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The Influencing Risk Factors of Measles in Bantul Regency

Anik Susilowati ✉, Yuni Wijayanti, I Made Sudana

Universitas Negeri Semarang, Indonesia

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Abstract

Measles is the cause infant and child deaths that occur in developing countries, WHO states that measles cases are reported to have increased by 300% in the first month of 2019 compared to 2018. Africa is the most significant increase of 70% in the world. Ukraine, Madagascar and India are the worst affected countries, with tens of thousands of cases registered for every million of its population. Since September, at least 800 people have died from measles in Madagascar . The purpose of this study was to analyze the risk factors that influence the incidence of measles in infants. This research was a quantitative research, with a Case Control Study approach. The research sample consisted of 122 respondents with Purposive Sampling. Data analysis used univariate, bivariate and multivariate analysis using multiple linear regression. The results showed that knowledge (p = 0.003), nutritional status (p = 0,000), parenting (p = 0.029) and behavior influenced the incidence of measles in infants (p = 0.034). Furthermore, multivariate analysis showed that the risk factors for measles in infants were knowledge, nutritional status, parenting and behavior. The community is expected to improve parenting and healthy behavior, especially related to factors that can prevent measles in an effort to increase prevention of comprehensive diseases

✉address:
Kampus Unnes Jl Kelud Utara III, Semarang, 50237, Indonesia
E-mail: aniksusilowati0401@gmail.com

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INTRODUCTION

Measles is still the cause of infant and child deaths that occur in developing countries in contrast with industrialized countries that have advanced. WHO states that measles cases are reported to have increased by 300% in the first month of 2019 compared to 2018. Africa experienced the most significant increase of 70%. Ukraine, Madagascar and India are the worst affected countries, with tens of thousands of cases registered for every million of its population. Since September, at least 800 people have died from measles in Madagascar (WH0, 2019). Measles that occurs to people who have never been attacked before will generally cause a lot of deaths. Measles outbreaks in high immunization coverage countries in China in the city of Xiaoshan were found cases of measles outbreaks of 11 cases, the main cause being nosocomial infections (Wang F-J et al., 2014).

In Indonesia, it was reported that there were 12,681 cases of measles, with the number of cases killed as many as 1 case (CFR 0.01%) in 2016. Measles Insidence Rate (IR) in 2016 was 5.0 per 100,000 populations, an increase compared to 2015 which was 3.20 per 100,000 populations. The biggest cases of measles occur in the age group of 1-4 years old and 5-9 years old, each of which is 3,223 cases and 4,013 cases (Ministry of Health, 2017).

Measles outbreaks occur in children who are vulnerable to conditions of poor nutrition and weak immune system. Measles can cause a decrease in endurance so people with measles are easily exposed to secondary infections or complications such as broncopneumonia (75.2%), gastroenteritis (7.1%), encephalitis (6.7%) and others (7.9%) (Sumarmo, 2008).

Data from Yogyakarta Health Office surveillance field shows that measles is still a health problem with 32% Insidence Rate (IR). In 2017 (January-June), there were 412 cases of measles with children aged 1-4 years as many as 110 cases with positive laboratory results spread in 4 districts. (Yogyakarta Health Office, 2016)

Based on data from measles report in Bantul Regency Health Office in 2015, it contributed to the case of routine measles Case Based Measles Surveillance (CBMS). From 551 cases, there were 54 cases of positive measles. This number has increased in 2016 amounting to 124 cases with the highest number of cases in Banguntapan II Health Center with a total of 16 cases of measles (Bantul Health Office, 2017). In 2017 measles in Bantul Regency experienced an increase with 138 cases of positive measles (Bantul Dinkes, 2018).

The findings of Toure *et al*. (2014) study stated that knowledge factors are one of the factors that influence the occurrence of measles in infants. The study conducted by Casaeri (2002) stated that the risk of children who have poor nutritional status for measles is 4.6 times compared to children with good nutritional status.

According to Cairns *et al.,* (2010), poor nutritional status is considered to be associated with an increase in measles Case Fatality Rate (CFR). From the results of monitoring the nutritional status of toddlers in Bantul Regency in 2017, it was reported that there were 40 under-five malnourished children (Weight/ Height) and the prevalence of malnourished toddlers was 0.41%.

Research conducted by Ariyanto (2018), states that lack of parenting understanding is a risk factor for measles. Toddlers who have poor parenting styles have a risk 3 times more likely to develop measles than good mother care. The pattern of parenting is the attitude of the behavior of mother or other caregivers in

terms of their proximity to children, feeding, caring, cleanliness, giving love and so on (Soekirman, 2000).

According to Bernadetta (2016), it stated that the actions of mothers in facing measles are not in accordance with the knowledge and attitudes in handling measles. The behavior of parents in preventing, caring for and seeking treatment for measles has an influence on the occurrence of measles.

The gap between immunization coverage and the incidence of measles shows that efforts to prevent measles are still not optimal. The case of measles with the potential for outbreaks encourages researchers to study further because there are unknown host factors and environment risk factor in the incidence of measles of infants in Bantul district.

METHOD

This study used a quantitative approach with observational analytic research and case control study design. The population in this study were all children aged <5 years suffering from measles and not suffering from measles. The sampling technique in this study used purposive sampling. The sample amounted to 122 respondents who were divided into groups of cases 61 respondents and the control group amounted to 61 respondents. Data analysis used univariate, bivariate and multivariate analysis (multiple linear regression).

RESULT AND DISCUSS

This research was conducted in September - October 2018 in Bantul Yogyakarta with the aim of analyzing the risk factors of knowledge, nutritional status, parenting and behaviour of parents towards the incidence of measles in infants using a questionnaire.

Table 1. Analysis of frequency distribution and characteristics of respondents.

Characteristic	Cases		Control		Total	
	n	%	N	%	n	%
Sex						
Male	9	14.8	6	9.8	15	12.3
Female	52	85.2	55	90.2	107	87.7
Age						
<= 2 y.o	33	54.1	29	47.5	62	50.8
2 -5 y.o	28	45.9	32	52.5	60	49.2
Education						
Elementary school	3	4.9	8	13.1	11	9.0
Secondary school	12	19.7	10	16.4	22	18.0
High School	35	57.4	34	55.7	69	56.6
Higher Education	11	18	9	14.8	20	16.4
Occupation						
Entepreneur	9	14.8	3	4.9	12	9.8
Employee	17	27.8	9	14.8	26	21.3
Housewife	35	57.4	46	75.4	81	66.4
Teacher	0	0	3	4.9	3	2.5

Based on the table above, it can be seen that the highest proportion of both the case group and the control group are 52 cases (85.2%) and 55 respondents (90.2%) respectively. Age distribution was seen in the case group <= 2 years as many as 33 respondents (54.1%) while in the control group are 32 (52.5%) with approximate aged 2-5 years. The proportion of respondents based on education, both the case group and the control group, appeared to have the highest level of education at the high school level, respectively, in cases of 35 (57.4%) and controls 34 (55.7). The distribution of respondents based on work shows that both the case and control groups showed that most of the work as housewives were involved in the research in each case group by 35 (57.4%) and the control group 46 (75.4%)

Table. 2. Distribution of Respondents Based on Knowledge, Nutritional Status, Parenting and Behavior Against the Occurrence of Measles.

Characteristic	Cases		Control		Total	
	n	%	N	%	n	%
Knowledge						
Poor	23	37.7	2	3.3	25	20.5
Average	25	41	13	21.3	38	31.1
Good	13	21.3	46	75.4	59	48.4
Nutritional Status						
Poor	6	9.8	0	0	6	4.9
Average	44	72.1	10	16.4	54	44.3
Good	11	18	51	83.6	62	50.8
Parenting Style						
Poor	45	73.8	15	24.6	60	49.2
Average	1	1.6	3	4.9	4	3.3
Good	15	24.6	43	70.5	58	47.5
Behaviour						
Poor	51	83.6	9	14.8	60	49.2
Average	3	4.9	4	6.6	7	5.7
Good	7	11.5	48	78.7	55	45.1

Based on the table above it appears that in the case group of respondents with enough knowledge (41%) is the most while in the control group responsive with good knowledge (75.4%) are most involved in the study. In the nutritional status variable, it was seen that respondents with sufficient nutritional status in the case group were mostly involved, namely 44 respondents (72.1%) while in the control group 51 respondents (83.6%) had good nutritional status. Based on the table above, it can be seen that the respondents in the control group had the most inadequate upbringing of 73.8%, whereas in the control group the most influencing factors were good parenting 78.7%. In the behavioral variable in the case group, there were respondents with 83.6% bad behavior at most. Whereas, in the control group, respondents with good behavior 78.7% were most involved in this study.

Bivariate Analysis

This analysis was used to determine the effect of knowledge, nutritional status, parenting and behavior on the incidence of measles.

Tabel 3. *Chi Square* results of risk factors for the incidence of measles

Variable	Measles Incidence (Y)						
	Positive		Negative		Total		*sig.*
	n	%	n	%	n	%	
Knowledge (X1)							0.000
Poor	23	92.0	2	8.0	25	100.0	
Average	25	65.8	13	34.2	38	100.0	
Good	13	22.0	46	78.0	59	100.0	
Nutritional Status (X2)							
Poor	6	9.8	0	0	6	100.0	0.000
Average	44	72.1	10	16.4	54	100.0	
Good	11	18	51	83.6	62	100.0	
Parenting Style (X3)							
Poor	45	73.8	15	24.6	60	100.0	0.000
Average	1	1.6	3	4.9	4	100.0	
Good	15	24.6	43	70.5	58	100.0	
Behaviour (X4)							
Poor	51	83.6	9	14.8	60	100.0	0.000
Average	3	4.9	4	6.6	7	100.0	
Good	7	11.5	48	78.7	55	100.0	

Based on the bivariate analysis in the table above, the knowledge obtained *p* value of 0.000> 0.05 it means that there is a statistical influence between knowledge of the incidence of measles in infants. In the nutritional status variable *p* value is 0.000> 0.05, it means that there is a statistical influence between nutritional status on the incidence of measles in infants. In parenting, the *p* value is 0.000 <0.05, it means that there is an influence between parenting and the incidence of measles in toddlers.

The results of behavioral statistics obtained a *p* value of 0.000 <0.05 means that there is an influence between the behavior of the incidence of measles in infants.

Multivariate Analysis.

Multivariate analysis in this study used the enter method, which is to enter all independent variables simultaneously at one step, without passing certain statistical security criteria. The independent variables included in the analysis are variables that have a *p* value <0.25 from bivariate analysis. If the bivariate results produce *p* value <0.25, then the variable directly enters the multivariate stage. Multivariate analysis in this study used multiple linear regression performed using computer devices with the following results.

Table 4. Summary of Results of Multiple Linear Regression Analysis.

Variable	Regreesion Coeficient (B)	Std. error	Beta	T_{cpunt}	Sig t
Constants	0,643				
Knowledge (X1)	0,257	0.085	0,231	3,037	0,003
Nutritional Status (X2)	0,265	0.067	0,312	3,936	0,000
Parenting Style (X3)	0,208	0.094	0,176	2,212	0,029
Behaviour (X4)	0,237	0.110	0,230	2,147	0,034
R Square= 0,597					
R = 0,772					

Dependent variable: Measles Incidence

Hypothesis 1 test. From the regression results above we can see that the value of *t* is 3.037 with p-value (sig.) of 0.003, this means sig <0.05, thus it can be interpreted that Ha is supported (Hypothesis 1 is supported) means influential knowledge significant impact on measles. The hypothesis 2 Test. From the regression results above we can see that the value of *t* is 3.936 with p-value (sig.) of 0.000, this means sig <0.05, thus it can be interpreted that Ha is supported (Hypothesis 2 is supported) means the status variable nutrition has a significant effect on the incidence of measles. The Hypotheses 3 test. From the regression results above we can see that the value of *t* is 2,212 with p (sig.) of 0.029, this means sig <0.05, thus it can be interpreted that Ha is supported (Hypothesis 3 is supported), means parenting has a significant effect against the incidence of measles. Hypothesis 4 test, from the regression results above we can see that the value of *t* is 2.147 with p-value (sig.) of 0.034 this means sig <0.05, thus it can be interpreted that Ha is supported it means the behavior of parents has a significant effect on the incidence of measles.

Table 5. regression Result

Model	R	R *Square*	*Adjusted R Square*	*Std. Error of the Estimate*
1	.772[a]	.597	.583	.32424

a. Predictors: (Constant), Knowledge (X1), Nutritional Status (X2), Parenting (X3), Behaviour (X4).

b. Dependent Variable: Measles Incidence (Y).

Based on the data above, the determination coefficient (R2) of 0.597 is obtained. With a determination coefficient of 0.597, it can be interpreted that 59.7% of the incidence of measles in Bantul Regency can be explained by the four independent variables consisting of variables of knowledge, nutritional status, parenting, and behavior of parents. While the remaining 40.3% is influenced by other

variables not included in the research model (variables not examined).

Table 6. Effective Donation Results and Relative Donations

Variable	r_xy	Beta	R Square	SE	SR
Knowledge (X1)	0.593	0.231	0.597	13.7	22.9
Nutritional Status (X2)	0.640	0.312		20.0	33.4
Parenting (X3)	0.562	0.176		9.9	16.6
Behaviour (X4)	0.703	0.230		16.2	27.1
Total				59.7	100.0

Table 6 shows the effective contribution (SE%) of the four variables in this study amounted to 59.7%. Knowledge variable is 13.7%, nutritional status is 20.0%, parenting is 9.9% and parental behavior is 16.2% while the remaining 40.3% is influenced by other factors not examined in this study. The relative contribution (SR%) of the four variables was 22.9% of knowledge, 33.4% of nutritional status, 16.6% of parenting and 27.1% of the variables of parental behavior towards the incidence of measles. Based on the table, it can be concluded that the nutritional status variable plays a large role in influencing the measles incidence of infants in Bantul Regency in 2018.

The influence of knowledge on the incidence of measles in infants in Bantul regency

According to Siswantoro (2012) the factors of ease or predisposing factors are the most important internal factors that someone has can affect his health behavior such as mother's knowledge. Family responsibilities, especially for mothers on immunization, plays an important role in the success of immunization and child health, so that the utilization of health services is influenced by individual factors, especially maternal knowledge about immunization (Kadir, 2014).

Based on the findings in this study, it was shown that the number of measles events in children with less parental knowledge was high compared to thosewho are good handling, it was statistically showed that there was a significant effect of knowledge on the incidence of measles in children under five (p = 0.003 <0 , 05). In line with the research conducted by Triana (2015), it was stated that parents who have low knowledge risk 2.02 times greater risk of not provding complete basic immunization to their babies than mothers who have high knowledge so that this can lead to a disease.

Knowledge is the result of knowing what happens after someone has sensed a particular object. Most knowledge is obtained through the senses of vision and hearing. Knowledge is needed in generating racial confidence and attitudes and behavior every day, so that it can be said that knowledge is a very important domain for the formation of one's actions. Knowledge of a disease can affect a person's perception of a disease which can ultimately affect a person's behavior to reduce the threat of an diseases (Azwar, 2013).

People who have knowledge about something will apply this knowledge in their daily lives, as well as immunization problems, parents / mothers with high knowledge about immunization, then they will provide complete basic immunization in their baby and pay attention for the right time to give the immunization.

One of the factors that influence a person's knowledge is the level of education. In line with the research conducted by Irwan (2017) that children under five years old from families with lower education level of Secondary School students were at risk of 2,436 times developing measles, compared with children whose their parents come from senior high school or university level.

According to Mubarak (2013) stated that the higher a person's education, the easier it is for them to receive information.Whereas, if a person has a low level of education, they will hamper the development of their apptitute towards receiving information and newly introduced values.

Mothers who have good knowledge are expected to be able to provide measles immunization to their children, so that by giving measles immunization to children, the incidence of measles can be reduced (Astuti, 2017). Mothers with sufficient knowledge have 154 times chance to provide complete basic immunization to their babies than parents with low education level (Dewi, 2013). Meanwhile, vaccinated children can reduce the mortality rate from measles three times more than for unvaccinated cases (Aaby, 2012).

The influence of nutritional status on the incidence of measles in infants.

Deaths associated with measles reach high level, more than 10% occur in children with malnutrition. Children with poor nutritional status can excrete measles virus secretions for a longer time, when compared to children who have good nutrition. This involves the risk of a longer recovery for them by increasing the time of infection and the high intensity of transmission to others (Strebel, 2004).

This study shows the number of measles events in children with sufficient nutritional status is higher than children who have measles with good nutritional status and statistically shows that there is a significant influence between the nutritional status of children and the incidence of measles ($p = 0,000 < 0,05$) .

Liwu (2016) highlighted that there is a significant relationship between nutritional status and measles complications in children. Children who suffer from measles with poor nutritional status tend to have complications of measles compared to children with good nutritional status, overweight and obesity. The results of the Khotimah study (2013) showed that toddlers with poor nutritional status had a risk of 4.405 times more likely to develop measles than toddlers with good nutritional status. Toddlers with low food intake have chance of 9,677 times greater compared with toddlers who have good food intake so that this can aggravate the condition of children affected by measles (Lestari, 2016).

One of the factors that can affect children's nutritional status is parenting style. The role of parents is very influential in the nutritional condition of children; parenting plays an important role in the occurrence of disruption of growth in children. Parental care for children affects children's growth through adequate food and health conditions (Pratiwi, 2016).

Children who are difficult to be directed have the habit of having difficulty eating and only choosing certain foods they like, there are also parents who have a poor parenting style but good nutritional status, this happens because parents who are busy working entrust their children to nanny or those who have household assistants so that childcare activities are replaced by them and the child becomes controlled by parenting and nutritional status (Manumbalang, 2017).

Parenting affects nutritional status because children's growth and development is not only from nutritional intake, but affection, attention, comfort and good

parenting also make the child grow well (Munawaroh, 2015). In addition there are internal factors that are contained within the child that psychologically appear as a problem in children. One of the factors related to the nutritional status of children was influenced by factors of socio-economic conditions, including maternal education, mother's work, and number of children, mother's knowledge and parenting as well as the overall economic condition of the parents (Putri, 2015).

According to Soetjiningsih (2015) children who get good care and provide adequate and nutritious food, physical growth and brain development. One of the effects of poor parenting is that it is difficult for children to eat or obesity.

Family and social stimulation or early stimulation also needs to be given by giving training to parents how to do early stimulation for personal, social, language, fine and gross motoric skills to the family. The process of training, health education, and the mentoring process for families are able to increase family knowledge regarding the provision of adequate nutrition for children (Wijaya, 2014).

Parenting influence on the incidence of measles in infant at Bantul regency.

Parenting is the ability of the family (especially mother/ caregiver) to provide time, attention, support for children so that they can grow and develop as well as possible physically, mentally, and socially. Parenting is very closely related to the growth and development of children under the age of five, because children are still dependent on mother care, especially in the first years of life (Istiany & Rusilanti 2013). The age of children under five who are still in the stage of dependence in fulfilling their basic needs for their parents or caregivers makes food intake highly dependent on how to care and how to feed.

This study is known that the incidence of measles occurs in infants with children who have poor parenting compared to toddlers who have good parenting and the statistical results also show that there is a significant influence between parenting to the incidence of measles (p = 0.029 <0 , 05). In line with Arianto's research (2018) that reviews the risk factors for measles incidence in infants in Sarolangun District, he mentions that parenting has a significant relationship to the incidence of measles in children under five in Sarolangun District. Less parenting style has 3 times the risk of developing measles compared to good mother care.

Caring in food / nutrition for infants includes breastfeeding, quality supplementary food, preparation and provision of nutritious food. In breast milk contains anti-infective substances in the form of antibodies, leukocyte cells and enzymes and hormones so that it can provide protection against various kinds of infections both caused by bacteria, viruses, parasites, and other antigens. Breast milk has a higher nutritional value, so that if toddlers do not get breast milk exclusively, it will result in under-nutrition children (Widyaningtyas, 2016).

Parenting also includes health care for toddlers. According to Amalia (2016) that toddlers who get poor health care are at risk of 2,844 times more likely to suffer from malnutrition than toddlers who get good health care. Amalia also stated that the health care variables for toddlers were mostly in good category. This is because most mothers always pay attention to children's health and hygiene. This can be seen from the behavior of mothers who directly bring their children to health services if the child is sick and always monitors growth and development once a month

Parenting can be seen in terms of how parents provide practice and care about good

environmental hygiene and sanitation. According to Husin (2008), parenting in the practice of environmental hygiene and sanitation also has a relationship to the nutritional status of children. Environments that do not meet health requirements allow for various types of diseases.

The upbringing of a family is also influenced by the level of education possessed by a mother where if a mother has higher education it will be easier for the mother to receive information about nutrition and health from the outside. Mothers with higher levels of education will be easier to receive information from outside, compared to mothers who have lower levels of education (Hayyudini, 2017).

The influence of behavior on the incidence of measles in infants in Bantul district

Behavior is all activities that can be observed directly or indirectly by other people (Fitriani, 2011). Knowledge is needed in generating racial confidence and attitudes and behavior every day, so that it can be said that knowledge is a very important domain for the formation of one's actions. Knowledge of a disease can affect a person's perception of a disease which can ultimately affect a person's behavior to reduce the threat of an illness (Azwar, 2013).

When viewed from behavioral risk factors, it appears that the incidence of measles occurs a lot in older people who have bad behavior compared to parents who have good behavior. The statistical results appears that there is a significant influence between the behavior of parents on the incidence of measles ($p = 0.034 < 0.05$) in line with the research conducted by Wahyunarni (2015) that highlight people prefer choose measles prevention by natural means. Parents consider that measles do not need to be feared and it is not serious and threatening problem because they haven been familiar with that disease.

Rahmayanti (2015) also shows that preventive behavior has a relationship with the incidence of measles. The results of the research also showed that the level of knowledge of the informants about measles was very low. With this ignorance, parents are unaware of the importance of giving measles immunization as an action to avoid or prevent things that are harmful. Knowledge is also possible to build a person's attitude and behavior. If someone has good knowledge it is likely to show a good attitude and vice versa.

Behavior is closely related to knowledge. Behavior based on knowledge will be long-lasting or so that respondents will provide basic immunization to their babies because they have understood the importance of basic immunization for their babies (Widiastuti, 2008).

People who are more educated will act more rationally. Education can help mothers or community to increase knowledge as well as to improve their behavior to achieve optimal health status. Health behaviors can be classified into three groups, namely behaviors or efforts of a person to maintain health so that they are not sick and attempt to cure when sick, find health care systems or facilities, often called treatment seeking behavior that is concerning the efforts of someone's actions when suffering from an diseases (Bernadetta, 2016).

The behavior of parents can also be influenced by how the mother's attitude. Mothers who have a good attitude tend to behave always immunize their children. Different results are found in mothers who have a bad attitude. Mothers who have a bad attitude tend not to immunize their children (Hudhah, 2017). These stimuli stimulate the public to respond the form of positive attitudes and negative attitudes which will eventually be realized in the form of concrete actions.

CONCLUSION

Based on the research and discussion conducted in Bantul district, it can be concluded that there is an influence between knowledge, nutritional status, parenting and behavior towards the incidence of measles in infants.

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