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Review article

A COMPARATIVE OVERVIEW OF POISONING IN MULTIDIMENSIONAL PERSPECTIVE

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ABSTRACT

Background: Poisoning cases occur universally and have plagued mankind since antiquity. Keeping this in view, this study was contemplated to find the comparative overview of poisoning in India and Saudi Arabia to know how the racial and cultural factors influence the pattern of poisoning. **Material and Methods:** A systematic web based search was conducted and original studies on poisoning published in India and Saudi Arabia were analyzed with respect to age, gender, category of poison, and overall distribution of toxic agents. **Results:** The study concluded that the male to female ratio in India was 1.53:1 while in Saudi Arabia it was 1.2:1. In India, the highest frequency of poisoning occurred with agrichemicals while in Saudi Arabia it was mainly due to pharmaceutical drugs. In India the most common mode of poisoning is intentional (70.6%) and it is commoner in the age group 21-30 years (31.1%). This is in contrast with Saudi Arabia, which showed that most of the cases of poisoning is accidental (54.1%) and occurred in children <10 years. **Conclusion:** The study suggested various similarities and variations in the pattern of poisoning in the two countries with regards to distribution of poisoning among female and young adult victims based on contextual factors like circumstances of poisoning and differential access to the toxic agents. Careful and well planned strategies may reduce the incidence of poisoning in these countries

Key words: Poisoning, Age group, Agrichemical, Pharmaceutical drug, Intentional, Accidental

INTRODUCTION

Poison is any substance taken internally or applied externally that causes injury or damage that causes injury or damage to the body due to its exposure. ¹Poisoning cases are increasing day by day due to changes in the lifestyle and social behaviour. Advances in technology and social development have resulted in the availability of most drugs and chemical substances in the community. ²The trend of poisoning associated morbidity and mortality differs from country to country and it varies with the span of time. According to World Health Organization (WHO), globally more than three million of acute poisoning cases with 2,20,000 deaths occur annually. ³The present study was undertaken to determine the trend of poisoning in the countries

where the original studies were conducted namely India and Saudi Arabia. The study revealed that the paradigm of poisoning illustrates some resemblance and variation based on the socio-demographic figure of the cases, the toxic agents involved and circumstances surrounding the incidents.

MATERIAL AND METHOD

This study, conducted with the purpose of examining similarities and disparities in the patterns of poisoning across the two countries namely India and Saudi Arabia. The comparison was based on the data from the original paper published and collected randomly from four different regions of India and Saudi Arabia respectively. The papers which reported

the age and gender distribution, distribution of toxic agents and circumstances of poisoning were included. In total, the four papers in India reported data on 1486 poisoning cases and in Saudi Arabia 1757 cases. All papers described the data collection tools as a pre-tested data collection. The demographic and clinical variables collected from the paper included the age, and sex of the victims of poisoning; the names and

types of poisoning agent, the circumstances of poisoning, whether accidental or deliberate. In line with the objectives of the study, a re-analysis of data was undertaken in order to make comparisons based on pre-defined groups. On the basis of observation and analysis, results were discussed and compared with other relevant literatures.

RESULT AND DISCUSSION

Table1: Poisoning per age category and gender

Country	Age categoryn(%)						Total	Gender	
	<10%	11-20%	21-30%	31-40%	41-50%	>50%		Male	Female
India n=1486	209 (14.1)	300 (20.2)	515 (34.7)	195 (13.1)	149 (10.0)	118 (7.9)	1486	900 (60.6)	586(39.4)
Saudi Arabia n=1757	715 (40.7)	290 (16.5)	466 (26.5)	167 (9.5)	86 (4.9)	33 (1.9)	1757	971 (55.3)	786(44.7)

Table2: Overall distribution of toxic agents

Country	Toxic agent'sn(%)					
	Pharmaceuticals	Household products	Agrichemicals	Animal and insect bites	Food poisoning	Others
India n=1486	167(11.2)	259(17.4)	616(41.5)	187(12.6)	12(0.8)	245(16.5)
Saudi Arabia n=1757	839(47.8)	371(21.1)	134(7.6)	231(13.2)	99(5.6)	83(4.7)

Table3: Circumstances of poisoning per age category

Country	Circumstances	Age categoryn(%)						
		<10yrs	11-20	21-30	31-40	41-50	>50	Total
India n=1486	Intentional	none	268(18.0)	461(31.1)	158(10.6)	102(6.9)	60(4.0)	1049(70.6)
	Accidental	197(13.3)	32(2.2)	none	none	26(1.7)	49(3.3)	304 (20.5)
	others	12(0.8)	None	54(3.6)	32(2.5)	21(1.4)	9(0.6)	133 (8.9)
Total		209(14.1)	300(20.2)	515(34.7)	195(13.1)	149(10.0)	118(7.9)	1486
Saudi Arabia N=1757	Intentional	none	192(10.9)	385(21.9)	139(7.9)	56(3.2)	10(0.6)	782(44.5)
	Accidental	715(40.7)	98(5.6)	68(3.9)	21(1.2)	28(1.6)	21(1.2)	951(54.1)
	others	None	None	13(0.7)	7(0.4)	2(0.1)	2(0.1)	24(1.4)
Total		715(40.7)	290(16.5)	466(26.5)	167(9.5)	86(4.9)	33(1.9)	1757

The increase in poisoning cases represents a major health problem worldwide with high mortality and morbidity. Incidence of poisoning varies from one community to another and is influenced by age, sex, economic status, local customs, social and environmental circumstances. In both India and Saudi Arabia males outnumbered females. The ratio being

1.53:1 in India, which is comparable to the studies by Dash S K et. al, (2005), Escoffery C T et.al, (2004).^{4,5} While in Saudi Arabiamales: females ratio was 1.2:1,which is comparable to other studies of Ghaznawi HI et. al (1998).⁶This could be due to the fact that males are more exposed to stress and strain associated to family responsibilities in their day to

day life. At the same time males are more susceptible for taking risks as compared to females.⁶

The age group with a maximum incidence of poisoning in India was 21-30years(34.7%). It is obviously due to the fact that this age group is the determining factor of the life with high levels of stress in terms of education, job issues, marriage and other factors. Therefore, they are subjected to substantial amount of mental strain during this period.^{4,7}While in Saudi Arabia the maximum incidence of poisoning was in children under 10 years of age(40.7%). This pattern came also in accordance with other studies in Saudi Arabia that showed the highest incidence of poisoning in children, Moazzam M, etal (2009),⁸ Al-Barraq A(2011)⁹.This may be because children have tendencies to explore the surroundings and put everything in their mouths without the knowledge to discriminate between the safety of products.⁹ Irresponsibility on the part of the parents could also not be ignored. Also the increased number of boys in poisoned pediatric group could be attributed to more mobility and exploratory behavior in male children than female.¹⁰In the present study, the lowest incidence of poisoning was in people over 50 years (1.9%). The incidence of poisoning in this age group is very low as Islam condemns and strictly proscribes intentional self-destruction (suicide).

The present study showed that in India the highest frequency of poisoning occurred with Agrichemicals (41.5%) followed by household products(17.4%). Because, India is predominantly an agrarian country about 60 to 80% of rural population depend on agriculture and the poisoning with such products are more common.¹¹Agrichemicals particularly organophosphates and aluminum phosphide were the most commonly used poison. The high incidence is because of unsafe practices, illiteracy, ignorance, lack of protective clothing and easy available over the counter for agriculture purposes.^{12,13}

On the contrary, in Saudi Arabia most commonly encountered group of poison was pharmaceutical drugs (47.8%) both in adults and children followed by house hold product(21.1%). The most frequently ingested drugs among adults and children were acetaminophen and other NSAID's. This pattern has been reported in many western countries, some eastern mediterranean and Asian countries. Similar results as our findings were observed with the study of Moazzam et al., in the Qassim Region of Saudi

Arabia. They found that paracetamol and other analgesics (NSAIDs) were frequently reported among both adults and paediatric cases.⁸Drugs were a major problem in several reports from Kingdom of Saudi Arabia.^{8, 14} Some of the reasons include the lack of dispensing drugs in child-resistant containers, an easy access to medications without prescriptions and careless storage of drugs inside homes.¹⁵ This observation points out the urgency of implementing the nationwide use of child-proof drug prescription bottles, in order to eliminate or reduce childhood drug poisoning in Saudi Arabia.¹⁶

In India among pharmaceutical agents, Benzodiazepine group drugs (Diazepam, Alprazolam, Nitrazepam etc.) were most commonly abused agents. The second common cause of poisoning in both the countries was by household products. Household cleaning products like phenol, bleaches, and their derivatives are stored in most houses and easy availability of such products makes them responsible for the higher incidence of poisoning. Parjapati et al.¹⁷ also reported household chemicals as the second most common toxic agents.

Animal stings and Scorpion bites are also on rise in Saudi Arabia. The high rate of Animal stings and bites in young adult victims may be explained on the basis that this age category is associated with most outdoor activities like moving out to the surrounding mountains for recreation.¹⁸

In India the most common mode of poisoning was intentional (70.6%) and it was commonest in the age group 21-30 years (31.1%). It is comparable to other studies¹⁸ and suggests that poisoning by intention has increased because of their easy availability in the market and also there is a general belief that poison terminates life with minimal suffering.^{19,20}Poverty, inadequate income to run the family, monsoon failure was responsible for higher incidence of poisoning among laborers and farmers.²¹Failure in the exams or inability to cope up the high expectation from parents and teachers has increased the incidence of poisoning among students.

This is in contrast with Saudi Arabia which showed that most of the cases of poisoning is accidental (54.1%) and occurred in children <10 years(40.7%). This came in accordance with Izuora and Adeoye(2001), who in their study in,Saudi Arabia also found that there were no cases of intentional poisoning in these age groups which may be due to

the rarity of this behavioral pattern in this area of the world.²²

This also could be explained by the different styles of living between countries regarding the degree of adherence of this age group to their families which provide some protection against intentional poisoning. Moreover, parents should be advised to keep drugs in child secure lockers, cupboards with secure locks in bathrooms can reduce accidental poisoning by household insecticides.

In India accidental poisoning was observed in 13.3% cases among children. In some of the cases poisonous substances like house-hold products e.g. acid, caustic soda etc were mistakenly given to the children by their mothers. Studied showed that kerosene is the commonest agent involved because it is still used as a cooking fuel by the low socio-economic class.²³

While in Saudi Arabia the second group comprises of intentional poisoning cases(44.5%) that was highest among young adults in the age 21-30years(21.9%), with females significantly outnumbering males. Females were mostly Saudis who had an intentional intake of poison whereas males were predominantly expatriate farm workers. Some of the reasons for the lower percentage of intentional intake in Saudi Arabia than India is because the level of stress (in this age group)is low, level of education is better than India, employment level is better, most important of all is that as Islam condemns and strictly proscribes intentional self-destruction (suicide) which plays a major contributory factor for lower level.²⁴ Unfairness towards females with high incidence of family quarrels, domestic troubles, mal-adjustments in married life which constitute some of the important factors contributing towards the preponderance of females.²⁵

CONCLUSION

The present study findings suggest various similarities and variations in the pattern of poisoning in the two countries with regards to distribution of poisoning among female and young adult victims, based on contextual factors like circumstances of poisoning and differential access to the toxic agents. Careful and well planned strategies may reduce the incidence of poisoning in these countries. Following are the recommendations for prevention and limiting

the exposure of poisons and reducing the mortality associated with it.

Recommendations

1. Foster the establishment of toxic exposure surveillance system (TESS) which is used to identify hazards early, focus on prevention education, guide clinical research and direct training.
2. That policies addressing the overall strategies regarding the issues of illicit drug abuse as well as pharmaceutical and pesticide misuse should be designed and implemented in order to address acute poisoning and related mortality.
3. Development of high quality poison information and poison control services at national or regional poison level to improve the evidence based guidelines to aid management.
4. That restrictive legislation and regulations on toxic agents particularly agrichemicals should be enacted and enforced through a concerted effort between the legislative and judiciary arms of government with the active participation of civil society.
5. Legalizations should be implemented to ban over the counter selling of medications and to sell potentially dangerous chemicals in childproof containers.
6. Public education with appropriate messages and exposure of children to toxic agents requires more attention especially among families to improve their awareness about safety requirements inside homes and to provide training programs especially for recently married couples.
7. That prospective cohort studies, both facility-based and population-based, should be conducted so that data on a comprehensive range of variables can be collected, and used in building predictive models of acute poisoning patterns and guide the design of interventions.

Conflict of interest: Nil

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