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OCCUPATIONAL EXPOSURE OF FARMERS TO PESTICIDES IN COTTON GROWING AREAS OF SINDH, PAKISTAN

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ABSTRACT

In this study farmers who grew cotton or vegetables were interviewed about their socioeconomic background, health status of family, and perception about the use of pesticides and health signs and symptoms and data were collected on a pre-designed questionnaire with closed and open questions. Respondents were randomly selected using a snowballing technique. The survey was conducted in District Nawabshah a cotton-growing area of Sindh, where heavy use of pesticides had been reported. Risk associated with pesticide to agricultural workers and the needs of epidemiological studies for the assessment and management in the country are discussed.

Keywords: Pesticide, Occupational hazards, cotton, vegetables, farmers Pakistan.

INTRODUCTION

Indiscriminate use of pesticides may cause considerable hazards to health and environment. As pesticides are inherently toxic to living organisms, they are more likely to affect the health of human and other living beings than non-pesticide agricultural chemicals such as fertilizers. Exposure to pesticides in agriculture occurs during loading, mixing, application of pesticides and manual activities in treated crops. The pesticide-poisoning cases are usually observed in developing countries, where malnutrition and dehydration are likely to increase the susceptibility to pesticide-poisoning (WHO, 1990). Annually 10,000 farmers and field workers get poisoned by pesticides in Pakistan. About 60-70% of unintentional acute pesticide poisoning cases are due to occupational exposure (Copplestone, 1985). Workers in developing countries particularly in pesticide industries such as manufacturers, formulators and packers of pesticides are at tremendous risk (Geiger, 1993). Human exposure to pesticides 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 and 2006).

Cotton is a cash crop of Pakistan and plays a vital role in the country's economy. It is growing on 2.9 million hectors. This crop receive tremendous amount of organophosphate (OP), carbamate and pyrethroid pesticides against insect pests. There is no regular program for monitoring the health of workers involved in handling the pesticides (Inayatullah and Haseeb, 1996). Ahmad (1998), Bungush and Anwar (2000) and Ahmed *et al*., (2002) reviewed acute pesticide-poisoning cases and identified the factors contributing occupational related acute poisoning.

The pesticide exposure intentional or accidental is followed by medical symptoms (Jabbar, 1992, FAO, 2001). The pesticide poisoning starts with vomiting, headache, nausea, sweating, suffocation restlessness, muscle pain and fasciculation of muscles. The WHO recognizes the ChE bio-monitoring as a preventive measure against OP exposure and there appears to be good correlation between exposure and ChE reduction (Tahir, 2000, Khan *et al*., 2005).

Informations about health of workers, occupationally exposed to pesticide residues are very limited in Pakistan. A study was conducted on the perception of farmers about hazards of pesticides and its effect on their health. The base line information collected from this study would probably help to design appropriate community health awareness and preventions that will improve families' knowledge about the use of pesticides and their effect on the health and environment.

MATERIALS AND METHODS

A questionnaire with closed and open questions were designed to collect data about farmer's socioeconomic background, health status of family, and perception about the use of pesticides and health signs and symptoms from pesticide use. The survey was conducted in three study areas, i.e. Sakrand, Dolatpur and Nawabshah thehsils of District Nawabshah, a cotton-growing area of Sindh, where heavy use of pesticides had been reported. A total of 27

farmers, who grew cotton or vegetables and had ever used pesticides on their crops were randomly selected using a snowballing technique and interviewed. The questionnaire were analyzed by statistical computer software SPSS.

RESULTS AND DISCUSSION

The results of this study showed that farmers in Nawabshah District of Sindh, Pakistan are exposed to pesticides in various degrees depending upon the family structure and traditional living habits, face occupational hazards and show various frequencies of symptoms of ailment (Fig. **1**). Only 70% farmers had primary education and 68% male and 29% female were engaged in agriculture. Almost 93% farmers applied pesticides on their crops and only 38% of them dumped or burnt the empty bottles, while 56-67% farmers did not eat and drink during spray. Whereas 21% did not wear any protective masks while 79% took precautionary measures during spray and covered their faces with a piece of cloth. 85% respondents believed that pesticides caused ill effects on the health due to pesticide-poisoning. Similar perception about pesticide hazards with sign and symptoms was observed in female cotton pickers of Southern Punjab (FAO, 2001). Feenstra *et al*. (2000) reported 82% awareness of farmers about health hazards due to pesticides in Sindh province. In the present study also awareness about the use of pesticides was found to be 87% among the farmers. Ahmed *et al*., (2002) reported 23% occupational and 24% accidental poisoning due to commercial pesticides in Multan. Bungush and Anwar (2002) have reviewed the pesticide poisoning cases in Pakistan and discussed the contributing factors to occupational-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. Baig and Farhat (1986) reported that the direct risks involved in the pesticide application are the most obvious and cannot be overlooked. In Pakistan the users of pesticides n the agriculture sector where are illiterate do not follow the instructions on the labels or what is told to them by the extension workers / private sectors sales representatives. Ahmad (1998) has also reported that in general practice the farmers and field labors do not use protective clothing masks etc on the hot days resulting in accidents leading to loss of precious lives. Hussain (1998) has reported that the use of the agricultural chemicals is not suitably regulated in the developing countries including Pakistan. The doses are not calculated, manufacture's instructions are not followed, the required safety precautions are not observed and the operators are not equipped with technical know-how. Farmers are worst hit due to pesticides. Their families, livestock, water sources, food etc come next in the ladder of effecters. A report of United Nations that one farmer dies every minute in the developing world due to pesticide poisoning vouches the above statement as per report of Ahmad (1998).

The pesticides affect the exposed parts of the body, wounded portions and the genital parts with ease. These enter the body though mouth (oral digestion), nose (inhalation and breathing) and through the skin (dermal absorption). The pesticides keep on accumulating in the fat cells of animals and human beings. This results in the development of fatal diseases of brain liver, kidneys and may cause arthritis and cancer. Some times the memory is lost under severe exposures. The chemical toxicants enter the seeds, fruits, and stones of plants which when taken by the organisms cause health degradation. As per report of United Nations presented by Hussain (1998) the annual death toll due to handling of pesticide is as high as 80,000 deaths and about two million are poisoned. In addition to these figure a large chunk of world population suffers from acute ailment. In Pakistan it is feared that at least 100 people lay their lives every year because of lethal effects of pesticides and 50,000 individuals are poisoned. Certain chemicals like alkyl phenols and DDE may affect female hormone estrogen. Certain fishes exposed have both male and female organs. The male alligators have exhibited feminish characters. Chemicals containing radioactive substances like uranium affect the reproductive potential. Similarly dermatitis and skin cancer were usually common in pest control operators. There were apparent associations between high serum OC-pesticides level and the subsequent appearance of hypertension and antherosclerotic cardiovascular disease (Rodmoski *et al*., 1968, Wang and Machmohan, 1979). The cause of pathological conditions and its association with pesticide needs necessitates further investigations of similar nature.

In the present study 89% farmers suffered from dizziness, headache, tiredness, excessive sweating, salivation nervousness, short breath, cold legs and hands at night, stomach cramps, vomiting, red eyes, coughing and unconsciousness. Almost the similar sign and symptoms were reported by Tahir (2000) followed by severe headache, nausea and vomiting. The extensive use of OP results in acute intoxication and symptoms starts with vomiting excessive sweating restlessness and fasciculation of the muscles (Aboela *et al*., 1988). During picking in the pesticides contaminated field residue enters into the blood through skin, inhalation or ingestion and is accumulated in adipose tissue (Mughal and Rehman, 1973). Onset of illness begins with headache, dryness nausea, sweating, vomiting and unconsciousness.

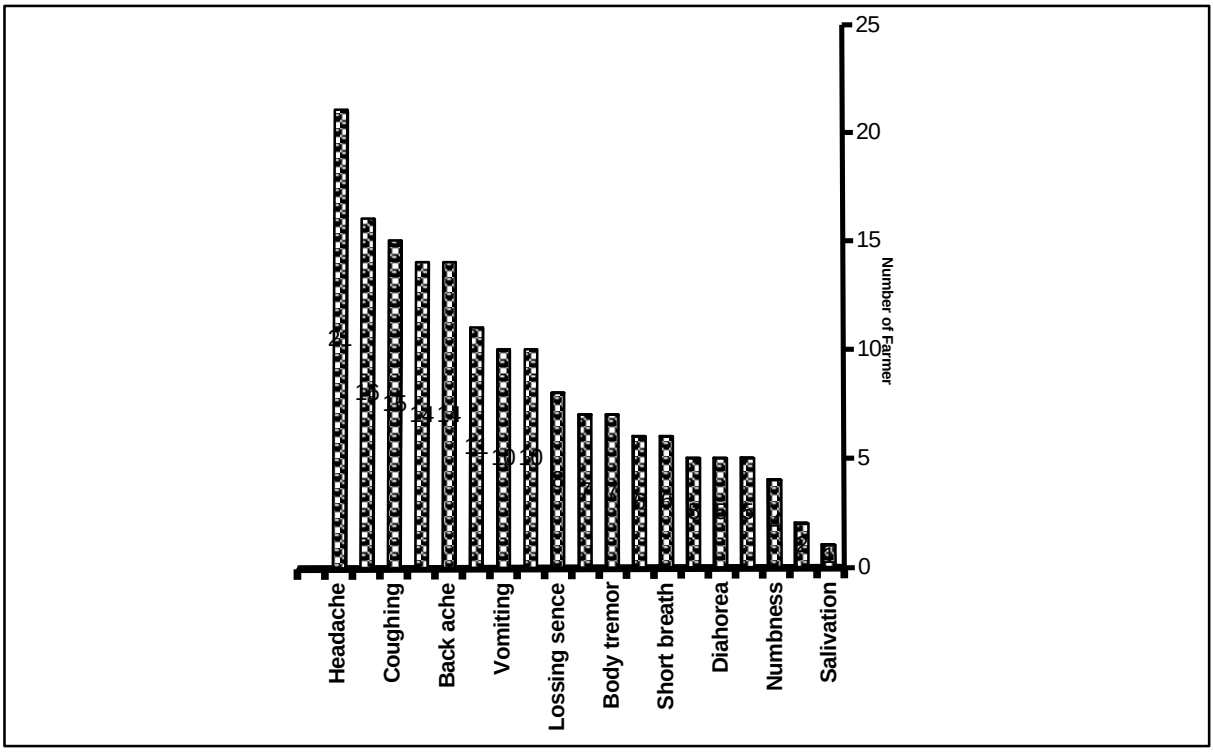

Fig. 1 Frequency of symptoms as shown by users of pesticides in Agricultural Sectors in Sindh, Pakistan.

In Pakistan pesticides being used on cotton are pyrethroids and organophosphates. Besides agricultural workers general public are also being exposed to these pesticides though win drift and contaminated food. A varying degree of pesticide residues have been reported in water, fruits and vegetable in Pakistan (Anwar *et al*., 2004 and 2005). The epidemiological studies regarding the pesticide poisoning needs to be carried out in cotton growing area of Pakistan for the assessment of risk associated with pesticides and would help in developing the policies in risk management in the country, particularly with reference to ChE inhibition in the suspects of pesticide poisoning, the correlation of ChE and symptoms of pesticide poisoning should confirm the status of patients.

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