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SHORT COMMUNICATION

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Seroprevalence of Japanese encephalitis virus using competitive enzyme linked immunosorbent assay (C-ELISA) in pigs in East Sumba, Indonesia

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ABSTRACT

Japanese Encephalitis (JE), a vector-borne zoonotic viral disease, is mostly prevalent in Asian countries. The objective of this study was to investigate the occurence of JE virus (JEV) among pigs in East Sumba, Indonesia. Blood samples (n=52) were randomly collected from 52 apparantly healthy pigs where pig population was high in East Sumba. The samples were subjected for seroprevalence study for the presence of antibodies against JEV using competitive enzyme linked immunosorbent assay (C-ELISA). Results showed that 53% (n=28/52) blood samples from the pigs contained antibodies against JEV. This finding is suggestive that the JEV is circulating among pig population in East Sumba, Indonesia. The data may help in designing control strategies of the JEV in the East Sumba, Indonesia.

Keywords

Japanese encephalitis, Pig, Vector borne diseases, Zoonosis

ARTICLE HISTORY

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INTRODUCTION

Japanese Encephalitis (JE), a viral disease caused by Japanese Encephalitis Virus (JEV), is a vector-borne zoonotic disease occuring mostly in Southeast Asia, East Asia, South Asia, and the Pacific (Shimojima et al., 2011). About 3 billion people live in the countries where JEV is endemic, and the annual incidence of the disease is estimated as 30,000-50,000 cases (Saxena, 2008). The JE has considerable fluctuations in estimates of its global impact (WHO, 2008).

Pigs play an important role as major amplifying host of JEV exerting potential health risk to human (Ritchie et al., 2007; Yamanaka et al., 2010). *Culex* mosquitoes may act as the amplifying intermediate host of JEV (Hurk et al., 2008). The clinical manifestations of JE in human include febrile illness, aseptic meningitis or encephalitis which manifests sensorium, seizures and focal neurological deficit and acute flaccid paralysis (Liu et al., 2010).

Migration of mosquitoes from one island to another is often considered as the influencing factor to increase incidence of JE (Samuel et al., 2008). JE causes significant epidemics of encephalitis, especially in children aging less than 10 years, causing 10,000 deaths annually (Diagana et al., 2007; Saxena, 2008). Information regarding the distribution and public health importance of JE in South East Asian countries is very important (Nidaira et al., 2007; Olsen et al., 2010).

According to the survey report of PATH and NIHRD (2006) on 15 hospitals in 6 provinces in Indonesia, the incidence of JEV was recorded mostly among children aging <15-year. In 2006, 12 patients who were clinically diagnosed symptoms of encephalitis had been infected with JEV in Bali. Serologically, 36.2% of 116 cases were positive for JE infection, as reported by Sendow et al. (2005). In Bali and Java, pigs are regarded as an important amplifying host for JE, as antibodies to JEV is present in majorly pigs of these areas (Yamanaka et al. 2010; Kumara et al., 2013). In 2009, JE antibodies were detected in pigs in East Nusa Tenggara Province. The highest prevalence (100%) of JE was recorded in pig serum in Manggarai and West Manggarai districts (Santhia et al., 2008). However, there is no report of the seroprevalence study on JE that covers East Sumba area

of Indonesia. Thus, the present study was designed to investigate the seroprevalence of JE in pigs in East Sumba, Indonesia.

MATERIALS AND METHODS

A total of 52 blood samples were randomly collected from 52 apparently healthy pigs from East Sumba, particularly from the areas in East Sumba where pig population was very high. The age of the pigs varied from 6 months to 3 years. The blood samples were collected in test tubes without using any anticoagulant. After collection, the blood samples were transported to the Laboratory of Animal Disease, Denpasar-Bali. The blood samples were processed for the preparation of serum, as described by Guma et al. (2014). The serum samples were centrifuged at 3,000×g for 10 min. The upper clear portion of serum was collected and incubated for 30 min at 56^0C to destroy the complements. Finally, the serum samples were examined for the presence of JEV antibodies using competitive enzyme-linked immunosorbent assay (C-ELISA) kit, according to the method described by the manufacturer. The commercial C-ELISA kits were obtained from Austalian Animals Health Laboratory, Australia.

RESULTS AND DISCUSSION

A total of 52 serum samples from 52 pigs were tested by C-ELISA, of which 53% (n=28/52) serum samples were found to be seropositive for antibodies against JEV (**Figure 1**).

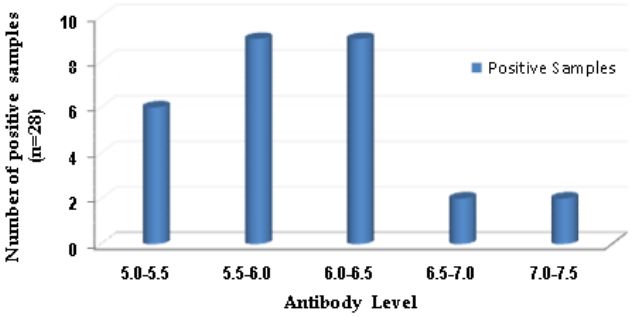

Figure 1. Seroptositive for antibodies against Japanese Encephalitis Virus.

Livestock rearing system is closely associated with the transmission of the disease. Prior to sampling, a survey was conducted in the areas where pigs were maintained both by extensive and intensive systems. This fact has been known to cause JE by vectors (*Culex* mosquitoes) that can easily transmit JEV from pigs to humans (Liu et al., 2010). Moreover, the location of pig maintenance with home has become an important source of disease transmission.

The close distance between the pig farms to the residential areas becoming an important cause of JE. The houses of the owners located adjacent to rice fields influenced the occurrence of JE, as the rice fields are known to be a source of *Culex* mosquito breeding. The JEV is mainly transmitted by the mosquito (*Culex tritaeniorrhynchus*), which prefers to breed in irrigated rice paddies (Tobias et al., 2009). Climatic conditions of East Indonesia (Sumba) strongly support the *Culex* mosquito for their easy growth and multiplication.

Environmental management for vector control, such as an effective irrigation requires well-organized educational programs (Tobias et al., 2009). Environmental management measures also may act as broader approach of vector management (WHO, 2008) through which JE can be controlled.

CONCLUSION

The results indicate that JEV is circulating among pig population in East Sumba, Indonesia with a prevalence rate of 53%. Care should be taken for effective prevention and control of JEV so that public health can be ensured in East Sumba, Indonesia.

CONFLICT OF INTERESTS

The authors declare that they have no conflict of interests.

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REFERENCES

Diagana M, Preux PM, Dumas M (2007). Japanese encephalitis revisited. Journal of the Neurological Sciences, 262: 165-170.

Guma EI, Hussien MO, Salih DA, Salim B, Hassan SM (2014). Prevalence of ticks (Acari: Ixodidae) and Theileria annulata antibodies in White Nile State, Sudan. Journal of Advanced Veterinary and Animal Research, 2: 69-73.

Hurk AF, Ritchie SA, Johansen CA, Mackenzie JS, Smith GA (2008). Domestic pigs and Japanese encephalitis virus infection, Australia. Emerging Infectious Disease, 14: 1736-1738.

Kumara WB, Adi AM, Mahardika GN (2013). Deteksi Antibodi terhadap Virus Japanese Encephalitis pada Ternak Babi Di Wilayah Jembrana dan Klungkung. Indonesia Medicus Veterinus, 2: 76-84.

Liu W, Gibbons RV, Kari K, Clemens JD, Nisalak A, Marks F, Xu ZY (2010). Risk factor for Japanese encephalitis: a case-control study. Epidemiology and Infection, 138: 1292-1297.

Nidaira M, Taira K, Itokazu K, Kudaka J, Nakamura M, Ohno A, Takasaki T (2007). Survey of the antibody against japanese encephalitis virus in Ryukyu wild boars (Sus scrofa riukiuanus) in Okinawa, Japan. Japanese Journal of Infectious Diseases, 60: 309-311.

Olsen SJ, Supawat K, Campbell AP, Anantapreecha S, Liamsuwan S, Tunlayadechanont S, Visudtibhan A, Lupthikulthum S, Dhiravibulya K, Viriyavejakul A, Vasiknanonte P, Rajborirug K, Watanaveeradej V, Nabangchang C, Laven J, Kosoy O, Panella A, Ellis C, Henchaichon S, Khetsuriani N, Powers AM, Dowell SF, Fischer M (2010). Japanese encephalitis virus remains an important cause of encephalitis in Thailand. International Journal of Infectious Diseases, 14: 888-892.

PATH [Project in Indonesia is a collaborative effort between] dan NIHRD [The National Institute of Health Research and Development] (2006). Japanese Encephalitis Surveillance in Indonesia: current status and activities. Litbang. Depkes RI.

Ritchie SA, Hurk AF, Zborowski P, Kerlin TJ, Banks D, Walker JA, Lee JM, Montgomery BL, Smith GA, Pyke AT, Smith IL (2007). Operational trials of remote mosquito trap systems for Japanese encephalitis virus surveillance in the Torres Strait, Australia. Vector Borne and Zoonotic Diseases, 7: 497-506.

Samuel PP, Arunachalam N, Hiriyan J, Tyagi BK (2008). Host feeding pattern of Japanese encephalitis virus vector mosquitoes (Diptera: Culicidae) from Kuttanadu, Kerala, India. Journal of Medical Entomology, 45: 927-932.

Santhia K, Morrissy APC, Dibia N, Putra AAG, Moss A, Lunt R, Peter D (2008). Surveiprevalensi JE pada sapi dan babi kota Denpasar, Kabupaten Buleleng dan Tabanan. Buletin Veteriner BPPV VI Denpasar, 21: 83-88.

Santhia K, Morrissy APC, Dibia N, Soeharsono, Moss A (2000). Survei Serologis terhadap Antibodi Virus *Japanese encephalitis* pada Babi di Propinsi Nusa Tenggara Timur. Buletin Veteriner BPPV VI Denpasar, 13: 19-25.

Saxena SK (2008). Japanese encephalitis: perspectives and new developments. Future Neurology, 3: 515-521.

Sendow I, Bahri S, Sarosa A (2005). Perkembangan Japanese Encephalitis di Indonesia. Warta Zoa, 15: 111-118

Shimojima K, Isidor B, Le Caignec C, Kondo A, Sakata S, Ohno K, Yamamoto T (2011). A new microdeletion syndrome of 5q31.3 characterized by severe developmental delays, distinctive facial features, and delayed myelination. American Journal of Medical Genetics Part A, 155: 732-736.

Tobias EE, Weiss S, Keiser J, Utzinger J, Wiedenmayer K (2009). Past, Present, and Future of Japanese Encephalitis. Emerging Infectious Diseases, 15: 1-7.

WHO (2008). WHO position statement on integrated vector management. Available at- http://www.who.int/malaria/publications/atoz/who_htm_ntd_vem_2008_2/en/ (Accessed on October 18, 2015).

Yamanaka A, Mulyatno KC, Susilowati H, Hendrianto E, Utsumi T, Amin M, Lusida MI, Soegijanto S, Konishi E (2010). Prevalence of antibodies to Japanese encephalitis virus among pigs in Bali and East Java, Indonesia, 2008. Japanese Journal of Infectious Diseases, 63: 58-60.

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