

Determinant Factor of Childhood Basic Immunization Compliance during the COVID-19 Pandemic in Jambi City, Jambi Province, Indonesia

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ABSTRACT

Background: The coverage of immunization among children in Jambi City decreased during COVID-19 pandemic.

Purpose: This study aimed to identify the factors that might be associated with basic vaccination compliance among mothers in Jambi, Indonesia.

Methods: This study uses a case control design in 5 Jambi City Regions in March-May 2021. The sample in this study is mothers who have children in age 9-24 months. The sampling that is used in this study is cluster sampling with total sample of 506 mothers. The data analysis used in this study is descriptive statistical analysis of univariate, bivariate using chi square test.

Results: The results of data analysis showed that the variables related to compliance were perceptions of receiving immunization, attitudes, knowledge, husband's support with p value < 0.01, and distance traveled with p value < 0.05.

Conclusion: Effort to improve compliance in the pediatric immunization Pandemic are needed to strengthen mother's perception, knowledge, attitudes during COVID-19. Analysis with predictive models is highly recommended to determine the odd-ratios and adjusted odd-ratios between factors related to the complying for basic vaccination.

Keywords: Childhood Basic Immunization, Compliance, COVID-19 Pandemic, Factor.

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BACKGROUND

Since the COVID-19 outbreak was declared as global pandemic by WHO on March 11, 2020, immunization coverage for children around the world has been affected (Andrews, et al 2020). WHO stated, 5.7 million babies did not get complete basic immunization, in the first four months of 2020 (Irawati, 2020). This is supported by the research of MacDonald, et al (2020) which stated that the COVID-19 pandemic caused disruption of routine immunization programs, including reduction in visits and timeliness immunization for children. A quick survey conducted by UNICEF and the Ministry of Health of 7558 parents in Indonesia, stated that 84% of immunization services were disrupted due to the COVID-19 pandemic. Disruption to immunization services is caused by various reasons, such as a lack of understanding of the Ministry of Health guidelines, the number of health facilities that close immunization services, and the high risk of COVID-19 transmission in health facilities (Kartini, et al 2021; Mukhi & Medise, 2021; Kemenkes & UNICEF, 2020; Aji Patriawati, 2020).

The immunization coverage rate in Indonesia in January-August 2020 showed a significant reduction starting from 0.5%-87% (Nurhasanah, 2021). According to the Badan Pusat Statistik RI (2020) the percentage of children aged 12-23 months who received complete basic immunization in Jambi province in 2018-2020 sequentially, namely: 2018 (65.09%), 2019 (52.57%), 2020 (50.44%) , this shows that the coverage rate is low and has decreased significantly every year. The percentage of basic immunization coverage in 2020 in Jambi City also showed a decrease of 7.1% compared to the same period in 2019, this was influenced by the COVID-19 Pandemic situation which required the termination of services at posyandu and a reduction in the frequency of services in various health facilities (Dinas Kesehatan Provinsi Jambi, 2020). The decline in immunization services occurred in almost all health facilities serving immunizations, one of which was the work area of the Jambi City Coffee Garden Health Center. The number of children under two years old (baduta) who received complete basic immunization in 2020 in this work area was 620 baduta (48%), this shows that the achievement rate is still far from the set performance target of 1,287 baduta (Data internal Puskesmas Kebun Kopi Kota Jambi, 2020).

A study conducted in one of the provinces in Indonesia reported that education level, socioeconomic status, and ability to access health facilities were significantly associated with higher immunization coverage (Maharani & Kuroda, 2018). However, information about factors related to complete basic immunization status in children aged 12-23 months in Indonesia is still very minimal, especially during the COVID-19 pandemic (Efendi et al., 2020). In addition, investigating the link between maternal compliance in immunization can be a strategy to increase immunization coverage rates. Therefore, this study aims to examine factors related to maternal compliance in providing basic immunization to children aged (9-24 months) in Jambi City.

OBJECTIVE

This study aims to explain the factors that influence maternal compliance in providing basic immunization to children aged 9-24 months during the COVID-19 pandemic.

METHODS***Research design***

This study is a community-based retrospective case-control study to identify the distance of their living home to the health facility center, perception, attitude, knowledge, husband support on basic vaccination compliance among mother in Indonesia.

Sample and setting

The study was conducted in Jambi City, Indonesia, between March-May 2021. There were five region from two community health centers in Jambi City, which were randomly selected. We recruited 506 eligible participants based on the study criteria. The inclusion criteria of mothers who meet basic immunizations include: 1) Respondents are able to write and read. 2) Respondents are mothers aged under two years (9-24 months) in Jambi City. 3) Have a complete history of giving basic services to children at local health services (puskesmas or hospitals). 4) Respondents have a Health Card (KMS) or KIA book. The inclusion criteria of mothers who did not comply with basic vaccination as controls in this study were: 1) Mothers did not monitor their child's monitoring and did not have records. 2) The child suffers from a disorder that cannot be immunized, such as malignancy or HIV AIDS.

Research instrumen

Demographic data were collected using a self-designed questionnaire survey containing participant's demographic characteristics, including Total number of their children, Religion, Educational level, Family income, transportation access, Health Insurance, History of Experience for Child basic immunization, Health Protocol Facility, Health Professional Support (Molan, 2020; Buffarini et al., 2020; Kemenkes RI, 2020; Herliana & Douiri, 2017; EB et al., 2016; Nainggolan, 2014; Hu et al., 2014; Waluyanti, 2009). Parity was the amount of maternal history in child birth (Fiandany Erynda et al., 2020). The measuring instrument used was a questionnaire adapted by research Molan (2020), Buffarini et al., (2020), EB et al., (2016), and Hu et al., (2014) with the classification of birth order as follows: first, second, third or more. Family income was the total amount of husband and wife income earned for the type of work done in each month (Fiandany Erynda et al., 2020). The division of categories in family income, based on the Jambi Provincial Minimum Wage (UMP) value of Rp. 2.630.162 (Setiawan, 2021). The measuring instrument used was a questionnaire. The scale of the data was continuous, to facilitate analysis, the data was converted into dichotomous coded 0 = < UMP (<Rp 2.700.000); 1 = > UMP (≥ Rp 2.700.000).

Based on the mother's ease of access to health facilities which consists of two categories, namely (Nainggolan, 2014): 0 = Easy (cars, bicycles, motorbikes, public transportation, and others); 1 = Difficult (walking, bicycle, boat, air transportation, etc.). The questions were adapted from the 2013 RISKESDAS questionnaire on households and individuals. Insurance coverage represented any health insurance provided through social security or local government, by employer, privately purchased or other insurance (Herliana & Douiri, 2017). The measuring instrument used was a questionnaire with the following classification: 1 = Does not have health insurance; 1 = Have health insurance (Herliana & Douiri, 2017; Waluyanti, 2009). Immunization experience is the experience of giving complete basic immunizations to previous children, where children are given immunizations from the age range of 0-9 months (Kemenkes & GAVI, 2015). Previous immunization experience was explored by asking about the completeness of immunization in previous children which was adapted from research (Waluyanti, 2009) with the following categories: 0 = No Experience; 1 = Complete; 2 = Incomplete.

Health protocol facilities are all forms of health protocol facilities that are used to manage each patient and protect patients and health workers from a dangerous environment (Agarwal et al., 2020). This research instrument was compiled based on technical guidelines for services during the COVID-19 pandemic by Kemenkes RI (2020), which consisted of 5 questions. Based on the instrument validity test, all question items were declared valid (r

count > r-table = 0.278) with a cronbach alpha value of 0.676, meaning that the questions in this study were declared reliable. Based on the number of scores, it is classified into 2 categories: 1) Adequate = Score > median; 2) Inadequate = Score < median (Median 5). Health worker support is one of the social supports, in the form of information support related to health behavior (Wau & Razella, 2020). The research instrument used is a modified result of Waluyanti research (2009) and has been modified according to the COVID-19 pandemic situation. The results of the validity and reliability test stated that this item was valid (r count > 0.278) and reliable at an alpha of 0.681. Based on the number of scores, classified into 2 categories: 1) Support = Score > median; 2) Not Supported = Score < median (Median 4).

Potential factors contributes to basic vaccination compliance among mothers, consist of: distance of their living home to the health facility center, perception, attitude, knowledge, and husband support. This study uses a survey questionnaire based on relevant and related studies and literature. Distance of their living home to the health facility center calculated based on the distance to the nearest healthcare facility as the straight-line distance from a household to the healthcare facility, based on geographic coordinates, and this as 4 km categorized or 4 km, according to Le Polain de Waroux et al., (2013) assuming that 5 km would roughly corresponds to an hour's walk. Perception variable consists of a question regarding religious views on immunization, in this study the instrument used is a modification of the research of Rachmawati & Putri (2016). The results of the validity test in the research of Rachmawati & Putri (2016) stated that the item was valid with a calculated r value > r table and cronbach alpha 0.944 (r > 0.444) which stated that this item was reliable. Variables were measured using a Likert scale and classified according to 2 categories: 1) Support = if > median; Not Support = if < median (median 4).

Attitude was the mother's response in the form of a statement of agree or disagree with the delivery of immunizations to her baby (Fiandany Erynda et al., 2020). The research instrument is a modified result of Zuliani research (2016) and the instrument has also been modified to assess the attitude of mothers in carrying out immunizations during the COVID-19 pandemic. Based on the validity test of the instrument, all question items were declared valid (r count > r table = 0.278) with a cronbach alpha value of 0.859, meaning that this instrument was declared reliable. Knowledge instrument aims to measure the extent to which the mother's level of knowledge about immunization is the result of the information received and understood (Fiandany Erynda et al., 2020). The instrument used in this study is the result of a modification from the research of Zuliani (2016) and Matondang (2016). The researcher has also modified the question items by adding questions regarding mother's knowledge regarding immunization service policies during the COVID-19 pandemic. Mother's knowledge about immunization was assessed by giving 20 questions. A score of 1 was given if the mother answered the questions correctly and 0 if not. The average number of each question is calculated and categorized into three groups: 1) Good, if the answer is between 76% - 100%; 2) Enough, if the answer is between 56% - 75%; 3) Less, if the answer is between <56% (Asfaw et al., 2016; Arikunto 2013). Based on the validity test of the instrument, all question items were declared valid (r count > r table = 0.278) with a cronbach alpha value of 0.795, meaning that this instrument was declared reliable.

Husband support is any form of support or assistance provided by husband in providing immunizations to infants (Fiandany Erynda et al., 2020). This research instrument is a modified result of research conducted by Matondang (2016), the researcher has also modified the question item by adding a question regarding husband's support regarding the implementation of immunization during the COVID-19 pandemic. Husband's support is measured by giving a score or weight with the following details: If the type of question is

positive) and the respondent's answer is yes, it is given a weight of 1 and if the answer is not, it is given a weight of 0, on the other hand, if the type of statement is negative and the respondent's answer is yes, it is given a weight of 0. not weighted. The assessments are categorized into three groups: 1) Good, if the answer is between 76% - 100%; 2) Enough, if the answer is between 56% - 75%; 3) Less, if the answer is between <56% (Arikunto 2013).

Data Analysis

A X2 test was used to examine the distributions of participant characteristics and the relationship between factors related to the Basic Vaccination Compliance. Continuous data such as Total number of their children, dan jarak tempuh would be categorized based on the mean if the data was normally distributed. While, if the distribution was not normally distributed, the data would be categorized based on median number. However, since the data of (religion, education, occupation, income, health insurance ownership, previous immunization experience, and means of transportation) were not normally distributed, those data were categorized based on the median as the cut of points [49]. All statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS) vers. 25.0 (Chicago, IL, USA).

Ethical Consideration

The study protocol was reviewed and approved by the Institutional Review Board Ethics Committee (SK-76/UN2.F12.D1.2.1/ETIK 2021) from Faculty of Nursing University Indonesia and conformed to the provisions of the Declaration of Helsinki. Written informed consent was obtained from each participant after they had received both verbal and written information about the research.

RESULTS

From the total of participants, there were significant differences in distributions between mothers who did not complying for basic vaccination and mother who complying for basic vaccination in the total number their children and education (Table 1). As well, significant differences were found in the distributions of perception, attitude, knowledge and husband support (Table 2).

Table 1. Distributions of demographic characteristics between mothers who did not complying for basic vaccination and mother who complying for basic vaccination (N=506).

Characteristic	Did not complying for basic vaccination (N=262) (%)	Complying for basic vaccination (N=244) (%)	p value
Total number of their children			
1	104 (39.70%)	67 (27.50%)	<0.05
2	87 (33.20%)	78 (32%)	
>2	71 (27.10%)	99 (40.60%)	
Religion			
Non moslem	22 (8.40%)	23 (9.40%)	0.75
Moslem	240 (91.60%)	221 (90.60%)	
Educational level			
College	198 (75.60%)	161 (66%)	<0.05

Senior high school or below	64 (24.40%)	83 (34%)	
Health Insurance			
Without health insurance	69 (26.30%)	63 (25.80%)	0.92
With health insurance	193 (73.70%)	181 (74.20%)	
Family income			
< Rp. 2.700.00,-	131 (50%)	118 (48.40%)	0.72
> Rp. 2.700.00,-	131 (50%)	126 (51.60%)	
History of Experience for Child basic immunization			
Without experience	81 (30.90%)	87 (35.70%)	
Did not complying for basic immunization	28 (10.70%)	22 (9.00%)	0.49
Complying for basic immunization	153 (58.40%)	135 (55.30%)	
Health Protocol Facility			
Low	47 (17.90%)	36 (14.80%)	0.34
Good	215 (82.10%)	208 (85.20%)	
Health Professional Support			
Low	74 (28.20%)	59 (24.20%)	0.31
Good	188 (71.80%)	185 (75.80%)	
Transportation			
Difficult to access	11 (4.20%)	7 (2.90%)	0.47
Easily accessed	251 (95.80%)	237 (97.10%)	

Note. X2 test was used to compare between groups.

Table 2. Distributions of potential risk factors contributes to basic vaccination compliance among mothers (N=506).

Characteristic	Did not complying for basic vaccination (N=262) (%)	Complying for basic vaccination (N=244) (%)	p value
Distance			
> 4km	59 (22.50%)	36 (14.80%)	<0.05
< 4km	203 (77.50%)	208 (85.20%)	
Perception			
Do not support basic vaccination compliance	96 (36.60%)	60 (24.60%)	<0.01
Support basic vaccination compliance	166 (63.40%)	184 (75.40%)	
Knowledge			
Low	95 (36.30%)	43 (17.60%)	<0.01
Good	167 (63.70%)	201 (82.40%)	
Attitude			
Not Good	119 (45.40%)	85 (34.80%)	<0.01
Good	143 (54.60%)	159 (65.20%)	

Husband Support			
Low	168 (64.10%)	121 (49.60%)	<0.01
Good	94 (35.90%)	123 (50.40%)	

DISCUSSION

This study concludes that mothers who lives with the distance of < 4km to health facility were had a positive relationship with the complying for basic vaccination with p value < 0.05. In this study, the result showed that distance to the public health facility to get the vaccination site was probably negatively associated with on-time full vaccination. This finding is consistent with studies in Burkina Faso, China, Ethiopia, and Tanzania (Mekonnen et al., 2020; Hu et al., 2014; Le Polain de Waroux et al., 2013). Thus, this further strengthened the argument that the time spent to reach the vaccination site expenses a high opportunity cost to caregivers by creating the need for multiple visits (Mekonnen et al., 2020). Distance also had a strong effect on timely HB-0 and BCG vaccination, where children born in the urban area were significantly more likely to be vaccinated on time. This is most likely explained by the fact that many children in the urban setting were born in health facilities, therefore vaccinations such as HB-0 and BCG-Polio 1 will be given immediately after birth (Hu et al., 2014).

This study concludes that mothers who had the perception to support basic vaccination were complying for basic vaccination with p value < 0.01. The results of this study are related to the research of R. S. Putri (2016) and Hudhah & Hidajah (2018) which stated that there was a significant relationship between perceptions of immunization reception according to the mother's beliefs and maternal compliance in giving immunizations to toddlers (p = 0.002). The influence in the results of this study was due to the fact that most of the respondents believed that immunization had a good impact on children and the beliefs held to provide support for immunization (Hudhah & Hidajah, 2018). Parents who have anxiety about post-immunization events tend to refuse to get immunizations (Sriatmi et al., 2019). Similar results were also found in a survey conducted by the Kementerian Agama RI (2021) which showed that public confidence in vaccine safety, effectiveness, and side effects (66.13%) were the determining factors for compliance with the national vaccine program and perceived acceptance factors. Immunization based on belief does not affect vaccination adherence.

This study concludes that mothers who had good knowledge of vaccination were had a positive relationship with the complying for basic vaccination with p value < 0.01 compared to mother who had low level of knowledge of vaccination. This is in line with the research of Dewi Lisencia Fitri et al., (2018), the results of this study indicate that there is a relationship between the level of knowledge and the completeness of pentavalent immunization. This is in accordance with research conducted by Albertina & Febriana (2016) in Jakarta, Latifah (2014) in Tegal, Luthfi (2014) in Boyolali, Nurbaya (2014) in Kabupaten Pangkep, and Wijaya et al., (2013) in Jakarta, which states that there is a relationship between the level of knowledge and completeness of immunization. The results of this study are also in line with research conducted by Kiptoo (2015) which states that poor knowledge of immunization schedules significantly causes low immunization coverage in children aged 12-23 months (OR = 9.04; 95% CI = 1.37 to 7.87; p = 0) and research Smith et al. (2017) which states that one of the factors that influence immunization coverage is vaccine knowledge. The reason parents do not give vaccines is because they have the wrong knowledge about the vaccination schedule, lack of knowledge about vaccines or where to get it, believe that the previous vaccine dosage is still effective and feel just one vaccine

dose is enough. This study concludes that mother's knowledge can influence their beliefs so that mothers will behave in accordance with their beliefs. Good knowledge about basic immunization is expected to increase the awareness of mothers on the importance of giving basic immunizations in full to their children (Erynda et al., 2020).

This study concludes that mothers who had good attitude toward vaccination were had a positive relationship also with the complying for basic vaccination with p value < 0.01 compared to mother who had bad attitude toward vaccination. This is consistent with a study conducted by Dewi Lisencia Fitri et al., (2018) di Cipondoh, Wijaya et al (2013) in Jakarta, Hartatik et al (2013) di Tulangagung, Emilya in Padang (2017), and Hudhah & Hidajah (2018) in Jawa Timur also stated that there was a relationship between maternal attitude with the completeness of basic immunization. The results of this study are also in line with Erynda et al., research (2020) which states that parents who have a negative attitude about immunization are 1.92 times more likely to not provide complete basic immunization to their babies than mothers who have a positive attitude. The researcher analyzed that the mother's attitude towards immunization was influenced by the high level of knowledge, husband's support, and perceptions of immunization reception according to the mother's religion. According to Adhayani Arda et al., (2018) and Erynda et al., (2020) factors that influence respondents to have a negative attitude towards immunization are the mother's lack of knowledge about immunization, the less mother's knowledge about immunization, the greater the impact on the formation of a negative mother's attitude about immunization. A person's attitude is influenced by the knowledge he has, where the higher the level of knowledge a person has of a thing, the better the attitude he has of it (Hudhah & Hidajah, 2018). Alport's theory also states that the formation of a person's attitude is influenced by 3 main components, namely beliefs or perceptions of certain concepts, emotional life or one's evaluation of objects, and the tendency to act (Notoatmodjo, 2014), so that a person's attitude cannot stand alone in influencing compliance behavior. , there are other factors that support the occurrence of attitudes, one of which is the belief or perception factor (Hudhah & Hidajah, 2018). As the results in this study which states that mothers who have a perception of receiving immunization significantly support maternal compliance. In addition, attitudes can be influenced by personal experience factors, the influence of others who are considered important, the influence of culture, mass media, religious institutions and emotional factors (Erynda et al., 2020).

This study concludes that mothers who were supported by their husband were significantly with p value < 0.01 positively related with the complying for basic vaccination. This is in line with research conducted by Erynda et al., (2020), Senewe et al., (2017), and Arista & Hozana (2016) which state that there is a relationship between husband's support and a history of giving basic immunizations to infants. Husband's support is an important factor in healthy behavior. Husbands who believe in the benefits of immunization for their babies will support their wives to make optimal use of health services. Husband's support can be in the form of providing information to mothers about immunization, accompanying mothers to immunize their babies, and helping mothers take care of babies after getting immunizations (Senewe et al., 2017). The results of this study concluded that if the husband supports the mother in providing complete immunization for her baby, then the mother tends to have positive attitudes and behaviors in providing complete immunization for her baby. On the other hand, if the husband does not provide support, it will be difficult for a mother to fully immunize her baby (Erynda et al., 2020). This is supported by the theory put forward by Soekidjo Notoatmodjo which states that to realize an attitude into a real action, it is necessary to have supporting factors that come from the family, one of which is the husband's support (Igiyany, 2020). The support of a husband will facilitate mothers in changes

in behavior, including compliance in implementing the basic immunization (Jayanti et al., 2017).

CONCLUSION

The results of data analysis showed that the variables related to maternal compliance in basic immunization were perceptions of immunization reception, attitudes, knowledge, husband's support with p value < 0.01 , and distance with p value < 0.05 . Increasing mother's knowledge indirectly has an positive impact on the formation of attitudes and perceptions of mothers towards immunization reception. Therefore, researchers suggest that the strengthening of mother's knowledge continues to be carried out, both in the form of health education activities at the family and community levels. In addition, ensuring that all health service providers open immunization services during the COVID-19 pandemic can also increase immunization coverage rates, especially in posyandu services while still involving husband's support in its implementation.

This study has several limitations by using a case-control research design, making it difficult to produce a causal relationship between predictors and outcome variables. This study did not analyze the relationship factors related to maternal characteristics, such as age, education level, occupation, history of childbirth (antenatal care, birth attendant, health facilities used, etc.) all of which may affect immunization compliance. However, the possibility of information bias on maternal compliance did not occur, because the researchers directly observed and documented the child's immunization records listed in the KMS or KIA books. Analysis with predictive models is highly recommended to determine the odd-ratios and adjusted odd-ratios between factors related to the complying for basic vaccination.

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CONFLICTS OF INTEREST

The authors declare that there is no conflict of interest.

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