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THE RELATIONSHIP BETWEEN MOTHERS' KNOWLEDGE, ATTITUDES, AND BEHAVIOR TOWARDS THE IMPORTANCE OF BASIC IMMUNIZATION

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Abstract

Background: Basic immunization is one of the most effective public health interventions to prevent infectious diseases and reduce morbidity and mortality among infants and young children. Despite the availability of immunization services, coverage rates in several regions of Indonesia have declined in recent years, indicating persistent challenges in immunization uptake. Maternal factors, particularly knowledge, attitudes, and behavior, play a crucial role in decision-making regarding childhood immunization. Inadequate knowledge, negative attitudes, and vaccine hesitancy among mothers may contribute to incomplete immunization, even when health services are accessible.
Purpose: To analyze the relationship between mothers' knowledge, attitudes, and behaviors regarding the importance of basic immunization for infants.
Methods: This study employed a quantitative cross-sectional design conducted at the Integrated Health Post (Posyandu) RT 002, Karangsatria Subdistrict, Bekasi Regency, Indonesia. Total of 117 respondents were selected using purposive sampling based on predefined inclusion criteria. Data were analyzed using bivariate analysis using the chi-square test to examine relationships between variables. Ethical approval was obtained from the Ethics Committee of Bani Saleh Health College (No: EC.200/KEPK/STKBS/VII/2024).
Results: Bivariate analysis revealed a statistically significant relationship between maternal knowledge and attitudes toward basic immunization ($p = 0.008$). However, no significant relationship was found between maternal knowledge and immunization behavior ($p = 0.060$), nor between maternal attitudes and immunization behavior ($p = 0.348$).
Conclusion: Maternal knowledge was significantly associated with attitudes toward basic immunization, whereas neither knowledge nor attitudes were significantly associated with immunization behavior, indicating that immunization practices are influenced by factors beyond individual cognition and attitudes.

Background

Vaccination or immunization is a method of preventing specific diseases that can be administered to children, adolescents, and adults. Immunization is performed by introducing weakened or inactivated bacterial or viral antigens into an individual's body. The purpose of this intervention is to stimulate the immune system to produce specific antibodies against the antigen. The immune response generated following vaccination plays a crucial role in enhancing the body's resistance to the targeted disease. By strengthening the immune system, vaccination increases population immunity and helps prevent the transmission of vaccine-preventable diseases. Therefore, vaccination serves as an effective strategy to protect communities from diseases that may have adverse impacts on health (Darmin, 2023).

Based on the West Java Health Profile data, the total primary vaccination coverage in West Java Province reached 97.34% in 2023. This figure represents a decrease of 4.56 percentage points compared to 2022, when coverage reached 101.9%. Six regencies/cities achieved more than 100% coverage of complete basic immunization among infants, namely Cirebon Regency (123.83%), Subang Regency (103.21%), Pangandaran Regency (102.65%), Sukabumi Regency (101.73%), Purwakarta Regency (100.90%), and Cianjur Regency (100.50%). In contrast, Bekasi City recorded a coverage rate of 84.29%, reflecting a decline of 11.41 percentage points compared to 2022, when coverage was 95.7% (West Java Provincial Health Office, 2023).

The increasing incidence of childhood morbidity due to inadequate primary immunization is influenced by multiple factors affecting parental decision-making regarding whether to vaccinate their children. One of the key determinants is the mother's role. Several factors may influence maternal knowledge about childhood vaccination, including education, occupation, age, and religion. Education is a crucial factor, as educated mothers generally have broader knowledge, enabling them to think critically and make informed decisions in providing the best care for their children. Maternal occupation may also influence vaccination decisions; working mothers may have limited time and opportunities, which can reduce their ability to bring their children to healthcare facilities for vaccination. Nevertheless, employment remains important as it supports family needs and socioeconomic stability (Panjaitan, 2021).

The results of a survey conducted by the researchers at Karangsatria Community Health Center in March 2024 revealed that the coverage of complete basic immunization in 2023 was 93.43%, but it declined to 78% in 2024. This decrease of 15.43% in complete basic immunization coverage was accompanied by an increase in childhood morbidity due to inadequate immunization, particularly measles cases, which increased from zero cases in 2021 to three cases in 2023.
Based on this background, the researchers were motivated to further investigate whether maternal knowledge, attitudes, and behaviors have a positive impact on complete basic immunization coverage. The main objective of this study was to examine the relationship between maternal knowledge, attitudes, and behaviors and the importance of basic immunization for infants and children in the Karangsatria area, Bekasi

Method

The research design used by the researcher is quantitative research with a cross-sectional approach. The research location was conducted in the Integrated Health Post RT 002, Karang Satria Subdistrict, Bekasi Regency. The research population totaled 250 respondents. The sample calculation used the Slovin formula, so that the minimum sample size was 117 respondents. The sampling technique was purposive sampling with inclusion criteria: Respondents were willing to be research samples by filling out an informed consent form, mothers who have toddlers (children aged 1-5 years), and domiciled in the working area of the Integrated Health Post RT 002, Karang Satria Subdistrict, Bekasy Regency. This research has received ethical approval from Bani Saleh Health College with No: EC.200/KEPK/STKBS/VII/2024.

The instruments used in this study included a demographic data questionnaire, a knowledge questionnaire, an attitude questionnaire, and a behavior questionnaire. The knowledge questionnaire consisted of 27 items and had been previously tested for validity and reliability by Ari Kunto (2013). Knowledge levels were categorized as good (76%–100%), moderate

(56%–75%), and poor (<56%). The validity test showed item correlation coefficients greater than 0.444, and the reliability analysis yielded a Cronbach's alpha value of 0.861.

The attitude questionnaire comprised 15 items developed by Notoatmodjo (2018). Attitude scores were classified as negative (<30) and positive (30–60). The validity test results indicated item correlation coefficients ranging from 0.882 to 0.926, and the reliability analysis demonstrated a Cronbach's alpha value of 0.899. The behavior questionnaire consisted of 8 items. Behavioral scores were categorized as poor (<16) and good (16–32). The validity test results showed item correlation coefficients ranging from 0.791 to 0.918, with a Cronbach's alpha value of 0.847, indicating good reliability

Results

Univariate Analysis

Table 1. Characteristics of Respondents (n = 117)

Variabel	Frekuensi (n)	Presentase (%)
Education		
Basic Education	24	20,5
Secondary Education	74	63,2
Higher Education	19	16,2
Total	117	100
Age		
Young (< 15 years old)	0	0
Productive Age (15 – 64 years old)	117	100,0
Non-Productive Age (> 64 years old)	0	0
Total	117	100
Occupation		
Homemaker	101	86,3
Laborer	1	0,9
Private Employee	8	6,8
Civil Servant	5	4,3
Entrepreneur	2	1,7
Total	117	100
Agama		
Islam	117	100,0
Catholicism*	0	0
Buddhism	0	0
Protestantism	0	0
Confucianism	0	0
Hinduism	0	0
Total	117	100

Source: Primary Data 2024

Based on Table 1, a total of 117 mothers participated in this study. All respondents were within the productive age group (15–64 years), accounting for 117 participants (100%). Regarding educational level, most respondents had a secondary education (senior high school or equivalent), totaling 74 individuals (63.2%), followed by primary education with 24 respondents (20.5%) and higher education with 19 respondents (16.2%).

In terms of occupation, the majority of respondents were housewives, comprising 101 participants (86.3%), while a smaller proportion were employed as private-sector workers, civil servants, laborers, or entrepreneurs. All respondents were Muslim, accounting for 117 individuals (100%)

Table 2. Overview of Mothers' Knowledge Regarding the Importance of Basic Immunization (n = 117)

Knowledge	Frequency (n)	Percentage (%)
Good	43	36,8
Moderate	67	57,3
Inadequate	7	6,0
Total	117	100

Source: Primary Data 2024

Based on Table 2, the distribution of maternal knowledge regarding the importance of basic immunization showed that most respondents had a moderate level of knowledge, with 67 mothers (57.3%). Respondents with good knowledge accounted for 43 individuals (36.8%), while those with poor knowledge comprised 7 respondents (6.0%).

These findings indicate that most mothers possess a basic understanding of immunization; however, further improvement in knowledge is needed to achieve a higher level of comprehension

Table 3. Overview of Attitude Toward the Importance of Basic Immunization (n = 117)

Attitude	Frequency (n)	Percentage (%)
Positive Attitude	13	11,1
Negative Attitude	104	88,9
Total	117	100

Source: Primary Data 2024

Based on Table 3, the majority of respondents exhibited negative attitudes toward the importance of basic immunization, with 104 mothers (88.9%), while only 13 respondents (11.1%) demonstrated positive attitudes.
These results indicate that although some mothers have an adequate level of knowledge, attitudes toward basic immunization remain predominantly negative

Table 4. Overview of Practice Toward the Importance of Basic Immunization (n = 117)

Practice	Frequency (n)	Percentage (%)
Poor	17	16
Good	100	84
Total	117	100

Source: Primary Data 2024

Based on Table 4, most respondents demonstrated good behavior toward basic immunization, with 100 mothers (84%), while 17 respondents (16%) exhibited poor behavior.

These findings suggest that the majority of mothers continue to practice immunization despite predominantly negative attitudes toward basic immunization

Table 5. Relationship between Knowledge and Attitude toward Basic Immunization

Knowledge	Positive Attitude	Negative Attitude	Total	P value
Good	10 (23.3%)	33 (76.7%)	43	0.008
Sufficient	3 (4.5%)	64 (95.5%)	67	
Poor	0 (0.0%)	7 (100.0%)	7	
Total	13 (11.1%)	104 (88.9%)	117 (100%)	

Source: Primary Data 2024

The Chi-square test results indicated a statistically significant association between maternal knowledge level and attitudes toward the importance of basic immunization ($\chi^2 = 9.743$; $p = 0.008$). The highest proportion of positive attitudes was observed among mothers with good knowledge (23.3%), followed by those with moderate knowledge (4.5%), while no respondents with poor knowledge exhibited positive attitudes. These findings suggest that improved knowledge may contribute to more positive maternal attitudes toward basic immunization.

Table 6. Relationship between Knowledge and Behavior of Basic Immunization

Knowledge	Good Practice	Poor Practice	Total	P Value
Good	40 (93.0%)	3 (7.0%)	43	0.060
Sufficient	52 (77.6%)	15 (22.4%)	67	
Poor	5 (71.4%)	2 (28.6%)	7	
Total	97 (82.9%)	20 (17.1%)	117 (100%)	

Source: Primary Data 2024

The Chi-square test showed no significant association between maternal knowledge level and basic immunization behavior ($\chi^2 = 5.642$; $p = 0.060$). Although a higher proportion of good immunization behavior was observed among mothers with good knowledge (93.0%) compared to those with moderate (77.6%) and poor knowledge (71.4%), these differences did not reach statistical significance. This finding indicates that knowledge alone is insufficient to ensure adherence to immunization practices without the support of other contributing factors.

Table 7. Relationship between Attitude and Behavior of Basic Immunization

Attitude	Good Practice	Poor Practice	Total	P Value
Positive	12 (92.3%)	1 (7.7%)	13	0.348
Negative	85 (81.7%)	19 (18.3%)	104	
Total	97 (82.9%)	20 (17.1%)	117 (100%)	

Source: Primary Data 2024

The Chi-square analysis indicated no significant association between maternal attitudes and basic immunization behavior ($\chi^2 = 0.879$; $p = 0.348$). The proportion of good immunization behavior among mothers with positive attitudes (92.3%) was comparable to that among mothers with negative attitudes (81.7%). These findings suggest that negative attitudes do not necessarily lead to reduced immunization behavior; rather, immunization adherence may be more strongly influenced by external factors such as healthcare policies, social pressure, or access to health services than by just individual attitudes.

Discussion

1. Respondent Characteristics

The study results showed that all respondents were within the productive age group (15–64 years), with the majority having a secondary level of education (63.2%), most being housewives (86.3%), and all respondents identifying as Muslim (100%). The predominance of respondents in the productive age group indicates that they are in an active social and reproductive phase of life, playing a crucial role in decision-making related to child health, including immunization. The dominance of secondary education suggests that most mothers possess basic capacity to receive health information, although this does not necessarily ensure comprehensive understanding. Being a housewife reflects greater time availability and proximity to the child, but it may also limit access to formal health information if mothers are not actively engaged in community health activities.

These findings are consistent with studies conducted in various regions of Indonesia, which report that the majority of mothers with young children are within the productive age group and have a secondary level of education (Ministry of Health of the Republic of Indonesia, 2022; Sari et al., 2021). Research by Pratiwi and Lestari (2023) also identified housewives as the dominant group in studies related to basic immunization, as they serve as the primary caregivers for their children. The World Health Organization (2021) has further emphasized that maternal demographic characteristics, particularly productive age and educational level, are important determinants of immunization service utilization behavior.

However, several studies have reported different findings, particularly with respect to educational level. Research conducted in large urban areas has shown a higher proportion of mothers with higher education compared to those with secondary education (Putra et al., 2020). In addition, studies in multicultural settings have reported greater religious diversity, which may influence perceptions and acceptance of immunization (Rahman et al., 2022). These differences are likely attributable to regional characteristics, levels of urbanization, and sociocultural heterogeneity.

The researchers assume that the predominance of mothers of productive age and housewives presents substantial opportunities for community-based immunization education interventions. However, the dominance of secondary education does not guarantee in-depth understanding of immunization, highlighting the need for simple, contextual, and repetitive health communication approaches

2. Mothers' Knowledge about the Importance of Basic Immunization

The study results indicated that most mothers had a moderate level of knowledge (57.3%), followed by good knowledge (36.8%), with only a small proportion demonstrating poor knowledge (6.0%). The predominance of moderate knowledge suggests that mothers are generally aware of the basic benefits of immunization, standard immunization schedules, and disease prevention goals; however, they may lack deeper understanding regarding vaccine safety, potential side effects, and the consequences of incomplete immunization.

These findings are consistent with studies by Dewi et al. (2021) and Nugroho et al. (2023), which reported that the majority of mothers had a moderate level of knowledge concerning basic immunization. A study by UNICEF Indonesia (2022) also highlighted that although immunization coverage is relatively high, maternal understanding often remains superficial and

is not strongly grounded in health literacy. This suggests that while immunization programs have been successful in terms of implementation, they have not yet fully achieved their educational objectives.

In contrast, studies conducted in urban areas with high access to digital information have reported a predominance of good knowledge levels among mothers (Suhartini et al., 2020). Additionally, research in upper–middle-income countries has shown higher proportions of good knowledge due to more systematic health education access (World Health Organization, 2023). These differences may be influenced by information accessibility, the quality of health education, and exposure to health-related media.

The researchers assume that maternal knowledge is influenced by the frequency of health education sessions, the quality of communication provided by healthcare workers, and informal information sources such as family members and social media. Unverified information may also contribute to mothers remaining at a “moderate” level of knowledge without progressing to a “good” level.

3. Mothers' Attitudes towards the Importance of Basic Immunization

The study findings showed that the majority of mothers exhibited negative attitudes toward basic immunization (88.9%), while positive attitudes were observed in only a small proportion of respondents (11.1%). These negative attitudes reflect the presence of doubts, concerns about potential side effects, distrust in vaccines, or the influence of prevailing social norms and beliefs within the community. These results are consistent with studies by Yuliana et al. (2021) and Hidayat et al. (2024), which reported a high prevalence of negative maternal attitudes toward immunization despite relatively high immunization coverage. The World Health Organization (2022) describes this phenomenon as *vaccine hesitancy*, a condition in which individuals delay or refuse vaccination despite the availability of vaccination services. Global studies have shown that negative attitudes toward vaccination are often driven by misinformation and concerns regarding vaccine safety

However, several studies have reported that the majority of mothers hold positive attitudes toward immunization, particularly in areas with intensive health education and strong support from community leaders (Fitriani et al., 2020). These differences suggest that attitudes are highly influenced by social and cultural contexts as well as the health communication strategies employed.The researchers assume that the negative attitudes observed in this study may be influenced by inaccurate information, personal or environmental experiences, and limited open dialogue between mothers and healthcare providers. Attitudes do not always align with knowledge, as they also involve emotional and belief-based components.

4. Mother's Behavior Towards Providing Basic Immunization

The study results showed that the majority of mothers demonstrated good behavior toward basic immunization (84%), although a smaller proportion still exhibited poor behavior (16%). This finding indicates that most mothers continue to bring their children for scheduled immunizations despite holding negative attitudes toward immunization. These findings are consistent with the study by Lestari et al. (2022), which reported that immunization behavior is often influenced by external factors such as mandatory immunization programs, the role of community health volunteers, and access to healthcare services. The World Health

Organization (2021) also emphasizes that strong policies and health service systems can promote healthy behaviors even when individual attitudes are not fully positive. In contrast, some studies have shown that negative attitudes are directly associated with poor immunization behavior (Rahmawati et al., 2020). These differences may be attributed to variations in healthcare systems, the role of healthcare providers, and the level of social pressure within communities. The researchers assume that good immunization behavior observed in this study is more strongly influenced by structural factors, such as mandatory immunization policies, regular community health post schedules, and encouragement from healthcare providers, rather than solely by individual attitudes. This finding underscores that health behavior does not always directly reflect an individual's internal attitudes.

5. Relationship between Knowledge and Mothers' Attitudes towards Basic Immunization

The bivariate analysis revealed a statistically significant association between maternal knowledge level and attitudes toward the importance of basic immunization ($p = 0.008$). The highest proportion of positive attitudes was observed among mothers with good knowledge (23.3%), followed by those with moderate knowledge (4.5%), while no positive attitudes were found among mothers with poor knowledge. These findings indicate that higher levels of maternal knowledge are associated with an increased likelihood of positive attitudes toward basic immunization. These findings are consistent with previous studies indicating that knowledge is a key determinant in the formation of health-related attitudes. Studies by Lestari et al. (2021) and Hidayat and Putri (2023) demonstrated that mothers with higher levels of knowledge tend to have more positive attitudes toward immunization compared to those with lower knowledge levels. The World Health Organization (2022) also emphasizes that improving maternal health literacy plays a critical role in reducing vaccine hesitancy. Furthermore, a UNICEF study (2023) highlighted that consistent, evidence-based education can positively influence public perceptions and attitudes toward immunization.

Nevertheless, several studies have found that good knowledge does not always translate into positive attitudes. Research by Rahmawati et al. (2020) showed that although some mothers possessed adequate knowledge, their attitudes toward immunization remained negative due to the influence of cultural beliefs, previous adverse experiences, and social environmental factors. Studies conducted in several developing countries have also demonstrated that religious and social factors may weaken the relationship between knowledge and attitudes (Smith et al., 2021) The researchers assume that knowledge serves as a fundamental foundation in shaping maternal attitudes toward immunization. Accurate, comprehensive, and repeated information can enhance rational understanding and reduce fear and uncertainty. However, knowledge alone is insufficient; emotional, social, and cultural factors continue to play a significant role in shaping mothers' ultimate attitudes toward basic immunization.

6. Relationship between Knowledge and Basic Immunization Behavior

The analysis showed no statistically significant association between maternal knowledge level and basic immunization behavior ($p = 0.060$). Although descriptively mothers with good knowledge demonstrated a higher proportion of good immunization behavior (93.0%) compared to those with moderate (77.6%) and poor knowledge (71.4%), these differences did not reach statistical significance. This finding indicates that good knowledge does not necessarily guarantee maternal adherence to basic immunization practices

These findings are consistent with studies by Sari et al. (2022) and Nugroho et al. (2024), which reported that immunization behavior is not solely determined by maternal knowledge. The World Health Organization (2021) emphasizes that health behavior results from the interaction of individual, environmental, and health system factors. A study by Pradana et al. (2023) also demonstrated that mothers with moderate to low levels of knowledge continued to vaccinate their children due to encouragement from healthcare providers and the presence of scheduled immunization programs.

In contrast to the present findings, some studies have identified a significant association between knowledge and immunization behavior. Fitriani et al. (2020) reported that mothers with good knowledge were more likely to complete their children's immunizations. These discrepancies may be attributed to differences in study design, respondent characteristics, and variations in social context and healthcare systems. The researchers assume that basic immunization behavior in this study was more strongly influenced by external factors, such as mandatory immunization policies, ease of access to health services, the role of community health volunteers (posyandu cadres), and social pressure from the surrounding environment. Therefore, even when maternal knowledge is not optimal, immunization behavior can still be well maintained due to the presence of a strong supporting system.

7. Relationship between Attitude and Basic Immunization Behavior

The Chi-square test results indicated no significant association between maternal attitudes and basic immunization behavior ($p = 0.348$). The proportion of good immunization behavior among mothers with positive attitudes (92.3%) was not substantially different from that among mothers with negative attitudes (81.7%). These findings suggest that negative attitudes toward immunization are not necessarily followed by immunization refusal behaviors. These results are consistent with studies by Lestari and Wulandari (2021) and the World Health Organization (2022), which reported that immunization compliance often remains high despite the presence of hesitant or negative attitudes, particularly in settings with strong immunization systems. UNICEF (2023) also noted that many parents continue to vaccinate their children due to social expectations and trust in healthcare providers, even when personal concerns persist.

In contrast, several studies have reported a significant association between attitudes and immunization behavior. Rahman et al. (2020) found that negative attitudes were associated with lower immunization coverage. These differences may be influenced by factors such as access to health services, the quality of communication by healthcare providers, and the level of public trust in the healthcare system. The researchers assume that, in the context of this study, immunization behavior is more strongly influenced by structural and systemic factors than by individual psychological factors. Integrated immunization programs, supervision by healthcare workers, and strong social norms encourage mothers to continue immunizing their children despite the presence of attitudinal hesitancy.

Conclusion

Based on the findings regarding the relationships between maternal knowledge, attitudes, and behaviors toward the importance of basic immunization, as well as the univariate and bivariate analyses conducted, several conclusions can be drawn.

First, there was a statistically significant association between maternal knowledge level and attitudes toward basic immunization, indicating that higher knowledge levels are associated with more positive attitudes.

Second, no significant association was found between maternal knowledge and basic immunization behavior, suggesting that knowledge alone is insufficient to ensure immunization adherence.
Third, no significant association was observed between maternal attitudes and immunization behavior, indicating that immunization practices are more strongly influenced by external factors such as health service systems, immunization policies, and support from healthcare providers and the social environment.

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