Original Paper

A Ten-year Retrospective Study on Poisoning Cases in Two Major Cities of Malaysia and India

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ABSTRACT

This is a retrospective study conducted at Kuala Lumpur, Malaysia, and Delhi, India to make preliminary assessment about poisoning cases and their etiologies. The study was aimed at finding out the common age group involved, methods of poisoning, and types of substances used for committing suicide. Besides this, it also attempts to relate with ethnic groups and their choice.

The commonest age group affected in both Malaysia and India appears to be the 16–30 group. Indians are more likely to commit suicide by poisoning (58.9%), compared to Chinese (28.5%), and Malays (5.3%). The majority of the cases of poisoning were suicidal in nature (58.8%), followed by accidental (16.6%), and homicidal (0.1%), while a significant number of cases were unclear in nature (24.4%). This study serves as a pilot project for more detailed prospective and retrospective studies involving multiple centres in the future.

Key Words: Poisoning, India, Malaysia

Introduction

All around the world, acute poisoning remains a major cause of hospital admissions.[1-3] The wide availability, and easy access to potentially toxic chemicals (which have widespread use in medicine, industry, agriculture and even in normal daily life) contribute to the ease with which the lay public can get their hands on lethal poisons.[4] In the United States alone, more than 2 million cases are reported every year to poison centers.[5] Often, many of these cases are treated and discharged without serious complications. However, the toxic nature of certain chemicals do not lend to effective treatment, especially if some time has elapsed, or if the patient ingests them intentionally in larger doses.[6,7]

The primary objective of the present study was to determine the pattern of poisoning deaths in the Klang Valley, in the middle of Selangor, which encompasses Kuala Lumpur, the capital of Malaysia. It has the largest population of all metropolitan areas in Malaysia. It has also a multiracial mix of population comprising Chinese, Malays, and Indians. As far as is known, there has been no comparative analysis done on the pattern of poisoning deaths in Malaysia and India. Therefore, we decided to do the same in two major centers in these two countries, to set a point of reference, and for the purposes of comparison.

Materials and Methods

An analysis of all poisoning deaths confirmed at autopsies, was made from the records of the Forensic Departments of three hospitals: University Malaya Medical Centre (UMMC), Kuala Lumpur, Tungku Ampuan Rahimah Hospital (TARH), Klang, both in Malaysia, and

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University College of Medical Sciences (UCMS), Delhi, in India. The cases were identified by reviewing the autopsy books of the respective hospitals, and extracting the relevant data. With regard to cases where the cause of death was marked as 'pending toxicological analysis', individual files were reviewed to ascertain the cause of death wherever possible. Despite an exhaustive search however, for some cases, even with toxicological analysis and a battery of other tests, the cause of death could not be confirmed as due to an exact substance, nor could it be confirmed as to whether it was accidental or intentional in nature. Such cases were categorized as unspecified.

The various agents implicated in poisoning deaths were categorized under pesticides, drugs, alcohols, carbon monoxide, other gases, and other substances. Pesticides mainly comprised malathion and paraquat, or some other herbicide. Drugs encompassed those that are commonly prescribed, as well as over-the-counter pharmaceutical products. Alcohol cases were mostly due to consumption of ethanol. Carbon monoxide exposure was mostly to do with motor vehicles. Other gases included cooking gas and other unspecified gases.

Indigenously designed data collection forms were used to obtain data including the demographic origins of the patients, the poisons involved, and the circumstances surrounding the incidents.

Results

During the years 1996 – 2005, there were 89 cases of poisoning deaths in UMMC. **Table 1** shows the demographic characteristics of poisoning deaths during the 10-year period. Slightly more than two thirds of the deaths involved males. The majority of the poisoning cases were in the 16–30 age group (44.94%). There was one case of unknown age, who died of acute alcohol toxicity. Of the 3 major races in Malaysia, Indians (50.56%) and Chinese (37.08%) made up the majority of poisoning deaths while Malays accounted for just 3.37%.

Suicide cases (78.7%) far outnumbered accidental (13.5%) and homicidal (1.1%) cases. **Fig 1** shows the breakdown of the agents implicated and the nature of the poisoning. It can be seen that the major group implicated is pesticides (50.6%). Poisoning from other substances, drug overdose and carbon monoxide trailed far behind with 16.9%, 13.5% and 12.4% respectively.

In TARH, we only managed to access records between the years 2003 – 2005. There were however, already 62 cases in the span of 3 years as compared to 89 for 10 years in UMMC.

Table 2 shows the demographic characteristics of poisoning deaths during 2003-2005. Again, males (61.29%) outnumbered females (38.71%), however, with a lower margin as compared to the cases in UMMC. Again, the highest age group was the 16–30 age group with 37.10%. As in the case of UMMC, racial demographics show that Indians make up the most cases (70.97%) followed by Chinese (16.13%) and Malays (8.06%). This is a large increase in the ratio of Indians to Chinese and Malays as in UMMC, Indians only make up 50.56%.

Table 1 Demographic characteristics of poisoning deaths in UMMC between 1996 – 2005

Age	Frequency	Percent	Ethnic Group	Frequency	Percent
1–15 yrs	2	2.25	Chinese	33	37.08
16–30 yrs	40	44.94	Malay	3	3.37
31–45 yrs	29	32.58	Indian	45	50.56
46–60 yrs	13	14.61	Indonesian	6	6.74
>61 yrs	4	4.49	Others	2	2.25
Unknown	1	1.12	Total	89	100
Total	89	100			

Gender	Frequency	Percent
Male	60	67.42
Female	29	32.58
Total	89	100

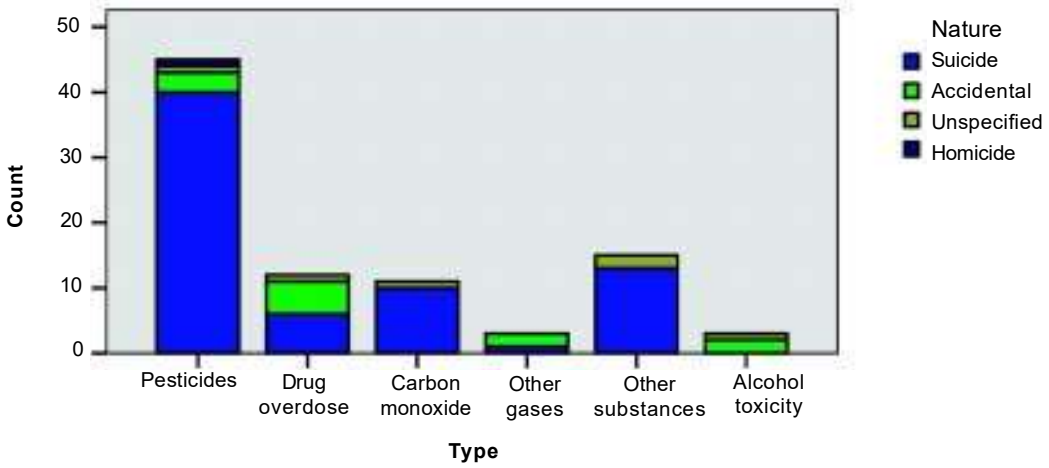

Fig.1 Agents implicated in poisoning and the nature of the poisoning deaths in UMMC

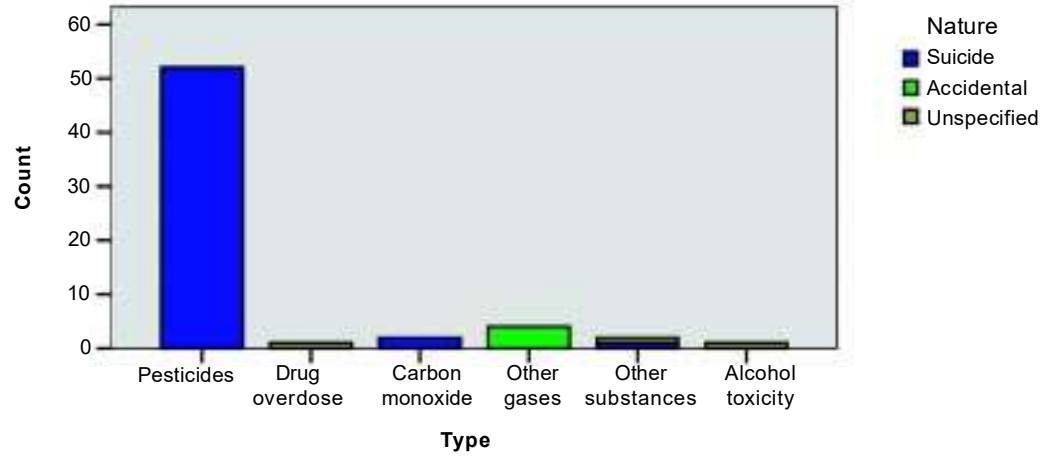

Fig.2 Agents implicated in poisoning and the nature of the poisoning deaths in HTAR

Intentional or suicidal poisoning deaths again far outnumbered the accidental poisoning cases (88.7% compared to 6.5%), while the remaining 4.8% were unspecified in the records. **Fig 2** shows the breakdown of the poisoning agents and the nature of the poisoning.

Pesticides again predominate, but with a much larger percentage – 83.9%. All pesticide cases were suicidal in nature. Other gases came in a very distant second with 6.5%, while miscellaneous agents and carbon monoxide accounted for 3.2% each.

With regard to University College of Medical Sciences (UCMS), there was a total of 786 cases over a period of ten years. This is extremely high, more than nine-fold the number of deaths recorded in UMMC over the same period of time. **Table 3** shows the demographic characteristics of poisoning deaths in UCMS over a period of ten years, from 1996 to 2005. Yet again, male deaths outnumbered female deaths (66.67% vs 33.33%). As in the previous situations, the main age group that recorded the highest number of deaths is the 16–30 year old age group. In India, this group records a very high percentage (60.81%), which is more than double the next category, the 31–45 year old category, with 24.30%.

Suicidal deaths again far outnumbered accidental deaths (54.2% vs 17.8%). UCMS records however, were rather

Table 2 Demographic characteristics of poisoning deaths in HTAR between 2003 - 2005

Age	Frequency	Percent	Ethnic Group	Frequency	Percent
1–15 yrs	1	1.61	Chinese	10	16.13
16–30 yrs	23	37.10	Malay	5	8.06
31–45 yrs	17	27.42	Indian	44	70.97
46–60 yrs	13	20.97	Indonesian	2	3.23
>61 yrs	8	12.90	Others	1	1.61
Total	62	100.00	Total	62	100.00
Sex	**Frequency**	**Percent**			
Male	38	61.29			
Female	24	38.71			
Total	62	100.00			

Table 3 Demographic characteristics of poisoning deaths in UCMS between 1996 - 2005

Age	Frequency	Percent	Sex	Frequency	Percent
1–15 yrs	44	5.60	Male	524	66.67
16–30 yrs	478	60.81	Female	262	33.33
31–45 yrs	191	24.30	Total	786	100.00
46–60 yrs	58	7.38			
>61 yrs	15	1.91			
Total	786	100.00			

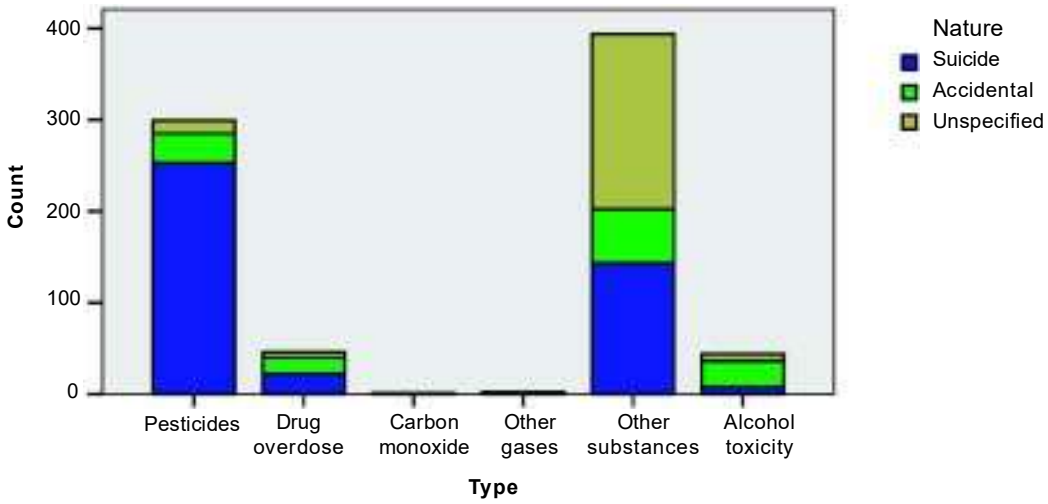

Fig.3 Agents implicated in poisoning and the nature of the poisoning deaths in UCMS

sketchy, and the majority of the type of poisons was marked as unknown, and was therefore recorded by us as "other substances". This has led to the high percentage of "other substances" being implicated in poisoning deaths in India (50.1%). However, if we were to ignore this, the main cause of poisoning deaths would be pesticides (38%). Drug overdose and alcohol toxicity trail far behind with 5.9% and 5.6% respectively. Alcohol toxicity also is more of a problem in India, and it is the main cause of accidental deaths due to poisoning.

Discussion

In all three studies, the poisoning trend appears similar with pesticides predominating over other poisons[1,3] mainly due to easy availability and low cost. However, there are some significant variations in all three studies. This is probably due to the fact when people commit suicide they tend to use the most accessible and cheapest means possible. In UMMC, the subjects are probably more affluent, and even own cars, sometimes using that as a means of suicide via carbon monoxide poisoning. Similarly, some would prefer to purchase drugs and overdose on them, but that again requires money. In the TARH, the general socioeconomic background is rather lower than the KL area, and thus suicide by carbon monoxide poisoning or overdosing on drugs is less common. The same pattern is seen in India, though there are differences; for instance, acid can be bought cheaply too, and thus they are also used in cases of suicide. India also has a higher number of alcohol consumers, and this in turn leads to the higher than usual rate of deaths due to alcohol overdose. This is further compounded by the drinking of home-made alcohol, which is usually toxic due to its methanol content.

It is noteworthy that poisoning deaths are rarely accidental. Most are suicidal in nature.[8] This is because the most poisonous substances are often unpalatable or unpleasant, and thus it would be unlikely that someone would accidentally consume them, especially in the case of pesticides. Overdosing on drugs accidentally is more plausible, but then, a large amount is usually necessary for death to occur. Furthermore, if one were to accidentally overdose, should there be any symptoms, he/she would have rushed to the hospital where prompt medical attention would prevent further complications. Alcohol toxicity is probably the easiest to happen accidentally, as a person's rationality may be seriously impaired once he is drunk, and therefore he would no longer be in control of his mental faculties, leading to further overdrinking.

In all three studies, the age group most commonly involved in poisoning deaths is the 16-30 year age group.[9] This is probably due to the fact that at this time in life, most youths are in the process of transition from teenage to adulthood, and this is a difficult period associated with emotional upheavals, thus setting the stage for suicidal thoughts.

In Malaysia, interestingly, Indians are far more likely to be involved in poisoning deaths than the Chinese, while Malays account for the least number. This could be due to several reasons. Indians predominantly work in the agricultural field, and thus they would have easier access to organophosphates. Although unconfirmed by studies, it would also seem that the Chinese prefer to use other means of committing suicide such as hanging and jumping from a height. In the case of Malays, suicide is taboo in the religion that they profess, and hence very few take their own lives.

Conclusions

- The most common age group implicated in poisoning cases in both Malaysia and India is the 16-30 year age group, with a mean of 57.7%, followed by the 31-45 year age group, with a mean of 25.3%.
- Poisoning deaths are predominant among males (66.4%) as compared to females (33.6%).
- In Malaysia, Indians are more likely to commit suicide by poisoning (58.9%), when compared to the Chinese (28.5%) or the Malays (5.3%).
- Most cases of poisoning are suicidal in nature (58.8%) as compared to accidental (16.6%), or homicidal (0.1%), while a significant number is unclear in nature (24.4%).
- With the exception of unknown substances (43.9%), the most commonly involved group comprises the pesticides (42.3%), followed by pharmaceutical drugs (6.3%), and alcohol (5.1%).
- The most common accidental poison is alcohol, followed by pharmaceuticals.
- Pesticide poisoning is almost always suicidal in nature.

Poisoning deaths are much more rampant in Delhi, India (78.6 cases/year), than in Kuala Lumpur, Malaysia (8.9 cases/year).

REFERENCES

1. Sharma SK. Current scenario of poisoning in rural India. J Forensic Med Toxicol 1998; 15: 89-94.
2. Ministry of Health. Annual Report. Malaysia: Ministry of Health 1998; 147.
3. Ministry of Health. Annual Report. Malaysia: Ministry of Health 2000; 113.
4. Jeyaratnam J. Acute pesticide poisoning: A major global health problem. WHO Health Statistics Quarterly 1990; 43: 139-144.
5. Litovitz TL, Klein-Schwartz W, Rodgers GC, Cobaugh DJ, Youniss J, Omslaer JC, et al. 2001 Annual report of the American Association of Poison Control Centres toxic exposure surveliance system. Am J Emerg Med 2002; 20: 391-452.
6. Murty OP, Amir FL, Lindy Bak LM, Bari NA, Ong KY, Ahmat Z. Retrospective study of unnatural causes of death in medico-legal autopsies at UMMC over ten years. Int J Med Toxicol Legal Med 2005; 7: 22–29.
7. Santos RP, Cavaliere MJ, Puga FR, Narciso ES, Pelegrino JR, Calore EE. Protective effect of early and late administration of pralidoxime against organophosphate muscle necrosis. Ecotoxicol Environ Saf 2002; 53: 48–51.
8. Chaudhary BL, Singh D, Tirpude BH. Trends of poisoning in the Kasturba Hospital, MGIMS, Sevagram. Int J Med Toxicol Legal Med 2005;7: 13–17.
9. Aggarwal P, Handa R, Wali JP. Common poisonings in India. J Forensic Med Toxicol 1998; 15: 73–79.
10. Fathelrahman AI, Ab Rahman AB, Zain ZM. Demographic features of drug and chemical poisoning in Northern Malaysia. Clin Toxicol 2005; 43: 89–94.