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Determinants of Maternal Behavior in Measles Prevention in Children Aged Toddlers in Banda Aceh City 2023

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ABSTRACT

Introduction: Measles or Measles Rubella (MR) is an infectious disease caused by a virus and is easily transmitted. Measles cases at the Lampaseh Health Center always increase every year. In 2022, the most measles cases reached 70 cases and in 2023 measles cases at the Lampaseh Health Center reached 23 cases.

Objective: This study aims to identify determinants of maternal behavior in the prevention of measles in children aged toddlers (1-5 years) in the working area of the Lampaseh Health Center.

Method: This study used analytical observational method with a cross-sectional approach. The population in this study is mothers registered in the posyandu registration book in six villages in the working area of the Lampaseh Health Center. Sampling with a simple random sampling technique amounted to 90 mothers who had toddlers. Data collection was conducted by interviews using questionnaires. Data analysis using chi-square test and logistic regression test using SPSS 22 program.

Result: The results of the study based on univariate analysis showed mothers who had good behavior in measles prevention 60.0%, the highest education category was the middle category 56.7%, mothers the most as IRT 62.2%, families with high income 55.6%, mothers who had information sources 73.3%, mothers whose families were less supportive 51.1% and mothers with health workers played a role 55.6%. The results of bivariate analysis showed that there was a relationship between education levels (P-Value = 0.039), family income (P-Value = 0.009), information sources (P-Value = 0.001), family support (P-Value = 0.001) and the role of health workers (P-Value = 0.001) with maternal behavior in measles prevention in children under five years old. Multivariate test results obtained that family support (P-Value = 0.001; OR = 10.206) and the role of health workers (P-Value = 0.005; OR = 5.942).

Conclusion: There is a relationship between maternal education, family income, sources of information, family support and the role of health workers and maternal behavior in measles prevention in children under five years old.

Keywords: Maternal Behavior; Measles Prevention; Family Support; The Role of Health Workers

INTRODUCTION

An Extraordinary Event, abbreviated as KLB, is illness or death that is epidemiologically significant or increases in an area over a certain period of time and is a situation that can cause an outbreak. According to the regulations of the Ministry of the Republic of Indonesia (2008), a minimum of two positive detections a measles IgM sample means there is a measles epidemic in the area. It is determined that an area is called an outbreak if there are at least 2 cases of measles in that area that have been laboratory confirmed and these cases have an epidemiological relationship (1). Through *The Expanded Program on Immunization* (EPI), WHO has set a goal to reduce measles cases by 90.5% by 2015 and deaths by 95.5%. Measles remains a global threat with outbreaks in five of the six WHO regions (2).

The number of reported measles cases increased exponentially in 2017 due to severe and prolonged outbreaks in many countries. Measles outbreaks across WHO regions were caused by gaps in vaccination coverage and resulted in 110,000 measles-related deaths (3). According to data (CDC, 2023), the country with the most measles outbreaks in first place is India with 36,154 measles cases. Indonesia is in eighth place with 4,182 measles cases. In Indonesia, in 2021 there were 2,931 suspected cases of measles occurring in Central Java (493 cases), DKI Jakarta (489 cases) and East Java (366 cases). The highest number of suspected measles cases was in the age group over 14 years, 29.3%, in the 1–4-year age group, 26.7%, while in the 10–14-year age group, 10.8%.

The number of cases will increase by 3,341 cases in 2022, in 12 provinces classifying measles cases as Extraordinary Events (KLB), namely, Aceh, West Sumatra, North Sumatra, Riau, Jambi, Banten, West Java, Central Java, East Java, North Kalimantan, East Nusa Tenggara and Papua (4). Aceh Province had a total of 270 measles cases in 2020, a decrease compared to 2,986 cases in 2019. According to Regency/City, the highest number of suspected measles cases were in Nagan Raya (56 cases), Bireuen (35 cases), Lhokseumawe (34 cases) and East Aceh (30 cases). Banda Aceh had 15 suspected measles cases. The number of suspected measles cases in 2021 decreased by 62 cases with an *Incidence Rate* (IR) of suspected measles in Aceh of 1 per 100,000 population. The decline in measles cases in 2021 was due to the Covid-19 pandemic (5,6). Suspected cases of measles in Aceh in 2022 will reach 941 cases, the discovery of uncertain cases in several areas can be said to be an outbreak. In 2022, the percentage of measles immunization coverage for children under five will only be 38.19% or far from the national average.

The working area of the Lampaseh City Community Health Center is one of the community health centers that has the highest number of suspected measles cases compared to other community health centers in Banda Aceh City. There will be an increase in measles cases in 2022 with 80 suspected measles cases at the Lampaseh City Health Center. In 2023, from January to early October, there will be 23 confirmed cases of suspected measles. The Indonesian government has initiated various programs to prevent measles. The immunization program is one of the efforts made to reduce morbidity and mortality due to measles. One effort to reduce cases of measles is by providing measles immunization. Breaking the chain of transmission of measles and *rubella* requires immunization coverage of at least 95%.

METHOD

This research is a quantitative research with observational analytical methods with a cross-sectional design. The population in this study is all mothers who have toddlers who are registered at the Lampaseh Community Health Center during 2023. The population in this study is 929 mothers who have toddlers with sample calculations using the Slovin formula to become 90 samples. Sampling for each village used the Proportional Random Sampling formula calculation which was divided into six villages in the working area of the Lampaseh Community Health Center. The independent determinants in this study are maternal education, family income, information sources, family support and the role of health workers. Data collection was carried out by researchers interacting directly with research respondents using a questionnaire that had been adapted from previous studies. SPSS software was used to perform data analysis. In the first stage, univariate analysis was used to see the frequency and percentage of each variable in the study. The second stage of bivariate analysis to determine the relationship between the dependent variable and the independent variable uses the chi-square statistical test with a confidence level of 95% and a significance level (α) of 0.05. In the third stage, a multivariate analysis was carried out which aims to determine variables that have a very significant relationship and have an influence on the dependent variable using a multiple logistic regression test.

RESULTS

Univariate Analysis

Tabel 1. Distribution of Respondents Based on Independent Research Variables (N=90)

Variable	Frequency (n)	Percentage (%)
Mother's Behavior		
Perilaku Kurang	36	40,0
Perilaku Baik	54	60,0
Mother's Education		
Dasar	13	14,4
Menengah	51	56,7
Tinggi	26	28,9
Family Income		
Rendah	40	44,4
Tinggi	50	55,6
Resources		
Tidak Ada Informasi	24	26,7
Ada Informasi	66	73,3
Family Support		
Kurang Mendukung	46	51,1
Mendukung	44	48,9
Role of Health Workers		
Kurang Berperan	40	44,4
Berperan	50	55,6

Based on the table, it shows that 54 (60.0%) mothers had good behavior, while 36 (40.0%) mothers had poor behavior. Most of the mothers were at secondary education level, 51 people (56.7%), while at least 13 people were at primary education level (14.4%) and mothers at higher education level were 26 people (28.9%). There were 50 mothers who had high family incomes (55.6%), while there were 40 mothers with low family incomes (44.4%). A total of 66 mothers (73.3%) had information on measles, while 24 mothers (26.7%) had no information. Mothers with less supportive families were 46 people (51.1%), while mothers with supportive families were 44 people (48.9%). A total of 50 mothers (55.6%) had a role as health workers, while 40 mothers (44.4%) had less role as health workers.

Bivariate Analysis

Tabel 2. Results of bivariate tests examining the relationship between each independent variable and the dependent variable of the study

Variabel	Maternal Behavior in Measles Prevention						P value (95% CI)
	Poor Behavior		Good Behavior		Total		
	n	%	n	%	n	%	
Mother's Education							
Dasar	9	69,2	4	30,8	13	100	0,039
Menengah	20	39,2	31	60,8	51	100	
Tinggi	7	26,7	19	73,1	26	100	
Family Income							
Rendah	22	55,0	18	45,0	50	100	0,009
Tinggi	14	28,0	36	72,0	40	100	
Resources							
Tidak Ada Informasi	19	79,2	5	20,8	24	100	0,001
Ada Informasi	17	25,8	49	74,2	66	100	
Family Support							
Kurang Mendukung	31	67,4	15	32,6	46	100	0,001
Mendukung	5	11,4	39	88,6	44	100	

Role of Health Workers							
Kurang Berperan	28	70,0	12	30,0	40	100	0,001
Berperan	8	16,0	42	84,0	50	100	

The statistical table shows that 69.2% of respondents with basic education had poor behavior in preventing measles, compared to 30.8% of respondents with basic education who had good behavior. 39.2% of respondents with secondary education had poor behavior, compared to 60.8% of respondents with secondary education who had good behavior. 26.7% of highly educated respondents had poor behavior, compared to 73.1% of highly educated respondents who had good behavior in preventing measles. The results of statistical tests using the Chi-square test obtained a *p-value* of $0.039 < \alpha 0.05$.

Mothers with low family income of 55.0% had poor behavior in preventing measles, compared to mothers with low family income of 45.0% who had good behavior in preventing measles. Respondents with high incomes were 28.0% who had less good behavior, compared to respondents with high incomes, namely 72.0% who had good behavior in preventing measles. The results of the Chi-square statistical test obtained a *p-value* of $0.009 < \alpha 0.05$.

The information source variable shows that 79.2% of respondents who had no information had poor behavior in preventing measles, compared to 20.8% of respondents who had no information who had good behavior. 25.8% of respondents with information had poor behavior, compared to 74.2% of respondents with information had good behavior in preventing measles in children under five. The results of the Chi-square statistical test obtained a *p-value* of $0.001 < \alpha 0.05$.

The level of respondents who have family support shows that 67.4% of their families are less supportive and have poor behavior in preventing measles, compared to 32.6% of less supportive family respondents who have good behavior. In the category of respondents with supportive families, 11.4% had poor behavior, compared to respondents with supportive families, 88.6% had good behavior. The Chi-square test results obtained a *p-value* of $0.001 < \alpha 0.05$.

The level of role of health workers shows that respondents who lack the role of health workers by 70.0% have poor behavior in preventing measles, compared to respondents whose health workers play less of a role, 30.0% have good behavior. In the category of respondents with the role of health workers, 16.0% had poor behavior, compared to respondents with the role of health workers, 84.0% had good behavior in preventing measles in children under five. The results of the Chi-square statistical test showed a *p-value* of $0.001 < \alpha 0.05$.

Multivariate Analysis

Tabel 3. Results of Multivariate Analysis of Logistic Regression Test

Variable	<i>P value</i>	OR	95% (CI)
Mother's Education			
Higher education	0,264	-	-
Middle education	0,179	0,243	0,031-1,914
Basic education	0,106	0,223	0,036-1,378
Family Income	0,738	1,241	0,351-4,390
Resources	0,130	2,922	0,730-11,689
Family Support	0,001	10,206	2,674-38,959
Role of Health Workers	0,005	5,942	1,736-20,334

Based on the table, it shows that the variables that have a *p-value* > 0.05 are maternal education, family income and sources of information. The results of multivariate analysis using the logistic regression test show that there are two variables that have a *p-value* < 0.05 , which means that these two variables have a significant relationship with the dependent variable. The family support variable has the most significant relationship with maternal behavior in preventing measles in children under five with values (*P-Value* = 0.001) and (OR = 10.206). This value shows that respondents who lack family support are 10 times more likely have poor behavior in preventing measles in children, compared to respondents with supportive families who have good behavior. The variable role of health workers has a significant relationship with maternal behavior in preventing measles, showing results with value (*P-Value* = 0.005) and value (OR = 5.942). This value shows that respondents who lack the role of health workers are 5 times more likely to have poor behavior in preventing measles in children under five compared to respondents who have the role of health workers.

DISCUSSION

Maternal Education and Maternal Behavior in Preventing Measles in Toddlers (1-5 Years)

The level of education has a significant influence on a person, because an educated person will more easily accept his own input and actions. Education is an important field related to a person's knowledge to search for information, solve problems and shape a person's behavior. Positive behavior towards disease prevention is based on knowledge and attitudes received through better education. Mothers with higher education and secondary education are more likely to behave to prevent measles. Mothers with low education are less likely to prevent measles in children due to lack of knowledge and utilization of health services to maintain children's health (8).

This research is in line with previous research conducted by Yuliani (2019) entitled Several Factors that Influence Measles Rubella (MR) Immunization Coverage in Babies Aged 9-24 Months. The chi-square test results showed a *p-value* of $0.021 < 0.05$ with an OR = 2.200, which means there is a relationship between maternal education and measles-rubella immunization (9). This research is also supported by research conducted by Teti and Jannah (2021) with a *p-value* = $0.031 < 0.05$ and an OR value = 10.125 that there is a relationship between maternal education and measles immunization behavior (10). This is different from the results of Uswatun and Daramusseng's (2020) research entitled The Relationship between Mother's Education and Knowledge Level and the Risk of Measles Incidents in Toddlers in the Palaran Community Health Center Working Area. The statistical test results show that the *p-value* = $0.914 > 0.05$ means there is no relationship between the mother's education level and the risk of measles (PR=0.872; 95% CI=0.409-1.859) PR value < 1 means the mother's education level is not a risk factor but rather a protective factor (12).

Family Income and Mother's Behavior in Preventing Measles in Toddlers (1-5 Years)

Families with high incomes face greater financial burdens than low-income households and this is related to behavior. Communities with a higher economic level tend to pay more attention to health factors so they are willing to spend more on health service costs. This is different from low-income people who are less concerned about health problems, due to limited costs, distance to health facilities and lack of knowledge in treating disease (14).

This research is supported by research conducted by Ulfah et al (2027) entitled Factors Associated with the Incidence of Measles in Toddlers in East Bekasi District. The *p-value* obtained = $0.001 < 0.05$, which means there is a relationship between family income and the incidence of measles in East Bekasi District (15). The results of research conducted by Gahara et al (2015) with a *p-value* = $0.000 < 0.05$, which means there is a relationship between economic status and the completeness of mandatory immunization for children aged 1 year at the Kampung Sawah Community Health Center (16). In contrast to the results of research conducted by Isnayni (2017), the *p-value* = $0.725 > 0.05$, which means there is no relationship between family income and basic immunization status (18).

Sources of Information on Mother's Behavior in Preventing Measles in Toddlers (1-5 Years)

Factors that support or facilitate behavior are facilities and infrastructure, sources of information and facilities that enable health behavior such as health centers, posyandu and hospitals. Media is a means of accessing information and has a strong influence on disease prevention behavior (21). Technological developments encourage mothers to make more use of social media in seeking information about health. This is also the result of research that some mothers also get information from social media. Mothers who receive information tend to carry out more behaviors to prevent measles in children than mothers who do not receive information.

This research is supported by previous research conducted by Siregar et al (2021) with statistical results *p-value* = $0.000 < 0.05$, there is a significant relationship between the mother's source of information about MR immunization and MR immunization coverage in Simpang Tiga Pekan Village (22). This is also supported by research conducted by Andrelia et al (2022) showed a *p-value* = $0.032 < 0.05$, there was a significant relationship between the source of information and maternal behavior in providing measles immunization to toddlers at the Sungai Riam Community Health Center (23). Other research related to information sources carried out by Subli et al (2020) obtained a *p-value* = 0.000 . This shows that there is a relationship between the source of information and the measles immunization status of toddlers at the Community Health Center (24). In contrast to the results of Yunola and Sari's (2021) research "The Relationship between Knowledge and Information Sources and Providing Measles Rubella Immunization" which is inconsistent, showing the results of a *p-value* = $0.138 > 0.05$, which means there is no significant relationship between sources of information and Measles Rubella immunization. Researchers are of the opinion that the source of information does not influence the completeness of immunization, because the media or tools used to convey information are not necessarily accepted and implemented by the recipient of the information (25).

Family Support with Mother's Behavior in Preventing Measles in Toddlers (1-5 Years)

Family members play a role in disseminating information, guidance, suggestions, advice and input. Family support includes encouragement and supervision regarding daily living habits and treatment. Family involvement is very necessary to prevent health problems in children. Human support is a form of care and affection that makes individuals feel comfortable, safe and respected. The majority of mothers get family support, especially husbands, to provide measles immunization and other prevention measures for measles such as vitamin A at the posyandu. Some mothers also do not prevent measles in their children due to the support of their husbands who do not allow mothers to immunize their children and lack of knowledge or information about measles prevention (26).

This research is supported by previous research conducted by Andrelia et al (2022), there is a relationship between family support and maternal behavior in providing measles immunization to toddlers at the Riam Health Center, with a $p\text{-value} = 0.001 < 0.05$ (23). Other research related to family support conducted by Lestari and Siyam (2023) stated that there was a relationship between family support and Measles Immunization Status (MR1) during the Covid-19 Pandemic, with a $P\text{-value} = 0.001 < 0.05$ (27). In research conducted by Lisni et al (2023) obtained statistical results with a $p\text{-value} = 0.000 < 0.05$, which means there is a relationship between family support and community behavior towards measles immunization during the Covid-19 pandemic at the Bayu Community Health Center (11). In contrast to the results of research by Billa (2023), which were inconsistent, the statistical test results showed $p\text{-value} = 0.413 > 0.05$, which means there is no relationship between husband's support and measles immunization in children under five in Naikolan Village (19).

The Role of Health Workers and Maternal Behavior in Preventing Measles in Children Under Five (1-5 Years)

Health workers provide mothers with comprehensive knowledge, understanding and information about measles prevention, especially measles vaccination. Health workers are used as a place to ask questions and provide input regarding the use of health services. Health Workers are responsible for providing specialized services to individuals and communities that impact the health status of the community. The quality of health services is influenced by the attractiveness of health workers providing services, which ultimately increases maternal satisfaction. If the service received is in line with expectations, then the quality of service is considered good and satisfactory. Conversely, if the expected service does not meet expectations, then the quality of the service is considered low. Mothers who receive the role of health workers will carry out more measles prevention behavior in their children based on the knowledge they get from the officers. In contrast, mothers who lack the role of health workers are less likely to prevent measles in children and receive less information about health (29).

This research is supported by previous research conducted by Greece et al (2023) with statistical results $p\text{-value} = 0.000 < 0.05$, which means there is a relationship between the role of health workers and the provision of rubella immunization at the Posyandu in Bagelan Village (30). Research conducted by Sari (2022) also found a relationship between the role of health workers and the provision of measles immunization, with statistical results $p\text{-value} = 0.001 < 0.05$ at the Gelumbang Community Health Center in 2022 (31). This is also supported by research conducted by Sari et al (2022) obtained a $p\text{-value} = 0.001 < 0.05$, which means there is a relationship between the role of officers and the provision of measles-Rubella booster immunization at the Pagar Gunung Community Health Center (32). Different from research results Fitriani et al (2021), which is inconsistent, shows a statistical test result of $p\text{-value} = 0.092 > 0.05$, which means there is no relationship between the role of health workers and the provision of continued Measles Rubella immunization for toddlers aged 18 months to 2 years (33).

CONCLUSION

This research concludes that there is a relationship between maternal education, family income, sources of information, family support and the role of health workers with maternal behavior in preventing measles in children in the Lampaseh Community Health Center UPTD working area. The results of the multivariate analysis showed that family support variables and the role of health workers were the most significant determinants of maternal behavior in preventing measles in children under five (1-5 years) in the working area of the Lampaseh Community Health Center UPTD.

SUGGESTION

This research recommends that KIE and immunization department health center officers be more active in providing health promotion through information media to increase mothers' knowledge about measles and its prevention. Community health center officers can also provide training to cadres in each village to carry out activities that support increased immunization in the community.

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