



A Study of Erythrocyte Acetylcholinesterase Activity and Respiratory Functions Among Agricultural Workers Exposed to Organophosphate Pesticides in Magway Region

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Introduction

Since Myanmar is one of the agricultural countries, the agricultural sector is the backbone of its economy. Therefore, increased farm production is an important factor for agricultural workers. At the same instant, agricultural workers are reliant on pesticides to raise farm productivity. In recent years, occupational exposure to pesticides is noticeably causing many different health effects, including increased respiratory diseases and decreased respiratory functions.

Objectives

- ❖ to determine and compare the erythrocyte acetylcholinesterase enzyme activity in control subjects and agricultural workers
- ❖ to determine and compare the respiratory functions in control subjects and agricultural workers
- ❖ to find out the relationship between erythrocyte acetylcholinesterase enzyme activity and respiratory functions among control subjects and agricultural workers

Methodology

Study Design : Community-based cross-sectional, comparative study
 Sample size (n) : 80 in number
 Study population: Agricultural workers who have duration of occupational exposure >10 years and age/BMI matched control subjects
 Study area : A-lal-chaung village and Yan Way Quarter, Magway Township



Figure 1. Spectrophotometer (KW-PD-303, Apel Co.,Ltd, Japan)



Figure 2. Spirobank II Spirometer (910575, Medical International Research, Italy)

Results

Table 1. General Characteristics of the study groups

	Control Group (n = 40)	Agricultural Worker Group (n = 40)
Age (years)	40.40 ± 2.59	40.45 ± 3.14
Body Weight (Kg)	59.50 ± 3.87	55.97 ± 7.67
Height (m)	1.65 ± 0.05	1.60 ± 0.08
Body Mass Index (Kg/m ²)	21.99 ± 1.31	21.98 ± 1.84

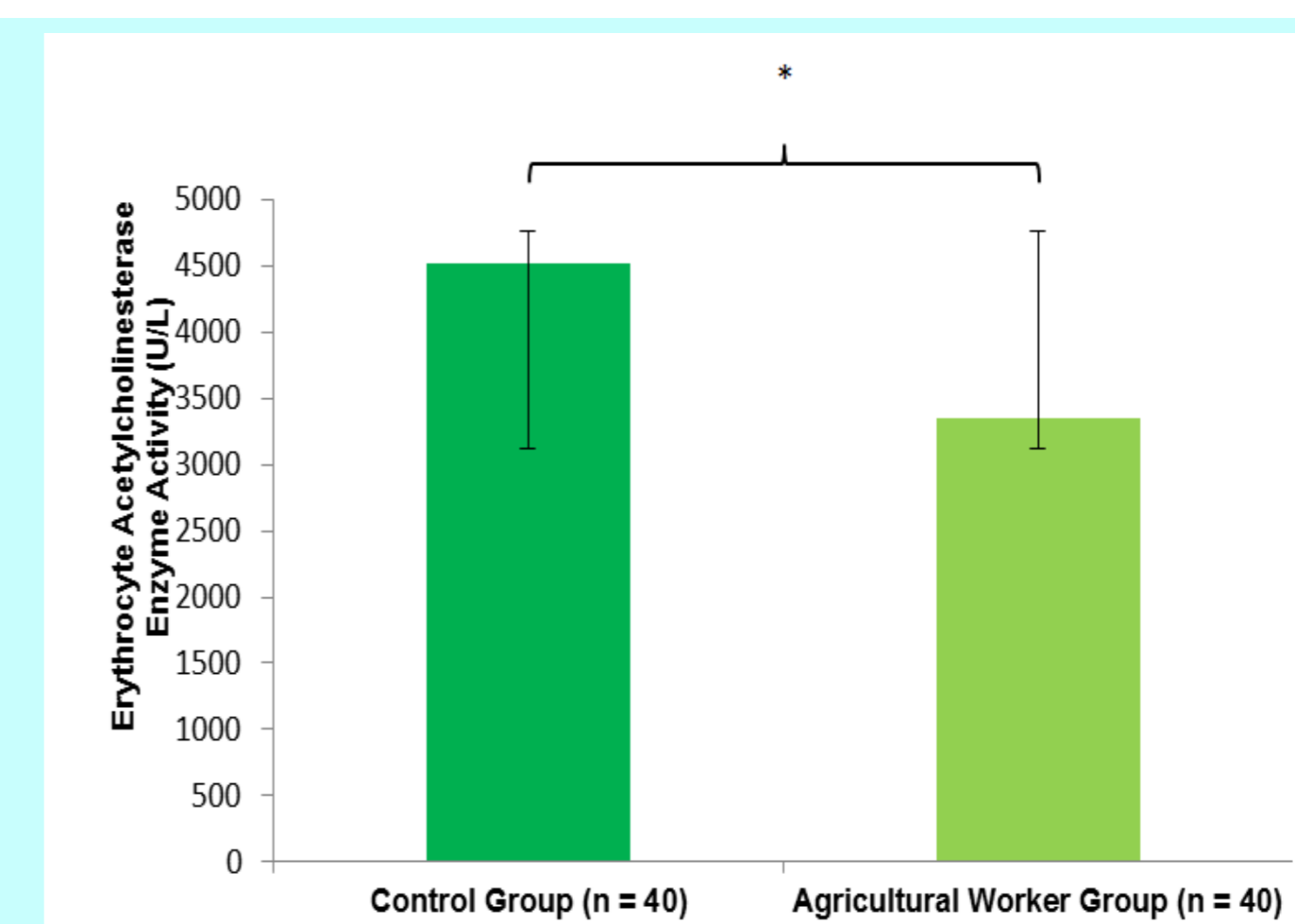


Figure 3. Comparison of erythrocyte acetylcholinesterase enzyme activity between control group (n = 40) and agricultural worker group (n = 40) * indicates significant difference between two groups p<0.05

Table 2. Comparison of respiratory function parameters between control group (n = 40) and agricultural worker group (n = 40)

Respiratory Function Parameters (% of predicted value)	Control Group (n = 40)	Agricultural Worker Group (n = 40)	p value
FEFV ₁	75.95 ± 4.05	72.13 ± 4.40	<0.05
FVC	70.60 ± 4.20	66.90 ± 4.40	<0.05
FEFV ₁ / FVC	111.32 ± 1.33	110.35 ± 2.69	<0.05
PEF	79.40 ± 5.09	75.52 ± 8.66	<0.05
FEF _{25-75%}	90.03 ± 6.19	88.18 ± 4.84	>0.05

Table 3. Relationship between erythrocyte acetylcholinesterase enzyme activity and respiratory function parameters in study group (n = 80)

Respiratory Function Parameters (% of predicted value)	Erythrocyte AchE activity (U/L)	p value
FEFV ₁	r = 0.425	<0.001
FVC	r = 0.301	<0.05
FEFV ₁ / FVC	r = 0.099	>0.05
PEF	r = 0.316	<0.05
FEF _{25-75%}	r = 0.098	>0.05

r = Pearson's correlation coefficient

Conclusion

It was concluded that agricultural workers who exposed to organophosphate pesticides have lower respiratory functions than that of control subjects. The present findings highlighted that agricultural workers need to be a self awareness in use of pesticides.