Original Article

Assessment of Socio–Demographic Profile among the Poisoning Death Cases at SMS Hospital, Jaipur

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Abstract

Background: Poison can be defined as, a substance (solid, liquid or gas) which if introduced in a living body or brought in contact with any part will produce ill health or death by its constitutional or local effects or both. The trends of poisoning fatalities may guide towards planning of preventive measures.

Aims & Objective: Assessment of socio–demographic profileamong the poisoning death cases at SMS Hospital, Jaipur.

Material & Methodology: A cross-sectional descriptive observational prospective study that used inclusion and exclusion criteria was conducted. 110 autopsies of suspected poisoning deaths were taken in this study. The present study has been conducted in the Mortuary, Department of Forensic Medicine & Toxicology, SMS Medical College, Jaipur from 1st June 2021 to 31st May 2022.

Result & observation:

Conclusion: Health education and strict legal enforcement of rules regarding storage, handling, transportation and commercial sale of poisonous substances should be established to restrict the easy availability of toxic substances. Public education regarding use & storage of poisons must be enhanced and counselling centres for persons going through economic or family distress may be helpful.

Key word: Poison, Socio-demographic Profile, SMS, Jaipur, Autopsies, Toxic.

Introduction

Poison can be defined as, a substance (solid, liquid or gas) which if introduced in a living body or brought in contact with any part will produce ill health or death by its constitutional or local effects or both[1]. Poisoning is a common cause of morbidity and mortality since time immemorial[2]. Various chemicals including pesticides, insecticides, alkaloids, acids and other toxic substances are used by many for day to day household commercial purpose & industrialization with green revolution has increased the chances of poisoning deaths and have also become more rampant owing to use of poisons for causing intentional self-harm and harm to others. Poisoning cases are also commonly encountered in emergency and post-mortem rooms and are dealt by forensic persons for

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medico legal evaluation. Due to rapid development in the field of science and technology and vast growth in the industrial and agricultural sector, the poisoning is spreading like a wild fire[3]. All cases of deaths due to poisoning are recorded as unnatural death and medico legal and police formalities are mandatory. The causative substances may differ with place to place due to availability of those substances in the area and so far; the studies on pattern of poisoning in autopsied bodies have not been undertaken at this hospital. Hence, there is a need for the study to known the definite and detailed profile of such poisoning. The trends of poisoning fatalities may guide towards planning of preventive measures.

Aim and Objectives

Study was conducted to evaluate the poisoning deathsin terms of socio-demographics profiles and to paint a picture therefor.

Materials and Method

Medico-Legal autopsies with alleged history of poisoning conducted at Mortuary S.M.S. Hospital Jaipur during June 2021 to May 2022 where legal heir gave written informed consent for participation in the study were included in the cross – sectional descriptive observational study. We excluded cases of deaths with alleged history of poisoning not confirmed on autopsy as per post-mortem findings. Sample size was calculated at 95% confidence level assuming survival of up to six hours in 60.9% cases of poisoning in India as found in seed article17. At an absolute allowable error of 10%, 92 cases of poisoning were required as sample size, which was further enhanced to 110 cases for the purpose of present study.

Observations and Results

The present study was carried out on 110 cases of suspected poisoning deaths which were selected as per the proposed inclusion and exclusion criteria from among medicolegal autopsies of poisoning deaths conducted at the study centre during the study period. A total of 4400 medicolegal autopsies were conducted at the centre during the study period, out of which 230 were suspected poisoning deaths (excluding drug overdose and snake bite fatalities).

In the current study, the majority of subjects (79.10%) were between the ages of 20 and 29 years, 30 to 39 years, and 40 to 49 years, which is society's productive age group. The majority of these subjects (34.54%) were between the ages of 20 and 29. The other age groups affected, in ascending order, were the >60 years, sixth, second, fourth and fifth decades. The age group of 1st decade was the least affected, with only one case. Male victims peaked in the third decade, while female victims peaked in the fourth.

Table 1: Age & Sex Wise Distribution of Study Subjects.

Age Group (years)	Male	Female	Subjects	%
0-9	1	0	1	0.90
10 - 19	8	3	11	10
20-29	28	10	38	34.5
30-39	17	12	29	26.4
40-49	11	9	20	18.2
50-59	6	1	7	6.4
>60	2	2	4	3.6
Total	73	37	110	100

Male subjects outnumbered females in the current study. Males accounted for 66.36% of cases, while females accounted for only 33.64%, resulting in a Male: Female ratio 1.97 : 1.During the study period, there were no cases of transgender people.

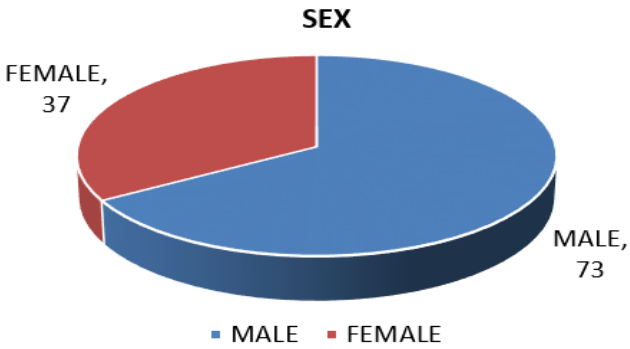

Figure 1: Distribution of Study Subjects According To Marital Status.

In the current study Married subjects largely dominated. Married accounted for 74.54% (82 subjects) of the cases and unmarried for 25.46% (28 subjects)

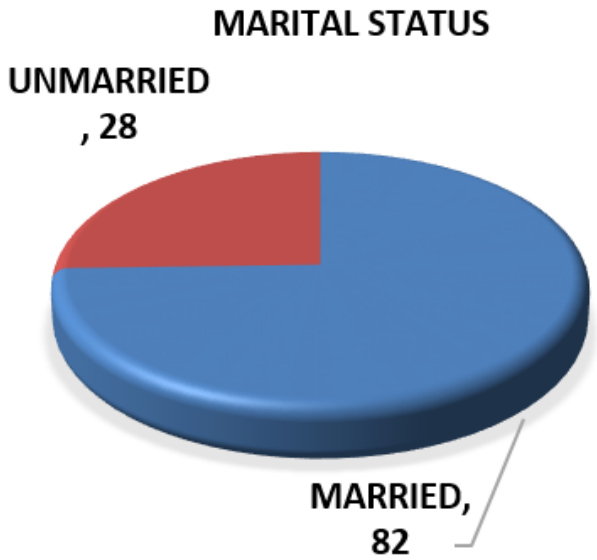

Figure 2: Distribution of Study Subjects According To Marital Status.

In the current study, Hindu subjects largely dominated the study population. Hindus accounted for 90.90% (100 subjects) of the cases, followed by Muslims at 5.45% (06 subjects) and Sikhs at 3.65% (4 subjects)

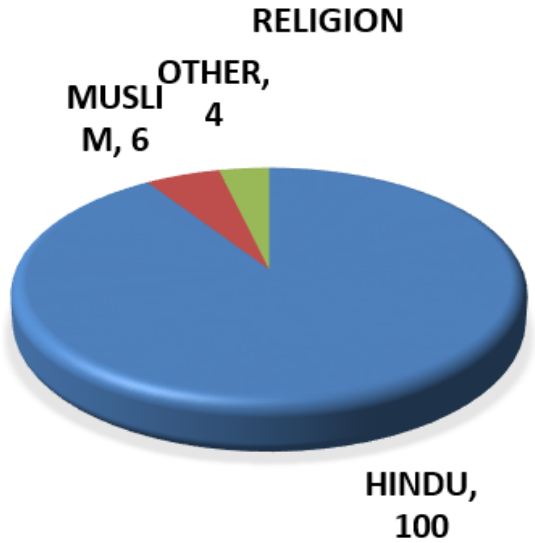

Figure 3: Distribution of Study Subjects According To Religion.

Rural subjects outnumbered urban subjects in the current study. Subjects from rural region accounted for 56.36% of cases, while those from urban region accounted for 43.64%, resulting in a Rural: Urban ratio of 1.3:1.

Figure 4: Distribution of Study Subjects According To Domiciliary Status

In the current study, the majority of subjects (26.36%) were illiterate. In descending order, the other group affected had education up to Graduation (29.09%), Primary School (17.27%) & High School (17.27%) followed by Middle School (7.27%), and professional degree (2.72%). No subject was there with an education upto Intermediate / Diploma.

Table 2 : Distribution of Study Subjects According To Educational Status.

Education Status	No. of Subjects	Percentage
Illiterate	29	26.36%
Primary School	19	17.27%
Middle School	8	7.27%
High School	19	17.27%
Intermediate / Diploma	0	0%
Graduate	32	29.09%
Professional Degree	3	2.72%
Total	110	100%

In the present study maximum number of study subjects were unemployed -33 subjects (30%), followed by students-28 subjects (25.45%), housewife-21 subjects (19.09%) and least number of subjects were from employed and self-employed group- 14 subjects (12.72%) in each.

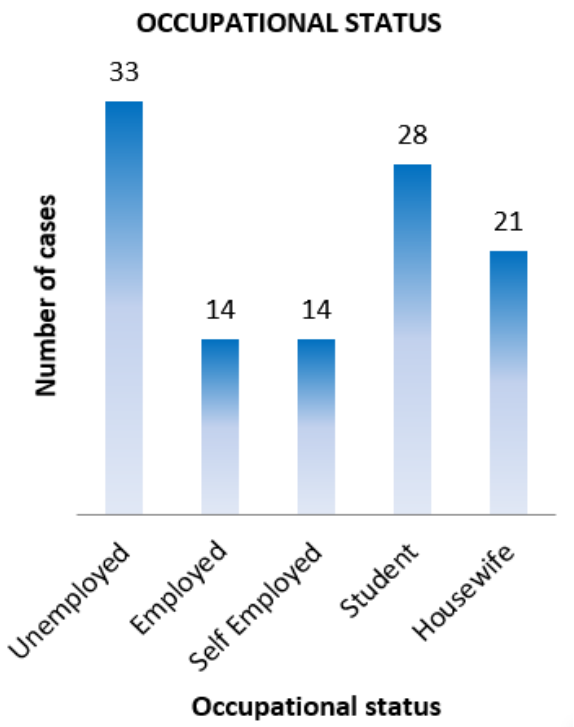

Figure 5: Occupational status Wise Distribution among Study Subjects

Discussion

Age, Sex, marital Status & Religion

In the present study males (66.36%) outnumbered the females (33.64%). The male: female ratio is 1.97:1. The proportion of males is more than females in most studies of poisoning deaths same as in the present study which is quite obvious as males being the active members of the society are more vulnerable to exposure of risks like accidental ingestion or inhalation. More so, the male population of society is subjected to more stressful situations which also make them vulnerable to incident of suicidal & homicidal poisoning deaths. Is although females have an easier access to household poisons but the males have an access to both household as well as to poisonous substances available in market, work place etc. The male preponderance observed in the present study is similar to 55% males & 45% females **(Singh B, et al., 2017, Ranchi, Jharkhand)[4];** 68.8% males & 31.2% females **(Mundri S, 2018, Ranchi, Jharkhand)[5];** 57.93% males & 42.06% females **(Gunjan NK** and **Kishore KA, 2021, North – West Delhi)[6];** 62.23% males & 37.77 females **(Goswami O, et al., 2021, Guwahati, Assam)[7];** 66.74% males & 33.26% females **(Karthick R, 2021, Salem, Tamil Nadu)[8];** 66.67% males & 33.26% females (**Yangala R and Pragna D, 2021, Adilabad, Telangana)[9];** but still lesser in comparison to 70.4% males & 29.6% females reported by **Vashishtha B, et al., 2019, Rohtak, Haryana[10].** The male : female ratio of present study is 1.97:1 which is quite comparable to 2.2:1, (**Mundri S, 2018, Ranchi, Jharkhand);** 2.1:1, (**Karthick R, 2021, Salem, Tamil Nadu)[8];**2:1, **(Yangala R and Pragna D, 2021, Adilabad, Telangana)[9]**but slightly higher than 1.22:1, (**Singh B, et al., 2017, Ranchi, Jharkhand)[4];** 1.38:1, (**Gunjan NK and Kishore KA, 2021, North – West Delhi)[6];** 1.65:1, (**Goswami O, et al., 2021, Guwahati, Assam)[7]**and little less in comparison to 2.38:1, (**Vashishtha B, et al., 2019, Rohtak, Haryana)[10].** Most fatalities and medico legal incidences report a male preponderance which is quite explainable by the fact that the males are a part of the active population in Indian society still more commonly in rural households. In the present study, 20–29 years age group was the most affected by fatal poisoning (34.54%) followed by 30–39 years (26.36%) and 40–49 years (18.18%). Thus the majority of poisoning fatalities in the present study were reported in 20–49 years age group (79.1%). The least affected age group were those of children less than 10 years of age and senior citizens. The adolescent population was 4th most commonly affected (10%). This is an expected observation. 50-59 years age range was the least affected (6.36%). These results are quite similar to other studies viz. majority cases in 15 – 30 years (**Singh B, et al., 2017, Ranchi, Jharkhand)[4];** 21 – 30 years **(Mundri S, 2018, Ranchi, Jharkhand)[5];** 15 – 29 years (**Gunjan NK and Kishore KA, 2021, North – West Delhi)[6];** 21 – 30 years (**Goswami O, et al., 2021, Guwahati, Assam[7]**and **Karthick R, 2021, Salem, Tamil Nadu[8]).** The result of present study are in contradiction to those of (**Yangala R and Pragna D, 2021, Adilabad, Telangana)** who reported a preponderance of poisoning deaths in 41 – 60 years (66.67% and 33.33% in each decade) followed by senior citizen (>60 years) age group (20%). The variation in study population and regional socio – cultural difference may have resulted in such variability. The mean age of subjects who died due to poisoning in the present study was 33.45 years ± 13.07 years ranging from 3 years to 76 years. 82 subjects (74.54%) were married persons in the present study, which is again similar to many

studies, 90% married persons reported by (**Yangala R and Pragna D, 2021, Adilabad, Telangana)**[9]and 60% married and 40% unmarried in **(Singh B, et al., 2017, Ranchi, Jharkhand)**[4] but the results are in contrast to 53.26% unmarried persons reported by (**Mundri S, 2018, Ranchi, Jharkhand)**[5]**.** Most authors have not considered marital status as a variable in the results of their studies. Hindus (90.99%) dominated in the present study followed by 5.45% Muslim & rest others. This is a quite obvious finding as the study was conducted in a Hindu majority region. The religion wise distribution of study participants has not been conducted in most other studies. India is a Hindu predominant country which explains the Hindu predominance in the present study. (**Singh B, et al., 2017, Ranchi, Jharkhand)**[4]also reported Hindu predominance followed by Christian & Muslim. There was no Christian death due to poisoning in the present study.

Domicile, Educational, Socio – Economic & Occupational Status

In the present study the rural population suffered more fatalities due to poisoning 56.36% in comparison to urban population 43.64%. The institute is a referral centre for a large area of Rajasthan and also caters to a large rural population which explains the rural preponderance. The rural predominance is also explainable by the fact that rural society has an easier access to substance that is poisonous but useful in agriculture and household activities. Rural predominance has also been reported by **Mundri S, 2018, Ranchi, Jharkhand**[5](39% rural, 28.4% urban, 27.6% semi urban region)**.** Most other studies have not evaluated the domicile wise distribution of cases of poisoning deaths.

More educated persons has succumbed to poisoning (73.64%) in comparison to uneducated (26.36%) persons in the present study. The most predominant group were graduates (29.29%), followed by high school and primary school educated people (17.27% each). 30% of the persons who died due to poisoning in the present study were unemployed (33 in number) which explains preponderance of educated person among poisoning death. Students (25.45%) were the next higher in numbers, followed by Housewives (19.03%). The employed and self-employed persons comprised the least affected group (12.72% each). Present study also reported preponderance of middle class persons (52.71%) in poisoning death. The study subjects were classified in lower, upper lower, lower middle, upper middle and upper class categories in regard to socio – economic status on basis of Modified Kuppuswamy Scale. Lower class was the next commonly affected (30%) by the poisoning deaths. The results of the present study are similar to **Singh B, et al., 2017, Ranchi, Jharkhand**[4]who also reported more literates (66%) in comparison to illiterate succumbed to poisoning. This study is also similar in regards to a higher preponderance of unemployed persons (50%) in comparison to employed persons although the reported proportions of unemployed individuals who died due to poisoning is slightly higher than present study (30%). They also reported majority of victims from middle socio economic status (85%) which is again slightly higher than the proportion of the present study (52.7%). The lower and higher classes are less in both studies with slight difference in proportion as in middle class. Rural preponderance has also been reported by **Mundri S, 2018, Ranchi, Jharkhand (**39%**)**[5]**; Goswami O, et al., 2021, Guwahati, Assam**[7] **(**63.8%**). Mundri S, 2018, Ranchi, Jharkhand (**46.8%**)**[5]and **Yangala R and Pragna D, 2021, Adilabad, Telangana**[9] **(**53.33%**)** and have also reported a preponderance of middle socio economic status among poisoning fatalities. Most of the studies have not elaborated these variables in relation to poisoning deaths. Considering the type of family it was observed in the present study that 51.81% fatalities were reported in those living in joint families followed by 36.38% cases from nuclear families, the least number of cases were seen in persons from extended nuclear families. Family status wise distribution has not been considered in most other studies. **Vashishtha B, et al., 2019, Rohtak, Haryana**[10]reported a preponderance of person from joint families (63.6%) among poisoning deaths which is similar to the result of present study (51.81%) joint & 63.62% (nuclear & extended nuclear families), least number of poisoning deaths (11.81%) were observed in extended nuclear families where grandparents, parents & children were living together.

Conclusion

Health education and strict legal enforcement of rules regarding storage, handling, transportation and commercial sale of poisonous substances should

be established to restrict the easy availability of toxic substances. Poison control centres with facility for prompt detection of various toxic substances shall be an asset in the direction of prevention of such mortalities. Public education regarding use & storage of poisons must be enhanced and counsellingcentres for persons going through economic or family distress may be helpful.

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Ethical approval: From the institutional ethical committee.

Conflict of interest: Nil

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