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Attitude towards Pesticide Risk Reduction of the Mango Growers

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Authors' contributions

This work was carried out in collaboration between all authors. Author MSR designed the study, wrote the protocol, designed the conceptual framework and supervised the research work. Author SH co-supervised the research work and did overall monitoring of the research. Author MAH did the field survey, collected data and wrote the first draft of the manuscript. Authors NM and MRAFN managed the literature searches, did statistical analyses and edited the manuscript. All authors read and approved the final manuscript.

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ABSTRACT

Aims: The purpose of the study was to assess the attitudes of mango growers towards the pesticide risk reduction.
Study Design: Eighty four (84) respondents were selected as sample from a recent list of 335 mango growers using multi-stage random sampling method. The population size consists of the mango growers of the sadar upazila of Dinajpur district.
Place and Duration of Study: The study was conducted in Sadar upazila under Dinajpur district. Data were collected by a pre-tested interview schedule during 23rd April to 26th May 2014.
Methodology: Scales were used to measure information transfer. An open form question was designed to obtain information like knowledge on pesticide use which was measured by rating

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scores. Five point Likert scale was used for ascertaining attitude towards pesticide risk reduction.
Results: Two-thirds (66.2 percent) of the respondents had less favorable attitude followed by 21.3 percent had medium favorable and only 12.5 percent had high favorable attitude towards pesticide risk reduction. Among the independent variables educational qualification, information transfer and knowledge on pesticide use of the respondents showed positive significant relationships with their attitude towards pesticide risk reduction. Most of the mango growers i.e. 70.24 percent use safety shoes, 60.71 percent use cap, 23.81 percent use gloves, traditionally 22.62 percent use towel as mask, 11.90 percent use safety glasses and only 4.76 percent use shirt as apron during pesticide application. However, some complained that they were not aware about PPE.
Conclusion: To promote awareness and minimize the risk of pesticide exposure in using PPE and there is a need for better sanitation facilities and hygiene that improves the attitude of the mango growers.

Keywords: Attitude; pesticide; risk reduction; mango growers.

1. INTRODUCTION

Bangladesh is predominantly an agricultural country and about 60 percent of her population is engaged in agriculture for their livelihood [1]. The population density of Bangladesh is 1015 persons per square kilometer and per capita income is about US dollar 923 [2]. Agriculture is the backbone in the economy of Bangladesh. It plays a vital role in ensuring food security, rising standard of living and increase export earnings. Agriculture and environment has a close relationship and interact with each other. The health of agriculture depends on the proper functioning of environmental process and the health of environment depends upon a respectful agriculture.

There are many kinds of fruits grow in Bangladesh. It is the most important source of food for humans on the earth. The economic value of fruits can never be underestimated. They help us to nurture our health and meet essential nutritional requirement. A large number of people of our country earn their living by selling and cultivation different kinds of fruits.

Mango is the king fruits and proud of the country. It is grown in all over the country especially in the greater Rajshahi and Dinajpur district, due to the suitable climatic and edaphic condition for quality mango production. Undoubtedly, pesticides are substances meant for attracting, seducing, destroying or mitigating any pest. The most common use of pesticides is as plant protection products, which in general protect plants from damaging influences such as weeds, plant diseases or insects [3]. In general, a pesticide is substances intended for use as a plant growth regulator, defoliant, desiccant, or agent for thinning fruit or preventing the premature fall of fruit [4].

The mango growers use various types of pesticides for increasing mango production but they do not use Personal Protective Equipment (PPE) i.e. gloves, safety shoes, mask, cap, apron, goggles etc. properly. That is why, over use of pesticides put sustainable agricultural production at risk including health and environmental hazard. So to reduce these types of risk and to improve eco-friendly environment, mango growers should use PPE properly during pesticide application and personal hygiene and sanitation practices should be maintained also.

In view of the above circumstances; the present study was carried out to fulfill the following specific objectives:

1. To determine and describe the selected characteristics of the mango growers.
2. To assess the mango growers attitude towards pesticide risk reduction.
3. To explore the relationship between selected characteristics of mango growers and attitude towards pesticide risk reduction.

2. METHODOLOGY

For conducting this research, Sadar upazila under Dinajpur district was selected purposively as the study area. The selection was done due to researchers' availability in the research area and having good understanding with the language and culture of the local people. Sadar upazila consists of 10 unions in which two unions namely Chehelgazi and Auliapur were selected randomly as the locale of the study. The total number of mango growers i.e. 335 under these two unions was considered as the population of the study. Out of this population, a sample of 84 mango growers (about 25 percent) was selected by random sampling method.

In the present study, nine selected characteristics were selected as the independent variable. These were: age, educational qualification, farm size, annual income, information transfer, knowledge on pesticide use, personal hygiene and sanitation practices, use of personal protective equipment (PPE) and practice of pesticide. Attitude towards pesticide risk reduction was undertaken as the dependent variable. To assess the attitude of the mango growers towards pesticide risk reduction was measured by using 12 statements (6 positive and 6 negative). A 5-point Likert scale was used to measure the attitude of the mango growers that ranked as 'strongly agree', 'agree', 'undecided', 'disagree' and 'strongly disagree'. Score was assigned as the positive opinion as 4, 3, 2, 1, 0 and reverse as negative opinion. The attitude score of a respondent was computed by adding the scores for responses to all the 12 statements. The possible attitude scores could range from 0 to 48, where 0 indicating highly unfavorable attitude and 48 indicating highly favorable attitude towards pesticides risk reduction.

Data were collected during 23th April to 26th May 2014 through face-to-face interview. Descriptive statistics such as range, number, percentage, mean and standard deviation were used. Pearson's Product Moment Correlation Co-efficient were used in order to assessment of the relationship between the concerned variables.

3. RESULTS AND DISCUSSION

3.1 Characteristics Profile of the Mango Growers

Table 1 revealed that the slightly more than half (51.2 percent) of respondents were in the young aged category followed by 34.5 percent middle aged and 14.3 percent under old category.

The highest proportion (41.7 percent) of mango growers had secondary education compared to 22.6 percent having primary education, 21.4 percent respondents can sign only, 11.9 percent illiterate and only 2.40 percent had above secondary level of education. Near about two-thirds (65.5 percent) of the respondents had medium sized farms followed by 19.0 percent had large and 15.5 percent had small sized farm respectively. 36.9 percent of the respondents had medium annual income, while 34.5 percent had high and 28.6 percent had low annual income. Near about three-fourths (73.8 percent) of the respondents had medium, 16.7 percent of the respondents had high and 9.5 percent of the respondents had low information transfer respectively. More than three-fourths (78.6 percent) of the respondents had medium, 14.3 percent of the respondents had high and 7.1 percent of the respondents had low knowledge on pesticide use respectively. Educational qualification and knowledge on pesticide use had statistically significant relationship at 1% level of probability and information transfer had statistically significant relationship at 5% level of probability. On the other hand, age, farm size and annual income were not statistically significant.

3.2 Personal Hygiene and Sanitation Practices

The good proportion of the mango growers i.e. 91.66 percent who handle pesticide reported they did not do training and check-up health before pesticide exposure. However, Most of the mango growers that means 65.48 percent handle pesticide ate or drank at workplace. After pesticide use 40.48 percent take shower while 69.05 percent do not change cloths before and after pesticide exposure. To improve the attitude of the mango growers towards personal hygiene and sanitation, there is a need for better sanitation facilities and hygiene. Similar behavior was reported by Gaber and Latif [6]. Such behavior contributes to the mango growers increased exposure to pesticides.

3.3 Use of Personal Protective Equipment (PPE)

Most of the mango growers i.e. 70.24 percent use safety shoes, 60.71 percent use cap, 23.81 percent use gloves, traditionally 22.62 percent use towel as mask, 11.90 percent use safety glasses and only 4.76 percent use shirt as apron during pesticide application.

Good proportion of the mango growers reported that the use of PPE including safety shoes; cap and gloves etc. however, some complained that they were not aware about PPE. They were also not instructed for the use of PPE. Majority of the mango growers uses safety shoes and cap and very few mango growers use aprons. Similar results of unsafe practices among pesticide handlers were also reported in other studies [6].

Table 1. Distribution of the mango growers' according to their selected characteristics

Characteristics	Range		Categories	Respondents		Mean	r value
	Possible	Observed		No.	%	(SD)	
Age (Years)	Unknown	22-68	Young (Up to 37)	43	51.2	40.20	-0.015
			Middle (38-52)	29	34.5	(11.05)	
			Old (about 52)	12	14.3		
Educational qualification (Year of schooling)	Unknown	0-12	Illiterate (0)	10	11.9	4.77	0.454**
			Can sign only (0.5)	18	21.4	(3.90)	
			Primary education (1-5)	19	22.6		
			Secondary (6-10)	35	41.7		
			Above secondary (>10)	2	2.4		
Farm size (Hectare)	Unknown	.21-1.77	Small (up to 0.51)	13	15.5	0.86	0.064
			Medium (.52-1.21)	55	65.5	(0.35)	
			Large (>1.21)	16	19.0		
Annual income ('000' Tk.)	Unknown	35-90	Low income (<47)	24	28.6	58.76	0.191
			Medium income (48-69)	31	36.9	(18.71)	
			High income (>69)	29	34.5		
Information transfer (Scores)	0-48	16-36	Low (up to 18)	8	9.5	23.15	0.243*
			Medium (19-27)	62	73.8	(4.35)	
			High (>27)	14	16.7		
Knowledge on pesticide use (Scores)	0-20	10-18	Low (up to 11)	6	7.1	13.55	0.318**
			Medium (12-15)	66	78.6	(1.66)	
			High (>15)	12	14.3		

*** Significant at 0.01 level of probability; * Significant at the 0.05 level of probability*

Table 2. Personal hygiene and sanitation practices by the mango growers during pesticide exposure

Sl. no.	Questions	Number (Percentage)	
		Yes	No
1.	Do you change clothes before and after pesticide exposure?	26 (30.95)	58 (69.05)
2.	Do you wash your hands after pesticide exposure?	27 (32.14)	57 (67.86)
3.	Do you shower after pesticide exposure?	34 (40.48)	50 (59.52)
4.	Do you eat or drink at the workplace?	55 (65.48)	29 (34.52)
5.	Do you take medical check-up and proper training before pesticide application?	7 (8.33)	77 (91.66)
6.	Do you avoid any windy and sunny weather before using of pesticides?	23 (27.38)	61 (72.62)

Note: Figure in the parentheses indicate percentage of mango growers (Source: Field Survey, 2014)

Table 3. Type of Personal Protective Equipment (PPE) used during pesticide exposure

Sl. no.	Type of PPE	Number (Percentage)	
		Yes	No
1.	Gloves	20 (23.81)	64 (76.19)
2.	Safety shoes	59 (70.24)	25 (29.76)
3.	Mask	19 (22.62)	65 (77.38)
4.	Apron	4 (4.76)	80 (95.24)
5.	Safety glasses	10 (11.90)	74 (88.10)
6.	Cap	51 (60.71)	33 (39.29)

Note: Figure in the parentheses indicate percentage of mango growers use PPE (Source: Field Survey, 2014)

3.4 Practice of Pesticide

Most of the mango growers i.e. 90.48 percent were unaware about pesticide exposure level, 80.95 percent were not instructed or suggested to use safe pesticide handling methods, 72.62 percent did not read the written information on pesticide packages; 78.57 percent could not

understand and 66.67 percent did not give attention to the written information on pesticide packages. Change in practice leads to reduce risk to the mango growers. So it would be useful to implement continuous education and training programs for mango growers on pesticides handling in order to promote awareness and minimize the risk of pesticide exposure [5,6].

3.5 Attitude towards Pesticide Risk Reduction

Attitude scores of the growers could range from 0 to 48. Computed scores of the growers ranged from 10 to 40 and the mean value was 25.88 with a standard deviation of 4.24. On the basis of computed scores, the growers who handle pesticides were classified into the following three categories as less, medium and high favorable.

Fig. 1 indicated that nearly two-thirds (66.2 percent) of the respondents had less favorable attitude followed by 21.3 percent had medium favorable and only 12.5 percent had high favorable attitude towards pesticide risk reduction. Majority of the respondents had less favorable attitude towards pesticide risk reduction. Due to less favorable attitude most of the respondents do not use PPE during pesticide exposure and do not follow personal hygiene and sanitation practices during pesticide exposure. That is why, should take measures for creating awareness and set program for proper training. Control and safety behavior practices reduce exposure to pesticide. But, due to less favorable attitude most of the respondents do not use PPE during pesticide exposure and do not follow personal hygiene and sanitation practices during pesticide exposure.

3.6 Relationship between the Characteristics of the Mango Growers and their Attitude towards Pesticide Risk Reduction

The relationships were measured by using the Pearson's Product Moment Correlation Co-Efficient (r). The summary of the results of correlation analysis between independent and dependent variables are presented in Table 5.

Table 4. Practice of pesticide of the mango growers

Sl. no.	Questions	Number (Percentage)	
		Yes	No
1.	Are you aware of pesticide exposure level?	8 (9.52)	76 (90.48)
2.	Did you read information written on pesticide packages?	23 (27.38)	61 (72.62)
3.	Could you understand the information written on pesticide packages?	18 (21.43)	66 (78.57)
4.	Do you give attention to the written information on pesticide packages?	28 (33.33)	56 (66.67)
5.	Have you been instructed or suggested about safe pesticide handling methods?	16 (19.05)	68 (80.95)

Note: Figure in the parentheses indicate percentage of mango growers (Source: Field Survey, 2014)

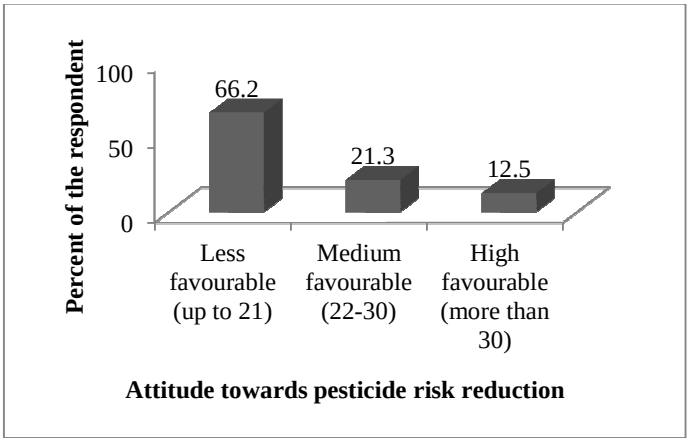

Fig. 1. Bar graph showing the distribution of the growers based on attitude towards pesticide risk reduction

Table 5. Co-efficient of correlation showing the relationship between independent and dependent variables

Dependent variable	Independent variables	Correlation of Co-efficient (r)	Tabulated value of 'r' with 82 df	
			0.05 level	0.01 level
Attitude towards pesticide risk reduction	Age	-0.015		
	Educational qualification	0.454**		
	Farm size	0.064		
	Annual income	0.191	±0.214	±0.279
	Information transfer	0.243*		
	Knowledge on pesticide use	0.318**		

*** Correlation is significant at the 0.01 level; * Correlation is significant at the 0.05 level*

Table 5 revealed that out of six tested null hypotheses, three were rejected. Among these, educational qualification, information transfer and knowledge on pesticide use showed a positive significant relationship with their attitude towards pesticide risk reduction. On the other hand, age, farm size and annual income did not show any significant relationship with the attitude towards pesticide risk reduction. Age also showed a negative trend.

4. CONCLUSION

Based on the findings and their logical interpretations the following conclusions have been drawn:

The study findings strongly support the approach of attitude towards pesticide risk reduction which is the major concern for the study area. The mango growers of the study area become aware and conscious about pesticide exposure level and attitude could not be the less favorable attitude converted to highly favorable of the mango growers. Education is generally a contributing factor for gaining knowledge and upgrading the education level of the respondents would contribute to the development of their favorable attitude offering effective education to the respondents may be very useful in forming their favorable attitude towards pesticide risk reduction. Though information transfer had significant positive relationship with pesticide risk reduction it may be concluded that the respondents had a great opportunity to connect the information source which could develop favorable attitude towards pesticide risk reduction. Knowledge as a component of attitude is very important and has further been proved and confined in this study. Therefore, it may be concluded that if knowledge on pesticide use could be increased, then the attitude towards pesticide risk reduction could also be enhanced.

Major proportion of the mango growers reported that the use of PPE including safety shoes; cap and gloves etc. however, some complained that they were not aware about PPE. To promote awareness and minimize the risk of pesticide exposure in using PPE and there is a need for better sanitation facilities and hygiene that improves the attitude of the mango growers. Change in practice leads to reduce risk would be implement continuous education and training programs for mango growers on pesticides handling.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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