

Original Research Article

Trend of fatal poisoning in Kanpur: a two year autopsy based study

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ABSTRACT

Background: Kanpur is not only the biggest city of the Uttar Pradesh but also 9th most populated city of the India and is the main centre of commercial and industrial activities. Kanpur is situated at the bank of holy river Ganga. It is very crowded city and facing the problems of population influx from neighboring towns and villages. Apart from fame for industry, Kanpur lies between two rivers Ganga and Pandu. The land of Kanpur district is plain and fertile with Cultivable Barren Land 185480 Hectare. Kanpur is an only notified metropolitan area by UP Government under Code of Criminal Procedure 1973, and therefore has a Chief Metropolitan Magistrate. Poisoning is an important public health issue in India and worldwide. The present study is aimed to assess the epidemiological variables of fatal poisonings in Kanpur.

Methods: All medico legal autopsies of the city were conducted in the GSVM Medical College mortuary, Kanpur. During the study period, 582 cases of fatal poisoning were autopsied. Only autopsies with confirmed diagnosis of poisoning were included in this prospective study.

Results: A total of 7648 medico legal autopsies were performed at the aforementioned centre. Poisoning deaths comprised 582 cases (7.6%) of the total autopsies conducted during the study period.

Conclusions: Suicidal poisoning is accountable for majority of poisoning deaths in India. Societies at large owe a collective responsibility to this manner of death and mere condemnation or sympathy is not sufficient to curb these avoidable deaths.

Keywords: Fatal poisoning, Medico-legal autopsy, Pesticides, Suicide

INTRODUCTION

Indian economy is basically agrarian, and nearly three-quarters of the Indian population depends upon agriculture for a livelihood. Kanpur is a district in the state of Uttar Pradesh in India. According to the most recent census in 2011, the total population was 3,494,275 making it the 9th most populous district in India.¹⁻³ The city accommodates many industrial areas which provide easy accessibility of large number of chemicals and pesticides which in turn results in tremendous use of these agents for poisoning. The agricultural diversity of Kanpur has resulted in increased use of pesticides for

deliberate self-harm and accidental exposures. Suicide is recognized as a major manner of pesticide poisoning with increasing incidence among the younger generation, it is important to understand the magnitude and pattern of fatal poisonings in a particular region, which is helpful in early diagnosis and treatment, as well as in implementing the preventive measures.⁴ Thus, the ultimate aim of reducing morbidity and mortality due to poisoning can be achieved. The GSVM Medical College is the biggest amongst all medical colleges in Uttar Pradesh. The main hospital L. L. R Hospital along with its sister units e.g., Chest hospital, Infectious disease hospital, Children hospital, Maternity hospital, Cancer institute and

Cardiology institute, constitute one of the biggest patient care center in Asia.⁵ Every unnatural death whether suicidal, accidental or homicidal, represents a tragic waste of precious human life and resources.⁶ Death due to poisoning is no exception. Pesticides act as a common agent for suicidal purpose after trivial family problems in developing countries kill around 3 00,000 people each year.⁶⁻⁸ Suicidal deaths in industrialized countries are also caused by pesticide ingestion.^{6,7} Accidental poisoning occurs in manufacturers, users, children of users, packers, sprayers and due to contamination of food grains mixed with insecticides preserved for seedling purposes. Poisoning also occurs from fruits and vegetables the objective of the present study was to study the epidemiological variables in relation to fatal poisonings and determine the problem status of fatal poisonings in Kanpur, a metropolitan city of the Uttar Pradesh.⁸

METHODS

This prospective study was conducted at the GSVM Medical College and LLR and associated hospital’s mortuary, Kanpur (U.P) from July 2015 to June 2017. All medico legal autopsies of the city were conducted in the GSVM Medical College and LLR and associated hospital’s mortuary, Kanpur. During the study period, 582 cases of fatal poisoning were autopsied. Only autopsies with confirmed diagnosis of poisoning were included in the study. The viscera and body fluids were sent for chemical analysis to confirm the type of poison consumed. In addition to the autopsy findings, relevant details were obtained from the investigating authorities and the relatives of the deceased to conclude the manner of poisoning deaths. Information pertaining to the cases included in the present research was also gathered from the inquest documents furnished by the police and clinical case record of the diseased, Thereafter, all the details were analyzed and presented in graph, chart and tabular form.

RESULTS

A total of 7648 medico legal autopsies were performed between from July 2015 to June 2017 at the aforementioned centre. Poisoning deaths comprised 582 cases (7.6%) of the total autopsies conducted during the study period. Intentional self-poisoning (suicides) constituted 516 (90.8%) of these deaths, followed by unintentional (accidental) consumption of poison 30 (5.3%). No case of homicidal poisoning death was reported during the study period. In 23 (3.9%) cases the manner of death remained undetermined. Males outnumbered females constituting 367 (63.1%) and 215 (36.9%) of cases respectively with a male-female ratio of 1.7:1, and maximum numbers of cases (32.2%) were in the age group 21-30 years. Majority of the poisoning cases belong to the urban area (57.1%) and most of the victims were married (71%). Maximum number of poisoning death have been reported in the month of June (14.4%) followed by March (13.5%). On external

examination of the deceased characteristic odor was present in 175 (30%) cases, frothing at mouth and nose was present in 162 (27.8%) cases and cyanosis of extremities was present in 145 (24.9%) cases.

Table 1: Victim profile in poisoning fatalities (n=582).

		No.	%
Gender	Male	367	63.1
	Female	215	36.9
Age in years	0-20	104	17.8
	21-30	187	32.2
	31-40	128	21.9
	41-50	98	16.8
	51-60	48	8.4
	Above 60	17	2.9
Marital status	Married	416	71.0
	Unmarried	141	25.0
	Not known	025	04.0
Type of family	Nuclear	286	49.1
	Joint	238	40.8
	Extended	58	10.1
Substance use	Organophosphorus	134	23
	Alp/Zinc Sulphate	110	18.9
	Hair dye	128	21.9
	Drugs	35	6.3
	Toiletries	29	4.9
	Mosquito repellent	40	6.8
	Corrosive	38	6.5
	Dhatura	5	0.9
	Others(Miscellaneous)	63	10.8
Manner of death	Suicidal	529	90.8
	Accidental	030	05.3
	Undetermined	023	03.9

Table 2: Autopsy findings in poisoning fatalities (n=582).

		Present	%
Autopsy findings external	Characteristic Odor	175	30.0
	Frothing at mouth & nose	162	27.8
	Cyanosis of Extremities	145	24.9
Autopsy findings internal	Cerebral edema	395	67.8
	Pulmonary congestion	582	100
	Pulmonary edema	395	67.8
	Myocardial congestion	582	100
	Myocardial necrosis	88	15.1
	Congestion of gastro intestinal tract	582	100
	Petechial hemorrhage of gastro intestinal tract	582	100
	Congestion of liver	582	100
	Fatty infiltration of liver	108	18.5
	Congestion of kidney	582	100
	Congestion of spleen	582	100
	Necrosis of spleen	200	34.4
	Generalized visceral congestion	582	100

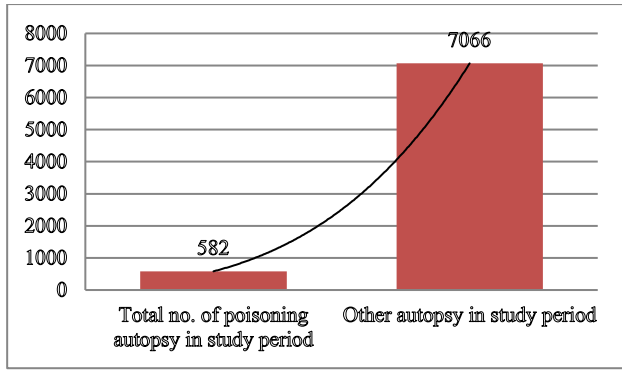


Figure 1: Incidence of poisoning fatalities among all unnatural death.

Table 3: Comparison of incidence of poisoning death of present study with various studies.^{6, 13, 14, 17-12}

Name of the author	Year	% of poisoning autopsy in study period
Dhattarwal SK et al ¹³	2001	26.6
Kapila P et al ¹⁴	2003	14.0
Gupta BD et al ¹⁷	2005	16.0
Kanchan T et al ¹⁸	2008	18.0
Haloi M et al ⁶	2013	3.9
Ahmad M et al ¹⁹	2014	5.8
Kumar A. et al ²⁰	2014	8.7
Koulapur V et al ²¹	2015	24.4
Chakrabarty P. et al ²²	2015	11.1
Present study	2017	7.6

On internal autopsy examination congestion of GIT with sub mucous petechial hemorrhage and generalized visceral congestion was present in all cases and pulmonary and cerebral edema was present in 395 (67.8%) cases. Maximum 134 (23%) of the poisoning cases were consumed Organophosphorus followed by hair dye 128 (21.9%). Minimum cases were of Dhatura poisoning 5 (0.9%). In all cases of death due to poisoning (n=582) the viscera were sent for chemical analysis. The reports of chemical analysis were received in all the cases. According to the reports, Organophosphorus was found in 123 (21.1%) cases followed by Organochlorous 101 (17.4%). In 358 cases (61.5%) no poison could be detected in chemical analysis.

DISCUSSION

In the present study, incidence of poisoning found to be (7.6%). Male victim 367 (63.1%) outnumbered female 215 (36.9%) as males lead a more stressful life than female due to family responsibilities.⁶⁻²² Maximum numbers of cases (32.2%) were in the age group 21-30 years due to the fact that at this period they are by nature more emotional, aggressive, intolerant and irrational.^{14,15,19,21} Married outnumbered 413 (71%) single 142 (25%), because after marriage economic problem of family results in frequent quarrels and familial

disharmony leading to increased stress.⁶⁻¹⁸ Maximum numbers (27.6%) of victims were educated up to high school level. In our study maximum number of poisoning death have been reported in the month of June (14.4%) followed by March (13.5%).

In our study it Reveals that on external examination of the deceased characteristic odor was present in 175 cases frothing at mouth and nose was present in 162 cases and cyanosis of extremities was present in 145 cases on internal autopsy examination congestion of GIT with sub mucous petechial hemorrhage and generalized visceral congestion was present in all cases and pulmonary and cerebral edema was present in 395 cases. The observation may be explained that it is possible that a person may die from the effects of poison, and yet none may be found in the body after death if the whole of the poison has disappeared from the lungs by evaporation, or has been removed from the stomach and intestines by vomiting and purging, and after absorption has been detoxified, conjugated and eliminated from the system by the kidneys and other channels. Certain vegetables poisons may not be detected in the viscera, and they do not have any reliable tests, while organic poisons, especially the alkaloids and glycosides, may, by oxidation during life or purifications after death, and split up into other substances, which have no characteristic reactions sufficient for their identification.

Table 4: Evaluation of male and female victim of present study with different studies.^{6,14-22}

Name of the Author	Year	% of Male victim	% of Female Victim
Kapila P et al ¹⁴	2003	66.0	34.0
Nigam M et al ¹⁵	2004	66.0	34.0
Dash SK et al ¹⁶	2005	53.0	47.0
Gupta BD et al ¹⁷	2005	62.1	37.9
Kanchan T et al ¹⁸	2008	73.3	26.7
Haloi M et al ⁶	2013	62.5	37.5
Ahmad M et al ¹⁹	2014	58.0	42.0
Kumar A. et al ²⁰	2014	71.5	28.4
Koulapur V et al ²¹	2015	72.3	27.6
Chakrabarty P. et al ²²	2015	64.2	35.7
Present study	2017	63.1	36.9

Modi saw cases in which there were definite signs of death from poisoning, although the chemical examiner failed to detect the poison in the viscera preserved for chemical analysis. It has, therefore been widely held by that in case where a poison has not been detected on chemical analysis, the judge, is deciding a charge of poisoning, should weigh in evidence the symptom, post mortem appearances and the moral evidence.²³ In the present study (90.8%) cases of poisoning were suicidal and (5.3%) were accidental. No case of homicidal poisoning was found during study period. The suicidal cases were more than the accidental cases in both the sexes. Our country but also seen in south Asian countries.

Table 5: Evaluation of the most common age group of the victims of death due to poisoning of the present study compare with other studies.^{6,14-17,19,21,22}

Name of the Author	Year	Most common age group	% of victim
Kapila P et al ¹⁴	2003	21-30 Years	52.3
Nigam M et al ¹⁵	2004	21-30 Years	32.4
Dash SK et al ¹⁶	2005	11- 20 Years	32.3
Gupta BD et al ¹⁷	2005	21-30 Years	43.1
Haloi M et al ⁶	2013	20-29 Years	33.3
Ahmad M et al ¹⁹	2014	21-30 Years	39.0
Koulapur V et al ²¹	2015	21-30 Years	38.1
Chakrabarty P. et al ²²	2015	40-49 Years	20.0
Present study	2017	21-30 Years	32.2

Table 6: Comparison of Autopsy findings of the present study with earlier studies.²⁴⁻²⁶

External autopsy findings	Present study	Job C et al ²⁴	Zariwal RC et al ²⁵	Datir SB et al ²⁶
Characteristic Odor at mouth	30.0%			46.0%
Frothing at mouth and nose	27.8%	63.0%	36%	59.0%
Cyanosis of Extremities	24.9%			31.0%
Internal autopsy findings				
Congestion of gastro intestinal tract	100%	76.3%		97%
Petechial hemorrhage of GIT	100%			42%
Congestion of liver	100%			95%
Congestion of kidney	100%			97%
Congestion of spleen	100%			97%
Pulmonary congestion	100%			93%
cerebral congestion	100%			98%
Cerebral edema	67.8%			76%
Pulmonary edema	67.8%	90%		98%

The present study findings are similar with most of the studies done in this field but few studies have some variation is also noted.^{6,13-17,19,20-22} The incidence of death due to poisoning among all unnatural death shows marked variation, the lack of uniformity may be depends on variety of factors such as urban or rural area, some

part of our country where the farmer used very toxic pesticides shows marked mortality, availability of good medical facility, awareness and strict regulation on sale of poisonous substance also play an important role. As we seen in the Comparison table the incidence of death due to poisoning ranges between less than (4%) to some study particularly in Punjab region as high as (26%) and this type of trends not only common in our country but also seen in south Asian countries.^{6,14}

CONCLUSION

Suicidal poisoning is accountable for majority of poisoning deaths in India. Individuals in rural India resort to this desperate measure when unable to cope with financial and personal crisis. Societies at large owe a collective responsibility to this manner of death and mere condemnation or sympathy is not sufficient to curb these avoidable deaths. Suicidal poisonings present a significant social and public health problem in our region. Preventive measure must be developed for high-risk groups identified in the study. Legislative control on the sale and use of pesticides, and stress management are recommended along with better health care facilities to prevent poisoning related death. It is customary to emphasize the role of psychiatric consultant in most of the background situations most important to death from poisoning, Establishment of specialized toxicological units for detection and management of poisoning cases at all hospitals and primary health care centers could considerably minimize the morbidity and mortality due to poisoning.

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