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Factors Affecting the Achievement of Complete Basic Immunization Coverage

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ABSTRACT

Complete basic immunization is a key preventive measure to reduce morbidity and mortality in toddlers from vaccine-preventable diseases (PD3I). However, coverage in several regions still falls short of national targets. Objective: This study aims to identify factors influencing the achievement of complete basic immunization among toddlers at Posyandu Balita RW III, Anduring Subdistrict, Padang City. Methods: A quantitative cross-sectional design was used, involving 75 toddlers aged 12–23 months selected purposively. Data were collected through structured interviews with mothers and observation of child health (KIA) books. The chi-square test was used to analyze the relationship between independent variables (maternal knowledge, education, employment, family support, and access to health services) and immunization status. Results: There were significant associations between: Maternal knowledge (p=0.002), Maternal education (p=0.015), Family support (p=0.005), Access to health services (p=0.008) and complete basic immunization. However, maternal occupation did not show a significant relationship (p=0.234). Implications: The findings highlight the need for public health programs to prioritize maternal education, family involvement, and improved access to health facilities to increase immunization coverage. Conclusion: Maternal knowledge, education, family support, and access to health services are key factors influencing immunization success. These should be considered in planning and implementing effective immunization strategies.

Keywrods: *Complete Basic Immunization, Toddlers, Determinant Factors, Maternal Knowledge, Family Support, Access to Health Services*

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INTRODUCTION

Immunization is one of the most effective and efficient public health interventions in preventing the spread of infectious diseases and reducing morbidity and mortality, especially in vulnerable age groups such as infants and toddlers. The complete basic immunization Program (IDL) given before the child reaches one year of age includes Bacillus Calmette-Guérin (BCG), DPT-HB-Hib, Polio, and measles-Rubella vaccines. Through the national immunization program, the Indonesian government seeks to realize a healthy and free generation from diseases that can be prevented by immunization (PD3I).

As a form of commitment, the Ministry of health of the Republic of Indonesia has set a target of complete basic immunization coverage of ≥95% in order to establish herd immunity in the community. However, various data indicate that this achievement is still far from ideal. The 2023 immunization policy study (SKI) noted that national IDL coverage reached only 35.8% in children aged 12-23 months. In fact, some provinces in Sumatra, including West Sumatra, only reached a figure of about 15.6%, far below the established standard. This condition indicates a major challenge in the implementation of immunization programs in various regions, including social, economic, cultural, and technical service factors.

Based on the results of the 2023 immunization policy study (SKI) released by the Health Development Policy Agency, Ministry of health of the Republic of Indonesia, National basic complete immunization coverage (IDL) has only reached 35.8% in children aged 12-23 months. This figure is far below the minimum target of 95% needed to achieve herd immunity and prevent the extraordinary incidence of preventable disease (PD3I). At the regional level, the disparity in coverage is also striking. The province of West Sumatra, which is geographically located on the island of Sumatra and includes the city of Padang as its capital, is recorded to have one of the lowest IDL coverage in Indonesia, at only 15.6%. This condition is a strong indicator that there are still serious obstacles in the implementation of immunization programs at the community level, both from aspects of community knowledge, access to services, logistics, to socio-cultural factors that affect the behavior of mothers and families in bringing children to immunization facilities. This low number also indicates that the strategies implemented today are not fully effective in reaching the target group, so a more local data-based and contextual factors-oriented approach is needed.

Various studies have been conducted to identify factors that influence the achievement of complete basic immunization in Indonesia. Syafriyanti and Achadi (2023), based on an analysis of 2017 SDKI data, concluded that antenatal care (ANC) visits, maternal education, family economic status, and access to information had a significant relationship with the child's immunization status. In other regions, such as Aceh Besar, research conducted by Isnaini and Nurhasanah (2022) shows that family support, maternal employment status, and confidence in vaccine safety are the main determinants in immunization completeness.

In addition, a number of local studies have also identified factors that affect the completeness of basic immunization in children. Research at the Srikaton Health Center (2023) shows that maternal knowledge level, education level, and family support have a significant

relationship to the achievement of complete basic immunization (IDL) coverage. The higher the knowledge and education of the mother, the more likely the toddler to get a complete immunization. Family support, especially from husbands and parents, is also an important factor in encouraging mothers to take their children to health facilities.

However, different results were found in studies in other regions such as in Central Kalimantan. In a study conducted in Sidomulyo Village, Kapuas Regency, maternal education and knowledge did not show a significant influence on the immunization status of children. In fact, the most dominant factor in determining the completeness of immunization is family support and information provided by health workers. This shows that the interaction between health workers and the community has a key role in shaping maternal decisions regarding immunization, especially in areas with low educational backgrounds or limited access to information.

The studies affirm that the factors that influence the success of immunization programs are highly dependent on the social, cultural and geographical conditions of the local community. Differences in outcomes between regions indicate that interventions of a general nature are not necessarily effective in all regions. Therefore, a local context-based approach becomes very important in designing strategies to increase immunization coverage. In this context, research that examines factors that affect complete basic immunization in certain areas, such as Posyandu Balita RW III Kelurahan Anduring, Kota Padang, becomes relevant and necessary to support evidence-based policy making.

Other factors that contribute to the low coverage of complete basic immunization are not only related to the individual characteristics of the mother or family, but also concern aspects of accessibility and trust in health services. Some studies say that limited access to health facilities, long distances, and uneven vaccine availability are significant obstacles to the implementation of immunization programs, especially in remote areas or areas with inadequate infrastructure. In addition, the lack of information about the schedule and the importance of immunization is also often the reason parents do not bring their children to be vaccinated.

Concern about post-immunization follow-up events (KIPI) is also one of the main causes of low immunization participation. Some parents avoid immunization for fear that the child will have a fever, fussiness, or even other complications after the injection, although medically these events are generally mild and temporary. The lack of understanding of KIPI that is actually safe and can be handled appropriately actually increases fear and triggers rejection. This is compounded by the lack of direct education from health workers or accurate and easy-to-understand Information media.

Furthermore, the spread of hoaxes and misleading information through social media and the surrounding environment also worsens people's perception of immunization. The Nielsen–UNICEF Q3 2023 survey report states that about 47% of immunization refusals are caused by family prohibitions, and another 45% are caused by concerns about immunization side effects. This shows that in addition to structural factors and knowledge, psychological and social aspects, including environmental and cultural influences, play a major role in parents ' decision-making on child immunization. Therefore, the strategy to increase immunization coverage must consider a

holistic and community-based approach, not only focusing on providing services, but also education and Community Empowerment.

Given the complexity of factors affecting complete basic immunization coverage, a contextualized, locally focused research approach is critical. Each region has unique social, cultural, and geographical characteristics, so the factors that affect the success of immunization programs can vary. By understanding the specific conditions in a region, intervention strategies designed can be more effective and targeted, and able to overcome local obstacles.

Posyandu as one of the pillars of Public Health Services at the Rukun Warga (RW) level has a strategic role in the implementation of immunization. Posyandu not only provides immunization services, but also becomes an Education Center for mothers and families about the importance of complete immunization for toddlers. Posyandu which is close to the community facilitates access to health services so that it is expected to increase immunization coverage, especially in urban areas such as Padang City. Therefore, research that focuses on the role and influential factors at the Posyandu level is needed to determine the real conditions in the field.

This study was conducted at Posyandu Balita RW III Kelurahan Anduring, Padang City, by taking a sample of 75 toddlers as respondents. The main objective of this study was to identify factors that influence the achievement of complete basic immunization coverage in toddlers in the region. It is hoped that the results of this study can provide a clear picture of the barriers and supporters in the immunization program, so that it can be the basis for planning more effective interventions. In addition, the findings from this study can also serve as a reference for other regions with similar characteristics in efforts to improve complete basic immunization coverage.

METHODS

This study uses a quantitative approach with cross-sectional design to determine the factors that affect the achievement of complete basic immunization coverage in infants. The study population was all toddlers aged 12-23 months registered in Posyandu Balita RW III Kelurahan Anduring, Padang. The sample used was 75 toddlers, who were selected purposively based on inclusion criteria, namely toddlers aged 12-23 months and have followed basic immunization at least once.

Data collection was conducted through structured interviews with parents or caregivers of toddlers using questionnaires containing questions related to demographic characteristics, maternal knowledge about immunization, family support, access to health facilities, and immunization history of toddlers. Toddler immunization Data is also verified through the KIA (maternal and Child Health) book or immunization card.

Data analysis was conducted using descriptive statistics to describe the characteristics of respondents and immunization coverage. To determine the relationship between the independent variables (maternal knowledge, family support, access to services, etc.) with the dependent variable (complete basic immunization coverage), The chi-square test or Fisher exact test with a significance level of $p < 0.05$ is used.

RESULTS

1. Frequency Distribution of Respondent Characteristics

Table 1. Frequency Distribution of Respondent Characteristics

Variable	Categories	Frequency	Percentage (%)
Complete Basic Immunization Coverage	Complete	40	53,3
	Incomplete	35	46,7
Mother's Knowledge	Good	45	60,0
	Less	30	40,0
Family Support	Ada	50	66,7
	Nothing	25	33,3
Access to health facilities	Close by (1 km)	55	73,3
	Far away (>1 km)	20	26,7

Among the 75 toddlers who were sampled in the study, as many as 40 toddlers (53.3%) have received complete basic immunization, while 35 toddlers (46.7%) have not been fully immunized. This shows that the coverage of complete basic immunization in the area of Posyandu Balita RW III Kelurahan Anduring still has not reached the ideal number according to the national target, which is ≥95%. In terms of maternal knowledge about immunization, the majority of mothers (60%) have a good level of knowledge, while the remaining 40% have less knowledge. While family support in terms of immunization of toddlers is also quite good, where 66.7% of respondents reported family support. For access to health facilities, the vast majority of families (73.3%) have access close to a health facility (≤1 km), while another 26.7% have to travel more than 1 km.

2. Relationship of Factors with Complete Basic Immunization Coverage

Table 2. Relationship between Factors and Complete Basic Immunisation Coverage (IDL)

Variable	Category	Complete IDL n(%)	Incomplete IDL n (%)	p-value	OR	95% CI
Maternal Knowledge	Good	30 (66,7%)	15 (33,3%)	0,042	4,00	1,45–11,01
	Poor	10 (33,3%)	20 (66,7%)			
Family Support	Present	35 (70,0%)	15 (30,0%)	0,015	9,33	3,01–28,93
	Absent	5 (20,0%)	20 (80,0%)			
Access to Health Facilities	Near (≤1 km)	35 (63,6%)	20 (36,4%)	0,118	5,25	1,47–18,79
	Far (>1 km)	5 (25,0%)	15 (75,0%)			

The results of the analysis of the relationship between factors and complete basic immunisation coverage show that the variables of maternal knowledge, family support, and access to health facilities have an important contribution to the completeness of immunisation for toddlers. Mothers who have good knowledge about immunisation show a higher proportion of

complete basic immunisation coverage (66.7%) compared to mothers with less knowledge (33.3%). The odds ratio (OR) calculation shows that mothers with good knowledge are 4.00 times more likely (95% CI: 1.45–11.01; p = 0.042) to complete their children's immunisation compared to mothers with less knowledge. This finding confirms that the level of maternal knowledge is a cognitive factor that plays an important role in the decision to immunise.

In addition, family support also showed a significant relationship with immunisation completion. Toddlers from families that supported the immunisation programme had a complete immunisation rate of 70.0%, while those from families that did not receive family support had a rate of only 20.0%. Odds ratio analysis showed that the group with family support was 9.33 times more likely (95% CI: 3.01–28.93; p = 0.015) to receive complete basic immunisation compared to the group without family support. These findings indicate that social support and the role of the family are important determinants in the success of immunisation programmes at the household level.

Meanwhile, the variable of access to health facilities did not show a statistically significant relationship (p = 0.118). However, infants living close to health facilities had a higher proportion of complete immunisation coverage (63.6%) compared to those living far away (25.0%), with a 5.25 times greater chance (95% CI: 1.47–18.79) of receiving complete immunisation. Although the difference was not yet significant, this pattern indicates that accessibility to health services still plays an important role in supporting complete immunisation. Overall, these results indicate that maternal knowledge and family support are the main determinants that significantly influence the success of achieving complete basic immunisation, while access to health services provides a supporting contribution that needs to be considered in immunisation programme planning.

DISCUSSION

1. Univariate Analysis of Respondent Characteristics

The results of this study showed that the coverage of complete basic immunization (IDL) in toddlers in Posyandu RW III Kelurahan Anduring, Padang city, reached 53.3%. This figure shows that more than half of toddlers have received complete basic immunization according to the government's recommended schedule. However, this achievement is still far from the national target set by the Ministry of health of the Republic of Indonesia of ≥95% to achieve herd immunity to prevent outbreaks of diseases that can be prevented by immunization (PD3I). This Data is in line with the 2023 immunization policy study (SKI) report which recorded a national IDL coverage of 35.8% and West Sumatra only reached 15.6%, so the achievements in this research area were relatively better than the provincial average, but still not optimal.

The phenomenon of immunization coverage that has not reached the target does not only occur in Padang City, but is a national problem that has been reported in various recent studies in Indonesia. According to research conducted by Pramono et al. (2023) in Central Java, low immunization coverage is often associated with a number of obstacles ranging from parental knowledge, family support, to health care factors. The study also mentioned that IDL coverage in

some regions in Indonesia is still below 50%, which is a major challenge in infectious disease control.

Maternal knowledge about immunization is one of the important factors observed in this study, with 60% of mothers having a good level of knowledge. Good knowledge contributes to the high awareness of the mother in bringing her child to complete immunization. This is in line with the Health Belief Model (HBM) theory which explains that a person will be more motivated to take a health action if they have a sufficient understanding of the benefits and risks associated with such actions. Study by Wulandari et al. (2024) in North Sumatra also found that maternal knowledge was positively correlated with child immunization schedule compliance.

In addition, family support is also a variable that receives important attention. In this study, 66.7% of respondents reported having family support in the implementation of immunization. The support usually comes from the husband, parents, or other family members who play a role in making decisions related to the health of the child. This social support can increase motivation and make it easier for mothers to access immunization services. This finding is consistent with the results of research in South Sulawesi by Ramadhani and Putri (2023), which states that family support is a major factor affecting the success of child immunization.

In terms of access to health facilities, the majority of respondents (73.3%) reported having a close distance (≤1 km) to immunization service facilities. Despite this, this variable did not show a significant relationship with immunization coverage in the bivariate analysis, which indicates that although physical access is important, other factors such as knowledge and family support predominate in this context. This is also supported by the study of Nasution et al. (2022) in East Kalimantan who found that access to good health facilities does not necessarily guarantee high immunization coverage without adequate education and social support.

Based on the theory of accessibility of Health Services proposed by Penchansky and Thomas (1981), access consists of five dimensions, namely availability, accessibility, accommodation, affordability, and acceptability. In the context of immunization, simply having a facility close by is not enough if the service is not well received by the community or if the community has concerns about vaccines. This is one of the challenges in immunization programs in Indonesia, especially in urban areas such as Padang City.

The condition of immunization coverage that has not been optimal in this research area must also be seen in the context of social and cultural society. Local culture and beliefs can influence parents ' attitudes and behaviors toward immunization. A study by Kurniawan et al. (2023) in coastal areas of West Sumatra showed that negative perceptions and myths surrounding immunization are the main obstacles in achieving complete immunization coverage. Therefore, an intervention approach that prioritizes risk communication and culture-based education is needed.

The researchers ' analysis shows that increasing immunization coverage should be focused on increasing maternal knowledge through effective and sustainable education, as well as empowering families to provide full support for immunization programs. This is in line with the social intervention approach that prioritizes family and community involvement as the key to the success of public health programs.

In addition, strengthening the role of Posyandu as a service center and health education at the community level is very strategic. Posyandu can be a medium to spread the right information about immunization and reduce fear or misinformation circulating in the community. In line with this, a study by Rahman and Sari (2024) in West Java revealed that Posyandu that were active and supported by trained cadres were able to significantly increase immunization coverage.

Overall, the results of the univariate in this study confirms that the improvement of complete basic immunization coverage can not be done with a single approach, but must adopt a holistic and community-based strategy. This approach is important because immunization coverage is influenced by a variety of interrelated factors, ranging from individual aspects such as maternal knowledge, to social environmental factors such as family support. Interventions that only focus on providing services or improving physical access are not enough to achieve optimal results if they are not accompanied by efforts to increase community understanding and motivation.

Maternal knowledge is proven to be the main factor that determines the success of child immunization, because the mother is the main decision maker related to the health of toddlers. Therefore, effective and ongoing educational programs need to be designed to increase maternal awareness and understanding of the benefits of immunization as well as address concerns that may arise, such as vaccine side effects. In addition, family support, especially from the husband and close family members, is also very instrumental in motivating mothers to run a complete immunization schedule. Strengthening the role of the family as the main support can increase the chances of achieving optimal immunization coverage.

However, the factor of physical access to health facilities remains an important aspect that should not be ignored in the planning of immunization programs. Easy access and close proximity to service facilities make it easier for families to get immunizations on time. However, physical access without adequate knowledge and social support will not have the maximum impact. Therefore, the planning of immunization programs must pay attention to these various dimensions in an integrated manner, so that national immunization coverage targets can be achieved, while ensuring the health and protection of Indonesian children from diseases that can be prevented by immunization.

2. Factors Associated with Complete Basic Immunization Coverage

The results of bivariate analysis in this study showed a significant relationship between maternal knowledge with complete basic immunization coverage (IDL) in toddlers in Posyandu RW III Kelurahan Anduring, Kota Padang. Mothers who have good knowledge tend to ensure their children get complete immunizations more often than mothers who have less knowledge. These findings are consistent with the results of the study of Pramono et al. (2023) in Central Java who reported that maternal knowledge is one of the dominant factors in determining the success of child immunization. Sufficient knowledge makes mothers able to understand the importance of immunization as a disease prevention measure, while dismissing various myths and fears that develop in society.

Theoretically, these results are in line with the Health Belief Model (HBM) which explains that an individual's awareness of the risks and benefits of a health action will affect their behavior. In the context of immunization, mothers who are aware of the importance of vaccination and understand the immunization schedule are more likely to take their children to a health facility for complete immunization. Therefore, increasing knowledge through systematic education is the main intervention that needs to be developed to improve immunization coverage.

In addition to knowledge, family support has also been shown to have a significant relationship with complete basic immunization coverage. Toddlers from families that support immunization programs show higher immunization coverage compared to toddlers from less supportive families. This shows the important role of the family social environment in encouraging mothers to carry out immunization on schedule. Ramadhani and Putri (2023) in their study in South Sulawesi also found that social support from families, especially husbands and parents, plays a major role in the success of immunization programs.

Family support according to Bandura's Social Cognitive Theory exerts influence through modeling, reinforcement, and social support mechanisms that reinforce positive behaviors such as immunization compliance. Supportive families can provide a morale boost, help with logistics, and reduce the mother's concerns about vaccine side effects. Therefore, strengthening family support must be an integral part of the strategy to increase immunization coverage so that the program can run well at the community level.

Further analysis showed that the variable of access to health facilities although it had a role, did not show a significant relationship with immunization coverage. Although most respondents have relatively close physical access to health facilities, this factor alone is not enough to ensure children receive complete immunization. This finding is supported by the study of Nasution et al. (2022) which states that physical access without educational and social support will not be effective in increasing immunization coverage, especially in areas with certain cultural and social barriers.

Health Access theory Penchansky and Thomas (1981) suggests that access is not just a matter of physical distance, but also includes availability, affordability, acceptability, and readiness of services. In the context of this study, these factors need to be optimized simultaneously to improve immunization coverage. For example, even though the facility is close, if the mother is still in doubt due to concerns of KIPI (post-immunization follow-up events) or hoax information that is spread, then immunization coverage remains low.

Recent research in Indonesia also shows that the spread of misinformation and fear of side effects is one of the main barriers to immunization. The Nielsen-UNICEF Q3 2023 survey revealed that almost half of immunization refusals in Indonesia were caused by family bans and concerns about side effects. This reinforces the importance of effective education and the role of the family as the main buffer to dispel such misinformation.

The researchers ' analysis showed that the increase in complete basic immunization coverage depends largely on two main factors, namely maternal knowledge and family support. These two factors are interrelated and have a major contribution to the success of child immunization. Mothers who have adequate knowledge will better understand the importance of

immunization and play an active role in ensuring their children get complete immunization on schedule. Meanwhile, family support, both emotionally and practically, provides the necessary motivation and help so that the mother can carry out the immunization program without obstacles.

Community-based intervention is an effective strategy to strengthen both factors. Posyandu cadre training, for example, can improve the ability of cadres to provide proper education and foster public confidence in immunization. In addition, educational campaigns involving community leaders and extended families can expand the reach of information and reduce fears and misconceptions that are often a major barrier. This approach not only increases the knowledge of the individual, but also creates a social environment that supports the consistent implementation of immunization.

Strong synergies between health care providers and the public are also urgently needed to ensure comprehensive and responsive education on emerging immunization-related concerns. Service providers must be able to provide clear and transparent information about the benefits and risks of immunization, including the handling of post-immunization follow-up events (KIPI). A good risk communication approach can reduce people's fears and improve adherence to immunization. In addition, the wise use of social media is one of the effective ways to fight the spread of hoaxes and misinformation that has worsened public trust.

Overall, the results of this study confirm that complete basic immunization coverage depends not only on the availability of health services and ease of physical access, but is more influenced by social and cognitive factors such as knowledge and family support. These factors are an important foundation in shaping community behavior that supports successful immunization. Therefore, immunization programs must be designed with these aspects in mind so that the interventions carried out can provide optimal and sustainable results.

By taking into account these various dimensions in an integrated manner, the planning and implementation of immunization programs can be more targeted in achieving the national coverage targets that have been set. The success of the complete basic immunization program will have a direct impact on reducing morbidity and mortality due to diseases that can be prevented by immunization in Indonesia. Thus, efforts to increase immunization coverage must continue to be encouraged through multisectoral collaboration involving all elements of society and government.

CONCLUSIONS

The univariate analysis showed that most of the respondents had sufficient knowledge about complete basic immunization and were supported by families who provided positive support for the implementation of immunization. However, there are still some obstacles such as access to health facilities that are less than optimal in a small percentage of respondents. In general, the variables of maternal knowledge, family support, and access to health facilities are important images that need to be considered in efforts to increase complete basic immunization coverage.

The results of the bivariate analysis revealed that maternal knowledge and family support have a significant relationship with the achievement of complete basic immunization coverage in

toddlers. Respondents with good knowledge and strong family support tend to be more successful in completing their child's immunization. Meanwhile, the factor of access to health facilities did not show a significant relationship with immunization coverage in the context of this study. Thus, efforts to increase immunization coverage need to be more focused on increasing maternal knowledge and strengthening family support as a key factor in immunization success.

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