

# **EXPOSURE TO PESTICIDES AND LIVER ENZYMES AMONG WOMEN AND CHILDREN IN AN AGRICULTURE COMMUNITY COMMUNITY IN MALAYSIA**

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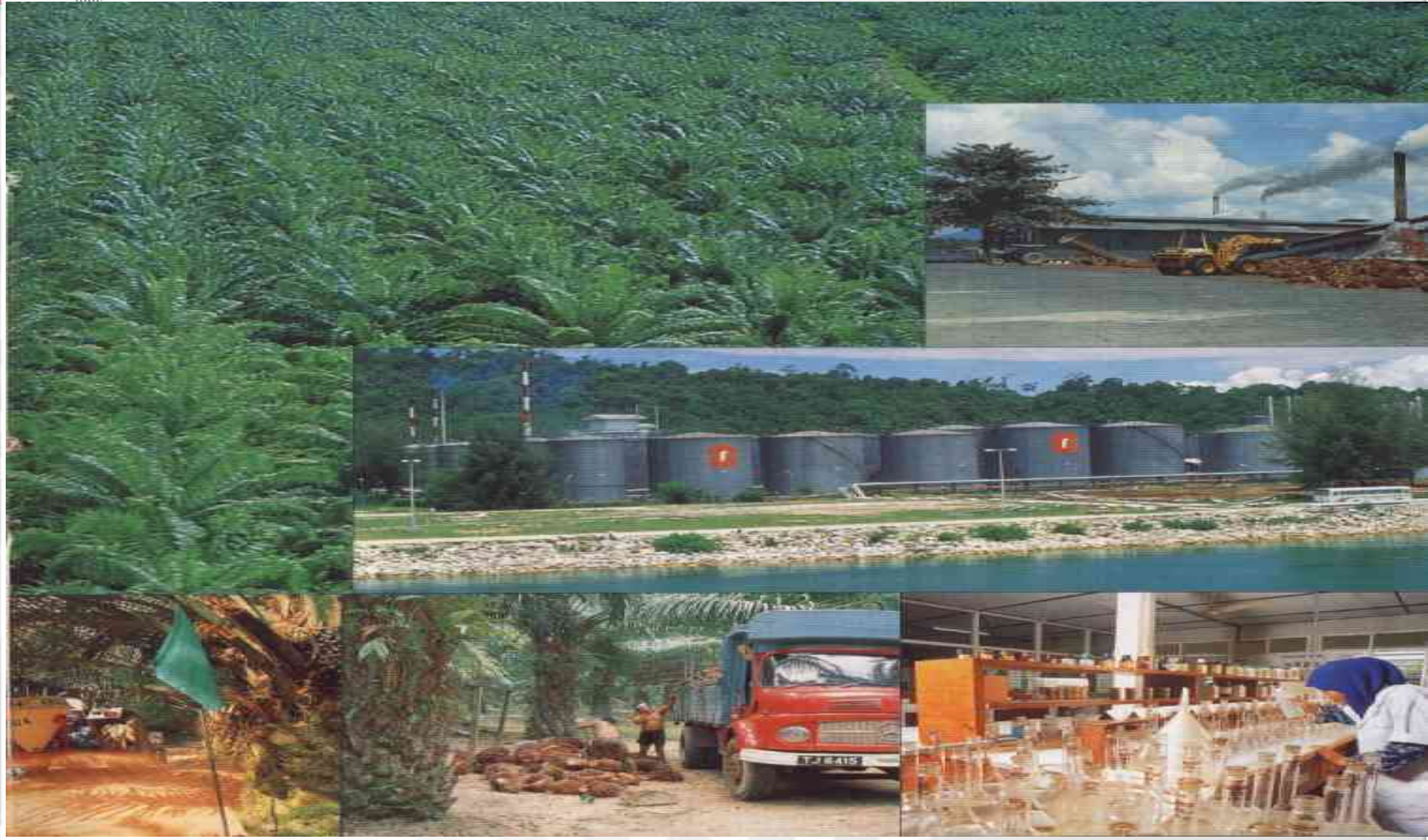
# *Introduction*

- Study design: cross sectional study
- Objective: to determine the liver enzyme ALT, AST and GGT levels and exposure to pesticides.

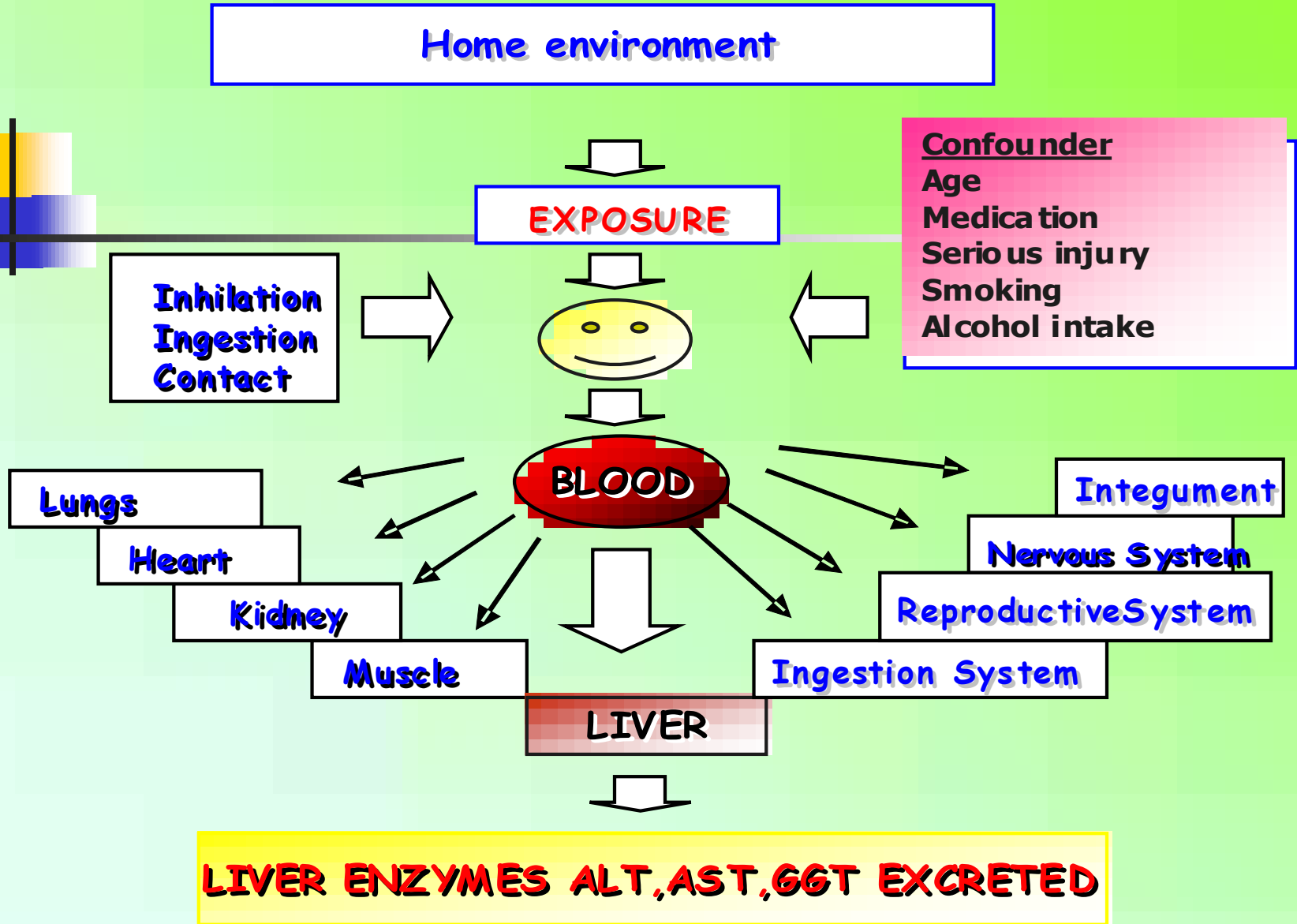


# *Methodology*

- Location: an oil palm plantation community (FELDA)
- Family with children (<12 yrs) selected at random
- Questionnaires used to gather background information and exposure
- Blood collected to determine liver enzymes



# Figure 1: Conceptual framework



# Table 1: Socio demographic background



<b>Variable</b>		<b>n</b>	<b>%</b>
<b>Family status</b>	<b>Mother</b>	<b>38</b>	<b>42.69</b>
	<b>Children</b>	<b>51</b>	<b>57.31</b>
<b>Age (year)</b>	<b>6 – 12 (child)</b>	<b>28</b>	<b>31.46</b>
	<b>21 – 66 (adult)</b>	<b>61</b>	<b>68.54</b>
<b>Marital Status</b>	<b>Single</b>	<b>33</b>	<b>37.08</b>
	<b>Married</b>	<b>42</b>	<b>47.19</b>
	<b>Single mother</b>	<b>14</b>	<b>15.73</b>
<b>Monthly Income (RM)</b>	<b>0 - 500 (low)</b>	<b>10</b>	<b>11.24</b>
	<b>500-1000 (middle)</b>	<b>67</b>	<b>75.28</b>
	<b>1100-5000 (high)</b>	<b>12</b>	<b>13.48</b>

## Table 2: Types of Pesticides and Frequency of Use



Types of pesticides	Frequency of use	
	n	%
•Alay (Metsulfuran methyl)	38	42.69
•Roundup, Sentry (Glyphosate)	45	50.56
•Spark	9	10.11
•Gramoxone (Paraquat)	10	10.14
•2 4-D (Phenoxy herbicide)	1	1.12

**Table 3 : Activities for Pesticide Use**

	Always		Sometimes	
	n	%	n	%
<b>Exposure to respondents</b>				
<b>Father use pesticides on the estates</b>	<b>23</b>	<b>25.84</b>	<b>52</b>	<b>58.43</b>
<b>House located close to the estates</b>	<b>22</b>	<b>24.72</b>	<b>19</b>	<b>21.35</b>
<b>Spray while families are in the house</b>	<b>18</b>	<b>20.22</b>	<b>46</b>	<b>51.69</b>
<b>Wash pesticide contaminated clothes at home</b>	<b>15</b>	<b>16.85</b>	<b>37</b>	<b>41.57</b>
<b>Father use pesticides on around the house.</b>	<b>11</b>	<b>12.36</b>	<b>62</b>	<b>69.66</b>
<b>Did not make sure windows are closed</b>	<b>10</b>	<b>11.24</b>	<b>30</b>	<b>33.71</b>
<b>Play at the estate during spraying</b>	<b>1</b>	<b>1.12</b>	<b>38</b>	<b>42.70</b>

**Table 4: Agriculture Pesticide Currently Used (after 2000)**

Type of Agriculture Pesticide	Always		Some time	
	n	%	n	%
Alay (Metsulfuran methyl)	18	20.22	20	22.47
Roundup, Sentry (Glyphosat)	21	23.59	24	26.97
Spark	5	5.62	4	4.49
Gramoxone (Paraquat)	2	2.25	8	7.89
2 4-D (Phenoxy herbicide)	1	1.12	0	0.00

# Table 5: Household Pesticide Used in Households



Type of household pesticide	Always		Sometimes	
	n	%	n	%
Ridsect (Prallethrin 0.09%)	43	48.31	41	46.07
Shieldtox (Tetramethrin 0.22%)	24	26.97	42	47.19
Mortin (D-phenothrin 0.10%)	16	17.98	42	47.19
Fumakilla (S-bioallethrin 0.30%)	7	7.87	40	44.94
Baygon (Propoxur (0.725%))	3	3.37	0	0.00

**Table 6 : Comparison of liver enzyme among adult and children**

Variable		n	min	S/p	z	p
ALT	Children	28	18.20	12.45		
	Adult	61	23.32	12.18	-2.647	0.008**
AST	Children	28	30.28	9.47		
	Adult	61	28.22	8.35	-0.897	0.370
GGT	Children	28	8.99	4.27		
	Adult	61	22.91	23.05	0.4135	<0.001***

\*\* significance at  $p < 0.01$ ,

\*\*\* significance at  $p < 0.001$

**Table 7: Major factor influencing the ALT enzyme level**

Variable	<i>b</i> (95% CI)	t	P
Pesticide exposure score	0.280(-0.244,0.803)	1.062	0.291
Distant of house from farm	0.005(-0.009,0.020)	0.701	0.485
Duration of stay in the area	0.175(-0.217, 0.567)	0.886	0.378

N = 89 Double Linear Regression Test enter *b* : *unstandardized coefficient*  
 F = 0.899 p = 0.445 ; R = 0.175 R<sup>2</sup> = 0.031



**Table 8: Major Factors influencing the AST enzyme level**

Variable	<i>b</i> (95% CI)	t	P
Pesticide exposure score	0.266(-0.089, 0.622)	1.490	0.140
Distance of house from farm	0.005(-0.015, 0.004)	1.098	0.275
Duration of stay in the area	0.300(-0.566, 0.034)	2.242	0.028*

N = 89 Double Linear Regression Test enter . *b* : *unstandardized coefficient*  
F = 2.878 p = 0.041 ; R = 0.304 R<sup>2</sup> = 0.092  
•significant at p < 0.05

**Table 9: Major factors influencing the GGT enzyme levels**

Variable	<i>b</i> (95% CI)	t	p
Pesticide exposure score	0.631(-0.212,1.473)	1.488	0.140
Distance of house from farm	0.006(-0.018,0.029)	0.492	0.624
Duration of stay in in the area	0.427(-0.204,1.058)	1.344	0.182

N = 89 Double Linear Regression Test enter . *b* : *unstandardized coefficient*  
 F = 1.657 p = 0.182 ; R = 0.235 R<sup>2</sup> = 0.055



**Table 10: Major factors influencing the health scores**

Variable	<i>b</i> (95% CI)	t	p
Pesticide exposure score	0.374(0.169, 0.579)	3.627	<0.001***
Distance of house from farm	-0.005(-0.011, 0.001)	-1.876	0.064
Duration of stay in Felda	-0.061(-0.215, 0.092)	-0.796	0.428

N = 89 Double Linear Regression Test enter . *b* : *unstandardized coefficient*

F = 6.436 p = 0.001 ; R = 0.430 R<sup>2</sup> = 0.185

\*\*\* significant at p < 0.001

# *Conclusion*



- The children had significantly lower ALT and GGT than the women probably due to their shorter period of residency in the area.

- The level of the liver enzymes among the respondents are still normal
- However, the mean AST enzyme in the children was higher than the normal value, Therefore, there is a tendency for these children to experience liver or cardiovascular problems in the future.

## *Recommendations*

- Collaboration of the 2 enforcement agencies to ensure that the family members are not exposed to occupational hazards from the head of families or the community are not exposed to pollution from industries. Interface of the 2 fields.

# Con't; Recommendation



- Emergency Response Plan should also included in the plantation in case of emergency of pesticide spill
- Community Right to Know should be also adopted in these plantations
- Awareness program and training on the use of pesticides among farmers to protect themselves as well as the family members



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**THANK YOU**