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LEPTOSPIROSIS TRANSMISSION BY CATTLE IN PLATEAU

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Abstract: - Leptospirosis is zoonotic disease caused by *leptospira* bacteria and transmitted to human through contact with animal urine and contaminated environment. The cases appeared since 2010 in Ponorogo and outbreak happened in 2011. One of the cases is Ngrayun. Ngrayun is a plateau area which supposed to have a small risk of the leptospirosis cases because it occur in lowlands as usually. But the different phenomenon occurred, the most number of cases in Ngrayun. The purpose of this study is to analyze behaviour and leptospirosis in cattle related to leptospirosis incidence in Ngrayun in 2013. This research was an explanatory research with observational method using case control design. The subjects were 10 cases and 30 controls recruited with inclusion criteria. Diagnosis of cattle's leptospirosis based on blood examination by IgG ELISA. The data was analyzed in univariate, bivariate and multivariate tests using logistic regression. The results with multivariate test of this research found that cattle's leptospirosis that influenced the incidence of leptospirosis in human (P value < 0.05, OR = 26.689) and behaviour of footwear that influenced the incidence of leptospirosis in human (P value < 0.05, OR = 16.885). It was suggested for people to applied wearing barefoot. Thereby, people can be preventing themselves from leptospirosis transmission.

Keywords: Leptospirosis, Cattle, Plateau

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INTRODUCTION

Leptospirosis is one of zoonotic disease caused by the bacterium *leptospira. sp* and its distribution area almost entire the world, especially the tropics that have high humidity and rainfall. Indonesia is a tropical country which is expressed as leptospirosis endemic area in Southeast Asia. Distribution of leptospirosis cases in Indonesia occurred from 2009 to 2013 mostly located in lowlands and flooding areas.

In 2011, leptospirosis suddenly appeared in Ngrayun District, Ponorogo which is plateau areas. Based on a preliminary study, the high cases of leptospirosis in Ngrayun District possibility reservoir caused by factors that cattle infected with *leptospira* because Ngrayun has a high population of cattle. Cattle are animals that have a higher prevalence of leptospirosis than other livestock. Livestock as final host which specific serovar *leptospira* strain to be transmitted to humans (Faine in Koizumi and Yasutomi, 2012). Koizumi and Yasutomi (2012) explain contact with cattle on a farm in Japan could lead to *leptospira* infection. So, it is important to identify and eradicate the infected animals have to break the chain of *leptospira* infection in humans.

92% patients indicated who has cattle with leptospirosis in 2013. They are breeder who has a higher risk of *leptospira* infection. Seroprevalence distribution is different for different regions due to the complexity of ecological *leptospira*. Many factors affect them, agriculture, topography, rainfall, livestock activities, contact between species, and including wildlife (Dreyfus, 2013). The incidence of leptospirosis in humans is influenced by a variety of risk factors. Among of the incidence of leptospirosis factors in cattle and behavioral factors. Factors that influence the behavior is footwear and washing hands.

Footwear is one of behaviour that can prevent human from environmental hazard. In study, some of individual behaviour with a significant risk of leptospirosis, e.g. swimming or walking barefoot (Lou, 2009). Hand washing is one of the behaviors of living a clean and healthy, Auliya (2014) research showed that there is a relationship between the strata PHBS in order household with the incidence of leptospirosis with the value of odds ratio (OR) = 4.667, and the interval from 1.643 to 13.256. Respondents with household strata PHBS order unfavorable had 4.667 times higher risk of developing leptospirosis than respondents with good household strata of PHBS.

The purpose of this study is analyze the relationship between behavior with leptospirosis cases, to analyze the relationship between the incidence of leptospirosis in cattle with leptospirosis in humans, relationship between behaviour with leptospirosis in humans, and potential risk factors leptospirosis cases for human being.

MATERIALS AND METHODS

The study is an observational study. This study is case-control. This study using interviews and laboratory method. Behavioral risk factors using a questionnaire based interviews while laboratory testing using IgG ELISA (Enzyme Linked Immunosorbent Assay) research location conducted in the District Ngrayun. The study was conducted from December 2013 to June 2014. The subjects of this study are 10 people as group of cases who are registered in the public health service with positive data of leptospirosis and 20 people as group of control are the communities. The statistical analysis used was a bivariate with *chi-square test* and multivariate logistic regression.

RESULT AND DISCUSSION

Relationship between footwear and leptospirosis

Table 1. Relationship of habit in footwear on leptospirosis incidence

Footwear habit	Group				P Value
	Control		Case		
	N	%	n	%	
Yes	23	57.5	2	5	0.002
No	7	17.5	8	20	
Totally	30	75	10	25	

Table 1. The incidence of leptospirosis based on respondents who have a footwear only 2 people (5%) and who have a habit barefoot for 8 people (20%), while the distribution of respondents to a control group who had a habit of footwear by 23 people (57.5%) and who have a habit of barefoot by 7 people (17.5%). Habits are barefoot has been associated with leptospirosis in the community in District Ngrayun because it has a value P value of <0.05 (OR = 13.143, 95% CI 2.249-76807). Respondents who do not have the habit of footwear has 13.143 times higher risk of developing leptospirosis. In line with that Priyanto et al. (2008) states that there is a relationship between the custom of barefoot with leptospirosis cases (p=0.000) (OR = 4.66 95% CI=2.07 to 10.51). Respondents who do barefoot when working had 4.66 times the risk of leptospirosis are greater than the respondents who footwear when working.

Relationships between hand washing and leptospirosis

Table 2. Relationship of hand washing habits on leptospirosis incidence

Hand Washing Habits	Group				P Value
	Control		Case		
	n	%	n	%	
Yes	20	50	2	5	0.025
No	10	25	8	20	
Totally	30	75	10	25	

Based on Table 2. The incidence of leptospirosis in respondents who have the habit of washing hands only 2 people (5%) and who have a habit of not washing hands for 8 people (20%), while the distribution of respondents to a control group who have the habit of washing hands for 20 people (50%) and who have a habit of not washing hands for 10 people (25%). value P value of <0.05 (OR = 8, 95% CI 1425-44920). Breeders who do not have the habit of washing hands have 8 times more risk of developing leptospirosis. Pujiyanti et al. (2014) suggest that human behavior may be a factor in triggering the occurrence of leptospirosis as re-emerging zoonoses in Demak. Improved personal hygiene through hand washing with soap has been made respondents before eating, in order to reduce the risk of leptospirosis cases.

Relationship between leptospirosis in cattle and leptospirosis in human

Table 3. Relationship of leptospirosis in cattle on leptospirosis incidence

Laptospirosis in Cattle	Group				P Value
	Control		Case		
	n	%	n	%	
Negative	27	67.5	3	7.5	0.001
Positive	3	7.5	7	17.5	
Totally	30	75	10	25	

Based on Table 3. The incidence of leptospirosis in humans who have cattle that positive leptospirosis is amounting to 7 people (17.5%) and that have a negative leptospirosis only 3 (7.5%), while the distribution of respondents to a control group who have cattle that positive leptospirosis only 3 (7.5%) and that have a negative leptospirosis by 27 people (67.5%).

Value P value of <0.05 (OR = 21, 95% CI 3460-127467). People who have cattle that positive for leptospirosis have a 21 times higher risk of leptospirosis. This shows that the possibility of transmission of leptospirosis from cattle to humans. Cattle as livestock hosted host of the specific serovar *Leptospira* strain to be transmitted to humans (Faine in Koizumi and Yasutomi, 2012). Dreyfus (2013) states that leptospirosis is still the Occupational Diseases, which is important in New Zealand, especially for farmers and slaughterhouse workers who have the highest risk exposed to leptospirosis in the workplace. Based on the theory that *leptospira* bacteria infect farm animals, wild animals and humans. Animals that have most likely infected with, among others, mice, cows, sheep, goats, pigs, dogs, cats and some wild animals.

Analysis of Potential Risk Factor of Leptospirosis Incidences

Risk factors that testing is a risk factor that has a P value <0.25 , among others, habit of footwear, hand washing, and of leptospirosis in cattle.

Table 4. Multivariate Analysis of Potential Risk in Leptospirosis in Humans

Variable	Pvalue	ExpB
footwear	0.019	16.885
Laptospirosis in Cattle	0.06	26.689

Based on Table 4 the potential risk of human leptospirosis cases in the Ngrayunis footwear and leptospirosis in cattle with a P value <0.05 . It shows that there is a significant interaction or relationship between footwear and leptospirosis in cattle with leptospirosis in humans.

Respondents who barefoot in outdoor have a risk of leptospirosis 16.885 times higher than those respondents who always footwear in outdoor. While respondents who have a positive leptospirosis in cattle have a risk of leptospirosis 26.689 times higher than the respondents who have a negative leptospirosis. It shows that there is a significant interaction or relationship between footwear and leptospirosis in cattle with leptospirosis in humans. Thus, in this study showed the pattern of leptospirosis distribution in Ngrayun as follows, people who suffered from leptospirosis have positive cattle leptospirosis and have a habit of barefoot in outdoor. So, that the transmission of the bacteria *leptospira* transmission from cattle to humans.

CONCLUSION

There is a relationship between the behavior of footwear habit, handwashing, and leptospirosis in cattle with leptospirosis in humans.

Potential risk factors for leptospirosis incidence in humans are footwear behavior and the incidence of leptospirosis in cattle.

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