

A Clinico-Epidemiological Study of Cases of Poisoning in a Tertiary Care Centre of Southern Odisha

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ABSTRACT

Background: Poisoning is an important public health problem throughout the world. This study was conducted to study the clinico- epidemiological factors associated with poisoning and to suggest measures to reduce the associated morbidity and mortality.

Methodology: This cross-sectional study was conducted from August 2021 to December 2021 in a tertiary care hospital of Southern Odisha. The study subjects were selected purposively, all in-patients with a history of exposure to any form of poison were included. The sample size was calculated using the formula $Z (1 - \alpha/2)^2 pq/l^2$ where prevalence (p) was 41%, q is 59%, $Z (1 - \alpha/2) = 1.96$ at 95 % confidence interval and $l=10\%$. Information was collected in a pretested predesigned semi-structured questionnaire and analyzed using SPSS 17.

Result: A total of 102 patients of acute poisoning were included in the study. 56.9% patients were males and 43.1% were females. The most common age group involved was between 15 to 25 years (42.25%). Most of the cases of poisoning were from rural area (78.43%) and 46.1% of them were unemployed. Around 59.8% of the study participants had studied upto middle school and above. Poisoning was suicidal in majority (97.1 %) of the cases. The most common type of poison used was Organophosphorus (31.4%). Direct admission was done in 20.6 % of the cases. 61.8% of the patients were cured and discharged.

Conclusion: Stringent rules should be followed regarding the sale and availability of pesticides. Peripheral health care centers should be strengthened.

Key words: Poisoning, Organophosphorus compounds, Suicidal, Peripheral health care facilities, Stringent rules, Celphos

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INTRODUCTION

Poison is any substance which can cause ill health or death when inhaled or ingested or by local action. Exposure to a substance in toxic doses leading to clinical signs and symptoms is poisoning [1]. Poisoning is an important public health problem throughout the world causing morbidity, mortality along with hospitalization [2]. It can be accidental or intentional. Worldwide about three million acute poisoning cases occur every

year. Majority of the fatal poisoning cases are seen in agricultural workers in developing countries. In India about 5-6 deaths/lakh occur every year due to poisoning [1]. However data related to exact number of poisoning cases is lacking. In 2016 there were 2.3 lakh suicidal deaths in India [3]. The leading cause of death in the 15-39 years age group was suicide and majority of the deaths were among women [4].

Common factors associated with poisoning are ignorance, socio-economic factors, poverty, financial problems, availability of various toxic substances, over-the-counter drugs, stress, influence of mass media and also peer pressure. Gender based issues also play a role in the intentional poisoning case. Easy availability of poisons and a variety of poisonous wild plants results in both suicidal and homicidal poisoning. India is an agriculture-based country and pesticides are widely used for agricultural purposes. These pesticides which

are primarily organo phosphorous substances are the most commonly used substances causing poisoning in India [1,5]. The pattern and risks of poisoning accidents change with time and place. Therefore, epidemiological data of every region is required to determine the extent and characteristics of the problem, according to which preventive measures can be taken. Information related to clinical profile and outcome of poisoning is instrumental to understand the problem and help in better management of the patients.

There are limited studies on poisoning in Odisha and Ganjam. The objective of the study was to study the clinico-epidemiological factors associated with poisoning and to suggest measures to reduce the associated morbidity and mortality.

MATERIALS AND METHODS

Study design: Cross-sectional study.

Study period: August 2021-December 2021.

Study Population: Patients of poisoning admitted to the medicine ward of MKCG Medical College, Berhampur

Sample Size: Taking prevalence (p) as 41% (5), sample size was calculated as follows:

$$N = Z (1 - \alpha/2)^2 pq/l^2$$

Where Z (1- $\alpha/2$) =1.96 at 95 % confidence interval, q=100 - p=59 %, l= 10 %

Adding non response rate 10%, N= 102

Sampling method: Purposive

Inclusion criteria

Patients willing to participate in the study.

Exclusion criteria

Pregnant women, cases of food poisoning.

Detailed history was taken from the patients admitted to the IPD in a pretested predesigned semi structured questionnaire. Information was collected regarding the socio-demographic characteristics, type of poison, route of poisoning, reason of poisoning, date and time of exposure to the poison, admission details and the outcome of treatment.

Analysis was done using SPSS 17. Descriptive profile analysis was expressed as frequency and percentages. Chi square statistic was used for testing association between variables.

The study was approved by the Institutional Ethics Committee vide No 860 dated 20-07-2021. Informed consent was obtained from all study participants.

RESULTS

A total of 102 patients of poisoning were included in the study based on inclusion and exclusion criteria. In the present study, 56.9% patients were males and 43.1%

were females. The most common age group involved was between 15 to 25 years (42.25%) followed by 25-35 years (25.5%) (Table 1). Most of the case of poisoning were from rural areas (78.43%) and 21.6% from urban areas. About 46.1 % of them were unemployed. Around 59.8% of the study participants had studied upto middle school and above. However, 14.7% of the participants were illiterate (Table 1).

Poisoning was suicidal in majority (97.1 %) of the cases and accidental in only 2.9% of cases. There were no homicidal cases of poisoning in the current study. The most common type of poison used was organophosphorus compounds (43.13%) followed by Celphos (35.29%) (Table-2). Place of residence was associated with the type of poison patients had consumed. Use of organophosphorus compounds was more prevalent in the rural areas as compared to the urban areas and the difference was statistically significant (Table 3). Familial disharmony was the cause of poisoning in 79.4% of the cases. Love affairs, educational and financial problems accounted for 14.7% of cases (Table 4). Majority (96.1%) of the patients were given the initial treatment within 6 hours. However initial treatment was not started till 12 hours in 2% of the cases (Table 5). Direct admission was done in only 20.6 % of the cases and the rest were

Table 1: Sociodemographic profile of study participants (n=102).

Variable	Frequency	Percentage
Age group (in years)		
15-25	43	42.2
25-35	26	25.5
35-45	14	13.7
45-55	9	8.8
55-65	7	6.9
≥ 65	3	2.9
Sex		
Male	58	56.9
Female	48	43.1
Occupation		
Professional	2	2
Semi-professional	4	3.9
Clerical/ Shop owner/ farmer	10	9.8
Skilled worker	15	14.7
Unskilled worker	24	23.5
Unemployed	47	46.1
Education		
PG or Graduate	4	3.9
Intermediate	25	24.5
High school	32	31.4
Middle school	16	15.7
Primary school	10	9.8
Illiterate	15	14.7

Table 2: Distribution of study participants according to type of poison (n=102).

Type of poison	Frequency	Percentage
Organophosphorus	44	43.13
Celphos	36	35.29
Others	22	21.56

referred from various peripheral hospitals (79.4%). The cause of referral from peripheral hospitals to medical college in our study was because of the serious condition of the patient in 69.6% of the cases. Other reasons for referral were for better treatment and for convenience in 29.4 % and 1% of the cases respectively. Referral was more among the rural population as compared to urban population and the difference was statistically significant ($p=0.039$) (Table 6).

About 43.1%, 34.3% and 22.5% of the patients stayed in the hospital for 3-7 days, <72 hours and >7 days respectively. Around 61.8% of the patients included in the study were cured and discharged, 25.5 % left against medical advice, 11.85 died and only 1% referred (Table 7).

Table 3: Association between place of residence and type of admission.

Place of residence	Type of admission		Total
	Direct	Referred	
Rural	13 (16.25 %)	67 (83.25 %)	80
Urban	8 (36.36 %)	14 (63.63 %)	22
Total	21	81	102
$\chi^2=4.270$ $P=0.039$			

Table 4: Distribution of study participants according to cause of poisoning.

Cause of poisoning	Frequency	Percentage
Financial	3	2.9
Educational	5	4.9
Familial disharmony	81	79.4
Love affairs	7	6.9
Others	6	5.9

Table 5: Time of exposure to initial treatment.

Time of exposure to initial treatment	Frequency	Percentage
< 6 hours	98	96.1
6-12 hours	2	2
12-24 hours	1	1
>24 hours	1	1

Table 6: Association between place of residence and type of admission.

Place of residence	Type of admission		Total
	Direct	Referred	
Rural	13 (16.25 %)	67 (83.25 %)	80
Urban	8 (36.36 %)	14 (63.63 %)	22
Total	21	81	102
$\chi^2=4.270$ $P=.039$			

Table 7: Association between residence and type of poison.

Residence	Type of poison			Total
	Organophosphorus	Celphos	Others	
Rural	40 (50%)	25 (31.25%)	15 (18.75%)	80
Urban	4 (18.18%)	11 (50%)	7 (31.18%)	22
Total	44	36	22	102
$\chi^2=7.135$ $P=0.028$				

*Others include organ chlorine compounds, phenyl, bathroom cleaner, rodenticides, oleander and sedatives

DISCUSSION

Information related to epidemiological factors and clinical aspects of poisoning will help develop appropriate treatment modalities and effective strategies for prevention of the morbidities, mortalities and the economic impact associated with poisoning.

There was male preponderance in our study and similar findings were observed by Prayag et al. [6] and Churi et al [7] whereas female preponderance was reported in a study conducted in South-eastern Odisha by Shagun Thakur et al. [8] The high incidence among males could be because they are more exposed to stress and occupational hazards as compared to females. Even accessibility of poisons is easier for the males as compared to females. Similar reason was stated by Prayag et al. in their study conducted at Belagavi, Karnataka [6].

The most common age group involved in our study was between 15-25 years followed by 25-35 years. This could be because of the fact that this age group is most vulnerable to various stressors like examination failure, unemployment, marital problems etc. The most common age group involved was between 20 to 40 years in a study by Vedpathak et al. [9] and Hemani Ahuja et al. [2] at Maharashtra and northern India respectively. The reason attributed by Vedpathak was involvement of adults especially males in outdoor activities and more exposure to stress and strain associated with occupation [9].

Majority of the patients of acute poisoning were from rural areas in the current study which is similar to findings by Vedpathak et al. [9] and Kaur et al. [10] contrary to the findings by Kora et al. [11]. Most (46%) of the patients were unemployed in the present study. The increase in the number of poisoning cases could be because of the economic crisis people had to face as a result of lockdown due to covid. Majority were farmers followed by students in a study by Vedpathak et al. [9].

The intent of poisoning was suicidal in majority of the cases. The findings of this study were consistent with the findings of Debbarma et al [12]. The most common type of poison used was Organophosphorus compounds. This was in accordance to findings in studies conducted by Hemani Ahuja et al. [2] and Kora et al. [11]. Agriculture being the major occupation in our region, easy availability of organophosphorous compounds at cheap rate, could be the reason for preference of these compounds. The use of organophosphorus compounds and Celphos for poisoning was more in rural areas as compared to urban areas and the difference was significant ($P=0.028$).

The most common cause of poisoning was familial disharmony. Majority of the patients were given the initial treatment within 6 hours in this study which was similar to findings in a study conducted at West Bengal by Banerjee et al. [13]. However, most of the patients were admitted within <3 hours of consumption in a study by Vedpathak et al. [9] in Maharashtra. Direct admission was done in only 20.6 % of the cases and the rest were referred from various peripheral hospitals (79.4%) The

cause of referral from peripheral hospitals to medical college in our study was because of the serious condition of the patient in 69.6% of the cases. However, the reason of referral was for better treatment and for convenience in 29.4 % and 1% of the cases respectively. Referral admission was more among the rural population as compared to the urban population and the difference was statistically significant ($P=0.039$).

Maximum number of poisoning cases stayed in the hospital for 3-7 days. This was in accordance with studies conducted in South-Eastern Odisha by Shagun Thakur et al. [8]. The mortality rate was 11.76% in the current study which was similar to findings by Vedpathak et al [9]. Mortality rate was 16.24% and 18% respectively in studies conducted by Banerjee et al. [13] and Hemani Ahuja et al. [2] whereas it was as low as 4.72 % in a study conducted by Kora et al. in Southern India and they have stated that the mortality rate directly depended on the time at which the patient received the treatment [11].

CONCLUSION

Life skill education and skill development should be emphasized specially for the unemployed rural youth so that they become financially independent and will be able to solve most of their problems. Psychiatric counseling should be done for those with suicidal tendency and mental health component should be strengthened at all peripheral health care facilities. Stringent rules should be followed regarding the sale and availability of organophosphorus compounds, Celphos and other pesticides. Peripheral health care centers should be strengthened and upgraded so that emergency management of acute poisoning cases can be done immediately and referral to higher centers can be minimized.

CONFLICT OF INTEREST

Nil.

SOURCE OF FUNDING

Nil.

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