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Awareness of Safe Plant Protection Measures among Vegetable Growers in Prayagraj District of Uttar Pradesh

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Vegetable producers are often less knowledgeable about pest and disease identification, pesticide doses, application times, and health impacts of pesticides. As a result, it was thought that the research would be very useful in determining the level of perception of safe plant protection techniques among vegetable producers. The study was conducted in Prayagraj District of Uttar Pradesh to measure the awareness of safe plant protection measures among the vegetable growers in Prayagraj district of Uttar Pradesh. A total number of 120 respondents were selected randomly from ten villages under Chaka block because productivity, production and area under vegetable cultivation were found to be maximum. The data were collected by personnel interview method by using pre structured interview schedule and descriptive research design was used for this study. The findings of the study revealed that 47.50 per cent of the respondents belonged to the middle- aged group, majority of the respondents (55.84%) belong to the OBC caste and majority of the respondents belongs to medium level of annual income i.e. 50,000 – 1 lakh. The findings also revealed that 49.16 per cent of the respondents had medium level of awareness towards safe plant protection measures followed by 23.34% and 27.50% of the respondents with low and high levels of

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awareness respectively. It was found that independent variables like age, caste, economic motivation were positively and significantly correlated with awareness of safe plant protection measures. It is suggested that government should organized awareness camps, campaigns and demonstrations about safe plant protection measures.

Keywords: Awareness; safe plant protection; vegetable growers.

1. INTRODUCTION

India is blessed with a variety of agro-climate zones with unique seasons, allowing for the cultivation of a vast variety of vegetables. Nutrients, dietary fibre, phytochemicals, and vitamins are abundant in vegetables. Farmers have seen larger economic returns from shorter-duration, higher-productivity vegetables. Vegetables are high in carbs, proteins, vitamin A, vitamin B, vitamin C, and minerals, according to studies. It can be grown in various seasons throughout the year.

India, behind China, is the world's second-largest producer of veggies. India produces 14 percent of the world's total vegetable production. West Bengal, Uttar Pradesh, and Madhya Pradesh are the top three vegetable growers in the country, accounting for approximately 40% of total production, with West Bengal accounting for roughly 16% of overall production and Uttar Pradesh accounting for 14%. Furthermore, Madhya Pradesh contributed 8.6 percent to overall production, followed by Bihar with 8.75 percent, Gujarat with 7%, Odisha with 6%, Karnataka with 5%, and Tamil Nadu and others with 3.4 percent. (Source: State Horticulture Directorates, 2021). Farmers in India who lack a technical understanding of pesticides, their uses, and safety considerations are exposed to misinformation, which raises the risk of pesticide misuse. India's rapidly growing population puts ongoing pressure on agriculture to increase production [1-3]. It is quite possible that pesticides will be misused in such a situation. Pesticides have now been proven to have detrimental consequences all around the world. Direct users of pesticides, such as farmers and agricultural labourers, are more likely to be harmed by pesticide acute toxicity. However, there are about 550 crops produced in India that lack label claims for all of these pesticides. (http://cibrc.nic.in/).

The chronic use of pesticides, as well as their injudicious application, are the main causes of residue in food products. Following "Good Agricultural Practices" is a choice that entails a complete understanding of how to use various pesticides in an efficient and environmentally friendly manner. Pesticide residues in various commodities have increased from 1.2 percent to 2.6 percent in the last five years [4].

Despite the fact that the uncontrolled and indiscriminate use of pesticides in agriculture poses a significant risk to humans and the environment, changes in legislation, integrated pest management (IPM), and genetically modified crops have so far failed to reduce pesticide use. However, population expansion, pesticide resistance, and economic concerns all point to pesticides being used indefinitely [5-7]. Many pesticides, by their very nature, may represent a risk to humans, animals, and the environment. Dermal absorption occurs when pesticides come into direct contact with the skin, or when pesticide residues contaminate clothing and instruments. After high-level pesticide exposures at work, dermal exposure and ingestion may play a role in systemic inflammation or sensitization. Pesticide exposures are influenced by physiochemical features of the pesticide, temperature, humidity, meteorological conditions, personal hygiene (e.g. hand and face washing), and the use of personal protection equipment.

2. RESEARCH METHODOLOGY

Descriptive research design was adopted for the study as it describes the characteristics or phenomena that are being studied. The present study was conducted in Prayagraj district of Uttar Pradesh. Out of 20 blocks in Prayagraj district, Chaka block is selected purposively based on maximum area covered under vegetable cultivation. From the selected block, ten villages were selected purposively based on the maximum area covered under vegetable cultivation. The information was elicited from the respondents with the help of structured interview schedule. Pen, pencil, camera was also use during the data collection. The Primary data was collected with the help of personal interview technique with the help of interview schedule with especially objectives, focused study.

Secondary data was collected from library, journals, books, papers, and other materials related to study. The entire data were transformed into score for tabulation. To interpret the results and to show the relationship between independent variable and dependent variables, Mean, Frequency, percentage, correlation coefficient was followed.

2.1 Objectives of the Study

1- To assess the socio-economic profile of the respondents.
2- To determine the extent of awareness of safe plant protection measures.

3. RESULTS AND DISCUSSION

From the Table 1, it is shown that 47.50 per cent of the respondents belonged to the middle age-group. Majority of the respondents (55.84%) belong to OBC caste and 28.33 per cent of the respondents had primary level of education. In terms of annual income, 56.66 per cent of the respondents had medium level of income in which 45 per cent had land holding of 1 ha to 2 ha. It is evident that majority of the respondents (89.16%) lived in nuclear family. It is also evident that 48.33 per cent of the respondents possessed a medium level of mass media exposure. It is seen that in terms of scientific orientation, 48.34 per cent of the respondents possessed medium level of scientific orientation and 45.00 per cent of the respondents had medium level of economic motivation. Lastly 38.34 per cent of the respondents had medium level of extension contacts. Similar findings were also reported by [7].

As a result, it is reasonable to conclude that the backward caste was found to be mostly involved in vegetable production in the research area. The similar findings were also reported by Mishra and Ghadei [12]. The average size of family was observed to be 6 members with minimum and maximum in the range of 03 to 15 numbers of family members. It could be attributable to the presence of a dominating nuclear family system in the studied area. Maurya et al. reported comparable findings as well [13]. In the study area, the majority of the farmers were small and marginal. It could be caused to familial disintegration. In comparison to the state's and country's average literacy rates, it could be claimed that the respondents' educational level was quite high. Singh et al. also reported on similar findings [7].

The above table, Table 2 shows that a majority of the respondents (54.16%) were partially aware about term safe plant protection measures, 37.50 per cent of the respondents were not aware about identification of insects and diseases. About 50.84 per cent of the respondents were partially aware about preparation of solution with proper recommended dose and a majority of the respondents (56.67%) were partially aware about pesticide residual found in plants after use. About 49.17 per cent respondents were partially aware about pesticide residual found in clothes after use; also 39.17 per cent of the respondents were partially aware about pesticide residual found in vegetables after use. About 45.83 per cent of the respondents were partially aware about storage of pesticides inside house and a majority of the respondents (50.83%) were partially aware about pesticide should be stored under lock and key. About 45 per cent were partially aware about dispose of empty pesticide container by burning. (Similar findings were also reported by [1].

It is critical to have a high degree of understanding about safe plant protection techniques in order to develop effective educational and policy strategies. The majority of the farmers in this survey were well aware of pesticides' negative impacts on the environment and human health. This shows that, despite knowing the risks of pesticides, farmers may often engage in dangerous conduct due to a lack of education, resulting in a lack of knowledge and comprehension of safe pesticide usage techniques. As a result, the farmers appear to be more concerned with their crops' high economic yields than with their personal health.

This research revealed several concerning pesticide storage practises. This illustrates the farmers' lack of understanding of pesticides and how to store them properly. Pesticides stored in living areas can increase cancer risk, especially in locations where farmers prepare food, eat, and sleep. Pesticides were also placed in animal shelters, posing a risk to farm animals.

Farmers in general showed a lack of awareness and expertise concerning pesticide disposal. Poor pesticide handling techniques can result in toxic residues in harvested products, as well as contamination of soil and water, posing a concern to human and environmental health. Improper animal housing that could put agricultural animals in danger [12,13].

The Table 3 reveals that 49.16 per cent of respondent had medium level of overall awareness about safe plant protection measures. Considerable percentages of vegetable farmers were found having high (27.50%) and low level of awareness (23.34%), respectively. Suman [10] reported on similar findings as well.

It was concluded that the independent variables i.e. Age, caste, educational qualification, annual income, type of house, land holding, family size, mass media exposure, scientific orientation, economic motivation, extension contacts, were positively and significantly correlated with the awareness of vegetable growers towards safe plant protection measures (Table 4). Whereas the variable family type availed was negatively and significantly correlated with the awareness of vegetable growers towards safe plant protection measures respectively.

Table 1 .Socio-economic profile of the respondents

S. No	Independent variables	Category	Frequency	Percentage
1.	Age	Young age (Upto 35 years)	22	18.34
		Middle age (36-55 years)	57	47.50
		Old age (above 55 years)	41	34.16
2.	Caste	General	21	17.50
		OBC	67	55.84
		SC & ST	32	26.66
3	Educational qualification	Illiterate	16	13.33
		Primary school	34	28.33
		Junior Higher Secondary	31	25.83
		Higher Secondary	20	16.66
		Intermediate	11	9.16
		Graduate above	8	6.69
4	Annual income	Low (below 50,000)	36	30.00
		Medium (50,000-1lakh)	68	56.66
		High (above 1 lakh)	16	13.34
5	Type of house	Hut (Kuchha)	35	29.16
		Semi cemented	66	55.00
		Cemented	19	15.84
6	Land holding	Marginal (up to 1 ha)	22	18.34
		Small + medium (1.01 to 2 ha)	54	45.00
		Large (Above to 4 ha)	44	36.66
7	Family size	Small	47	36.16
		Medium	57	47.50
		High	16	13.34
8	Family type	Nuclear family	107	89.16
		Joint family	13	10.84
9	Mass media exposure	Low	39	32.50
		Medium	58	48.33
		High	23	19.17
10	Scientific orientation	Low	50	41.66
		Medium	58	48.34
		High	12	10.00
11	Economic motivation	Low	32	26.67
		Medium	54	45.00
		High	34	45.00
12	Extension contacts	Low	35	29.16
		Medium	46	38.34
		High	39	32.50

Table 2. Distribution of respondents based on awareness about safe plant protection measures

Sl no	Particulars	Evaluation		
		Fully aware F (%)	Partially aware F (%)	Not aware F (%)
1	Familiar with the term safe plant protection.	22(18.34%)	65(54.16%)	33(27.50%)
2	Identification of the insects/diseases.	20(16.67%)	55(45.83%)	45(37.50%)
3	Name of 03 mostly use pesticides and insecticides.	27(22.50%)	61(50.84%)	32(26.66%)
4	Preparation of solution of pesticides (With proper recommended dose)	42(35.00%)	68(56.66%)	10(8.34%)
5	Better safe plant protection methods (Chemical method, biological method, mechanical method, cultural method)	31(25.84%)	59(49.16%)	30(25.00%)
	Pesticide residual found after use			
6	Plants	34(28.33%)	68(56.67%)	18(15%)
7	Soil	26(21.67%)	57(47.5%)	37(30.83%)
8	Clothes	33(27.50%)	59(49.17%)	28(28.33%)
9	Work Equipment's	42(35.00%)	63(52.50%)	15(12.50%)
10	Vegetables	28(23.33%)	47(39.17%)	45(37.50%)
11	Irrigation Water	18(15.00%)	46(38.34%)	74(61.66%)
	Storage of pesticide			
12	Inside the house	38(31.67%)	55(45.83%)	27(22.50%)
13	Under lock and key	29(24.17%)	61(50.83%)	30(25.00%)
14	In the field	32(26.66%)	58(48.34%)	30(25.00%)
15	Tools storage shade	41(34.17%)	63(52.50%)	16(13.33%)
16	Near the irrigation channel /source	27(22.30%)	67(55.83%)	26(21.67%)
17	Any other	23(19.17%)	70(58.33%)	27(22.50%)
	Dispose of empty pesticide containers			
18	Burning	33(27.50%)	54(45.00%)	33(27.50%)
19	Burying	31(25.83%)	46(38.33%)	43(35.84%)
20	Washing and reusing at home	26(21.67%)	53(44.17%)	41(34.16%)
21	Reuse for storage of other pesticides	40(33.34%)	63(52.50%)	17(14.16%)
22	Throw outside	45(37.50%)	66(55.00%)	9 (7.30%)

Table 3. Awareness level of the respondents about safe plant protection measures.

Sl. No.	Awareness	Frequency	Percentage
1	Low (25-38)	28	23.34
2	Medium (39-51)	59	49.16
3	High (52-64)	33	27.50
Total		120	100.00

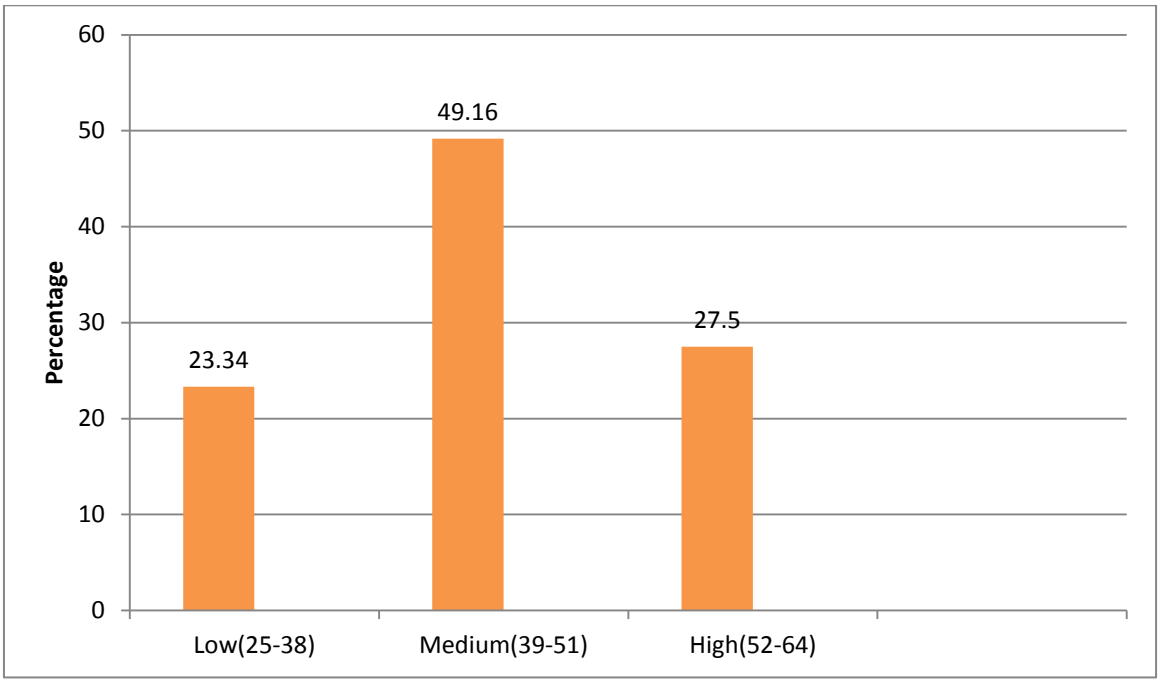

Fig. 1. Awareness level of the respondents about safe plant protection measures.

Table 4. .Association between selected independent variables with awareness

S.No.	Variables	Correlation coefficient (r)
1	Age	0.912*
2	Caste	0.745*
3	Educational qualification	0.781*
4	Annual income	0.857*
5	Type of house	0.881*
6	Land holding	0.833*
7	Family size	0.572*
8	Family type	-0.533*
9	Mass media exposure	0.811*
10	Scientific orientation	0.511*
11	Economic motivation	0.997*
12	Extension contacts	0.977*

*= *Significant*

4. CONCLUSION

It is concluded that majority of the respondents belonged to middle-aged group, having education up to primary level, having medium level annual income. Further, backward caste farmers were dominantly engaged in vegetable enterprises belonging to nuclear family system with land holding of more than 1 to 2 hectares. Majority of the respondents had medium levels of mass media exposure, extension contact and scientific orientation .It was found that most of the respondents had medium level of awareness about the safe plant protection measures. It was found that independent variables like age, caste, economic motivation were positively and significantly correlated with awareness of safe plant protection measures. It is suggested that government should provide regular training and demonstration about side effects of pesticides and organized awareness camps, campaigns and demonstrations about safe plant protection measures. Farmers must follow the instruction given on labels of the package/container then use.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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