Bangladesh Med Res Counc Bull 2011; 37: 61-65

Acute poisoning in southern part of Bangladesh – The case load is decreasing

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Abstract

This retrospective study was carried out in the Medicine Department of Khulna Medical College, the biggest tertiary hospital in the southern part of Bangladesh to observe the trends of poisoning in southern part of Bangladesh over four years including age and sex variation, mode of poisoning, type of poison used and outcome of poisoning. The hospital medical records of all patients, aged 10 years and above with history of acute poisoning from January, 2003 to December, 2006 were enrolled. Patients were categorized into four age group including Group (Gr.) I, Gr. II, Gr. III & Gr. IV having age range of 10-20, 21-30, 31-40 & >40 respectively. Underlying causes of poisoning were also observed totally and individually in different mode with male, female ratio and the percentage. Death cases according to mode of poisoning with demographic alignment were also observed. Statistical analysis were done using epi-info version 3.5.1 and measures were presented as proportion and percentage. Among 1903 cases, 1012 (53.1%) were male and 891 (46.8%) female with a ratio of 1.4: 1. The year wise total number of cases were progressively decreased from 627 (2003) to 353 (2006). Most commonly found toxic agent was Organo-Phosphate compound (526; 27.64%) with a very little sexual variation & this trend remained same in all study years. Poisoning with unknown substance was the second leading cause (16.03%) followed by Copper-sulphate (14.03%), Sedative (13.35%), Snakebite (12.93%) etc. Incidence of unknown poisoning, sedatives, snake-bite and corrosives were found to be gradually decreased over the study years. Male were found mostly affected in majority type of poisoning except Copper-sulphate, kerosene, puffer fish, paracetamol and other drugs category. Age group II (710; 37.3%) was the most vulnerable group with male (57.89%) preponderance followed by group I (643; 33.7%), III (329; 17.2%) and IV (221; 11.6%) respectively. Highest 1308 (68.7%) cases were suicidal in mode followed by 304 (15.9%) accidental and 291 (15.2%) homicidal. Out of 1903, 140 (7.3%) patients died. Death rate was highest in OPC poisoning (52.1%) followed by unknown substance (13.5%), snakebite and copper-sulphate (11.4%) etc. In an agro-based country like Bangladesh, it's very difficult to reduce the poisoning cases and mortality. Prospectively designed multi-centered studies are needed to reflect the epidemiological properties of poisonings throughout Bangladesh, and would be very valuable for the determination of preventive measures.

Introduction

The pattern of poisoning has been changing in recent years from country to country. Though some poisons still occupy the peak in developing world, the picture has already been changed in developed countries. Acute poisoning is a serious threat to society and one of the commonest causes of mortality and morbidity anywhere in communities. Deliberate self-poisoning has reached epidemic proportions in parts of the developing world where the toxicity of available poisons and sparse medical facilities ensure a high fatality rate[1]. In developed countries, the annual incidence of both unintentional and deliberate human poisoning varies from 0.2–9.3 poison exposures per 1,000 populations, and continue to increase annually worldwide[2]. The purpose of this study was to have an idea about common mode of poisoning in southern part of our country, along with age & sex distribution, the ultimate clinical outcome and to compare them with successive years.

Materials and Methods

This retrospective observational study was carried out in the Medicine department of Khulna Medical

College, a tertiary hospital in the southern part of Bangladesh. The hospital medical records of all patients, aged 10 years and above with acute poisoning from 1st of January, 2003 to 31st December, 2006 were included. The record books of medicine ward (one is maintained by in-charge staff nurse and another by assistant registrar) were used to collect the data's. Data were first taken from staff nurse's record book, than verified following assistant registrar's record book. So, all the data's were double checked before entering into analysis. Around 60,000 different cases were searched in the record books to get the poisoning cases. Only the cases which have complete information were included. Missing diagnosis, missing poison name, discharge on risk bond (DORB) and absconded cases were excluded from the study. Patients were categorized into four age groups (Gr.) including Gr. I, II, III, & IV having age range of 10-20, 21-30, 31-40, and >40 respectively and all groups were classified with male, female distinction. Underlying causes of poisoning were observed in total and separated number of patients with male, female ratio and percentage. The number of death cases in all causes & the mode of poisoning with demographic alignment were also maintained. Snake bite, kerosene, puffer fish etc. were considered as accidental poisoning followed by organo-phosphates (OPC), copper sulphate (CuSO4), sedatives, paracetamol (PCM) etc. as suicidal & commuters poisoning (unknown) as stupefy. Statistical analysis were done using epi-info version 3.5.1 and measures were presented as proportion and percentage with various figures and tables.

Results

Over a period of four years, 1903 cases of acute poisoning were admitted in the Medicine ward of Khulna Medical College Hospital. Out of 1903 cases, 1012 (53.18%) were male and 891 were (46.82%) female. Male, female ratio was 1.14:1. The year wise total number of hospital admission due to poisoning were progressively decreased from 627 (2003) to 353 (2006).

Most commonly found toxic agent was OPC (526; 27.64%) with a very little sexual variation & this trend remained same in all study years (Table I). Poisoning with unknown substance was the second leading cause (16.03%) followed by copper-sulphate (14.03%), sedative (13.35%), snakebite (12.93%) etc. Hospital admission of unknown poisoning, sedatives, snake-bite and corrosives were found to be gradually decreased over the study years (Table I). Datura poisoning was the lowest (0.16%), while Paracetamol and puffer fish poisoning cases were only 0.42% and 0.53% respectively.

Figure 1 shows different age and sex distribution of cases. There were four age groups. Age group II (710; 37.3%) was the most frequently occurring group with male (57.89%) preponderance followed by group I (643; 33.7%), III (329; 17.2%) and IV (221; 11.6%) respectively.

Table I: Year wise distribution of various categories of poisoning.

Toxic agents	2003	2004	2005	2006	Total (2003-2006)	Percentage (2003-2006)
OPC	124	130	139	133	526	27.64
Unknown	109	84	56	56	305	16.03
CuSO4	105	92	27	43	267	14.03
Sedative	88	73	45	48	254	13.35
Snakebite	93	70	44	39	246	12.93
Corrosive (Savlon,Mortene,Acid, Harpic,Dettol)	53	41	37	5	136	7.15
Rat killer	15	18	19	14	66	3.47
Alcohol	22	19	7	2	50	2.63
Kerosene	8	6	7	5	26	1.37
Puffer fish	7	3	0		10	0.53
PCM		2	4	2	8	0.42
other drug				6	6	0.32
Datura	3	0			3	0.16
Total case	627	538	385	353	1903	

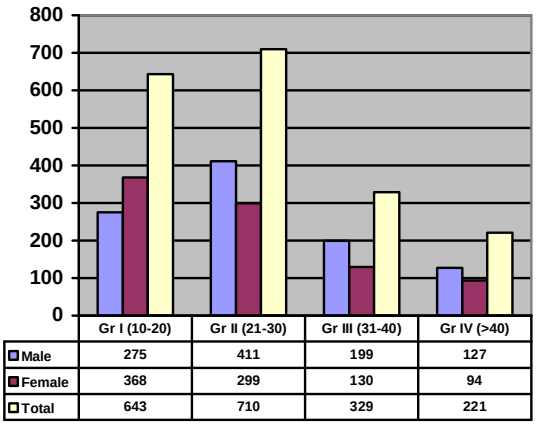

Fig. 1: Sex distribution of cases in different age groups.

Figure 2 elaborates the pattern of poisoning with male, female distinction. There was variation between the various types of poisons according to sex groups. Male were found mostly affected in majority type of poisoning except copper-sulphate, kerosene, puffer fish, paracetamol & other drugs category. In this study OPC was the most significant agent of poisoning both in male & female. Unknown causes of poisoning (second leading cause) were also high in male (76%) probably because of their habit of traveling.

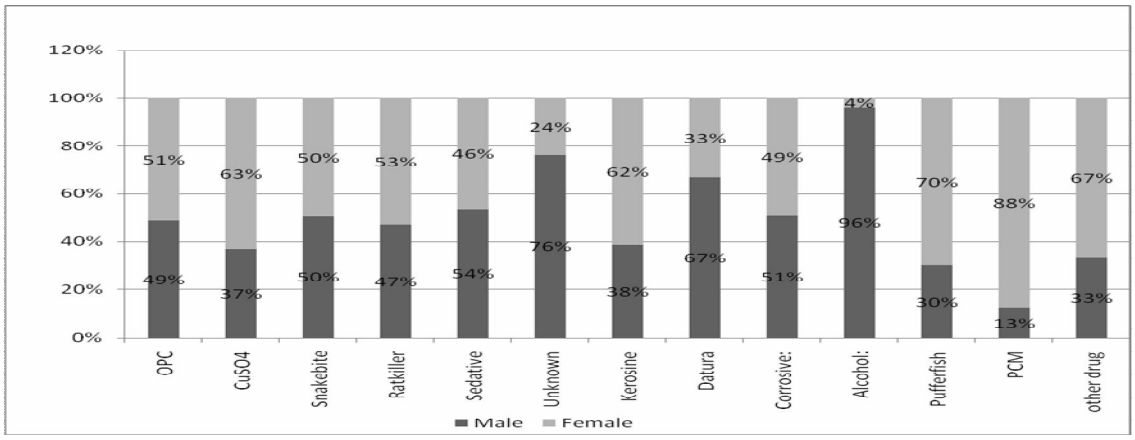

Fig. 2: Pattern of poisoning with male, female distribution (2003-06).

Highest 1308(68.7%) cases were attempt to suicidal in mode followed by 304 (15.9%) accidental and 291 (15.2%) stupefying (Fig. 3). Males were more victims of stupefying poisoning mostly by unknown toxic agents which usually occurred in the streets because of frequent traveling.

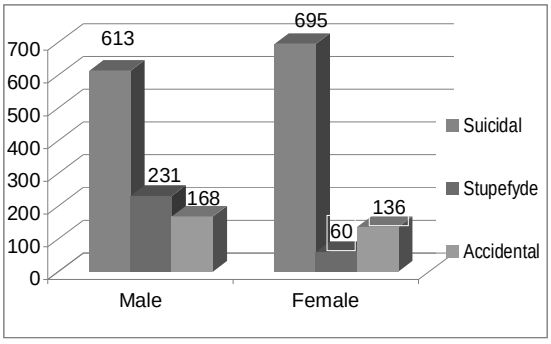

Fig 3: Mode of poisoning with sex distribution (2003-06).

Out of 1903, 140 (7.3%) patients died with male: female ratio of 1.06:1. Death rate was highest in case of OPC poisoning (13.88%) which actually comprised 52.14% of the total causes of death followed by corrosive agents (8.09%), snakebite (6.50%), unknown substance (6.23%) & copper-sulphate (5.99%) etc. Datura, alcohol, puffer fish, paracetamol & other drugs didn't have any fatality.

Table II: Case fatality rate (2003-06) according to toxic agents

Toxic agents	Total cases (n=1903)	Hospital deaths (n=140)	Case fatality rate (%)
OPC	526	73	13.88
Corrosive	136	11	8.09
Snakebite	246	16	6.50
Unknown	305	19	6.23
CuSo4	267	16	5.99
Kerosene	26	1	3.85
Rat killer	66	2	3.03
Sedative	254	2	0.79
Datura	3	0	0
Alcohol	50	0	0
Puffer fish	10	0	0
Paracetamol	8	0	0
Other drug	6	0	0
Total	1903	140	7.36

Discussion

Pesticides poisoning from occupational, accidental and intentional exposure is a major developing world public health problem[3]. A recent study demonstrated that 44% of all deaths amongst 10-50 year old women in Bangladesh were due to poisoning, the majority following suicidal ingestion of pesticides[4]. In 1990, Jeyaratnam estimated that self-harm resulted in two million cases of poisoning each year with 200 000 deaths globally[3]. In contrast accidental and occupational exposure were estimated to cause one million cases with 20 000 deaths[3].

This study showed, OPC as the predominant cause of poisoning (27.64%) and also provided the highest number of death (13.88%). The findings is almost similar (28.5%) with the baseline survey done in 2007 throughout the country and another pilot study recently done in different categories of hospital in Bangladesh[5,6]. The mortality was found much higher in few studies of India where it was around 40%[7]. But the rate was much lower in America, Eastern Mediterranean region and in Europe which was 11%, 7% and 5% respectively[8,9]. A Systematic review showed that global mortality due to OPC poisoning is around 30% (27% to 37%).[8] Travel related poisoning came across as the second highest (16.03%) cause southern part of Bangladesh where the case load is gradually rising in number. The agents used for travel related poisoning has been changing over time from 'dhutura' (opiates) to unknown cocktail of stupefying agents. Majumder et al showed that between 2004 to 2006, this type of poisoning increased from 6.1 to 9.5% of all admissions and representing 46.6 to 55.7% of all admitted poisoning cases at Dhaka medical college hospital (DMCH)[10]. Urine analysis of those victims showed benzodiazepine compounds (highest with lorazepam) as main offending agent[10]. The case load differ greatly from our study, possibly because

the later done in the highly populated capital city of Bangladesh where frequent short and long distance travel goes on. Copper-sulphate was the third leading (14.03%) cause of poisoning particularly reported in our study area with female predominance (63%) though the country wide incidence is only 0.15%[5]. The number of hospital admission due to it is coming down significantly since 2003. This heavy metal poisoning is quite unusual in the world now a day's except some parts of India. Studies from the developed Countries suggested analgesics, particularly paracetamol as the most common cause of deliberate poisonings in adults[11,12]. In the UK, paracetamol accounts for 43% of all acute poisoning emergencies followed by opioids (15%) and benzodiazepines (15%)[12]. Different form of sedatives were also found as important agent (13.3%) in our study too though cases due to paracetamol was very few (0.42%). The country wide baseline survey reported sedatives as the leading agent (37.1%) after including travel related poisonings under this group.[5] Snake bite is another important issue in Bangladesh. Recently Rahman et al, found the estimated incidence density of snake bite is around 623.4/ 100 000 person years[13]. In our study snake bite was responsible for 12.93% of poisonings with quite high case fatality rate (6.50%). It is noticeable that puffer fish poisoning comprised 0.53% of total poisonings which was quite rare in other parts of Bangladesh. Evidence was reported from only Khulna district before, though recently largest outbreak occurred in inland districts (Natore, kishoreganj and Dhaka)[14,15].

In this study the most commonly involved age group was between 21-30 (37.3%) followed by 10-20 (33.7%). Findings are quite similar (21-30/34.6%; 13-20/25.1%) in respect of age with the baseline survey done in 2007[5]. Reports from other countries also identified 15-30 years age group as most frequently occurring group[16,17]. Suicidal attempts comprised 68.73% with a female to male ratio of 1.13:1 which is quite high compared to baseline survey (41.7%)[5]. This study revealed 7.3% overall mortality which is also high compared to national baseline data (4.1%)[5]. Studies done in Sri Lanka and India (community based) showed 3.7% and 137.1/100,000 death respectively[7,18].

The data used here was a bit old which might be the limitation of the study. But the result can be used as baseline for further comparison in both regionally and nationally. Again, it was a retrospective study using hospital records where the occupation, marital status & other demographic data could not be evaluated. The clinical features at admission & treatment given during hospital stay also could not be assessed.

In this study like other regional and national studies, pesticides came across as the most commonly used agents of poisoning but restricting pesticides might not be practical in an agro based country like Bangladesh rather proper labeling and strict regulation & monitoring of storage and sale in open market can be a better solution. This study reflects the emerging importance of marine and animal toxin which also a point of concern for near future. Availability of antidotes needs to be ensured in every secondary and tertiary care hospitals of the country. We had a poison information center (PIC) established in the year 2006 in Dhaka Medical College. But unfortunately since 2008 it had no visible activities. It urgently needs to revive because strengthening of institutions is the ultimate way to face this problem. Prospectively designed country wide multicentre studies and community based surveillance need to conduct immediately to understand the disease burden and epidemiological properties of poisonings which would be very valuable for the determination of preventive measures.

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