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Submission date: 18-Apr-2023 08:13AM (UTC+0700)
Submission ID: 2067809216
File name: Jurnal_6.pdf (172.11K)
Word count: 3249
Character count: 17045

Unnes Journal of Public Health 8 (2) (2019)

Unnes Journal of Public Health

http://journal.unnes.ac.id/sju/index.php/ujph

Measles Vaccination Status is Not Related To Serology Laboratory IgM Measles in Cirebon Regency

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Article Info

Article History:
Submitted April 2019
Accepted May 2019
Published July 2019

Keywords:
Status of Measles Vaccination, IgM Measles, Serology

Abstract

The incidence rate of measles cases in Indonesia is still high at 3.20/1000 population in 2016 while the national target is 0/1000 population. The purpose of this study was to investigate the relationship between vaccination status and laboratory serology test results of IgM measles. The research design used case control, data obtained from secondary data from C1 sheet 2016 Cirebon regency. Samples in this study were 60 positive IgM cases and 34 negative IgM controls that had met inclusion and exclusion criteria. The research instrument uses a document sheet of secondary data of individual measles cases with documentation techniques in data collection. Data analysis using chi square test. Measles vaccination status was not related to serological laboratory test results of IgM (p value = 0.161, OR = 2.124; 95% CI = 0.849-5.315). There was no association between measles vaccination status and serologic laboratory serology test result.

INTRODUCTION

Measles is one of the leading causes of death even though a safe and cost-effective vaccine is available. In 2015, there were 134.200 measles deaths globally about 367 deaths every day or 15 deaths every hour (World Health Organization, 2017). Indonesia is a country in the Southeast Asia region with the second highest number of measles cases after India (Fernandez et al., 2011). There were 1 cases of measles deaths in Jambi Province (Andriani, 2017). 2010 until 2015, there are an estimated 23,164 cases of measles. In 2014 cases of measles in Indonesia are 12,943 (Incidence rate: 5.13 per 100,000 population). While in 2015, the number of measles in Indonesia is 8,185 incidence rate cases: 3.20 per 100,000 population) lowered IR by 2016 to 2.70 per 100,000 population. However, based on Indonesia Health Profile 2016, the measles CFR increases from 0.012% in 2015 to 0.073% by 2016. In West Java in 2014 the largest cases of measles occurred in the city of Cirebon with IR 58.35/100.000 population. In 2015 coverage of measles immunization in West Java was 98.15%. In 2014, there are 262 cases of clinical measles with the number of positive cases of measles (confirmatory profitor) as many as 158 cases. According to Muchlastriningsih study (Alimul, 2013) shows that the number of measles patients treated the most from the 5-14 age group (30.6%) the status of measles immunization of all patients (61.76%) did not receive measles vaccination. Based on Cirebon Health Profile 2013, there are 599 cases of measles clinical with positive measles (confirma-

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pISSN 2252-6781
eISSN 2584-7604

tion of profitor) as many as 62 cases in Cirebon City in 2013. Based on Cirebon Health Profile 2014, the coverage of measles vaccination in Cirebon reaches 96.7% in 2014 but the clinical cases of measles became 955 cases. From the clinical case of 955, based on the immunization status of measles 72.8% never received measles immunization and 4.7% did not know the history of immunization.

Cirebon Regency has the highest number of measles cases in West Java with incident rate 58.35 / 100.000 population. Measles immunization is related to laboratory IgM serology (Linnemann et al., 1973; Bolotin et al., 2013). Serological laboratory IgM test to someone which is not vaccinated will have a positive (Hickman et al., 2011). Study among children that have clinical measles report that measles IgM antibody was found in five of seven children with no history of immunization, whereas five of seven children with history of immunization have IgM antibody negative (Linnemann et al., 1973).

Study report that the occurrence of measles in persons years after receiving live virus vaccine has been attributed to primary vaccine failure due to insufficient primary antigenic stimulation, and secondary vaccine failure due to loss of protective antibody or waning immunity (Erdman et al., 1993). In clinical measles cases with vaccine history, the appearance of a primary antibody repsonse-a delayed IgG response with IgM production would be an indication of primary vaccine failure or failure to immunize (Erdmann et al., 1993). Therefore, we investigated the relation between vaccination status with IgM serology testing results in Cirebon.

METHODS

This case control study was used secondary data of Case Based Measles Surveilans (CBMS) Cirebon 2016 with case report individual (C1). Measles Case Report Individual (C1) was obtained from health centers and hospitals who patients with laboratory confirmation results IgM serology positive.

The population in this study was patient with clinical sign and symptoms of measles infection based on CBMS Cirebon 2016 i.e. 678 patients. Case population in this study is clinical measles patient which confirmed positive IgM serology based on CBMS Cirebon 2016 i.e. 410 cases, while control population in this study is clinical measles patient which confirmed the negative IgM serology based on CBMS Cirebon 2016 data as much as 268. The sample in this study were 60 cases and 34 controls who had met the inclusion criteria (Individuals suffering from proven clinical measurements with IgM laboratory serology results) and exceptions (blank data) include: age of respondents 0-4 years old, time of taking blood specimens 4-28 since incidence of rash, vitamine A administration status.

Measles cases is defined as clinical confirmed measles positive IgM patients based on CBMS data of Cirebon 2016. Measles vaccine status is defined as measles immunization at the age of 9 months. The research design used case control, data obtained from secondary data from C1 sheet 2016 Cirebon regency. The obtained results were statistically analyzed using SPSS 16.0 statistical software (IBM Corporation). Chi-square test was applied to calculate the significance association status vaccine related to serology laboratory IgM measles. The research protocol was approved by the institutional research committee of the Faculty of Sports Science, Universitas Negeri Semarang (No. 042/KEPK/EC/2017).

We compared the variables of Child Factors (Immunization Status, Status of Vitamin A, Nutritional Status, Sex of the Child, Age of Child) Maternal Characteristics (Education, Knowledge, Employment) Environmental Factors (Occupancy Density). These variables are expressed as absolute and percent values, and compared between the case group and the control group using the chi-square test. We estimated the odds ratio (OR) and the 95% confidence interval (CI) between kidney stones and kidney stone parameters based on univariate and multivariate logistic regression analysis. Multivariate analysis was used to find dominant factors associated with risk of kidney stones after adjusting for confounding variables such as age. Statistical analysis was performed using SPSS version 16.0, with a p value of less than 0.05 considered significant.

RESULTS AND DISCUSSION

The number of analyzed were 94 respondents, 60 cases and 34 controls. The number of male respondents was 45 (47.9%) and female was 49 (52.1%) respondents. Female respondents had a higher prevalence of laboratory measles than males. Respondent distribution by demographic characteristics presented in Table 1.

Table 2 show the result of bivariate analysis. A total of 34 out of 60 respondents who had positive measles IgM had been given measles vaccine, while 26 (43.3%) others were not given measles vaccine. A total of 25 of 34 respondents who had negative measles IgM had been given a measles vaccine, while 9 (26.5%) others were not given the measles vaccine.Vaccination status was not associated with measles laboratory IgM (p=0,161; CI 95%= 0.8-5.3; OR=2,124).

Previous study conclude that measles immunization status is related to IgM measles laboratory (Linnemann et al., 1973; Coughlin et al., 2017). Measles IgM in someone which was not vaccinated will have a positive (Hickman et al., 2011). Study among

Table 1 Sex Distribution in Cases Group

	Case		Control	
	n	%	n	%
Sex				
Female	29	48,3	20	58,8
Male	31	51,7	14	41,2

Table 2 Vaccination Status on Cases Group

Measles Vaccination Status	**IgM**				**Total**		**p- value**	**OR**	**95% CI**
	Positive		**Negative**						
	N	**%**	**N**	**%**	**N**	**%**			
							0,161	2,124	0,849-5,315
No	26	43,3	9	26,5	35	37,2			
Yes	34	56,7	25	73,5	59	62,8			
Total	60	100	34	100	94	100			

children that have clinical measles report that measles IgM was found in five of seven children with no history of immunization. Five of seven children with history of immunization have IgM measles negative (Linnemann et al., 1973).

This study report that status of measles vaccination was not related to IgM measles serology laboratory. This result was consistent with study among in pre-school children in England and Wales, report that status of measles vaccination was not associated with IgM measles serology laboratory (Yates corrected $\chi 2 = 0.55$, $P = 0.46$) (Pebody et el., 2002). Study in Sumatera and DKI Jakarta, Indonesia, also report that status of measles vaccination was not related to IgM measles serology laboratory (p=0.480; CI 95%= 0.80-1.60), this is due the collection data to related measles vaccination. the status is not complete at the time of collecting data parents or caregivers forgot the status of vaccination against measles. Positive IgM levels in unvaccinated individuals (Mursinah et al., 2010).

Serum speciments can be used to diagnose most measles cases if collected between 72 hours and 4 weeks after rash onset by using an IgM capture EIA. In previously vaccinated persons, there may be a small increased risk of not detecting an IgM response to measles when specimens are collected >2 weeks after rash onset (Helfand et al., 1999; Sulistina, 2018). Respondents with negative measles IgM may suffer rubella. Measles and rubella are presumably caused by some other virus presenting similar clinical symptoms. In this study, it was confirmed to measles IgM without IgM rubella test. Rubella virus infection is typically diagnosed by the identification of rubella virus-specific immunoglobulin M (IgM) antibodies in serum, 1-4 after rash onset, where the time rubella body fever (warm-warm), the rash is smoother and the color is pink, unclear and not red like rash measles (Abernathy et al., 2009; Rahayu & Tumbeleka, 2016). The results of this study reported that no related between vaccination status and measles IgM caused by negative measles IgM test resulted in the fact that the respondent was infected with the rubella virus, so that in the measles IgM test it was negative. It is reinforced that every year through surveillance activities it is reported that more than 11,000 cases of measles suspect in Indonesia, and laboratory confirmation results show that 12-39% of them are lab confirmed, while 16-43% are defined rubella. Based on Indonesia Health Profile 2015 from 2010 until 2015, it is estimated that there are 23,164 cases of measles and 30,463 cases of rubella. So it can be said that the prevalence of measles and rubella is almost the same. The results of this study reported that no related between vaccination status and measles IgM was also due to the quality of measles vaccine. A study of 60 villages in Pasuruan Regency showed that there was an effect of vaccine quality on measles incidence, it was found that most of the measles vaccine qualities in the area were in the less category, since there are still one or more vaccine quality criteria not performed by immunization midwife in the village (Ningtyas & Wibowo, 2015). The results of this study are similar to the results of research conducted in Semarang, vaccines brought in the wrong way causing bad or damaged vaccine quality 9.4 times greater (Hikmarida, 2014; Rahayu, 2014). According Ningtyas & Wibowo (2015), vaccine damage is indicated by the change in VVM indicator from condition A or B to C or D. The damaged vaccine loses its potential and does not maximally provide protection to the community against measles, so that people are still vulnerable to measles even after immunization.

Management of vaccines in an effort to maintain the quality of vaccines properly starts from storage, distribution to vaccine usage (Kartoglu & Milstien, 2014). The quality of the vaccine is not only seen in terms of storage and management of immunization services in posyandu but also needs to be considered in terms of packing or transportation of vaccines. Vaccine packing in this study is not done according to standard or done based on the perception of each midwife such as packing with vaccine carrier that does not meet the standard even use thermos with the amount of cool pack used less than 4 pieces, in addition there is still packing of vaccine by using cold pack (ice frozen water) that can cause vaccine submerged in ice water and prone to damage the vaccine. Diseases that can be prevented by immunization one of them measles disease remains the main cause of death. Efforts to reduce mortality and morbidity, the immunization program not only talks about immunization coverage but also the quality of services should be guaranteed, one potential vaccine is through the management of cold chain vaccine from the factory until spaciousness is maintained properly according to the provisions. Vaccine, cold syringe and cold chain support are required to ensure that vaccine quality complies with standards to foster an optimal immunity for immunization targets (Maksuk, 2012). Some immunization-related conditions are not in accordance with the provisions of PERMENKES (Health Ministry Role) No. 42 about immunization organizers, guidelines for measles and polio immunization campaign in 2009-2011, and SOP Immunization Implementation in 2012, causing the possibility of vaccine damage to be greater. Damage to the efficacy of measles vaccine may result in a given vaccine not being able to protection against measles (Maksuk, 2012) This can be the cause of the high incidence of measles in the Cirebon Regency even though the coverage of measles immunization has exceeded the target (Oktaviasari, 2018).

This study has limitation. The design used in this study is a case control that allows recall bias. This study also did not perform IgM rubella examination in respondents with clinical measles that allowed respondents with negative IgM measles had positive IgM levels. Despite these limitations, our study was strengthened by having controlled variables such as age, vitamin A status, and timing of blood specimens.

CONCLUSION

Current study conclude that measles vaccination status is not related to measles IgM serology test. Some possibility causes may affect this condition, such as infection not due to measles but rubella or other similiar clinical signs infections. Other possibilities might be because of low vaccine efficacy associated with misadministration and some other causes that must be proven in future studies.

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