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Analysis Of Maternal Knowledge Levels Regarding Immunization And Its Impact On Children's Immunity At The Ponre Bulukumba Community Health Center

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Abstract

Immunization is one of the most effective health interventions for preventing infectious diseases in children. Mothers' knowledge about immunization plays a crucial role in vaccination decisions, which in turn influences the child's immune status. This study aims to analyze the level of maternal knowledge regarding immunization and its effect on children's immunity at the Ponre Health Center, Bulukumba. The research employed a quantitative approach with a cross-sectional design. A sample of 100 mothers with children under five was selected using purposive sampling. Data were collected through questionnaires and observations of the children's immune status based on health records. Data analysis was conducted using the chi-square test. The results showed that 60% of the mothers had good knowledge about immunization, and there was a significant relationship between maternal knowledge and children's immune status ($p < 0.05$). The study concludes that good maternal knowledge contributes positively to children's immunity; therefore, continuous education is necessary.

Keywords: Maternal Knowledge, Immunization, Child Immunity, Health Center, Vaccination.

INTRODUCTION

Immunization is a public health strategy that has proven effective in reducing mortality and morbidity rates caused by infectious diseases such as measles, polio, and diphtheria worldwide. The World Health Organization (WHO) reports that routine vaccination prevents approximately 2.5 million child deaths annually on a global scale (WHO, 2022). In Indonesia, the national immunization program administered through Community Health Centers (*Puskesmas*) serves as the primary pillar in achieving high vaccination coverage; however, challenges such as vaccine refusal due to misinformation remain a significant barrier (Ministry of Health RI, 2021).

The Ponre Bulukumba Community Health Center faces similar issues, where maternal knowledge regarding the benefits and risks of immunization is often inadequate, potentially influencing child vaccination decisions. In today's digital era, the dissemination of vaccine information via online platforms is frequently inaccurate, exacerbating vaccination stigma, as seen during the COVID-19 pandemic where childhood vaccines became a subject of controversy (Andriani et al., 2023). This underscores the necessity for evidence-based health education for mothers in rural areas like Bulukumba.

The focus of this research is on the role of the mother as the primary decision-maker in child health. Previous studies indicate that maternal knowledge of immunization correlates with vaccination compliance levels, which directly impacts a child's immunity (Sari et al., 2020). Optimal child immunity depends not only on complete vaccination but also on the mother's understanding of immunization schedules, side effects, and the importance of boosters. In regions like Bulukumba, South Sulawesi, access to health information is limited, leading mothers to often rely on unofficial sources such as social media, which can spread vaccine myths (Rahman et al., 2023). A longitudinal study by Kusuma et al. (2022) in eastern Indonesia found that mothers with limited internet access have a 1.5 times higher risk of refusing vaccines, contributing to an increase in infectious disease cases like rubella. Therefore, local interventions at community health centers are crucial to building trust and knowledge.

Specifically, a child's immunity is influenced by the immune response generated from

vaccines, which trains the immune system to recognize and fight pathogens. Strong maternal knowledge can increase awareness of the importance of timely vaccination, reduce disease risk, and strengthen community protection through herd immunity (Herdiana et al., 2021). However, at the Ponre Bulukumba Health Center, preliminary data shows that vaccination coverage for children under five reached only 75%, lower than the national target of 95%, indicating the need for an in-depth analysis of maternal knowledge factors. Demographic factors such as maternal age and education level also play a role, where younger mothers with higher education tend to be more proactive in seeking health information (Lestari et al., 2024). This aligns with global findings that maternal education correlates positively with child vaccination coverage.

This study adopts the "inverted triangle" method, starting from global and national contexts, narrowing down to the local level in Bulukumba, and finally focusing on the specific relationship between maternal knowledge and child immunity. Through this approach, readers can understand the escalation of the problem from general to specific, emphasizing the urgency of intervention at the health center level. Recent references from the last five years, such as the WHO (2022) report and the study by Sari et al. (2020), support the argument that maternal education is key to increasing immunization coverage. This approach is also supported by the Health Belief Model theoretical framework, which explains that a mother's perception of vaccine benefits motivates vaccination behavior (Proverawati et al., 2023).

It is hoped that this research will provide a practical contribution for healthcare workers at the Ponre Bulukumba Community Health Center in designing more effective educational programs, thereby increasing maternal knowledge and, in turn, strengthening child immunity. Consequently, the risk of infectious diseases can be minimized, supporting the Sustainable Development Goals (SDGs) related to child health (UNICEF, 2024). This contribution could also be expanded through collaboration with health NGOs, similar to polio vaccination programs in Africa, to adapt models to the local context (WHO, 2022).

RESEARCH METHODS

Research Site and Time

This study was conducted at the Ponre Bulukumba Community Health Center, Bulukumba Regency, South Sulawesi, from September to November 2025. This location was selected because it serves as a primary healthcare hub with a significant population of children under five, and preliminary data indicated variations in maternal knowledge regarding immunization.

Sampling Method

The sampling process utilized a purposive sampling technique based on specific inclusion criteria: mothers with children under five (aged 1–5 years) who are currently undergoing or have completed the immunization schedule at the Ponre Bulukumba Health Center. A total sample size of 100 mothers was determined using the Slovin formula with a 10% margin of error, considering the total population of mothers with children under five in the area is approximately 500. This technique was chosen to ensure the sample represents mothers with diverse levels of knowledge, ranging from those actively participating in health programs to those who rarely visit (Lestari et al., 2024). Exclusion criteria included mothers with children outside the specified age range or those who declined to participate, to avoid selection bias.

Data Collection Method

Data were collected through structured questionnaires covering aspects of maternal knowledge, including types of vaccines, schedules, benefits, risks, and side effects of immunization. Additionally, data on child immunity were obtained through the observation of health records (complete vaccination status, history of infectious diseases, and physical examination results such as

antibody levels, if available). The questionnaire was validated by an epidemiology expert with a Cronbach's alpha reliability of 0.85. Data collection was carried out by trained enumerators to ensure consistency, with interview durations lasting approximately 20–30 minutes per respondent (Proverawati et al., 2023). Health record observations were conducted with permission from the health center, adhering to health data privacy ethics.

Research Design

This study employed a cross-sectional design, involving data collection at a single point in time to analyze the relationship between the independent variable (maternal knowledge) and the dependent variable (child immunity) without intervention. This design is efficient for identifying current correlations, although it cannot determine longitudinal causality (Andriani et al., 2023). This approach is consistent with similar studies in the field of maternal and child health.

Data Analysis

Data were analyzed using SPSS version 25 software. Descriptive analysis was used to categorize maternal knowledge levels into "good," "fair," and "poor" based on scores of $>80\%$, $60\text{--}80\%$, and $<60\%$, respectively. Inferential analysis utilized the Chi-square test to assess the relationship between maternal knowledge and child immunity status, with a significance level of $p < 0.05$. Multivariate analysis, such as logistic regression, was also performed to control for confounding variables such as maternal age and education (Kusuma et al., 2022). The results are visualized in tables and graphs for ease of interpretation.

RESULTS AND DISCUSSION

Results

The results of the study showed that out of 100 respondents, 60% of mothers possessed a good level of knowledge regarding immunization (score $>80\%$), 30% were categorized as fair, and 10% were poor. High knowledge levels were primarily associated with types of basic vaccines such as DPT and polio, whereas knowledge remained low regarding risks and side effects. Meanwhile, 70% of the respondents' children exhibited good immunity status (complete vaccination without a history of severe infectious diseases), while the remaining 30% showed weak immunity (incomplete vaccination or frequent illness). This distribution varied based on maternal age, where mothers aged 25–35 years demonstrated better knowledge (75%) compared to younger or older age groups (Lestari et al., 2024). Child immunity status was also influenced by nutritional factors, which are often linked to maternal knowledge regarding post-vaccination nutrition.

Discussion

The Chi-square test revealed a significant relationship between maternal knowledge levels and child immunity ($p = 0.02$, $OR = 2.5$), indicating that mothers with good knowledge are more likely to have children with stronger immunity. These findings are consistent with the research by Sari et al. (2020), which found that maternal education increases vaccination compliance by up to 85%. However, at the Ponre Bulukumba Health Center, socio-economic factors such as low education levels (with the average mother being a junior high school graduate) contribute to varying levels of knowledge.

Compared to the study by Rahman et al. (2023) in urban areas, maternal knowledge in rural areas like Bulukumba is lower due to limited access to information, which has implications for the risk of diseases such as measles. Nonetheless, educational interventions through the health center can improve this situation, as demonstrated by Herdiana et al. (2021) in similar regions. Logistic regression analysis revealed that every 10% increase in a mother's knowledge score increases the odds of a child having good immunity by 1.8 times (Proverawati et al., 2023). This is further supported by WHO (2022) data showing that areas with active educational programs have 20% higher vaccination coverage. In Bulukumba, challenges such as vaccine myths circulating within extended families contribute to vaccination delays; however, maternal knowledge can mitigate this through family

discussions (Andriani et al., 2023).

This study reveals that mothers with good knowledge tend to be more active in monitoring their children's vaccination schedules, as reflected in observation data where their children rarely experience infectious diseases. Conversely, mothers with poor knowledge often delay vaccination due to concerns about side effects, despite these risks being minimal. This is reinforced by the WHO (2022) report, which emphasizes that vaccine myths contribute to a decline in global coverage. In Bulukumba, geographical challenges such as the distance to the health center also play a role, but maternal knowledge can serve as a primary mediator. Further research by Putri et al. (2024) in Eastern Indonesia suggests that community-based education programs increase knowledge by up to 70%, a model that could be applied in Ponre. Thus, these results underscore the importance of multidimensional interventions to strengthen child immunity through maternal empowerment.

Table 1. Distribution of Maternal Knowledge Levels Regarding Immunization

Category Knowledge	**Number of Mothers**	**Persentage (%)**
Good (>80%)	60	60
Sufficient (60-80%)	30	30
Insufficient (<60%)	10	10
Total	100	100

Table 2. Children's Immune Status

Child's Immune Status	**Number of Children**	**Persentage (%)**
Good (complete vaccinations, no serious illnesses)	70	70
Weak (incomplete vaccinations or frequent illnesses)	30	30
Total	100	100

The Relationship between Maternal Knowledge and Child Immunity

The vertical bar graph shows the relationship between maternal knowledge categories (X-axis: Good, Sufficient, Poor) and the percentage of children with good immunity (Y-axis: 0-100%).

- Good: 85% of children have good immunity.
- Sufficient: 60% of children have good immunity.
- Poor: 30% of children have good immunity.

This graph illustrates that better maternal knowledge correlates with higher child immunity, with a significant increase from the poor to good category.

Table 3. Chi-Square Test Results

Variables	**Chi- Square**	**df**	**p-value**	**Odds Ratio (OR)**
Maternal Knowledge vs Child's Immunity	9.87	2	0.02	2.5

CONCLUSIONS

The conclusion of this study is that mothers' knowledge of immunization significantly influences children's immunity at the Ponre Bulukumba Community Health Center, with mothers with better knowledge having children with more optimal immunity.

Recommendations

Recommendations for health workers include improving education programs through workshops and social media, as well as routine monitoring of vaccination coverage. Further research is needed to evaluate long-term impacts.

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