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DETERMINANTS OF PARENTAL REJECTION IN IMPLEMENTING IMMUNIZATION IN CHILDREN POST COVID-19

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ABSTRACT
Complete basic immunization coverage in Pidie Regency, Aceh Province, is still very low after the COVID-19 pandemic, which has increased the risk of diseases that can be prevented. This study analyzes the determinants of parental refusal to implement complete basic immunization in children aged 0–2 years. The study used a mixed methods approach with a cross-sectional design for quantitative and in-depth interviews for qualitative. A quantitative sample of 270 respondents was selected using the cluster random sampling method, while qualitative informants were selected using purposive sampling. The analysis showed that the number of children, attitudes, family support, health worker behavior, the role of community and religious leaders, and exposure to information was significantly related to immunization refusal ($p < 0.05$). Qualitative findings revealed that the issue of halal-haram vaccines and the influence of local traditions were the main obstacles. The factors of the number of children (OR=3.47), attitudes (OR=0.19), family support (OR=0.16), and exposure to information (OR=0.24) were the dominant determinants.

Keywords: complete basic immunization; immunization refusal; parents; post COVID-19; toddlers

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INTRODUCTION

Diseases that can be prevented by immunization are still a significant concern in the field of public health because they contribute significantly to the morbidity and mortality rates of children in Indonesia. Diseases such as measles, diphtheria, pertussis, neonatal tetanus, tuberculosis, hepatitis B, and polio are infectious diseases whose spread can be controlled significantly by providing complete basic and advanced immunizations. Suppose prevention efforts through immunization are not carried out optimally. In that case, the risk of Extraordinary Events, severe complications, and even death will increase drastically, especially in vulnerable groups such as infants and toddlers (Markum, 2018). The success of the immunization program greatly determines the quality of public health in the long term (Inayati & Nuraini, 2021).

Immunization aims to stimulate the immune system to recognize and actively fight infectious agents so that when the body is re-exposed to the same pathogen, the body already has a ready defense system. This process allows children to grow and develop optimally because the risk of severe infection can be prevented. Lestari (2020) stated that immunization is one of the most cost-effective public health efforts because it supports the success of human resource development and reduces morbidity and mortality rates. In addition to protecting individuals, immunization also creates group immunity (herd immunity), which is very important, especially for children who cannot receive vaccines for medical reasons (Simangunsong et al., 2024).

The immunization coverage of Indonesian children is still uneven. UNICEF (2020) noted that around 19.4 million children have not received immunization globally, including in Indonesia. This condition creates a large group of vulnerable individuals who are not only at high risk of Vaccine-Preventable Diseases but can also be a source of transmission for the community. Even children who have received immunization are at risk of infection if immunization coverage in the community is too low, so it fails to form effective herd immunity (Markum, 2018). This gap reflects the persistence of structural and social barriers in the implementation of immunization that need to be addressed seriously (Arini & Peranto, 2022).

The Indonesian government is legally responsible for ensuring that every child is protected against life-threatening or disability-causing diseases. This is stated in Law Number 35 of 2014 concerning Child Protection, which emphasizes that the state, local governments, families, and parents must ensure that every child is protected from life-threatening diseases. In this context, complete basic immunization is a child's non-negotiable health and must be implemented by all relevant parties (Subiyakto et al., 2023). This commitment needs to be realized through policies, programs, and ongoing education for the community, especially in areas with low immunization coverage (Zubaedah & Putri, 2024).

The COVID-19 pandemic that hit the world from early 2020 to 2022 has presented new challenges in implementing routine childhood immunization. Social restriction policies, public concerns about COVID-19 vaccination, and the circulation of false information or hoaxes about vaccine side effects have increased doubts and even rejection of vaccination in general, including childhood immunization. The fear caused by various issues related to the COVID-19 vaccine has spread to basic and advanced immunization programs. As a result, there has been a decline in child immunization coverage nationally, including in Aceh Province and Pidie Regency, which were previously classified as low (Kumala, 2022; Pidie Health Service, 2023). This overall distrust of vaccines is a significant challenge that must be anticipated by the government and health workers (Arina, 2021).

Post-pandemic, there has been a significant increase in Extraordinary Events for diseases included in the PD3I category. This is due to the formation of population pockets that have not received complete immunization due to logistical obstacles, refusal, or lack of education (Nursetyo & Hasri, 2021). Polio cases that had not been found in Indonesia for a long time re-emerged in Aceh Province at the end of 2022, indicating that community immunity to the virus had decreased drastically (Pratiwi et al., 2024). This condition is clear evidence that negligence in maintaining immunization coverage can cause a reemergence of previously controlled diseases (Asmawati et al., 2022).

Not only polio but measles cases in Indonesia have also increased drastically. WHO and UNICEF noted that Indonesia is among the 47 countries with the highest measles cases in the world (Anggraini & Bambang, 2017). Data from 2022 recorded more than 21,115 suspected measles cases, 4,850 confirmed as definite measles, and 841 definite rubella cases (Ministry of Health of the Republic of Indonesia, 2023). Every 20 minutes, one child in Indonesia dies from measles complications (Yuliani, 2019). This is exacerbated by a significant decline in immunization coverage in several provinces, including Aceh, where the complete introductory immunization rate is far below the national target of 90% (Pidie Health Service, 2023).

Aceh Province, especially Pidie Regency, recorded very low achievement of complete basic immunization. In 2022, the achievement of basic immunization only reached 4.8% and even decreased to 2.8% in 2023. The coverage of advanced immunizations such as MR-2 and DPT-HB-Hib-4 also stagnated at a figure far from the national target. This shows that many

children are still not optimally protected from infectious diseases. Lack of access to health services, minimal parental knowledge, and the influence of social and cultural factors are the main obstacles to increasing immunization coverage (Pidie Health Service, 2023).

Various studies have shown that in addition to individual factors such as parental education and occupation, many other determinants influence parents' decisions to provide immunization, such as perceptions of vaccines, the influence of social media, and trust in health institutions. According to Wahyuni et al. (2023), parental trust in the halalness of vaccines and concerns about adverse postimmunization events are significant obstacles to the success of immunization programs. Immunization refusal is also often associated with religious teachings or specific cultural values that perceive vaccines as products, not beliefs (Kurnia et al., 2022). This study aims to determine the determinants of parental refusal in implementing immunization in children after COVID-19.

METHOD

This study uses a mixed methods approach, namely a combination of quantitative and qualitative methods, with a concurrent triangulation design. This approach was chosen to explore comprehensive data on the determinants influencing parental immunization refusal of children aged 0–2 years in Pidie Regency, Aceh Province. The quantitative study was conducted with a cross-sectional survey design and involved 270 respondents selected using the cluster random sampling technique. This study's target population was all parents with children aged 0–2 years, as recorded by the Pidie Regency Health Office in 2023, totaling 30,817 people. Inclusion criteria included parents willing to be respondents. They had children aged 0–2 years. In contrast, exclusion criteria included respondents who were unwilling, represented by someone else, or not the child's biological parents.

For qualitative data collection, a purposive sampling method with a maximum variation approach was used to obtain a diversity of perspectives and social contexts from various informants. Key informants in this study came from eight predetermined health center work areas, including Teupin Raya, Glumpang Baro, Mutiara Timur, Ujong Rimba, Peukan Baro, and Indra Jaya Health Centers. The selection of informants was based on recommendations from the health center and their willingness to be interviewed directly in a safe and comfortable place. The location of the interview was determined through mutual agreement between the researcher and the informant, such as the living room of a house, a cottage, a village hall, or a meunasah. Qualitative data were obtained through in-depth interviews to identify social, cultural, and belief factors influencing immunization attitudes.

Data analysis was conducted separately for quantitative and qualitative data. Quantitative data were analyzed using logistic regression tests to determine the relationship between independent and dependent variables. Meanwhile, qualitative data were analyzed through four main stages based on the Miles and Huberman approach: data collection, data reduction, data presentation, and conclusion. Interview transcripts and field notes were arranged in narrative form to reveal thematic patterns from the interview results. Concluding was carried out in stages and was temporary until the data reached saturation and a consistent pattern was found. Qualitative findings were then used to enrich and clarify the results of the quantitative analysis to produce a more comprehensive understanding of the determinants of immunization refusal in the research area.

RESULT

Table 1 shows that out of 270 respondents, the majority or 251 people (92.96%) did not provide complete basic immunization to their children, while only 19 respondents (7.04%) did. The characteristics of the majority of respondents were in the early adulthood age group

(25–35 years), unemployed, had income below the UMK, and had secondary education. Most respondents had good knowledge about immunization (51.11%), but showed less supportive attitudes (70.74%) and minimal support from family (62.59%). In addition, perceptions of the behavior of health workers were dominated by poor assessments (69.26%), and the role of community and religious leaders was considered negative by most respondents (67.78%). The availability of immunization facilities was also still inadequate (51.85%), and most respondents stated that they were not exposed to information related to immunization (67.41%). These findings indicate that in addition to individual factors, social and structural factors also play a role in the low coverage of basic immunization in children.

Table 1.
Respondent characteristics

Variables	f	%	Mean	SD (Min-Max)
Implementation of immunization				
Incomplete	21	7,78		
Complete	249	92,22		
Age			30,05	5,69
Late adolescence	63	23,33		(20-48)
Early adulthood	156	57,78		
Late adulthood	51	18,89		
Job				
Working	32	11,85		
Not working	238	88,15		
Income				
Below City Minimum Wage	172	63,70		
Above City Minimum Wage	98	36,30		
Education				
Primary	30	11,11		
Secondary	192	71,11		
Higher	48	17,78		
Number of Children			2,3	1,22
> 2 people	105	38,89		(1-6)
< 2 people	165	61,11		
Knowledge			12,26	2,80
Poor	132	48,89		(5-19)
Good	138	51,11		
Attitude			31,75	5,57
Poor	191	70,74		(23-50)
Good	79	29,26		
Family Support			9,50	2,62
Not Supportive	169	62,59		(5-15)
Supportive	101	37,41		
Health Workers Behavior			14,49	2,97
Poor	187	69,26		(8-21)
Good	83	30,74		
The role of Community and Religious Figures				
Negative	183	67,78	17,65	4,12
Positive	87	32,22		(9-27)
Availability of Facilities			11,66	2,15
Incomplete	138	51,85		(7-15)
Complete	132	48,15		
Information Exposure			11,41	2,58
Less available	182	67,41		(8-18)
Available	88	32,59		

Table 2 shows that most respondents' characteristic variables, such as age, occupation, income, and education, do not significantly relate to implementing complete basic immunization in children after the COVID-19 pandemic. Respondents who are early adults, unemployed, have secondary education, and have incomes below the City Minimum Wage

tend to be more likely not to provide complete immunization to children, but the results of the statistical test show a p-value> 0.05, which indicates no significant relationship. In contrast, the number of children variable shows a significant relationship with the implementation of immunization, where respondents who have less than two children are three times more likely to not carry out immunization than those who have two or more children (OR = 3.47; 95% CI = 1.35–8.92; p = 0.010).

Table 2.
Characteristics of parents with regard to the implementation of immunization in children

Variables	Implementation of Immunization				OR	95% CI	*P*-Value
	Complete		Incomplete				
	f	%	f	%			
Age							
Late adolescence	4	6,35	59	93,65			
Early adulthood	11	7,05	145	92,95	0,90	0,27-2,91	0,852
Late adulthood	6	11,76	45	88,24	0,51	0,13-1,90	0,316
Job							
Working	5	15,63	27	84,38			
Not working	16	6,72	222	93,28	2,56	0,87-7,57	0,087
Income							
Below City Minimum	10	5,81	162	94,19			
Wage	11	11,22	87	88,78	0,48	0,19-0,19	0,116
Above City Minimum Wage							
Education							
Primary	1	3,33	29	96,67			
Secondary	14	7,29	178	92,71	0,43	0,06-3,46	0,434
Higher	6	12,50	42	87,50	0,24	0,03-2,11	0,199
Number of Children							
> 2 people	14	13,33	91	86,67			
< 2 people	7	4,24	158	95,76	3,47	1,35-8,92	0,010

Table 3.
Determinants of parental refusal in implementing immunization in children

Variables	Implementation of Immunization				OR	95% CI	*P*-Value
	Incomplete		Complete				
	f	%	f	%			
Knowledge							
Poor	129	97,73	3	2,27	0,15	0,05-0,53	0,003
Good	122	88,41	16	11,59			
Attitude							
Poor	185	96,86	6	3,14	0,18	0,68-0,45	0,000
Good	66	83,54	13	16,46			
Family Support							
Not Supportive	164	97,04	5	2,96	0,16	0,06-0,46	0,001
Supportive	87	86,14	14	13,86			
Health Workers Behavior							
Poo	178	95,19	9	4,81	0,30	0,12-0,74	0,009
Good	73	87,95	10	12,05			
The Role of Community And Religious Figures							
Negative	176	96,17	7	3,83	0,26	0,10-0,65	0,004
Positive	75	86,21	12	13,79			
Availability of Facilities							
Incomplete	128	92,75	10	7,25	1,06	0,43-2,57	0,904
Complete	123	93,18	9	6,82			
Information Exposure							
Less available	176	96,70	6	3,30	0,26	0,11-0,67	0,005
Available	75	85,23	13	14,77			

Table 3 shows that several social and behavioral factors significantly affect the implementation of complete basic immunization in children after the COVID-19 pandemic.

Respondents with good knowledge, positive attitudes, and family support were shown to be less likely to refuse immunization, with odds ratios (OR) of 0.15, 0.18, and 0.16, respectively, and a p-value <0.01, indicating a statistically significant relationship. In addition, positive perceptions of the behavior of health workers and the role of community and religious leaders also correlated significantly with acceptance of immunization, with ORs of 0.30 and 0.26, respectively. Likewise, exposure to good information also supports the implementation of immunization, indicated by an OR of 0.26 (p = 0.005). Conversely, the availability of immunization facilities did not show a significant relationship with the implementation of immunization (OR = 1.06; p = 0.904), indicating that access factors have not sufficiently influenced immunization decisions if not accompanied by adequate information and social support.

Table 4.
Determinants of parental refusal in implementing immunization in children

Factors	Model 1 (Predisposing Factors) OR: CI, P -value	Model 2 (Driving Factors) OR : CI, P -value	Model 3 (Supporting Factors) OR : CI, P -value
Age	0,18 (0,41-11,34) 0,354		
Job	1,42 (0,38-5,29) 0,600		
Income	0,64 (0,19-2,18) 0,484		
Education	0,63 (0,22-1,78) 0,389		
Number of Children	6,68 (1,53-29,11) 0,011		
Knowledge	0,16 (0,04-0,59) 0.007		
Attitude	0,19 (0,07-0,53) 0.002		
Family Support		0,16 (0,05-0,47) 0,001	
Health Worker Behavior		0,40 (0,15-1,07) 0,068	
Role of Community and Religious Leaders		0,31 (0,11-0,83) 0,020	
Availability of Facilities			1,37 (0,54-3,45) 0,509
Information Exposure			0,24 (0,09-0,63) 0,004
Pseudo R2	0.2441	0.1762	0.0589

Table 4 shows three main groups of factors that significantly influence parental refusal of complete basic immunization in children after COVID-19. In the first model (predisposing factors), the number of children is the most dominant variable related to refusal of immunization, with a p-value = 0.011 and an odds ratio (OR) of 0.12 (95% CI: 1.53–29.11) and a predictive contribution of 24.41% (Pseudo R^2 = 0.2441). In the second model (facilitating factors), parental attitudes are the most influential factor, with p = 0.002 and OR = 0.19 (95% CI: 0.07–0.53), indicating that respondents with negative attitudes have a higher tendency to refuse immunization, with a predictive power of 17.62%. Meanwhile, in the third model (supporting factors), information exposure becomes the most influential variable, with p = 0.004 and OR = 0.24 (95% CI: 0.09–0.63), which explains the contribution of 8.36% to immunization refusal. These three models indicate that the number of children, attitudes towards immunization, and information exposure are the main determinants in parents' decisions to refuse or accept child immunization.

Table 5.
Characteristics of informants

Informant Code	Age (Years)	Education	Origin	Position
SA	98	Elementary school	Glumpang Baro	Dukun
NJ	27	Senior High School	Peukan Baro	Kader
R	54	Senior High School	Ujong rimba	Keuchik
NA	46	Senior High School	Glumpang Baro	Ketua mukim
IN	39	Diploma III	Mutiara Timur	Tokoh wanita
TR	56	Elementary school	Teupin Raya	Imum Meunasah

The results of the qualitative data analysis showed that the six informants interviewed had diverse backgrounds in age, education, and social roles, reflecting the heterogeneity of perspectives in the community. The informants' ages ranged from 27 to 98 years, with the youngest age distribution being 27 years and the oldest being 98 years, indicating a

representation of the younger generation to older people. Their education levels also varied: two elementary school graduates, three high school graduates, and one college graduate. In the social structure in their respective work areas, the informants play essential roles as shamans, health cadres, Kaushik (village heads), mukim heads, women's figures, and mum meunasah (religious leaders), making them key sources of information regarding community views on immunization and the dynamics of its acceptance at the local level (Table 5).

Interviews with six informants revealed that parental refusal of post-COVID-19 immunization was influenced by two main factors: belief in the halal-haram issue of vaccines and the influence of tradition. Some informants showed positive beliefs about vaccines, but others refused because of doubts about their halal status. In addition, tradition also plays a role, and some parents still believe that children can grow up healthy without immunization. This finding confirms that aspects of religious beliefs and local culture are significant obstacles to implementing child immunization.

DISCUSSION

The study results showed that sociodemographic characteristics of parents, such as age, occupation, income, and education, did not have a significant relationship with the implementation of complete basic immunization in children after the COVID-19 pandemic. Early adulthood, which dominated the respondents, showed a high level of immunization rejection, in line with the opinion of Taufikurrahman et al. (2023) that young people are often not ready to make health decisions. Likewise, employment status and income were not the primary determinants because most respondents were housewives with incomes below the Provincial Minimum Wage and still rejected immunization (Maulida et al., 2022).

On the other hand, the number of children was shown to have a significant relationship, where mothers with less than two children were more likely to refuse immunization. This finding aligns with research by Alvey et al. (2020) and Veltkamp et al. (2020), which showed that optimal health practices do not always require excessive attention to the first child. This means that experience is not the only determining factor. Although logically, mothers with few children should be more focused, the reality shows otherwise due to limited household decision-making roles.

Parental knowledge about immunization also significantly influences the decision to carry out immunization. Respondents with good knowledge are less likely to refuse immunization than those without knowledge (Dillyana & Nurmala, 2019). Knowledge plays an important role in shaping behavior and can be obtained from various information channels, including health workers and the media. Good knowledge will increase awareness of the importance of immunization as a preventive measure against preventable diseases (Juditha, 2020).

Parents' attitudes towards immunization also play a role in immunizing their children. Positive attitudes, such as belief in the importance and benefits of immunization, contribute to increasing immunization coverage. Conversely, negative attitudes based on halal issues, fear of side effects, or lack of trust in the government are significant factors in refusal (Dillyana & Nurmala, 2019). This emphasizes that behavioral change requires an emotional and educational approach that is right on target. One of the main qualitative findings is belief in the halal and haram issues of vaccines. Many informants said that people reject immunization because they think vaccines contain haram ingredients, such as pork enzymes, even though the Indonesian Council of Ulama has issued a fatwa that immunization is permissible (Nurhasin & Jalaluddin, 2022). This misinformation was obtained from community and religious leaders at the local level, who had not fully received official clarification from the

central authorities. This inconsistency of information is what strengthens doubts and worsens the acceptance of immunization at the grassroots level.

Family support has also been shown to play an important role in immunization decisions. The results of this study support the findings of Budiarti (2019), who states that support from husbands and other family members greatly determines maternal compliance in bringing children for immunization. Most respondents who did not undergo immunization stated that they did not receive support from their families. This strengthens the assumption that immunization decisions are not only individual but collective within the family unit, especially in environments that uphold the role of men in decision-making (Lexi, 2019).

The role of health workers also has a significant relationship with the implementation of immunization. Respondents who considered officers to be kind and friendly tended to be more receptive to immunization (Pohan et al., 2023). However, in practice, even though officers were present and provided good service, respondents were still reluctant to bring their children because they came to the integrated health post only for weight monitoring, not immunization. This shows the need for a more intensive and consistent communication approach from health workers so that the educational function is truly conveyed. Community and religious leaders also have a big influence on immunization decisions. Respondents who receive positive encouragement from community leaders tend to be more open to immunization. Conversely, if religious leaders convey doubts or negative issues, the community will also reject them. Pohan et al. (2023) and Putri (2022) emphasized that the role of local leaders is crucial in conveying correct information and convincing the community about the benefits of immunization, especially in responding to halal-haram issues. Finally, tradition and exposure to information have a major influence. Many respondents did not get immunized because they were used to following traditions or family rules, including prohibitions from their husbands or negative experiences after immunization. In addition, exposure to misinformation from social media reinforces these fears (Napitupulu, 2023). Educational interventions need to consider community-based and local cultural approaches to counter hoaxes and increase trust in immunization programs.

CONCLUSION

Parental rejection of the implementation of complete basic immunization in children after COVID-19 in Pidie Regency is influenced by a combination of predisposing, facilitating, and supporting factors. Factors such as the number of children, parental attitudes, family support, exposure to information, and the influence of community and religious leaders have been shown to have a significant relationship with immunization decisions. In addition, factors such as belief in the halal-haram issue of vaccines and local traditions also strengthen the rejection of immunization. Based on these findings, it is recommended that further research explore more deeply the community-based intervention approach, such as actively involving religious and traditional leaders, and more effective risk communication strategies in addressing misinformation related to vaccines.

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