

# Effect of Pesticide Use on the Health of Farming Community

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## ABSTRACT

Pesticides are the chemical or biological substances used to kill or repel targeted organisms. Pesticides are applied to the environment with the aim of suppressing the impact of plant and animal pest and to protect agricultural and industrial products (Dey *et al.* 2013). Exposure to pesticide results in both acute and chronic health problems which range from short term to long term effects. Keeping this in view a study was conducted to know the effect of pesticide use on the health of farming community in Dharwad taluka, Karnataka state. A survey was conducted by interview method from 130 farmers in three village of Dharwad taluka and information regarding health effects and use of personal protective clothing while spraying pesticides was collected. Majority of the farmers are suffering from various health problems like headache, dizziness, vomiting, nausea, burning vision, itching of skin burning of hands, excessive salivation and watery of eyes. All these problems are related to the indiscriminate handling of pesticides by the farmers. Use of protective clothing while spraying pesticides would help the farmers to come out from these problems.

## Highlights

- Pesticides are dangerous substances used for controlling diseases and attack of insect pest in the crops
- Spraying of pesticides to the crops without taking any protective measures leads to various health problems in sprayers

**Keywords:** Pesticide, Sprayers, Farming community, Health effects, Protective clothing

Pesticides are the chemical or biological substances used to kill or repel targeted organisms. In modern Agriculture, pesticides are inevitable inputs in agro-ecosystem in spite of a variety of problems associated with them. Studies have shown that handling the different types of insect and pest control measures. In the world 44% of the insecticides, 30% of herbicides, 21% fungicides and others 5% are used; whereas in India the pattern of pesticide usage is different from that the world in general. About 76% of insecticides and 13% of fungicides, 10% of herbicides and 1 % others are used (Mathur *et al.*, 2005).

The main use of pesticides in India is for cotton crops (45%) followed by paddy and wheat. Pesticides are applied to the environment with aim of suppressing the impact of plant and animal pests and to protect

agricultural and industrial products (Calvert 2008). Humans are exposed to the pesticides that are found in environment by different routes of exposure like inhalation, ingestion and dermal contact. For sustainable agriculture and protection of the environment and human health, the importance of using safe pesticides has assumed global importance subsequent to the 'Earth Summit' in 1992 (Prabhathi *et al.* 2017). Safe method of using pesticides is also equally important as for as health and safety of the farmer is concerned. Exposure to pesticides results in both acute and chronic health problems, which range from short term effects to chronic diseases like cancer, reproductive and developmental disorders etc. (Dey *et al.* 2013). So while spraying pesticide it is essential to wear necessary protective measures and use the pesticides safely.



Hence is the present study is aims to find out the effect of use of pesticide on the health of farming community with the following specific objectives:

1. To study the usage pattern of pesticides by the selected men farmers.
2. To study the precautions taken by the farmers before and after the application of pesticides.
3. To know the effect of pesticides on health of farming community.

## MATERIALS AND METHODS

The present study was undertaken in three villages namely, Marewad, Naredra and Yettingudda villages of Dharwad district, Karnataka state. A self structured pretested interview schedule was administered on 130 farmers among which 80 were men farmers and 50 were women farmers selected randomly for the study. All selected farmer do the pesticide application activity to different crops. Personal interview technique was used to gather the general and specific information, highlighting the usage pattern of pesticides and their effect on health. The data on application of pesticide was not collected by the women farmer as they are not directly involved in pesticides application by sprayers. Women farmers will do the supportive activity like mixing of water to the pesticide, filling of hand pump etc. The data was further tabulated and analyzed by calculating frequency and percentage.

## RESULTS AND DISCUSSION

### (I) Demographic characteristics of the study sample

Demographic profile of the selected farmers is presented in table 1. On analyzing the data collected is found that majority of the men farmers (67.5%) belonged to the age group of 36 to 55 years followed by 18 to 35 years of age group (22.5%) and 10 per cent of farmers were above the age group of 55 years. Among women farmers 48 per cent belonged to the age group of 36 to 55 years followed by 18 to 35 years of age group (46%) and 6 per cent of them were above the age group of 55 years.

Majority of the men farmers (57.5%) had completed primary education followed by illiterate (23.75%), high school (10%) education and PUC (6.25%).

Among women farmers 44 percent of them were illiterate followed by primary education (34%), high school education (20%) and PUC (2%).

Based on the information collected from the farmers it was clear that more than 50 per cent of both men and women farmers had dry land whereas 30 per cent of men farmer and 12 per cent of women farmers had irrigated land.

Regarding land holding, 55 percent of men farmer had 3 to 5 acres of land followed by above 5 acres (13.75%) and less than 3 acres (11.25%) of land. Among women farmers 44 percent had 3 to 5 acres of land followed by above 5 acres (32%), less than 3 acres (16%) of land and 8 per cent of women farmers had no land. The total sample selected for the study were in small land holding category ( $\leq 5$  acres).

**Table 1:** Demographic profile of the selected farmers (N=130)

| Demographic profile                                   | Men (n=80) | Women(n=50) |
|---|------------|-------------|
| <b>Age</b>  |            |             |
| 18-35 yrs   | 18(22.5)   | 23(46.00)   |
| 36-55 yrs   | 54(67.5)   | 24(48.00)   |
| Above 56 yrs  | 8(10.00)   | 3(6.00)     |
| <b>Education</b>                                      |            |             |
| Primary (1 to 7 <sup>th</sup> class)                  | 46(57.5)   | 17(34.00)   |
| High school (8 <sup>th</sup> to 10 <sup>th</sup> std) | 8(10.00)   | 10(20.00)   |
| PUC   | 5(6.25)    | 1(2.00)     |
| Graduate  | 2(2.5)     | —           |
| Illiterate  | 19(23.75)  | 22(44.00)   |
| <b>Land holding</b>                                   |            |             |
| Less than 3 acres                                     | 9(11.25)   | 16(32.00)   |
| 3 to 5 acres  | 44(55.00)  | 22(44.0)    |
| Above 5 acres   | 27(13.75)  | 8(16.00)    |
| No land   | —          | 4(8.00)     |
| <b>Type of land</b>                                   |            |             |
| Dry land  | 56(70.00)  | 42(84.00)   |
| Irrigated land  | 24(30.00)  | 6(12.00)    |
| <b>Crops grown</b>                                    |            |             |
| Cereals   | 10(12.5)   | 21(42.00)   |
| Pulses  | 24(30.00)  | 11(22.00)   |
| Commercial  | —          | 2(4.00)     |
| Vegetables  | 46(57.5)   | 12(24.00)   |

*Note: figures in parenthesis indicates percentages.*



It is noticed that more than half (57.5%) of the men farmers had grown vegetables in their land followed by pulses (30%) and cereals (12.5%). Among women farmers 42 per cent had grown cereals in their land followed by vegetables (24%), pulses (22%) and Commercial (4%) crops.

## (II) Pesticide usage pattern

Application pattern of pesticide by the selected men farmers is shown in Table 2. Majority of the farmer (66.25%) are using pesticides since from 11 to 20 years followed by less than 10 years (18.75%) and more than 21 years (15%) for their crops. The Women farmers are not directly involved in the pesticide application process but they do the supportive activities like bringing of water, mixing of water to the pesticide, mixing of different pesticides, filling of hand pump with pesticides etc.

**Table 2:** Application pattern of pesticide by the selected men farmers (n=80)

| Years of using pesticide                                 | Men (n=80) |
|--|------------|
| 1 to 10 yrs  | 15(18.75)  |
| 11 to 20yrs  | 53(66.25)  |
| 21 to 30 yrs   | 12(15.00)  |
| Frequency of using of pesticide                          |            |
| Before sowing  | 17(21.25)  |
| After sowing   | 34(42.5)   |
| Both before and after sowing                             | 29(36.25)  |
| Quantity of pesticide application to the crop per season |            |
| Up to 1 lit  | 20(25.00)  |
| 1 to 3 lit   | 48(60.00)  |
| More than 3 lit  | 12(15.00)  |
| Method of pesticide application                          |            |
| Hand pump  | 71(88.75)  |
| Drip irrigation  | 2(2.5)     |
| Trough tractor   | 7(8.75)    |

*Note: figures in parenthesis indicates percentages.*

About 42.5 per cent of the farmers used pesticides only after sowing followed by both before and after sowing (36.25%) and only before sowing (21.25) of seeds. Generally the farmers do not enter a field for at least three days after spraying pesticides, but during peak period, they harvest vegetables immediately after spraying the pesticides (i.e. the next day).

More than 50 per cent of the farmers used 1 to 3

liters of pesticides for their crops followed by up to 1 liter (25%) and more than 3 liters of pesticides (15%) for each crop. Moreover both men and women farmers hardly follow any precautions like taking bath and using protective measures before and after spraying the pesticides in the field.

It is evident from the findings that majority of the farmers (88.75%) were using hand pump for spraying of pesticides in their field followed by using tractor (8.75%) and drip irrigation (2.5%) system for the application of pesticides.

Contact of pesticides with various body parts while application by farmers is presented in Table 3. Hand contact of pesticides is found about 38.75 per cent followed by feet contact (21.25%), face contact (16.25%) and 23.75 per cent of the farmer expressed that no direct contact of pesticide. About 60 per cent of women farmers also expressed that they did not have direct contact of pesticides whereas 28 per cent farmers expressed hand contact followed by feet (12%) contact of the pesticide.

**Table 3:** Contact of pesticides with various body parts while application by farmers (N=130)

| Body parts | Men (n=80) | Women (n=50) |
|------------|------------|--------------|
| Face       | 13(16.25)  | —            |
| Hands      | 31(38.75)  | 14(28.00)    |
| Feet       | 17(21.25)  | 6(12.00)     |
| No contact | 19(23.75)  | 30(60.00)    |

*Note: figures in parenthesis indicates percentages.*

Use of personal protective cloths by the selected farmers while spraying pesticides is depicted in Table 4. Handling of pesticide and application of the same in recommended concentration in the field requires the use of appropriate personal protective equipment as a precaution against pesticide exposure. This involves the use of gloves, masks, head gear footwear etc. It was observed that about 43.75 per cent of the men farmers were using gloves while spraying pesticides in the field followed by head gear (37.5%) and mask (18.75), whereas none of the women farmers were using any protective cloths. The present findings are in accordance with the findings of Dey *et al.* 2013. Who observed that selected farmer sprayer in the study area took no necessary individual protective measures while handling pesticides. Similarly Mahale *et al.* 2011 reported that very few per cent of the farmers were



using protective cloths like gloves, mask, footwear and hand gloves while spraying pesticide to the different crops.

It is evident from the Table 4 cent per cent of the men and women farmers wash their hands and feet after spraying pesticide in the field. About 87.5 per cent of the men farmers were changing their cloths after spraying of pesticides. About 88 per cent of women farmers also expressed that they change their cloths after completion of the spraying activity.

**Table 4:** Information on personal protective measures followed by the farmers while and after using pesticides (N=130)

| Personal protection                                | Men (n=80) | Women (n=50) |
|--|------------|--------------|
| <b>Protective clothing</b>                         |            |              |
| Gloves   | 35(43.75)  | —            |
| Mask   | 15(18.75)  | —            |
| Head gear  | 30(37.5)   | —            |
| Not using  | —          | 80(100.00)   |
| <b>Hand and foot wash after spraying pesticide</b> |            |              |
| Yes  | 80(100.00) | 50(100.00)   |
| No   | —          | —            |
| <b>Clothing change after spraying pesticide</b>    |            |              |
| Yes  | 70(87.5)   | 6(12.00)     |
| No   | 10(12.5)   | 44(88.00)    |
| <b>Contact with doctors</b>                        |            |              |
| Yes  | —          | —            |
| No   | 80(100.00) | 50(100.00)   |

*Note:* figures in parenthesis indicates percentages.

### (III) Effect of pesticide usage on health of the farmers

Effect of pesticide application on health of selected farmers is presented in Table 5. More than 60 per cent of the men farmers experienced head ache followed by burning vision (38.75%), dizziness (33.75%), nausea/vomiting (32.5%), excessive salivation (12.5%) and only 10 per cent farmers experienced other problems like itching of hands, burning of hands and watery of eyes. Among women farmers 40 per cent of them experienced nausea/vomiting problem followed by headache (38%), burning vision (36%), dizziness (8%) and excessive salivation (4%) problem. It was observed that women in the field continue to work, while pesticides are being sprayed. This exposure to

pesticides could cause a variety of reproductive health problems in the farmers. The present findings are in accordance with the findings of Solomon *et al.* (2000) that farmers experienced health effects related to pesticides.

**Table 5:** Effect of pesticide application on health of farmers (N=130)

| Effects              | Men (n=80) | Women (n=50) |
|----------------------|------------|--------------|
| Dizziness            | 27(33.75)  | 4(8.00)      |
| Headache             | 52(65.00)  | 19(38.00)    |
| Burned vision        | 31(38.75)  | 18(36.00)    |
| Nausea/Vomiting      | 26(32.5)   | 20(40.00)    |
| Excessive salivation | 10(12.5)   | 2(4.00)      |
| Others               | 8(10.00)   | 4(8.00)      |

*Note:* Figures in parenthesis indicates percentages, multiple responses are obtained.

### CONCLUSION

It can be said that for increasing yield, improving the quality and controlling diseases and attack of insect pest in the crops farmers use huge amount of pesticides. In the long run this causes great damage to their health of the farmer and suffer from various health problems like headache, dizziness, vomiting, nausea, burning vision, itching of skin burning of hands, excessive salivation and watery of eyes. All these problems are related to the indiscriminate handling of pesticides by the farmers. Another interesting thing is that they hardly go to the doctor for these problems and thinking that they will get cured naturally. Many of the farmers are not wearing any protective measures like mask, head gear, footwear, gloves etc. while spraying pesticides in the field. So, there is a need to create awareness among the farmers about effects of pesticides application on health of the farmer and benefits of using protective cloths while spraying pesticides.

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