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Prevalence and Patterns of Poisoning Cases among Patients Presented to Jimma University Specialized Hospital: A Five Years Retrospective Data Analysis

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Abstract

A poison is any substance that is harmful to the body when ingested, inhaled, injected, or absorbed through skin. Poisonings are either intentional or accidental. According to World Health Organization data, in 2004 Estimated 346,000 people died worldwide from unintentional poisoning. Epidemiological Data on this important health issues are scarce in Ethiopia. This study aimed to assess the pattern of poisonings and the approaches employed for the management of poisoning and outcomes of poisoning cases in Jimma University specialized hospital. A facility based cross sectional retrospective data analysis was done. The reviewed data includes patient's medical record and additional laboratory data sets from January, 2010 to December 31, 2015. Majority of patients 186 (78.9%) were in the age group between 12-30 years and females were more affected (65.4%). The commonest poisoning agents used were household cleaning agents (40.4%) followed by Organophosphates (24%). Most cases (76.7%) were intentional exposures and most patients (96.1%) presented to hospital in the first 24 h and psychiatric referral was made for 49.8% of patients. Supportive cares and GI decontamination were the approaches employed for management. Intentional exposure accounted for the majority of cases. Linkage of patients with suicidal attempts to appropriate mental health service should be improved.

Keywords Jimma university specialized hospital; Prevalence; Poisoned cases; Retrospective data analysis

Introduction

Poison is a substance capable of producing damage or dysfunction in the body by its chemical activity. It can enter the body in various ways to produce general or local effects (limited to the eyes, skin, lungs, etc.). All cases of poisoning that result from the accidental use of a drug and chemical substance or the use of drugs by children due to lack of curiosity are known as accidental or non-intentional poisoning. Poisoning is a qualitative term used to define the potential of a chemical substance in acting adversely or deleteriously on the body [1].

After checking the structured checklist for their completeness and brief training for data collectors on how to extract the necessary information from the cards, the principal investigator has an ongoing supervision each day during the data collection to ensure the quality of data by checking filled formats for their completeness and consistency.

Around 61% of poisoning cases presented to JUSH their clinical presentation includes either vomiting or epigastric pain only or both symptoms at the same time each accounting for 19.2%, 10.6%, and 31.7% respectively. Thirty (12.5%) patients had altered level of consciousness, patients who had CO poisoning had breathing difficulty

Organophosphate (OP) pesticides were responsible for the majority of deaths in most series of self-poisoning cases, particularly those from rural areas. OP compounds are a diverse group of chemicals used in both domestic and industrial settings. Examples of OPs include insecticides (Malathion, parathion, diazinon and fenthion), nerve gases (soman, sarin, tabu,), ophthalmic agents (echothiophate, isoflurophate) and anti-helminthic (trichlorfon) [6].

Poisoning either accidental or intentional is a significant global public health problem. According to world health organization (WHO) data, in 2004 an estimated 346,000 people die worldwide from unintentional poisoning, of this death, 91% occurred in low and middle-income countries. Nearly a million people die each year as result of suicide and chemicals account for a significant number of these deaths. For example, it is estimated that deliberate ingestion of pesticides causes 370,000 deaths each year [7].

Every day in the USA, nearly 82 people die as a result of unintentional poisoning and another 1,941 are treated in Emergency department (ED). In 2007, 29,846 (74%) of the total 40,059 poisoning deaths in the USA were unintentional, and 3,770 (9%) were of undetermined intentional (CDC 2010) [8].

Data on suicide and the methods used for suicide on the African continent are sparse. Data on hospital admissions (fatal and non-fatal) for self-poisoning indicates that pesticides were used in 46% of episodes in Kampala (Uganda) in 2002, about 50% in Nairobi (Kenya 1980), 3-30% in Nigeria in the 1970-80, about 40% in the major hospitals in Zimbabwe in the 1980s and 90s and in about 50% in Ethiopia in the early 1980s [9].

Millions of people are exposed to danger by hazardous occupational practices and unsafe storage. However, it is deliberate self-poisoning that causes the great majority of deaths and the immense strain that pesticides put on hospital services, particularly in Asia. In 1990 Jeyaratnam estimated that self-harm resulted in 2 million cases of

poisoning each year with 200,000 deaths. In contrast, accidental and occupational exposures were estimated to cause 1 million cases of 20,000 deaths. Many studies have shown that deliberate self-poisoning has a far higher mortality than accidental poisoning [10,11].

The other factors to be considered in the study of poisoning cases are of children. Children are generally curious in nature and they try different things due to their nature [12]. This trying may cause serious accidents to them. The most common type of accidental poisoning associated with children was found to be due to hydrocarbons (Bharati 2001 and Lohani 1998). It has been found that even a small amount of hydrocarbon, for example, 1-5 ml of kerosene can produce severe or even fatal symptomatology [5]. Studies done in Tikur Anbessa University specialized hospital and Gondar University in 2010 and 2006 respectively showed that the case fatality rate from acute poisoning was about 8.5% and 2.4% respectively [13,14].

Materials and Methods

Study settings

The study was conducted at Jimma University Specialized Hospital (JUSH) found 354 km away from Addis Ababa. JUSH is one of the few teaching Hospitals in the country, and the only referral hospital in the southwest part of Ethiopia. It has four major clinical departments (Internal medicine, surgery, pediatrics and Gyne/Obs) and four minor departments (psychiatry, Ophthalmology, Dermatology, and Dentistry) along with other follow up and special clinics for specific diseases and it provides services for approximately 9,000 inpatient and 80,000 outpatient attendances a year from the catchment population of about 15 million people. It has a bed capacity of 450 and 750 staffs of both supportive and professional. The study was conducted from August 15-20 2015. A facility based cross-sectional study design were used and data was collected retrospectively on poisoning cases from patients records among attendants of JUSH from January 1, 2010 to December 31, 2015. A total of 385 individual poisoning medical histories were retrospectively analyzed from their medical record [15].

Data collection

After preparing a data collection checklist; cards were collected from the card office by workers in the office. For this purpose, the card number in the registration book of any OPD and wards were used. After selecting the cards, the structured format was filled by health officers and nurses after brief training on how to extract the necessary information from the medical record.

Data quality control

After checking the structured checklist for their completeness and brief training for data collectors on how to extract the necessary information from the cards, the principal investigator has an ongoing supervision each day during the data collection to ensure the quality of data by checking filled formats for their completeness and consistency.

Data analysis

The collected data was analyzed with the help of computer using MS office application software and the results were presented by using tables, figures, and different charts. A chi-square test analysis was used to measure the presence of an association with the outcome variable.

Ethical considerations

An ethical clearance was obtained from Jimma university ethical clearance office and a letter of cooperation from Jimma University medical school to JUSH was sent. The objective of the study was briefed to the documentation department staffs. Documents were also kept confidential.

Results

Socio-demographic characteristics

A five years retrospective study of poisoning cases presented to JUSH from January 1, 2010, to January 1, 2015, was made from 236 patients medical records and the study revealed that the majority of patients were between the age range of 12-20 years which accounted for 109 (46.2%), followed by the age range from 21-30 years representing 32.7% (77) of all cases. And there were 25 (10.6%) under 5 children. Regarding sex of patients, the majority were females accounting for 65.4% (154) of all cases (Table 1).

Age (in years)	Sex		Total No (%)
	Male	Female	
	No (%)	No (%)	
<5	9 (3.85%)	16 (6.73%)	25 (10.6%)
6-11	7 (2.82%)	2 (1%)	9 (3.82%)
12-20	32 (13.46%)	77 (32.7%)	109 (46.2%)
21-30	25 (10.6%)	52 (22.1%)	77 (32.7%)
31-40	9 (3.85%)	7 (2.89%)	16 (5.8%)
Total	82 (34.6%)	154 (65.4%)	236 (100%)

Table 1: Percentage distribution of poisoning cases who attended JUSH by age and sex, from January 1, 2010 to January 1, 2015.

Causes of poisoning

The analysis of patient's records revealed that the commonest poisoning agents used were household cleaning agents followed by organophosphates and different class of drugs accounting for 40.4% (95), 24% (57), and 15.67% (37) respectively. The remainders of cases were accounted for 11 cases of carbon monoxide poisoning, 11 cases of alcohol intoxication, 7 cases of hydrocarbons and 18 other cases (Table 2).

Items	No (%)
Organophosphates (rat poison , malathion)	57 (24%)
House hold cleansing agents (bleach etc.)	95 (40.4%)
Hydrocarbons	7 (2.9%)
Drugs Acetaminophen	16 (6.7%)
Benzodiazepines	7 (2.9%)
Phenobarbitone	5 (1.92%)
Other Drugs	9 (3.84%)
Alcohol	11 (4.8%)
Carbon monoxide	11 (4.8%)
Other	18 (7.7%)
Total	236 (100%)

Table 2: Distribution of common causes of poisoning cases who attended JUSH from January 1, 2010 to January 1, 2015.

Predisposing factor

From 181 intentional exposures included in this analysis 65.2% (118) were suicidal attempts following a social conflict from which females account 41.2% (56) and 21.55% (39) of cases had associated suspected psychiatric illnesses, although the specific psychiatric illnesses were not specified, and in the remaining cases the comorbid conditions were unspecified (Table 3).

Underlying causes	No (%)
Psychiatric problems	39 (21.55%)
Substance abuse	14 (7.73%)
Social conflict (family, marital)	118 (65.2%)
Others	5 (2.76%)
Unspecified	5 (2.76%)

Table 3: Possible predisposing factor of poisoning among patients who presented to JUSH from January 1, 2010 to January 1, 2015.

Route of exposure

The route of exposure in almost all cases was oral and it accounted for 94.25% (222) of all cases. Inhalational exposure after CO poisoning accounted for the remaining cases included in this retrospective analysis (Table 4).

Route of exposure	No (%)
Oral ingestion	222 (94.2%)
Inhalation	12 (4.8%)
Eye	2 (1%)
Total	236 (100%)

Table 4: Frequency distribution of route of exposure to poisoning among patients who presented to JUSH from January 1, 2010 to January 1, 2015.

Clinical presentations

Around 61% of poisoning cases presented to JUSH their clinical presentation includes either vomiting or epigastric pain only or both symptoms at the same time each accounting for 19.2%, 10.6%, and 31.7% respectively. Thirty (12.5%) patients had altered level of consciousness, patients who had CO poisoning had breathing difficulty at presentation and 27 (11.5%) patients had no symptoms at presentation. Other clinical presenting associated symptoms were hypotension, fever and headache (Table 5).

Clinical Presentation	No (%)
Vomiting and Epigastric pain	75 (31.7%)
Vomiting	45 (19.2%)
Epigastric pain	25 (10.6%)
Altered Consciousness	30 (12.5%)
Other	34 (14.42%)
No symptoms	27 (11.5%)

Table 5: Frequency distribution of clinical presentation of patient's poisoning cases who attended JUSH from January 1, 2010 to January 1, 2015.

Associations of management with outcome of the patient

Type of management given to presenting poisoned cases has a significant effect on the outcome of the patent. Out of 221 (93.6%) who get improved 144 (65.2%) managed by GI decontamination, antacids and antidote so, the way of managing poisoned cases has a significant effect on the outcome of the patent (p-value=<0.001). GI decontamination without antacids and antidotes were used on 8 (3.38%) of cases though the outcome is death. Observation as one way of managing poisoned cases had an improved outcome on 27 (11.44%) of cases (Table 6).

Type of management	Outcome		Statistical test
	Improved	Death	
GI Decontamination, antacids and antidote	144 (65.2)	4 (1.69)	χ^2 35.52 (p-value 0.001) df=3
GI Decontamination only	30 (12.7)	8 (3.38)	
Oxygen support	4 (1.69)	3 (1.27)	

Observation	27 (11.44)	2 (1.07)	

Table 6: Association of way of management poisoned cases with outcome of the patient who presented to JUSH from January 1, 2010 to January 1, 2015.

Association of time of presentation with outcome

From the total of poisoned cases, only 124 (27.1%) patients were presented within one hour and their outcome was improved. Poisoned cases who arrive lately after the incidence of poisoning that is within 1-24 h 92 (64.9%) were not improved as their outcome was death (p-value=0.047) (Table 7).

Time of presentation	Outcome		Statistical test
	Improved	Death	
<30 min	65 (2.6)	1 (0.5)	
30 min to 1 h	59 (24.5)	2 (2.1)	
1 h to 24 h	92 (64.9)	5 (2.6)	χ^2 12.96 (p-value 0.0047) df=3
>24 h	9 (2.1)	3 (0.5)	

Table 7: Association of time of presentation and outcome of patient with poisoning who presented to JUSH from January 1, 2010 to January 1, 2015.

Circumstance of poisoning

Majority 76.7% (181) of poisoned cases were exposed themselves intentionally for the suicidal attempt, 18.22% (43) cases were accidental exposures. The accidental exposures were mostly from those of under 12 years old children and cases of CO poisoning. Unspecified circumstance for poisoning has occurred for small number (5.08%) of cases (Figure 1).

Patient outcome

The analysis of patient's records revealed that 221 (93.6%) patients were followed at OPD level and discharged improved with a psychiatric referral made for only 110 (49.8%) patients and specific education on prevention was provided for 147 (66.5%) patients upon discharge. There were 15 (6.4%) deaths, 12 were following intentional organophosphate exposure out of this eight cases were males. Three cases were because of carbon monoxide poisoning (Figure 2). The Psychiatric referral was given to patients with suspected psychiatric illness and some patients who had social conflict.

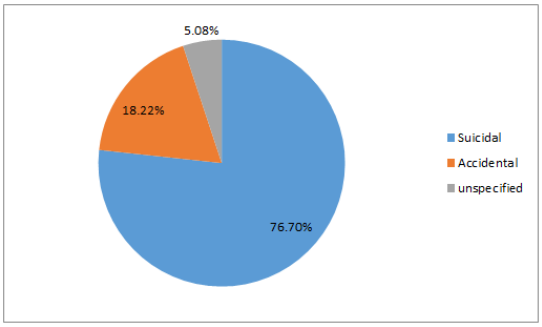

Figure 1: Circumstances of poisoning among patients who presented to JUSH from January 1, 2010 to January 1, 2015.

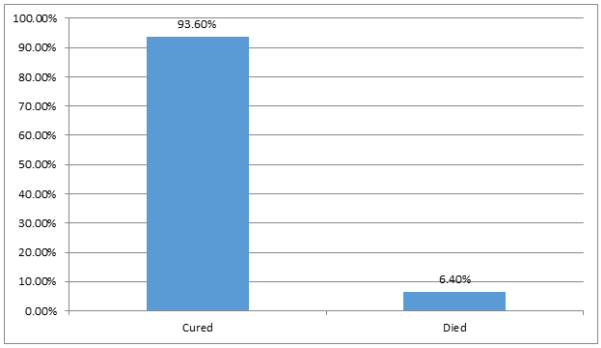

Figure 2: Patients' outcome with acute poisoning who presented to JUSH from January 1, 2010 to January 1, 2015.

Discussion

Poisoning continues to be an important health problem. Epidemiological data on this important health issue is scarce in Ethiopia. The retrospective analysis of 236 patient's medical records presented with poisoning to JUSH revealed that 78.9% of patients age ranged from 12-30 years and 10.6% were under 5 years old children. Females outnumbered males accounting for 65.4% of all cases. The same study was done at South Africa and Tikur Anbessa Specialized Hospital (TASH) shows with a female predominance of 57.8%, 55.7% respectively. About 76.92% of cases were intentional exposures. Household cleaning agents were the leading causes of poisoning (40.4%) followed by Organophosphates (24%), hydrocarbons (2.9%) and CO (4.7%). A study done at Gondar University showed organophosphates (70%) were a common cause. Most of the above results are comparable with the results of a study done at TASH from January 2007 to December 2008 [13].

Almost all exposures (94.2%) were through oral route and only 39.42% patients arrived at the hospital within one hour of exposure but most (56.7%) arrived within 1-24 h. Simultaneous vomiting and epigastric pain, vomiting only, epigastric pain only and altered level of consciousness were the common presenting features accounting for 31.7%, 19.2%, 10.6%, and 12.5% respectively.

The result from TASH also revealed comparable result except for the bit higher presentation of altered level of consciousness which might

be specific types of organophosphates (rat poisoning, pesticides) and dose-related [13].

The approaches employed in the management of poisoning mainly were supportive cares followed by GI decontamination procedures. Nearly half (44.23%) of patients had GI decontamination. Specific antidotes were provided to 52 patients. This result is comparable with the result obtained from the retrospective analysis of patients records with poisoning presented to Gondar university hospital where specific antidotes were used in a substantial number of patients (14).

Among 181 patients who took the poison intentionally (65.2%) reported their reason to be a temporary quarrel/social conflict and 22% had suspected psychiatric illnesses. This result is a bit higher than the results from TASH probably because many of patients' records don't include the reasons for intentional poisoning in TASH [13]. And 93.6% patients were discharged improved with a psychiatric referral made for 49.8% of patients. There were 15 deaths with the case fatality rate of 6.4%. This result is a bit higher than results from Gondar University Hospital probably because the time of arrival was after one hour.

Conclusion

Based on the findings the pattern of poisoning in the hospital showed that more than three fourths of patients were in the age range of 12-30 years and females outnumbered males accounting around three fifths of cases. Household cleaning agents were the commonest poisoning agents followed by organophosphates and hydrocarbons. The most identified circumstance of poisoning was intentional and more than three fourth of this was because of social conflict. Oral route was the most prominent route of exposure for poisoning almost in all cases. Presentation of cases to the hospital was immediate for most of the cases. The commonest features of a clinical presentation by poisoned cases were vomiting, epigastric pain and altered state of consciousness. GI decontamination was done for half of the cases and there is a low provision of specific antidotes. Discharging of cases with improvement was good, but psychiatric referral made was low. There was a low report of death case among poisoned patients.

As the majority of cases poisoned themselves intentionally for suicidal intent, so linkage of these suicidal patients to appropriate mental health service should be improved. Awareness on proper handling of household cleaning agents and chemicals should be given to users of these agents. Further large-scale regional or national level study should be conducted to know the magnitude, associated factors, and public health importance of this problem.

Conflicts of Interest

The authors declare that there are no conflicts of interest regarding the publication of this article.

Acknowledgement

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