Originalni članci/
Original articles

PATTERN OF ACUTE POISONING AND MANAGEMENT OUTCOME AMONG PATIENTS PRESENTED TO ADAMA REFERRAL HOSPITAL, ETHIOPIA

PRIKAZ AKUTNOG TROVANJA I ISHOD LEČENJA BOLESNIKA U BOLNICI „ADAMA REFERRAL HOSPITAL" U ETIOPIJI

Correspondence to:

Fekede Bekele Daba (B.Pharm, M.Pharm, R.Ph)
School of Pharmacy, College of Health Sciences, Jimma University, Ethiopia.
P.O.Box: 378
Mobile: +251-935970999
Email: fekedeb@gmail.com;
fekede.bekele@ju.edu.et

Jemal Wakushie, Fekede Bekele Daba

School of Pharmacy, College of Health Sciences, Jimma University, Ethiopia.

Key words
poisoning; household; cleansing agents; Adama Referral Hospital, Ethiopia

Ključne reči
trovanje, domaćinstvo, sredstva za čišćenje, Adama Referral Hospital, Ethiopia

Abstract

Background: Poisoning, whether accidental or intentional, is a significant global public health problem. Studies on the causes and consequences of acute poisonings are scarce in Ethiopia. Thus, the aim of this study was to assess the circumstances of acute poisoning and determine the types of management and its outcome in Adama Referral Hospital, Ethiopia.

Methods: A cross-sectional study design involving retrospective chart review of acute poisoning adult cases presented to the hospital from February 2013 to January 2015 was conducted using structured format. SPSS software version 20.0 was used for data entry and analysis. Chi-square statistic (χ^2) was calculated to determine the relationship between the variables at 95% CI and p-value ≤ 0.05 was used to determine significance.

Result: The study included 226 patients, of which about 53% were females. Mean age was 25.18±9.55 years and majority was below 35 years of age (86.3%). Most cases (81.9%)were intentional poisoning. Poisonous agents associated with most cases were household cleansing agents (41.6%), followed by organophosphates and drugs. The over-all mortality rate was 7.5%and the majority was observed in males (64.7%).

Conclusion: Acute poisoning is common and an important clinical emergency, highlighting the importance of early diagnosis, treatment and prevention. Limiting the availability of, and access to, highly toxic chemicals can help reduce the number of intentional poisoning cases in addition to educational programs that emphasis on preventive measures among the general public.

INTRODUCTION

A poison is any substance that is harmful to the body when ingested, inhaled, injected or absorbed through skin. Any substance can be poisonous if too much is taken. Poisonings are either intentional or accidental. It is a qualitative term used to define the potential of a chemical substance in acting adversely or deleteriously on the body [1].

Poisoning, whether accidental or intentional, is a significant global public health problem. According to WHO data, in 2012 an estimated 193,460 people died worldwide from unintentional poisoning. Of which, 84% occurred in low- and middle-income countries. Nearly a million people die each year as result of suicide, and chemicals take a major shareof these deaths. It is estimated that deliberate ingestion of pesticides causes 370,000 deaths each year [2, 3].

Advances in technology and social development have resulted in the availability of most drugs and chemical substances in the community. These chemical substances pose a significant threat due to their poisonous effect and extensive use in medicine, agriculture, industry and residential environments [1]. Household products used for cleaning agents and pesticides are among major public health problems of developing world including Asian and African communities [4]. CNS (Central Nervous System) drugs are the commonest medicines used for self-harm throughout the developing world. Case series of antiepileptic, benzodiazepines or antidepressants, and barbiturates were an extremely common means of self- poisoning [5]. Acute poisonings or drug overdoses constitute a significant source of aggregate morbidity, mortality, and health care expenditure. The true incidence is unknown due to under diagnosis and underreporting. Acute

alcohol intoxication is common among patients presenting for emergency care and is associated with a number of complications including suicidal actions.

Poisoning, like other injuries, is a predictable and preventable event. Some of the prevention strategies include legislation and education. Of these, education is most relevant to the health-care providers. The vast majority of adults with toxic ingestions has an uncomplicatedcourse of poisoning and recovers fully with supportive care. Gastrointestinal (GI) decontamination, i.e., the practice of functionally removing an ingested toxin from the GI tract in order to decrease its absorption, must be guided by the potential severity of the poisoning, the time from ingestion, and the potential risk to the patient of the interventions considered. The availability of an effective antidote substantially reduces the importance of decontamination.

Hence there are few studies done on acute poisonings in the study area, it is believed that the information gained from this study would be used as baseline data for future studies in the area for prevention and intervention of poisoning; for decision making and better management of cases; and as general information for planning by policy makers. Therefore, the aim of this study was to assess the causes and circumstances of acute poisonings and determine the types of management of poisoning cases.

METHODS

The study was conducted at Adama referral hospital (ARH). ARH is one of the referral hospitals in the country, Ethiopia. Across-sectional study design involving retrospective chart review of 226 acute poisoning adult cases presented to ARH from February 2013 to January 2015 was conducted using structured format. The data abstracted included socio-demographic variables, clinical characteristics including treatments given and its outcome on hospital discharge; poisoning-related variables including history of previous poisoning, type and source of toxicants used for poisoning. SPSS software version 20.0 was used for data entry and analysis. Descriptive statistics was calculated for demographic and clinical characteristics of patients. Chi Square statistic (χ^2) was calculated to determine the relationship between the variables at 95% CI and p-value ≤ 0.05 was used to determine significance. The study was conducted after ethical clearance was obtained from the College of Health Sciences, Jimma University, according to the procedures set for retrospective studies. Permission to use medical records was confirmed from the Medical Director of ARH. During data collection, name of the patients was excluded and record card numbers were used. Data analysis was performed using a code number that had been given to each patient data collection instrument. Hence, confidentiality of all information obtained from the patients' medical records cards was kept. Information was utilized for research purpose only.

RESULTS

Socio-demographic and other baseline characteristics of acute poisoning

Medical records cards of 226 adult patients who were acutely poisoned and presented to ARH from February 2013 to January 2015 were reviewed. One hundred nineteen (52.7 %) were females. Mean age was 25.18± 9.55 years and the age ranged from 15 to 67 years and more than 86 % of the studied population were below 35 years of age. One hundred forty eight patients (65.5 %) were from urban areas. More than half of the patients were Orthodox Christians (51.8%), followed by Muslims and Protestants, accounting for 27.4%and18.1%. Almost 82 % of cases were intentional poisoning. The most commonly involved toxic agents were household cleansing agents (41.6%), organophosphates (31.4%) and drugs (11.5%). The most common drugs involved in the poisoning were Phenobarbital and amitriptyline [Table 1].

Table 1: *Frequency distribution of baseline characteristics of acute poisoning cases [n=226]*

Variables		n	(%)
Age (years)	15-24	146	(64.6)
	25-34	49	(21.7)
	35-44	20	(8.8)
	45-54	3	(1.3)
	55-64	7	(3.1)
	65+	1	(0.4)
Sex	Male	107	(47.3)
	Female	119	(52.7)
Residence	Urban	148	(65.5)
	Rural	78	(34.5)
Religion	Orthodox	117	(51.8)
	Muslims	62	(27.4)
	Protestants	41	(18.1)
	Others	6	(2.7)
Circumstances of poisoning	Intentional	185	(81.9)
	Accidental	23	(10.2)
	Unspecified	18	(7.9)
Toxic agents involved	Household cleansing agents	94	(41.6)
	Organophosphates	71	(31.4)
	Drugs	26	(11.5)
	Alcohol	22	(9.7)
	Unspecified	13	(5.8)
Management approach	GI decontamination	146	(64.6)
	Specific antidote	43	(19.0)
	Unspecified	26	(11.5)
	No management	11	(4.9)
Outcome	Recovery	155	(68.6)
	Death	17	(7.5)

Circumstances of acute poisoning

Nearly 82 % of the poisoning cases were intentional. Circumstances of acute poisoning among male and females were almost similar, although both intentional and accidental cases were slightly higher in females. More than 64 % of all intentional poisoning cases andmore than 65 % of accidental poisoning cases were aged 15-24 years. About 66 % of intentionally poisoned cases and 56.5 % of accidental cases were from urban areas. Household cleansing agents were the common toxic agents used among intentionally poisoning cases (41.1%) [Table 2].

Table 2: Circumstance of acute poisoning and associated factors

Patient Characteristics		Circumstance of Poisoning	
		Intentional n (%)	Accidental n (%)
Sex	Male	89 (48.1)	11(47.8)
	Female	96(51.9)	12(52.2)
Age (years)	15-24	119(64.3)	15 (65.2)
	25-34	41 (22.2)	3 (13.0)
	35-44	17(9.2)	3 (13.0)
	45-54	2(1.1)	1 (4.3)
	55-64	5(2.7)	1 (4.3)
	65+	1(0.5)	0
Residence	Urban	122 (65.9)	13 (56.5)
	Rural	63(34.1)	10 (43.5)
Religion	Orthodox	91 (49.2)	14 (60.9)
	Muslim	51(27.6)	6 (26.1)
	Protestant	37(20.0)	3 (13.0)
	Others	6 (3.2)	0
Toxicants	House hold cleansing agents	76(41.1)	9 (39.1)
	Organophosphates	56(30.3)	9 (39.1)
	Drugs	23 (12.4)	2(8.7)
	Alcohol	20(10.8)	1 (4.3)
	Others	10(5.4)	2 (8.7)
Drugs involved	Phenobarbital	9(39.1)	1 (50.0)
	Amitriptyline	7(30.4)	1 (50.0)
	Others	7(30.4)	0

Table 3: Outcome of acute poisoning and associated factors

Patient Characteristics		Outcomee of Poisoning	
		Recovery n (%)	Death n (%)
Sex	Male	64 (41.3)	11 (64.7)
	Female	91 (58.7)	6 (35.3)
Age (in years)	15-24	99 (63.9)	11 (64.7)
	25-34	37 (23.9)	2 (11.8)
	35-44	11 (7.1)	3 (17.6)
	45-54	1 (0.6)	1 (5.9)
	55-64	6 (3.9)	0
	65+	1 (0.6)	0
Residence	Urban	103 (66.5)	12 (70.6)
	Rural	52 (33.5)	5 (29.4)
Religion	Orthodox	75 (48.4)	4 (23.5)
	Muslim	41(26.5)	7 (41.2)
	Protestant	39(25.2)	0
	Others	0	6 (35.3)
Circumstances of poisoning	Intentional	129 (83.2)	15 (88.2)
	Accidental	11 (7.1)	2 (11.8)
Toxic agent involved	Household cleansing agents	58 (37.4)	7 (41.2)
	Organophosphates	54 (34.8)	4 (23.5)
	Drugs	19 (12.3)	2 (11.8)
	Alcohol	16 (10.3)	2 (11.8)
	Others	8 (5.2)	2 (11.8)
Management approach	GI decontamination	113 (72.9)	0
	Specific antidote	39 (25.2)	0
	Unspecified	3 (1.9)	8 (47.1)
	No management	0	9 (52.9)

Management and outcome of poisoning cases

Among poisoning cases reviewed, 17 were died representing7.5 % of all poisoning cases. Case fatality was high in males compared to females. There was significant relationship between sex and outcome of poisoning (p = 0.045). That is, 14.7 % of males were died of acute poisoning compared to 6.2 % of females. Deaths were most common in poisoning cases with age group of 45-54 years(50 %) compared to elders and younger adults. It has been noted that the risk of death from intentional poisoning cases was 1.564 times the risk for accidental casesal though the relationship is not significant (p=0.581). Deaths were higher in poisoning cases from household cleansing agents compared to other causative agents. There were no fatal cases among acute poisonings that were managed by GI decontamination and specific antidotes. All poisoning cases (100 %) who didn't take any management were died. The analysis shows that, the relationship between the management approaches and the outcome was significant (p = 0.000) [Table 3].

DISCUSSION

During two years study period, 226 adult patients with acute poisoning were presented to the hospital. This indicates that acute poisoning is common and an important clinical emergency. Hence, a thorough review of the risk factors, early detection, treatment and prevention of poisoning are crucial in reducing the incidence of the poisoning and related disability and mortality [1].

The findings of the present study revealed that poisoning was a slightly higher in females (52.7%) than in males, which is comparable to other finding of the same nation[7]. This might be due to the fact that females in such a developing nation are being disadvantaged by cultural influences compared to males. Among different age groups, young adults were the most commonly affected as more than 86 % of the study population was below 35 years of age. This was also similar with the study done at Tikur Anbesa Specialized Hospital (TASH) (Ethiopia) that majority (87.9%) were below 30 years of age[7].The mean age was 25, which was also similar with 21 years in TASH and 22 years in Gondar, Northwestern part of Ethiopia[7] and 21.8 in Palestine [8]. This could be related to economic status that younger individuals are associated with low income and employment status.About 66 % of intentionally poisoned cases were from urban areas. This could be explained in terms of the availability and accessibility of most toxic agents in the urban

areas. Existing literature supports this idea that, socio-demographic factors such as residence and socioeconomic status have been associated with acute poisoning elsewhere. And also, most of the cases were from low cost, densely populated urban areas suggesting an influence of socioeconomic status and living conditions on acute poisoning [9].

As reported in the current study, most of the poisoning cases (~82 %) were intentional. Other studies also reported similar findings, representing 96.5% and 72 % in two different areas of Ethiopia [7], 79% and 69.3 %in two different sites of Iran [10,11], 71% in Turkey [12], and 56.4% in Nepal [1]. All these results of different studies indicate that self-harm poisoning is common worldwide, despite differences in the prevalence. These differences might be explained in terms of difference in size of the study population, type of patients included in the study, accessibility to the health facility, inadequacy of patients' information records and other related factors. In this regard, some of the circumstances were not specified on patients profile card.

The most commonly involved toxic agents were household cleansing agents (sodium hypochlorite). Sodium hypochlorite is the most widely used household cleansing agent and hence contributed to its use for self-poisoning. One study in India reported that household products were identified as the main cause of poisoning [13]. Other literature also showed that household cleansing agents (sodium hypochlorite), organophosphates and drugs were the most common toxic agents which causing acute poisoning[7]. In the current study, organophosphates, specifically malathion were the second most common toxicants. In other studies, organophosphates were reported as the main reason of poisoning related deaths [11].

Drugs prescribed for other medical conditions were also among the causative agents involved in the acute poisoning of the cases. Accordingly, 11.5% of poisonings was due to drugs including phenobarbital and amitriptyline. This was similar with studies done in different areas of the same nation that poisonings were due to prescribed drugs[7]. This finding highlights that a great work is required in the area of improving rational use of drugs and the patients should be thoroughly counseled in this regard in order to minimize poisonings due to drugs.

The current finding also showed that, the case fatality rate was 7.5%. This result was found to be high when compared to other studies that reported 1.2% in Western Iran [11], 2.6% in Zambia (14). In contrary, it was less compared to 8.6% in JUSH of Ethiopia [7], 11.7% in Turkey [10] and 15% in India [15].These variations can be related to the differences in fatal capacity of toxic agents involved. The time duration of poison exposure to hospital presentation might also one factor that affects the outcome and results in differences in fatality rate among different studies.

The current study shows that, number of deaths was high in males compared to females. This finding was similar with other studies[16]. The high fatality rate in males might be attributed to the males tendency to choose and decide on more violent and successful means of self-harm than females. In terms of the involved causative agents, high case mortality rates were associated with household cleansing agents. This can be attributed to the availability and toxicity of the agents. Even though the relationship was not significant, risk of death was higher among intentionally poisoned cases compared to accidental cases. Hence all cases who didn't take any management were died, early detection and proper management of poisoning of all causes is crucial as majority (68.6%) of the patients were recovered with proper management approaches including GI contamination and specific antidotes. This indicates that with intensive care management, poisonings can be reversed.

Restricting access to the most hazardous chemicals would be of paramount importance to reduce the number of severe acute poisoning cases and case-fatalities and would provide greater opportunities for preventive programs to act effectively.

CONCLUSION

Acute poisoning is common and an important clinical emergency, highlighting the importance of early diagnosis, treatment and prevention of poisoning. Poisoning with suicidal intention was becoming a serious health problem so that psychiatric consultation is important. Household chemicals used for cleansing purposes were the most common causes of poisoning. Majority of the patients recovered with intensive care management, indicating that poisonings is almost manageable if it is detected early. The number of deaths from intentional poisoning due to household products can be reduced by limiting the availability of, and access to, highly toxic chemicals. Educational programs with more emphasis on preventive measures are necessary to create awareness among the general public.

ABBREVIATIONS
CNS-Central Nervous System, GI-Gastrointestinal, ARH-Adama ReferralHospital, TASH-Tikur AnbesaUniversity Specialized Hospital, WHO-World Health Organization

CONFLICT OF INTEREST
There is no any conflict of interests among the authors.

Sažetak

Uvod: Trovanja, bilo da su slučajna ili namerna, predstavljajz ozbiljan problem na svetskom nivou. Istraživanja koja govore o uzrocima i posledicama trovanja koja su registrovana u Etiopiji su retka. U skladu sa tim, cilj ovog rada bio je da se procene okolnosti akutnih trovanja i utvrdi način i ishod lečenja ovih bolesnika u bolnici „Adama Referral Hospital" u Etiopiji.

Metode: "Cross sectional" dizajn studije, koji je obuhvatio grafički prikaz akutnih trovanja odraslih osoba koja su zabeležena u periodu od februara 2013. godine do januara 2015. godine, je sproveden korišćenjem softvera SPSS 20.0 za unos i obradu podataka. Chi kvadrat (χ^2) test je korišćen za identifikovanje odnosa između varijabli sa intervalom pouzdanosti od 95% i p-vrednošću ≤ 0,05 za utvrđivanje značajnosti.

Rezultati: U istraživanje je bilo uključeno 226 bolesnika, od kojih su žene činile 53%. Prosečna životna dob bila je 25,18±9,55 godina, pri čemu je većina bolesnika (86,3%) bila mlađa od 35 godina. Većina trovanja (91,9%) bila su namerna. Toksični agensi su u najvećem broju slučajeva bila sredstva za čišćenje domaćinstva (41,6%), a zatim organofoforna jedinjenja i lekovi. Ukupa stopa smrtnosti iznosila je 7,5% i većina je zabeležena u muškoj populaciji (64,7%).

Zaključak: Akutna trovanja su veoma ozbiljna i klinički urgentna stanja, pri čemu treba naglasiti značaj rane dijagnostike, lečenja i prevencije. Ograničavanje dostupnosti i pristupa visoko toksičnim hemikalijama može da pomogne da se smanji broj slučajeva namernih trovanja uključujući i edukaciju sa naglaskom na prevenciju od strane javnosti.

REFERENCES

1. Pokhrel D, Pant S, Pradhan A, Mansoor S. A comparative retrospective study of poisoning cases in central, zonal and district hospitals. Kathmandu University journal of science, engineering and technology. 2008; 4(1):40-8.

2. Konradsen F, van der Hoek W, Cole DC, Hutchinson G, Daisley H, Singh S, Eddleston M. Reducing acute poisoning in developing countries—options for restricting the availability of pesticides. Toxicology. 2003; 192(2):249-61.

3. WHO. International Program on Chemical Safety (IPCS) Poisoning Prevention and Management, 2010. Available at: www.who.int/ipcs/poisons/en/ (access date: 18.05.2016).

4. Nhachi CF, Kasilo OM. Household chemicals poisoning admissions in Zimbabwe's main urban centres. Hum ExpToxicol. 1994; 13(2):69-72.

5. Wesseling C, McConnell R, Partanen T, Hogstedt C. Agricultural pesticide use in developing countries: health effects and research needs. International Journal of Health Services. 1997; 27(2):273-308.

6. Roberts DM, Aaron CK. Managing acute organophosphorus pesticide poisoning. BMJ 2007; 334:629.

7. Desalew M, Aklilu A, Amanuel A, Addisu M, Ethiopia T. Pattern of acute adult poisoning at Tikur Anbessa specialized teaching hospital, a retrospective study, Ethiopia. Hum ExpToxicol. 2011; 30(7):523-7.

8. Sawalha AF, Sweileh WM, Tufaha MT, Al-Jabi DY. Analysis of the pattern of acute poisoning in patients admitted to a governmental hospital in Palestine. Basic & clinical pharmacology & toxicology. 2010; 107(5):914-8.

9. Harriss L, Hawton K. Deliberate self-harm in rural and urban regions: a comparative study of prevalence and patient characteristics. SocSci Med. 2011; 73(2):274-81.

10. Shadnia S, Esmaily H, Sasanian G, Pajoumand A, Hassanian-Moghaddam H, Abdollahi M. Pattern of acute poisoning in Tehran-Iran in 2003. Hum ExpToxicol. 2007; 26(9):753-6.

11. Akhlaghi M, Arbabi Z, Khadivi R. Pattern of acute poisoning in Shahrekord (Western Iran). Asian Journal of Epidemiology. 2009; 2(1):9-12.

12. Tüfekçi IB, Curgunlu A, Şirin F. Characteristics of acute adult poisoning cases admitted to a university hospital in Istanbul. Hum ExpToxicol. 2004; 23(7):347-51.

13. Patil A, Peddawad R, Verma VC, Gandhi H. Profile of acute poisoning cases treated in a tertiary care hospital: a Study in Navi Mumbai. Asia Pacific Journal of Medical Toxicology. 2014; 3(1):36-40.

14. Z'gambo J, Siulapwa Y, Michelo C. Pattern of acute poisoning at two urban referral hospitals in Lusaka, Zambia. BMC Emergency Medicine 2016; 16:2

15. Singh B, Unnikrishnan B. A profile of acute poisoning at Mangalore (South India). J Clin Forensic Med. 2006; 13(3):112-6.

16. Camidge DR, Wood RJ, Bateman DN. The epidemiology of self-poisoning in the UK. British journal of clinical pharmacology. 2003; 56(6):613-9.