

Effect of pesticides on activities of Alanineaminotransferase (ALAT) and γ -glutamyltranspeptidase (GGT) in blood among vegetables farmer in Muar, Johor, Malaysia

ABSTRACT

Most vegetable farmers are using agricultural chemicals on their farms. Many of these chemicals are used to control pests and are known as pesticides. Pesticides can be categorised according to their chemical basis. Most of the more toxic pesticides fall into chemical groups of organophosphates, carbamates and bipyridyls. The general objective is to study the level of liver enzymes as a result of being exposed to pesticides among the farmers in Muar, Johor. The specific objectives of the study are to identify relationship between pesticide exposure duration with the liver enzyme level, frequency of handling the pesticides and using PPE when applying the pesticides, comparing of the liver enzyme level between exposure group and comparative group and finally identifying the factor which can influence the liver enzyme lever at farmer who exposed to pesticides. The cross sectional study on the effect of pesticides to the liver enzymes among vegetable farmers at Muar, Johor was conducted by using the liver enzymes such as Alanine aminotransferase (ALAT) and γ -glutamyltranspeptidase (GGT) as indicators. 92 workers were selected as respondents, where 47 respondents are in the exposed group and the other 45 respondents in the comparative group. Respondents had been selected from farmers in Muar as the exposed group and respondents from Terengganu Health District Office as the comparative group. The selection of the respondents was made through purposive sampling from list provided. The liver enzyme levels were measured by taking blood from respondent. The Automated Analyser Hitachi 902 was used in the blood analysis. Two types of the liver enzymes (ALAT and GGT) were analyzed. Mean GGT for exposed group was 63.5 Units/L and ALAT was 61.9 Units/L, significantly higher compared to comparative group while the mean of GGT was 20.7 Units/L and ALAT was 23 Units/L. Non-parametric difference Mann-Whitney U test showed there was significant different between exposed and comparative group on GGT ($Z=6.535$; $p \leq 0.001$) and ALAT level ($Z=-5.315$; $p \leq 0.001$). Five occupational factors have been measured in this study was years of working, number of pesticide used per day, frequency of handling pesticide per day, pesticide spraying duration and personal protective equipment (PPE) scores. Result showed both GGT and ALAT enzymes level has significant correlations with pesticide spraying duration ($r=0.412$; $p=0.004$ & $r=0.445$; $p=0.002$) and personal protective equipment (PPE) scores ($r=-0.397$; $p=0.006$ & $r=-0.478$; $p=0.001$). Pesticides spraying duration was the occupational exposure factor which has most influence on GGT ($r=0.710$; $p < 0.001$) and ALAT ($r=0.574$; $p < 0.001$) enzymes level among exposed group after adjustments for all confounders in this study. This study found there are significant differences of liver enzyme (GGT & ALAT) levels between exposed group and comparative group due to pesticides exposure. This study also found there are significant correlations between liver enzyme (GGT & ALAT) levels with pesticide spraying durations (hours) and PPE score.

Keyword: Pesticides; ALAT; GGT; PPE; Vegetables farmer