

Outbreaks Surveillance of Unknown Origin Acute Fever in Jeneponto, South Sulawesi

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ABSTRACT

April 2019, the Jeneponto District Health Office be up against outbreak of the acute fever of unknown origin in Garonggong, Tuju Village, West Bangkala District, there were 70 patients with three deaths. South Sulawesi Provincial Health Service investigation found that 27 patients had fever accompanied by nausea, vomiting and headaches since the end of March 2019. Patients also felt pain in the muscles and joints so that there was a suspicion of *Leptospira* and or *Rickettsia* infection in the area. Banjarnegara Health Research and Development Unit conducted an epidemiological investigation by examining blood and kidney samples in reservoir animals in the area. Rat capturing was carried out for 2 nights to test *Leptospira* and *Rickettsia* content with PCR Methods. A total of 20 rats were caught and PCR test found one individual rat of *Rattus tanezumi* species positively infected by the bacteria *Leptospira* sp. *Rickettsia* examination shows that *Xenopxylla cheopis* fleas infested *R. tanezumi* positively infected with *Rickettsia* sp. We conclude that Garonggong, Tuju Village, West Bangkala Subdistrict, Jeneponto Regency, South Sulawesi has the potential for rat-borne disease transmission, particularly *Leptospirosis* and *Rickettsiosis*.

Keywords: *epidemiological investigation, Leptospirosis, Rickettsia*

1. INTRODUCTION

An unknown pathogens cause of fever suddenly occurred in Garonggong Hamlet, Tuju Village, Bangkala Barat District, Jeneponto Regency, South Sulawesi in April 2019, caused 70 illnesses and three deaths. The local government-South Sulawesi Provincial Health Office and Jeneponto District Health Services teams perform rapid respond to investigate into this case and confirm the state of affairs. it was reported that 27 people from this location being suffered from fever accompanied by nausea, vomiting and headaches since 27 March 2019. Of the total cases of the disease, 2 people died. In addition to nausea and vomiting, pain symptoms in the muscles and joints were arisen.

The team arranged blood samples survey for the pathogen examination. As a result, the test showed 2 positive of 25 samples tested with *Tipoid* RDT; 20 negative samples of the *DDR* test; and 60 samples whose results were all negative of the *malaria* RDT test. To ensure the potential transmission of diseases from animals in Garonggong, samples from the community were sent to check for *Dengue*, *Chikungunya*, and *Zika* diseases at *BBTKLP* Class 1 Makassar, but the results of all the three diseases were negative also.

The South Sulawesi Provincial Health Office continued the inquisition of the outbreak, invites any other institution to assist the efforts. Referring to the information of symptoms of the diseases, epidemiological investigations

establish various types of diseases with similar symptoms as a target. *Nipah Virus*, *Hendavirus*, *Hantavirus*, *Leptospira*, *Rickettsia*, chemical poisoning and *Anthrax*^{5,6} was hypothesized as potential sources of the responsible agent contribute to the outbreaks. Banjarnegara Health Research and Development Unit have been participated by conduct an epidemiological investigations focusing on the possibility of animals borne diseases, especially *leptospirosis* and *rickettsiosis* transmitted by rat.

2. METHOD

To identify outbreaks of unknown origin acute fever, we collect rats-*leptospirosis* reservoir- blood and kidney specimen and flea specimen. Rat captured on Garonggong, West Bangkala, Jeneponto, South Sulawesi at May 12th-17th 2019.

The activity of rats capturing began by setting 190 live traps in the afternoon. every houses in the village installeds 2 traps respectively, placed where they are thought to be frequented by rats. We used roasted coconut as a lure and the arrest was held for 2 consecutive nights. Traps that already contained rats were labeled and put into cloth bags. Furthermore, rats were stunned by anesthetized *Ketamine HCL* 100 mg/kg body weight of rats, then were taken blood and fleas and then dissected to take the kidneys as an examination of the presence of pathogens. The kidneys are examined to find *Leptospira* bacteria by PCR method. Ectoparasites were identified and examined for *Rickettsia* spp by PCR method. The examination was

carried out at the Microbiology, Biomolecular and Immunology Laboratory of the Banjarnegara Research and Development Center.

3. RESULTS AND DISCUSSION

Garonggong is a hamlet in Tuju Village, West Bangkala District, South Sulawesi province. Traps were installed throughout all houses and disperse on the residential area.

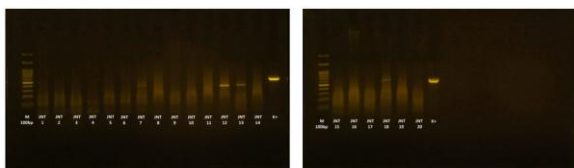


Figure 1. Map of Garonggong and rat captured point.

Recapitulation of rat capture dan results of *Leptospira* examination showed in Table 1 and Figure 2.

Table 1. Recapitulation of rat capture in Garonggong Hamlet dan the results of *Leptospira* examination using PCR method

No	Species	Sex	Labels	Samples Code	PCR Results
1	<i>Rattus tanezumi</i>	F	73	JNT 1	-
2	<i>Rattus tanezumi</i>	M	21	JNT 2	-
3	<i>Rattus tanezumi</i>	M	6	JNT 3	-
4	<i>Rattus tanezumi</i>	M	47	JNT 4	-
5	<i>Rattus tanezumi</i>	F		JNT 5	-
6	<i>Rattus tanezumi</i>	F	138	JNT 6	-
7	<i>Bandicota bengalensis</i>	F		JNT 7	-
8	<i>Rattus norvegicus</i>	M	40	JNT 8	-
9	<i>Rattus tanezumi</i>	F	47	JNT 9	-
10	<i>Rattus tanezumi</i>	F	136 L	JNT 10	-
11	<i>Rattus tanezumi</i>	M	41	JNT 11	-
12	<i>Rattus norvegicus</i>	M	42	JNT 12	+
13	<i>Rattus tanezumi</i>	M	131	JNT 13	-
14	<i>Rattus tanezumi</i>	F	134	JNT 14	-
15	<i>Rattus tanezumi</i>	F	133	JNT 15	-
16	<i>Rattus norvegicus</i>	M	64	JNT 16	-
17	<i>Rattus tanezumi</i>	M	72	JNT 17	-
18	<i>Rattus tanezumi</i>	M	135	JNT 18	+
19	<i>Rattus tanezumi</i>	M	190	JNT 19	-
20	<i>Rattus tanezumi</i>	M	188	JNT 20	-



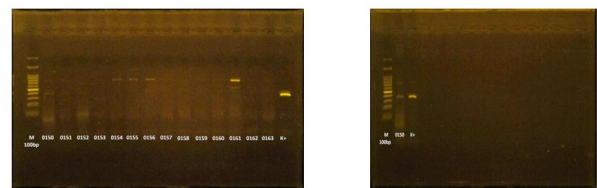
Exp.: M : Marker; JNT 1- 20 : Samples; K+ : Positive Control

Figure 2. Results of *Leptospira* examination in rat kidney samples using PCR method

The results of examination of the presence *Rickettsia* spp. using PCR method showed in Table 2 and Figure 3.

Table 2. Results of examination of the presence *Rickettsia* spp. in rat ectoparasites captured in Garonggong Hamlet using PCR method

No	Type of Ectoparasites	Samples Code	PCR Results
1	Fleas (<i>X. cheopis</i>)	JNT 2	+
2	Fleas (<i>X. cheopis</i>)	JNT 3	-
3	Mites	JNT 3	-
4	Mites	JNT 4	-
5	Fleas (<i>X. cheopis</i>)	JNT 5	-
6	Fleas (<i>X. cheopis</i>)	JNT 10	-
7	Fleas (<i>X. cheopis</i>)	JNT 14	-
8	Mites	JNT 14	-
9	Fleas (<i>X. cheopis</i>)	JNT 15	-
10	Mites	JNT 15	-
11	Ectoparasites	JNT 16	-
12	Fleas (<i>X. cheopis</i>)	JNT 17	-
13	Mites	JNT 17	-
14	Fleas (<i>X. cheopis</i>)	JNT 18	-



Exp.: M: Marker; K+: Positive Control; 0150-0163: Samples Code

Figure 3. Results of examination of the presence *Rickettsia* spp. using PCR method

DISCUSSION

Inhabitant settlements in this region are grouped and separated from others by paddy fields and dry fields boundaries (Figure 1). The fever outbreak that harm people only in this region indicates the cause of the disease comes from the internal region. it strongly indicates environmental factors comprise the main cause of the disease. Based on this fact, we have direct the investigation targeting pathogen contained in the area. Our team conducted an epidemiological investigation based on this assumption. As part of a main team that conducts a comprehensive investigation, we only focus on suspicion of animal-borne disease transmission. Especially, the notions that the symptoms of the disease are similar to those of leptospirosis and rickettsiosis, so we collect samples from reservoir of the both: rats.

The number of rat obtained from two nights of trapping was 20 individu, *Rattus tanezumi* or house rat was the major species. Generally, they were trapped in different houses, indicates an even distribution pattern of rat in resident houses. However, there were broillers hennery in the northern side of the settlement, we caught a total of 6 individual rat in and around (Figure 1; Table 1, Label 131-138), illustrates that the rat density in the coop has been dense and tends to cluster. Rat existance in this location has been supported by abundant food sources in the cage, rats utilize chicken food scraps as a nourishment. Furthermore, spacious construction allow rats live in much numbers concomitant the large carrying capacity of the environment. Another predispose factor was the minimum level of control of rats, the chicken farmer employee

acknowledge that there are no extermination program so far.

a. *Leptospira* Detection

Examination of *Leptospira* conducted by PCR method. Twenty of rats kidney was used as samples. The results showed that one rat was positive of pathogenic *Leptospira* (samples number 18). The rat species that found positive of pathogenic leptospira was *R.tanezumi*. The results in line with the report of vectora and reservoir disease specific research in South Sulawesi (2017). Aside as reservoir of leptospirosis, *R. tanezumi* can also play as reservoir of Hanta disease. Even does possibility of double infection in one rat. The positive rat was obtained around chicken coop. That matter should be a vigilance because of the presence of several water reservoirs and wells around the chicken coops that can be a transmitting medium of leptospirosis to humans. Furthermore, the community habits of not closing the wells can increases the risk factor of leptospirosis transmission⁷.

b. *Rickettsia* Detection

Ectoparasites of the rat were used as samples for examination of the presence *Rickettsia* spp. Ectoparasites that found in rats captured in Garonggong Hamlet consisted of mites and fleas (*Xenopsylla cheopis*). There was one rat that was positive for *Rickettsia* spp. in Garonggong Hamlet. The positive rat was *R. tanezumi* species. Rats and the type of ectoparasites species that were positive for *Rickettsia* spp. in Garonggong Hamlet were accordance with the results of Widiastuti's research in Semarang City. According to those research, *Xenopsylla cheopis* infested all types of rats found in Semarang City so that there were no specific hosts for these fleas⁸. The existence of fleas that was positive *Rickettsia* spp. in Garonggong Hamlet can be a concern of public health institution in that area. That was because Murine typhus disease caused by these bacteria cannot be distinguished specifically from a fever that is caused by other pathogens.

4. CONCLUSION

One species of *Rattus tanezumi* that captured in the survey site was confirmed for positive of pathogenic *Leptospira* using PCR method. Ectoparasites from rats captured in the survey site was confirmed for positive *Rickettsia* spp. was the fleas of *Xenopsylla cheopis*

5. RECOMMENDATION

There needs to increase the vigilance of the potential transmission of infectious disease by vector and reservoir in Garonggong Hamlet. Counseling and training about transmission of infectious disease by vector and reservoir need to be provided for health workers to find out the appropriate prevention, control and management. It is necessary to provide device for leptospirosis and rickettsiosis detection in public health service as first detection tool if there are diseases with symptoms that

leads to those disease. There needs to provide a comprehensive reports (joint reports) regarding epidemiological investigations which have been done jointly together with several instansions during extraordinary outbreaks events in Garonggong Hamlet.

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