



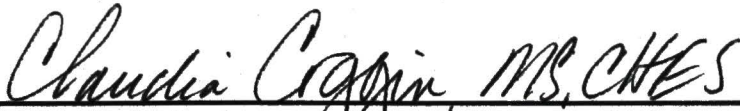
A STUDY OF PESTICIDE SAFETY AND HEALTH PERCEPTIONS AMONG
TARRANT COUNTY PESTICIDE APPLICATORS

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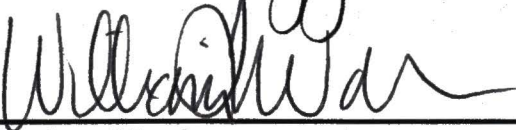
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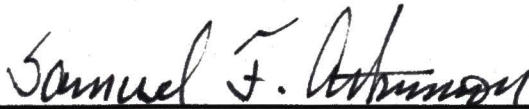
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A STUDY OF PESTICIDE SAFETY AND HEALTH PERCEPTIONS AMONG
TARRANT COUNTY PESTICIDE APPLICATORS

PROBLEM-IN-LIEU OF THESIS

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TABLE OF CONTENTS

	Page
INTRODUCTION	1
METHODS	2
RESULTS	3
DISCUSION	8
APPENDIX	10
REFERENCE	13

Pesticides have become an important part of our lives. We rely on them to help protect our crops from pest; they rid our homes of unwanted pests and help us make our lawns and public parks beautiful. Pesticides are also important to public health. They are a major source of vector control and help stop the spread of vector-borne disease. Even though we used them in our everyday lives, it is important to remember that pesticides are poisons, and that great care must be taken to ensure the safety of the public and the safety of those who work with pesticides. This study looked at the safety knowledge and health perceptions among Tarrant County, Texas licensed applicators. Much research has been focused on the effects of pesticides on human health. Much of this research has been focus on the farmer applicator (Alavanja, 1999). This study focuses on applicators that work mostly in the urban areas of the County, as well as ranchers live in the County. These licensed urban applicators included those who work for city parks departments, golf courses, commercial applicators, lawn care service, pest control and some private ranchers. The Texas Pesticide Regulations require that a person may not use a restricted-use or state-limited use pesticides or herbicides unless licensed by the Texas Department of Agriculture (2000). Therefore the purpose of this study is to see if an association between health beliefs and pesticide safety knowledge exist. The reason it is important is because these people can have either a positive or negative impact on the safety of themselves and their crews. Acute pesticide poisoning is one of the biggest risks that applicators face. The state of Texas conducts an active surveillance of occupational-related pesticide poisonings. The Environmental Epidemiology and Toxicology Division at the Texas Department of Health (TDH)

have had this system in place since 1985. TDH reported that 107 work related cases occurred during 1998, with 55 confirmed as occupational pesticide poisoning (1998). The most frequent symptoms reported were neuromuscular symptoms such as headaches, dizziness, confusion, irritability, and twitching muscles. Pyrethroids and pyrethrins were the most commonly reported class of pesticides exposure (51%) followed by Organophosphates (25%), which are the most widely used form of insecticides, as well as herbicides and fungicides. Pesticide safety and the TDH surveillance system are two very important ways of informing pesticide applicators about the risk and what can be done to minimize that risk to themselves and their crew.

METHODS

A written survey was developed and used for this study. The survey consisted of 28 questions that were meant to assess the general pesticide safety knowledge of the participant and the health beliefs of the participant towards pesticide safety. Six background questions were asked such as age, health status, frequency of pesticide use, number of years applying pesticides as a profession, and use of pesticides at home. The survey also included 15 True or False questions about general pesticide safety knowledge. There were five questions that dealt with health beliefs of working with pesticides that were answered on a Lickart scale of 1-5, with 1 being strongly disagree to 5 being strongly agree. Three questions dealt with risk perceptions of working with pesticides and answered on a Lickart scale of 1-5, with 1 being very unlikely to 5 being very likely. Five questions were that dealt with self-efficacy were answered on a Lickart scale of 1-5, with 1 being not confident to 5 being very confident. The survey was given at a Continue Education Unit (CEU) class sponsored by the Texas Agriculture Extension Service. In

order to maintain a pesticide license, workers are required to maintain a certain number of CEUs per year. These CEUs are earned by attending classes that the Texas Agriculture Extension Service offers every quarter. The survey was distributed at the registration table and turned in during breaks between classes. Descriptive statistics were done on the knowledge questions, health belief, risk perceptions and self-efficacy sections of the survey. To explain the relationship between knowledge and health belief, risk perceptions and self-efficacy were done using, Spearman rank correlation coefficients with an alpha level at 0.05 (Pagano, 2000). Spearman rank correlations were also used to see if there was a relationship between age groups and number of years working with pesticides with knowledge scores. All statistical calculations were performed using the SPSS statistical package.

RESULTS

A total of 89 people participated in the survey. Out of this number 35% were between the age group of 41-50 yrs and 30% were in the age group of 51-60%. The number of years applicators worked with pesticides was evenly divided with 33% working 1-4 yrs, 25% 5-10 yrs and 42% working 11-20+ yrs. The majority of the people reported their current health status as good (56%) with 36% reporting their health status as excellent. When asked about using pesticides at their home, 74% reported yes, with 26% saying they would not. Table 1 shows the 15 knowledge questions and the percentage of correct responses. The percentage correct ranged from 58% for the question about "Inhaling pesticides is the most common form of exposure" to four questions having a 100% correct response. When looking at the percent correct for each individual survey, the lowest was 73% correct and highest of 100% correct. Table 2 shows the

mean, median and Spearman correlation coefficient for the questions related to Health Belief. Knowledge scores were significantly associated with being taught how to use personal protective equipment correctly (Spearman $R = .267$) and with direct exposure to pesticides is not harmful to human health (Spearman $R = .255$). Table 3 shows the mean, median, and Spearman correlation coefficient for the questions related to Risk Perception. There was no significant association between knowledge scores and questions relating to risk perception. Table 4 shows the mean, median, and Spearman correlation coefficient for the questions related to self-efficacy. There was no significant association between knowledge questions and questions dealing with self-efficacy. Table 5 shows the significant association between knowledge scores of age groups and number of years working with health belief and self-efficacy.

Table 1

Pesticide Safety Knowledge Questions Among Tarrant County Applicators n=89

Knowledge questions	No. Correct	%
1. The most important information source is the label. (true)	89	100
2. Chemical resistant coveralls are the only protection needed. (false)	88	99
3. When transporting pesticides, you don't need protective clothing. (false)	73	82
4. Inhaling pesticides is the most common form of exposure. (false)	50	58
5. Wash your gloves and boots with detergent and water. (true)	83	95
6. Some pesticides have been shown to cause cancer in animals. (true)	89	100
7. Clothes worn while spraying pesticides can be washed with other clothing. (false)	86	97
8. A dust mask is an effective substitute for a pesticide respirator. (false)	87	98
9. Have a supply of water available when working with pesticides. (true)	89	100
10. There is no physical symptoms with pesticide poisoning. (false)	84	98
11. Must wash immediately after pesticides touch skin. (true)	86	98
12. Eating or drinking is allowed while pesticides are being applied. (false)	89	100
13. Any respirator will be effective for all types of pesticides. (false)	85	99
14. Pesticides should not be sprayed near street drains. (true)	79	90
15. The pesticide concentrate is the chemical in its most toxic form. (true)	78	92

Table 2

Association Between Knowledge Scores and Health Beliefs Among Tarrant County Applicators

Question	Mean	Median	Value	Spearman R
I'm too busy to use personal protective equipment when using pesticides	1.60	1	Strongly Disagree	-.169
I have been taught how to use personal protective equipment correctly	4.14	5	Strongly Agree	.267*

A pesticide would not be put on the market if it weren't safe for humans to use	2.73	3	Neutral	-.032
Exposure to pesticides will not cause cancer	1.80	2	Disagree	.023
Direct exposure to pesticides is not harmful to human health	1.43	1	Strongly Disagree	-.255*

* Correlation is significant at the .05 level

Table 3
Association Between Knowledge Scores and Risk Perceptions Among Tarrant County Applicators

Question	Mean	Median	Value	Spearman R
How likely is it that getting pesticides on your skin will cause immediate health risk?	3.03	3	Neutral	-.023
How likely is it that getting pesticides on your skin will cause long-term harm?	3.56	4	Likely	.132
How would you rate the health risk associated with pesticide use?	3.36	3	Neutral	.004

Table 4
Association Between Knowledge Scores and Self-Efficacy Among Tarrant County Applicators

Question	Mean	Median	Value	Spearman R
How confident are you that you are able to prevent yourself from being exposed to pesticides?	3.90	4	Confident	.048
If you were ready to spray pesticides and the wind came up how confident are you that you would be able to wait until the wind died down to spray?	4.28	5	Very Confident	.080
If you needed advice on how to safely handle a given pesticide, how confident are you that you would be able to get advice?	4.53	5	Very Confident	.108
How confident are you that you are able to get the proper equipment from your employer?	4.32	5	Very Confident	.057
How confident are you that you are able to use the protective equipment correctly?	4.51	5	Very Confident	.149

Table 5

Significant Associations Among Knowledge Scores and Age Groups and Number of Years Working with Pesticides

<p>Age 31-40</p> <p>HEALTH BELIEF</p> <p>I have been taught how to use personal protective equipment correctly.</p> <p>Spearman R = .421*</p> <p>* Correlation is significant at the .05 level</p> <p>SELF EFFICACY</p> <p>How confident are you that you are able to get the proper equipment from your employer?</p> <p>Spearman R = .449*</p> <p>* Correlation is significant at the .05 level</p>
<p>5-10 years working with pesticides</p> <p>HEALTH BELIEF</p> <p>I'm too busy to use personal protective equipment when using pesticides.</p> <p>Spearman R = -.467*</p> <p>* Correlation is significant at the .05 level</p>
<p>11-20 years working with pesticides</p> <p>SELF EFFICACY</p> <p>If you were ready to spray pesticides and the wind came up how confident are you that you would be able to wait until the wind died down to spray?</p> <p>Spearman R = .473*</p> <p>* Correlation is significant at the .05 level</p>
<p>20+ years working with pesticides</p> <p>SEFLF EFFICACY</p> <p>If you were ready to spray pesticides and the wind came up how confident are you that you would be able to wait until the wind died down to spray?</p> <p>Spearman R = .518*</p> <p>* Correlation is significant at the .05 level</p> <p>HEALTH BELIEF</p> <p>Exposure to pesticides will not cause cancer</p> <p>Spearman R = .518*</p> <p>* Correlation is significant at the .05 level</p>

DISCUSSION

At least 67% of the applicators have worked in the business between 5 to 20 years. That is why it was not surprising that the majority of the knowledge questions concerning pesticide safety were very well answered. Out of the 15 questions there were only two questions, which were not answered correctly by at least 90% of the respondents. The question about inhaling pesticides is the most common form of exposure was answered correctly by only 58% of the respondents. The question of not needing to wear protective clothing was answered correctly by only 82% of the respondents. Compared to a similar study (Perry, 2000), the number of correct responses per question was better. It is important to also keep in mind that the people taking this survey are trained professionals. Due to the fact that so much attention is given to protecting against pesticide inhalation and wearing of respiratory safety equipment is the reason so many people missed the question about the most common exposure. The most common form of exposure is dermal contact (Brender, 1988). The Health Belief Model, which has been used a number of behavioral modification experiments (Glanz, Lewis & Rimmer, 1997) was used in developing the questions to help determine the health beliefs, risk perceptions and self efficacy. In the question dealing with health beliefs it was found that most people agreed that using personal protective equipment was important, and they have been taught how to use the equipment properly, but reported "neutral" on whether or not a pesticide would be put on the market if it were not safe for human use. This neutral feeling can also be seen with risk perceptions. It was reported "likely" that skin contact with pesticides will cause long-term harm on health, but was reported "neutral" on immediate health risk of contact with pesticides and the

health risk associated with pesticide use. Self-efficacy is important to look at as well, because it deals with their perceived ability to do the job. Of the questions asked, the overall answers were that of being “confident” or “very confident”. The questions asked about how confident you are in being able to prevent yourself from being exposed to pesticides was answered with “confident”. What this seems to say is that they know when to use protective equipment and have been taught how to use the equipment. They are confident in their ability to protect themselves, but the perceived risk of using pesticides is still unsure, or “neutral” in being able to prevent them from health risk associated with pesticide use.

Pesticides are poisons and should not be taken for granted. If people are properly trained in pesticide safety and know how to and do use protective equipment properly, the risk of health effects due to pesticide exposure are reduced. This is easier said than done. Even with training and knowledge there still seems to be a doubt to the long-term health effects of working with pesticides. One-way to help ease this doubt is to continue the educational process and to address these specific concerns. CEU classes could focus more on basic safety knowledge that was covered when their license was first obtained.

APPENDIX

Please circle your answer

Age	< 21	21-30	31-40	41-50	51-60
How would you consider your health?	Excellent	Good	Fair	Poor	
How frequently do you use apply pesticides?	Seasonally	Periodically	Frequently		
When you use them, do you use them for a	Month more than	Week 2 hours	Day less than 2 hours	½ Day	
Would you use these same types of pesticides at your home?	Yes	No			
How long have you applied pesticides as a profession?	1-4 yrs >20 yrs	5-10 yrs	11-20 yrs		

Please check either True or False for the following questions.

The most important information source is the label.	True	False
Chemical resistant coveralls are the only protection needed.	True	False
When transporting pesticides, you don't need protective clothing.	True	False
Inhaling pesticides is the most common form of exposure.	True	False
Wash your gloves and boots with detergent and water.	True	False
Some pesticides have been shown to cause cancer in animals.	True	False
Clothes worn while spraying pesticides can be washed with other clothing.	True	False
A dust mask is an effective substitute for a pesticide respirator.	True	False
Have a supply of water available when working with pesticides.	True	False
There are no physical symptoms with pesticide poisoning.	True	False
Must wash immediately after pesticides touch skin.	True	False
Eating or drinking is allowed while pesticides are being applied.	True	False
Any respirator will be effective for all types of pesticides.	True	False
Pesticides should not be sprayed near street drains.	True	False
The pesticide concentrate is the chemical in its most toxic form.	True	False

Using the scale, please circle the number that most closely matches your opinion. With 1=Strongly disagree and 5=Strongly agree

I'm too busy to use personal protective equipment when using pesticides.	Strongly disagree 1	2	Neutral 3	4	Strongly agree 5
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I have been taught how to use personal protective equipment correctly.	Strongly disagree 1	2	Neutral 3	4	Strongly agree 5
A pesticide would not be put on the market if it weren't safe for humans to use.	Strongly disagree 1	2	Neutral 3	4	Strongly agree 5
Exposure to pesticides will not cause cancer	Strongly disagree 1	2	Neutral 3	4	Strongly agree 5
Direct exposure to pesticides is not harmful to human health.	Strongly disagree 1	2	Neutral 3	4	Strongly agree 5

Using the scale, please circle the number that most closely matches your opinion. With 1=Strongly disagree and 5=Strongly agree

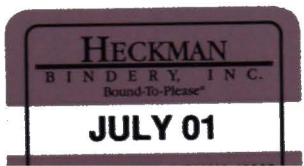
How likely is it that getting pesticides on your skin will cause an immediate health risk?	Very unlikely 1	2	Neutral 3	4	Very likely 5
How likely is it that getting pesticides on your skin will cause long-term harm?	Very unlikely 1	2	Neutral 3	4	Very likely 5
How would you rate the health risk associated with pesticide use?	Very unlikely 1	2	Neutral 3	4	Very likely 5
How confident are you that you are able to prevent yourself from being exposed to pesticides?	Not confident 1	2	Neutral 3	4	Very confident 5
If you were ready to spray pesticides and the wind came up how confident are you that you would be able to wait until the wind died down to spray?	Not confident 1	2	Neutral 3	4	Very confident 5
If you needed advice on how to safely handle a given pesticide, how confident are you that you would be able to get advice?	Not confident 1	2	Neutral 3	4	Very confident 5
How confident are you that you are able to get the proper equipment from your employer?	Not confident 1	2	Neutral 3	4	Very confident 5
How confident are you that you are able to use the protective equipment correctly?	Not confident 1	2	Neutral 3	4	Very confident 5

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