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SHORT COMMUNICATION ON
THE LANGKAWI CHARTER ON URBAN HEALTH

CONSTRUCTION SITE AS TRANSMISSION HUB FOR DENGUE: CHALLENGES AND CONFLICT IN URBAN ENVIRONMENT

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Dengue is the most important vector-borne disease, globally. The number of dengue cases reported for dengue fever and dengue hemorrhagic fever in Malaysia has risen dramatically over the last decades. Urban development contributes to the increased risk of dengue infection and transmission, especially in construction sites. In Malaysia, the construction industry has been identified as one of the major contributors that create breeding sites and increase the dengue virus transmission. In 2015, dengue cases and deaths that have been caused by dengue in the construction site have increased by 11.2% and 50% respectively compared to 2014 (Fernandez, 2016). While in 2018, between the period from January to August, a total of 77 construction sites in Johor have been fined and given compounds for various dengue-related offences (Ali, 2018). Construction activities and construction site uncleanliness can cause massive dengue outbreak (Lee et al., 2015). The increase of cases and deaths are difficult to control because construction sites with their canvas, plastics, polystyrene, pails, drums, containers, and ground depressions become potential as breeding areas for mosquitoes. The best breeding conditions are offered by poorly maintained, unventilated latrines or uncovered septic tanks especially in the construction area (Saleeza et al., 2011). The developer needs to ensure that the construction sites are free from breeding grounds for Aedes mosquitoes. Human activities can trigger the breeding of mosquitoes but they can be countered by adequate checking and monitoring as well as through complying with the laws.

HIGHLIGHTED ISSUES FROM MUHF 2019

The discussion aims to aid in the design of integrated vector control, with an emphasis on environmental management and biological control strategies, to be used by the construction industry in order to eradicate breeding sites and reduce dengue transmission in the construction site.

Construction sites are complex environments in terms of their geographical and surrounding condition which contribute to the complexity of dengue transmission. Any places or objects that can contain water and are hidden from sunlight have the potential to become the breeding sites of the mosquitoes. These are some factors regarding a construction site that may contribute to dengue transmission the size, phase and duration of the project, the number of workers involved and the abundance of mosquito species. Bigger projects usually pose a higher risk of dengue transmission since they demand longer construction periods. The workers are exposed longer to the biological risk which may worsen the threat of being infected by dengue when the potential breeding sites are not eliminated (Dattani et al., 2018). Moreover, improper waste management and poor housekeeping at the construction site and the workers' quarters are also among the problems. Proper housekeeping is often neglected since the workers only focus on building activities to ensure on-time building completion. Abandoned projects also become a problem because site monitoring cannot be done. Many construction workers are foreign workers. Thus, the language barrier between the site supervisors and the

workers is also a challenge in sustaining a safer biological environment. The foreign workers might have a problem in understanding the instruction and orders from their supervisor regarding the construction site's housekeeping and cleanliness.

Construction sites are threats to the urban population as it promotes dengue transmission. An effective way to improve the construction site's condition is by implementing the concept of 'Hierarchy of Prevention': elimination, substitution, engineering controls, administrative controls and personal protective equipment (PPE). Firstly, all unnecessary equipment, containers, plastic receptacles etc around the construction site should be removed. Secondly, the waste containers to collect on-site waste should be covered from rain and shine. Next, segregation of waste on-site can be practised to keep potential containers from collecting water. Then, the administrative control should assign tasks for supervisors to oversee potential breeding sites. Finally, the use of protective clothing and repellants for workers during construction activities are encouraged to prevent mosquito bites. In order to keep the cleanliness and good housekeeping in construction sites, the Safety and Health Officer (SHO) and the Site Safety Supervisor (SSS) in charge should monitor this biological risk. Guidelines from the Ministry of Health especially the "Garis Panduan Kawalan Denggi Di Tapak Pembinaan" provide biological, chemical, and mechanical methods to control dengue. The Adaptation of Environmental Impact Assessment (EIA) and the Environmental Management Plan (EMP) concept for the construction sites are also effective ways to improve housekeeping in the construction site. Other than that, spreading knowledge and awareness to the construction workers can help in minimising the dengue threat. This biological risk can be made aware to the workers via the morning briefing (toolbox meeting) by site supervisors. Health education on this issue can also be made as a part of the green card training program to all workers. The Construction Industry Development Board (CIDB) awareness day program should also focus on the control of dengue infection in construction sites.

Effective vector control strategies in the construction site can prevent mosquito breeding and reduce dengue transmission. Each project must have a proper mitigating measure plan for the project not only to protect the environment but also for disease prevention. The integration of connection and contribution between agencies are important to ensure the mitigation plan is monitored and followed. This integration requires a responsible leader to lead and give orders; the head of Municipal Council for local incidents or referring to the Malaysian National Security Council (NSC) for a bigger disaster. This is to make sure all agencies play their role and do their part accordingly. Moreover, government and researcher should work together to conduct researches on the effectiveness of the current control measure to see whether it is still relevant and can it reduce the number of dengue cases. Also, engagement with local communities by mobilising local communities and activating local leadership with the active participation of government and non-government organisations are important for the initiation of preventive strategies such as the Communication for Behavioural Impact (COMBI) program in the construction site. The community should be aware of and concern about the construction activities in their neighbourhood and should not hesitate to report to the authority if they suspect the developers' construction sites harbour mosquito breeding places. In addition, hiring a pest control company can be a compulsory requirement before tendering for a license from the local council and Department of Occupational Safety and Health (DOSH).

Enforcement can decrease dengue breeding and transmission in the construction site. The Occupational Safety and Health Act (OSHA) 1994 has a list of all the employer's responsibilities. The employer should comply with the regulation without fail to avoid any legal action that can be taken against them. Moreover, if the construction site is found to have mosquito breeding, the developer may be charged under Section 13 (1) of the Destruction of Disease Bearing Insects Act 1975, in conjunction with Section 13 (2) of the same act on conviction to a maximum fine of RM10,000 or imprisonment of up to two years or both for the first offense. Legal actions such as fines, penalty, prosecution in court, stop-work orders and construction site closure can decrease dengue breeding and transmission in construction sites. The developers should take this issue seriously as legal actions may prolong the completion period, affecting their building progress and will increase their cost. At the moment, these acts: Communicable Disease Control (CDC) Act 1988, Occupational Safety and Health Act (OSHA) 1994, Destruction of Disease Bearing Insects Act 1975, Factories and Machinery (Safety, Health and Welfare) Regulations 1970, Contractor Registration Regulations (Construction Industry) 1995, Uniform Building By-Laws 1984, and By-Laws under the Local Government Act are statutory tools against this biological risk on the construction site. The frequency of enforcement depends on the instruction from the Ministry of Health from time to time depands on the trend of the dengue cases. The frequency of enforcement are different for the non-outbreak and outbreak area. While 'Search and Destroy' activity will be conducted for every single dengue case that is reported, a theme-based operation such as the "OPS Tapak Bina" and the "OPS Gempur Aedes" are also conducted at a quarterly peroid per year. However, the participants have suggested that the

operation should be conducted more regularly throughout the construction period.

The presence of mosquito breeding in the construction sites albeit pest control measures that have already been employed do not negate the developers' full responsibilities, since every registered developer must have established Hazard Identification, Risk Assessment and Risk Control (HIRARC) plan prior to the project. The developers should take appropriate action themselves to eliminate and prevent mosquitoes breeding and dengue transmission in the construction site. Other agencies such as DOSH, CIDB, Department of Environment (DOE), MOH, and local authorities can only help to ensure compliances with the law. All parties are responsible for educating and preventing dengue transmission in the construction sites, therefore a proper module for education should be prepared and distributed to all agencies as a contingency reference. Effective 'bottom-up' community participation such as the local authorities (local council, district health office, CIDB) has been recognised as an important component of environmentally sustainable control programs. Sustainability on construction site can be achieved by inter-agencies working together, which can be done by conducting a monthly meeting between the head of department from each related agencies with the authorities. During the meeting, developers or contractors who fail to comply should be reported to CIDB for further actions to be taken.

At the end of the session, it can be concluded that integration between agencies, a complete mitigation plan should be made and followed as a guideline for all agencies. All unregistered construction sites and the abandoned sites must also be monitored to reduce the biological hazards.

CONTRIBUTION STATEMENT

The MAEH Urban Health Forum was held at Langkasuka Hotel, Langkawi from 17-18 June 2019. FAS, ZAZ, NHN, IAA, MFS, and MHCJ conceived the forum, applied for and obtained the funding from the Malaysian Association of Environmental Health, Majlis Perbandaran Langkawi Bandar Pelancongan, Langkawi Development Authority (LADA) and Universiti Teknologi MARA, and also drafted the first version of the charter. NHI, NCD, BCA, MAZZ and MFA analysed the issue. All participants at the forum contributed to the focus group discussion that produced the charter and all approved the final version.

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