

Occupational Exposure of Pesticides and Preventive Practices among Farmers in a Rural Block, Odisha

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Abstract

Introduction: Agriculture is a vital part of both the economy and the health of consumers, and the health and productivity of farmworkers ultimately affects everyone. Advances in agriculture has also led to the indiscriminate use of pesticides globally .Despite the toxicity and hazards posed by pesticide exposure among farmers, the usage has not reduced.However availability and appropriate use of protective gear while pesticide application can contribute significantly in reducing the health hazards due to pesticides.

Objectives:

1. To determine the prevalence and pattern of occupational pesticide exposure among farmers
2. To assess the practices regarding pesticide handling including the adoption of personal protective equipment among them

Method: Multistage cluster random sampling method was adopted to recruit 200 farmers and history of pesticide exposure, preventive practices while pesticide application, self reported symptoms during pesticide spraying was elicited using a semi structured questionnaire and face to face interview.

Results: 75.5% farmers reported of using pesticides during farming with a male preponderance. The use of protective equipment was found to be relatively low, the main reason being discomfort while farming.18.5% farmers stored pesticide at home. About 43.7% farmers did not follow safety instructions before using pesticides

Conclusion: The pesticide use among study subjects was high as well as hazardous. The need for special training programme and health education sessions to sensitize the farmers regarding the health impact of improper usage of pesticides is indispensable.

Keywords: Pesticide, Occupational Health, Farmer

Introduction

Pesticides are widely used among agricultural workers for crop production. However the unsafe use among farmers can be hazardous for both health and environment. Farmers are exposed to pesticides while mixing, loading the pesticide as well as while cleaning the equipment and disposing of empty containers [1]. Pesticide use is further complicated by farmers' not perceiving these chemicals as hazardous or that they have to be handled correctly. Farmers are at a high risk of exposure to pesticides through contact with pesticide residues on treated crops, unsafe handling, storage and disposal practices, poor

maintenance of spraying equipment, and the lack of protective equipment or failure to use it properly.[2,3]Furthermore, chronic exposure has been linked to other health problems, such as polyneuropathy, dermatitis, behavioural changes, and cancer as stated in a number of publications. The accidental chronic poisoning due to failure in adopting proper preventive measures during spraying/application is known, but only very few studies have been carried out in this direction[4]. Understanding factors affecting the use of personal protective equipment (PPE) during handling of pesticides is of major importance to implement strategies to minimize exposure among farmers. The present study was undertaken with the objectives to

1. To determine the prevalence and pattern of occupational pesticide exposure among farmers
2. To assess the practices regarding pesticide handling including the adoption of personal protective equipment among them

Materials and Method

The present descriptive cross sectional study was conducted as a part of bigger study on skin diseases among farmers where in assessment of pesticide exposure was also done among farmers of Krushna Prasad block of Puri district, Odisha. Farmers aged >18years involved in farming for more than a year and a permanent resident of the study area and who give consent to participate were included in the study. Around 200 farmers were recruited for the study using multi stage cluster random sampling technique from 22 villages of the rural block. The institutional ethics committee approval from IEC, KIMS, Bhubaneswar was sought before commencement of study. The study was conducted during the afternoon hours when the farmers were available. Due permission from village leaders were taken prior to study. Face to face interview was done and information was elicited on socio

demographic characteristics, details of farming, pesticide use, pattern of PPE and knowledge regarding pesticide handling using a predesigned semi structured questionnaire. Data was entered in Microsoft Excel and analyzed using Epi Info.7.

Results

Out of the 200 recruited farmers, it was found that the age distribution of farmers was maximum in the age group of 40-60 years i.e. 65.5%. The mean age of the farmers was found to be 47 ± 10.4 years. All the farmers in the present study were Hindus. Majority, 55% were from general category, 31.5% were scheduled tribes and only 13.5% belonged to other backward class. Similarly, a majority of farmers were illiterate i.e. 61% and 39% were literate. Socio economic status was assessed using Modified BG Prasad scale. About 41% farmers belonged to lower socioeconomic class with monthly per capita income below Rs 843/-. 40% of farmers were from lower middle class with per capita monthly income of Rs 843- 1684 and the rest 19% were from middle socioeconomic class with per capita monthly income of Rs 1685-2807. (Table 1)

In the present study it was found that 75.5% i.e. 151 out of total 200 farmers were involved in pesticide handling i.e. these farmers used pesticides for better crop production. The patterns usage of pesticides, usage of PPE during pesticide application, storage practices adopted, and type of pesticide application equipment used for pesticide application were studied among 151 farmers. Out of 151 farmers handling pesticides, 64.9% were males and the rest 35.1% were females(Fig 1).

As shown in Table 2, it was found that among the farmers using pesticides, 47% were using it for more than 10 years, followed by 39.1% for 8-10 years and only 13.9% used for less than 8 years duration. A majority of the pesticide handlers (42.4%) were exposed to pesticides for 5-8hours/day. In the present study, many farmers were

involved for long hours for crop and vegetable cultivation which requires pesticide application.

Table 3 shows the distribution of Personal protective equipment use among pesticide handlers. Majority of farmers 60.6%, were not using the recommended protective gears. About 61.6% of them were not using gloves during pesticide handling and 87.4% were not using goggles. Farmers in the present study area were conscious about inhalational exposure of pesticides, 76.1% were using cloth as a form of nose protector. When probed about other nose protectors like gas mask or dust mask, they were unaware. In our study 43% preferred to be barefoot. Majority of farmers 67.5% were using improper clothing while pesticide application .Improper clothing implied uncovered sleeves, uncovered lower limbs and no use of protective overalls.

The findings of the study also reveal that 49.7% of the pesticide handlers did not prefer storing pesticides before use because of the easy availability in shop; however, 18.5% preferred storing at home & 31.8% stored at workplace. It was also found that 65.5% of the farmers handling pesticides, read the safety label before use and 43.7% did not follow instructions in safety manual. Only 7.9% of farmers reported of undergoing training for appropriate pesticide use technique(Table 4) . During spraying of pesticides, headache (34.4%) was the most common symptom reported by farmers followed by burning sensation in eyes (24.5%), cough and irritation in throat by 7.9%.

Discussion

The prevalence of pesticide use among farmers in the study area was high i.e 75.5% of farmers were using pesticide during farming/crop cultivation. The gender distribution showed a male preponderance which could be due to the fact that work like preparation of land which

consists of pesticide spraying is done mostly by male farmers in this part of the country.

47% farmers reported of using pesticides for farming for more than 10 years, followed by 39.1% for 8-10 years and only 13.9% used for less than 8 years duration. A study by Khatri et al found that 46.5% were using pesticides for 9-16years which was similar to our study[5] .Another study conducted in Palestine found majority of farmers used pesticides for 11-20 years[6].

On assessing protective practices, 49.7% of the pesticide handlers did not prefer storing pesticides before use, 18.5% stored at home & 31.8% stored at workplace. This is not recommended in terms of safety. A study conducted in rural areas of Ahmednagar district, found similar results with 50% respondents storing pesticide in fields and 20% at home[7].

43.7% farmers did not follow instructions in safety manual. 72.9% of them had some kind of addiction in the form of chukka, betel nut, smoking and alcohol while pesticide application. Consumption of gutkha or tobacco with lime is commonly practiced among farmers in between the pesticide application/spraying without washing the hands. Alcohol decreases inhibitory control on mind, thereby increasing the chances of risk taking behaviour and not taking adequate precautions and PPE. Similar findings were found in a study among farmers by Manwani et al in rural areas of Maharashtra[8].

Majority of pesticide handlers 60.6%, were not using the recommended protective gears. About 61.6% of them were not using gloves during pesticide handling and 87.4% were not using goggles. Farmers in the present study area were conscious about inhalational exposure of pesticides, 76.1% were using cloth as a form of nose protector. When probed about other nose protectors like gas mask or dust mask, they were unaware. Majority of farmers 67.5% were using improper clothing while

pesticide application. A study carried in Western Uttar Pradesh showed majority 34% of respondent had used mask/hand gloves and 81% were using mask followed by 67% who used gloves[9]. Other similar studies conducted in Cambodia, Palestine and Bolivia revealed that majority 90% had used mask as Personal protective equipment (PPE) which was similar to present study[8,10]. Few findings of the present study were not similar to the studies conducted in Cambodia, Nepal and Bahrain which showed majority of the respondents were using aprons as Personal protective equipment(PPE) and rest of them did not use protection [10,11].

Conclusion

The present study reveals high usage of pesticides among farmers along with hazardous exposure. Health education and training regarding correct direction of pesticide spraying ,appropriate usage of protective device ,hand washing practices were inculcated among the study participants after the survey. Training regarding integrated pest management was also imparted to the study participants which could help in reduction in pesticide use if not totally stop it. The use of PPE was also found to be low . Appropriate cost effective protective gears which is suitable to both male and female farmers body stature should be developed. Furthur study should be conducted for suitable protective clothing/gears for farmers subject to the terms and conditions of different parts of the country.

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Table 1:SOCIO DEMOGRAPHIC PROFILE OF FARMERS			
Variables	Male (n=134)	Female (n=66)	Total (N=200)
AGE GROUP (YEARS)	Number (Percentage)		
18-40	20(14.9)	13(19.7)	33(16.5)
40-60	91(67.9)	40(60.6)	131(65.5)
≥60	23(17.2)	13(19.7)	36(18)
CASTE			
General	74(55.2)	36(54.5)	110(55)
Other backward class(OBC)	17(12.7)	10(15.2)	27(13.5)
Schedule tribe	43(32.1)	20(30.3)	63(31.5)
LITERACY			
Literate	49(36.6)	29(43.9)	78(39)
Illiterate	85(63.4)	37(56.1)	122(61)
SOCIO ECONOMIC CLASS (Per capita monthly income)			
Lower (Below Rs 843)	73(54.5)	9(13.6)	82(41)
Lower middle(Rs 843-1684)	41(30.6)	39(59.1)	80(40)
Middle(Rs 1685-2807)	20(14.9)	18(27.3)	38(19)
Total	134(67)	66(33)	200

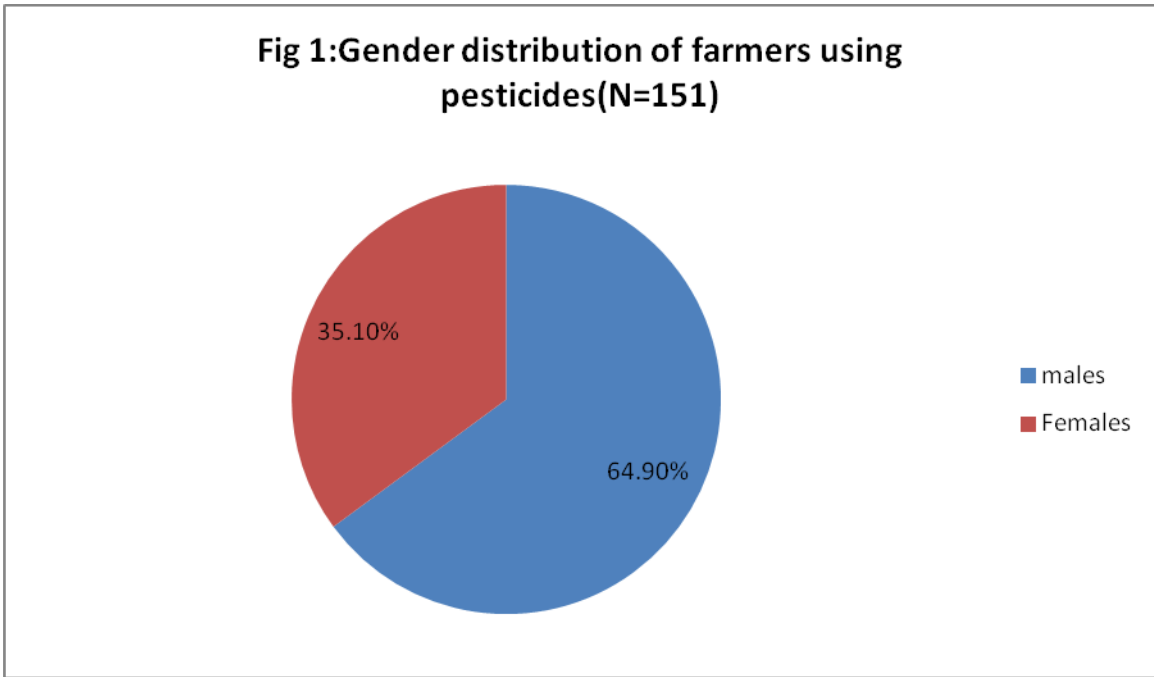


Table 2: Pattern of pesticide usage among farmers

Years of pesticide use	Number(N= 151)	Percentage (%)
<8years	21	13.9
8-10years	59	39.1
>10years	71	47
Pesticide exposure		
2-4hrs/day	49	32.5
5-8hrs/day	64	42.4
>8hrs/day	38	25.1

Table 3. Distribution of pesticide handlers with respect to Personal protective equipment (PPE)use (N=151)

Variables	Number*	Percentage (%)
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Use PPE	58	38.4
Don't use PPE	93	60.6
GLOVES		
Non user	93	61.6
User	58	38.4
GOGGLES		
Non user	132	87.4
User	19	12.6
FOOTWEAR		
Bare foot	65	43
Slippers	86	57
NOSE PROTECTOR		
Cloth	115	76.1
No protection	36	23.9
CLOTHING		
Proper clothing	49	32.5
Improper clothing	102	67.5

Table 4. Pesticide handling practices among farmers, (N =151)

	Number(N= 151)	Percentage (%)
Storage Of Pesticides		
Don't store	75	49.7
At home	28	18.5
At fields	48	31.8
Read label before use		
Yes	99	65.6
No	52	34.4
Follow instructions		
Yes	85	56.3

No	66	43.7
Undergone training for pesticide use		
Yes	12	7.9%
No	139	92.1%