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Assessment of Safety Practices of Pesticide Use among the Farmers in Adargunchi and Noolvi, Karnataka - A Cross Sectional Study

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Abstract

Background: Modern agricultural practices reveal an increase in the use of pesticides and fertilizers to meet the food demand of increasing population which results in more exposure of pesticide residues. Many of the pesticides have been associated with health and environmental hazards. Thus, understanding farmer's knowledge of pesticides and safety practices is vital to provide valuable information aimed at preventing or reducing the health hazards associated with it.

Objectives : To assess the awareness of the safety practices related to pesticide among the farmers and to identify the health problems associated with it**.**

Method: A cross sectional study was conducted among 150 farmers in Adargunchi and Noolvi of Dharwad district, Karnataka, in the month May and June 2014. A pretested, semi-structured questionnaire was used to collect data.

Results: 93% were not aware of the harmful effects of pesticide. 78% did not undergo any practical training related to pesticides. 70% did not take any precautions nor use any protective equipment. 59% suffered from one or the other ailment due to exposure to pesticides and only 5% have sought medical care.

Conclusion: Overall awareness of agricultural workers on pesticide was inadequate. The findings of the study emphasize the need to educate agricultural workers regarding safe and adequate use of pesticides to prevent health hazards.

Key Words: *Farmers, Awareness, Pesticides, Herbicides, Agricultural workers.*

Introduction

Pesticides are substances or mixtures of substances that are mainly used in agriculture or in public health protection programs in order to protect plants from pests, weeds or diseases, and humans from vector-borne diseases, such as malaria, dengue fever, and schistosomiasis. Some of the typical examples includes; Insecticides, fungicides, herbicides, rodenticides, and plant growth regulators [(1, 2, 3)].

India is largest manufacturer of basic pesticides in Asia and ranks 12th globally. The production of pesticides started in India in 1952 with the establishment of a plant for the production of BHC near Calcutta, and India is now the second largest manufacturer of pesticides in Asia after China [(4)]. The pattern of pesticide usage in India differed from that for the world in general where in India, 76% of the pesticide used is insecticide, as against 44% globally. The main use of pesticides in India is for

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cotton crops (45%), followed by paddy and wheat. The use of herbicides and fungicides is correspondingly less heavy [4, 5].

Because of the widespread use of agricultural chemicals in food production, people are exposed to low levels of pesticide residues. Many of the pesticides have been associated with health and environmental hazards [1, 2, 6-8], and the agricultural use of certain pesticides has been abandoned [2]. Evidence also suggests that children are particularly susceptible to adverse effects from exposure to pesticides including neurodevelopment defects [9]. No segment of the population is completely protected against exposure to pesticides and the potentially serious health effects, though a disproportionate burden is shouldered by the people of developing countries and by high risk groups in each country [1]. The world-wide deaths and chronic diseases due to pesticide poisoning number about 1 million per year [10]. The high occupational, accidental, or intentional exposure to pesticides can result in hospitalization and death [1, 11]. Thus, understanding farmer's knowledge of pesticides and safety practices is vital to provide valuable information aimed at preventing or reducing the health hazards associated with pesticides. This study aims to study the awareness of the safety practices related to pesticides among the farmer and to identify the health problems associated with exposure to pesticides**.**

Objectives

To assess the awareness of the safety practices related to pesticides among the farmers

To identify the health problems associated with exposure to pesticides**.**

Method

This was a cross sectional study of conducted among the farmers in Adargunchi and Noolvi of Dharwad district, Karnataka, in the month May and June 2014. Convenient sampling method was used to collect the data and the total sample size included was 150.

Inclusion criteria – Labourers and Farmers exposed to pesticide who have given consent to participate in the study.

Data collection: The participants were briefed about the purpose of the study and informed written consent was taken and data was collected by in depth interview method with a pre-determined, pre-tested questionnaire in English and was asked in local language (Kannada) and details regarding pesticide usage, precautions taken, and health problems during exposure and awareness about harmful health effects of pesticides.

Data Analysis: The data collected was entered in Microsoft Excel and later analyzed using SPSS version 20. Chi-Square test was applied as test of significance and p-value of <0.05 was considered statistically significant.

Results

Table 1. Socio-demographic factors

Variables		No. of farmers	Percentage
Locality	Adargunchi	54	35.3
	Noolvi	96	0.7
Gender	Male	139	92.7
	Female	11	7.3
Religion	Hindu	135	90.0
	Muslim	15	10.0
Education	Literate	76	50.7
	Illiterate	74	49.3
Duration of farming	<5 years	5	3.4
	5 - 10 years	12	8.0
	>10 years	133	88.7

93% of the participants were males, about half of them (51.7%) were literate and 88% were BPL card holders. 89% of the study participants were cultivating for more than 10 years.

Table 2. Practices of the farmers

Variables		No. of farmers	Percentage
Practical training attended	Yes	33	22.0
	No	117	78.0
Method of usage	Mixed	95	63.3
	Separately	41	27.3
	Both	14	9.3
Storage at safe place	Yes	148	98.7
	No	2	1.3
Printed instruction followed	Yes	102	68.0
	No	48	32.0
Increased usage compared to previous years	Yes	87	58.0
	No	31	20.7
	Not considerably	32	21.3
Equipment used	Manual placement	2	1.3
	Sprayer	5	3.3
	Trigger pump	143	95.3
Frequency of usage per year	1	33	22.0
	2	77	51.3
	3	19	12.7
	4	17	11.3
	≥5	4	2.7
Visits in the field after application of pesticides	After few hours	77	51
	After few days	54	36
	After a week	19	13
Precautions taken during application	Yes	45	30.0
	No	105	70.0

78% of them were not practically trained. 64% mixed different pesticides and used, 41% uses separately and 14% uses both at a time. Almost all of them (99%) store the pesticides in a safe place. 68% of them follow printed instruction. 58% were opined that pesticide usage has been increased as compared to that of previous year. 95% of them use trigger pump for pesticides applications. 51% of used twice a year and few reported using ≥ 4 times a year. 51% goes to field immediately after the application and 70% do not take any precautionary measures while applying the pesticides (Table 2).

Most of the farmers use only masks and many of them did not use any kinds of personal protective devices (PPD) during application (Table 3). Majority of them (93%) were not aware of the harmful effects of pesticide. About 59% reported suffering from pesticide exposure on the day of exposure or on the next day. Majority (46%) had general health problems viz., headache malaise, fatigue etc. (Fig. 3) and 2% were hospitalized. Only 7% were aware of the harmful health effects of pesticide treated product consumption and only 5% of them have sought medical care.

Table 3. Types of PPD use during pesticides applications

Types of PPD*	No. of farmers	Percentage
Respirator	1	0.7
Mask	44	29.3
Boots	2	1.3
Gloves	11	7.3
Shield	3	2
Resistant clothing	2	1.3

* Personal protective devices

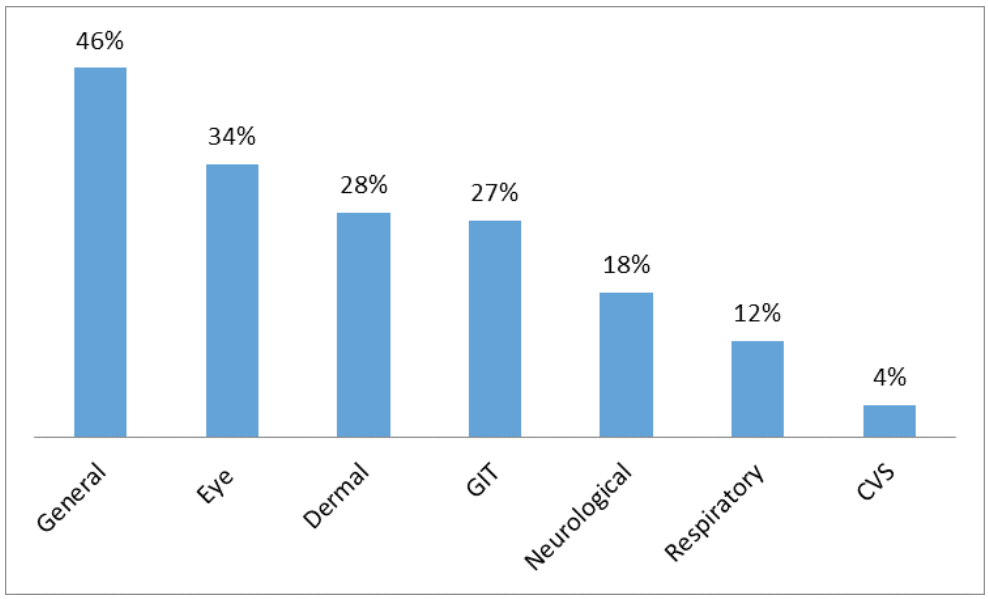

Figure 1. Self reported health problems due to exposures of pesticides

Majority (46%) of the participant complaints of general health problems viz., headache malaise, fatigue etc. after exposure to pesticides.

Table 4: Relation between literacy and health problems with precautions taken

Variables		Precautions		p- value
		Yes (%)	No (%)	
Literacy	Literate	27 (18%)	49 (32.7%)	>0.05
	Illiterate	18 (12%)	56 (37.3%)	
Health problems	Yes	34 (22.7%)	54 (36%)	<0.05
	No	11 (7.3%)	51 (34%)	

Those who were literate have better precautionary measures as compared to illiterate and but it not was found to be statistically significant (Table 4). Precautionary measures and health problems were found to be statistically associated ($p< 0.05$).

Table 5: Association between duration of cultivation with eye and dermal problems

Duration of cultivation	Eye problem		Dermal problem	
	Yes (%)	No (%)	Yes (%)	No (%)
< 5 years	2 (1.3)	3 (2%)	3 (2%)	2 (1.3%)
5 to 10 years	6 (4%)	6 (4%)	3 (2%)	9 6%
>10 years	44 (29.3%)	89 (59.3)	37 (24.7%)	96 (64%)
p-value	>0.05		> 0.05	

As the duration of cultivation increases the health problems increases as well i.e eye problems and skin problems but it was not found to be statistically significant ($p > 0.05$).

Discussion

This study was conducted in Adargunchi and Noolviof Dharwad District of Karnataka with the aimed to assess the awareness of the safety practices related to pesticides among the farmers and to identify the health problems associated with it**.** In our study 93% of the farmers were males 89% of them were cultivating for more than 10 years. Whereas in the similar study conducted by Strong et.al study 73.5 were male, 62.5 were cultivating for more than 10 years and in the Mohanty K M et.al study, all the participants were male [12,13].

In our study 68% were not aware of the harmful effects of pesticide and 7% were aware of the harmful health effects of pesticide treated product consumption. Whereas in the study conducted by Strong et.al, 91.9% were aware about the harmful effects of pesticides [12].

In our study, 29.3% used masks, 7.3 used gloves, 2% used gloves, 1.3% used boots and resistant clothes and 0.7% used respirator pesticides application. In the study conducted by Strong et.al, 41.2% used protective boots, 38.4% gloves, 82% hat and 22.7% protective lenses always during the application of the pesticides. And in the study conducted by Mohanty K M et.al, 40% to 70% were not using any protective equipment during pesticide spraying [12, 13].

46% of the respondents reported having general health problems such as headache, fatigue and malaise after exposure to pesticides. 35% reported eye problems such as burning, itching and watering. 28% reported skin problems such as itching, redness and 27% reported gastrointestinal symptoms such as loss of appetite, vomiting and diarrhoea. 2% reported of being hospitalized after exposure to pesticides. There were very few cases which manifested neurological symptoms and no reported cases of poisoning, respiratory, cardiac and renal problems. Only 5% of them have sought medical care.

Conclusion

93% were not aware of the harmful effects of pesticide. 78% did not undergo any practical training related to pesticides. 70% did not take any precautions nor use any protective equipment. 59% suffered from one or the other ailment due to exposure to pesticides and only 5% of them have sought medical care. Safety measures taken by farmers were not satisfactory and overall awareness of agricultural workers on pesticide was inadequate. The findings of the study emphasize the need to educate agricultural workers regarding safe and adequate use of pesticides to prevent health hazards.

Limitation

The study had some limitations. Firstly, the data was based on self report and evaluation was only based on questionnaire and didn't include any form of medical examination, therefore subject to bias. Secondly, the farmers in Adargunchi and Noolvi grow mainly cotton, for which they use pesticides less frequently i.e., 1-2 times/year. So the results might not be generalizable.

Recommendation

Proper training in pesticide handling and education on the hazards of pesticide exposure would diminish substantially the health hazards currently facing by farmers. Continuous emphasis on the importance of protective equipment is essential for changing wrong habits of farmers which can be hazardous for their health. The farmers should be encouraged for periodic medical check-up to minimize the adverse health effects of the pesticides.

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Declaration

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