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Factors Affecting The Completeness Of Completeness Of Basic Immunization Of Infants Aged 12 To 24 Months In The Working Area Of Puskesmas X Pekanbaru City

Aridiansyah Aridiansyah[1*], Quenda Anisa[2], Supriadi Supriadi[3]
[1-3]Medical Education Study Program, Faculty Of Medicine, Abdurrab University,Indonesia

*Author Correspondence : dr.aridiansyah.spa@gmail.com**

Abstract.*Background: Complete Basic Immunization (IDL) is an indicator in the immunization program. IDL aims to actively gain early immunity. IDL data at Puskesmas X in 2021 was 83.5% and there was a decrease in the percentage rate in 2022 to 82.87%. Based on an initial survey, on May 9-19, 2023, it was found that out of 73 mothers who brought their children to the posyandu for immunization, around 22 children (30%) were not fully immunized. Objective: Knowing the factors that influence the completeness of immunization in the working area of Puskesmas X Pekanbaru City. Methods: Using analytic observational study design, with cross sectional research design. This research was conducted at Puskesmas X Pekanbaru city. The sampling technique was done by accidental sampling. Variables of knowledge level, and education were analyzed using Kendall Tau test, while variables of employment, family support, mother's attitude and number of children used contingency coefficient test. Results: The results of the Kendall Tau test analysis of the variable level of knowledge, and education obtained a p value of 0.001 and 0.392 respectively. While in the contingency coefficient test the variables of employment, family support, maternal attitudes and number of children obtained a p value of 0.889; 0.000; 0.000 and 0.455 respectively. Conclusion: There is a significant relationship between the level of knowledge, mother's attitude and family support with the completeness of basic immunization of infants aged 12-24 months in the working area of Puskesmas X Pekanbaru City.*

Keywords: *Immunization indicators, Complete Basic Immunization, Infants Aged 12 to 24 Months*

1. INTRODUCTION

The provision of basic immunization in infants is important because basic immunization aims to actively gain initial immunity, while further immunization aims more to maintain the level of immunity and extend the protection period (booster) (Ministry of Health of the Republic of Indonesia, 2022). The general objective of the immunization program in Indonesia is to reduce morbidity, mortality and disability due to NCDs (Ministry of Health of the Republic of Indonesia, 2015). If the coverage of complete basic immunization is not achieved, it can have an impact on infants, namely being more vulnerable to severe illness, at risk of contracting diseases and transmitting them to others so that they can lead to extraordinary events (KLB), at risk of developing complications of immunization-preventable diseases (PD3I).

Based on WHO data in 2021, as many as 25 million children were not fully immunized at the global level. While in Indonesia, the number of children who have not been fully immunized from 2017 to 2021 is 1,525,936 children (World Health Organization, 2023). In 2019, immunization coverage reached the target of 93.7%. There was a significant decrease in

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achievement in 2020 to 2021 due to the COVID-19 pandemic, resulting in an immunization coverage of 84.2%. In Riau Province in 2020, UCI was 42.2% and the percentage of children who received complete basic immunization was 59%. Meanwhile, in Pekanbaru City, the UCI coverage of villages is far from the target, which is 51% with the percentage of children who get complete basic immunization of 54%. The lack of achievement of the target of complete basic immunization that occurred was the result of the COVID-19 outbreak so that the implementation of posyandu in the community also experienced obstacles or low visits (Riau Provincial Health Office, 2021). The increase in UCI achievements in Riau Province occurred in 2021 by 43% but is still far from the target achievement, with the percentage of children who received complete basic immunization also increasing by 67%. Likewise, the percentage of UCI in Pekanbaru City is 59% and the percentage of children who received complete basic immunization this year is 78%. Although the UCI presentation has increased from the previous year, it still has not reached the target (Riau Provincial Health Office, 2021). Based on data on Complete Basic Immunization (IDL) at Puskesmas X in 2021, it is 83.5%. There was a decrease in the percentage rate in 2022, which amounted to 82.87% with each percentage in the village / kelurahan, namely; Tangkerang Tengah (85.3%), Tangkerang Barat (79.8%), and Wonorejo (82.8%) then experienced a very significant decline in 2023, starting in April the total percentage of IDL coverage was only 8%, each percentage in the village / kelurahan, namely; Tangkerang Tengah (9%), Tangkerang Barat (5.2%), Wonorejo (9.8%). Based on the initial survey, on 9-19 May 2023, out of 73 mothers who brought their babies to the posyandu for immunization, around 22 babies (30%) were not fully immunized. In this study, enabling factors and reinforcing factors were not studied because the facilities and infrastructure at Puskesmas X are quite good. The attitude and behavior of immunization officers and cadres are also quite good. There are several factors that cause incomplete complete basic immunization (IDL) data at Puskesmas X in 2023 including family support factors for mothers, maternal knowledge factors, maternal attitude factors, maternal education factors, employment status factors, and the number of children. Based on the description above, researchers are interested in knowing the factors that influence the completeness of immunization at Puskesmas X Pekanbaru City.

2. THEORETICAL STUDY

Immunization is one way to obtain active immunity as an effort to prevent infectious diseases by giving vaccines to cause or increase a person's immunity actively against a disease, so that if one day exposed to the disease will not get sick or only experience mild pain (Ministry of Health, 2015).

Diseases that can be prevented by immunization (PD3I) include tuberculosis, measles, rubella, hepatitis, pertussis, diphtheria, polio, tetanus neonatorum, meningitis, pneumonia, cervical cancer due to Human Papilloma Virus infection, Japanese Encephalitis, diarrhea due to rotavirus infection and so on. These diseases can be prevented by getting complete basic immunization. Complete Basic Immunization (IDL) is an indicator in the immunization program, where every baby aged 0 to 11 months has received Hepatitis B immunization once, Bacille Calmette-Guerin (BCG) once, Diphtheria Pertussis-Tetanus, Hepatitis B and Haemophilus influenza B (DPT-HB-Hib) three times, Polio four times, Inactivated Polio Vaccine (IPV) once, and Measles Rubella (MR) once (Ministry of Health of the Republic of Indonesia, 2022).

Complete immunization is crucial in reducing morbidity and mortality from vaccine-preventable diseases, particularly in children. Understanding the factors influencing complete immunization coverage is vital for public health strategies. Here are the main factors associated with complete immunization:

1. Socioeconomic Status

- **Income Level**: Families with higher income levels are more likely to have complete immunization due to better access to healthcare services and the ability to afford transportation to health facilities.
- **Parental Education**: Higher educational attainment among parents, especially mothers, is strongly associated with complete immunization. Educated parents are more likely to understand the benefits of vaccines and adhere to the immunization schedule (Bbaale, 2013).

2. Access to Healthcare Services

- **Proximity to Healthcare Facilities**: Families living closer to healthcare facilities are more likely to complete immunization schedules due to easier access (Antai, 2012).
- **Healthcare Infrastructure**: The availability of well-equipped healthcare centers and trained personnel significantly impacts immunization rates. Inadequate infrastructure can lead to missed opportunities for vaccination (Favin et al., 2012).

3. Parental Knowledge and Attitudes

- **Awareness of Immunization**: Parents with a higher awareness of the benefits and schedule of immunization are more likely to ensure their children receive all necessary vaccines (Tagbo et al., 2014).
- **Perceptions of Vaccine Safety**: Concerns about vaccine safety can lead to vaccine hesitancy, resulting in incomplete immunization (Gowda & Dempsey, 2013).

4. Cultural and Social Influences

- **Community Beliefs and Norms**: Cultural beliefs and social norms can either promote or hinder vaccination. In some communities, traditional beliefs may discourage vaccination (Obadare, 2013).
- **Peer Influence**: Parents are often influenced by the behavior of their peers, and in communities where immunization is the norm, higher coverage rates are observed (Streefland et al., 1999).

5. Government and Policy Interventions

- **Immunization Programs**: Government-led immunization campaigns and programs, such as the Expanded Program on Immunization (EPI), play a significant role in increasing coverage. Policies that make vaccines more accessible and affordable also contribute to higher immunization rates (WHO, 2013).
- **Legislation and Enforcement**: In some countries, legislation mandating immunization for school entry has been effective in ensuring higher rates of complete immunization (Salmon et al., 2006).

6. Demographic Factors

- **Child's Birth Order**: First-born children are often more likely to receive complete immunization compared to later-born children. This may be due to increased parental attention and resources available for the first child (Thind & Cruz, 2003).
- **Gender of the Child**: In some cultures, boys may be prioritized over girls for immunization, leading to gender disparities in immunization rates (Pande & Yazbeck, 2003).

Univariate Test Results

Based on table 1, respondents who have complete immunization completeness are 74 people (77.9%), and those who are incomplete are 21 people (22.1%). It is known that the characteristics of respondents who have complete immunization completeness based on the

level of knowledge, the majority have good knowledge of 45 people (47.3%). Based on the level of education, the majority of respondents had a junior high school education of 40 people (42.1%). Based on employment, the majority of respondents who did not work were 54 people (56.8%). Based on attitude, the majority of respondents had a positive attitude of 74 people (77.9%), the majority of respondents' family support was supported by 58 people (61.1%), and the majority of respondents had more than one child by 39 people (41%).

Bivariate Test Results

Bivariate analysis aims to determine the significant relationship between the independent variable and the dependent variable. For variables of knowledge, education level, and attitude using an ordinal scale using the Kendall Tau test. While the variables of employment, family support, and number of children use a nominal scale that uses the contingency coefficient test.

a) The relationship between mother's knowledge level with the completeness of basic immunization in infants aged 12-24 months in the working area of Puskesmas X Pekanbaru City.

Table 2 Correlation test results of mother's knowledge level with the completeness of basic immunization in infants aged 12-24 months.

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			Tingkat Pengetahuan	Kelengkapan Imunisasi
Kendall's tau_b	Tingkat Pengetahuan	Correlation Coefficient	1.000	.345**
		Sig. (2-tailed)	.	.001
		N	95	95
	Kelengkapan Imunisasi	Correlation Coefficient	.345**	1.000
		Sig. (2-tailed)	.001	.
		N	95	95

The correlation test for this variable uses Kendall Tau test. Based on the results of the correlation test in table 2, there is a significant relationship between the characteristics of the mother's knowledge level and the completeness of basic immunization of infants aged 12-24 months in the X Puskesmas area with a p-value (Sig.) of 0.001.

b) The relationship between education level with the completeness of basic immunization in infants aged 12-24 months in the working area of Puskesmas X Pekanbaru City.

Table 3. Correlation test result of mother's education level with the completeness of basic immunization of infants aged 12-24 months.

			Tingkat Pendidikan	Kelengkapan Imunisasi
Kendall's tau_b	Tingkat Pendidikan	Correlation Coefficient	1.000	.084
		Sig. (2-tailed)	.	.392
		N	95	95
	Kelengkapan Imunisasi	Correlation Coefficient	.084	1.000
		Sig. (2-tailed)	.392	.
		N	95	95

Based on the results of the correlation test in table 3, there is no significant relationship between the characteristics of the mother's education level and the completeness of basic immunization of infants aged 12-24 months in the X Puskesmas area with a p-value (Sig.) of 0.392.

c) The relationship between mother's occupation with the completeness of basic immunization in infants 12-24 months in the working area of Puskesmas X Pekanbaru City.

Table 4. Correlation test results of mother's occupation with the completeness of basic immunization of infants aged 12-24 months

		Value	Approximate Significance
Nominal by Nominal	Contingency Coefficient	.014	.889
N of Valid Cases		95	

The correlation test on this variable uses the contingency coefficient test, because it uses a nominal data scale. The results of the contingency coefficient test on this variable showed no significant relationship between the characteristics of maternal employment and the completeness of basic immunization in infants aged 12-24 months in the working area of Puskesmas X in Pekanbaru city with a p-value of 0.889.

d) The relationship between mother's attitude with the completeness of basic immunization in infants aged 12-24 months in the working area of puskesmas X 24 months in the working area of health center X, Pekanbaru city.

Table 5.Results of correlation test of family support with the completeness of basic immunization of infants aged 12-24 months

		Value	Approximate Significance
Nominal by Nominal	Contingency Coefficient	.405	.000
N of Valid Cases		95	

Based on table 5, the results of the contingency coefficient test in this study showed a significant relationship between maternal attitudes and the completeness of basic immunization in infants aged 12-24 months in the working area of the X health center in the city of Pekanbaru with a p-value of 0.000.

e) The relationship between maternal family support and the completeness of basic immunization of infants aged 12-24 months in the working area of the X health center in Pekanbaru city.

Table 6 Results of contingency coefficient test of maternal family support with the completeness of basic immunization of infants aged 12-24 months in the working area of community health center X, Pekanbaru city.

		Value	Approximate Significance
Nominal by Nominal	Contingency Coefficient	.341	.000
N of Valid Cases		95	

Based on table 6, the results of the contingency coefficient test in this study showed a significant relationship between family support obtained by mothers with the completeness of basic immunization in infants aged 12-24 months in the working area of puskesmas X in pekanbaru city with a p-value of 0.000.

f) The relationship between the number of children with the completeness of basic immunization of infants aged 12-24 months in the working area of the X health center in Pekanbaru city.

Table 7 Correlation test results of the number of children with the completeness of basic immunization of infants aged 12-24 months.

Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Contingency Coefficient	.076	.455
N of Valid Cases		95	

The results of the contingency coefficient test in this study showed no significant relationship between the number of maternal children and the completeness of basic immunization in infants aged 12-24 months in the working area of the X health center in Pekanbaru city with a p-value of 0.455.

3. DISCUSSION

The relationship between the level of maternal knowledge with the completeness of basic immunization in infants aged 12-24 months in the working area of Puskesmas X Pekanbaru City.

Knowledge is the result of remembering something, including recalling events that have been experienced either intentionally or unintentionally and this occurs after people make contact or observation of a particular object. Knowledge has an important role for individuals to act (Fitriani et al, 2021). In this study, the P value = 0.001 ($p < 0.05$) was obtained, this means that there is a relationship between knowledge and the completeness of basic immunization at Puskesmas X. This is in line with research (Negara, 2022) which shows that there is a significant relationship between the Relationship between Maternal Knowledge and Completeness of Advanced Immunization in toddlers at the Pangirkiran Health Center, Halongonan District, North Padang Lawas Regency with a p value = 0.000 that the majority of respondents' knowledge level is less knowledgeable, this shows that mothers are still less knowledgeable about the importance of providing advanced immunizations to toddlers. The results of this study are in line with research conducted by Delan (2018) entitled "The Relationship Between Maternal Knowledge Level, Socioeconomic Level With Complete Basic Immunization Status In Toddlers". In this study, it was found that out of 50 respondents who had poor knowledge, 24 people (48%), who had sufficient knowledge were 18 people (36%), and those who had good knowledge were 8 people (16%). So it was concluded that the majority of respondents were less knowledgeable.

According to Fitriani et al (2021) basic immunization in toddlers is not complete, so toddlers will easily experience contracting diseases. Mothers who have not produced complete immunization for their children are due to environmental and socio-cultural influences and do not believe that complete basic immunization in children is important, due to the influence of thinking that even without immunization their children will still grow well. Some mothers lack understanding of the importance of completing basic immunizations for their children. Mothers who have low knowledge tend not to complete their children's immunizations, thus it is hoped that health workers can conduct counseling or provide more understanding of the importance of meeting the completeness of basic immunization in children to mothers by including cadres and community leaders in the area. It is hoped that the rate of completeness of basic immunization in toddlers can increase better.

Based on the analysis of the results of the questionnaire, it can be concluded that the knowledge that is less understood by the baby's mother is the benefits and objectives of immunization, as well as the age of immunization.

The relationship between mother's education level and the completeness of basic immunization in infants aged 12-24 months in the Working Area of Puskesmas X Pekanbaru City.

Based on the results of research on the relationship between maternal education with the completeness of basic immunization of infants showed that there was no significant relationship (p value = 0.392). While respondents with secondary education (high school) are more likely to carry out advanced basic immunization to their children compared to respondents whose education level is basic (elementary - junior high school) and college. This is in line with the research of Wulandari et al (2022) found in the study P value = 0.676 (p> 0.05) this means that there is no relationship between education level and completeness of basic immunization at Puskesmas X Palembang city. The results of the research by Rikianto et al (2019) obtained a p-value of 0.589 or p>0.05, which means that there is no relationship between maternal education and the completeness of basic immunizations in infants at Puskesmas Perumnas II Pontianak City.

Ulfah and Sutarno (2023) in their research revealed that basically someone who has a higher education will influence a person's mindset when receiving information and processing any information obtained from the surrounding environment or from information media. However, in relation to health behavior, having a high education is not enough for someone to have good health behavior. Likewise, with the fulfillment of basic advanced immunization for their children, even a mother who has a high education if she does not have the care and support of those closest to her will also influence the mother not to meet the immunization needs of their children. While a mother's low education does not guarantee that the mother does not meet the immunization needs of their child, because there are other factors such as the knowledge they get about immunization in the living environment as well as the support of the family, invitations from neighbors and the distance between the house and health facilities such as posyandu is very close, so that it can motivate the mother to meet the immunization needs of their child.

The relationship between maternal employment status and the completeness of basic immunization in infants aged 12-24 months in the working area of Puskesmas X Pekanbaru City.

Needs theory (Maslow's theory) suggests the value of 5 levels of basic human needs. The five levels are physiological needs, security and protection needs, social needs, appreciation needs, self-activity needs. Mothers who have a job to meet family needs (first need) will affect immunization activities which include security and protection needs so that mothers prioritize work rather than taking their babies for immunization (Suparyanto, 2011). There are several reasons why mothers do not immunize their children, namely the child is often sick and has a fever after immunization, does not know the place of immunization, the place of immunization is far away, the mother is busy, and the family does not allow it (Asih et al, 2022). In this study there were 95 respondents with a P value of 0.889 which means that there is no significant relationship between the mother's employment status and the completeness of immunization. This is in accordance with the research of Asih et al (2022), that there is no significant relationship between employment status and the completeness of basic immunization.

According to the researcher, the mother's employment status has no effect on the completeness of basic immunization of infants in the working area of Puskesmas X Pekanbaru City because many mothers who are housewives cause mothers to have a lot of free time to take their children to immunization and a small number of working mothers are also known to be able to take their time at every immunization schedule so that this determines the results of the researcher's research. Mothers who do not work have a lot of time at home so there is no reason for them not to take their babies to the health service to be immunized (Arda et al, 2018). Working mothers tend to get more information than non-working mothers. However, working mothers potentially have other activities and may forget to take preventive measures for their children. Working mothers will have more time to be outside the home and have new burdens besides taking care of children, so they do not follow the growth, development and needs of children including getting immunizations (Asih et al, 2022).

The relationship between maternal attitudes and the completeness of basic immunization in infants aged 12-24 months in the working area of Puskesmas X Pekanbaru City.

Attitude is a person's opinion or assessment of the environment and its relationship to health (Herbert et al, 2013). According to Nugrawati (2019), a positive maternal attitude towards immunization causes mothers to bring their babies to the service center to get complete immunization. In this study it was found that 95 respondents with a P value of 0.000 which means that the mother's attitude affects the completeness of basic immunization of infants. In accordance with the research of Chairani et al (2020), there is a relationship between maternal

attitudes and the completeness of basic immunization of infants. Attitude is a psychological element that occurs in people and has the ability to encourage or encourage action. A person's good attitude will result in an increased tendency to agree to take action, meaning that the better the mother's attitude about basic immunization, the greater the mother's awareness of immunizing her child (Nawangsari et al, 2021).

According to the researcher, the mother's attitude affects the completeness of basic immunization of infants in the working area of Puskesmas X Pekanbaru City due to the mother's awareness and willingness to produce a positive attitude of the mother to bring her child to immunization.

The relationship between family support and the completeness of basic immunization in infants aged 12-24 months in the working area of Puskesmas X Pekanbaru City.

Family support is the main key to maternal attitudes and behavior towards immunization in children. Family support referred to in this study is support provided by family members (husband, wife and siblings) so that individuals who are given support feel that they are cared for, valued, and get help from people who matter and have strong family ties with other family members (Husnida, et Al, 2019).

In this study, it was found that most respondents received good support from their families for complete basic immunization. The p value in this variable is 0.000, which means that there is a significant relationship between family support and the completeness of basic immunization.

This is in line with research by Igiany (2020) which states that there is family support for mothers in the form of getting information from the family about basic immunization in children. Mothers will feel that immunization is very important to improve the health of the baby. This condition will certainly greatly affect the achievement of the expected immunization. In line with Heardman's theory (1990), family is a source of support because in family relationships a trusting relationship is created. Individuals as family members will make the family a collection of hopes, a place to tell stories, a place to ask questions, and a place to complain when individuals are experiencing problems (Friedman, 2010). This is in line with this study, that the better the relationship created in the family, the higher the support so that it will cause the mother to bring her baby to get immunized.

In line with research (Widiyanti et al, 2023) Family support can be realized by paying attention, being empathetic, providing encouragement, providing advice, providing knowledge and so on. Forms of family support that can be provided by families are encouragement, giving advice or supervising about caring for babies or children. In this study, the family support in

question is encouragement related to the provision of basic immunizations to children given by parents, in-laws.

The relationship between the number of children and the completeness of basic immunization in infants aged 12-24 months in the working area of Puskesmas X Pekanbaru City.

Based on the results of research conducted by researchers, it shows that mothers who have > 1 child, with a p value = 0.455 (p> 0.05), meaning that there is no relationship between the number of children and the completeness of complete basic immunization.

This is in line with the results of research by Rahmi and Husna (2018) with the title of the relationship between the number of children in the family with the completeness of basic immunization of children in Sukowiryo Village, Jelbuk District, Jember Regency with the results of p value 1.00, namely there is no relationship between the number of children with the completeness of immunization status in children. This is because most mothers have completed immunization of their children and have planned the number of children they have so that it affects the correlation between the number of children in the family with the completeness of basic immunization of children.

The results of different studies conducted by Muchlisa and Bausad (2021) reported that there was a significant relationship between the number of children and complete basic immunization, this is because mothers who have more than two children tend to get less attention than mothers who have the first child who tend to pay more attention related to basic immunization. In addition, another study also in line with this study is a study conducted by Negussie et al (2016) in Ethiopia which explained that when the number of children in the family increases, resources including time and attention will be divided among their children, this results in children born late in the family not getting a complete immunization series. The number of children is related to the mother's opportunity to provide basic immunization to her child in a timely manner due to the division of attention focus between one child and another. Researchers assume that mothers who have many children will be more experienced about how to care for and maintain the health of their children, for example in immunization so that children avoid several dangerous diseases, so that immunization is applied to other children. However, there are also mothers who do not have many children, so they do not really understand about immunization so they do not immunize their children.

4. CONCLUSION AND SUGGESTION

Based on the results and discussion of the factors that influence the completeness of basic immunization in infants aged 12 to 24 months in the working area of Puskesmas X Pekanbaru City, conclusions can be drawn, namely there is a significant relationship between the level of knowledge with the completeness of basic immunization in infants aged 12 to 24 months in the working area of Puskesmas X Pekanbaru City, there is a relationship between maternal attitudes with the completeness of basic immunization in infants aged 12 to 24 months in the working area of Puskesmas X Pekanbaru City. There is a relationship between family support and the completeness of family immunization with infants aged 12 to 24 months in the working area of Puskesmas X Pekanbaru City. There is no relationship between education level and completeness of basic immunization in infants aged 12 to 24 months in the working area of Puskesmas X Pekanbaru City. There is no relationship between employment status and the completeness of basic immunization in infants aged 12 to 24 months in the working area of Puskesmas X Pekanbaru City. There is no relationship between the number of children with the completeness of basic immunization in infants aged 12 to 24 months in the working area of Puskesmas X Pekanbaru City.

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