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Factor Analysis on Measles after The 2017 Measles Rubella Vaccine Campaign in Magetan District

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ABSTRACT

Measles is an infectious disease, infecting many children and becomes a major cause of child mortality in Indonesia. This disease is highly contagious, transmitted by viruses through droplets. Undeveloped immunity and low immunization coverage make it potentially epidemic. According to the 2016 Health Profile of Magetan Regency, measles cases were ranked first. Indonesia is committed to achieve the elimination of measles in 2020, with strategies such as the Measles Rubella vaccine campaign for children between 9 months-15 years. The research purpose was to analyze the factor of measles after the 2017 measles rubella vaccine campaign in Magetan Regency. This research used retrospective case control research design, the case sample was all the measles patients after the MR vaccine campaign until July 2018, as many as 16. The control sample was a part of the Magetan Regency population who did not suffer measles, as many as 64, determined with a ratio of 1:4. The research variables were immunization status, gender, exclusive breastfeeding, patient contact history, and knowledge of measles. The results showed that there is an effect of immunization status on the incidence of measles. The probability of someone who was not immunized is 81% for measles infection compared to those who are immunized. There is no influence of gender, exclusive breastfeeding, patient contact history, and knowledge of measles on the incidence of measles. Conclusion: immunization factor is the dominant factor that influence the incidence of measles. Suggestion: to reduce morbidity and mortality rates due to measles, Health Center (Puskesmas) is expected to increase the coverage of measles immunization, supported by highest quality of vaccine and techniques.
Keywords: measles, campaign, rubella measles vaccine

INTRODUCTION

Background

Measles is an infectious disease which infects many children and is a major cause of child mortality in Indonesia. This disease is highly contagious, transmitted by viruses through droplets when coughing or sneezing. Measles is a potential epidemic if the immunity is not developed and the immunization coverage is low[(1)]. Measles cases in Indonesia increase from 2013 to 2015. Surveillance activities reported that more than 11.000 cases of suspected measles with laboratory confirmation results of 12-39% are definite measles. The number of cases from 2010 to 2015 is estimated to have 23.164 cases. This number is estimated to be lower than the actual number in the field, considering there are still many unreported cases, especially from private services and the completeness of the surveillance reports that are still low[(2)]. According to the 2016 Health Profile of Magetan Regency, measles cases were ranked first[(3)].

The measles immunization status affects the protection from measles. Population density is a factor which influences the spread of the disease, because dense settlements are fertile nurseries for viruses and facilitate transmission. Decreased vitamin A levels lead to increased child mortality[(4)]. Measles can cause complications including Bronchopneumonia, Acute Otitis Media, Encephalitis and some children can suffer Enteritis[(5)].

The Global Vaccine Action Plan (GVAP) of measles is targeted to be eliminated in 5 WHO regions by 2020. The 2012-2020 Global Measles & Rubella Strategic Plan maps out the strategies needed to reach the target of world without measles, rubella or CRS. One of the five strategies is achieving and maintaining a high level of immunity by giving two doses of vaccine containing measles through routine and additional immunization with high coverage (>95%) and evenly distributed. Indonesia has committed to achieve an elimination of measles and CRS control by 2020, with strategies such as routine strengthening immunization to achieve measles coverage of ≥95% evenly at all levels; implementing measles crash program in children aged 9-59 months in 185 districts/cities in August-September 2016; making MR (Measles Rubella) vaccine campaign for children aged 9 months-15 years in stages in 2 phases of August-September 2017 and 2018; introduction of

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MR vaccines to routine immunization programs in October 2017 and 2018; conducting case-based rubella measles and CRS sentinel surveillance in 13 hospitals; and fully investigating the Extraordinary Phenomenon of measles outbreak[2].

Goal

This research to analyzed the influence of immunization, gender, exclusive breastfeeding, contact history with patients, and knowledge of measles toward the incidence of measles after the 2017 measles rubella vaccine campaign in Magetan Regency.

Hypothesis

Immunization status influenced to incidence of measles; gender influenced to incidence of measles; exclusive breastfeeding influenced to incidence measles; contact with measles sufferers influenced to incidence of measles; knowledge about measles influenced to incidence measles.

METHODS

This research used retrospective case control design. The sample cases were all measles patients after the 2017 MR vaccine campaign, which are as many as 16 people. The control group sample was a part of the Magetan Regency population who did not suffer measles, as many as 64 people. It was taken with consecutive techniques with a ratio of cases and controls 1:4 because the prevalence of measles cases was unknown[6]. The research variables were immunization, gender, exclusive breastfeeding, contact history with patients, and knowledge of measles. The instrument of data collection was a questionnaire. The data analysis used Chi Square statistical test and logistic regression. This research had received ethical approval.

RESULTS

Relation between Immunization Status, Gender, Exclusive Breastfeeding, Patient Contact History, and Knowledge of Measles with The Incidence of Measles

The relation between immunization status, gender, exclusive breastfeeding, contact history and knowledge of measles with the incidence of measles can be seen in the following table.

Table 1. The relation between immunization status, gender, exclusive breastfeeding, patient contact history, knowledge of measles and the incidence of measles

Variables	Measles						p-value
	Infected		Not infected		Total		
	f	%	f	%	f	%	
Immunization status							0.000
Not immunized	9	81.8	2	18.2	11	100	
Immunized	7	10.1	62	89.9	69	100	
Total	16	20.0	64	80.0	80	100	
Gender							0.014
Men	13	30.2	30	69.8	43	100	
women	3	8.1	34	91.9	37	100	
total	16	20.0	64	80.0	80	100	
Exclusive breastfeeding history							0.214
Not exclusive	7	15.2	39	84.8	46	100	
Exclusive	9	26.5	25	73.5	34	100	
Total	16	20.0	64	80.0	16	100	
Contact history with patient							0.029
Presence	10	32.3	21	67.7	31	100	
absence	6	12.2	43	87.3	49	100	
total	16	20.0	64	80.0	80	100	
Knowledge of measles							0.138
Less	9	28.1	23	71.9	32	100	
well	7	14.6	41	85.4	48	100	
Total	16	20.0	64	80.0	80	100	

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Most of measles the patients who do not get immunizations are male, get breastfed exclusively, have a history of contact with measles patients, but have good knowledge about measles.

Table 2. The effect of immunization status, gender, exclusive breastfeeding, patient contact history, knowledge of measles on the incidence of measles

Variables		B	Significance	Exp (B)	KI 95%	
					Under	Above
Stage 1[a]	sex(1)	1.312	0.106	3.713	0.758	18.186
	immunization(1)	3.299	0.001	27.077	4.105	178.600
	contact(1)	0.722	0.333	2.058	0.477	8.873
	knowledge(1)	0.298	0.686	1.348	0.317	5.730
	exclusive breastfeeding(1)	0.197	0.800	1.217	0.267	5.560
	Constant	-3.504	0.001	0.030		
Stage 2[a]	sex(1)	1.304	0.107	3.684	0.754	17.996
	immunization(1)	3.240	0.000	25.535	4.120	158.262
	contact(1)	0.719	0.335	2.051	0.476	8.841
	knowledge(1)	0.302	0.682	1.352	0.319	5.735
	Constant	-3.370	0.000	0.034		
Stage 3[a]	sex(1)	1.316	0.104	3.728	0.763	18.204
	immunization(1)	3.293	0.000	26.917	4.378	165.500
	contact(1)	0.731	0.326	2.078	0.483	8.934
	Constant	-3.260	0.000	0.038		
Stage 4[a]	sex(1)	1.259	0.120	3.521	0.721	17.198
	immunization(1)	3.504	0.000	33.262	5.711	193.739
	Constant	-2.955	0.000	0.052		
Stage 5[a]	immunization(1)	3.685	0.000	39.857	7.137	222.577
	Constant	-2.181	0.000	0.113		

The statistical results through five stages showed that immunization status variable has a dominant influence on the incidence of measles, with a value of p=0.000 (p<0.05). The regression equation model obtained: Y= -2,181 + (3,685 x 1) = 1,504 P = 1 / (1+0,222) = 0,81 or 81%. The incidence of measles probability in people who are not immunized is 81%.

DISCUSSION

Age

The ages of measles patients after the 2017 MR vaccine campaign in Magetan Regency are as follows. The youngest was 3 years old, the oldest was 16 years old and more in primary school age, 6-12 years old. All ages had the same susceptibility to infection[(1)]. The results showed that the most cases of measles were in 30 months of age[(7)], then adults, followed by children aged 8 months-5 years, and the least is under 8 months of age[(8)]. The highest incidence of measles is in the age group <5 years[(9)]. The three results of the research showed distribution in different age groups. The spread of age distribution on measles patients is the basis of MR vaccine campaign given to children aged 9 months to 15 years, with a high coverage (minimum 95%) and evenly distributed, thus is expected to form immunity so as to reduce the virus's transmission to a more mature age and protect the group when entering the reproductive age.

Residence

Measles patients after the 2017 MR vaccine campaign in Magetan District reside in Karas, Magetan, Parang, Ngariboyo, Kartoharjo, Bendo, Plaosan and Kawedanan Sub-districts. Measles is related to population density and immunization coverage. The incidence of measles tendency is lower in an isolated population and with a small population of <400.000 people, as well as regions with high immunization coverage[(1)]. The results showed that population density is a risk factor of measles[(10),(11)]. According to the 2017 Health Office Profile of Magetan Regency, Karas, Bendo and Parang Sub-districts are not included in the criteria for high population density, but

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in terms of immunization coverage they are still below the target. Even though Magetan, Kawedanan and Kartoharjo Sub-districts are included in high population densities, but the immunization coverage is high. Whereas the case in Ngariboyo Sub-district, besides the population density is high, the immunization coverage is also low.

Immunization Status

There is an influence of immunization on the incidence of measles. The tendency of individuals who did not get immunization to be infected by measles is 81% compared to individuals who got immunization. Measles patients after the 2017 MR vaccine campaign in Magetan Regency, most of them did not get immunization. The presence of immunization is expected to protect people from infection and to have important effects in the disease epidemiology by changing the age distribution. Giving immunization to babies will reduce the infection agent's transmission and reduce the chance of someone who is vulnerable to exposure. Giving immunization to adolescence will prevent the incidence of measles in the reproductive age[(2)]. Supporting research results including Yu Wen Zhou's, Shiu Tie Jun's research on the analysis of epidemiological characters in China from 2004 to 2006 concluded that there was a decrease in cases after measles immunization campaigns in Xinjian and Guizhov[(12)]. Research by Mujiati, Muntahar, Rakmiwati on measles risk factors concluded that immunization status was the cause of measles incidence in children aged 1-14 years in Metro Pusat Sub-district, Lampung Province[(13)].

Gender

There is no influence of gender on the incidence of measles. Measles patients after the 2017 MR vaccine campaign in Magetan Regency were mostly men. Women had higher antibody titers than men, this condition will affect immunity so infection is higher in men, as well as the risk of measles infection[(1)]. The results of research by Yahya Mohammed, that the ratio of men and women to measles infection is 2:1. The absence of gender influence on the incidence of measles, this is likely because there are more dominant factors[(7)]. Because male is one of the factors that contributes to measles, parents should try to increase the immunity of their male babies, children, and adolescents.

Exclusive breastfeeding

There is no influence of exclusive breastfeeding history on the incidence of measles. Measles patients after the 2017 MR vaccine campaign in Magetan District are more with a history of obtaining exclusive breastfeeding. The results of this research do not support the results of Ardiyanto, Kirwono, Kusumawati's research which shows that there is a relation between exclusive breastfeeding and measles. Exclusive breastfeeding is breast milk given to babies up to the age of 6 months without other foods. There are more than 30 types of immunoglobulin contained in breast milk, especially Ig A and Ig G, which protect the baby's body against infection[(1)]. Even having breastfed exclusively, but more cases of measles possibly due to reduced immunity because the patient is 3 years old or older.

Contact Patient History

There is no influence of contact history with patient on the incidence of measles. Measles patients after the 2017 MR vaccine campaign in Magetan Regency, most of them have a history of having contact with measles patients before. When someone is exposed to measles, 90% of people who interact closely with patients can get infected if they are not immune to measles[(2)]. Even though there is contact with the patient, as long as the body's immunity is good, they can avoid the possibility of contracting measles.

Knowledge of Measles

There is no influence of knowledge about measles on the incidence of measles. Measles patients after the 2017 MR vaccine campaign in Magetan Regency mostly have lack of knowledge about measles. Knowledge or cognitive is very important domain in shaping a person's actions (overt behavior). Based on the experience and the study, behaviors that are by knowing the nature of infectious diseases, modes of transmission, methods of prevention, handling methods, and factors that support measles to easily infect, it will support someone to act or do things that can prevent transmission and contract disease.

CONCLUSION

Measles immunization affects a person's susceptibility to measles. The probability of measles incidence in individuals who are not immunized is 81% compared to those who get immunization. Gender, exclusive breastfeeding, contact history with patient and knowledge of measles do not affect a person to get measles infection. To reduce morbidity and mortality due to measles, the health center (*puskesmas*) is expected to increase the coverage of measles immunization with the support of highest quality of vaccine and techniques. People who are the target of the measles immunization program are expected to participate in the program.

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