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THE RISK AND HAZARDS OF PESTICIDES RELATED TO LACK OF AWARENESS IN DEALERS COMMUNITY

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ABSTRACT

A survey was conducted to assess the perception of toxic pesticide dealers in Karachi. Information was collected on a predesigned questionnaire containing two parts; one part comprising questions regarding the handling, health implications, *modus operandi* for sale of pesticides and best-selling products. The second part was concerned with the observations on behaviors, awareness, placement and sorting of pesticides, accessibility to children and whether eating or smoking in the section where pesticides are stored separately or mixed with food items were permissible. Despite majority of dealers (80%) knew hazards associated with pesticides but only 33% observed methods to rectify the impact.

Keywords: Toxic insecticides, dealers, perceptions, hazards and risk.

INTRODUCTION

Pakistan has promoted the use of pesticides to expand agriculture land and increase in yield out-put per acre. As a consequence of this expansive policy, pesticides use has more than doubled since 1991-92 rising from 15,258 metric tons to 32,152 metric tons in 2011-12 financial year (PBS-2014). Mankind enjoyed the benefits of the synthetic agro-chemicals for three decades without knowing their ill effects. Carson (1962) in her curtain-raising publication, "Silent Spring" has rightly said "for the first time in the history of the world that every human being is now subjected to contact with dangerous chemicals, from the moment of conception until death". It is now necessary to create awareness among the occupational groups but also to non-occupational groups of community. Further, it is imperative to develop the regulatory system in Pakistan for pesticide residues and upgrade the existing facilities for pesticide analysis across the country to monitor the account of the whole body intake of pesticides via food and air which may be used to develop the model for the safety testing for human exposure. One of the key difficulties which are faced by the scientists in assessing the potential health risk areas is popularly called, "the cocktail effect". This problem could be illustrated by the reference to pesticide residues in fruits, vegetables and water that may contain residues of different types of pesticides. To prevent adverse effects on public it is a must to establish control measures in order to ensure MRLs to be respected. Moreover, the problem can also be minimized if the perception of occupational groups be measured about the health implication of pesticides and necessary steps taken to train these people through discussion surveys, seminars and media campaign.

The pesticides contaminate water, soil and food and accumulate in the soil for relatively longer period of time and then pass into various parts of the plants grown on the contaminated soil. Ahmad (2004) emphasized the importance of continuous monitoring of pesticide residues in our food, environment and biosphere at large and need for creating awareness of contamination level and to build up a data-base upon which future plan could be decided. The misuse of pesticides has led to tremendous economic losses and hazards to human health. Human exposure to pesticides is usually estimated by measuring their levels in the environment i.e. soil, water and food (Tahir *et al*., 2001, Anwar *et al*., 2004, 2005, 2011, 2012, 2013a, 2013b, 2014). About 60-70% of pesticide poisoning cases were reported due to occupational exposure and female cotton pickers appeared to be at high risk of hazards (Ahmad, 1998; Tahir and Anwar, 2012). Tariq *et al*. (2007) reviewed the pesticide poisoning cases in Pakistan. The present survey was undertaken in Karachi, Sindh among the pesticide dealers to assess the perception about the health hazards of pesticides with the objective to create awareness among the dealers/salesman for safe use of pesticides. Ahmad *et al.* (2013) comprehensive review of pesticide poisoning should be an eye-opener in pesticides perspective.

Information on potential hazards for use and safe handling of pesticides for both farmers and dealers. Without a sufficient understanding of the risks involved, the exposure may not be appropriate and protective measures, against unfavorable outcomes appear a disseminator of this information in developing countries. It is a difficult task due to poor literacy rates of end-users and limited access to information. In this respect dealers (retailers) are important for user's selection of pesticides for recommended dose and safe handling informations which must be passed to end users. Therefore this survey was carried out to help understand the dealer's health risk perception of toxic pesticides.

MATERIALS AND METHODS

A survey was conducted to assess the perception of pesticide dealers in Karachi. Around 40-50 pesticide dealers are spread in 2-3 locations, majority of them around fruits & vegetable markets and areas around agricultural land. Information was collected on a predesigned questionnaire (Annexure-1) containing two parts: one part comprised questions regarding kind of pesticides (branded, generic, both) best-selling products, awareness about handling, health implication, and *modus operandi* for sale of pesticides. The second part was based on the observation by interviewer regarding overall attitude of dealers i.e. placement, sorting of pesticides, and precautionary measures taken at the sale point. The survey was conducted in two towns of Karachi i.e. Sadar Town and Gulshan Town, where mostly the pesticide dealers are located. The survey was carried out by the students of Department of Agriculture and Agribusiness Management, Department of Zoology and Institute of Environmental Sciences, University of Karachi. The survey was conducted in the month of May-July 2012 with reference to accessibility to children, whether eating or smoking is permissible and pesticides are stored separately or mixed with food items as a routine. Survey was conducted in Karachi, Sindh. The data were statistically analyzed.

RESULT

Forty-five dealers were interviewed but six did not respond. Mosquito repellents, coils, aerosols and pesticides are common products. Among pesticides DDVP was the only pesticide specifically reported by one dealer. Eighty Percent dealers knew the importance of safe handling and sorting of the pesticides. Majority of (31%) dealers sold both branded and generic pesticides whereas, 31% sold only generic pesticides and 38% branded pesticides (Fig. 1). When the dealers were asked regarding the safe handling of pesticides only 15% dealers did not respond whereas, 62% had knowledge about the safe handling; however, 23% reported that they had no knowledge regarding the handling of pesticides (Fig. 2). Fifty four percent dealers were found to have knowledge about health problems associated with pesticides, however, 31% reported that they had no knowledge regarding risk due to exposure to pesticides. 15% of the dealers gave no response on the health related issues (Fig. 3).

Investigating how user generally got information regarding use of pesticides, it involved 40% dealers; farmers & customers preferred to purchase pesticides which were recommended by the extension officials. About disposal of used bottles 80% dealers did not answer the question while remaining 20% mentioned that either they burned out, disposed off in drains or returned the products to Pesticide Company. It was observed during the survey that 33% dealers had separate sections for pesticides while, 60% kept pesticides along with the food items. In 73% cases pesticide bottles were within reach of children. Similarly 93% dealers allowed eating and smoking freely in their shops. Regarding displaying pesticides in racks 60% dealers did not sort pesticides according to any standard (toxicity, formulation or packing size). Only 6% stored pesticides according to toxicity followed by formulation (13%) and size or packing (20%). All the dealers were observed to display warning note and kept the areas clean.

Majority of dealers (66%) neither took any precautionary measures during pesticide sale nor cared of the consequences. Only 20% reported to be very careful regarding the precautionary measures. The majority of dealers/salesmen (87%) were cooperative during survey and only (13%) did not respond.

DISCUSSION

Human exposure to pesticide is usually estimated by measuring the levels in the environment i.e. soil, water and food (Tahir *et al.* 2001; Ahmad, 2004, Anwar *et. al.*, 2004, 2005, 2013b and 2014). Cotton is a cash crop of Pakistan and plays a vital role in the country's economy. It is grown on 3 million hectares (ESP-2007). This crop receives tremendous amount of organophosphate (OP), carbamate and pyrethroid pesticides against insect pests. Anwar *et al.* (2017) reported pesticides residues in nine vegetable samples using the gas chromatographic techniques with all samples contaminated and seven of those were found having above the Maximum Residues Level (MRL) (as shown

in their Table 1) mostly having organo-phosphate and pyrethroid. The continuous consumption s of vegetables could be more hazardous if consumed raw and without washing.

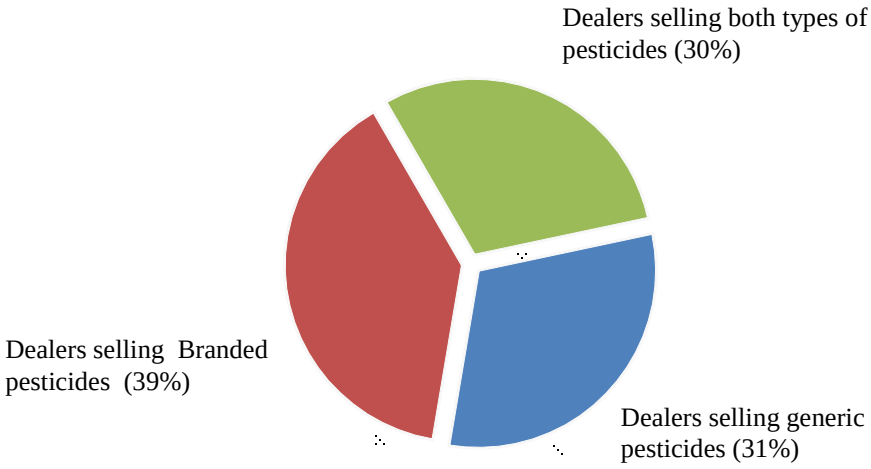

Fig. 1. Percent proportions of dealers selling different types of pesticides.

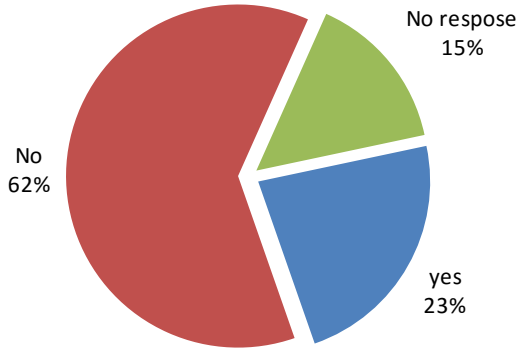

Fig. 2. Dealers know-how about the safe handling of Pesticide.

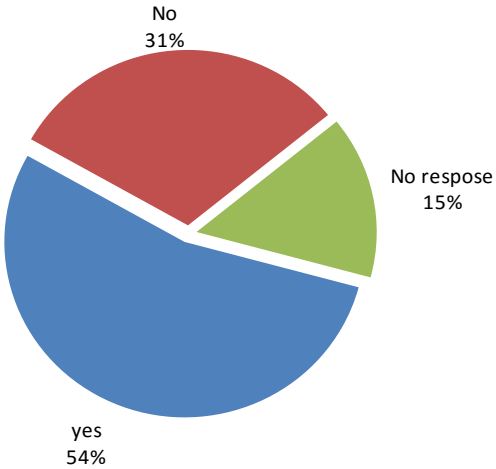

Fig. 3. Dealers Know-how regarding health implication associated with pesticide handling.

Annexure-1

Pest Management Research Institute
Southern zone Agricultural Research Centre
Pakistan Agricultural Research Council, University Karachi

Questionnaire for pesticide dealears (Section -1)

Name:	Location:
Nature of business	Town:
Age:	Timing:

1. What are the best selling products of your shop

2. Do you know safe handling, sorting and placement of pesticides?

1	Yes	
2	No	
3	Others	

3. Do you deal with ?

1	Branded	
2	Generic	
3	Both	

4. Do you know about health implication arising from occupational exposure of these chemicals, if yes give details?

1	Yes	
2	No	
3	Details	

5. What is modus operandi for sale of pesticide you know safe handling, sorting and placement of pesticides?

1	Farmers/Customers purchase at his own will	
2	Farmers/Customers purchase at your guidance and insistence	
3	Farmers/Customers purchase on recommendation of extension	

6. How do you disposed of broken/ leaked bottles or pesticides

1	
2	
3	

Observation (Section-2)

1. Pesticide Section

Separate	A	
Merged with food items	B	
Merged with non-food items	C	

2. Accessibility to Children.

Easily accessible	A	
Placed beyond the reach of children	B	

3. Eating/smoking

Not allowed	A	
Partially allowed	B	
Allowed (not restricted)	C	

4. Sorting of pesticides according to.

Toxicity	A	
Formulation	B	
Packing and size	C	
Not sorting		

5. Placement

Stacked roughly in congested area	A	
Placed with warning note at clean place	B	
other	C	

6. Awareness status

Shopkeeper take precautionary measures while selling pesticides	A	
Did not care about the consequences	B	

7. Behavior of dealer/ Selman

Very cooperative	A	
Cooperative but nervous	B	
Non responsive	C	

There is no regular monitoring program for the health of workers involved in handling the pesticides in Pakistan (Ahmad, 1998), Ahmad *et al.* (2013) and Bungush and Anwar (2000) reviewed pesticide poisoning cases and identified the factors contributing occupation related acute poisoning.

The results of this study showed that pesticide dealers in Karachi, Pakistan are not aware of the occupational hazards as 80% pesticide dealers did not answer the question regarding disposal of broken pesticides bottles. On the contrary 85% respondents believed that pesticides caused ill effects on the health due to pesticide-poisoning during a study carried out in Punjab among female occupational group (FAO, 2001). Fenestra *et al*., (2000) reported 82% awareness of farmers about health hazards for pesticides in Sindh province. Bungush and Anwar (2000) have reviewed the pesticide poisoning cases in Pakistan and discussed the contributing factors to occupation related acute poisoning. Baloch (1995) reported that in Multan in 1972 workers with improper clothing, unloading a consignment of phorate under extreme hot conditions fell ill and later seven of them died. The results are supported by this study despite awareness of dealers regarding health hazards although majority of them did not care for exposure to pesticides. In Pakistan the users of pesticides in the agriculture sector are illiterate and did not follow the instructions on the labels or what is told to them by the extension workers/private sector's sales representatives. Ahmad (1998) has also reported that in general practice the farmers and field labors did not use protective clothing, etc. on the hot days resulting in accidents leading to loss of precious lives. Hussain (1998) has also reported that the uses of agricultural chemicals are not suitably regulated in the developing countries including Pakistan. The doses are not calculated, manufacturer's instructions are not followed, the required safety precautions are not observed and the operators are not equipped with technical know-how. Similarly, pesticides dealers are not aware about the exposure to pesticides. According to a report of United Nations one farmer dies every minute in the developing world due to pesticide poisoning further supports the above statement as per report of Ahmad (1998).

In Pakistan pesticide being used on cotton are pyrethroids and organophosphates. Besides agricultural workers general public are also being exposed to these pesticides through wind drift and contaminated food. A varying degree of pesticide residues have been reported in water, fruits and vegetables in Pakistan(Ahmad, 2004; Ahmad and Anwar, 2007, Anwar *et al.*, 2012, Anwar *et al.*, 2017 and Ahmad *et al*., 2013). The epidemiological status regarding the pesticide poisoning needs to be carried out in Pakistan for the assessment of health risk associated with pesticides and would be a great help in developing the policies in risk management in the country.

Dasgupta and Maningi, (2005) surveyed 110 Bangladeshi pesticide traders and developed the two equation bivariate probit analysis made for health improvement and traders perception with health effects as an endogenous regress or in the perception equation. Toxicity, exposure, duration, age (experience) and interaction between harmful pesticides and training received in pesticide use and handling were reported to be the significant determinant factors of health impairment status. The authors also recommended that training progress should be revised with great' emphases on health hazards at averting behavior.

Studies of the health effects of pesticide exposure on dealers are practically non-existent in Pakistan and most of the information is available on Farmer's health (Tahir and Anwar, 2012). It is important to point out here that dealer's perception of pesticide risk can be used as an indicator about the awareness among end-users. This study on the misperception of pesticide toxicity and health risk would be an eye opener and would provide a base line in literature.

Conclusion

In the light of limited resources available for such efforts, targeting such information program at the trader level would be advantageous for them and masses would benefit from this information rightly to take appropriate precautions to reduce health risks. They may pass this information to the end-users, and improve the farmer's understanding of pesticide handling and could take better precautions. It is suggested that similar surveys must be carried out to assess the knowledge of pesticide dealers about the pesticides risk associated with health in the other cities of Sindh where large number of pesticide dealers are located. The information generated would help in

developing the strategies to create awareness among the occupational and non occupational groups related with agriculture in the country.

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