

# Timeliness and Coverage of Basic Immunization among Children 12-48 Months in Puskesmas Amplas Medan City

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**Abstract:** Immunization is a way to increase the body's immunity against a disease. It can prevent the occurrence of the disease if an individual is exposed to it later in life. The completeness and timeliness of immunization are important to ensure the optimal protection against the diseases. This was an observational descriptive study with a retrospective approach. This study was conducted in the working area of Puskesmas Amplas (health center). The respondents were mothers who have children aged 12 – 48 months which obtained by using the consecutive sampling method. A total of 72 mothers were interviewed using structured questionnaire and the health cards of children were recorded and analyzed. The aims of this study were to analyze immunization coverage and its timeliness and to assess the knowledge of mothers about basic immunization. The study found that the basic immunization coverage reached only 58.3%, while the highest timeliness of immunization was Hepatitis B 0 vaccine 95.8% and the lowest was Polio 4 vaccine 38.9%, where mothers who had good knowledge about immunization only 58.3%. Therefore, it is important to increase knowledge of mothers about immunization and take advantage of using a reminder for immunization schedule.

## 1 INTRODUCTION

Immunization is one of the most effective and inexpensive ways as a public health intervention against vaccine-preventable diseases. It is estimated to avert 2-3 million deaths every year (WHO, 2017). The purpose of immunization is to provide antigen specific bacteria or viruses that have been attenuated or killed in order to stimulate the body's immune system to form antibodies against the disease (Ministry of Health, 2016).

The immunization program is targeted towards populations whom are vulnerable to communicable diseases, namely infants, children, women of childbearing age, and pregnant women (Ministry of Health, 2017).

The Health Act No. 36 of 2009 states that every child is entitled to basic immunization in accordance with the provisions to prevent the occurrence of diseases that can be avoided through immunization

and the government is obliged to provide full immunization to every infant and children (Ministry of Health, 2017).

The Ministry of Health of the Republic of Indonesia's goal in the years 2015-2019 is to increase the completion of the basic immunization required of infants aged 0-11 months to 91-93% (Ministry of Health, 2015). Based on the 2013 Basic Health Research (*Riskesdas*), completion of basic immunization nationally reached 59.2%, whereas based on the Indonesian Health Profile data in 2014, completion of basic immunization amounted to 86.9%, while in North Sumatera this number was 78%. It still has not reached the desired target of the Strategic Plan (*Renstra*) of 2015- 2019 which is 91-93% (Ministry of Health, 2015).

There are many obstacles to implement the immunization program such as lack of knowledge and awareness of mothers and community, myths of immunization, and black campaigns of immunization. Therefore it is a need to analyze the

basic immunization coverage and its timeliness among children 12 – 24 months in the working area of Puskesmas Amplas Medan and assess the level of knowledge of mothers about the basic immunizations.

## 2 METHODS

This research was a descriptive observational study with retrospective approach. This research was conducted in working areas of Puskesmas Amplas. The samples were obtained using consecutive sampling method. The samples in this study were mothers who have children aged between 12-48 months, where they interviewed by using structured questionnaires and their children immunization records (immunization card/other health card that records the data of immunization) were observed and analyzed. A total of 72 mothers who have children aged 12 – 48 months was interviewed about their knowledge about basic immunization and the immunization history that their babies had during aged 0 - 12 months. The immunization history was cross-checked with the immunization record (health card) or the medical record from health centre (*posyandu/puskesmas*).

## 3 RESULTS

### 3.1 Characteristics of Mothers and Children

Characteristics of mothers and their children showed in Table 1, where the majority of the mothers were aged between 20-30 years, where 40 (55.6%) of the mothers were in that age range. Majority mothers had education at senior high school level 42 people (59.3%). Most of the mothers were either housewives or unemployed 58 people (80.6%). Meanwhile in term of gender of children, there were boys 51.4% and girls 48.6%.

Table 1: Characteristics of mothers and children.

Characteristics	n	%
Mother Age (years)		
20 - 30	40	55.6
30 - 40	29	40.3
>40	3	4.1
Educational Level		
Primay School	2	2.8
Junior High School	10	13.9
Senior High School	42	59.3
University	18	25
Mother Work		
Not Working/Housewife	58	80.6
Privat Employee	11	15.3
Government Officer	3	4.1
Children Gender		
Boys	37	51.4
Girls	35	48.6

### 3.2 Basic Immunization Coverage and Mothers' Knowledge

The coverage of basic immunization in this study was defined as complete immunization if a child aged less than 12 months completed his/her immunization by receiving one dose of Hepatitis B 0 vaccine, one dose of BCG vaccine, four doses of Polio vaccine, three doses of Pentavalent vaccine (DPT-HB-Hib), and one dose of Measles vaccine. The status of immunization coverage among 72 children in this study can be seen in Table 2 below.

Table 2: Basic immunization coverage.

Coverage	n	%
Complete	42	58.3
Incomplete	30	41.7
Total	72	100

Table 2 showed that the completeness of basic immunization coverage only reached 58.3%, and about 42% of children didn't complete their basic immunization.

Based on the type of immunization, the completeness of each immunization as shown in Table 3 below.

Table 3: Coverage for each immunization.

Basic Immunization Type	Complete		Incomplete	
	n	%	n	%
Hep B0	69	95.8	3	4.2
BCG	71	98.6	1	1.4
Polio 1	60	83.3	12	16.7
Polio 2	70	97.2	2	2.8
Polio 3	69	95.8	3	4.2
Polio 4	56	77.8	16	22.2
Pentavalent 1	72	100	0	0
Pentavalent 2	68	94.4	4	5.6
Pentavalent 3	64	88.9	8	11.1
Measles	66	91.7	6	8.3

The completeness of basic immunization was vary among the type of vaccination where the highest coverage was Pentavalent 1 (100%), followed by BCG (98.6%) and Hepatitis B 0 (95.8%). Meanwhile the lowest coverage was immunization of Polio 4 as much as 77.8%.

Table 4: Basic Immunization coverage and mothers' knowledge.

Level of Knowledge	Basic Immunization Coverage				Total	
	Complete		Incomplete			
	n	%	n	%	n	%
Poor	1	1.39	5	6.94	6	8.33
Average	15	20.83	9	12.5	24	33.3
Good	26	36.1	1	22.2	27	58.3
Total	42	58.3	30	41.6	72	100

The knowledge about basic immunization is important thing that influence mothers behavior regarding implementation of immunization programs. Table 4 revealed that majority of respondents was had good knowledge level about basic immunization as much as 58.33%. Table 4 also showed that from the 42 respondents (58.33%) that have completed required immunizations for their children, there were 26 respondents (36.11%) with a good level of knowledge, 15 respondents (20.83%) with an average level of knowledge and 1 respondent (1.39%) with a poor level of knowledge of basic

immunization. Meanwhile, from the 30 respondents (41.67%) that have not completed the required immunizations for their children, there were 16 respondents (22.22%) with a good level of knowledge, 9 respondents (12.50%) with an average level of knowledge and 5 respondents (6.95%) with a poor level of knowledge of basic immunization.

### 3.3 Basic Immunization Timeliness and Mothers' Knowledge

The timeliness of basic immunization in this study was defined as right time, if a baby aged less than 12 months received his/her immunization in line with national immunizations program schedule, ie; hepatitis B vaccine 0 at 0 – 7 days, BCG vaccine at 1 month, Polio 1, 2, 3 and 4 vaccines at 1, 2, 3 and 4 months, Pentavalent 1, 2, and 3 vaccine at 2, 3, and 4 months, and Measles vaccine at 9 months. The status of timeliness of children in working areas of Puskesmas Amplas as in Table 5 below.

Table 5: Timeliness of basic immunization.

Timeliness	n	%
Right time	18	25
Not right time	54	75
Total	71	100

Based on Table 5, only 25% of the respondents who received the immunization at the recommended schedule, majority respondents did not receive the immunization at the appropriate time (75%).

Table 6: Timeliness for each immunization.

Basic Immunization Type	Right Time		Not Right Time	
	n	%	n	%
Hep B 0	66	91.7	6	8.3
BCG	56	77.8	16	22.2
Polio 1	40	55.6	32	44.4
Polio 2	32	44.4	40	55.6
Polio 3	31	43.1	41	56.9
Polio 4	28	38.9	44	61.7
Pentavalent 1	36	50	36	50
Pentavalent 2	29	40.3	43	59.7
Pentavalent 3	26	36.1	46	63.9
Measles	43	59.7	29	40.3

From Table 6 above, it can be revealed that highest percentage of timeliness among basic

immunizations was Hepatitis B 0 as much as 91.7% which meant the baby received Hepatitis B 0 at the right time as recommended schedule. The lowest percentage of immunization timeliness was Pentavalent 3 as much as 36.1%. The hepatitis B 0 immunization is given to a baby at 0-7 days after his/her delivery, while the Pentavalen 3 vaccine is given at age 4 months.

Table 7: Basic immunization timeliness and mothers' knowledge.

Level of Knowledge	Timeliness of Basic Immunization				Total	
	on Right Time		Not on Right Time			
	n	%	n	%	n	%
Poor	0	0	6	8.33	6	8.33
Average	5	6.95	19	26.39	24	33.34
Good	13	18.05	29	40.28	42	58.33
Total	18	25	54	75	72	100

Table 7 showed that from 18 respondents (25%) that were timely for immunizations, 13 respondents (18.05%) had a good level of knowledge, 5 respondents (6.95%) had an average level of knowledge and no respondents had poor level of knowledge on basic immunization. Meanwhile, from 54 respondents (75%) that were not on time to immunize their children, 29 respondents (40.28%) had a good level of knowledge, 19 respondents (26.39%) had an average level of knowledge and 6 respondents (8.33%) have a poor level of knowledge on basic immunization.

Table 8: Coverage and timeliness of basic immunizations.

Basic Immunization	Complete and on Right Time		Complete but Not on Right Time		Incomplete	
	n	%	n	%	n	%
Hepatitis B 0	66	91.6	3	4.2	3	4.2
BCG	56	77.8	15	20.8	1	1.4
Polio 1	40	55.6	20	27.8	2	2.8
Polio 2	32	44.4	38	52.8	2	2.8

Polio 3	31	43.8	38	52.8	3	4.2
Polio 4	28	38.9	28	38.9	16	22.2
Pentavalent 1	36	50.0	36	50.0	0	0
Pentavalent 2	29	40.3	39	54.2	4	5.6
Pentavalent 3	26	36.1	38	52.8	8	11.1
Measles	43	59.8	23	31.9	6	8.3

Table 8 data showed that the majority of respondents got complete and timely immunization of Hepatitis B 0, which amounted to 66 infants (91.6%). Meanwhile, the majority of respondents had completed but untimely immunizations of Pentavalen 2, which amounted to 39 babies (54.2%). Lastly, the most incomplete of administrations was the Polio 4 immunization, with 16 of the respondents (22.2%) having not completed it.

## 4 DISCUSSIONS

### 4.1 Basic Immunization Coverage

The completeness and timeliness of immunization are very important to ensure the effectiveness of immunization in order to achieve the optimal level of antibody to protect children from the diseases. The immunization behavior of children depends on the behavior of their mothers, where many factors may influence that behavior. One of the influencing factors is the knowledge of mothers about these immunizations. This study found that the level of knowledge of mothers was good as much as 58.33%, while the rest were average and poor knowledge level respectively 33.34% and 8.33%. Meanwhile, the majority of mothers in this study was mothers aged 20 – 30 amounted to 55.6%, with background education at least senior high school as much as 83.3%, and most of them with the status of not working or housewife. It's acknowledged that the higher level of education will result in the better level of knowledge. A study in Yogyakarta 2016, revealed that the majority (80%) of respondents had a good level of knowledge about immunization and more than half (57%) were senior high school graduates, while only 8% had a poor level of knowledge about immunization. A study conducted by Destiyanta (2015) found that there was no relationship between education and timeliness of measles immunization. Kusmita and Kartini (2015) which showed that the majority of respondents who were high school

graduates had a good level of knowledge about immunization. In addition, a study done by Rahayu and Wahtini (2017) also supported the results of this study.

In this study it was found that majority of children who had complete immunization coverage were 42 infants (58.3%). This study has not yet reached the target of a Strategic Plan (*Renstra*) in 2014 amounted to 90%. The same thing was also reported in the study (Thaib, 2013) obtained 83.5% of respondents had complete basic immunization status, 15.5% did not complete, and 1% never immunized. The reasons of incomplete basic immunization were parents' anxiety and afraid of side effects immunization. An evaluation of immunization Hepatitis B in District of Asahan, found that the reasons for the incompleteness of immunization were mother did not aware of time of immunization and children were sick (Harahap, 2008).

Other results obtained from studies by (Tanjung, 2017) at the General Hospital of Dr Haji Adam Malik Medan showed, that the number of infants who were fully immunized reached as many as 46 infants (40.7%) while, 67 infants (59.3%) had incomplete immunizations. This result is not much different with a complete basic immunization coverage study done in Padang in 2013. Basic immunization coverage in South Sulawesi in 2012 amounted to 88.8% (Makamban, 2014).

#### 4.2 Basic Immunization Timeliness

In this study, the timeliness of basic immunization among 72 children aged 12-48 months was inadequate, where 54 respondents (75%) didn't immunize on right time as recommended schedule and only 18 respondents (25%) immunized on right time. The timeliness for immunization of Hepatitis B 0 reached to 91.7% which meant the baby received Hepatitis B 0 at the right time as recommended schedule. The lowest percentage of immunization timeliness was Pentavalen 3 as much as 36.1%. The schedul of hepatitis B 0 immunization is 0 -7 days, while the Pentavalen 3 vaccine is at age 4 months.

The results of this study was better than the results from Fauziah (2016) where the accuracy of immunization in Sri Martuti Clinic, Yogyakarta was only 63.3%. Based on the data profile of Gedang Sari Yogyakarta Health Center in 2011, the coverage for immunizations Hepatitis B 0 was 90.48%, and only 41.7% (25 respondents) were timely in their immunizations, while 58.3% (35 respondents) were not. Based on a study by Azizah and Rahmawarti (2012), it can be concluded that a higher level of

education can increase parent compliance of required immunization for children and therefore increase overall immunization coverage and timeliness. A research conducted by Irawati (2011), revealed that the mother's level of knowledge regarding the timeliness of immunization, in which a poor level of knowledge results in increasing noncompliance of immunization schedules.

In addition, this study also found that the roles of health providers in the immunization of children aged 12-48 months in Puskesmas Amplas were well executed, but there were only a few officers who went to the citizens' houses to remind residents of immunization schedules. The results were similar to a study conducted by Supardi (2001) in Bangka District Health Center which stated that the role played by health provider will further enhance the implementation of the immunization program.

## 5 CONCLUSIONS

The coverage and timeliness of basic immunization among children aged 12 – 24 months in the working area of Puskesmas Amplas were 58.3% and 25% respectively. This basic immunization coverage consists of receiving one doses of Hepatitis B0 vaccine, one dose of BCG vaccine, four doses of Polio vaccine, three doses of Pentavalent vaccine and one dose of Measles vaccine before the child reaches age one year, while the timeliness of basic immunization refers to when a child receives each type of immunization at the right time in line with the recommended schedule by national immunization program. In order to attain higher coverage and timeliness of basic immunization, it is important to increase knowledge of mothers about immunization and take advantage of using a reminder for immunization schedule.

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