

Original Article

## ACUTE POISONING DUE TO COMMERCIAL PESTICIDES IN MULTAN

Rauf Ahmad<sup>1</sup>, Karam Ahad<sup>2</sup>, Rashid Iqbal<sup>3</sup> & Ashiq Muhammad<sup>4</sup>

### ABSTRACT:

**Objective:** To assess various mode of acute poisoning due to pesticides with respect to period of time, gender and age.

**Design:** Indoor patients poisoned by pesticide during 1996 - 2000.

**Setting:** Pesticide Poisoning Centre and ALMONAR Section, Nishtar Hospital, Multan.

**Main outcome measures:** Age and gender factors, mode of incidences and mortality rates.

**Results:** Out of 578 poisoned patients, 370 were pesticides victims (73% males and 27% females). Suicidal, occupational and accidental incidences were 53%, 23% and 24% respectively. A total of 54 deaths (34 males and 20 females) with cumulative death rate of about 15% was observed. About 81% of the victims were in the age range of 14-30 years.

**Conclusions:** Pesticides are the major chemical agents which pose a health threat, particularly to young people, depressed females and farm workers, in Multan.

**KEYWORDS:** Acute poisoning, pesticides, health.

### INTRODUCTION

Around the world, approximately 3 million acute poisonings and 220,000 deaths from the pesticides exposure have been reported annu-

ally<sup>1,2,3</sup>. In U.K. about 15% of all admissions, to acute medical units, are due to pesticide poisoning where mortality rate is about 1% and 80% of all the deaths occurred outside the hospital<sup>4</sup>. About 50,000 calls of acute poisoning per year is received in the Greater Cleveland Poison Control Centre, USA, where as more than 14,000 deaths occurred each year in the country among which about 6000 deaths are because of suicides and 5000 deaths are due to accidental poisoning by different, chemicals<sup>5,6,7</sup>. Non-fatal cases are 100-150 times the reported fatalities. The causes and frequency of poisoning vary from country to country and even from locality to locality. With the changing socio-economic pattern and agricultural modernization, there is an ever-increasing occurrence of poisoning particularly due to pesticides.

In order to safeguard agricultural produce from the ravage of pests to comply with the food and fiber demands of escalating population, pesticides were introduced in 1954 in Pakistan<sup>8</sup>. The pesticides consumption has risen many folds during the last two decades. The dependency on pesticide is evident from the in-

1,2. Scientific Officers (M.Phil Chemistry),  
Ecotoxicology Research Institute,  
National Agricultural Research Centre (NARC),  
Park Road, Islamabad.

3. Professor, Rashid Iqbal Ph.D  
Department of Chemistry,  
Quaid-i-Azam University, Islamabad

4. Scientific Officer (Ph.D Chemistry),  
Ecotoxicology Research Institute,  
National Agricultural Research Centre (NARC),  
Park Road, Islamabad.

### Correspondence:

Rauf Ahmad  
E-mail: rauf\_eco@yahoo.com

\* Received for publication: January 14, 2002

Revision Received: April 13, 2002

Revision accepted: April 16, 2002

creasing trend in its consumption from 665 mt in 1980 to 45,680 mt in 1999<sup>9</sup>. Moreover, cotton is an important cash crop of Pakistan with 60% export earning. Southern Punjab and northern Sindh are major cotton growing areas in the country. This crop suffers about 20-40% losses from many insect pests and diseases<sup>10</sup> for the control of which more than 76% of the total consumption of pesticides in the country is used over this crop<sup>11</sup>. Such an intensive use of pesticides in this particular area can pose risk to public health which necessitates surveillance of public health in cotton belt. The objective of this study is to report on acute pesticide poisoning in Multan, which is an important cotton growing area and a major market for pesticide business in Pakistan.

### VICTIMS AND METHODS

In this study all the patients being admitted to Nishtar Hospital, Multan from January 1996 to December 2000 because of poisoning were included irrespective of their age and sex. The information and data regarding the victims was obtained from the patient history sheets available in the record room "ALMONAR Section" of the hospital. All the patients were categorized in four groups i.e. G-I, G-II, G-III and G-IV having age range of 10-20, 21-30, 31-40 and >40 years respectively.

### RESULTS

Out of the total 578 patients being admitted into the Nishtar Hospital, Multan during the five years period (1996-2000) due to poisoning by various chemical agents, about 64% were the victims of organic pesticide poisoning in which about 73% were males and 27% were females having age in the range of 13-70 years. The mean age of the victims, irrespective of the sex was 26±12 years. Year and sex-wise distribution of victims is shown in figure-1 while the frequency distribution of victims according to sex and age group is shown in figure-2. The relationship between sex and mode of poisoning which was either suicidal (53%), occupational (23%) or accidental (24%) is shown in figure-3. There were a total

of 54 deaths out of which 34 (63%) were males and 20 (37%) were females with a cumulative death rate of about 15% (Figure-4). Most of the deaths (90%) occurred in the age range of 10-30 years due to suicidal (59%), occupational (24%) and accidental (7%) incidences (Table-I). Majority of the victims were from farmer community and were poisoned by mainly organophosphorus and organochlorines pesticides.

Fig. 1: Year and sex-wise distribution of victims during 1996-2000

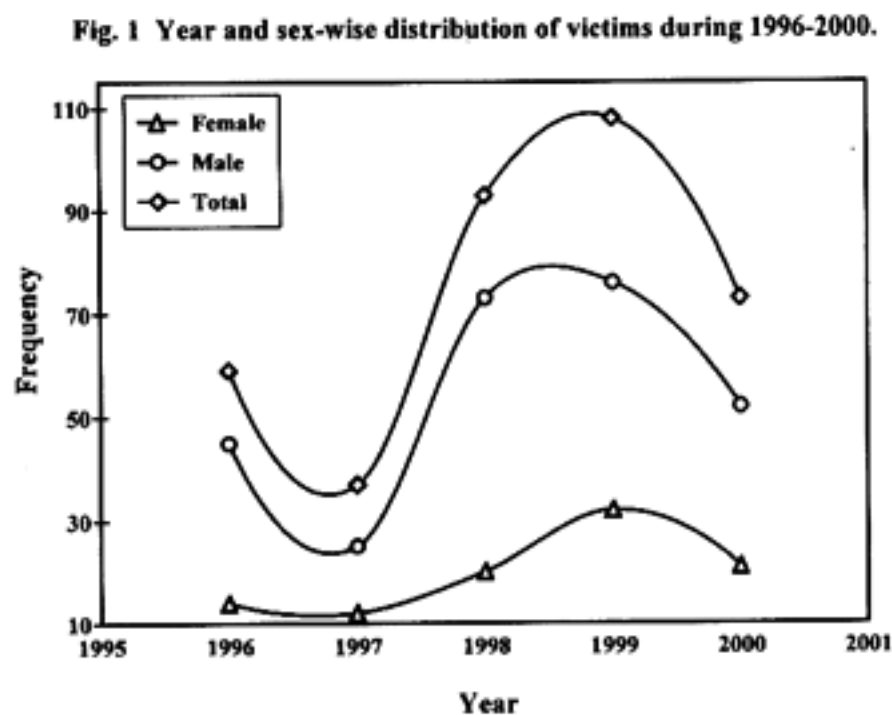


Fig. 2: Distribution of victims according to age and sex for the years 1996-2000. (G-I 10-20, G-II 21-30, G-III 31-40, G-IV > 40 years)

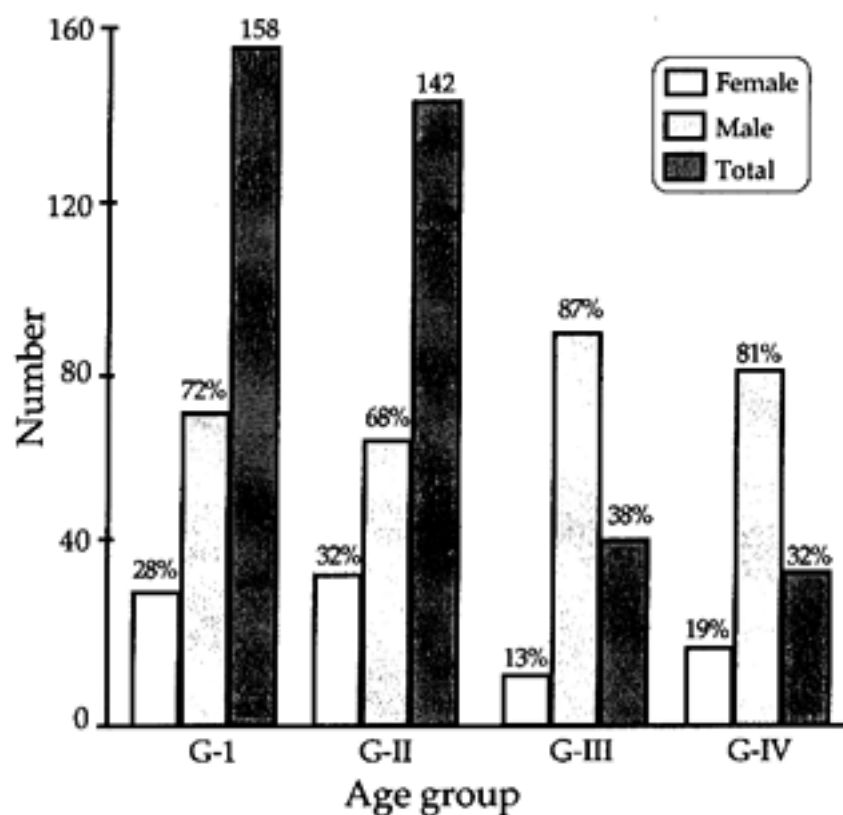


Fig. 3: Distribution of victims according to mode of poisoning and sex during 1996-2000

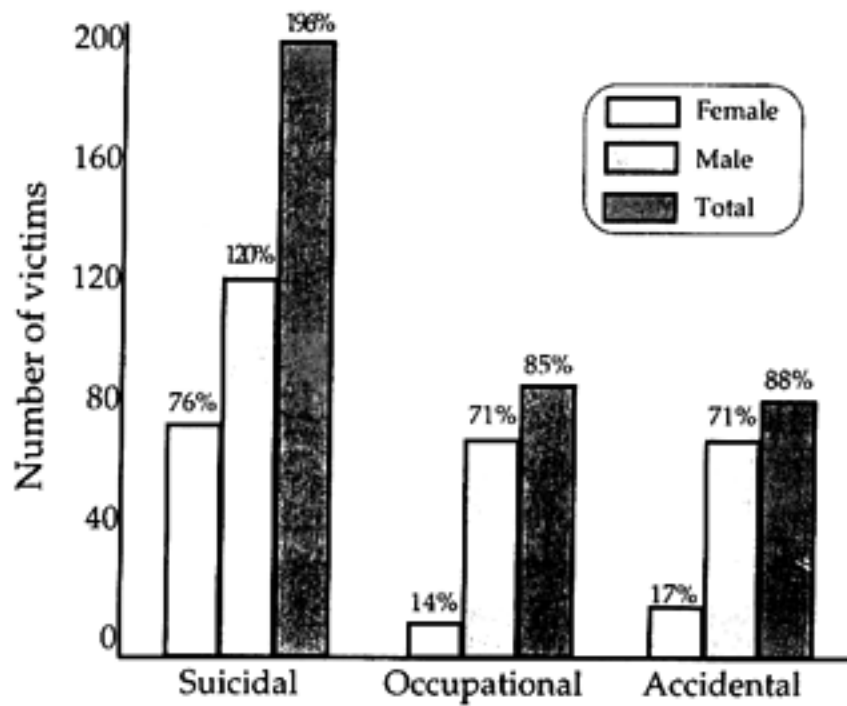


Fig. 4: Sex-wise death of victims during 1996-2000

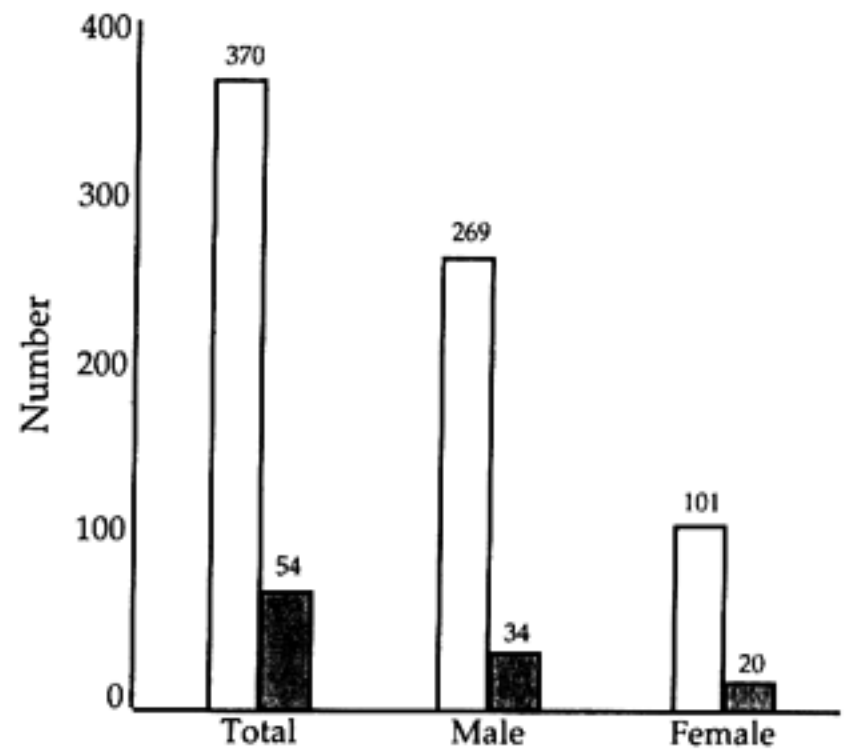


TABLE - I

Mode of pesticide poisoning and age-groupwise deaths in the Nishtar Hospital, Multan from 1996-2000

Group Code	Age (Years)	Suicidal	Occupational	Accidental	Total
G-I	10 -20	20	4	2	26
G-II	21 - 30	12	9	2	23
G-III	31 - 40	1	0	1	2
G-IV	Above 40	0	3	0	3
Total		33	16	5	54

## DISCUSSION

This survey reveals that the incidence of acute poisoning cases due to commercial pesticides was 6, 4 and 2 times more than earlier findings in Pakistan<sup>12</sup>, Africa<sup>13</sup>, European countries and U.S.A.<sup>4</sup> respectively. The ratio of male to female being affected is 2.7:1 which is significantly different as compared to a study conducted during 1986<sup>12</sup> in which this ratio was 10:1 but is consistent with other studies in which this ratio has been reported in the range of 1:1 to 1.5:1<sup>4,13,14,15</sup>. There is an overall increase in pesticide poisoning cases in 1998-99 (Figure 1). These peak incidences of poisoning may be attributed to

several factors like encouragement of pesticides usage by the government and hence their enhanced consumption of 45,680 mt in 1999<sup>9</sup>. However, in the subsequent year (2000) safer, pest selective chemistry and formulations were introduced and more mammalian toxic pesticides like methamidophos, malathion, methylparathion and carbaryl etc. were either lifted from the market or their use were restricted. Moreover, increasing adulteration in the generic products has virtually lowered the toxicity of formulations and hence the acute poisoning. On the other hand, some multinational companies launched their grocery shops and farm services through their representatives which greatly



reduced the probability of non-judicious access to pesticides. Thus a decline in poisoning casualties has been observed in the year 2000 as compared to the year 1999.

There were 158, 142, 38 and 32 poisoning cases in the age group of G-I, G-II, G-III and G-IV respectively. It is evident that most of the victims (83%) are in their younger or adult age (13-30 years). This is comparable to 68% victims in the same age range being reported<sup>13,16</sup>. This may be attributed to socio-economic factors and easy access of general public to pesticides. The relatively more acute poisoning cases in younger/adults reflect on the younger population structure of the farming/rural community and joint family system is more stressful to them as compared to elderly people. They are more emotional, have lesser maturity of mind, more exposed to the pace, competition and expectations of modern life<sup>13</sup>.

As for as mode of poisoning is concerned, suicidal, occupational and accidental cases were 53%, 23% and 24% respectively. These findings are in good agreement with the other studies<sup>13,15,16</sup> reporting high suicidal (60-70%) attempts. Moreover, according to press reports, Pakistan is ranking 3<sup>rd</sup> position in the world in suicides. The available data<sup>15</sup> in the country show that poisoning due to narcotics/tranquilizers is 25%, copper sulphate is 10% and insecticides is about 5%. But our study indicated that commercial pesticides were the major cause accounting for 80% poisoning while all other chemicals were accounting for less than 20% of the total poisoning. According to the present survey, death rate due to pesticides is 15% as compared to about 3% death rate reported earlier in 1986<sup>8</sup>. This implies five fold increase in fatalities due to pesticides poisoning. This may be due the fact that our data is representing a region where about 76% of the total pesticides is consumed and are easily available to general public. This is also consistent with a similar study conducted in Sri Lanka<sup>16,17</sup> in 1987 where suicidal attempts were 73% with a death rate of 7.7%.

Most of the deaths occurred in the age group G-I (48%) and G-II (43%) out of the total 158 and

142 victims in the respective groups (Table-I). As far as total deaths are concerned the male/female death ratio was found to be 1.7. But the death rates in male and female series separately were found to be 13% and 20% respectively. The occupational death rate in both genders is 30% implicating that working class is untrained and careless in observing protective gears.

Most of the females deaths (80% suicidal and 15% occupational) occurred in the age range of 15-30 years. But the situation was completely different in case of males where suicidal death were 50%, occupational were 38% and accidental 12%. This reflects on the low temperament, lesser experience, social stress and biological weakness, which makes female folk vulnerable to suicidal deaths. On the other hand, higher occupational and accidental deaths in males may be due to their factual position of greater exposure in the fields, pesticide industry and marketing.

#### ACKNOWLEDGEMENT

The cooperation of Brig. (Rtd.) Saeed A., the former Chief Executive and Dr. Ghulam Moheud-Din Ch., Professor of Medicine & Consultant Physician, Nishtar Medical College & Hospital, Multan during this study is highly acknowledged.

#### REFERENCES

1. Marrs T.C. Organophosphates poisoning, *Pharmacolther* 1993;58:51-56.
2. USDA Agricultural Chemical Usage. Field crop protection study Washington DC: Department of Agriculture, 1994.
3. Yasmashito M, Tanka J, Ando Y. Human Mortality in Organophosphate poisonings. *Vet Hum Toxicol* 1997;39:84-85.
4. Macleod J. Davidsons Principles and practice of medicine. 14<sup>th</sup> Ed., London: Churchill Livingstone, p. 701-731, 1984.
5. The Paediatric Clinics of North America. Paediatric Toxicology, 3(2):XI-XII; April 1986.
6. Jacoliziner H. Causation, Prevention and Control of Accidental Poisoning. *J Am Med Assoc.* 1959;171: 1769-74.

7. Patersdorf R.G., Adams R.D., Braunworld E et al. Harison's Principles of Internal Medicine. 10<sup>th</sup> Ed., New York: McGraw Hill p.1259-1273;1984.
8. Zahoor A. Pest problem of cotton – a regional perspective. Proceedings on Regional Consultation on "Insecticide Resistance Management in Cotton", ICAC-CCRI, June 28 to July 1, 1999, Multan-Pakistan.
9. Agricultural Statistics of Pakistan, 1998-1999. Ministry of Food, Agriculture and Livestock (MINFAL), Government of Pakistan, Islamabad.
10. Kafi, A. and Baig, M.M.H. Needs and prospects for manufacturing pesticides in Pakistan. Department of Plant Protection, Karachi and Federal Pesticide Laboratory, PARC, Karachi, 1987.
11. Khan, M.S.H. Pakistan crop protection market. PAPA Bulletin 1998;9:7-9.
12. Ghulam Mohe-ud-din Chaudhry, Noor Ahmad Noor, A. Wahid Qazi. Acute poisoning in adults in Multan. Quarterly Specialists. (Pak J Med Sci) 1992;8(4).
13. Cargdozo L.J., Mugerwa R.D. the pattern of acute poisoning in Uganda. East Af Med J. 1972;49(12):983-88.
14. Saddique M. Report on poisoning in Children admitted to General Paediatric Ward. Khyber Med J Nov 1985;4(1):4-6.
15. Sarwar S.A. Accidental Poisoning in Children. Pak J Med Res. 1973;XII 1-2:36-40.
16. Kessel N. Self-poisoning. Br Med J. 1965; 2 (1265): 1336-49.
17. Davis J.E. Changing Profile of Pesticides Poisoning. N Engl J Med. 1987;1316 (13):807-808.