

A Statistical Approach for Assessing Consciousness Regarding Health Effects of Pesticides Use Among Farmers in District Srinagar of Kashmir Valley

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Abstract

In many developing countries of the world, agriculture plays an important role in their economy and a large number of farmers are exposed to various pesticides. Farmers in district Srinagar of Kashmir valley use pesticide to control and get rid of disease vectors for the progress of agricultural production. The farmers guided by commercial motives are using more and more pesticides to care for their crops without realizing that these substances are also environmental toxins. The extensive use of pesticides can result in substantial health and environmental threats. A large number of farmers as well as general public is exposed to pesticides through the food chain which causes many diseases. The aim of our study was to assess consciousness regarding health effects of pesticide use among farmers of district Srinagar of Kashmir valley. The results obtained from a sample of 400 farmers selected at random revealed that majority of the farmers under study were conscious about the adverse health effects of using pesticide. Majority of respondents were not formally educated and the main source of information on health effects of using pesticide were family/elders. The farmers who participated in this study were aware about poisoning symptoms of pesticide use like Skin, Nervous system, Gastro-intestinal system, Respiratory system, Eye and Cardiovascular system. Further, farmers under study were conscious that pesticide use may have immediate as well as long term effects on health. The farmers were of the opinion that pesticide use may cause Cancer (85.5%), Foetal death (72.5%), Birth death (67.5%), Infertility (64.5%), miscarriage (52.5%), Parkinson's disease (51.5%) and Dizziness (19.5%). It was also revealed from our study that only 32.5% farmers under study were knowing about the pesticide residuals, 67.5% were using proper personal protective equipments during pesticides use, 62.5% were following strictly instructions given on pesticide container and only 16.5% were aware about the pesticide exposure toxicity in family. It was concluded that use of risk assessment tools, encouragement of organic diets, educating farmers from hazards of pesticides can help farmers in tackling the menace of pesticide hazards. Finally, it was suggested that training regarding safe use of pesticides should be given to the farmers in the study area.

Keywords: Farmer; Pesticides; Agriculture; Consciousness; Health; Statistics; Kashmir.

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Introduction

Pesticides are toxic hazards, natural or synthetic agents designed to kill, reduce, or prevent insects, weeds, rodents, fungi, or other organisms that can threaten public health and the economy of farmers. Farmers and workers throughout the world are exposed to dangerous pesticides directly when working as pesticide applicators, or indirectly during harvesting, planting and soil preparation. The use of pesticide and exposure among farmers is a central issue as it poses risks to environment and human health. The pesticide residues have been found to stay in the daily diet on fruits and vegetables even after they have been washed, peeled, or cored. Several pesticide products are not labeled; but even if they are, many people particularly illiterate and rural residents are ignorant of the adverse effects of pesticide use. The substances which are environmental toxins have been defined as "chemical compounds that are created and dispersed into the environment specifically in order to kill living creatures known as pests, be they insects, weeds, bacteria, fish, snails, birds, rodents or other forms of life" A study on chemical pesticides reported that pesticides are known to have deleterious effects on human health and the environment (Avasthi et al., 2010). The studies on pesticide-related health effects have found a link between pesticides and male fertility, including effects on sperm health and longer time to pregnancy etc mostly in industrialized countries (Subashiny and Thiruchelvan, 2008; Farr, 2004). It was reported that Knowledge, attitude, practice, and toxicity symptoms are associated with pesticide use among farm workers (Harley et al., 2008; Yassin, Mourad and Safi, 2002). It was also reported that women farmers working as partners in farming operations are often undercounted for the reason that usually the husband is measured as the main operator (WHO, 2001). The pesticide exposure may be linked to health problems as United Nations Environment Protection agency reported that nine of the twelve most unwanted persistent organic pollutants are pesticides used in agriculture crops and for public health vector control programme. Respiratory, gastrointestinal, ocular and dermal problems were observed among farmers who were associated with pesticides and many of the effects of pesticides in human health were same for men and women, but not always. Women farmers working as partners in farming operations are often undercounted because usually the husband is considered the main operator (WHO, 2001). The studies (Akbari et al., 2015; Schetler, 1997) reported

that farmers without realizing the health effects of pesticides, work without the appropriate personal protective equipment, work without taking care of personal hygiene and work without proper storing pesticide at home. In the light of the above studies, we plan to assess the consciousness regarding health effects of pesticide use among farmers.

Materials and Methods

The current descriptive cross-sectional study was carried out in district Srinagar of Kashmir valley to find out the consciousness of farmers regarding health effects of using pesticide. In this paper, we chose sample size as 400 vegetable farmers selecting respondents at random from the study area. A well designed validated questionnaire was used to collect the data from the farmers under study. The farmers who participated in this study were given a verbal explanation regarding the purpose of the study and were assured that information collected will be used only for academic purpose. The farmers who possessed at least two kanals of land and having experience of at least 5 years in agriculture were considered for the present study as a sample. The sample size for our study was computed as (Cochran, 1997)

$$n = \frac{Z_{\alpha}^2 P(1 - P)}{d^2}$$

Here on the basis of earlier studies, we take $p = 0.05$, $Z_{\alpha} = 1.96$ and $d = 0.05$. That gives the sample size $n \sim 384$ and we choose for our research $n = 400$. The data collected from the study was tabulated and analyzed using standard statistical tools, p -value less than 0.05 and 0.01 was considered as significant at 5% level of significance and at 1% level of significance. The analyzed data were summarized and presented in a simplified form using tables, charts and followed by interpretation.

Results and Discussion

The data presented in Table 1, reveals that majority (51.5%) of the respondents under study were in the age group of >45 years, 48.5% reported that their family size was 6–8, majority of respondents (39.0%) were able to read and write only, 52.5% reported that their monthly income (approximately) was <₹5000, 49.5% reported that they spend (daily) 5–7 hours in their field and 58.5% respondents reported that they have more than 10 years of experience in agriculture.

Table 1: Distribution of the population under study as per general information

S. No.	Variable	Type	Frequency	%
1	Age (years)	25-35	64	16.0
		36-45	130	32.5
		>45	206	51.5
2	Family Size	3-5	144	36.0
		6-8	194	48.5
		>8	62	15.5
3	Education Status	Literate (formal education)	98	24.5
		Illiterate	146	36.5
		Able to read and write only	156	39.0
4	Approximate Monthly income (in Rs)	<5000	102	25.5
		5001-10000	210	52.5
		>10000	88	22.0
5	Time Spend in Field (Daily)	<4 hours	94	23.5
		5-7 hours	198	49.5
		>7 hours	108	27.0
6	Experience in Agriculture Field	Upto 5 years	38	09.5
		Upto 10 years	128	32.0
		>10 years	234	58.5

The data presented in Figure 1, reveals that the main source of information on health effects of using pesticide as per respondents were family/ friends/elders (74%), followed by 10.5% who

reported electronic/ print media, followed by 8.5% respondents who reported personal experience and 7.5% reported extension workers.

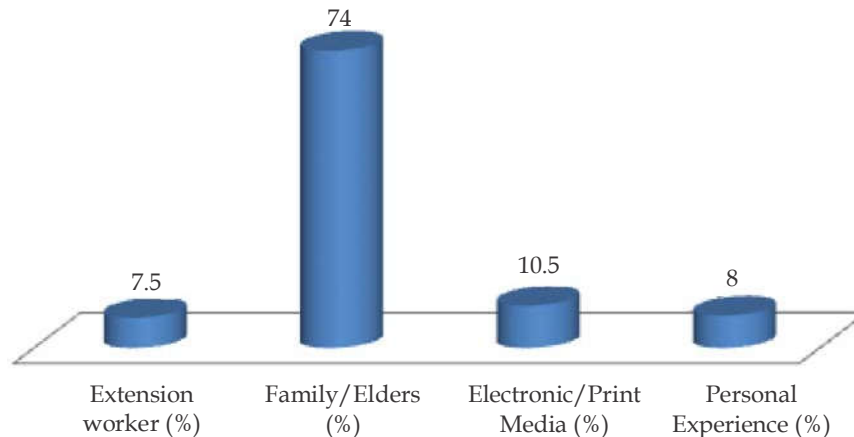


Fig 1: Source of Information on health effects of using pesticide

The data presented in Table 2, reveals that in response to questions asked to farmers under study related to consciousness regarding vulnerable and more vulnerable people of pesticide use, all farmers under study reported those who apply the pesticides, 90.5% farmers reported those farmers who consume the crops, 77.5% farmers reported those who work on the farm, 35.5% reported those who live near the farm area and 9.5% farmers were of the opinion that those farmers who purchase the pesticides. Further, all farmers under study reported that all pregnant

women, 94.5% reported that children and 70.5% respondents reported elderly people are more vulnerable people of pesticide use in the study area. The results of our study are in agreement with the earlier study (Gurung and Kumar, 2017) in which all respondents answered those who apply the pesticide and 16% respondents answered those who purchase the pesticide are vulnerable. Further, they reported in their study all respondents answered pregnant women and 70.5% respondents answered elderly people are more vulnerable people of pesticide use.

Table 2: Consciousness Among Respondents Regarding Vulnerable and More Vulnerable People of Pesticide Use

S. No.	Variable	Response	Frequency	%
1.	Vulnerable people	Those who apply the pesticide	400	100.0
		Those who work on the farm	310	77.5
		Those who consume the crops	362	90.5
		Those who live near the farm area	142	35.5
		Those who purchase the pesticides	38	9.5
2.	More Vulnerable people	Pregnant women	400	100
		Children	378	94.5
		Elderly	282	70.5

The data presented in Table 3, reveals that in response to questions asked to farmers under study related to consciousness regarding poisoning of pesticide use in skin 95.5% reported skin irritation, 91.5% reported dermatitis, 69.0% reported pruritis, 68.5% reported blister and 8.5% farmers reported crust formation. Regarding Nervous system, 96.0% reported dizziness, 93.0% reported headache, 55.5% reported numbness, 51.5% reported weakness and 23.0% reported pallor. Further, regarding Gastro-intestinal system, 93.5% reported vomiting, 81.5% reported nausea, 48.5% reported diarrhea

and 13.0% reported heat burn. In response to Respiratory system, 83.5% reported dyspnoea, 73.5% reported throat itching, 55.5 reported cough and 53.5% reported chest pain. In response to Eye system, 91.5% reported eye itching, 88.5% reported eye burning, 41.5% reported eye swelling and 23.5% reported blurred vision. Similarly, regarding Cardiovascular system, 84.5% reported tachycardia, 47.5% reported arrhythmia, 38.5% reported palpitation and 2.5% reported cyanosis. The results of our study are in partial agreement with the earlier study (Gurung and Kumar, 2017).

Table 3: Consciousness Among Respondents Regarding Poisoning Symptoms of Pesticide Use

S. No.	Variable	Type	Frequency	%
1.	Skin	Dermatitis	366	91.5
		Blister	274	68.5
		Skin irritation	382	95.5
		Crust formation	34	8.5
		Pruritis	276	69.0
2.	Nervous system	Dizziness	384	96.0
		Headache	372	93.0
		Weakness	206	51.5
		Pallor	92	23.0
		Numbness	222	55.5
3.	Gastro-intestinal system	Diarrhoea	194	48.5
		Heart burn	52	13.0
		Vomiting	374	93.5
		Nausea	326	81.5
4.	Respiratory system	Chest pain	214	53.5
		Cough	222	55.5
		Dyspnoea	334	83.5
		Throat itching	294	73.5
5.	Eye	Eye itching	366	91.5
		Eye swelling	166	41.5
		Eye burning	354	88.5
		Blurred vision	94	23.5
6.	Cardiovascular system	Palpitation	154	38.5
		Tachycardia	338	84.5
		Cyanosis	10	2.5
		Arrhythmia	190	47.5

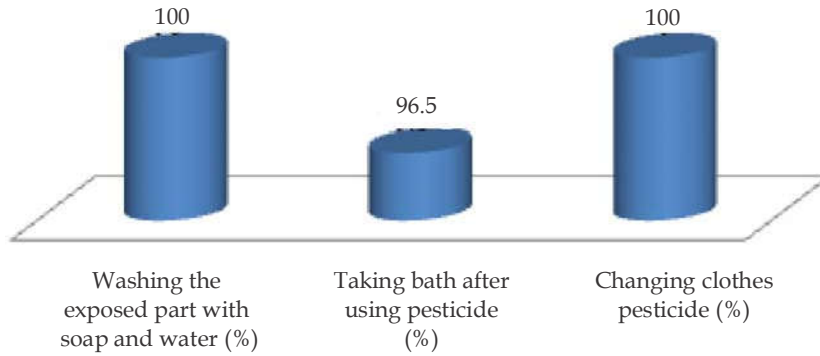


Fig. 2: Immediate Action taken by respondents after Pesticide contact with body

The data presented in Figure 2, revealed that the respondents under study reported that the immediate action they take after contact with pesticide with body, wash the exposed part of body

with soap and water (100%), taking bath (96.5%) and changing clothes (100%). The results are in agreement with the earlier study (Gurung and Kumar, 2017).

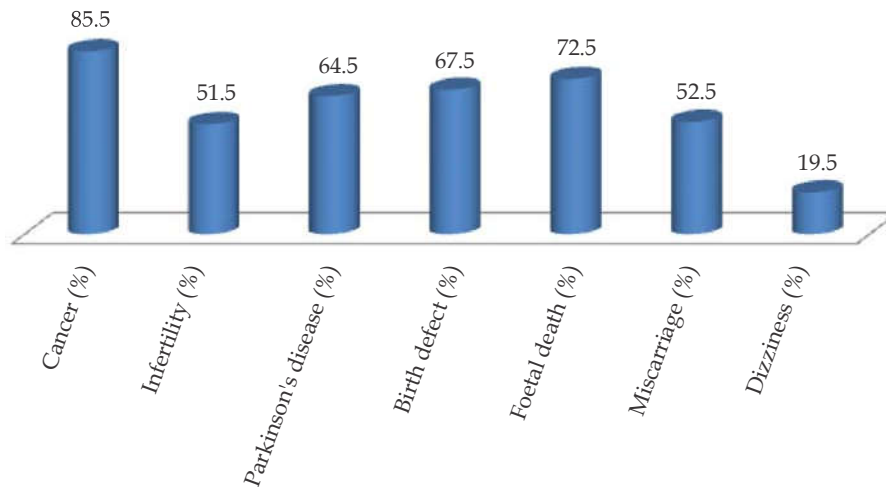


Fig. 3: Consciousness regarding longterm effects of pesticide use

The data presented in Figure 3, reveals that the farmers under study were conscious that pesticide use may cause cancer (85.5%), foetal death (72.5%), birth death (67.5%), infertility (64.5%), miscarriage

(52.5%), parkinson's disease (51.5%) and dizziness (19.5%). Our study is in agreement with the earlier study (Harley et al., 2008) which shows that there is a link between birth defects and pesticide use.

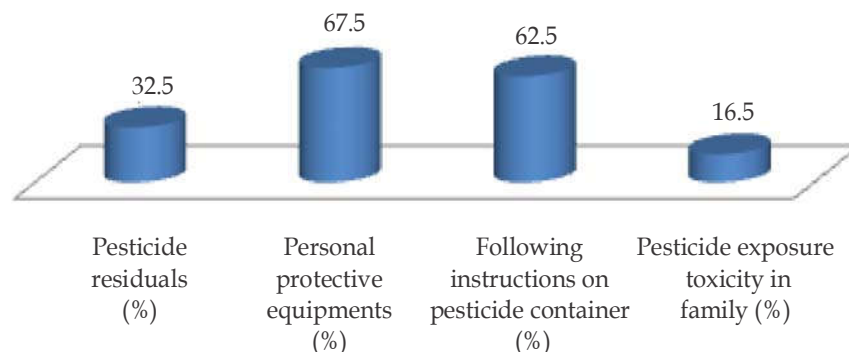


Fig. 4: Knowledge and Practice of farmers towards safe use of pesticides in the study area

The data presented in Figure 4, reveals that only 32.5% farmers under study were knowing about the pesticide residuals, 67.5% respondents were using personal protective equipments while using

pesticides, 62.5% respondents were following instructions given on pesticide container and only 16.5% farmers under study that they are aware about the pesticide exposure toxicity in family.

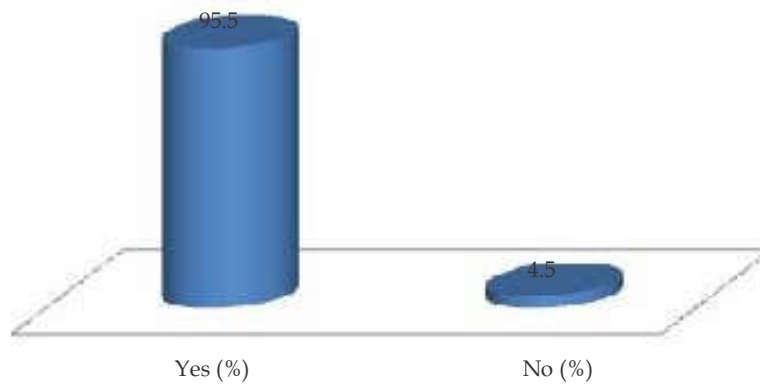


Fig. 5: Participated in awareness programme related to safe use of pesticides

The data presented in Figure 5, shows that 95.5% respondents reported that they never participate in any government organized awareness programme regarding safe use of pesticides. Statistically significant difference was noticed regarding participation in awareness programmes related to safe use of pesticides ($p < 0.01$).

Conclusion

The majority of the farmers under study were conscious about the adverse health effects of using pesticide. Majority of respondents were not formally educated, (39.0%) were able to read and write only, the main source of information on health effects of using pesticide were family/elders (74%). The respondents under study were aware about poisoning symptoms of pesticide use like Skin, Nervous system, Gastro-intestinal system, Respiratory system, Eye and Cardiovascular system. The farmers under study were conscious that pesticide use may have immediate as well as long term effects on health. The farmers were of the opinion that pesticide use may cause cancer (85.5%), foetal death (72.5%), birth death (67.5%), infertility (64.5%), miscarriage (52.5%), parkinson's disease (51.5%) and dizziness (19.5%). The study also reported that only 32.5% respondents were knowing about the pesticide residuals, 67.5% farmers under study were using proper personal protective equipments while using pesticides, 62.5% farmers were following strictly instructions given on pesticide container and only 16.5% respondents

were aware about the pesticide exposure toxicity in family. The respondents in majority (95.5%) reported that they never participate in any awareness programme regarding safe use of pesticides. It was concluded that use of pesticides should be reduced and training regarding safe use of pesticides as well as use of non chemical ways of controlling pests should be given to the farmers in the study area.

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