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ORIGINAL ARTICLE

Patterns and Clinical Outcomes of Poisoning Among Poisoning Cases Presented in a Hospital: A Retrospective Study

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Abstract

Introduction: Poisoning is one of the major health and health-related problems of our nations. It causes significant disease and death in many countries. In developing countries, the incidence of poisoning is increasing resulting in significant threats including hospitalization and huge financial crisis. This study aimed to assess the pattern of acute poisoning cases and their management at the emergency department of the hospital.

Methods: Study design was institution based retrospective cross sectional. All patients who presented with poisoning conditions between September 2016 and August 2020 were included in the study. Data was collected using a data extraction form from the case records. Data were analyzed using SPSS 20.

Results: In this study, most cases were among females, young age groups, and rural residents. The prevalence of acute poisoning per number of people presenting to the emergency departments in the hospitals was 0.52%. More than half (63.06%) of the patients were poisoned intentionally (deliberately), and the mortality rate due to poisoning was 2.5%.

Discussion and Conclusion: Among 360 acute poisoning cases, two third (63.06%) were intentional poisoning cases. Organophosphate poisoning accounts greater than one third (40.56%) of the total poisoning cases; the three major reasons for intentional poisoning were unemployment, marital disharmony, and quarrel with family.

Keywords: Acute poisoning; Emergency department; Outcome

According to Dorland's medical dictionary, poisons are substances that can cause damage to organisms.[1] It can be ingested, inhaled, injected, or absorbed through the skin.[2] The expansion in pharmaceutical and chemical industry make that every individual is exposed to toxic chemicals in sub-toxic doses, technology & social development, absence of facilities for safe storage & disposal and peer pressures made to an increase exposure to the chemicals and increased vulnerability of poisoning.[3–6]

The causes of poisoning can be inhabitant and manufacturing and unintentional and intentional. Purposeful self-poisoning has reached epidemic proportions in parts of underdeveloped world, where the toxicity of available poisons and sparse medical facilities ensure a high death rate.[7–9] The unintended or unplanned poisoning is common among children and contributes to increased childhood disease and death.[10]

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More than 300,000 people die every year from pesticide poisoning all over the world. The commonest causes are organophosphates and aluminum phosphide (ALP).[7] The World Health Organization has estimated that more than 200,000 people die each year from pesticide poisoning only and the death rates of 20%.[11]

Since agriculture is the main occupation in Ethiopia, insecticides are used to a greater extent and poisonings with such products are becoming very common. A recent study undertaken in Addis Ababa, capital of Ethiopia, reveals that organophosphate was the leading cause of poisoning which accounts (43.1%), whereas agricultural input pesticides were most cause of deaths.[9]

Management of acute poisoning includes prevention of cross-contamination, recognition of toxin through history or physical examination, supportive and symptomatic care, cleansing, removal, and antidote therapy.[12]

Despite rapidly growing role of chemicals in the country, the lack of poison centers and toxicological expertise among health professionals may increase the likelihood of adverse health impacts of acute poisoning to the public.[9]

Studies regarding the pattern of poisoning in a particular area would facilitate to identify the risk factors and allocate early diagnosis and management of such cases, which in turn should reduce morbidity and mortality in the public.[9]

Materials and Methods

Study Design and Data Collection

This retrospective, cross-sectional study was conducted at tertiary hospital that serves approximately 2.1 million patients per year. Since the total population is small in size census method used by taking all case of acute poisoning during study period. The medical records of all patients who presented at the emergency department due to acute poisoning during the study period of September 2013 to August 2016 were included. Cases of poisoning with incomplete patient information were excluded. The dependent variable was acute poisoning; independent variables were age, sex, residence, means of poisoning, type of poisoning, and season of the poisoning event. The data were collected by trained data collectors using a data collection tool, and the data collection process was supervised by the investigators.

Data Analysis

After checking the data for clarity and completeness, IBM SPSS Statistics for Windows, Version 20.0 software (IBM Corp., Armonk, NY, USA) was used to perform the statistical analysis. Descriptive statistic are presented as frequency percentage.

Table 1. Sociodemographic characteristics of patients with acute poisoning at the emergency department of Shashamane Referral Hospital, 2021 (n=360)

Sociodemographic characteristics	Frequency	Percent
Sex		
Male	170	47.22
Female	190	52.78
Age		
<15	41	11.39
16–30	187	51.94
31–45	90	25.00
46–60	27	7.50
>61	15	4.17
Residence		
Urban	203	56.39
Rural	157	43.61

Ethical Considerations

Ethics approval for this study was granted (no. HHSC - 063/2021) and consent was obtained from the administrative bodies of the hospital. Patient confidentiality was observed throughout the study.

Results

A total of 73,330 patients presented at the hospital emergency department between September 1, 2016 and August 30, 2020. In order to determine the magnitude of the problem, it is important to know and understand the prevalence. The results of this study found a rate of acute poisoning among those presenting at hospital emergency departments of 0.52% (382/73,330). Of the 382 cases diagnosed with acute poisoning, only 360 patients charts had complete information. The majority (52.78%) of the patients were female. More than half (51.94%) were from the age group of 16–30 years, and 70.6% of the patients were from rural areas (Table 1). In this study, 227 (63.06%) cases were reported as intentional poisoning, while 84 (23.33%) were unintentional (accidental), and in 49 (13.61%) cases the reason was unspecified. The most common reason documented for acute poisoning was unemployment, followed by marital disharmony (Fig. 1).

The largest proportion of reported acute poisoning cases [174 (48.33%)] occurred between June and August (summer), followed by the spring season of March to May [95 cases (26.39%)], the autumn season of September to November [52 cases (14.44%)], and the winter season of December to February with 39 (10.83%) cases.

Table 2. Common poisoning agents identified at the emergency department of Shashamane Referral Hospital, 2021 (n=360)

Data variables	Frequency	Percent
Organophosphate materials	146	40.56
Bleaching agents	62	17.22
Herbicides	31	8.61
Alcohol intoxication	21	5.83
Carbon monoxides	6	1.67
Traditional medicines	7	1.94
Others	13	3.61
Pharmaceuticals		
Benzodiazepines	33	9.17
Antipsychotics	13	3.61
Barbiturates	22	6.11
Others med. (antibiotics and analgesics)	6	1.67

Table 3. Management practice of acute poisoning at emergency department of Shashamane Referral Hospital, 2021 (n=360)

Data variables	Frequency	Percent
Fluid resuscitation	211	58.61
Chelation with activated charcoal	69	19.17
Antidote management	32	8.9
Gastric lavage	34	9.45
Medication other than antidote	14	3.89

The most common poisonous agents were organophosphates and bleaching agents, and the pharmaceutical agent most seen was a benzodiazepine and it accounts 9% (Table 2).

Most patients [221 (58.61%)] received fluid resuscitation management (Table 3). The majority [345 (95.8%)] of the patients survived without disability; the rate of acute poisoning fatality was 2.5% (Fig. 2).

Discussion

In this study, most cases were among females, young age groups, and rural residents. This is in line with the study done in Sheri-Kashmir Institute of Medical Sciences, India;[13] study done in Dessie Referral Hospital, northeast Ethiopia;[14] and other study done in India,[15] whereas it is opposite to that of the study done in Greece[16] and Gondar, Ethiopia,[12] which showed that acute poisoning is a highly distribution in urban inhabitants. The reason for the high rate of poisoning in young adults might be explained by their vulnerability to stressful life situations and immaturity to cope up with the situation; females, might be because some situations such as family disharmony could be frustrating them and rural residents, it might be this population has a lower literacy rate, resulting in a lack of knowledge and skills related to handling poisoning agents safely.

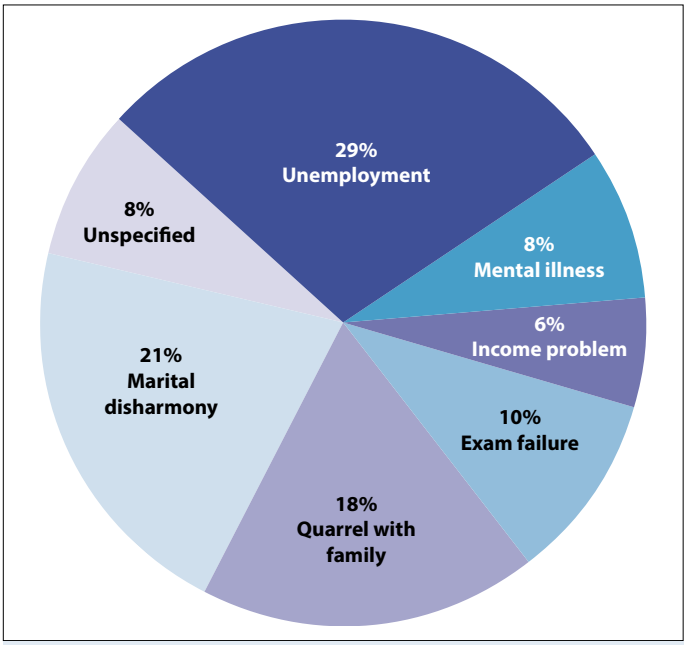

Figure 1. A pie chart that shows the reasons for acute poisoning among patients at emergency department of Shashamane Referral Hospital, between September 2016 and August 2020 (n=360).

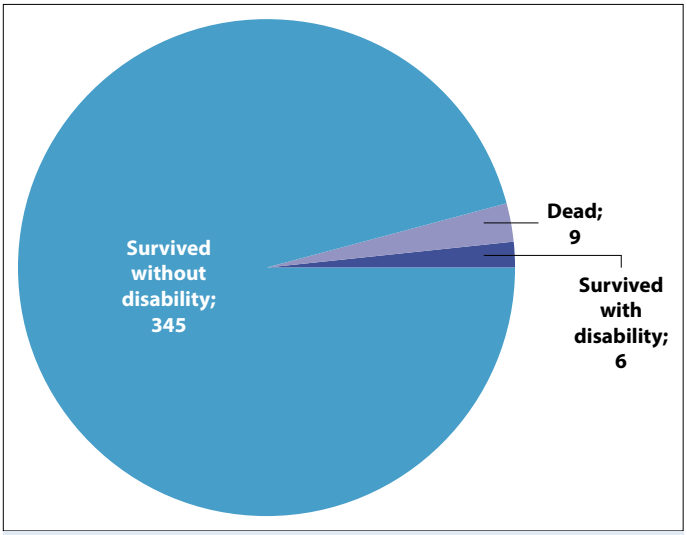

Figure 2. Pie chart indicates the outcomes of acute poisoning after treatment at the emergency department of Shashamane Referral Hospital, between September 2016 and August 2020 (n=360).

In this study, the prevalence of acute poisoning per number of people presenting to the emergency departments in the hospitals was 0.52%. This finding is similar with other studies done in Ethiopia.[8,9]

In this study, 63.06% of patients were poisoned intentionally (deliberately). This study compared with other studies done in Nepal, India, and Addis Ababa, Ethiopia, showed that de-

liberate poisoning is more common, accounting for 77.8%, 79.2%, and 96.6% of poisoning cases, respectively.[9,15,17] An increase in the number of self-poisonings may be due to the following factors: lack of employment, breakup in the family support system, failure of love affairs, an individual's frustrations, inadequacy to cope with some immediate situation, impulsive behaviors, stress due to job and family, etc.

In our study, the mortality rate due to poisoning was 2.5%. It is similar with the study done in Gondar, Ethiopia (2.4%). Nevertheless, it is lower than the study done in India (13.6%) and Zimbabwe generally it showed a higher case fatality ratio.[18,19] The observed disparity between the two studies might be due to the difference of socioeconomic status, availability and accessibility of poisoning agents, and methodological differences.

Limitations

In this study, poisoning was not confirmed using blood analysis instead it was report base by families. In addition, the study was hospital based retrospective, so it is difficult to generalize for the entire population.

Conclusion

Among 360 acute poisoning cases, greater than half (63.06%) were intentional poisoning cases. Organophosphate poisoning accounts 40.56% of the total of deliberate poisoning cases. The main reasons for intentional poisoning were unemployment, marital disharmony, and quarrel with family.

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