Original Paper

Pattern of Poisoning at a Tertiary Care Hospital in Bangalore, India: A Retrospective Two-year Survey

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ABSTRACT

With the progress in agricultural and industrial fields, a vast number of pesticides are available today, which on exposure produce severe toxicity. A thorough knowledge about the nature and magnitude of the problem in a particular area is essential for doctors in hospital practice to effectively manage such cases.

This retrospective study was done with regard to cases which were brought with alleged history of poisoning at the emergency department of MVJ Medical College & Research Hospital, Hosakote, Bangalore, during the period September 2009 to August 2011 with the objective of evaluating the pattern of poisoning at a tertiary care hospital, and to study the socio-demographic profile of the same.

Most of the victims of poisoning in this study consumed organophosphorus insecticide compounds for suicidal purpose, and were aged between 21-30 years, with almost equal ratio between males and females. Individuals from rural areas outnumbered the urban population. Aluminium and zinc phosphide accounted for some of the cases relating to pesticide exposure. A significant proportion of cases comprised victims who had consumed various allopathic and ayurvedic pharmaceutical preparations.

Key Words: Poisoning; Suicide by poisoning; Pesticides; Organophosphorus compounds; Aluminium phosphide; Zinc phosphide; Pharmaceuticals.

Introduction

Poison is any substance which when introduced into the living body or brought into contact with any part thereof will produce ill effects or death, by its local or systemic action or both.[1] With the progress in agricultural and industrial fields, a vast number of pesticides are available today, which on exposure may produce severe toxicity. In general, accidental poisoning is more common in children, whereas suicidal poisoning is more common in adults.[2] The problem of poisoning, especially due to pesticides could be much higher in rural areas. Further, people in rural areas need to travel long distances to obtain medical care, and hence morbidity and mortality also tend to be higher. Limited studies in the past have shown that presence of specific risk factors such as easy availability of products, history of mental health problems (depression and alcoholism in particular), previous suicidal attempts, acute economic crisis, history of domestic violence and absence of protective factors (coping abilities, crisis support, family attachment, timely communication, social support) contribute to the incidence of suicidal attempts.

Although statistically the figure of acute poisoning cases is somewhat less than that of road accident cases, the number of deaths resulting from both are generally similar. The latest figures on suicide quoted by National Crime Records Bureau (NCRB) are as follows: Bengaluru (1778), Chennai (1325), Delhi (1242) and Mumbai (1192) – the four cities together have reported almost 40.5% of the total suicides reported from 35 mega cities. The pattern of suicides reported from 35 cities showed that hanging (44.5%), poisoning (20.6%) and fire/self immolation (12.6%) were the prominent means adopted by the suicide victims in cities.[3] It is surprising that whilst the

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number of deaths from road accidents is rightly a matter of great public concern, far less attention is paid to an almost equal number of deaths caused by poisoning. Pesticides, especially organophosphorus/carbamate insecticides account for the majority of these poisoning cases. More recently, aluminium phosphide, because it is cheap, easily available, highly toxic, and has no antidote, has emerged as the most common suicidal agent in some parts of the country.

A thorough knowledge about the nature and magnitude of the problem in a particular area is essential for doctors in hospital practice to effectively manage cases of poisoning. Due to medicolegal complexities, a substantial number of poisoning cases are not reported to police for fear of becoming embroiled in investigative and legal proceedings. As there has been a steep rise in the number of suicide cases in the recent past in Bangalore (Karnataka), an attempt was made to explore the trend in our hospital which is located in the outskirts of Bangalore city.

Materials and Methods

This is a retrospective hospital record-based study, comprising cases which were brought with alleged history of poisoning to the emergency department of MVJ Medical College & Research Hospital, Hosakote, Bangalore, during the period September 2009 to August 2011. The total number of poisoning cases was 96. Details of the patients with regard to age, sex, marital status, time of ingestion, time taken for the treatment to be started and duration of hospitalization, type of poison consumed, and treatment outcome were studied. The manner of poisoning as to whether it was suicidal, accidental, or homicidal was analyzed. All cases of poisoning which were admitted to our hospital were included, excluding cases due to snake bite.

Results

A total of ninety six (96) cases were admitted to the MVJ Medical College & Research Hospital, Hosakote, Bangalore with diagnosis of acute poisoning. Incidence of poisoning was equal among males and females, 48 cases each out of 96 cases. With reference to age of the patients (**Table 1**), 06 cases (6.25%) were between 1-10 years, 20 cases (20.83%) belonged to 11–20 years of age, 43 cases (44.79%) were aged between 21–30 years, 16 (16.66%) cases were between 31–40 years, and 07 cases (7.29%) were between 41–50 years. There was only 01 case (1.04%) of 51–60 years, and 03 cases (3.12%) were aged between 61–70 years.

With regard to the marital status of the patients and their location, i.e., rural or urban (**Table 2**), 40 males were from rural, of which 14 (35%) were married, 21 (52.5%) were unmarried, and the status of 05 (12.5%) was not known. Of the remaining, 08 males were from urban area, of which 04 (50%) married and 04 (50%) unmarried. Forty two females belonged to rural area, of which 30 (71.42%) cases were married, 11(26.19%) unmarried, and the status of 01 (2.38%) was not known. Of the remaining, 06 female cases were from urban area, out of which 05 (83.33%) cases were married and 01 (16.66%) was unmarried.

Table 1 Age and Gender Distribution of Poisoning Cases

Age (years)	Total		Males		Females	
	Number N=96	Percentage	Number N=48	Percentage	Number N=48	Percentage
1–10	06	6.25	06	6.25	-	-
11–20	20	20.83	07	7.29	13	13.54
21–30	43	44.79	25	26.04	18	18.75
31–40	16	16.66	04	4.16	12	12.5
41–50	07	7.29	04	4.16	03	3.12
51–60	01	1.04	01	1.04	-	-
61–70	03	3.12	01	1.04	02	2.08

Table 2 Marital Status and Rural/ Urban Distribution

Sex		Rural Male (40) Female (42)			Urban Male (8) Female (6)		
		Married	**Unmarried**	**Not known**	**Married**	**Unmarried**	**Not known**
Male	Number	14	21	05	04	04	–
N=48	Percentage	35	52.5	12.5	50	50	
Female	Number	30	11	01	05	01	–
N=48	Percentage	71.42	26.19	2.38	83.33	16.66	–

With regard to the type of poison consumed (**Table 3),** 30 patients (31.25%) had consumed organophosphorus insecticides, 21 cases (21.87%) consumed some unknown pharmaceutical preparation, 19 cases (19.79%) consumed aluminium and zinc phosphide pesticides, 08 (8.33%) cases consumed drugs such as paracetamol, ranitidine, and iron supplements, and 06 (6.25%) cases consumed barbiturates. Pyrethroid insecticides accounted for 03 (3.12%) cases, while Ayurvedic medicines were consumed by 03 (3.12%) patients, and of the remaining 06 (6.25%) cases, miscellaneous poisons were involved (bleaching powder, turpentine oil, organochlorine compound, phenol, disulfiram, etc).

With regard to the time elapsed after consuming the poison and the beginning of treatment measures, (**Table 4**), maximum cases 43 (44.79%) were taken immediately or within an hour to the hospital, out of which 21 (21.87%) cases were cured and discharged, 03 (3.12%) cases were referred to higher hospitals, 17 (17.70%) cases were discharged against medical advice, and death occurred in the remaining 02 (2.08%) cases. Twenty seven cases (28.12%) were taken to the hospital between 1–6 hours after exposure to the poisonous substance, of which 14 were cured, while one patient was referred to a higher hospital, 06 (6.25%) cases went against medical advice, and 06 (6.25%) cases expired. There were 06 (6.25%) cases with the time lapse of 6–12 hours, of which 04 were cured, and one case each was referred and went against medical advice respectively. There were 02 (2.08%) cases with time lapse of 12–24 hours, of which one went against medical advice, and the other case succumbed. There were only 02 cases (2.08%) which took more than 24 hours to reach hospital, and one case each was cured and referred respectively. In 16 cases (16.66%) the status of time lapse was not known.

Discussion

Suicide is among the top 10 causes of death in India. The commonest mode of committing suicide in India, next to hanging, is by ingestion of poison. The age group with maximum incidence of poisoning is generally between

Table 3 Type of Poison Consumed

Poison	No of cases N=96	Percentage (%)
Organophosphorus insecticide	30	31.25
Unknown pharmaceutical	21	21.87
Aluminium & Zinc phosphide	19	19.79
Paracetamol, ranitidine, iron supplement	08	8.33
Barbiturate	06	6.25
Pyrethroid insecticide	03	3.12
Ayurvedic preparation	03	3.12
Miscellaneous	06	6.25

Table 4 Time Elapsed between Poison Consumption and Treatment (with Outcome)

Time taken (hrs)	No of cases	Percent-age	Treatment Outcome			
			Cured	Referred	Left against medical advice	Death
Within an hour	43	44.79	No of cases	No of cases	No of cases	No of cases
			21(21.87)	3(3.12)	17(17.7)	2(2.08)
1–6	27	28.12	14(14.58)	1(1.04)	6(6.25)	6(6.25)
6–12	6	6.25	4(4.16)	1(1.04)	1(1.04)	–
12–24	2	2.08	–	–	1(1.04)	1(1.04)
>24	2	2.08	1(1.04)	1(1.04)	–	–
Not known	16	16.66	11(11.45)	–	5(5.2)	–
Total	**96**	**100**	**51**	**6**	**30**	**9**

21–30 years in both males and females, and is significantly less in the extremes of age, followed by 11–20 years, and 31–40 years. The present study is similar in these respects as encountered in studies of other workers.[1,3–5]. This age group is most vulnerable because of pressures arising out of studies, service, marriage, etc, leading to substantial amount of mental stress and strain. In the age group of 0–10 years all the cases were due to accidental ingestion of poison. From 11 years onwards the rate of suicidal poisoning increases. Out of 96 cases there were 78 cases of suicidal poisoning and 15 cases of accidental poisoning. A single case of homicidal poisoning has been observed in this study.

A preponderance of rural habitat over urban habitat has been observed in this study, which could be explained by the fact that India is an agricultural economy, and more people live and earn their livelihood in rural areas than in cities. Our findings are in general agreement with those of others.[6] Unmarried males from rural area were more compared to married males, owing to the pressures arising out of suitable employment. Early marriage of females in the rural community and in some parts of urban area, along with its added familial responsibilities, social customs, limited resources etc may be the factors responsible for married females outnumbering unmarried females in the rural population. These findings are similar to those in other studies.[7]

Maximum cases were noted during summer followed by rainy season and winter season, which is in agreement to studies reported by others.[8–10]

Organophosphorus compound insecticides accounted for 31.25% cases, and were the most common poisons consumed, while aluminium and zinc phosphide accounted for 19.79% cases. The remaining cases comprised pharmaceutical preparations, pyrethroid insecticides, etc., which is broadly in agreement with other studies.[11,12] Mortality accounted for 9.4% cases in this study, of which 3.2% cases were due to organophosphorus compounds, and 4.2% cases were due to consumption of aluminium and zinc phosphide, and 2% deaths were due to consumption of some unknown compounds. Late presentation and high poison dose were important causes associated with mortality.

An attempt was made to know the time gap between the poison consumption and admission to the hospital, which directly or indirectly had relation with the outcome of treatment. Maximum cases (44.79%) were admitted to hospital within an hour, of which 21.87% showed improvement, 3.12% were referred for further treatment, 17.70% case went against medical advice, and 2.08% cases expired. This clearly indicates that early treatment can prevent most fatalities. Findings were similar with other authors.

It must be admitted that the retrospective record-based nature and relatively small sample size are major limitations of our study. Overall however, the current study has managed to contribute substantial additional information regarding the epidemiology and outcome of poisoning in a tertiary care hospital at a district level in this country.

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