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# MANAGEMENT ON BASIC IMMUNIZATION AT THE A HEALTH CENTER IN INDONESIA

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## ABSTRACT

**Background:** Complete basic immunization uses five certain vaccines given to babies. If one or more doses of certain vaccines are not given to babies, incomplete basic immunization occurs. Achievement of basic immunization at the A health center was incomplete namely 80.1 % in 2019. The objective of the present study is to find information on management and factors affecting incomplete basic immunization at the A Health Center in Indonesia. **Method:** Qualitative design is used to find information concerning the management of incomplete basic immunization; data collected by free and focused interviews, and reviewing documents. The quantitative design used a case-control study; the population is babies living in the working area of the A Health Center consisting of 286 cases and 1,308 controls; the sample size of 205 cases and 205 controls were taken by systematic random sampling from their population. Data collection used structured interviews with a questionnaire containing a close-ended question. Univariate, bivariate, and multiple logistic regression analyses were conducted. **Result:** Concerning management, there was no monitoring on incomplete basic immunization, and no coordination between the immunization and health

*promotion programs; low intellectual development, negative attitude, no family support, and side effect of vaccines affect incomplete basic immunization activities.*

**Conclusion:** *The management of the health centers should monitor basic immunization, coordinate immunization and health promotion programs to enhance health education for mother's low intellectual development, negative attitude, no family support, and managing side effects concerning basic immunization.*

**Key words:** incomplete basic immunization, management, intellectual development, attitude, family support.

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## 1. INTRODUCTION

Immunization is an effort to produce and increase body immunity actively to prevent and decrease the incidence rate of certain infectious diseases (Profil Kesehatan RI, 2017). Basic immunization is necessary given to babies to protect them from certain infectious diseases (Maryumi, 2020). Globally, every year more than 1,4 million children die from polio, measles, diphtheria, hepatitis, pneumonia, tetanus, meningitis which are ably prevented directly or indirectly by immunization (Kemenkes, 2009). At present, 22 million babies have not obtained complete basic immunization in the world; among them, 9.5 million babies have not obtained complete basic immunization in South East Asia including Indonesia (Kemenkes. 2013)

The government of the Republic of Indonesia campaign basic immunizations consisting of 5 vaccines namely 1 dose HB preventing for hepatitis B, 1 dose BCG for tuberculosis, 3 doses DPT for diphtheria, pertussis, and tetanus, 4 doses polio, and 1 dose measles (Kemenkes, 2016). Complete basic immunization occurs if all (5) vaccines are given to babies. Incomplete basic immunization occurs if one dose or more of any vaccine is not given to babies. In the last 5 years, the coverage of complete basic immunization was always more than 85%, and in 2017, the coverage of complete basic immunization was 91.2%, which almost achieved the target namely 92%.

In Riau Province, the coverage of complete basic immunization in 2017 was 75,2%, and in 2018, the complete basic immunization decreased to be 70,96% (Profil Kesehatan RI, 2018).

Based on Pekanbaru Health Profile, the complete basic immunization at the A Health Center increased namely 79.8% in 2018 and 80.1% in 2019 (Profil Kesehatan Kota Pekanbaru, 2019). However, it did not achieve minimal health service standards namely 100%.

Various factors affect complete basic immunization, one of which is the management of immunization programs including basic immunization. Management consists of planning, monitoring, and evaluation. In the planning, necessary information is a health problem related to the health program, and who are affected. Monitoring and evaluation use system approach by determining indicators in Input, Process, Output, Effect, and Impact. Input consists of human resources, infrastructure and logistics, and money. The Process is activities to achieve Output, while Output is the result of health services or health programs. The Effect is human behavior affected by activities of health promotion from health services or health programs concerned. The impact is the health status of the community including frequency, incidence, prevalence, mortality, and case fatality rate of diseases. Monitoring is activities to detect how far the achievement of indicators in Output affected by activities in the Process, which is

affected by the indicator in Input. Evaluation is activities to detect how far health status is affected by indicators in Output, indicators in Effect (Lapau and Birwin, 2017).

Besides the management of basic immunization at the A health center, there are mother's factors affecting the completeness of basic immunization including *predisposing factors* namely intellectual development, attitude, education, and occupation, including as *enabling factor* namely distance from mother's home to the place of immunization and including as *reinforce factors* namely family support to mothers, and side effects of immunization (Green, 1980).

Several previous studies concerning the significant association between mother's factors and the incompleteness of basic immunization of baby conducted in Indonesia are as follows:

- Low intellectual development of mother 3.5 times riskier to have incomplete basic immunization of baby compare to the high intellectual development of mother (Pratamadhita, 2012).
- The negative attitude of the mother 1.9 times riskier to have incomplete basic immunization of baby compare to the positive attitude of the mother (Triana, 2015).
- Low education (secondary school and low) of mother 4.5 times riskier to have incomplete basic immunization of baby compare to high education (high school and more) (Istyati, 2012).
- Working mother 2.7 times riskier to have incomplete basic immunization of baby compare to not working mother (Pramadhita, 2012).
- Mother's perception of feeling far distance her home from the place of immunization 5.3 times riskier to have incomplete basic immunization of baby compare to mother's perception of feeling close distance her home from the place of immunization (Febriati, 2017).
- No family support to mother is 5 times riskier to have incomplete basic immunization of baby compare to there is family support to mother (Pendit et al, 2019).
- The mother who has ever heard the side effects of basic immunization is riskier to have incomplete basic immunization of baby compare to a mother who has never heard side effects of basic immunization (Rahmawati et al, 2014).

The objective of the present study is to find information on the management of basic immunization and mother's factors affecting incomplete basic immunization at the A Health Center in Indonesia in 2020. Achievement of this objective is useful to improve the management of the health center and to formulate intervention concerning factors affecting incomplete basic immunization.

## 2. MATERIAL AND METHOD

### 2.1. Qualitative Method

To find information on the management of the immunization program, this present study used a non-standard qualitative research design (Lapau, 2015) with the format as in quantitative method organized before researching the field, but it is flexible which depends on the need.

Monitoring is an effort to find an association between indicators in Output and Process, and between indicators in Process and Input, while evaluation to find an association between indicators in Output and Effect, between indicators in Output and Impact, and between indicators in Effect and Impact. An indicator in Output is the completeness of basic immunization consisting of 1 dose HB, 1 dose BCG, 3 doses DPT, 4 doses polio, and 1 dose measles. An indicator in Process is the use of vaccine indicator (UVI), an indicator of Input is

vaccine supply (VSI) (Lapau, 1988). In this present study, Evaluation cannot be conducted because indicators of Effect and Process are not available.

To find information concerning the management of basic immunization, free and focused interviews were conducted with the head of the health center, the head of the immunization program, and the immunization worker using an interview manual. Processing and analysis of qualitative data conducted 3 steps namely data reduction, data presentation, and conclusion (Miles and Huberman, 2014).

## 2.2. Quantitative Method

The design type of the present study is a case-control study (Lapau 2015). The dependent variable is the basic immunization of the baby consisting of incomplete basic immunization, and complete basic immunization. The case is a baby having incomplete basic immunization, and the control is a baby having complete basic immunization. Each independent variable has the first category is *1. Risky*, and the second category is *2. Not Risky*. The definition and category of each independent variable are as follows:

- *Intellectual development* is the degree of mother's intellectual starting to know, to understand, and to apply: if mother maximally to know, her intellectual development categorized as *1. Low*; if mother minimally to understand, her intellectual development categorized as *2. High*.
- *Attitude* is a mother's response to a statement concerning a certain problem, whether she disagrees categorized as *1. Negative*, or she agrees categorized as *2. Positive*.
- *Family support* is given by the husband, mother, father, and/or other relatives to the mother to take her baby visiting the place of immunization; if there is no support categorized as *1. No*, and if there is support categorized as *2. Yes*.
- *Distance* is the mother's perception of feeling about the distance of her home to the place of immunization; if she answers far, it is categorized as *1. Far*; and if she answers close, it is categorized as *2. Close*.
- *The side effect* is the mother's behavior if she has ever heard about the side effect of immunization she does not like her baby to be immunized, and it is categorized as *1. Yes*; if she has never heard about the side effect of immunization, she like her baby to be immunized, and it is categorized as *2. No*.
- *Mother's education* which is a secondary school or low categorized as *1. Low*, and if it is high school and more categorized as *2. High*.
- *Mother's occupation*: if she works to obtain income, it is categorized as *1. Working*, but if she works without obtaining income, it is categorized as *2. Not Working*.

The population of the present study was babies (0 – 12 months old) living in the working area of the A health center. The population of the case is a group of babies who did not obtain complete basic immunizations or have incomplete basic immunization. The population of control is a group of babies who obtains complete basic immunization. The sample size was determined based on the design type of case-control study (Lapau, 2015) for each of the 7 independent variables. In this case, based on 5% alpha, 10% beta, Odds Ratio (OR) = 2, and the proportion of risk category in the control group of a previous study, the largest sample size among the 7 independent variables mentioned above is 205. The sample size of cases was taken from the population of cases by systematic random sampling, and the sample size of controls was taken from the population of controls by systematic random sampling.

Primary data concerning dependent and independent variables as mentioned above were collected from 205 respondents. The researchers collected data through a structured interview using the questionnaire containing close-ended questions (Fisher et al, 1993). The planning of

data collection consists of 3 phases: Phase 1 is permission for data collection; Phase 2 is data collection; and Phase 3 is the handling of data (Varkevisser et al, 1970).

Analysis of data consists of univariate, bivariate, and multivariate analysis. The objective of the univariate analysis is to describe the frequency distribution of each risk category of the dependent and independent variables and to detect homogenous independent variables where one of its category less than 15%. The objective of the bivariate analysis is to find a significant association between one independent variable and one dependent variable, by calculating the Odds Ratio (OR) at a confidence level of 95% (CI 95%). If (CI 95%: OR = >1 - >1), it means that there is a significant association between one independent variable and one dependent variable; if (CI 95%: Or = <1 - >1), it means that there is no significant association between one independent variable and one dependent variable; if (CI 95%: OR = <1 - <1), it means significant reverse association between one independent and one dependent variable. The objective of multivariate analysis (multiple logistic regression analysis) is to detect confirmed independent variables associated with incomplete basic immunization by conducting 2 steps namely bivariate selection and multivariate modeling which may find confounding variables (Mitra, 2015).

### **3. RESULT OF RESEARCH**

#### **3.1. Management of Basic Immunization**

This is based on the qualitative research method. Management consists of planning, monitoring, and evaluation. Evaluation could not be conducted because indicators in Effect and Impact were not available. Planning of basic immunization was running well suitable with standard operation procedures (SOP).

Monitoring is an effort to relate indicators of Output namely complete basic immunization (CBI) and indicator of Process namely the use of vaccine indicator (UVI), and to relate indicator of Process namely UVI and indicator of Input namely vaccine supply indicator (VSI) (Lapau, 1988). Achievement of indicator Output namely CBI was only 79.8% in 2018, and 80.1% in 2019. Since the target of Output is 100%, so the basic immunization program did not achieve the target. Based on free interviews and review of documents, the immunization program at the A health center has never used UVI and VSI.

Based on the review of the relevant document, the lowest percentage of immunization coverage was 79.6% for DPT (diphtheria, pertussis, tetanus) immunization; this problem may be due to based on a rapid survey that several mothers did not understand the usefulness of DPT. Based on observation on the activities of the health center workers, there was no coordination between those responsible for immunization and health promotion programs to conduct health education to mothers.

#### **3.2. Mother's Factors Affecting Incomplete Basic Immunization**

##### ***Bivariate Analysis***

Each of the independent variables namely the mother's intellectual development, attitude, family support, education, and occupation, and side effect of vaccines associated with incomplete basic immunization.

**Multivariate Analysis****Table 1** Final Result of Multivariate Analysis

No.	Variable	P-Value	Exp (B)	95 % For EXP (B)	
				Lower	Upper
1	Intellectual Development	0,000	6,038	3,518	10,363
2	Attitude	0,000	7,904	4,538	13,767
3	Family Support	0,000	6,453	3,629	11,477
4	Side Effect	0,000	3,237	1,927	5,435

Table 1 shows a significant association between each of the independent variables with incomplete basic immunization as follows:

- Low mother's intellectual development riskier 6,0 times to have babies with incomplete basic immunization compare to high mother's intellectual development (CI 95%; OR = 3,5-10,4)
- Negative mother's attitude riskier 7.9 times to have babies with incomplete basic immunization compare to positive mother's attitude.( CI 95% ; OR = 4,5-13,8)
- No family support to mother riskier 6,5 times to have babies with incomplete basic immunization compare to mother obtaining family support ( CI 95%; OR = 3,6-11,5)
- A mother who has ever heard side effects of vaccines riskier 3.2 times to have babies with incomplete basic immunization compare to a mother who has never heard side effects of vaccines ( CI 95%; OR = 1.9- 4.4).

**4. DISCUSSION****4.1. Management of basic Immunization**

This is based on the qualitative research method. Monitoring is an effort to relate indicators in Output, Process, and Input. The researchers found the problem of management concerning monitoring of basic immunization namely there has been no calculation of the Use of Vaccine Indicator (UVI), an indicator of Process; as a consequence, those responsible for the basic immunization program at the A health center, they did not know how many vaccines expel in vain. If the Indicator of Process namely UVI less than 80%, indicates many vaccines will expel causing indicator of Input namely Vaccine Supply Indicator (VSI) decreases. The decrease of VSI threatens the decrease of complete basic immunization (CBI). Complete basic immunization was 79,6% in 2018, and 85.7% in 2019, far away from the target, namely 100%. So those responsible for the program of immunization at the A health center did not calculate UVI, they could not monitor basic immunization whether complete or incomplete. It is recommended, the health center monitor health program by relating relevant indicators between Output, Process, and Input.

In this present study, the integration of public health disciplines (Lapau, 2019) could be created among 3 public health disciplines namely epidemiology, health policy and administration, and health promotion directed to prevent immunizable diseases. Epidemiology science discipline found 4 mother's factors namely intellectual development, attitude, family support, and side effect of basic immunization affecting incomplete basic immunization. Health policy and administration science discipline found that monitoring of basic immunization was not conducted at the A health center appropriately, and no coordination

between immunization and health promotion programs. It is recommended to apply the integration of public health science disciplines to solve certain problems at the health center.

#### **4.2. Mother's Factors Affecting Incomplete Basic Immunization**

This discussion concerns the research result based on the quantitative method.

1. Quality and accuracy data: Quality of data determined by relevancy and validity of data, while the accuracy of data determined by relevancy, validity, and reliability of data. (Lapau and Birwin, 2017). In this present study, data are relevant because the data collected, processed, and analyzed to achieve a specific objective and to prove a hypothesis.

The validity of data consists of external validity and internal validity. In this present study, there is no external validity so that the result of the study could not be generalized to a certain population.

Internal validity opposite to systematic error and random error. The systematic error consists of selection bias, information bias, and confounding bias. In this present study, we cannot avoid selection bias, information bias may happen, and there is no confounding bias.

The random error consists of alpha error and beta error. In this present study, based on confirmation of 5% alpha error, and 10% beta error, the researcher found a sample size of 205 cases and 205 controls.

The researcher could not determine the reliability of data because the data collected only one time.

#### ***Causal Relationship***

Multivariate analysis found 4 independent variables which associate with incomplete basic immunization namely intellectual development, attitude, family support, and side effect of the vaccine. The causal relationship based on Hill criteria (Beaglehole et al, 1999) consists of temporal, plausibility, dose-response relationship, the strength of association, consistency, and design type of study as shown in Table 2 as follows: 1) Temporal + means that independent variable came first before dependent variable; 2) Plausibility + based on the theory that independent variable associate with dependent variable; 3) Dose-response relationship – because the measurement level of the independent variable is not continuing but categorical; 4) Strength of association (OR = Odds Ratio) between independent and dependent variable based on multivariate analysis; 5) Consistency + because the significant association between independent and dependent variables in this present study is the same as previous study; 6) Design type – because the inference of case-control study in the present study is a weak causal relationship.

Table 2 shows starting from the dominant to less dominant, there is a causal relationship between each of the independent variables namely intellectual development, attitude, family support, and side effect of vaccines with incomplete basic immunization. Among the 6 Hill criteria, the criterium of Temporal is the strongest. Although the OR (Odds Ratio) for Intellectual Development namely 6 less than OR for Attitude namely 7.9, Intellectual Development is more dominant than Attitude because the Temporal of Intellectual Developments (+) is stronger than the Temporal of Attitude (+/-).

**Table 2** Causal Relationship Between Each Independent Variable and Incomplete Basic Immunization at the A Health Center

No	Hill Criteria	Independent Variables			
		Intellectual Development	Attitude	Family Support	Side Effect
1	Temporal	+	+/-	+/-	+/-
2	Plausibility	+	+	+	+
3	Dose Response Relationship	-	-	-	-
4	Strength of Assosiation	OR = 6.0	OR =7.9	OR = 6.5	OR =3.2
5	Consistency	+	+	+	+
6	Design Type	-	-	-	-

*Explanation: + means there is a causal relationship*

*-means there is no causal relationship*

*+/- means there may be a causal relationship or no causal relationship*

### ***The Implication of Causal Relationship***

Mother’s intellectual development has a causal relationship with incomplete basic immunization: Low intellectual development of mother affects incomplete basic immunization of her babies compare to the high intellectual development of the mother.

The mother’s attitude has a causal relationship with incomplete basic immunization: The negative attitude of the mother affects the incomplete basic immunization of her babies compare to the positive attitude of the mother.

Family support has a causal relationship with incomplete basic immunization: No family support to mother affects incomplete basic immunization of her babies compare to existing family support to mother.

The side effect of vaccines has a causal relationship with incomplete basic immunization: Mother who has ever heard side effect of vaccines affect incomplete basic immunization of babies compare to mother who has never heard side effect of vaccines.

**Recommendation:** The management of the A health center has to enhance health promotion concerning complete basic immunization especially to mothers having low intellectual development, negative attitude, no family support, and whoever heard side effects of vaccines.

## **5. CONCLUSION, RECOMMENDATION, AND SUGGESTION**

### **5.1. Conclusion**

- Management at the A Health Center has been running well in the planning of basic immunization activities. However, it has not been running in monitoring; as a consequence no coordination among the head of the health center, and those responsible for immunization and health promotion programs.
- Mother’s factors namely intellectual development, attitude, family support to mother, the side effect of vaccines affect basic immunization activities.

### **5.2. Recommendations**

- The management of the A health center has to conduct monitoring of immunization program by relating indicators of Output, Process, and Input. The information from



monitoring is useful to formulate coordination among the head of the health center, and those responsible for immunization and health promotion programs.

- Those responsible for immunization program has to monitor basic immunization program by relating indicator in Output namely complete basic immunization (CBI), indicator in Process namely the use of vaccines indicator (UVI), an indicator in Input namely vaccine supply indicator (VSI).
- The management of health centers has to enhance the activities of health promotion to mothers having babies concerning complete basic immunization, especially mothers having low intellectual development, negative attitude, no supporting family, and ever heard side effects of immunization.

### 5.3. Suggestions

Based on the recommendation, the researchers formulate suggestion as follows:

- The A health center has to strengthen the management of immunization program especially monitoring of basic immunization activities
- The head of the A health center has to study the concept of integration of public health science discipline essentially its application in the immunization program.
- The A health center has to develop followed by using relevant audiovisual showing the usefulness of complete basic immunization for babies, the problems appear if no basic immunization for babies; as a consequence, it motivates mothers to bring their babies for vaccination and motivate families to support mothers to use health services especially for basic immunization.
- To conduct *inform consent* to mothers before injection of vaccines to babies who may get a fever and how to decrease the temperature of the babies.
- Those responsible for complete basic immunization has to conduct inter-program communication such as health promotion program, and inter-sectoral communication such as education, religion, and other relevant sectors.

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