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Mother's level of education and attitude determines the provision of complete basic immunization in infants

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ABSTRACT

Introduction: Immunization is an effort to introduce vaccines into the body to increase a person's immunity and prevent a disease. The impact or risk of incomplete immunization is that children are more susceptible to illness, are at more risk of infecting family members or the environment, and the quality of life and life expectancy decrease. During the research, data were found that 19 out of 35 infants did not receive complete immunization. This research aimed to determine the relationship between the mother's education level and attitude towards providing complete basic immunization in infants at the Tombatu Community Health Center, Winorangian Satu Village.

Methods: Partial analytical observational research with a cross-sectional design, with independent and dependent variables, was conducted simultaneously with a sample size of 35 respondents. The analysis method used is the Chi-square.

Result: The mother's education level was higher in the high category (>junior high school), and the mother's attitude was associated with a frequency of 19 respondents (not supporting <50%). The Chi-square test results showed a relationship between maternal education level and the provision of complete basic immunization in infants at the Tombatu Community Health Center, Winorangian One Village, p-value = 0.00. The Chi-square test results showed a relationship between maternal attitudes and the provision of complete basic immunization in infants at the Tombatu Community Health Center, Winorangian Village. One p-value = 0.00.

Conclusion: The study results found a relationship between the mother's level of education and the provision of complete basic immunization to babies at the Tombatu Community Health Center. Winorangian Satu Village, and there is a relationship between the mother's attitude and the provision of complete basic immunization in infants at the Tombatu Community Health Center, Winorangian Satu Village

Keywords: Mother's education level, attitude, Provision of complete basic immunization.

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INTRODUCTION

Immunization is deliberately entering a vaccine into the body to increase immunity and prevent disease. Immunization only provides immunity or resistance to disease, so to avoid other diseases, other immunizations are needed (Nasution et al., 2020). Immunization is one of the Sustainable Development Goals (SDGs) programs for 2030 to reduce the Infant Mortality Rate (IMR). Immunization is mandatory for infants and children and helps prevent diseases that can be prevented by immunization (Kemenkes RI, 2020). Mandatory basic immunizations for children under 1 year old include Hepatitis B, Polio, and Bacillus Calmette-Guerin (BCG): Diphtheria, Pertussis, Tetanus (DPT), Rotavirus, PCV (pneumococcal conjugate vaccine), and Measles. Each immunization administration is different; hepatitis B should be given within 12 hours after birth, and Vitamin K should be administered about 30 minutes before. Polio is given in the newborn, and the following 3 times are given at the earliest 1 month apart. BCG is recommended before 3 months of age. Basic DPT is given 3 times from the age of 2 months with an interval of 4-6 weeks. Rotavirus immunization is given at 2 months and up to 4 months of age. PCV immunization is given at 2, 4, and 6 months of age and a booster at 12 and 15 months. Measles immunization is given at 9 months of age (Baiq & Ni Putri, 2022).

Immunization is one of the most effective public health interventions for reducing infant morbidity and mortality caused by vaccine-preventable diseases (Vasudevan *et al.*, 2024). The World Health Organization (WHO) emphasizes that high immunization coverage is essential to protecting infants from infectious diseases such as measles, diphtheria, and polio (Romer *et al.*, 2024). However, despite global efforts to increase immunization rates, gaps in coverage remain, particularly in low and middle-income countries. Several factors contribute to incomplete immunization, including socioeconomic status, healthcare accessibility, and parental knowledge and attitudes. Among these, a mother's level of education and attitude play a crucial role in determining whether an infant receives complete basic immunization (Chisnall *et al.*, 2025). Maternal education influences health-related decision-making, as educated mothers are more likely to understand the benefits of immunization, adhere to vaccination schedules, and seek healthcare services for their children. Studies have shown that higher maternal education levels correlate with increased immunization coverage, as educated mothers have better access to health information and resources (Moucheraud *et al.*, 2023). Conversely, mothers with lower education levels may lack sufficient knowledge about vaccines, leading to missed or delayed immunizations (Biks *et al.*, 2024).

In addition to education, maternal attitude toward immunization significantly impacts vaccination adherence (Laliotis, Mourelatos, and Lohtander, 2025). A positive attitude is often linked to higher immunization rates, as mothers who trust the healthcare system and believe in the benefits of vaccines are more likely to ensure their children receive complete immunization (Hill *et al.*, 2024). On the other hand, negative attitudes driven by fear of vaccine side effects, misinformation, or cultural beliefs can contribute to vaccine hesitancy and refusal. Given the critical role of maternal education and attitude in immunization uptake, this study aims to examine how these factors influence the provision of complete basic immunization in infants (Aguzzi *et al.*, 2024). Understanding the relationship between maternal education, attitude, and immunization status can provide valuable insights for designing targeted interventions to improve vaccination coverage and protect infant health (Basrowi, Farradika, and Sundjaya, 2024).

Several factors influence the incompleteness of complete basic immunization in infants, namely maternal age, education, income, employment, toddler attendance at

posyandu, mother's education level, attitudes, and the role of health workers (Rakha *et al.*, 2025). Mothers with low education have less knowledge of immunization information, making the mother's attitude less supportive of immunization actions because the mother has side effects (Herrera-Almanza and Rosales-Rueda, 2023). Parental attitudes and practices regarding immunization are the most critical contributors to immunization status (Siddiqi *et al.*, 2024). This decision is very influential in increasing immunization compliance; this aims to prevent the occurrence of PD3l in children to avoid disability and death. Based on the background, the researchers asked, "Is there a relationship between the level of education and maternal attitudes towards providing complete basic immunization in infants at the Tombatu Health Center, Winorangian Satu Village?". This study aimed to determine the relationship between the level of education and maternal attitudes towards providing complete basic immunization in infants at the Tombatu Health Center, Winorangian Satu Village.

RESEARCH METHODOLOGY

This study is a partial analytical observational study with a cross-sectional design that emphasizes the time of measurement or observation of data on independent and dependent variables carried out simultaneously (Sari et al., 2022). The independent variables in this study are the level of education and attitudes of mothers, while the dependent variable is the provision of complete basic immunization to infants. The data collection instrument used in this study is a questionnaire about maternal education and attitudes in providing complete basic immunization for infants, which has been tested by previous researchers, namely Marfiani (2018). The data obtained were processed through editing, coding, entry and tabulation. Data analysis uses univariate analysis to analyze each research variable descriptively by calculating the frequency distribution and bivariate analysis to see the relationship between two variables. The method to be used in this study is the bivariate correlation method for two categorical variables, namely the Chi-Square nonparametric statistical test. It is processed by a computer using the SPSS 26 application.

RESULT

Table 1: Frequency distribution based on mother's education level, mother's attitude, and Immunization Status

Category	Frequency (F)	Percentage (%)
Education		
Low (<SMP)	11	31.4
High (>SMP)	24	68.6
Mother's Attitude		
Negative (mean <50%)	19	54.3
Positive (mean >50%)	16	45.7
Immunization Status		
Incomplete	20	57,1
Complete	15	42,9

Most respondents had a higher level of education (above junior high school), with a total of 24 people (68.6%). In contrast, the rest, as many as 11 people (31.4%), had a lower level of education (below junior high school). This shows that most of the respondents have received a better education. Based on the study results, maternal attitudes towards immunization are divided into two categories, namely negative and

positive attitudes. Nineteen mothers (54.3%) had a negative attitude towards immunization, while 16 (45.7%) had a positive attitude. This higher proportion of negative attitudes indicates the presence of possible factors that affect the mother's perception of immunization, such as inadequate information or previous experience. The immunization status of children in this study showed that 20 (57.1%) had incomplete immunization status, while 15 (42.9%) had received complete immunization. The higher percentage of children with incomplete immunization indicates that there are still obstacles to implementing immunization programs regarding accessibility, maternal awareness, and other factors.

Table 2. Relationship between mother's education level and the provision of complete basic immunization in infants at the Tombatu Health Center

Category	Immunization Provision Status						*P-value*
	Incomplete		Complate		Total		
	F	%	F	%	F	%	
Mother's Education Level							
Low <(SMP)	11	100,0%	0	0,0%	11	100%	0,00
High (>SMP)	9	37,5%	15	62,5%	24	100%	
Mother's Attitude							
Negative (mean <50%)	19	100,0%	0	0,0%	19	100%	0,00
Positive (mean >50%)	1	6,3%	15	93,8%	16	100%	

Data shows that all mothers with low education levels (< junior high school) have children with incomplete immunization status (100%). In contrast, among mothers with higher education (> junior high school), only 37.5% have children with incomplete immunization, while 62.5% have received complete immunization. Statistical tests showed a p-value of 0.00, indicating a significant relationship between the mother's education level and the child's immunization status. Based on the results of the study, all mothers who had a negative attitude toward immunization (mean <50%) had children with incomplete immunization status (100%). Meanwhile, in mothers with a positive attitude towards immunization (mean >50%), only 6.3% of children have not received complete immunization, while 93.8% have received full immunization. With a p-value of 0.00, these results show that the mother's attitude towards immunization has a significant relationship with the child's immunization status.

This data shows that both the mother's education level and attitude towards immunisation significantly influence the children's immunisation status. Mothers with higher education tend to have children with more complete immunization status. Similarly, mothers with a positive attitude toward vaccination are more likely to complement their child's immunizations. Therefore, increased education and counseling for mothers regarding the importance of vaccination are needed to improve immunization coverage in the community.

DISCUSSION

The findings of this study indicate a significant relationship between maternal education level, maternal attitude, and the immunization status of children. Both factors are crucial in determining whether a child receives complete immunization.

Maternal Education Level and Immunization Status

The results reveal that all mothers with lower education levels (< junior high school) had children with incomplete immunization (100%). In contrast, among mothers with

higher education levels (> junior high school), only 37.5% had children with incomplete immunization, while 62.5% had children with complete vaccination. The significant p-value (0.00) suggests that maternal education level strongly influences immunization uptake.

Higher education levels are associated with better access to health information, improved understanding of immunization benefits, and greater awareness of potential risks associated with incomplete immunization (Raina *et al.*, 2023). Several studies have also demonstrated that educated mothers are more likely to seek preventive healthcare services and adhere to immunization schedules, ultimately improving health outcomes for their children (Sinuraya *et al.*, 2024). Conversely, lower education levels may contribute to limited knowledge, misinformation, and reluctance toward immunization. The mother's education level determines the child's immunization status (Das *et al.*, 2025). Studies show that children of mothers with secondary or higher education are more likely to receive complete immunizations than those with low or no formal education. A systematic review and meta-analysis found that a child's chances of getting fully immunized increased 2.3 times if their mothers had secondary or higher education compared to mothers without formal education (Memon *et al.*, 2023). Mothers with higher levels of education tend to have better knowledge of the benefits of immunization and recommended vaccination schedules, making it more likely to ensure their children receive immunizations on time (Ali *et al.*, 2024).

Access to higher education health information allows mothers to access and understand health information more easily, including the importance of immunization and increasing adherence to immunization programs (Yang *et al.*, 2025). Better literacy, reading, and writing skills help mothers understand health education materials and communicate effectively with health workers about their child's immunization needs (Girma *et al.*, 2023). The socioeconomic status of maternal education often correlates with better economic status, allowing for easier access to health services and immunization facilities. Variation by geographic and social context. Although the relationship between maternal education and child immunization was consistent across studies, the effects may vary based on geographic location and socio-economic context. For example, in some developing countries, structural barriers such as limited access to health services can reduce the positive impact of maternal education on child immunization. Improving women's education levels can be an effective strategy to increase child immunization coverage. Programs focusing on women's educational empowerment improve health knowledge and enhance families' overall well-being. In addition, interventions to raise awareness about the importance of immunization should consider the mother's education level to ensure the message is conveyed effectively (Emmanuel-Ajayi and Gu, 2024).

Mothers with higher levels of education tend to better understand the importance of immunization, have better access to health information, and are more compliant with recommended immunization schedules. In contrast, mothers with low education often face limitations in understanding vaccination information, putting their children at greater risk of incomplete immunizations.

Maternal Attitude and Immunization Status

A similar trend is observed in maternal attitudes. Mothers with negative attitudes toward immunization had children with incomplete immunization (100%). On the other hand, 93.8% of children whose mothers had positive attitudes toward immunization

received complete immunization. The p-value of 0.00 highlights a significant association between maternal attitude and immunization status.

A negative attitude toward immunization could stem from various factors, including fear of vaccine side effects, lack of trust in healthcare services, or exposure to misinformation. Misinformation about vaccine safety and efficacy, particularly through social media and community influence, can lead to vaccine hesitancy (Erika *et al.*, 2024). In contrast, mothers with positive attitudes are more likely to follow recommended immunization schedules, recognizing the importance of vaccines in preventing infectious diseases. A mother's attitude toward immunization is a major determining factor in providing complete immunization to their children (Nandi *et al.*, 2023). Mothers with neutral or negative attitudes toward vaccination are more likely not to vaccinate their children than mothers with a positive attitude. Mothers with negative attitudes were 43 times more likely not to immunize their children than mothers with positive attitudes (Mayanti *et al.*, 2024). The importance of understanding parents' attitudes and beliefs towards immunization. Variability in these measures of attitudes can influence a global understanding of how such attitudes affect immunization rates (Astuti, Suindyah Dwiningwarni, and Atmojo, 2025).

Lack of knowledge about the benefits and safety of vaccines can lead to hesitancy or rejection of immunization. Perceptions of what is considered right or wrong in the community can influence immunization decisions. For example, if there is a belief in a community that immunizations are not necessary, mothers may be reluctant to vaccinate their children (Semenova *et al.*, 2024). A mother's level of trust in health care providers and the national immunization system can influence their decisions. Distrust or previous negative experiences with health services can hinder adherence to immunization schedules. The spread of inaccurate information or myths about vaccines can affect maternal attitudes toward immunization. Although most parents have basic knowledge about vaccination, some still have negative attitudes that may be caused by a lack of knowledge and socio-cultural factors (Rahman *et al.*, 2023).

Understanding maternal attitudes towards immunization and the factors influencing them is critical to designing effective interventions. Targeted education programs to increase maternal knowledge about the benefits and safety of vaccines and efforts to build trust in the health system can help increase immunization rates. Additionally, it is important to handle and correct misinformation through effective public information campaigns. The mother's attitude greatly determines the decision to provide immunization to the child. Mothers with positive attitudes toward vaccination are more likely to ensure their children are fully vaccinated. In contrast, mothers with negative attitudes or hesitancy toward immunization are more likely to avoid or delay vaccination, which risks increasing the child's vulnerability to diseases that can be prevented by immunization.

Implications and Recommendations

The strong associations found in this study emphasize the need for targeted interventions to improve immunization coverage. Strategies to enhance maternal education and promote positive attitudes toward immunization include Health Education Programs. Providing accessible and easy-to-understand information about the benefits and safety of immunization, especially for mothers with lower education levels. Community Engagement. Encouraging healthcare professionals, local leaders, and community members to advocate for immunization and dispel common myths. Counseling and Support. Offering one-on-one or group counselling sessions to address concerns and build

trust in immunization programs. Mass Media Campaigns. Utilizing television, radio, and social media to spread accurate information about immunization and counter misinformation.

CONCLUSION

This study highlights that maternal education level and attitude significantly impact immunization uptake among children. Mothers with higher education levels and positive attitudes toward immunization are more likely to ensure their children receive complete vaccinations. Therefore, addressing barriers related to education and perception is crucial in improving immunization coverage and safeguarding public health. Future research should explore additional socio-economic and cultural factors influencing vaccine acceptance and compliance.

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Conflict of Interest

There are no potential conflicts of interest relevant to this article.

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