

Original Research Article

Knowledge and practices regarding pesticide application and handling among farmers in selected community areas of Uttarakhand

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ABSTRACT

Background: In South Asia region, India is the biggest country manufacturing pesticides for agricultural production and ranks 10th in world where farmers use pesticides in agricultural area. In India, farmers have less knowledge regarding pesticide application and very rarely they get opportunity to attend formal training program regarding handling of hazardous pesticides. In developing countries, farmers have unsafe pesticide application and handling practices due to which pesticide poisoning has a major health problems among farmers. Indian farmers who practice unsafe use of pesticides also experience different health problems. Hence there is a necessity to find out knowledge and practices of farmers while handling dangerous pesticides in day to day life.

Methods: A quantitative research approach and cross sectional survey design was used in present study. Total of 302 farmers residing in rural area of Doiwala block were selected by using purposive sampling technique. Ethical permission was obtained from institutional ethical committee and informed consent was taken from study participants. Data were analyzed using descriptive statistics.

Results: A total of 125 (41.5%) farmers were using pesticide two times in a year and 180 (59.8%) farmers used it for protection of crops. It was expressed by 223 (73.8%) farmers that they read the labels on the pesticide containers before using it but only 182 (60.3%) farmers followed the instructions on the label.

Conclusions: Farmers did not have adequate knowledge about frequency and reasons of using pesticide in farming. Majority of the farmers did not have adequate knowledge and practices regarding use of pesticide in agricultural area.

Keywords: Farmers, Knowledge and rural area, Pesticides

INTRODUCTION

All over the world, pesticides are commonly used in agriculture area for increase protection and production of crops.¹ Pesticides are substances used for attracting, seducing, and then destroying any pest.² Pesticide include insecticides, fungicides, herbicides, rodenticides, molluscicides, nematocides, plant growth regulators.³ Pesticides used by the farmers in agricultural area are chemical products to destroy pest and increase production of crops.⁴ According Mr. P. C. Abhilash and Mr. Nandite

Singh in South Asia region, India is the biggest country manufacturing pesticides for agriculture production and in the world, Indian stand in 10th rank where farmers use pesticides in agricultural area.⁵

Previously many studies have been done in Asia region in which researchers found that in developing countries farmers use less safety measures during storage and application of pesticides due to which they suffer from pesticide poisoning.⁶ Different research studies about pesticides suggest importance of decreasing pesticide risk

among general population and assist government in modifying public health policies.⁷ It was interesting to note that farmers are mostly exposed to pesticides due to storage of pesticides in one corner or separate room which is close to their residences/home.⁸

Due to excessive exposure to pesticide people are suffering from harmful effects on health and just an estimated five million people die every year as a result of intentional, accidental and occupational exposure of pesticides.⁹ Chandran et al conducted study on adverse health effects of pesticides in agrarian populations in which they found that mostly farmers had respiratory problems like cough and wheezing due to excessive exposure of pesticides.¹⁰

Objectives of the study was to assess the knowledge and practice of farmers regarding use of pesticides, to find the occurrence of self-reported health symptoms related to pesticide exposure.

METHODS

A quantitative research approach with cross sectional survey was adopted to determine the knowledge and practice about the safe use of pesticides by farmers. A total of 302 farmers were residing in rural area of Doiwala Block in Dehradun district were selected by purposive sampling technique.

The tools used for the study were Structured Demographic Data, Knowledge Questionnaire on Safety use of pesticides, Self-reported health assessment checklist and questionnaire consisted of practice on safety use. Research data was collected from June 2017 to May 2018. Ethical Committee permission was obtained from the concerned institutional authorities. Written consent was obtained from study participants.

RESULTS

Table 1 shows that majority (46.68%) of farmers were aged between 36-50 years and most (63.9%) of the farmers were males. Only 43.7% farmers had secondary education. Majority of (99.7%) farmers had open field agriculture. 90.4% did not attend any training courses regarding handling of pesticides, 46.6% farmers had 16-30 years of farming experience.

It was found that the knowledge of farmers regarding application and handling of pesticides, 41.5% were using pesticide two times in a year, more than half (59.8%) of farmers were using pesticides for protection of crops by killing harmful insect and only 62 (20.6%) farmers were using them for increase in production of crops. Most of the farmers 180 (59.8%) were not using empty containers for any agriculture work but 38.2% were using empty containers for keeping animals food products and agricultural items.

A significant percentage (38.2%) of farmers dumped or threw containers in the field area after using them and only 26.6% farmers put containers in dustbin. Majority of farmers (51.5%) did not have detailed knowledge of sign and symptoms of poisoning due to pesticides used in field area. 42.5% farmers had basic knowledge of harmful effect of pesticide on health but they did not know how to protect themselves from disease as farmers. Most farmers (46.8%) did not have knowledge regarding use of high quantity of pesticides in field area which could lead to poisoning for peoples and crops, 42.3% farmers knew bad effects of pesticides on environment like polluted sand, water, kill sand insect which are useful for agriculture and ecological imbalance in the environment.

Table 1: Demographic characteristics of farmers by frequency and percentages (n=302).

Demographic characteristics	Frequency (f)	%
Age in year		
20-35	61	20.19
36-50	141	46.68
51-65	75	24.83
65<	25	8.27
Gender		
Male	193	63.9
Female	109	36.1
Marital status		
Married	291	96.4
Unmarried	11	3.6
Educational status		
No formal education	16	5.3
Primary	94	31.1
Secondary	132	43.7
Graduation	50	16.6
Post-graduation	10	3.3
Type of agricultural field		
Open	301	99.7
Closed	1	0.3
History of previous use of pesticides		
1-10 year	194	64.2
11-20 year	99	32.8
21-30 year	9	3
Attended of training courses		
No	273	90.4
Yes	29	9.6
Working hours in field area per day		
1-4 hour	143	47.4
5-8 hour	138	45.7
9-12 hour	21	7.0
Years of experience		
1-15 year	88	29.13
16-30 year	150	49.66
More than 30 year	64	21.19

Table 2: Frequency percentage distribution of practices related to handling and application of pesticides by farmers (n=302).

Questions	Yes		No	
	Frequency	%	Frequency	%
Do you do the following?				
Read instruction on the pesticide containers before using	223	73.8	79	26.2
Follow the label instructions	182	60.3	120	39.7
Wear special protective equipment during use of pesticides as follows:				
Gloves	203	67.2	99	32.8
Cloths	143	47.4	159	52.6
Face mask	170	56.3	132	43.7
Wash hands after use of pesticide by using				
Plain water	44	14.6	258	85.4
Soap	289	95.7	13	4.3
Mud	22	7.3	280	92.7
Wash contaminated cloths separately	228	75.5	74	24.5
Change cloths after pesticide application	246	81.5	56	18.5
Eat while applying pesticide	41	13.6	261	86.4
Take bath after pesticide application	231	76.5	71	23.5
Smoke during application of pesticides	30	9.9	271	89.7
Protect myself during spraying	266	88	36	12
Sell / reuse empty pesticide containers	100	33.1	202	66.9
History of acute pesticide poisoning	20	6.6	282	93.4
Where do you dispose empty pesticide containers?				
In field	126	41.7	176	58.3
Buried in soil	144	47.7	158	52.3
Crushed	106	35	196	64.9
Where do you store pesticide?				
Specific store	111	36.8	191	63.2
At home	139	46	163	54
In our animal house	66	21.9	236	78.1
Where do you prepare pesticide?				
At home	107	35.4	195	64.6
In field	228	75.5	74	24.5
From where do you purchase pesticide?				
Govt stores	207	68.5	95	31.5
Local stores	134	44.4	168	55.6
What type of task do you perform in field ?				
Spraying	227	75.2	75	24.8
Mixing pesticide	136	45	166	55
Scattering seeds	97	32.1	205	67.9

Table 3: Percentage distribution of self-reported health related symptoms after use of pesticide (n=302).

Health symptoms	Severe		Mild		Never	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Respiratory tract symptoms						
Cough	4	1.3	87	28.8	211	69.9
Dry/sore throat	6	2	139	46	157	52.0
Chest tightness	2	0.7	51	16.9	249	82.5
Neuro muscular symptoms						
Numbness	00	0	30	9.9	272	90.1
Cramp	1	0.3	30	9.9	271	89.7
Muscle weakness	0	0	20	6.6	282	93.4

Continued.

Health symptoms	Severe		Mild		Never	
Headache	9	3	153	50.7	140	46.4
Mucosal surface symptoms						
Irritated eye	4	1.3	139	46	159	52.6
Ulcer(in skin or Mouth)	2	0.7	46	15.2	254	84.1
Any other (Specify)	0	0	0	0	302	100
Skin symptoms						
Itching	14	4.6	140	46.4	148	49
Blister	0	0	49	16.2	253	83.7
Crack	0	0	56	18.5	246	81.5
Skin colour change	0	0	10	3.3	292	96.7
Eye symptoms						
Irritation	16	5.3	125	41.4	161	53.3
Redness of eye	6	2	129	42.7	167	55.3
Temporary blindness	0	0	0	0	302	100
Abdominal symptoms						
Diarrhea	5	1.7	50	16.6	247	81.8
Cramps	0	0	43	14.2	259	85.7
Stomach ache	4	1.3	60	19.9	238	78.8
Nausea	3	1	121	40.1	178	58.9
Vomiting	2	0.7	93	30.8	207	68.5

DISCUSSION

In the present study it was found that farmers did not have proper knowledge regarding entry of pesticide in body through dermal absorption and inhalation. This finding was supported by other studies in which it was found that farmers were not aware of pesticide exposure which put them at risk.^{11,12}

In present study it was found that farmers who had good knowledge, used pesticides in field area according to the recommended guidelines for protection of crop, used protective measures and washed hands with soap and water after field work. In Lebanon country, it was found in similar study by Salameh et al that farmers poorly used protective measures during application of pesticides but have sufficient knowledge about pesticide use in agricultural field area.^{13,14}

It was also found through different research studies that farmers dispose off the empty used containers in the field, buried those containers in soil or crush them which are absolutely not safe practices due to above reasons pertaining to improper handling of pesticides, farmers suffer from various health problems.⁶ The farmers who spray and mix two or more pesticides and use pesticides in more than the recommended concentration in field area also jeopardize health of workers at risk owing to ill effect of chemicals.¹⁵

The study revealed that some farmers were not adhering to correct practices regarding precautions, handling and storage of pesticides. The above findings was supported by research study by Atreya et al in which it was found

that female famers were at high risk due to lower level safety practices during pesticide use.¹⁶

Regarding self-reported health symptoms the present study result showed that common symptoms like cough, itching, headache, vomiting and diarrhea were found in many farmers. In some research study researcher found that when farmers use more application of pesticides it resulted in more occurrence of self-reported toxicity among farmers.¹⁵

Limitations

Study design was confined to survey method only and sample size approximately 300 farmers.

CONCLUSION

Though overall knowledge of farmers regarding pesticide use was inadequate but it was surprising to note that they had good knowledge about safety measures which they were not implementing while using pesticides in field. It was found that farmers used empty pesticide containers as storage of other householder materials such as fuel, seeds, cereal grain and sometimes water also. Such types of home practices are dangerous for health of individual and family, in addition improper disposal of empty pesticide containers can cause harm to the environment. Hence such incidences are to be prevented by proper health education and awareness among farmers in rural community areas. Finding related to health symptoms required urgent preventive and protective measures for prevention of risk due to use of pesticides in field area by the farmers.

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