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 occurrence of JE virus (JEV) among pigs in East Sumba, Indonesia. Blood samples (n=52) were randomly collected from 52 apparently 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

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INTRODUCTION
Japanese Encephalitis (JE), a viral disease caused by Japanese Encephalitis Virus (JEV), is a vector-borne zoonotic disease occurring 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°C 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 Australian 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. Seropositive for antibodies against Japanese Encephalitis Virus.](image)

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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