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The Relationship between Mothers' Level of Knowledge and Attitudes with Administration of BCG Immunizations

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Abstract

The immune system of infants is still developing, making them more susceptible to infectious diseases, including tuberculosis (TB). One of the effective preventive measures against TB is Bacillus Calmette–Guérin (BCG) immunization. However, BCG immunization coverage in the regency has only reached 93.13%, with Pakandangan Health Center ranking as the second lowest, achieving only 64% coverage out of a target population of 242 infants. This study aimed to examine The Relationship between Mothers' Level of Knowledge and Attitudes with the administration of BCG Immunizations in Korong Pakandangan, Enam Lingkung District, in 2025. An analytic survey with a cross-sectional design was conducted among 92 mothers who had infants aged 0–11 months, using total sampling. Data were analyzed using univariate and bivariate analyses. The results showed that 60.9% of respondents had low knowledge regarding BCG immunization, 56.5% had negative attitudes toward BCG immunization, and 66.3% had provided BCG immunization to their infants. Bivariate analysis revealed

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a significant relationship between mothers' knowledge and BCG immunization provision (p = 0.001) as well as between mothers' attitudes and BCG immunization provision (p = 0.008). In conclusion, mothers' knowledge and attitudes are significantly associated with the provision of BCG immunization. It is recommended that health workers, particularly community health volunteers (posyandu staff), enhance the frequency of health education to improve awareness of the importance of BCG immunization for infants.

Keywords: Knowledge, attitudes of mothers, BCG Immunization

Introduction

The tuberculosis immunization program is designed to address serious health issues affecting infants and children. One of the main prevention strategies against tuberculosis is the administration of the Bacillus Calmette–Guérin (BCG) vaccine to infants between 0 and 1 month of age, with a maximum age limit of 11 months. However, according to the data collected, the program's coverage in some areas has not yet met the set targets.

The 2024 WHO global tuberculosis report still ranks Indonesia as the third-largest contributor worldwide, following India and China, with approximately 539,000 new cases and around 101,000 deaths annually (WHO, 2025). Tuberculosis in children is a very serious issue. The number of tuberculosis cases in children in Indonesia accounts for about one-fifth of all tuberculosis cases (WHO, 2022). The coverage of BCG vaccination at Puskesmas Enam Lingkung is in the second-lowest position out of 24 Puskesmas in Padang Pariaman Regency, with a coverage rate of 64% for a target of 90% (Profile of Padang Pariaman Health Office, 2022). All papers submitted to the journal should be written in English/Indonesian (customized templates). Authors whose English is not their native language are encouraged to have their paper checked before submission for grammar and clarity. The work should not have been published or submitted for publication elsewhere, and should be free from plagiarism (see statements).

Infants are more susceptible to infection by Mycobacterium Tuberculosis, the cause of tuberculosis (TBC), due to several reasons. These include an immature immune system, close contact with adults who have TBC in their surroundings, such as parents,

close relatives, caregivers, and others, and a lack of awareness among parents to administer the BCG vaccine to newborns as early as possible. The BCG vaccine consists of a weakened form of live Mycobacterium Tuberculosis that has been reduced in its ability to cause disease (its virulence). This weakened form can stimulate immune cells to protect against infection by Mycobacterium Tuberculosis without making the baby or child sick.

Important factors such as a mother's knowledge and attitude towards immunization have been identified as key supports in achieving the success of basic immunization programs, including BCG. Based on data from reports showing that coverage has not yet reached targets at both national and international levels, this indicates a gap between the implementation of immunization programs and their actual practice in the community, particularly in understanding the urgency and benefits of BCG vaccination. The variation in research findings regarding the strength of the relationship between knowledge and attitudes and immunization status also reflects the need for further analysis of this phenomenon.

This study was motivated by the uncertainty of previous research findings and the lack of local data in Korong Pakandangan regarding the relationship between mothers' knowledge and attitudes towards the administration of BCG vaccination. The research employed an analytical approach with a total sampling method targeting mothers who had infants aged 0–11 months in areas with low coverage of BCG immunization. This study provides stronger empirical evidence on the role of mothers' knowledge and attitudes in improving the uptake of BCG vaccination. The results of this study are expected to strengthen the scientific basis for the development of more effective health promotion interventions at the community level, as well as serve as a reference for improving strategies to enhance immunization coverage in areas with limited access to health services. This study aims to find the lack of scientific evidence in the local context and provide a basis for recommendations that are appropriate for the local community's conditions when developing health policies.

The purpose of this study is to find out the relationship between the level of knowledge and attitudes of mothers towards giving BCG vaccination to babies in Korong Pakandangan, Enam Lingkung Subdistrict, in 2025. It is hoped that the results of this study will provide useful information for policymakers and program

implementers in designing more effective communication and education strategies, which can help increase acceptance and coverage of BCG vaccinations among the community.

Method

1. Research design

This study use analitic design with a cross-sectional approach, which is an observational study to analyze variable data collected at a certain point in time, looking at the relationship between the knowledge and attitude of mothers and attitudes with administration of BCG immunizations.

2. Setting and samples

This study was conducted in Pakandangan Village, Enam Lingkung Subdistrict, from October 2024 to July 2025. The sample included all mothers who met the criteria of having a baby aged between 0 and 11 months in Pakandangan Village, Enam Lingkung Subdistrict, with a total of 92 participants. The sample excluded is mothers who move to another district from Pakandangan Village.

3. Measurement and data collection

Researchers gave questionnaires directly to participants who had agreed to take part. They explained clearly to each person about how the research works, what the study aims to find out, the benefits of taking part, how their information will be kept private, and how to complete the questionnaire. The form included questions about basic information, like the age and height of the mothers and young children. Participants were asked to fill out the questionnaire on their own, which usually took about 20 minutes. Researchers then checked to make sure everything was completed.

4. Data analysis;

Univariate analysis was conducted to see the frequency distribution of each variable, namely the independent variable (knowledge level and attitude of the mother) and the dependent variable (provision of BCG immunization). Bivariate analysis was conducted to see the relationship between the independent variables (knowledge level and attitude of the mother) and the dependent variable (provision of BCG immunization). The data was processed using a computer, and the chi-square test was used to analyze it. The significance level used was a = 0.05, which means there is a 95% confidence level in the results.

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Results

Table 1. The Relationship between Mothers' Knowledge Level and the Provision of BCG Immunization

Knowledge level of mothers	Provision of BCG immunization				Total		P value
	Provision		Non provision				
	f	%	f	%	f	%	
low	29	51,8	27	48,2	56	100	
high	32	88,9	4	11,1	36	100	0,001
Total	61	66,3	31	33,7	92	100	

The study found that a smaller percentage of respondents who had low knowledge about BCG vaccination received the vaccine (51.8%), compared to those with high knowledge (88.9%). The statistical test showed a p-value of 0.001, which is less than the significance level of 0.05. This indicates a significant relationship between respondents' knowledge about BCG vaccination and whether they received it.

Table 2. The Relationship between Mothers' Attitudes and the Provision of BCG Immunization

Attitudes of mothers	Provision of BCG immunization				Total		P value
	Provision		Non provision				
	f	%	f	%	f	%	
low	28	53,8	24	46,2	52	100	
high	33	82,5	7	17,5	40	100	0,008
Total	61	66,3	31	33,7	92	100	

The study found that a smaller percentage of respondents who had a negative attitude received the BCG vaccine (53.8%) compared to those with a positive attitude (82.5%). The statistical test showed a p-value of 0.008, which is less than the significance level of 0.05. This indicates there is a significant relationship between respondents' attitudes toward the BCG vaccine and whether they received it.

Discussion

The table analysis shows that 56 respondents (60.9%) have low knowledge

about BCG vaccination, while 36 respondents (39.1%) have high knowledge. Many respondents are unaware that BCG vaccination is given to provide active immunity against tuberculosis (TBC). The analysis also found that more than half (60.9%) of the respondents do not understand the benefits of giving BCG vaccine to babies. Additionally, the results clearly show that the lowest level of knowledge is about the vaccination schedule, as most respondents do not know when the BCG vaccine should be given to babies.

Based on the researchers' conclusions, many respondents have low knowledge about the BCG vaccine because they have never attended health education sessions conducted by health staff, or they have received little information. This is also influenced by the low educational background of the respondents. This is evident from the research findings analyzed by the author, where most of the respondents with low knowledge also have low levels of education.

More than half of the respondents (56.5%) still have a negative response towards BCG vaccination. The most common negative reaction is that respondents do not have a high awareness of taking their babies to the posyandu. In addition, some respondents still hold wrong beliefs about vaccination. This is shown by the fact that many respondents believe that giving vaccines to babies will make infant ill. The research table results show that out of 92 respondents, 31 people (37.5%) did not give their baby the BCG vaccine, while 61 people (66.3%) did give their baby the BCG vaccine.

The test to check the relationship between the two variables showed a p-value of 0.001, which is less than α of 0.05. This means there is a significant relationship between respondents' knowledge about BCG vaccination and whether they give their babies the BCG vaccine. The research also found that respondents with low knowledge about BCG vaccination are more likely not to give their babies the BCG vaccine. The test to check the relationship between the two variables showed a p-value of 0.008, which is less than α of 0.05. This means there is a significant relationship between attitude and the giving of BCG vaccination.

The research results show that there is a match between the respondents' knowledge and attitudes and their reactions. Those with low knowledge and negative attitudes mostly did not give their babies the BCG vaccine. The respondents did not

fully understand the benefits of the vaccine, so they thought it wasn't very important to give it to their babies. They also believed that their babies would stay healthy even without the vaccine. Additionally, some respondents thought the vaccine made babies sick, and they didn't have a strong enough motivation to give their babies the BCG vaccine.

Limitation

Reducing the occurrence of BCG vaccine provision should be looked at again, considering family-related factors.

Conclusion

This study found that most people had little knowledge about BCG immunization, especially about its benefits and when it should be given. Not getting enough health education and having less education helped explain why people didn’t understand BCG vaccination well. Also, more than half of the people had a negative view of BCG immunization, The study also showed that a person’s knowledge about BCG vaccination was connected to whether they gave it to their child. Similarly, their attitude toward BCG immunization was linked to how they acted about giving the vaccine. So, better health education and more awareness for mothers are important to help more babies get the BCG vaccine.

Ethical Considerations

This study followed the proper ethical rules for research that involves people. Before taking part, everyone gave their permission after being told about the study's goal, what would happen during the research, any possible advantages, and their rights as participants. They could choose not to take part or leave anytime without any problems. Taking part was completely up to each person. The study made sure that everyone's privacy was protected. Their personal information wasn't written down, and all the information collected was only used for the research. The data was kept safe to make sure no one's personal details were shared or found out during the study.

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