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Indicators of Mothers' Knowledge Regarding Completeness of Basic Imunization for Children Aged 0-24 Months in Kota Tengah Public Health Centre, Gorontalo

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ABSTRACT

Immunization is a crucial preventive measure to protect children from infectious diseases. A significant decline in coverage is often influenced by the role of mothers as the primary decision-makers in children's health.This study aimed to describe maternal knowledge indicators and their relationship with the completeness of basic immunization for children aged 0-24 months. Utilizing a quantitative design with a cross-sectional approach, the study was conducted on 42 respondents in the Kota Tengah Public Health Center work area, selected through accidental sampling. Data were collected using knowledge questionnaires and Maternal and Child Health (MCH) books, and then analyzed descriptively and using the Chi-square test. The results show that while the majority of mothers understand the definition of immunization, approximately one-third of respondents still have misconceptions regarding the types, benefits, and schedules of vaccinations. Statistical tests reveal a significant relationship between the level of maternal knowledge and immunization completeness (p=0.001), where mothers with better knowledge tend to be more compliant in completing their children's immunization status. In conclusion, maternal knowledge is a vital determinant in the success of immunization programs. More comprehensive health education strategies and continuous guidance for parents are highly necessary to raise awareness and ensure optimal child health protection at the public health center level.

1. INTRODUCTION

Immunization is one of the best ways to protect children from highly contagious diseases that can cause disability or death. After the basic immunizations are completed, the child's body will have a small amount of antibodies, which will gradually decrease. Therefore, additional vaccinations help the immune system to strengthen the existing response (Sitaremi et al., 2023). Infants' antibodies are still very vulnerable, and vaccines provide the necessary stimulus for their antibodies to become active when infection occurs (Sulastri & Fadza, 2024).

The completeness and accuracy of vaccination schedules for infants are greatly influenced by mothers' knowledge about vaccination. Mothers who have limited knowledge or believe that vaccination is unnecessary often do not follow the prescribed vaccination schedule. This puts their infants at higher risk of contracting Vaccine-Preventable Diseases (VPDs). On a larger scale, regular vaccination also helps reduce infant mortality rates (IMR). Additionally, adequate vaccination rates contribute to improving the overall health of the community. Therefore, maternal knowledge is a crucial step in strengthening the success of vaccination programs (Hidayah et al., 2025).

The complete basic immunization program includes the administration of BCG, DPT-HB-Hib, Polio, and MR vaccines in accordance with the national immunization schedule set by the Ministry of Health. When one or more of these vaccines are not administered according to schedule, the child is considered to have not received complete immunization. This condition indicates poor access or participation of families in the immunization program and shows that there are still gaps in basic health services (Faradita et al., 2022)

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National immunization coverage in 2022 showed a very significant increase, reaching 99.6%, exceeding the 2022 Strategic Plan target of 90%. Compared to 2021, the number of provinces that successfully met the strategic plan target also increased, from only 9 provinces to 15 provinces in 2022. Central Java was recorded as the province with the highest immunization coverage, namely 114.1%, which illustrates the high level of community participation in the vaccination program. Conversely, Aceh was the province with the lowest achievement, at only 48.1%, indicating that there are still disparities in access to and acceptance of immunization in the region. One measure of equitable health services is the percentage of districts/cities that are able to achieve a minimum coverage of 80%. Based on this indicator, there has been an increase in the number of provinces whose districts/cities meet this standard, from only 7 provinces in 2021 to 16 provinces in 2022. This data shows an improvement in the distribution and quality of immunization services, although disparities between regions still need further attention (Rahma & Hasanah, 2024)

The comprehensive basic vaccination program reflects the government's commitment to future generations by implementing evidence-based health measures that save millions of lives every year (World Health Organization, 2024). Incomplete vaccination can have serious clinical consequences compared to children who have been fully vaccinated. Children who are not fully vaccinated have a higher risk of contracting whooping cough and suffering from acute respiratory infections (ARI) (Hudjuala et al., 2026)

Based on data from the 2024 Indonesian Health Profile (2023 data), The coverage of complete basic immunization (IDL) for infants in Indonesia has reached 82.60%, but this figure is still below the 2024 Strategic Plan target of 90%. At the regional level, Gorontalo Province recorded an IDL achievement of 82.42%, while Gorontalo Regency stood at 78.97%. Challenges are evident in the continuity of immunization up to 24 months of age, where nationally, follow-up immunizations such as measles/MR2 have only reached around 67.20%, and for the Gorontalo Regency area, the achievement of follow-up immunization tends to be lower than basic immunization, in line with the downward trend in coverage occurring in children under two years of age (baduta) in various other regions (Kementerian Kesehatan, 2024)

The main issue in this study is the significant discrepancy between vaccination policies and actual conditions in the field. A preliminary study conducted at the Kota Tengah Community Health Center found that out of a total of 917 children aged 0 to 24 months, 686 children (74.8%) had not received complete vaccinations. Despite a positive trend in national basic immunization rates, there are still major challenges in terms of continuity up to 24 months of age. In Gorontalo province, there was a significant decline in vaccination rates from 90.81% in 2022 to 67.50% in 2024. This decline was influenced by health behavior factors, where mothers play a central role as the main decision-makers in children's health.

One of the keys to successful vaccination in children is parental involvement, especially for children aged 0-5 years, when they are still very dependent on their parents' care and decisions. In everyday life, mothers play a decisive role in meeting their children's needs. Therefore, increasing mothers' knowledge and awareness is key to ensuring the success of child immunization (Rahma & Hasanah, 2024). Adequate immunization coverage contributes to improving the overall health status of the community. Therefore, educating mothers is an important step in strengthening the success of immunization programs (Hidayah et al., 2025) Mothers play an important role in meeting their children's daily needs, especially those aged 0 to 5 years. Everything mothers do affects their children, including their behavior in preventing disease through vaccination. Mothers' low awareness of the meaning, types of complete basic immunizations, benefits, schedule of administration, and side effects of vaccination for their children is the biggest obstacle to the success of vaccination programs, with increasing anxiety about side effects and the emergence of myths about vaccine safety (Dayanti Harahap et al., 2020)

Lack of knowledge about the above indicators often causes excessive concern and uncertainty about whether the next dose can be administered and the immunization schedule can be completed. This study used a cross-sectional approach with the aim of analyzing the relationship between knowledge indicators and the status of complete basic immunization in the working area of the Puskesmas Kota Tengah in Gorontalo Province.

2. METHOD

The research design used quantitative methods with a cross-sectional approach to provide an overview of the relationship between mothers' knowledge and the completion of basic immunizations. This study used a population of 686 mothers with children aged 0-24 months who resided or received health services in the working area of the Kota Tengah Community Health Center. The sample size was calculated using the Slovin formula with a 15% margin of error, resulting in a sample size of 42 responses. Respondents were selected using accidental sampling with the following inclusion criteria: mothers with children aged 0-24 months who reside in the Kota Tengah Community Health Center area. The exclusion criteria were mothers who refused to have their children immunized and children who came without being accompanied by their mothers.

The tools used in this study to obtain data were KIA books, which record every immunization given to children aged 0-24 months, and questionnaires to measure mothers' knowledge about immunization. These tools underwent validity and reliability testing with a Cronbach's alpha value of 0.845 (Yulia, 2023). The respondents' data were processed using descriptive analysis to measure each indicator of mothers' knowledge, consisting of: understanding of immunization; types of immunization; benefits of immunization; immunization schedule; side effects of immunization. Furthermore, the relationship between mothers' knowledge and immunization completeness was measured using the Chi-square test with a significance level of 5% or 0.05. Researchers collected data during posyandu activities using questionnaires and immunization completion checklists based on the KIA book for children aged 0-24 months.

3. RESULT AND DISCUSSION

Result

Tabel 1. Distribution of Mothers' Knowledge Based on Indicators

Statement	True		False	
	(n)	**(f)**	(n)	**(f)**
Definition of Immunization				
1. imunization is an attempt to provide immunity against a disease	39	92,9	3	7,1
Immunization Types				
2. Hepatitis B, BCG, Polio, DPT, and Measles immunizations are part of the complete basic immunization schedule.	26	61,9	16	38,1
Vaccination Benefits				
4. The benefit of immunization is to prevent children from contracting diseases	26	61,9	16	38,1
7. Polio immunization to prevent paralysis	29	69	13	31
Immunization Schedule				
3. Hepatitis B, BCG, Polio, DPT, and measles immunizations are given before 9 months of age	27	64,3	15	35,7
5. Hepatitis B immunization (Hb0) is given at birth				
8. BCG immunization is given 5 times	26	61,9	16	38,1

9. DPT immunization is given 1 hour after birth	30	71,4	12	28,6
10. The last basic immunization given is measles	28	66,7	14	33,3
11. Immunization for newborns is given according to schedule	27	64,3	15	35,7
12. Polio immunization is given 4 times	34	81	8	19
13. Basic immunization is only given to children aged 0-4 months	34	81	8	19
14. MR Booster immunization is given at 24 months of age	32	76,2	10	23,9
	33	78,6	9	21,4
Side effects of immunization				
6. Side effects of BCG immunization include a red lump that oozes pus, without fever or pain.	30	71,4	12	28,6

According to Table 1, the indicator of mothers' knowledge about the meaning of immunization is very good, with 39 respondents (92.9%) understanding what immunization means. However, the indicator of the types, benefits, and schedule of immunization has a relatively homogeneous distribution of correct answers, ranging from 61% to 66%. This indicates that around one-third of respondents (33%-38%) still have a misconception about the types, benefits, and appropriate timing of immunization.

Tabel 2. The Relationship Between Mothers' Knowledge and Immunization Coverage in Children Aged 0-24 Months in the Working Area of the Central City Health Center

	Immunization				Total	*P value*
Knowledge	Complete immunization		Incomplete immunization			
	n	%	N	%	%	
Good	17	40,4%	2	4,7%	38%	
Fair	6	14,2%	5	11,9%	23,7%	0,001
Deficient	3	7,1%	9	21,4%	38,3%	
Total	26	61,8%	16	38,2%	100%	

According to Table 2, mothers with good knowledge tended to provide complete immunization for their children, with 17 respondents (40.4%), while mothers with poor knowledge tended to provide incomplete immunization for their children, with 9 respondents (21.4%). The statistical test results obtained a p-value of 0.001 with a<0.05. This indicates that there is a significant relationship between the level of knowledge of mothers and the completeness of immunization for children aged 0-24 months in the working area of the Puskesmas Kota Tengah

Discussion

Research conducted at the Puskesmas Kota Tengah showed that the majority of mothers understood the basic concept of immunization, but about one-third respondents still had misconceptions about the types, benefits, and schedule vaccinations. Knowledge is an important factor that influences health behaviors, including mothers' decisions to immunize their children. Lack of knowledge about immunization also contributes to low compliance among mothers in following the immunization schedule set by the government. Dirfan *et al*.,(2025) showed that many mothers were unaware of the importance of complete and timely vaccination, meaning that their children did not receive optimal protection. The immunization schedule, which should be completed by the time a child reaches one year of age, was often delayed or even incomplete.

The results of this study are in line with previous studies showing that mothers with a high level of knowledge tend to be more compliant with vaccination schedules. On the other hand, ignorance or the spread of misinformation can cause fear of side effects and reinforce myths about the risks of vaccines (Nuraeniah, Yeni dan Sumartiningsih, 2025) From a clinical perspective, incomplete vaccination status in children means a fivefold increase in the risk of whooping cough, as well as an increase in the frequency of acute respiratory infections (ARI) (Hayani *et al*., 2023). From an economic perspective, families with unvaccinated children face higher healthcare costs (Li *et al*., 2026) This proves that vaccination is a strategy to strengthen household finances through preventive measures in the form of vaccinations.

The results of this study are in line with research Dewi *et al*., (2024) which confirms that mothers' level of knowledge about immunization is directly related to the completeness of their children's immunization. Mothers who understand the types, schedule, and benefits of immunization are more likely to bring their children on time to get vaccinated according to schedule (Saptawulan et al., 2025). Knowledge about immunization is very important for mothers, especially those who are just starting out. Fear can affect knowledge and encourage further investigation of the topic. As knowledge increases, mothers will become more skilled at identifying problems and creating solutions (Kholila, 2022)

According to the results of the study, from 42 respondents, 17 respondents had good knowledge and provided complete immunizations for their children. This shows that the better the mother's knowledge, the higher the likelihood that her child will receive complete immunizations (Mei *et al*., 2024)**.** Adequate knowledge increases the likelihood that mothers will follow their children's immunization schedules completely and on time. Conversely, ignorance or inaccurate information often triggers anxiety about side effects and fuels false myths about the dangers of vaccines (Dewi *et al*., 2024).

Lack of knowledge about immunization also affects mothers' compliance with the immunization schedule set by the government Dirfan *et al*., (2025) revealed that many mothers are unaware of the importance of complete and timely vaccination, resulting in children not receiving optimal protection. The immunization schedule, which should be completed by the time the baby is one year old, is often delayed or even incomplete. This situation not only poses a health risk to the child concerned, but also hinders the achievement of disease elimination targets set by the Ministry of Health. A study by Pada *et al*., (2024) explains that children who do not receive complete immunizations have a higher incidence of acute respiratory infections (ARI) and diarrhea compared to children who have been immunized according to schedule. This condition clearly proves the important role of immunization in reducing morbidity rates in vulnerable age groups, especially infants and toddlers.

Incomplete immunization not only affects children's physical health in the short term, but also has long-term social and economic consequences. Families with children suffering from diseases due to lack of immunization face a much higher burden of treatment, both in terms of direct costs and loss of parental productivity. This condition reinforces the argument that immunization is not only a medical intervention, but also a strategy for strengthening household economics in the context of preventive health (Hardhantyo & Chuang, 2021).

Knowledge is one of the important factors that influence a person's health behavior. Without adequate knowledge about the benefits and purposes of an action, a person cannot take

the right action. In other words, the less knowledge a mother has, the less likely she is to fully vaccinate her child. This is due to a lack of understanding about the benefits of vaccination and the dangers of preventable diseases (Notoatmodjo, 2018). These findings are in line with Rahayu, N., & Pratiwi, (2022) which shows that mothers with moderate knowledge but a positive attitude towards immunization are still able to achieve high levels of compliance. Supporting factors such as education from health workers, proximity to health centers, and family support also increase the likelihood of mothers with sufficient knowledge to complete their children's immunizations.

Mothers with adequate knowledge are able to provide complete immunization due to internal motivation and external support from their environment. Although their knowledge is not as high as that of the "good knowledge" group, encouragement from health workers, immunization schedule reminders, and previous positive experiences motivate them to complete their children's immunizations (Putri et al., 2022). Based on the results of the study, it was found that 9 respondents had insufficient knowledge but incomplete immunization. This shows that low levels of knowledge affect mothers' awareness of the importance of completing their children's immunizations (Salma Hanani, Irma Jayatmi, 2024).

Mothers with low levels of knowledge are twice as likely to not complete their children's immunizations compared to mothers with high levels of knowledge. Mothers who do not fully understand the benefits of immunization are often hesitant or fearful of vaccine side effects, leading them to delay or even discontinue their children's immunizations (Syalsabilla, 2024). Lack of knowledge and incomplete immunization are caused by limited health information, lack of participation in health center activities, and misunderstanding of the benefits of immunization. In addition, fear of vaccine side effects and lack of support from family or health workers are also obstacles (Delvi *et al*., 2025).

4. CONCLUSION

Based on the results of research on maternal knowledge indicators and the completeness of basic immunization, it can be concluded that overall, of the five maternal knowledge indicators, approximately one-third of respondents (33%-38%) still have a misconception about the types, benefits, and appropriate timing of immunization. There is a specific relationship between maternal knowledge and the completeness of immunization.

The findings of this study can be used as a basis for improving public health services by providing comprehensive immunization programs for children to support an increase in the coverage of complete basic immunization, improving mothers' knowledge through an overview of knowledge indicators related to basic immunization, which forms the basis for planning educational interventions. The limitations of this study are that it cannot assess the causal relationship between knowledge indicators and the success of immunization, the possibility of bias in the information provided by respondents when completing the questionnaire, and the limitations in generalizing the data obtained. Additional factors such as family support, the role of health workers, access to immunization facilities, trust in vaccines, and socioeconomic conditions were not analyzed in depth, even though these factors also have the potential to influence the completeness of childhood immunization. Recommended for future researchers explore maternal knowledge indicators in greater depth using a qualitative approach to explore mothers' perceptions of immunization.

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