CONCEPTUAL ANALYSIS OF COTTON GROWING COMMUNITY ABOUT PESTICIDES: A CASE STUDY OF DISTRICT MULTAN

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Insecticides/Pesticides are the chemicals used to control the crop losses by cidal phenomenon (killing) the insects/pests harmful for crop and such chemicals are playing a vital role in yield and crop production. The ingredients of these chemical pesticides are not only lethal for target arthropods but also for human beings as pharmacokinetics for both is almost the same. Therefore, the main objective of the present study was to probe the orientation of cotton growers about these chemical pesticides and to assess the preventive measures they adopted to avoid the pesticide related health hazards. Twenty villages from district Multan were selected by multistage random sampling technique. From each selected village, 11 cotton growers were further selected randomly. Therefore, 220 cotton growers in total were the respondents from target community. They were interviewed through a reliable and validated interview schedule. The data collected were processed through statistical package for social sciences (SPSS). The results show that 94.0 percent of cotton growers were using the pesticide chemicals on their cotton crop and 75.0 percent of cotton growers were having the awareness about side effects of the pesticides on human health. The research study highlighted the awareness/orientation of cotton growers about pesticide chemicals and need for their training and education for adoption of preventive measures to avoid the pesticide related health hazards.
Keywords: pesticide, orientation, cotton growers, preventative measures.

INTRODUCTION

Cotton is the most important cash crop declared as 'White Gold' all over the world. It belongs to family Malvaceae. Species of this family cultivated in Pakistan on commercial bases are *Gossypium Arboretum, Gossypium Hirsutum, Barbadense* and *Gossypium Herbaceum* .Livelihood of millions of people, farmers and cotton picker females is linked with this cash crop in Pakistan. Fiber of cotton is proved scientifically to be the most suitable material for human clothing and preferred natural fiber for fashion and design fabrics all over the world. To meet the increasing demand of this crop, quality and quantity of the crop is manipulated by improving cotton crop yield/hectare and controlling its losses through integrated pest management (P.C.C.C., 1990).

Usage of pesticides had a long history, no dought, World Wars I and II served as a watershed for the current modern agrochemical industry. Chemicals and technologies innovated for warfare were later applied for promotion of agricultural farms. Crop dusting for cotton crop was first time used in Mississippi Delta in early 1922, which was approved pesticide for spraying in 1943. This chemical later used in agriculture fields as insecticide/pesticide in 1950's and 60's and still in practice. The pesticides marketed widely after World Wars. In 1962 these chemicals were challenged for their abuse followed by movement of agrochemical regulations now called IPM i.e. Integrated Pest Management (NARC, 2000).

Pesticides were used for the first time in 1950 in Pakistan to combat locust attack. In 1954, imports of chemical pesticides amounted to 254 tones and in 1980; the government controlled the imports, and subsidized the distribution of pesticides.

The sale of pesticides in 1995 was of worth 9 billion rupees (US$222 million). About 145 pesticide formulations had been registered. The parathyroid had the greatest share, with 45% of the market value, followed by organophosphates with 39%, chlorinated hydrocarbons 9% and carbonates 4% (Pakistan Economic Survey, 2002).

According to the Agriculture Census, in 1980 four percent of total farms used chemical plant protection measures but this raised to around 25% in 1990, that was 1.28 million farms or up to 16% of the total cropped area. Free aerial spraying was previously provided to control pest attacks on major crops. The Plant Protection Department now had a fleet of 22 aircrafts which sprayed about 351,000 hectares of crop area in the year 1995-96.

According to the Prime Minister's Task Force on agriculture, approximately 90% of the insecticides and pesticides are used on cotton crops. That means most of the 6.62 million acres used for cultivation of cotton crops i.e. the target of pesticide use (PAN International Website, natural collection, PANAP p.2).
Pesticides are used for cotton crops by the cotton growing community much more as compared to any other crop causing severe environmental and health problems (TGPC, 2000). A comprehensive programme focused on awareness of cotton growers for proper usage of pesticides, minimizing health hazards, protecting the environment and increasing the yield is needed. Positive effects on increased biodiversity in IPM cotton fields were also highlighted. The programme demonstrated the success of the IPM farmer field school approach in enhancing the management skills of farmers to improve their livelihoods in cotton- based cropping systems (NARC, 2000). Such programmes were proved to be beneficial and demanded by the respondent cotton growers to be continued and modified.

MATERIALS AND METHODS

The universe of the present study was Multan district of the Punjab Province. Multan is one of the major cotton-growing districts of Punjab. District Multan comprises 540 union councils out of which 114 are urban union councils whereas 426 are rural.
Multi stage random samples of 20 villages were selected. From each selected village, 11 cotton growers were further selected randomly. Thus 220 respondents were selected by using Fitzgibbon *et al*. (1987) table through simple random sampling technique. Keeping in view the objectives of the study, an interview schedule was developed for data collection. The data thus collected were analyzed with the help of Statistical Package for Social Sciences (SPSS).

RESULTS AND DISCUSSION

The data regarding awareness of the respondents for side effects of pesticides on human health is presented in Table 1.

Table 1. Distribution of the cotton growers according to their awareness for side effects of pesticides on human health

Side-effects of pesticides on human health	f.	%age
Yes	165	75.0
May be	38	17.3
Not at all	17	7.7
Total	220	100.0

Table 1 indicates that 75% cotton grower farmers were oriented with health hazards of pesticides on human beings used to control insects and pests, almost 17% of respondents were having a little knowledge about injurious effects of pesticides while almost 8% of respondents considered them to be harmless for human health. While also similar results were found by the Siddaramaiah and Srinivas (u.d.). Some respondents informed that they used to deseal the pesticide containers by using their teeth and some times small amount of pesticide got entry in to their oral cavity and they further told that it was tasteless having no bitter or sour taste and nothing was serious with them after such happenings and it happened multiple times with many respondents. Respondents told that they had the knowledge about the toxicity of pesticides that was why they stored it carefully away from reach of kids particularly. Even non educated cotton grower respondents informed the researcher that they had common sense that the pesticides could kill the pests which was a living creature and it was not possible that the same pesticide chemical might be the harmless for human beings because in both cases were the living creatures and had almost similar pharmacokinetics for most of the chemicals used in pesticides.

Table 2. Distribution of the cotton growers according to their recommendation for usage of pesticides

Recommendation of	f.	%age

pesticides usages		
Yes	207	94.1
No	13	5.9
Total	220	100.0

When researcher asked the respondents about their recommendation for pesticides usage even after knowing the side effects and health hazards of these chemicals. Table 2 shows that almost 94% of respondents favored the usage of pesticides while almost 6% respondents condemned their use or spray. Respondents informed that they wanted to have good yield of their cotton crop at any cost and it was only possible when they would be in a position to diagnose the attacking pest species and by using genuine pesticide with recommended doses and timings. Respondents added that it was rarely observed that any acute side-effect or emergency occurred due to pesticides and they did not consider the chronic side-effects whereas, it was not possible for them to accept low yield cotton crop indicating huge economical losses for respondents. Cheema *et al*. (2004) concluded that profit margin without and with usage of pesticides showed 1:22 ratio. This tremendous difference of profit with use of pesticides provided matchless attraction for usage of pesticides and proved to be the main reasons of increased consumption of pesticides in Pakistan (Psowal and Williamson, 1998) and Ahmad and Psowal (2000).

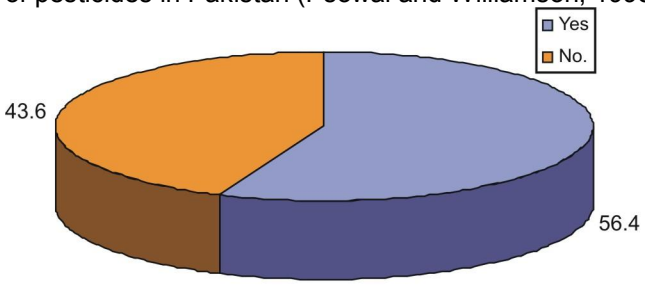


Fig. 1. Distribution of the cotton growers according to the consideration of air direction at the time of spray.

Above figure shows that approximately 56% of cotton growing farmers considered the direction of air currents at the time of spray while almost 44% of respondent farmers thought it to be useless and they did not care for direction of air currents at the said time. Respondents informed that they judged the direction of air by throwing some dust into air and observing the flow of dust particles, definitely it would flow with air currents showing the direction of air or sometimes by just observing the direction of movement of leaves of trees due to air. Respondents who had adopted this preventive measure told that as they did move against the direction of air currents while spraying pesticides, chances of inhalation were minimized on the other hand if they had moved in the direction of air, it would not had been possible for them to avoid droplet inhalation loaded with pesticides. Farmers considering the air direction were found to be wise, educated and adopted the preventive measures to minimize side effects of chemicals for controlling its inhalation. Masood and Akhtar (1997) also found the similar findings.

Table 3. Distribution of the cotton growers according to their body covering while spraying the pesticides

Body covering while spraying pesticides	f.	%age
Yes	50	22.7
No.	170	77.3
Total	220	100.0

During spraying of pesticides, chances of entrance of chemicals into sprayer's body by inhalation, ingestion, dermal contact and mucosal contact i.e. absorption do exist. To avoid the complications and health hazards, sprayer must cover his body as possible as could be and when this information was collected from respondents. Results shown in this Table 3 indicate that almost 23% of sprayers covered

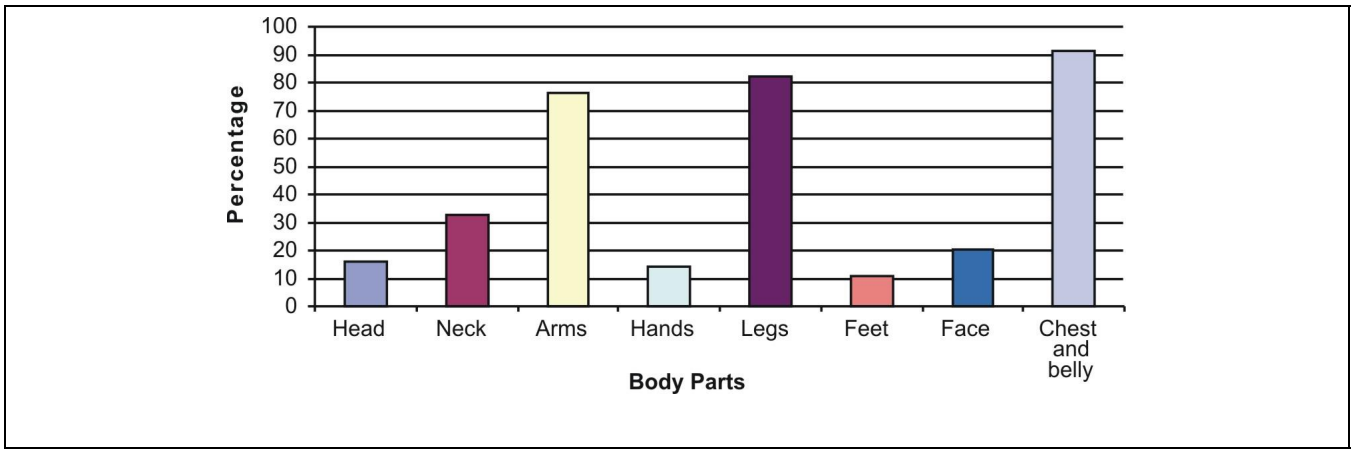
their body i.e. they were familiar with complications of pesticides and they adopted preventive measures to avoid these chemicals by minimizing the chances of their entry in to body by covering their body parts properly whereas approximately 77% of respondents did not adopt any preventive measure, in other words they were reluctant to adopt the preventive measures. Respondents informed that they did not take the health hazards of pesticides as a serious matter, rather a normal routine working activity. Some of the respondents exclaimed that they had developed a concept that these chemical pesticides could kill the small insects and pests but never the farmers. Therefore, they were reluctant in adapting the preventive measures.

Researcher asked about the protective measures adopted by respondents to prevent entrance of pesticide chemicals in their body as elaborated by Masood and Akhtar (1997) while they were performing the activity of pesticide spraying either by boom or manual manipulation. The data mentioned in Table 4 & fig. 2 show the alarming situation that almost 91% of the farmers had covered their chest and belly/abdomen i.e. with the highest frequency in organs/body parts protection from pesticide chemicals followed by lower limbs with approximately 82% and arms or upper limbs with almost 76%. Researcher observed that pesticide sprayers were dressed up in "bunian and dhoti/shalwer" most commonly during activity of pesticide spraying. On the other hand they had rarely covered their feet i.e. bared feet, almost 89% of farmers were without any shoes while they were involved in the activity of pesticide spraying for cotton crop also mentioned by Emaus (2002) followed by almost 86% without use of gloves and 84% sprayers without covering their head. It showed that cotton grower respondents were found to be quite careless about the protective measures adoption during pesticide spraying activity. It is concluded from the data shown in the Table 4 that "spray men" were reluctant in adoption of personal protective equipments (PPE) while spraying pesticides, which may lead to pesticide related health hazards as also described by Ushar (2006).

Table 4. Distribution of the cotton growers according to the preference in protective measures for their organs/body parts.

Organs/Body Parts	Yes		No		Total	
	f.	%age	f.	%age	f.	%age
Head	35	15.9	185	84.1	220	100.0
Neck	72	32.7	148	67.3	220	100.0
Arms	168	76.4	52	23.6	220	100.0
Hands	31	14.1	189	85.9	220	100.0
Legs	181	82.3	39	17.7	220	100.0
Feet	24	10.9	196	89.1	220	100.0
Face	45	20.5	175	79.5	220	100.0
Chest and belly	201	91.4	19	8.6	220	100.0

It is depicted from the data mentioned in Table 5 that the habit of washing of hands was up to almost 98% of the respondents and approximately 99% of cotton growers involved in activity of pesticide spraying were used to take bath at the end of spraying activity to avoid the complications of pesticides as they might be absorbed from skin of palms and body surface. But their habit of oral intake during process of pesticide spraying in cotton field was there, almost 37% of the respondents showed their practice of oral intake while performing the activity of pesticide spraying and it was alarming information. No-dought approximately 63% of respondents did avoid any oral intake while involved in the same activity, was a plus point but almost 2%of respondents never washed their hands and almost 1% of respondents avoided taking bath after completing their activity of pesticide spraying for their cotton crops.



CONCLUSIONS

It is concluded that majority of respondents (75%) in spite of having concept about harmful aspects of pesticide chemicals, almost all the cotton growers (94%) were involved in practice of pesticide handling to have better yield from their cotton crops.

Almost 43% of cotton growers while working as "Spray man" did not consider the direction of air currents and almost 77% of respondents did not cover their body while involved in the said activity. Approximately 37% of cotton growers while working as "Spray man" were found to be involved in practice of oral intake during activity of pesticide spraying phenomenon without washing their hands. Therefore, chances of entrance of pesticide residues into blood circulation of cotton growers through inhalation, ingestion and contact absorption are bright leading to pesticide related health hazards among cotton growers. To avoid such health problems, formal and informal teaching and learning of cotton growers should be promoted by Government and NGOs through media, training sessions, workshops and seminars.

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