



The Role of Several External Factors on Controlling Rabies in The City of Medan

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Abstract

Rabies cases are widespread worldwide and mostly prevalence in developing countries. Several Province in Indonesia are still categorized as endemic rabies, including the Province of North Sumatera. This research was aimed to evaluate the role of external factors that could influence in reduction the rabies suspected cases in the population of the City of Medan. The survey was conducted using a structured questionnaire. A Case-Control Design was used in this study. The two groups were rabies suspected case and rabies unsuspected case (control), consisted both male and female respondents. All the population involved in this study were living in the City of Medan. Primary and secondary data were collected using *purposive sampling* approach. Data were analysed by univariate analysis, bivariate analysis, and multivariate analysis. The result was obtained the ratio of 1:2 between rabies suspected case (64 cases) and rabies unsuspected case (128 cases) in the City of Medan. The bivariate analysis showed the significant influence of the role of livestock department officer, role of health worker, role of community leader and vaccination tools on the rabies suspected case ($P < 0.05$). Multivariate analysis showed that the dominant variable which affect the rabies suspected case was rabies vaccine tools.

Keywords: rabies suspected characteristic, rabies suspected case, role of external factor, Medan

Introduction

Rabies is one of infectious disease, which is known as mad dog syndrome in animal. The disease is caused by a virus from Rhabdoviridae family and could be transmitted to human through animal bite particularly dog, cat, and monkey. Once the virus entered the body, then attack central nervous system, and induces fatal encephalitis in the infected person and animals. The Case Fatality Rate (CFR) of rabies is 100%, since all of infected human and animals will results in death.

Rabies is spread worldwide and mostly endemic in developing countries. Approximately of 55,000 people died every year because of rabies infection. The highest incidence was found in Asia with 31.000 cases per year (56%) dan followed by Africa with 24.000 cases per year (44%). World Health Organization (WHO) reported that 30% – 50% of mortality rate was observed in children under 15 years old (WHO, 2006).

Indonesia is also categorized as country with endemic rabies. According Indonesian Regulation (UU No.4 Th.1984), the rabies outbreak can be established when

one mortality case found in human (Direktorat Jenderal P2PL Kemenkes RI, 2013). Therefore, rabies is considered as one of nationally priority for disease control program in Indonesia. Several provinces are still endemic with rabies cases, including the Province of North Sumatera. The Ministry of Health of Indonesia (2012) reported that in 2010, the case of rabid animal bite in North Sumatra were 3.714 cases, among of them of 35 people were tested positive rabies and finally died (CFR 100%). In five years later, in 2015, a number of bite case increased to 4.136 bite cases and 14 was died. In the same year, it was reported in North Sumatera that a number of 3.006 people were vaccinated with anti rabies vaccine (ARV) as effort to prevent them from high risk of rabies infection.

In North Sumatera Province, the dog population are around 190.042 animals, which spread in 25 districts/cities. In 2018, it was reported that in this province were 2634 new dog bite cases (20,4 cases per 100.000 people). Fortunately, among 2040 of them (77,4%) have been vaccinated with anti rabies vaccine (ARV). However, at the same time, 7 positive rabies cases were

found in human (2,7 per 1000 bite case) (Dinas Kesehatan Prop.Sumut, 2008).

Then, Specifically in North Sumatera Province, in the area of City of Medan has been reported that there were 441 cases of rabid animal bites, which were attacked 247 male and 194 females. The incident of dog bite was found different in the age range of 0 - 4 years (47 people), 5 -14 years (127 people), 15 -45 years (186 people) and > 45 years (81 people) (Dinas Kesehatan Kota Medan, 2008).

The Government of the City of Medan have implemented control strategy to prevent further cases of rabies, both involves Health Services and Veterinary Services. The prevention and controlling of rabies disease have been conducted by vaccination and elimination wild dog, and rabies surveillance. The effort also combined with socialization program to dog owners and improving community understanding as well as their awareness about rabies disease. Therefore, the role of various parties in rabies prevention is needed. Reinforcing factors that implemented to change community behaviour in facing rabies threat through community leader, religious leader, livestock department officer, health worker as well as the role of both electronic and printed media, were also considered in the effort strategy of rabies elimination in 2020. However, the rabies suspected case is still found. Therefore, this study was proposed to evaluate the relevancy and efficiency of prevention program as well as the possible role of external factors that affect the existence of rabies suspect cases in the City of Medan.

Materials and Methods

This research was analytic observational experiment with Case Control Design. The research was conducted in Medan in 2018. The population sample in this reseach was rabies suspected case and unsuspected case which involved both male and female lived in Medan. The number of samples used were 64 rabies suspected case and 128 unsuspected case (ratio1:2). Total samples were 192 people with sampling technique used was purposive sampling from 6 sub-districts of Medan Tuntungan,

Medan Selayang, Medan Sunggal, Medan Johor, Medan Helvetia, and Medan Perjuangan.

Independent Variable consist of knowledge, attitude, role of livestock department officer, role of health worker, role of community leader, role information media and rabies Data analysis was comprised of 3 analysis: univariate, bivariate, and multi variate analysis. Univariate analysis provides descriptive profile in form of distribution table, while bivariate was performed to evaluate the effect of independent variable on dependent variable using Chi-Square. Multivariate analysis was used to determine the dominant variable that affect rabies suspected case using logistic regression test. All the analysis was carried out using computer software.

Results and Discussion

1. Respondent Description

The data of distribution of respondent sociodemography (age, sex, race, religion, education Job, and income) is described in Table 1.

In age category, rabies suspected case mostly found between the ages of 38-47 (31,25%). On the other hands rabies unsuspected case was found in the higher ages of 48-57 (28,13%). Both suspected and unsuspected rabies case were found higher in female as compared to male, with value of 68,75% (44 people) and 76,56% (98 people), respectively.

Then, in the race category, the higher rabies suspected case was found in Batak race (60,94%). In contrast, in the category of unsuspected case, the higher case was observed in Java race (36,72%). When compared based on religion, it was found a slightly different proportion of suspected case between protestant christian (57,81% or 37 people), and Islam (61,72%).

A further proportion showed that the highest rabies suspected case was observed in group with education at senior high school (46.86%), unemployment (53.13%), and lower income (89,1%). Similar trend was also observed in rabies unsuspected case, in which the highest percentage of educational status, occupational status and

Table 1. Frequency distribution of respondent sociodemography characteristic in Medan in year 2018.

Sociodemography	Case		Control	
	N	%	N	%
Age (years)				
8-17	7	10.94	2	1.56
18-27	13	20.31	13	10.16
28-37	11	17.19	33	25.78
38-47	20	31.25	33	25.78
48-57	10	15.63	36	28.13
58-67	2	3.12	10	7.81
68-77	1	1.56	1	0.78
Sex				
Male	20	31.25	30	23.44
Female	44	68.75	98	76.56
Race				
Melayu	1	1.56	7	5.47
Batak	39	60.94	36	28.12
Karo	10	15.62	21	16.41
Mandailing	3	4.69	10	7.81
Jawa	7	10.94	47	36.72
Minang	4	6.25	5	3.91
Thamil	0	0	1	0.78
Nias	0	0	1	0.78
Religion				
Islam	19	29.69	79	61.72
Catholic	8	12.50	11	8.59
Protestant	37	57.81	35	27.35
Hindu	0	0	3	2.34
Highest education				
Elementary school	7	10.94	11	8.59
Junior high Sceondary school	12	18.76	31	24.22
Senior high school	30	46.86	62	48.44
Academy/university	15	23.44	24	18.75
Occupational status				
Civil servant	5	7.81	7	5.47
Bussinesman	25	39.06	55	42.97
Unemployment	34	53.13	66	51.56
Income				
<Rp.2.750.000, -	57	89.1	107	83.6
≥ Rp.2.75.,000, -	7	10.9	21	16.4
Total	64	100.0	128	100.0

Table 2. Cross tabulation between external factors that affects frequency of rabies suspected case in Medan in 2018.

External factor	Group of Rabies Suspected Case				P value	OR	CI 95%
	Case		Control				
	f	%	f	%			
Knowledge							
Low	9	14,1	27	21,1	0,234	0,612	0,269-1,394
Adequate	55	85,9	101	78,9			
Attitude							
Diasgree	0	0,0	0	0,0			
Agree	64	100,0	128	100,0			
Livestock Service Staff							
Low	45	70,3	108	84,4	0,036	0,439	0,214-0,899
Adequate	19	29,7	20	15,6			
Health Workers							
Low	34	53,1	104	81,3	0,001	0,262	0,135-0,507
Adequate	30	46,9	24	18,8			
Community Leaders							
Low	39	60,9	101	78,9	0,014	0,417	0,216-0,805
Adequate	25	39,1	27	21,1			
Vaccination Support							
Low	40	62,5	102	79,7	0,017	0,425	0,219-0,826
Adequate	24	37,5	26	20,3			

income was senior high school (48,44%), unemployment (51,56%), and lower income (83,6%), respectively.

2. Effect of external factors on the suspected rabies case

The distribution of external factors of knowledge, attitude, the influence of staff of of livestock service, the influence of health workers, the influence of community leaders, and rabies vaccination support are described in Table 2.

The effect of knowledge

Based on the Table 2 showed that in the cases group was found higher (85.9%) with adequate or good knowledge as compared to control group population (78.9%). However, it was not significantly different ($P>0.05$). According to Notoatmodjo (2012), knowledge plays an important role in the behavior changing. In this study, the knowledge has affected the rabies suspected case. Then, it is expected that by change their behavior, in turn may influence the community response through changing their attitude. Therefore, both knowledge and rabies prevention strategy are needed in order to decrease the rabies suspected incidence in the City of Medan.

The effect of attitude

In the Table 2 above, the result of assessment for attitude showed that all respondents in both groups totally agree with the influence of that aspect on change of behavior to response rabies case. Notoatmodjo (2012) suggested that although the good attitude showed through the results of survey, it does not mean that they will have a good practice in preventing the disease.

The influence by livestock department officer

A significant results ($P<0.05$) was obtained for the influence of the role of livestock officer in controlling the rabies case through increasing community awareness. In the case group, it was found 70.3% of respondents answered that lack of the role of livestock officer in controlling the rabies case through increasing

community awareness. Similar result was also obtained in the control group, since most of them (84.4%) given the same answer with the most respondent in the case group. The result of odds ratio analysis was showed that the role of livestock officer in controlling the rabies case through increasing community awareness is a protective factor. It was mean that improving the role of livestock officer in disease control will results in decreasing the number of rabies incidence.

The livestock department officer as a vaccinator play an important role to control rabies disease in rabies infected animal. The main duty of livestock officer was to prevent disease in animal. The increase of rabies incident due to transmission from animal to human should be the livestock officer responsibility. Therefore, the increase of biting incident by rabid animal may indicated a lack of information regarding the rabies prevention in receiving by the community. Rabies disease could be controlled if the livestock officer actively plays a role. Tahulending et al., (2015) has suggested that there was significantly correlated between the activity of livestock officer in extension program and rabies prevention effort ($p = 0,001$) with Prevalence Odds Ratio (POR) equal to 7,200. The animal health officer contributes in preventing and controlling rabies disease in order to minimize rabies suspected incident. The officer could give suggestion related to community behavior in rabies prevention.

According to Walgito (2003), normally, individual with authority in their field or skill can be easily give suggestion and will be easily accepted by others. Then, it will increase the trust to the given information, since the the community assumed that the person who sharing the guidance have a good expertise in the issue. Furthermore, Mantra in Sarwono (2004), was mentioned that educational approach in providing insight and improving health lifestyle was carried out by preparing the officer that able to transform information regarding the matters. Therefore, the livestock officer as skilled and expertise stakeholder need to involve and work

directly with the community to decrease or eliminate the rabies case in the City of Medan.

The influence of health worker

The result of this study was found that of 53,1% respondents answered that lack of influence of health officer. On the other, more respondents in control group (81.3%) were gave the same answer. It was found a significant effect of health officer role in the dynamic of cases. The results of association showed the value of OR at 0,0262 (95% CI: 0.135-0.507), which is mean as protective factor. In particular, if the health officer could conduct a regular campaign to increase community awareness on rabies risk. Tahulending et al., (2015) was found a significant association between the contribution from health worker for rabies prevention activity, thus may reduce the rabises suspected incidence.

The influence of community leader

The data obtained in this study showed that 60.9% respondent of control group were answered of lack of influence of community leader in increasing public awareness on rabies risk in the City of Medan (P<0.05). A similar trend (78.9%) was also found from the answer in the cases group. The results of analysis of OR was 0.417 (95% CI: 0.216-0.805). However, a different result was reported in the study by Marpaung (2009), which showed none influence of community leader in reducing risk of rabies in increasing public awareness. In fact, Gerungan (2003) stated that the deamenor and opinion of individual with high social prestige and good expertise, such as high position, community leader and scientist could influence the others in the community. The community leaders will be the role model for their community, thus their suggestion and advisory tend to be easily accepted by their community.

The influence of availability rabies vaccination tool

The results of analysis of the influence of availability of rabies vaccination tool showed a similar proportion of information obtained in cases dan control

group. Lack of availability of vaccination tool was answered by most of respondents (62.5%) in cases group and control group (79.7%) (P<0.05). OR was calculated at 0.425 (95% CI: 0.219-0.826), which concluded that the vaccination tool is considered as protective factor that could reduce the incidence of rabies suspected case. Logistic regression model exhibited that rabies vaccination tool was a dominant factor in dog rearing with $p = 0,001$ and $Exp = 2,864$. Especially, the vaccination tool is influence the owner behavior in dog rearing to control rabies (Marpaung, 2009). Similarly, Ganefa (2001) has mentioned that the availability of rabies vaccination tool could results in the disobedient of owner to vaccinate their dog. Therefore, the availability of vaccination tool may support the effort from the community to prevent rabies, thus in turn will decrease rabies incidence.

Multivariate analysis

Based on bivariate analysis, all variables fullfill the requirement of significance ($p < 0.25$), thus could be included in mutivariate analysis as depicted in Table 3.

Table 3. Independent variable in multivariate analysis

Variable	P
Knowledge	0.234
Role of livestock department officer	0.036
Role of health worker	0.001
Role of community leader	0.014
Rabies vaccination tool	0.017

Multiple logistic regression model was obtained from several processes. The process will stop when the variable was not more available to be included in the analysis. The multivariate analysis could be seen in Table 4.

Table 4 showed that the dominant factors that affect the rabies suspected case in Medan in the year of 2018 were rabies vaccination tool (Exp B= 0.606) and the influence of health worker (Exp B= 0.301). The most dominant factor between those two factors was the availability of rabies vaccination tool ($p = 0,171$ and $Exp B = 0,606$).

Tabel 4. Multivariate analysis

	Variable	Coef. (B)	p	Exp. (B)	95% C.I Exp (B)	
					Lower	Upper
Stage 1						
	Knowledge	-0.325	0479	0.722	0.294	0.777
	Influence of livestock department officer	-0.072	0.875	0.931	0.379	2.283
	Influence of health worker	-1.044	0.006	0.352	0.168	0.738
	Influence of community leader	-0.401	0.328	0.670	0.300	1.495
	Availability of rabies vaccination tool	-0.345	0.399	0.708	0.317	1.580
	Constant	0.665	0.093	1.944		
Stage 2						
	Knowledge	-0,330	0,471	0,719	0,293	1,765
	Influence of livestock department officer	-1,054	0,005	0,349	0,168	0,725
	Influence of health worker	-0,416	0,292	0,660	0,302	1,440
	Influence of community leader	-0,368	0,339	0,692	0,326	1,471
	Constant	0,642	0,080	1,900		
Stage 3						
	Influence of health worker	-1.106	0.003	0.331	0.161	0.680
	Influence of community leader	-0.342	0.373	0.710	0.334	1.508
	Availability of rabies vaccination tool	-0.411	0.279	0.663	0.315	1.396
	Constant	0.599	0.098	1.821		
Stage 4						
	Influence of health worker	-1.199	0.001	0.301	0.151	0.602
	Availability of rabies vaccination tool	-0.502	0.171	0.606	0.296	1.241
	Constant	0.487	0.150	1.627		

Conclusion

In conclusion, the result of this study showed that no significant influence of the knowledge and attitude. On the other hand, there were significant effect of the influence of livestock department officer, health department officer, community leader, and the availability of vaccination tool on rabies suspected case. Then, the dominant variable that affected the rabies suspected case was the availability of rabies vaccination tool.

Acknowledgement

The authors gratefully acknowledge the Universitas Sumatera Utara for funding this research through TALENTA Universitas Sumatera Utara (Fundamental Research Scheme) year 2018 with contract no:128/UN5.2.3.1/PPM/KP-TALENTA USU/2018.

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