

Sources of Pesticide Exposure among Egyptian Adolescents

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Introduction

Adolescents are more vulnerable to the adverse effects of pesticide exposure compared to adults.

Previous research has shown increased levels of pesticide biomarkers among both applicators and non-applicators. Non-occupational sources of exposure for adolescents are not well understood.

This research examines how non-occupational sources of pesticide exposure are affecting Egyptian adolescents.



Methods

Population

Egyptian Adolescents who did not apply pesticides.

Pesticide Exposure Assessment

Urine samples were collected to measure biomarkers of exposure for Chlorpyrifos and Pyrethroid insecticides.

3,5,6-trichloro-2-pyridinol (TCPy, n=49) was measured at three time periods (look back at months in code) as an indicator of Chlorpyrifos. 3-Phenoxybenzoic acid (3-PBA, n=46) was measured two times in one week as an indicator of pyrethroid exposure. Biomarkers were creatinine adjusted.

Analysis

Wilcoxon signed ranked test compared urinary metabolite levels before and during application. Wilcoxon rank sum test was used to compare metabolites and survey responses.

Results

Table 1: Median TCPy difference (Yes vs No)

	April	July	August
Indoor Plants	-3.9	5.4	-5.9
Outdoor Plants and Trees	4.8	6.0	-0.5
Other people spray insects in home	2.9	-1.7	4.4
Insects	-0.2	-1.8*	-1.6
Live within 25 meters of agricultural field	0.4	5.2	47.5
Head lice	-0.8	-2.6	-1.0
Brought home pesticides	-1.6	-13.7	23
Family fields	2.4	-3.9	4.3
Brought home pesticides used around home	-0.4	-1.5	-0.9
Fleas and ticks on pets	0.2	0.6	0.3
Number of times sprayed for insects (30+)	-2.0	-6.0	4.0
Share a room	2.0	3.6*	-2.4

*p-value < 0.05

Table 2: Median 3-PBA and survey responses

	Yes	No	P-value
Indoor plants	2.69	2.16	0.52
Outdoor plants and trees	1.96	2.56	0.52
Insects	2.60	1.90	0.20
Other people spray insects in home	2.14	2.58	0.88
Live within 25 meters of agricultural field	2.05	2.56	0.83
Head lice	3.42	2.09	0.14
Fleas and ticks	2.80	1.96	0.05
Brought home pesticides	1.84	2.51	0.87
Brought home pesticides used around home	4.36	1.83	0.39
Family fields	1.88	1.27	0.11
	30+	0-29	
Number of times sprayed for insects	2.69	1.96	0.21
	4+	0-3	
Number of people you live with	2.51	2.13	0.73
	0	1+	
Number of people you share a room with	2.62	2.0	0.76

Results

TCPy concentrations increased during the application season (+3.7 ng TCPy/mg-creatinine, p=0.02).

Adolescents who reported sharing a bedroom with one or more people had higher TCPy urinary metabolite levels than those who did not share a bedroom (p=0.03); however this increase did not persist across application season.

Although not statistically significant, distance from the field did show an increase in TCPy across the application season.

Conclusions

Despite not directly applying pesticides, adolescents showed increased chlorpyrifos exposure during the application season.

Children who have a sibling that applies pesticides should take similar caution regarding washing hands between meals and segregating clothing that is typically recommended for pesticide applicators.

A limitation of this study is the small sample size. Future studies should consider exposure in non applicators in addition to pesticide applicators.



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