Occupational Determinant of Erythrocyte Acetylcholinesterase Activity and Insulin Resistance in Pesticide Applicators in Magway Township

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Introduction

- Environmental pesticides could be one of the reasons of insulin resistance (IR).
- Pesticide applicators have highest exposure potential because they are working with pesticides so often.

Aims

The present study aimed to investigate the erythrocyte acetylcholinesterase (AChE) activity and IR in pesticide applicators in Magway Township.

Materials and Methods

❖This cross-sectional comparative study was undertaken in 45 pesticide applicators and 45 control subjects (who lived in the area 100 meters away from farms and did not involve in the pesticide application process) from Nat Kan village, Magway Township.

❖ Erythrocyte Acetylcholinesterase (AChE) activity was measured by spectrophotometer and the value > 5950 U/L, 5950 U/L to 3940 U/L and < 3940 U/L were considered as no inhibition, mild inhibition and high inhibition of erythrocyte AchE activity,respectively.

❖ Insulin resistance was calculated by Homeostatic Model Assessment (HOMA-IR)

HOMA-IR=Insulin(μIU/mL)x Fasting Glucose(mmol/L)/ 22.5

❖ HOMA-IR) value > 2.6 was regarded as IR.

Results

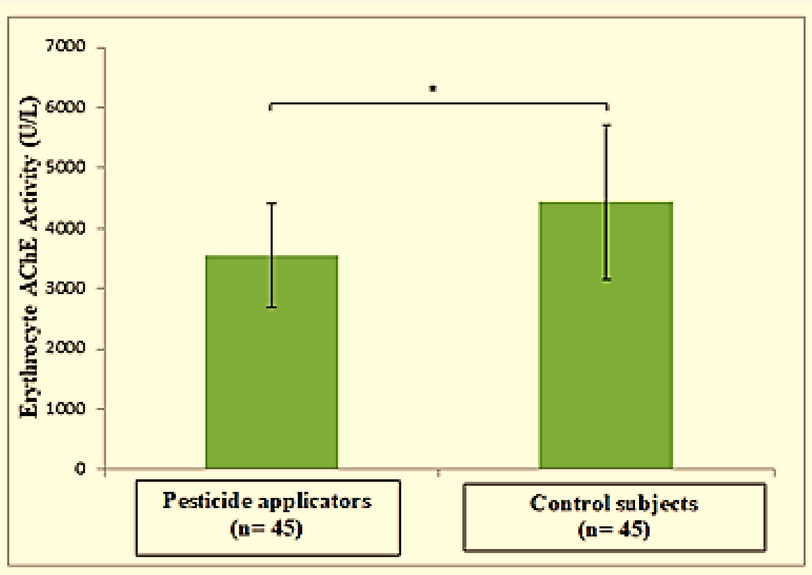

Figure 1. Comparison of erythrocyte AChE activity in Pesticides applicators (n=45) and control subjects (n=45)
*** indicates significant difference at p<0.001**

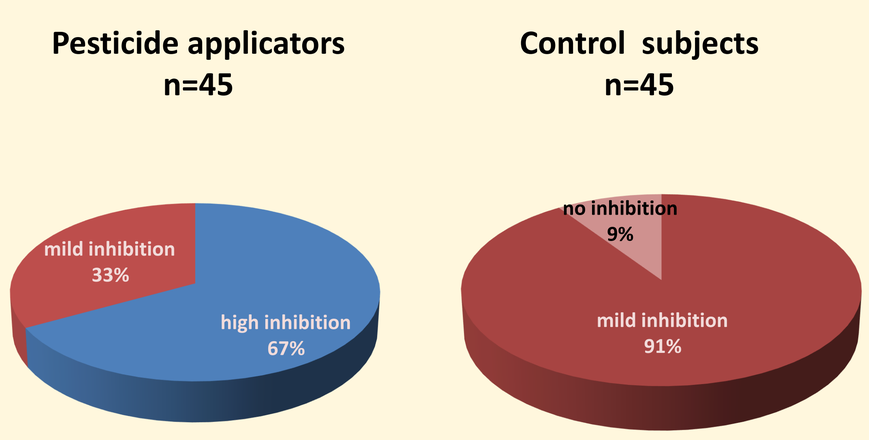

Figure 2. Inhibition of erythrocyte AchE activity in Pesticide applicators (n=45) and Control subjects (n=45)

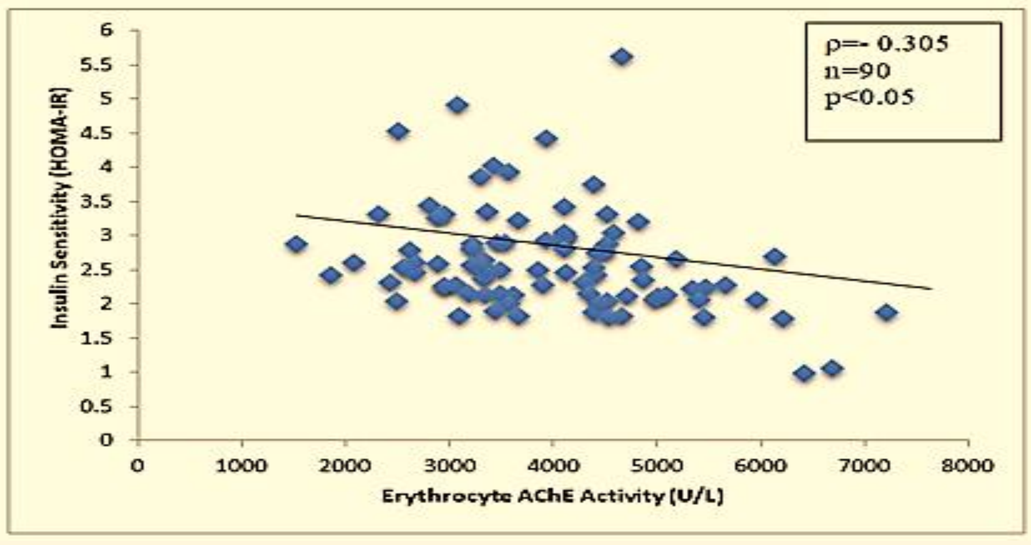

Figure 3.Correlation between erythrocyte AChE activtiy and insulin sensitivity (HOMA-IR) in all study groups
ρ = Spearman's correlation coefficient
n = Total number of subjects

	HOMA-IR<2.6	HOMA-IR >2.6	Total
Pesticide applicators (n=45)	13 (29%)	32(71%)	45
Control subjects (n=45)	24 (53%)	21 (47%)	45
	37	53	90

Table. 1 The risk of insulin resistance in Pesticide Applicators (Odd ratio=2.8; 95% confidence interval=1.18 to 6.72).

Discussion & Conclusion

➢Pesticide applicators in the present study were exposed to agricultural pesticides at the level resulting in high AChE inhibition and have a greater risk for IR .

➢ Moreover, the control subjects were even exposed to agricultural pesticides at the level resulting in mild AChE inhibition.

➢Therefore, pesticide applicators must be aware of pesticide safety usage and require knowledge, training and certification regarding pesticide application process.

No conflict of interest