 26.1. Individuals' perceptions of the COVID-19 vaccine are a predisposing factor influencing their decisions to accept or refuse vaccination. These perceptions can be influenced by various factors such as the information they receive, previous experiences, and opinions from people around them. Negative perceptions of the COVID-19 vaccine may include concerns about side effects, distrust in the safety or effectiveness of the vaccine, or receiving misinformation(Adane et al., 2022; McAteer et al., 2020). Efforts to increase the utilization rate of COVID-19 vaccine services are crucial to address and change these negative perceptions through accurate education, transparency in conveying information, and presenting reliable sources of information. In this way, individuals may be more likely to feel confident and secure in receiving vaccination, contributing to the collective efforts to combat the pandemic. Finally, immunization history does not significantly influence the utilization of vaccine services (p-value = 0.694). The p-value of 0.694 indicates that there is no significant relationship between immunization history and the utilization of vaccine services. In other words, individuals with or without previous immunization history have relatively similar levels of vaccine service utilization. This finding differs from other factors investigated in this study, such as age, occupation, knowledge, accessibility, family support, and perceptions, all of which have significant impacts on the utilization rate of vaccine services (Biswas et al., 2021; Lazarus et al., 2021; Paul et al., 2021). While previous immunization can influence the body's response to the COVID-19 vaccine, it appears that this factor is not a primary consideration in individuals' decisions to accept or reject vaccination during this pandemic.

CONCLUSION

The study reveals several factors influencing and not influencing the utilization of COVID-19 vaccine services at the Sigli City Health Center. On one hand, factors such as employment, adequate knowledge about COVID-19, easy accessibility, strong family support, and positive perceptions of the vaccine have proven to contribute positively to increasing the vaccine utilization rate. These results indicate that individuals who are employed, possess good knowledge, have easy access, are supported by their families, and have positive perceptions are more likely to accept the COVID-19 vaccine. On the other hand, factors such as age and educational level seem to have no significant influence on the vaccine utilization decision, with statistical test results not showing a strong relationship. Therefore, in efforts to enhance vaccination coverage at the Sigli City Health Center, the focus should be on educating and increasing public knowledge, ensuring easy accessibility to vaccine services, and promoting positive perceptions of the vaccine, while recognizing that factors such as employment, age, and educational level may have more limited impacts on individual decisions to receive the vaccine.

The implications of this research in everyday life for society are significant. By understanding the factors that influence vaccine utilization, policymakers and healthcare providers can develop targeted strategies to address barriers and promote vaccine acceptance among the public. Educating the community and increasing knowledge about COVID-19 and the vaccine can help

dispel misconceptions and address concerns, ultimately leading to higher vaccination rates. Ensuring easy accessibility to vaccine services, such as convenient locations and flexible scheduling, can remove practical barriers and improve vaccine uptake. Promoting positive perceptions of the vaccine through effective communication campaigns can help build trust and confidence in the vaccination process.

Despite providing valuable insights, the research on factors influencing the utilization of COVID-19 vaccine services at the Sigli City Health Center has certain limitations. These include the limited generalizability of the findings due to the focus on a specific location, the cross-sectional design that does not capture longitudinal dynamics, reliance on self-reported data potentially affected by social desirability bias, and the exclusion of additional influential factors. To overcome these limitations, future research could employ multi-center or multi-country studies, longitudinal designs, objective measures, and include a broader range of factors. Additionally, conducting intervention studies to evaluate the effectiveness of targeted interventions would further enhance the understanding of how to improve vaccine acceptance and uptake

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