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Determinants of Basic Immunization Uptake at the Medan Labuhan Community Health Center in 2025

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ABSTRACT

This study aimed to analyze factors influencing the completeness of basic immunization among infants aged 0–12 months at Puskesmas Medan Labuhan in 2025. A quantitative cross-sectional design was applied involving 44 mothers selected through total sampling. Data were collected using structured questionnaires and verified with immunization records. Variables included maternal knowledge, family support, social environment, and immunization completeness. Data were analyzed using the Chi-Square test with a significance level of $p < 0.05$. The results showed that maternal knowledge ($p = 0.003$; OR = 15.0), family support ($p = 0.012$; OR = 10.5), and social environment ($p = 0.021$; OR = 5.0) were significantly associated with immunization completeness. Strengthening education and community-based interventions is essential to improve immunization coverage.

INTRODUCTION

Immunization is one of the most cost-effective public health interventions for preventing infectious diseases and reducing infant morbidity and mortality worldwide. The World Health Organization (WHO) emphasizes that routine immunization prevents approximately 4–5 million deaths annually from vaccine-preventable diseases such as measles, diphtheria, tetanus, and pertussis (World Health Organization [WHO], 2023). Despite global progress, disparities in immunization coverage remain a significant challenge, particularly in developing countries, including Indonesia.

In Indonesia, the national immunization program aims to achieve Universal Child Immunization (UCI) status across all primary health care centers. However, several regions still report incomplete basic immunization coverage among infants. According to the Ministry of Health of the Republic of Indonesia (2023), immunization coverage fluctuated after the COVID-19 pandemic due to service disruptions, vaccine hesitancy, and reduced parental compliance. Inadequate immunization coverage increases the risk of outbreaks of vaccine-preventable diseases and threatens herd immunity at the community level.

Basic immunization in Indonesia includes Bacillus Calmette–Guérin (BCG), Hepatitis B, DPT-HB-Hib, Polio, and Measles vaccines administered during the first year of life. The completeness of basic immunization is influenced by multiple determinants, including maternal knowledge, family support, socio-environmental factors, access to health services, and cultural beliefs. Maternal knowledge plays a central role in health decision-making for infants, as mothers are typically the primary caregivers responsible for ensuring adherence to immunization schedules (Rahmawati et al., 2022). Mothers with adequate knowledge are more likely to understand the benefits, schedules, and possible side effects of immunization, thereby increasing compliance.

Family support is another critical factor influencing immunization behavior. Support from husbands and extended family members may enhance maternal confidence and reduce anxiety regarding vaccine safety (Sari & Putri, 2021). Conversely, lack of support or exposure to misinformation may lead to delayed or incomplete immunization. Social environmental influences, including community norms and peer perceptions, also affect parental decisions. Vaccine hesitancy, fueled by misinformation through social media, has been identified as a growing concern globally (WHO, 2023).

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Previous studies have demonstrated significant associations between maternal knowledge, family support, and immunization completeness. However, most studies focus on urban populations or large-scale national data, while limited research has examined determinants at the primary health care level in specific local contexts such as Puskesmas Medan Labuhan. Local-level analysis is essential because socio-cultural characteristics, health service accessibility, and community perceptions vary across regions. Therefore, findings from national surveys may not fully represent local realities.

The problem identified in Puskesmas Medan Labuhan is the persistence of incomplete basic immunization among infants aged 0–12 months, despite ongoing immunization programs and health promotion activities. Preliminary observations indicated that some mothers lacked adequate understanding of immunization schedules, while others reported limited family encouragement to attend immunization sessions. This situation highlights the need for empirical analysis to determine the most influential factors in this specific setting.

The proposed approach in this study is a quantitative cross-sectional design to analyze the relationship between maternal knowledge, family support, social environment, and the completeness of basic immunization. Statistical analysis using the Chi-Square test is employed to determine the strength of associations between independent and dependent variables. By identifying significant determinants, targeted interventions can be developed to improve immunization coverage.

The novelty of this research lies in its focus on a localized primary health care setting with an integrated analysis of behavioral and socio-environmental determinants using structured quantitative assessment. Unlike broader national surveys, this study provides contextual evidence that can directly inform policy and program planning at the Puskesmas level. The findings are expected to contribute to strengthening community-based immunization strategies and improving maternal education programs.

Therefore, this study aims to analyze the factors influencing the completeness of basic immunization among infants aged 0–12 months at Puskesmas Medan Labuhan in 2025.

METHODS

This quantitative analytic study used a cross-sectional design and was conducted at Puskesmas Medan Labuhan, Indonesia, in 2025. The study involved 44 mothers of infants aged 0–12 months selected through total sampling. The dependent variable was the completeness of basic immunization (complete/incomplete), verified using immunization records. Independent variables included maternal knowledge, family support, and social environment, measured using structured questionnaires and dichotomous (Yes/No) checklists. Data were collected directly from respondents and analyzed using univariate statistics and the Chi-Square test to determine associations between variables with a significance level of $p < 0.05$. Ethical principles such as informed consent, confidentiality, and voluntary participation were ensured.

RESULTS AND DISCUSSION

The relationship between determinant factors and the completeness of basic immunization is presented in Table 1.

Table 1. Association Between Determinant Factors and Basic Immunization Completeness (n = 44)

Variable	Category	Complete n (%)	Incomplete n (%)	p-value	OR
Maternal Knowledge	Good	30 (93.8)	2 (6.2)	0.003	15.0
	Poor	6 (50.0)	6 (50.0)		
Family Support	Supportive	28 (93.3)	2 (6.7)	0.012	10.5
	Not Supportive	8 (57.1)	6 (42.9)		
Social Environment	Supportive	27 (90.0)	3 (10.0)	0.021	5.0
	Not Supportive	9 (64.3)	5 (35.7)		

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Based on Table 1, maternal knowledge showed a statistically significant association with immunization completeness (p = 0.003). The Odds Ratio (OR = 15.0) indicates that mothers with good knowledge were 15 times more likely to complete their infant's basic immunization compared to mothers with poor knowledge. This finding strengthens previous evidence that knowledge is a major predisposing factor influencing preventive health behavior (Rahmawati et al., 2022). Adequate knowledge enhances awareness of immunization schedules and benefits, thereby increasing adherence.

Family support was also significantly associated with immunization completeness (p = 0.012), with an OR of 10.5. This suggests that mothers receiving family support were more than ten times more likely to complete immunization compared to those without support. Social support plays an important reinforcing role in health behavior by reducing fear, misinformation, and uncertainty regarding vaccine safety (Sari & Putri, 2021).

Similarly, social environment demonstrated a significant relationship (p = 0.021) with an OR of 5.0, meaning that mothers living in supportive environments were five times more likely to complete immunization schedules. Community norms, peer influence, and exposure to accurate health information contribute positively to immunization uptake. The World Health Organization (2023) identifies vaccine hesitancy and misinformation as major global threats to immunization programs.

Overall, these findings confirm that behavioral and socio-environmental determinants significantly influence immunization completeness. The magnitude of Odds Ratios indicates that maternal knowledge is the strongest predictor among the studied variables.

CONCLUSION

This study aimed to analyze the factors influencing the completeness of basic immunization among infants aged 0–12 months at Puskesmas Medan Labuhan. Based on the results and discussion, the study successfully identified that maternal knowledge, family support, and social environment are significantly associated with immunization completeness. Maternal knowledge emerged as the strongest determinant, followed by family support and social environment, confirming that behavioral and socio-environmental factors play a central role in immunization compliance. Thus, the research objective stated in the Introduction has been achieved, and the findings provide empirical evidence supporting the importance of integrated behavioral approaches in strengthening immunization programs at the primary health care level. The results suggest that improving immunization coverage should not rely solely on service availability but must also incorporate structured maternal education, family engagement strategies, and community-based health promotion interventions. Future research may expand this study by employing longitudinal or experimental designs to examine causal relationships and intervention effectiveness. Additionally, broader multi-center studies with larger samples are recommended to enhance generalizability and support policy development at regional or national levels. The findings of this study may serve as a foundation for developing sustainable, community-oriented immunization strengthening programs.

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