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RESEARCH ARTICLE

Nutrition Status as Determinant of Incidence of Measles in Jember Regency

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ABSTRACT

Measles disease is a communicable disease and leading causes of infant mortality. Jember regency is one of the contributors of high measles cases in 2010 there were 123 cases. In 2011 there were 128 cases. In 2012 there were 64 cases. In 2013 there were 45 cases, in 2014 there were 112 cases, in 2015 there were 109 cases, there were 266 cases in 2016. In 2017 to July there were 342 cases the number of measles incidents is very high compared to 2016. One of the risk factors for the disease is the host factor, host factor including age, immunization, nutritional status. The purpose of this study is to analyze the factors that influence the incidence of measles in Jember Regency. The method used was analytical with case control approach, the sample of research were 50 cases and 50 controls. Data analysis used is logistic regression test (α = 0.05). The result of analysis showed that there was an influence of nutritional status on measles incidence in Jember Regency, children with less nutrition had 2.113 times greater risk for measles compared with children with more nutrition and there are no influence of age and immunization on measles in Jember District.

Keywords: Measles, Age, Immunization, Nutritional status

INTRODUCTION

Background

Measles is a disease caused by the measles virus from the *Paramyxovirus* family, the genus *Morbilivirus* (Widiyono, 2008). Measles is one of communicable diseases and is a disease that gets more attention from the government, it is related to the reality that measles is one of the main causes of death in infants. Measles is one of the infectious diseases can be prevent by immunization. Immunization is an effort to cause or actively boosts an individual's immunity against the disease, so that if one day exposed to the disease will not be sick or only mild illness. Children who have been immunized will be protected from the various dangerous diseases, which may cause disability or death (Kemenkes RI, 2015).

Indonesia has measles immunization coverage which tends to decline every year but fulfills the target of 90%. The coverage of measles immunization in Indonesia in 2014 is 94.7% and in 2015 is 92.3%. The quantity of measles cases in 2014 amounted to 12.943 cases with 2.104 cases of measles outbreaks, Incidence Rate (IR) of 5.13 in 100,000 population. And by 2015 8,185 cases with 831 cases of measles outbreak, Number of deaths by 1 case Incidence Rate (IR) measles in 2015 amounted to 3.20 in 100,000 population (Kemenkes RI, 2015).

The coverage of measles immunization for province of East Java in 2015 was ranked 11th with 98.43% coverage in which the coverage of measles immunization has met the target of 90% but this coverage tends to decrease from the coverage of immunization in 2014 amount to 99.9%. The coverage of measles immunization is a description of how many children receive measles immunization, immunization can provide immunity up to 90%. However, the high coverage of measles immunization in East Java Province is still followed by the high number of cases of measles that occurred in 2012 as many as 1,085 cases, in 2013 of 2,529 and in 2014 fell to 762 cases, most cases of measles attacking pre-school children (Dinkes Prov. Jawa Timur, 2014) . In 2015 cases of measles have increased again by 1,072 (Kemenkes RI, 2015).

Jember regency is one of the contributors of measles case that is high enough in 2010 there were 123 cases. In 2011 there were 128 cases. In 2012 there were 64 cases. In 2013 there were 45 cases, in 2014 there were 112 cases, in 2015 there were 109 cases, there were 266 cases in 2016. From 2017 to July there were 342 cases the number of measles incidents is very high compared to 2016 (Dinkes Kab. Jember, 2016). The incidence of measles is closely linked to the success of the measles immunization program. The success of the measles immunization program can be seen through the coverage of measles immunization. The coverage of measles in Jember Regency increases annually by 86.47% in 2012 (has not met the set target of 90%), 90.39% in 2013, 93.07% in 2014 and 94.19% in 2015 (Dinkes Kab. Jember, 2016). Immunization coverage data that has reached the target can not be in accordance with the situation in the field, this is because the target amount is the estimated value set by the government. High immunization coverage is a feature of high individual immunity (Ningtyas and Wibowo, 2015). The gap between immunization coverage and the number of cases of measles from epidemiological investigation and case investigation illustrates that disease prevention through immunization is still not optimal, and still has the potential for measles outbreaks. Factors of failure in immunization that is due to immunity which was born from the baby, vaccine damage due to storage, discharge or use outside the guidelines, Furthermore, the gap that occurs illustrates that measles risk factors also have an important role in the incidence of measles.

The incidence of epidemiological triangle disease is influenced by agents, hosts and the environment. Factor host in measles disease is a risk factor for the occurrence of disease, the host in measles is human. Host factors include age, immunization, nutritional status, education, knowledge and occupation. Environmental risk factors that is from the socioeconomic environment is the family income. Measles is one disease that can be prevented by immunization. Research about the occurrence of measles conducted by Rahmadhani (2016) mentions that there are a significant correlation between immunization and the incidence of measles.

Knowledge and education also have an influence on the occurrence of measles this is in accordance with research conducted by Budi (2012) which states that knowledge and education are the main factors that affect the incidence of measles. In addition, the incidence of measles is also related to family income, where income affects the ability to get good health care, which family incomes affect the ability to get adequate health care. Based on the results of research conducted by Budi (2012) found that there is a correlation between family income and the incidence of measles and families with enough income have a protective risk of 0,18 times more children affected by measles when compared with less-income families.

Measles control measures by implementing measles immunization at 9-11 months old with 90% coverage and sweeping if not achieved, BLF / Blog Log Fighting is done in the village that is not achieved basic immunization, implementing second chance measles immunization with coverage above 95% in children aged <5 years through measles program crashes and giving measles immunization to children when entering primary school, conducting investigation and measles case management, carrying out individual-based measles surveillance with serology checks on suspects measles and conducting measles campaigns and other activities as part of the process of reducing and eliminating case. Government efforts in controlling measles disease continue to be implemented, but still not complete until the root of the problem in reducing the incidence of measles. One of the efforts to decrease measles case in Jember district is by measles campaign program. The measles immunization campaign program in Jember District has been implemented based on the Ministry of Health guidelines and able to increase the coverage of measles immunization although the group immunity in Jember Regency has not reached the minimum target of $\geq 95\%$ (Sohina, 2013).

Purpose

The purpose of this study was to analyze the risk factors for measles, namely age, immunization and nutritional status occupation affecting the incidence of measles in Jember Regency.

METHODS

This research was analytic with case control approach. In this study, case groups were those who had measles from January to August 2017 in Jember Regency and control group were respondents who never had measles. This research was conducted in the measles outbreak area of Jember Regency. The sample in this study were 50 case and 50 control. The sampling technique was conducted using simple random sampling method, then continued by using proportional random sampling method to get the proportion of control sample and case from each working area of puskesmas.

The data obtained from primary data from interviews and secondary data from Jember Regency Health Office. Data collection using questionnaires. Data that have been collected subsequently processed and analyzed, Data analyzed by Logistic Regression test with significance level of 5% ($\alpha = 0.05$).

RESULTS

Effect of Age on Incidence of Measles

Data on the results of the research related to the effect of age (can be seen in table 1.) showed the results that most are in the age group of 12-16 years of 28 respondents (56%), and only 3 respondents (6%) are in the age group of 0-5 years. The group of respondents who did not suffer from measles were mostly in the age group of 6-11 years as many as 26 respondents (52%) and only 4 respondents (8%) were in the age group of 0-5 years. The result of the analysis obtained is the result of significance equal to 0.149 (p <0.05) which means there is no influence of age to the occurrence of measles. The results of analysis using logistic regression shows the value of p value (0.149) <α (0.05), it can be concluded that there is no influence of age against the incidence of measles.

Table 1. Analysis of Age Affecting The Incidence of Measles

Variable	The Incidence of Measl						P Value	OR (95% CI)
	Measles		Not Measles		Total			
	n	%	n	%	n	%		
0 – 5 years	3	6	4	8	7	6.9	0.149	0.619 (0.323-1.187)
6 – 11 years	19	38	26	52	45	44.6		
12 – 16 years	28	56	20	40	48	47.5		

Effect of Immunization Status on Incidence of Measles

The data of the research on the influence of immunization (can be seen in table 2.) mostly have the basic immunization that are 32 respondents (64%), and only 8 respondents (16%) are not immunized. The group of respondents who did not have measles mostly had the basic immunization of 38 respondents (76%) and only 5 respondents (10%) had complete immunization. Logistic Regression Test results obtained p value (0.467) > α (0.05), which means there is no effect of immunization against the incidence of measles. The results can be concluded there is no effect of immunization status with the incidence of measles.

Table 2. Analysis of Immunization That Affect The Incidence of Measles

Variable	The Incidence of Measl						P Value	OR (95% CI)
	Measles		Not Measles		Total			
	n	%	N	%	n	%		
Not immunized	8	16	7	14	15	15	0.467	0.765 (0.371-1.574
Basic immunization	32	64	38	76	70	70		
Complete Immunization	10	20	5	10	15	15		

Effect of Nutritional Status on Incidence of Measles

Data of research result related to the influence of nutritional status (can be seen in table 3.) mostly have good nutrition status that as many as 32 respondents (64%), and only 2 respondents (4%) have more nutritional status. The group of respondents who did not have measles mostly had good nutrition status as many as 32 respondents (64%) and only 8 respondents (16%) had more nutritional status. Logistic regression analysis obtained value (0.042) < α (0.05) can be concluded there is influence between nutritional status with the incidence of measles. In addition the results of the analysis also showed that children with less nutrition have a 2.113 times greater risk of suffering from measles compared with children who have more nutrition.

Table 3. Analysis of Nutritional Status That Affect The Incidence of Measles

Variable	The Incidence of Measles						P *Value*	OR (95% CI)
	Measles		Not Measles		Total			
	n	**%**	**n**	**%**	**N**	**%**		
Malnutrition	16	12	10	20	16	16	0.042*	2.113(1.027–4.350)
Good Nutrition	32	64	32	64	64	64		
More Nutrition	2	4	8	16	10	10		

Information *= significant (*p value* < 0.05)

DISCUSSION

Age is one of the most important characteristics of a person, age is related to exposure level, magnitude of risk and nature of resistance (Noor, 2008). Widiyono (2008) mentions that measles is also commonly found in children aged 5-10 years, but after mass immunization the disease is mostly found to attack teenagers and adults who do not get immunized as a child or those who are immunized at the age more from 15 years. The result of data analysis showed that there is no influence of age on measles incident in Jember Regency. The results of this study are in line with research conducted by Khotimah (2015) which states that there is no meaningful correlation between age with measles incidence in toddlers. Measles disease can occur in any age group, can affect infants, toddlers or older age.

Based on the results of research in the field with the results of previous studies there is a correspondence between the results of the study because respondents with measles incidence has a diverse age. Because it is prone to contact between the measles patient with another child is very high. Lack of parental knowledge about early symptoms of measles makes children with measles continue to perform activities as usual. Early symptoms of measles such as heat, symptoms of cough, flu, red or watery eyes are often considered as common colds. Though the phase of transmission of measles is very contagious occurs in 1-3 days before the occurrence of red spots, and the source of transmission of measles occurs through droplet infection (droplet infection). This is in accordance with the theory according to the Department of Health RI (2011) which states that the transmission of measles occurs from person to person through splashes and transmission through the air mainly through coughing, sneezing or nasal secretions. Period of transmission 4 days before appearance rash, peak transmission at the time of early symptoms (prodromal phase), that is in the first 1-3 days of illness.

Measles or rubella is an acute disease, highly contagious and can lead to severe complications, the disease is caused by the measles virus. Measles can be prevented by immunization. Measles immunization is given for the purpose of providing active immunity against measles. Infection spread by air (airbone) (Mulyani and Rinawati, 2013). Measles vaccine has efficacy of approximately 85% therefore additional immunization is needed as prevention of measles.

The results of this study showed that there is no effect of immunization on the incidence of measles in Jember Regency. The results of this study are in line with the results of research conducted by Nelfrides (2015) which states that there is no significant correlation between immunization of children under five years with measles incidence in toddlers in Padang City. Ardiyanto's research results (2016) are also in line with the results of this study, Ardiyanto's research (2016) states that there is no correlation between immunization and measles disease.

The results of the study mentioned that some respondents did not immunize measles. Children who are did not immunized do not have immunity and may be susceptible to measles, according to the results of a study conducted by Giarsawan et al. (2012), which states that immunization factors in children will affect the occurrence of cases measles, and children who have an incomplete immunization has 16,923 times have a risk of measles compared with children with complete immunization. This is in line with research conducted by Ramadhani (2016) which mentions that toddlers who are not get measles immunized have a 4,449 times higher risk of measles than children who get measles immunization. WHO (2017) states that children who are not in vaccination are at high risk of measles and complications to death. Any person who has no immune (who has not been vaccinated or has been vaccinated but not immunized) may also be infected.

Most of the respondents had basic immunization that is only measles immunization at the age of 9 months. Measles vaccine has efficacy of approximately 85% therefore additional immunization is needed as prevention of measles. Serology results in elementary school children according to SRH (2009) showed that measles antibody titers of 52,60% -65,65% then after immunization the BIAS increased to 96,69%-96,75%. In addition, failure in immunization can occur because there is immunity brought on from birth, about 10% of children who have received immunization at age 9 months failed to form antibodies (primary vaccine failure). This is probably due to passive antibodies from mother (maternal antibody), which when measles vaccination is given when the levels of measles-specific antibodies are high will result in unsatisfactory results, since they will

neutralize the vaccine given (Anonim, 2015). Another effect are the occurrence of vaccine damage due to storage, discharging or use outside the guidelines. During the distribution of cold chain vaccines from production sites to the smallest health unit must be maintained to maintain the quality of the vaccine. Vaccine damage or poor quality of the vaccine may cause the vaccine's use of efficacy to provide no protection against measles, so even if the target has received the measles vaccine it can not protect the target (Maksuk, 2011).

Nutritional status is an expression of a state of equilibrium in the form of a particular variable, or the embodiment of a nutriture in the form of a particular variable. Lack of nutrients is an indirect cause of death in children aged 1-4 years in Indonesia, because there are a reciprocal correlation between less nutritional status and infectious diseases. Infectious diseases worsen the state of nutrition which then facilitates the infection (Supariasa, 2012).

The results showed that there was an influence of nutritional status on the incidence of measles in Jember Regency. In addition the results of the analysis also showed that children with less nutrition have a 2.113 times greater risk of suffering from measles compared with children who have more nutrition. The results of this study are in line with research conducted by Meilani and Budiati (2013) which states that there is an influence of nutritional status with the incidence of measles with OR 7,800. The results of Hardi's (2008) study that there are a correlation between nutritional status and the incidence of measles, lack of nutritional status makes children vulnerable to measles. The results of Khotimah's study (2015) states that nutritional status has significant correlation with measles and toddlers with less nutritional status risk of measles 4.405 times greater than children with good nutritional status.

Nutritional status is a body condition that is affected by diet, nutritional levels in the body and the ability to maintain normal metabolic integrity, and is one of the factors that affect a child's immunity (Rampengan and Laurentz, 1997). Some respondents have less nutritional status, children with nutritional status are more vulnerable to disease. Less nutrition is able to affect the immune process, so the eradication of the virus is disrupted. Micronutrient deficiency can also lead to complications, poor nutritional conditions can make it easier for children to get infected, and infectious diseases can worsen the state of nutrition. The correlation between nutritional status and measles disease is two-way and mutually burdensome, where children with less nutritional status can aggravate measles infections and children with measles infection if nutritional intake is not maintained can occur nutritional deficiency (Supariasa, 2012)(Marcdante, 2014). The incidence of measles is more common in malnourished children, especially in children who are vitamin A deficient or who have weak immunity caused by HIV / AIDS or other diseases (WHO, 2017). This is in accordance with a study conducted by Liwu (2016) which mentions that there are a significant negative correlation between nutritional status with measles complications compared with children with more nutritional status.

CONCLUSION

Based on the result of this study, it could be concluded that incidence of measles was affected by nutritional status, and children with less nutritional status have a 2.113 times greater risk of suffering from measles compared with children who have more nutrition.

REFERENCES

Anonim. (2015). Faktor yang Berpengaruh pada Keberhasilan Imunisasi. Open Acces in https://mediaimunisasi.com/2015/03/05/faktor-yang-berpengaruh-pada-keberhasilan-imunisasi/

Ardiyanto, B. S. (2016). Analisis Faktor Resiko dengan Kejadian Campak di Kabupaten Boyolali. *Skripsi*. Surakarta: Fakultas Ilmu Kesehatan Masyarakat: Universitas Muhammadiyah Surakarta

Budi, D. A. G. (2012). Faktor-Faktor yang Berpengaruh terhadap Kejadian Campak pada Peristiwa kejadian Luar Biasa Campak Anak (0-59 Bulan) di Kota Banjarmasin Provinsi Kalimantan Selatan Tahun 2011. *Tesis*. Depok: Fakultas Kesahatn Masyarakat, Program Pascasarjana Universitas Indonesia.

Dinas Kesehatan Provinsi Jawa Timur. (2014). *Profil Kesehatan Provinsi jawa Timur 2014*. Surabaya: Dinas kesahatan Provinsi Jawa Timur

Dinas Kesehatan Kabupaten Jember. (2016). *Laporan Seksi P3KL Kabupaten Jember 2016*. Jember: Dinas Kesehatan Jember

Giarsawan, Nyoman *et al*. (2012). *Faktor Faktor yang Mempengaruhi Kejadian Campak di Wilayah Puskesmas Tejakula I Kecamatan Tejakula Kabupaten Buleleng Tahun 2012*. Denpasar : Polteskes Denpasar

Hardi. 2008. Faktor Resiko Kejadian Campak pada Balita di Desa Semangut Kecamatan Bunut Hulu Kabupaten Kapuas Hulu Propinsi Kalimantan Barat Tahun 2008. *Skripsi*. Open Acces in eprints.undip.ac.id/37957/1/3342.pdf

Khotimah, Husnul. (2015). Hubungan Antara Usia, Status Gizi dan Status Imunisasi dengan Kejadian Campak Balita. *Jurnal Obstretika Scienti, ISSN 2337-6120*

Liwu T., Novie, H. R. dan Suryadi N. N. T. (2016). Hubungan Status Gizi dengan Berat Ringannya Campak pada Anak. *Jurnal e-Clinic (eCi)*, 4 (1)

Maksuk. (2011). Pengelolaan Rantau Dingin Vaksin Tingkat Puskesmas di Kota Palembang Tahun 2011. *Karya Tulis Ilmiah*. Palembang: Politeknik Kesehatan Kemenkes Palembang

Meilani, Rina R. E. Budiati. (2013). *Faktor-Faktor yang Mempengaruhi Kejadian Campak di Puskesmas Purwosari Kabupaten Kudus*. Jurnal Keperawatan dan Kesehatan Masyarakat STIKES Cendikia Utama Kudus, 2(1)

Marcdante, KJ. Kleigman RM, Jenson HB, Behrman Re. (2014). *Nelson Essential of Pediatrics (6th ed). In: Ikatan Dokter Anak, translator*. Indonesia: Saunders elsevier

Mulyani, N., dan M. Rinawati. (2013). *Imunisasi Untuk Anak dilengkapi Jadwal dan Mitos Seputar Imunisasi*. Jakarta: Nuha Medika

Nelfrides. (2016). Faktor Resiko Kejadian Campak pada Balita di Kota Padang Tahun 2015. *Skripsi*. Padang: Fakultas Kesehatan Masyarakat Universitas Andalas

Ningtyas, DW dan A. Wibowo. (2015). Pengaruh *Kualitas Vaksin Campak terhadap Kejadian Campak di Kabupaten Pasuruan*. Surabaya: Unair

Noor, N. N. (2008). *Epidemiologi Revisi*. Jakarta: Rineka Cipta

Supariasa, I., B. Bakri dan I. Fajar. (2012). *Penilaian Status Gizi*. Jakarta: EGC

Sohina, F. R. (2013). *"Implementasi Program Kampanye Imunisasi Campak dan Penurunan Kasus Campak di kabupaten Jember*. Jember: Fakultas Kesehatan Masyarakat Universitas Jember

Rahmadhani, N. F. (2016). Hubungan Status Imunisasi dan Riwayat Kontak dengan Kejadian Campak pada Balita di kabupaten Sukoharjo. *Skipsi*. Surakarta: Fakultas Ilmu Kesehatan Universitas Muhammadiyah Sukarta

Rampengan, TH. dan Laurentz, IR. (1997). *Penyakit Infeksi Tropik pada Anak*. Jakarta: EGC

RI, Kementrian Kesehatan. (2011). *Buku Pedoman; Peyelenggaraan dan Penanggulangan Kejadian Luar Biasa Penyakit Meular dan Keracunan Pangan: Edisi Revisi Tahun 2011*. Jakarta: Kementrian Kesehatan Republik Indonesia

RI, Kementrian Kesehatan. (2015). *Profil Kesehatan Indonesia 2015*. Jakarta: Kementrian Kesehatan Republik Indonesia.

Widiyono. (2008). *Penyakit Tropis; Epidemiologi, Penularan, Pencegahan & Pemberantasannya*. Jakarta: Penerbit Erlangga

WHO. (2017). Measles. Open Acces in http://www.who.int/mediacentre/factsheets/fs286/en/

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