



Analysis of Factors Associated with Mothers' Decision to Perform Follow-Up Immunization for Children Under Two Years in the Barong Tongkok Community Health Centre Upt Area, East Kalimantan

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Abstract

A key focus of health-related SDG 3 is Universal Health Coverage (UHC), including access to safe, effective, quality and affordable vaccines (Immunization). Immunization is one of the key components of primary health care and a human right. Routine Immunization has a specific routine schedule that has been set by the government and consists of basic Immunization and follow-up Immunization. Follow-up Immunization is required to maintain optimal levels of immunity. To assess the factors associated with mothers' decision to perform follow-up immunization for under-two children in the Barong Tongkok Health Centre Working Area. This study used a cross-sectional study design. Data from a sample of 237 infants were collected directly by conducting interviews. The chi-square test followed by the logistic regression test was used to see the factors associated with the completeness of immunization of infants. The results showed that there was a relationship between maternal knowledge ($p=0.028$), family support ($p=0.001$), the role of health workers ($p=0.003$) and access and facilities of health facilities ($p=0.022$) to the completeness of continued immunization of infants. Meanwhile, there was no relationship between the use of social media ($p=0.091$) and perceived need ($p=0.071$) to the completeness of continued Immunization of infants. Logistic regression test results showed that family support and the role of health workers were the most influential factors on the completeness of continued Immunization of infants. Maternal knowledge, family support, the role of health workers and access to health facilities are factors associated with the completeness of follow-up Immunization of infants. The most dominant variables were family support and the role of health workers.

Keywords: Follow-up Immunization, Childre under two years, factors

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1. Introduction

The main focus of Sustainable Development Goal (SDG) 3 related to health is Universal Health Coverage (UHC), including access to safe, effective, quality, and affordable essential medicines and vaccines [1]. This is in accordance with the development agenda in the 2020-2024 RPJMN, which is to improve quality and competitive Human Resources (HR) through improving access and quality of health services towards universal health coverage, especially strengthening basic health services by encouraging increased promotive and preventive efforts, supported by innovation and technology utilisation [2]. Immunization is one of the key components of primary health care and is a human right and one of the best health investments [3]. In 2020, the World Health Assembly endorsed the Immunization Agenda 2030 to reduce morbidity and mortality from vaccine-preventable diseases [4].

Immunization boosts immunity by administering vaccines that include weakened or modified viruses or bacteria [5]. Immunization is beneficial for preventing illness, disability and death from disease. Some of the diseases that can be prevented by Immunization are tuberculosis, hepatitis B, diphtheria, pertussis, tetanus, polio, measles, pneumonia, mumps, rotavirus-induced diarrhoea, German measles (rubella), and cervical cancer. Health Law No. 17 of 2023 states that every child has the right to receive basic Immunization to prevent diseases that can be prevented through Immunization [6]. Immunization is the most cost-effective health intervention, as it can prevent and reduce the incidence of morbidity, disability, and mortality from Immunization Preventable Diseases (PD3I). The Immunization programme consists of routine, supplementary and special Immunizations. Routine Immunization has a specific schedule set by the government and consists of basic and advanced Immunization [7].

Basic Immunization is Immunization given to infants before the age of 1 year to increase immunity against Hepatitis B, Poliomyelitis, Tuberculosis, Diphtheria, Pertussis, Tetanus, Pneumonia, Meningitis, and measles. Based on Minister of Health Regulation No. 12/2018, a child is declared to have received complete basic Immunization if he/she has received one HB-0 Immunization, one BCG Immunization, three DPT-HB/DPT-HBHiB Immunizations, four polio Immunizations or three IPV Immunizations, and one measles Immunization [8]. Follow-up Immunization is required to maintain optimal levels of immunity. Follow-up Immunization is given to Infant under 2 years old or around 18 months of age with DPT-HB-Hib and Measles/MR Immunization, as well as to grade 1 primary school children with Diphtheria Tetanus (DT) and Measles or MR Immunization, and grade 2 and 5 with Tetanus Diphtheria (DT) vaccine [8]. In 2020 and 2021, the COVID-19 pandemic put pressure on the health system, resulting in a setback in Immunization coverage. However, recovery was already well underway by 2022 [9].

Based on WHO data, in 2022 about 84% of infants worldwide-received three doses of the DTP3 vaccine, protecting them from serious infectious diseases [9]. However, inequalities among countries with different income levels are still significant, with low-income countries lagging behind [9]. For Measles, there will be 21.9 million children who have not received their first routine dose of measles vaccine by 2022, up from 19.2 million in 2019 [10]. According to the 2021 Indonesian Health Profile, DPT-HB-Hib4 Immunization coverage in 2020 was 67.8%, decreasing to 56.2% in 2021. Measles Rubella 2 Immunization coverage in 2020 was 64.7%, decreasing to 58.5% in 2021 [11]. Based on 2013 Basic Health Research data, for children aged 12-23 months, complete Immunization increased in 2007 by 41.6%, 2010 by 53.8%, and 2013 by 59.2% [12]. However, the 2018 Basic Health Research data showed a decrease in complete basic Immunization in children aged 12-23 months to 57.9% [13]. In 2022, Indonesia achieved 94.6% complete Immunization coverage, exceeding the national target of 94.1% [14].

Data from the Ministry of Health as of 14 July 2022 shows that Immunization coverage in newborns only reached 28.4% [15]. Low Immunization coverage can be caused by health behavior or a person's behavior in seeking and utilising health services. According to Andersen and Newman (1995), three factors influence a person to utilise health services, namely predisposing factors, supporting factors, and need factors [16]. Predisposing factors are internal factors such as demographics, socio-economics, attitudes, knowledge, and actions. Enabling factors include family resources and community resources. Need factors relate to how individuals perceive their health and functional condition [17]. The decision to carry out follow-up Immunization is related to maternal knowledge [18]. A good level of maternal knowledge is followed by the completeness of Immunization of her child [19]. The factor of distant health services or access to health services also affects Immunization decisions [20]. The role of health workers is also important to support health and the achievement of basic Immunization [21]. Family support is an important factor for Immunization completeness [22].

Social media also plays a role as an external factor in providing information related to children's health [23].
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Data from UPT Community Health Centre Barong Tongkok in 2022 showed that the completeness of DPT-HB-Hib follow-up Immunization for under-two children was 31.5% and measles was 42.8%. The latest data up to August 2023 showed that the completeness of DPT-HB-Hib follow-up Immunization among under-two children was 31.8% and measles was 28.7% [24]. Factors that influence Immunization include health behaviour, access to health services, and the role of health workers, family support, and social media. This study not only aims to look at the factors associated with mothers' decision to perform follow-up Immunization on infants in the Barong Tongkok Health Centre Working Area, but also to explore which of these factors have the most impact or influence on the status of follow-up Immunization. In order to develop specific interventions based on the findings of this study.

2. Materials and methods

2.1. Type of Research

The type of research used is analytical observational with a "Cross Sectional Study" design, which is an analytical epidemiological study that examines the relationship between knowledge, family support, the role of health workers, facilities and infrastructure, social media and mothers' perceived need with mothers' decisions to carry out follow-up Immunization for under-tuos. This study analyses exposure and disease outcomes measured simultaneously on each research subject in the population and at one specific time.

2.2. Place and Time of Research

This study was conducted from January to March 2024 in the working area of UPT Community Health Centre Barong Tongkok, Barong Tongkok sub-district, West Kutai district, East Kalimantan province.

2.3. Study Population and Sample

The population in this study were all 725 infants who were targeted by the Advanced Immunization Program in the Working Area of UPT Community Health Centre Barong Tongkok, East Kalimantan. This study used non-probability sampling with accidental sampling technique. This means that respondents were selected by chance or incidentally by the researcher when meeting them. Respondents who will be taken are individuals who come to visit the Community Health Centre or Posyandu, as well as those who walk around the working area of UPT Community Health Centre Barong Tongkok during January to March 2024 and are willing to participate in the study. Based on the results of the calculation, the sample size was obtained as many as 237 infants.

2.4. Research Instruments

The instrument in this study was a standard questionnaire adapted or taken from several previous studies. The questionnaire was then used to obtain data on knowledge, family support, the role of health workers, access and facilities of health facilities, use of social media and perceived need of research respondents.

2.5. Data Collection

Data collection based on the type of data, namely primary data and secondary data. Primary data is data

obtained by researchers directly to respondents (samples) and still requires processing to produce information. Primary data obtained directly from respondents through questionnaires. Data collection was carried out using questionnaire techniques, namely direct interviews with respondents and examination of KIA/KMS books. Secondary data is data obtained from the UPT Community Health Centre Barong Tongkok in the form of data on the number of infants targeted by the advanced Immunization program. Secondary data was also obtained from the West Kutai District Health Office, Books and various online and offline literature sources are also secondary data sources that support this research.

2.6. Data Processing and Analysis

The data obtained will be processed through a series of steps, including data checking to identify missing data, editing to correct errors, coding to facilitate data entry, entering data into MS Excel, and cleaning data from errors. After that, data analysis was conducted using univariate, bivariate, and multivariate analysis methods. Univariate analysis was used to obtain the distribution and percentage of each variable. Bivariate analysis involved cross tabulation and Chi square statistical test to evaluate the relationship between dependent and independent variables. Multivariate analysis used logistic regression to examine the association of multiple independent variables with one dependent variable. The results of this analysis will identify the independent variables that influence the continued Immunization status of under-two children.

3. Results and Discussions

Research on factors influencing the status of continued Immunization in under-two children.

3.1. Results

3.1.1. Respondent Characteristics

Based on Table 1, most of the respondents/mothers were in the age group of 20-35 years (80.6%), had a high school education level (52.7%), were unemployed or housewives (74.3%) and had children with complete basic Immunization (93.7%). Based on Table 2, most respondents/mothers had children who had received DPT-HB-Hib 4 (83.1%) follow-up Immunization. However, most had not received follow-up Immunization against measles 2 (62.8%). Overall, most respondents had complete follow-up Immunization status (67.5%). Based on the data analysis in Table 3, factors such as maternal knowledge, family support, the role of health workers, and access and facilities of health facilities were significantly associated ($p < 0.05$) with the completeness of follow-up Immunization among under-two children. Maternal knowledge showed a significant association ($p = 0.047$), where respondents with good knowledge had complete follow-up Immunization (68.8%), while respondents with poor knowledge had incomplete follow-up Immunization (45.5%).

Family support ($p = 0.001$), the role of health workers ($p = 0.003$), and health facility access and facilities ($p = 0.022$) also showed a significant association with the completeness of continued Immunization in under-two children. On the other hand, social media factors and perceived need did not show a significant association with the completeness of follow-up Immunization among under-two children. Although the majority of respondents with good

social media utilisation had complete follow-up Immunization (64.4%), and the majority of respondents with good perceived need also had complete follow-up Immunization (53.8%), there was no statistically significant association ($p > 0.05$).

3.1.2. Relationship between Factors and Completion of Follow-up Immunization in Under-two Children

Multivariate analysis used logistic regression test to determine the factors that were significantly associated with the completeness of follow-up Immunization among under-two children. The factors that do not meet the requirements ($p < 0.05$) will be excluded from the model gradually to get the most accurate model in predicting the completeness of continued Immunization in under-two children. Table 4, shows that of the variables tested, only the variables of family support and the role of health workers had p values < 0.05 , so they became the focus of analysis in the final stage. The logistic regression results produced the following equation: $Y = -0.393 + 1.408$ (family support) + 0.784 (health worker role), with a probability value for incomplete follow-up Immunization in under-two children of 85.83% if they have poor family support and health worker role. This indicates that family support and the role of health workers have a significant influence on the completeness of follow-up Immunization in under-two children.

3.2. Discussion

The results showed that most respondents had good knowledge about follow-up Immunization (64.1%). Almost all respondents had a good understanding of the definition, purpose, benefits, requirements, and adverse events after follow-up Immunization. However, there were still many respondents who did not understand the timing, type and nature of follow-up Immunization, especially regarding diseases that can be prevented by follow-up Immunization. Maternal knowledge is obtained from education, observation, or information obtained by a person, and with knowledge, a person can make changes so that behaviour can develop. Respondents' good knowledge is indicated by the ability to correctly answer questions related to advance Immunization knowledge. Maternal knowledge is used as a basis for behaviour, namely in providing Immunization to their children [25]. Based on the results of hypothesis testing, it was found that maternal knowledge was a factor associated with the completeness of follow-up Immunization in under-tuos ($p=0.047$). Respondents with good knowledge also had children with complete follow-up Immunization (68.8%). In contrast, there were still many respondents with poor knowledge who had incomplete follow-up Immunization (45.5%) [26].

This result is in line with the research of Puspawati et al. (2022) and Restu et al. (2023), where statistical tests ($p=0.000$) showed a significant relationship between maternal knowledge and completeness of Immunization of infants in West Kalimantan. However, Kandini et al. (2023) found different results, where there was no association between maternal knowledge and completeness of follow-up Immunization in children under two ($p>0.05$) [27-29]. Completeness of follow-up Immunization will arise with the suitability of reactions to certain stimuli, namely knowledge about booster Immunization.

Table 1. Distribution Based on Respondent Characteristics

Respondent Characteristics	Frequency	
	N (237)	%
Age		
< 20 Years	6	2,5
20 - 35 Years	191	80,6
> 35 Years	40	16,9
Education		
Not in School	3	1,3
Finished primary school	26	11
Completed junior high school	31	13,1
Completed high school	125	52,7
University graduates (D3/S1/S2)	44	18,6
Working Status		
Not Working	176	74,3
Work	61	25,7
Child Basic Immunization Completeness		
Incomplete	15	6,3
Complete	222	93,7

Source: Primary Data, 2023

Table 2. Distribution by Continued Immunization Status

Advanced Immunization	Frequency	
	N (237)	%
DPT-Hb-Hib 4		
No	40	16,9
Already	197	83,1
Measles 2		
No	149	62,8
Already	88	37,2
Advanced Immunization Status		
Incomplete	77	32,5
Complete	160	67,5

Source: Primary Data, 2024

Table 3. Relationship between Immunization Factors and Continued Immunization Status of Infant under 2 years old

Variables	Advanced Immunization Status				Statistical Test Results (p)
	Incomplete		Complete		
	n	%	n	%	
Mother's knowledge					
Less	35	45,5	48	30	0,028*
Good	42	54,5	112	70	
Family Support					
Less	51	66,2	50	31,3	0,001*
Good	26	33,8	110	68,8	
Role of the Health Officer					
Less	46	59,7	61	38,1	0,003*
Good	31	40,3	99	61,9	
Health Facility Access and Facilities					
Less	22	28,6	24	15	0,022*
Good	55	71,4	136	85	
Social Media Utilisation					
Less	37	48,1	57	35,6	0,091
Good	40	51,9	103	64,4	
Perceived Need					
Less	46	59,7	74	46,3	0,071
Good	31	40,3	96	53,8	

Source: Primary Data, 2024 *) statistically significant ($p < 0.05$)

Table 4. Multivariate Analysis of the Association of Factors with Completeness of Follow-up Immunization among Infant under 2 years old

Variables	B	Std.Err	pvalue	Exp B (OR)	95% CI (LL-UL)
First Stage					
Mother's knowledge	.367	.316	.246	1.444	0,777-2,684
Family Support*	1.293	.307	.000	3.644	1,996-6,652
Health worker role*	.630	.309	.042	1.878	1,024-3,443
Health Facility Access and Facilities	.557	.366	.128	1.745	0,851-3,575
Social Media Usage	.263	.312	.399	1.301	0,706-2,399
Perceived Need	.249	.309	.420	1.283	0,700-2,351
Const.	-1.193	.429	.005	.303	
Last Stage					
Family Support	1.408	.300	.000	4.088	2,271-7,356
Role of the Health Officer	.784	.299	.009	2.191	1,996-6,652
Const.	-.393	.248	.113	.675	

Source: Primary Data, 2024

According to Notoadmodjo (2003) in Darsini et al. (2019), behaviour based on knowledge will last longer than behaviour that is not based on knowledge. Bloom states that the formation of new behaviour begins in the cognitive domain, where the subject first knows the stimulus in the form of material or objects, giving rise to new knowledge and inner responses in the form of attitudes, which then trigger action [30-32]. The results also showed that most respondents had good family support for continued Immunization (57.4%), which included emotional support (65%), appraisal support (55.7%), instrumental support (55.7%), and informational support (56.1%). Family support acts as feedback guidance, guiding, and mediating problems, as well as a source and validator of family members' identities [33].

Family support is an attitude, action, and acceptance of family members that includes informational, appraisal, instrumental, and emotional support, which makes family members feel cared for [34]. Based on the results of hypothesis testing, family support is a factor associated with the completeness of continued Immunization in under-tuos ($p=0.001$). Respondents with good family support also had children with complete follow-up Immunization (68.8%). In contrast, most respondents with poor family support had incomplete follow-up Immunization (66.2%) [35].

The results of multivariate analysis with logistic regression showed that of all the study variables, family support ($p=0.000$; OR=4.088) and the role of health workers ($p=0.009$; OR=2.191) were the factors most associated with the completeness of continued Immunization of infants [36]. These results are in line with the research of Addiaro et al. (2022) and Kandini et al. (2023) who found that family support ($p<0.05$) was one of the factors associated with continued Immunization coverage in children aged 18-24 months [37-38]. In addition, the study showed that the role of health workers was a factor associated with the completeness of follow-up Immunization in under-tuos ($p=0.003$). Respondents who rated the role of health workers in the good category also had children with complete follow-up Immunization (61.9%), while most respondents who rated the role of health workers in the poor category had children with incomplete follow-up Immunization (59.7%) [39].

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Health workers have an important role in improving the quality of health services, increasing awareness, willingness, and ability to live a healthy life [40]. The results also showed that most respondents had a good assessment of access to health facilities for continued Immunization (80.6%). Almost all respondents had a good assessment of access to health facilities consisting of access (95.8% rated access as easy/close) and facilities (84% rated facilities as good) [41]. Based on the results of hypothesis testing, access and health facilities are factors associated with the completeness of continued Immunization in under-two children ($p=0.022$). Respondents who rated access and facilities as good also had children with complete follow-up Immunization (85%) [42].

The study also revealed that most respondents had used social media well to access information on follow-up Immunization (60.3%). Facebook (35.4%) and WhatsApp (47.3%) were the social media platforms most frequently used by respondents. However, based on the hypothesis testing results, social media utilisation was not associated with the completeness of follow-up Immunization among under-two children ($p=0.091$). Although most respondents with good social media utilisation also had children with complete Immunization (64.4%), many were incomplete (51.9%) [43]. This study showed that perceived need was not associated with the completeness of follow-up Immunization among under-two children ($p=0.071$). Respondents with good and poor perceived need showed almost equal Immunization completeness (53.8% vs 46.3%) [44]. This is in line with the research of Alifitya et al. (2022) and Napitupulu (2018) who found no significant relationship between individual perceived need and health service utilisation [45-46]. The study underscores the crucial roles of family support, health workers, and access to quality health facilities in ensuring complete immunization coverage for infants. Strong family support significantly enhances immunization completeness, with respondents receiving good family support showing higher rates of complete immunization follow-up. Similarly, the positive role of health workers is associated with higher rates of complete immunization. Access to and quality of health facilities also play a significant role; respondents who

rated these aspects positively were more likely to have their children fully immunized. While social media was widely used to access immunization information, it did not significantly influence immunization completeness, suggesting that while it is informative, it may not directly impact immunization outcomes. Additionally, the study found no significant relationship between individual perceived need and immunization completeness, aligning with previous research. These findings highlight the need for targeted interventions that strengthen family support systems and enhance health service delivery to improve immunization outcomes.

Research Limitations

Limitations of this study include a focus on one specific geographic area or population, which may limit the generalizability of the results. Future research could involve using more complex research designs, including longitudinal studies to track changes in catch-up Immunization behaviour over time. In addition, comparative studies between different regions or populations could provide additional insights into factors that influence the completeness of follow-up Immunization in under-two children. Research could also expand the scope to take into account cultural, social and economic aspects that might influence Immunization status.

Conflict of interest: None

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