Pesticide Usage: Attitudes and Practices among Rural Farmers in South India

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Abstract

Background: The major occupational diseases in India are occupational accidents, pneumoconiosis, musculoskeletal injuries, pesticide poisoning, and work place stress. Despite of low consumption of pesticides on global scale, cases of pesticide poisoning among Indian farmers are increasing every year. The reasons are many so in this study we wanted to assess the farmers' attitudes and practices about pesticide usage in rural areas of north Karnataka. **Methods:** A field based cross sectional study was conducted in the rural areas of Karnataka state Gadag district. Farmer's, attitudes and practices about pesticide usage and its harmful effects on human health was assessed. A pre-tested semi-structured questionnaire was used to obtain the data from January to February 2020. Data were collected at the rural settings by visiting their house and agriculture fields. **Results:** Totally 265 farmers were interviewed, out of that Almost all of them have good attitudes about pesticide usage, impacts on environment and only 40% of them have good practices about the pesticide usage. **Conclusion:** Majority of the Farmers have good attitudes and practices about pesticide usage. Nearly more than half of the participants have poor practices in personal protective equipment's usage while spraying the pesticide.

Keywords

Attitudes and Practices, Farmers practices, PPE Usage, Pesticide usage, Occupational health

1. Introduction

Occupational health is defined as the highest degree of physical, mental and social well-being of workers in all occupations. It is the branch of healthcare which deals with all aspects of health and safety at the workplace. It lays strong emphasis on the prevention of hazards at a primary level.

Agriculture is the second largest sector in the world as a source of work force. In other respects, agriculture is one of the most dangerous occupations among all sectors in the world [1].

India, by virtue of its huge young population, is an important country not only in Asia but in the whole world. It has been slow to adopt the high standards of occupational health and safety. However, majority of Indian population was engaged in unorganized sector such as agriculture work and resides in rural area; though the urban population has been on rise [2].

Pesticides are widely used in agricultural production to prevent or control pests, diseases, weeds, and other plant pathogens in an effort to reduce or eliminate yield losses and maintain high product quality [3].

Pesticide use in most Indian agriculture is an essential part of production technology and agriculture is an impor-

tant sector for economic development in India [4].

Lack of education, lack of knowledge, and unintentional application errors such as handling of pesticides carelessly can pose serious health risks to farmers. Their knowledge, attitudes and practices on potential hazards of pesticide is very important in preventing pesticide exposure [5].

India urgently requires modern Occupational Health Safety (OHS) legislation with adequate enforcement machinery, and establishment of centers of excellence in occupational medicine, to catch up with the rest of the world [6]. So in this study we have assessed the farmer's attitudes and practices regarding pesticide usage in South India.

2. Materials and Methods

2.1 Study setting

A field based cross sectional study was conducted in the rural areas of Gadag district on farmers. Data were obtained from January to February 2020; a pre-tested semi-structured interview questionnaire was used.

2.2 Study design

Purposive sampling technique was used to recruit the study participants. Socio-demographic details, attitudes and practices about the pesticide usage and its harmful effects on farmers health related data were obtained.

2.3 Participants

Those who involved in the agriculture activity and have experienced of previously used the pesticides and have at least once sprayed the pesticide. Among them those who given oral consent to participate in the study were included.

2.4 Variables

Independent variables: Gender, age, education and income status.

Dependent variables: Attitude and practice related Pesticide usage.

2.5 Data sources

Primary data were obtained introducing the questionnaire to farmers, visited the farmer's agriculture fields to obtain the data. Attitude and practice were assessed related to pesticide usage and its harmful effects on their health.

2.6 Study size

Purposive sampling technique method was used to recruit the study participants. Totally 265 farmers data were collected from the 5 villages.

2.7 Statistical methods

Data were entered into excel sheet, analyzed using SPSS v20 and expressed in frequency and percentages. Findings were expressed Descriptive statistics.

3. Results

In the current study, majority of the participants are belongs to 41-50 age group, half of them are completed primary education and all most all are married (Table 1).

In our findings, most of the farmers are agreed that pesticides are affects the human health and environment. Only few and majority of the farmers are neutral about the combination of pesticides more effective and safe usage was everyone's responsibility respectively. Nearly 1/3rd of the farmers are agreed that proper disposal of pesticide will reduce the environmental risk and it should store separately and handled safely. Most of them agreed that usage of personal protective equipment would reduce the risk on human health (see Table 2).

In the present study, more than half of the farmers have good practices about pesticide procurement, pest control advice and storage. Only few farmers have poor practices about empty pesticide bottles and unused leftover pesticides. More than half of the famers have the practice of wearing the mask which covers Nose and mouth. Very interesting finding was only one farmer responded that he will wore all personal protective equipment's while spraying the pesticide (Table 3).

Table 1. Socio-demographic details of study participants

Characteristics	Frequency (%)
Gender	Male
	232 (87.5)
	Female
	33 (12.5)
Age Group	20-30
	17 (06.4)
	31-40
	82 (30.9)
	41-50
	89 (33.6)
	51-60
	56 (21.1)
	61 & Above
	21 (07.9)
	Illiterate
	57 (21.5)
Education level	Primary
	113 (42.6)
	Secondary
	74 (27.9)
	Undergraduate
	13 (04.9)
	Graduate
	08 (03.0)
Marital status	Single
	10 (03.8)
	Married
	255 (96.2)

Table 2. Farmers' attitudes about pesticide usage (n-265)

Variables	Agree	Strongly agree	Disagree	Strongly disagree	Neutral
Pesticides affect human health	236 (89.1)	16 (6.0)	10 (03.8)	00	03 (01.1)
Pesticides affect the Environment	221 (83.4)	11 (4.2)	24 (09.1)	01 (00.4)	08 (03.0)
Usage of Combination pesticides more effective	217 (81.9)	02 (0.8)	17 (06.4)	00	29 (10.9)
Safe usage of pesticide is everyone's responsibility	227 (85.7)	11 (04.2)	04 (01.5)	00	23 (08.7)
Proper disposal pesticide and containers will reduce the environmental risk	232 (87.5)	09 (03.4)	04 (01.5)	00	20 (07.5)
Pesticides should store Separately and handled safely	245 (92.5)	11 (04.2)	03 (01.1)	01 (00.4)	05 (01.9)
Usage of Personal Protective Equipment's reduce the risk on human health	229 (86.4)	07 (02.6)	11 (04.2)	02 (00.8)	16 (06.0)

Table 3. Farmers' common practices about pesticide procurement and storage

Questions	Responses (n-265)		
	Options	Frequency	Percentage
Where do you procure the pesticides	Licensed shop	238	89.8
	Others	27	10.2
Where do you get the pest control advice	Pesticide sales agent	194	73.2
	Others	71	28.6
	In home	53	20.0
Where do you store pesticides	In Farm house	59	22.3
	In Separate cupboard	153	57.7
	Discarded	144	43.0
What do you do with the empty pesticide cans or bottles	Washed and Reuse	90	34.0
	Burnt	61	23.0
	Discarded	106	40.0
What do you with the unused leftover Pesticides	Stored and Reused	125	47.2
	Bury in Soil	34	12.8
	Gloves	27	10.2
	Goggles	05	01.9
	Full sleeved shirts	35	13.2
Which of the following do you wear while spraying the of Pesticides	Mask covering the Nose and Mouth	154	58.1
	Full shoes	00	00
	All of the above	01	00.4
	None of the above	43	16.2

Table 4. Farmers' safety practices about pesticide usage

Variables	Response by the farmers (n-265)		
	Always	Sometimes	Never
Consumption of the food while mixing or spraying the pesticides	53 (20)	44 (16.6)	168 (63.4)
Drinking water while mixing or spraying the pesticides	20 (07.5)	41 (15.5)	204 (77.0)
Smoking while mixing or spraying the pesticides	16 (06.0)	45 (17.0)	204 (77.0)
Pesticide sprayed in the direction of wind	112 (42.3)	84 (31.7)	69 (26.0)
Showering immediately after mixing or spraying	122 (46.0)	98 (37.0)	45 (17.0)
Washing of wearied clothes separately	167 (63.0)	82 (31.0)	16 (06.0)

In this study, we came out with an interesting findings about safety practices, more than half the farmers never done the mixing or spraying of the pesticides while consuming food, drinking water and smoking. Nearly half of the farmers have practice of sprayed pesticide in the direction of wind, showering immediately after mixing or spraying and washed their clothes separately (Table 4).

4. Discussion

4.1 Study population

In the current study, majority of the famers are male and belongs to the age group to 41-50 years, have completed primary education and married.

4.2 Attitudes about pesticide usage

In the findings, majority of the farmers have agreed that pesticide and its usage will affect the human health and environment. A study conducted in Turkey, Palestine, Uganda and Brazil found the same findings [7-10].

Majority of the participants are agreed that safe disposal of pesticide containers will reduce the health risk and environmental risk. Similar findings have been found in the study conducted at Pondicherry [11], Nepal [12], Tanzania [13].

In this study, all most all farmers are agreed that pesticide should be stored separately and handled safely. Similar opinion has been found in the study conducted at West-Bengal [14] and Bangladesh [15]. But a study conducted at Pakistan found unsafe storage of pesticides [16].

Nearly 1/3rd of the study participants was agreed to usage of PPE will reduce the risk on human health. Same results have been found in Ethiopia [17] and Kuwait [18].

4.3 Common Practices

In the current study, majority of the famers have practice of purchasing pesticide from licensed shop. The similar findings have been found in Nigeria [19] and contradictory result has been found in Ethiopia [20].

In our findings, only few farmers will burn the pesticide containers. The similar opinion has been found in World Health Organization report [21].

More than half of the famers stored the pesticide bottles in the safest place. A study conducted at France found the same findings [22] and in Bahrain [23].

Only few famers have the practice of wearing the gloves while spraying the pesticide. The similar findings found in Madhya Pradesh study [24], but a study conducted in Ethiopia found that majority of the farmers wore gloves [17].

More than half of the study participants have the practice of wearing mask. A similar result has been found in the study conducted in Indonesia [25].

4.4 Safety Practices

In our findings, more than half of the farmers have never consumed food while praying or mixing the pesticide. Similar findings have been found in Greece [3] and a contradictory result has been found in the study conducted in West Bengal [14].

Nearly 1/3rd of the farmers have never drank the water while spraying the pesticide. A similar finding has been found in Ghana [26], Ethiopia [27] and in Australia [28].

Nearly half of the farmers have the practice of showering and washing their clothes separately. Similar results have been found in the study conducted at Turkey [29] and in Iran [30].

5. Conclusion

Farmers have good attitudes and practices about the pesticide usage but they were not wearing the personal protective equipment's. They have adopted the good practices regarding food consumption, drinking of water and showering after the pesticide sprayed.

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7. Ethical Approval

KSRDPRU Institutional ethics committee.

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