UNIVERSITI TEKNOLOGI MARA

ASSOCIATION BETWEEN CHOLINESTERASE LEVEL AND CONTROL MEASURE ADEQUACY USING PERSONAL PROTECTIVE EQUIPMENT (PPE) AMONG ORGANOPHOSPHATE HANDLERS IN MERSING

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ABSTRACT

To prevent Dengue Fever cases, one of the epidemiological triangle chains must be controlled, which includes eliminating the Aedes aegypti mosquito, the dengue vector. One of techniques to carry out vector control activities includes eradicating mosquito by using pesticides. Organophosphate pesticides (OPs) are one of the pesticides commonly used in controlling dengue fever vectors. However, the exposure of OPs to vector control workers has raised concerns regarding the effect on workers' health. This study aimed to determine the association between cholinesterase level and compliance with PPE usage among Ops handlers in Mersing, Johor. An established checklist (D/WS/02-001) issued by Makmal Keselamatan Awam Johor Bharu (MKAJB) was distributed to the workers in two activities which are pesticide preparation and thermal fogging activities. Working baseline and post-exposure (within 24 hours) for cholinesterase test monitoring of 85 workers from Pejabat Kesihatan Daerah (PKD) Mersing and Majlis Daerah Mersing who directly involved in Ops handling were obtained from unit Kesihatan Pekerjaan dan Alam Sekitar (KPAS) PKD Mersing. It was found that the majority (74.3%) of the Ops handlers are complying with PPE usage during this study. Almost 32.9% of Ops handlers demonstrated an abnormal percentage reduction in cholinesterase level where more than half (25.7%) of this number are workers who do not comply with the use of PPE while handling Ops. It demonstrates that foggers who utilized PPE are less exposed to OPs pesticides than those inadequate in PPE usage. In conclusion, there are significant differences with p-value less than 0.005 in cholinesterase levels between Ops handlers who followed requirements on PPE use during handling pesticides with those who were inadequate with the requirements.

Keywords: Organophosphate, Personal Protective Equipment (PPE), Cholinesterase level, Fogging

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDY

Dengue infection is prevalent in several global locations. Because there is no vaccine for dengue fever, transmission prevention exclusively depends on vector control programs (Christofferson & Mores, 2015). Chemical vector control with pesticides was most nations' principal technique (Dieng et al., 2017) to decrease transmission burdens. Insecticide fogging against mosquito vectors is often used in disease management. Fogging activities targeting the adult mosquito population are common reactions to dengue infection.

Organophosphates (Ops) are a major component of the chemicals used in vector control activities. According to Recognition and Management of Pesticide Poisonings, OPs operate by inhibiting acetylcholinesterase (Ache), a vital enzyme for the correct functioning of the nervous system, as it hydrolyzes the neurotransmitter acetylcholine in the nerve synapse. Due to the possibility of excessive exposure to these chemicals by skin contact, inhalation, or unintentional ingestion, OPs pesticide handlers are at a heightened risk for OPs intoxication (Robb, 2023). The mixing or applying of these pesticides may result in potentially dangerous exposure via a single or several high-exposure episodes or chronic low-level exposure.

To assess whether the Ops handlers have been exposed to and poisoned with certain organophosphate pesticide chemicals by doing blood tests for cholinesterase levels monitoring (Mohd Hashadi et al., 2020). According to the Washington State Dept. of Labor & Industries, the Cholinesterase test can detect and diagnose organophosphate pesticide toxicity and exposure. It may also be used to monitor people at an elevated risk of exposure to organophosphate chemicals, such as agricultural and chemical industry workers and those being treated for exposure.