KO-INFEKSI VIRUS DENGUE DAN CHIKUNGUNYA PADA NYAMUK *Aedes aegypti* L. (Diptera: Culicidae) DI KOTA MATARAM

Munawir Sazali
18/435300/SBI/00153

INTISARI

Nyamuk *Aedes aegypti* merupakan vektor utama virus dengue (DENV) dan chikungunya (CHIKV). Surveilans vektor masih menjadi salah satu pilihan utama pengendalian kasus DENV dan CHIKV di lingkungan. Surveilans pada penelitian ini menggunakan rancangan penelitian *cross-sectional design* yang dilakukan pada 102 rumah di enam kecamatan Kota Mataram. *Density figure index* digunakan sebagai acuan untuk mengukur *container index* (CI), *house index* (HI), dan *breteau index* (BI) serta analisis Angka Bebas Jentik. Berdasarkan nilai *density figure index*, hal ini dijadikan sebagai patokan dalam menentukan analisis distribusi spatial-temporal, pola penyebaran dan wilayah berisiko vektor. Deteksi DENV dan CHIKV secara simultan dilakukan menggunakan RT-PCR untuk mendapatkan material genetik virus. Deteksi ko-infeksi virus dilakukan dengan pendekatan *real-time* qPCR. Interaksi antara reseptor protein *C-Type Lectin* (CTL) *Ae. aegypti* dengan ligan dari envelope DENV dan CHIKV dilakukan dengan analisis biokomputasi melalui pendekatan *protein docking*. Hasil analisis densitas vektor didapatkan HI dan ABJ berbeda secara signifikan ($p=0,000<0,05$), Kecamatan Mataram memiliki nilai HI tertinggi 76,47%. Nilai ABJ tertinggi di Kecamatan Sandubaya sekitar 70,59% (masih tergolong wilayah berisiko). Wilayah berisiko tinggi penyebaran vektor adalah Kecamatan Ampenan, Mataram dan Cakranegara dengan pola *dispersed*. DENV-1, 2, dan 3 serta CHIKV diketahui bervariasi di setiap wilayah dengan persentase secara berurutan 18,2, 36,4, 27,2 dan 18,2%. Informasi kandidat reseptor potensial secara bioinformatik menunjukkan CTL7 memiliki nilai *lowest binding energy* sebesar -1407,20 kcal/mol terhadap DENV1, 2, 3, 4, dan CHIKV, hal ini menunjukkan CTL7 merupakan kandidat reseptor terkuat dalam terjadinya ko-infeksi antara DENV 1, 2, 3, 4 dan CHIKV pada nyamuk *Ae. aegypti*. Oleh karena itu, pemanfaatan surveilans secara terpadu dan informasi infeksi virus pada vektor *Ae. aegypti* diperlukan untuk pengendalian kasus demem berdarah dengue dan chikungunya secara terpusat dan berkelanjutan.

Kata Kunci: *Aedes aegypti*, *C-Type Lectin* 7, DENV dan CHIKV, Surveilans

DENGUE AND CHIKUNGUNYA VIRUSES INFECTION AT *Aedes aegypti* L. (Diptera: Culicidae) di KOTA MATARAM

ABSTRACT

Aedes aegypti is one of the main vectors of dengue virus (DENV) and chikungunya virus (CHIKV). Vector surveillance is the important agenda of controlling DENV and CHIKV infections in the environment. The surveillance study used a cross-sectional research design, it's carry out vector surveillance on 102 houses in Mataram City, West Nusa Tenggara, Indonesia. The density figure index can measure container index (CI), house index (HI), and breteau index (BI) as well as Angka Bebas Jentik (ABJ) analysis. Based on the density figure index value, it can be used as a benchmark in determining spatial-temporal distribution analysis, distribution patterns and risk areas of vector. Simultaneous detection of DENV and CHIKV was carried out using the RT-PCR approach to obtain cDNA. Furthermore, virus infection detection was carried out based on the real-time qPCR program. The interaction of *Ae. aegypti C-Type Lectin* (CTL) protein receptors and viral envelope ligands were carried out in biocomputational analysis based on protein-protein docking. The results of vector density analysis showed that HI and ABJ were significantly different ($p=0.000<0.05$), Mataram Ssub-district has the highest HI value of 76.47%. The highest ABJ value was at Sandubaya District, around 70.59% (classified as a risky area). The high risk areas were Ampenan, Mataram and Cakranegara sub-districts with a dispersed pattern. DENV-1, 2, 3, 4 and CHIKV detection were found to be different in the region with the percentages of 18.2%, 36.4%, 27.2% and 18.2% respectively. Information of potential receptor was carried out bioinformatically, CTL7 has the lowest binding energy value of -1407.20 kcal/mol against DENV1, 2, 3, 4, and CHIKV. Therefore, surveillance and potential viral infections in *Ae. aegypti* were necessary for centralized and continuous control in Mataram City.

Keywords: *Aedes aegypti,* C-Type Lectin 7, DENV and CHIKV, Surveilansc