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Acute Poisonings During Pregnancy and in other non-pregnant Women in Emergency Departments of Four Government Hospitals, Addis Ababa, Ethiopia: 2010-2015

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ABSTRACT

Objective: To characterize acute poisonings in pregnant and nonpregnant women treated at emergency departments of government hospitals in Addis Ababa, Ethiopia, between 2010 and 2015.

Methods: All data for acutely poisoned women were retrospectively collected from patient medical charts at the emergency departments of Saint Paul's Hospital Millennium Medical College, Ras Desta Memorial Hospital, Yekatit 12 Hospital Medical College and Zewditu Memorial Hospital. Data were collected by extraction questionnaire and analyzed by using SPSS v. 20 statistical software.

Results: During the study period, 998 cases of acutely poisoned women were listed in the hospital registries. Of these, complete data for inclusion in the study were available for 592. 36.3% of the study participants were in the age group of 20-24, with a mean (\pm SD) age of 23.03 (\pm 6.3) years. 80.9% were from Addis Ababa; 4.6% were pregnant. The mean arrival time of all cases was 4.14 hours. 85.5% of all study cases were due to intentional self-poisoning, of whom 42.1% were discharged without complications. The most common poisons were bleach and organophosphates; 25.9% of pregnant cases and 32.6% of non-pregnant cases were poisoned by bleach and 18.5% of pregnant cases and 18.9% of non-pregnant cases had organophosphate poisoning. 0.7% had a history of poisoning; all were non-pregnant women. The common route of poison exposure was oral, and the case fatality rate of organophosphate poisoning in pregnant and non-pregnant women was 20 and 1.87%, respectively. The pre-hospital intervention for the majority of the women was milk, in 12.0% of cases.

Conclusion: Acute poisoning remains a public health problem in our community. Bleach is the most common poisons. Our present findings indicate the necessity of educational programs on preventable reasons of acute poisonings and their outcomes on pregnant and non-pregnant women.

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INTRODUCTION

Poisoning refers to the development of dose-related adverse effects following exposure to chemicals, drugs, or other xenobiotics through inhalation, ingestion, skin or eye contact, or inoculation (Waddy, 2007). Acute poisoning is one of the most common conditions found in Emergency Medicine and patients are predominantly treated in primary care emergency departments, in medical emergency system ambulances and in hospital emergency departments (Putze *et al.*, 2008).

According to the WHO global report on violence and health in 2002, suicide, a worldwide phenomenon on the rise, occurs every 40 seconds and an attempt occurs every 1-3 seconds. The most common method is intentional self-poisoning (Calitz *et al.*, 2008). Self-poisoning is not only for the purpose of suicide; it is also employed to gain attention, express distress or to get revenge. Hospital admissions due to acute poisoning are increasing due to changes in the lifestyle and socio-psychological pressures. Advances in technology and social development have resulted in easy availability of most drugs and chemical substances in various countries (Prajapati *et al.*, 2013).

The pattern of poisoning differs across countries and may vary over time. Therefore, country-specific epidemiologic surveillance is necessary to determine the extent of the problem and the preventive measures which need to be taken (Fallahzadeh *et al.*, 2014).

Acute poisoning during pregnancy is an important health concern worldwide, with potential short and long-term implications for both mother and fetus. Very little attention has been paid in the medical literature to this important issue, despite the fact that in each case there are two patients at risk. Specifically, fetal outcome (e.g. miscarriage rate, incidence of birth defects and neurobehavioral development) has not been systematically explored. Delay in appropriate treatment of the pregnant woman may result in morbidity and mortality of both mother and fetus. Moreover, fetal mortality can occur despite maternal recovery (Finkelstein *et al.*, 2006). Injuries during pregnancy are a major public health concern, with approximately 6-7% of women experiencing a medically treated injury throughout the course of their pregnancy (McClure *et al.*, 2010).

Acute intoxications constitute a considerable number of admissions to the emergency services of all hospitals. Intoxications may occur intentionally or after accidental intake. Although there are a large number of studies on acute intoxication in the literature, studies on pregnant women are rare. Most cases of acute poisonings during pregnancy are suicidal and attempted in the first trimester of gestation. The most common agents are medical drugs (Karadaş *et al.*, 2011).

Pregnancy has long been recognized as a potentially critical window of vulnerability for exposure to a variety of chemicals of recent concern, including phthalates, bisphenol-A, polybrominated diphenyl ethers, and perfluorinated compounds, and other chemicals with longer histories of investigation, including air pol-

lutants, lead, methylmercury, manganese, arsenic, and organophosphate pesticides (Bellinger, 2013). Acute carbon monoxide (CO) poisoning during pregnancy is an uncommon event, but failing to recognize maternal CO intoxication can have a dramatic effect on the fetus (Greingor *et al.*, 2001). Exposure of organophosphate compounds (OPCs) during pregnancy caused malformed fetuses, neural tube defect and shortening of pregnancy (Shafiullah, 2014).

Thus, the aim of this study was to characterize acute poisonings in pregnant and nonpregnant women admitted to emergency departments of government hospitals in Addis Ababa, Ethiopia, between 2010 and 2015.

METHODS

The study was conducted at four government hospitals in Addis Ababa: St. Paul's Hospital Millennium Medical College (SPHMMC), Zewditu Memorial Hospital, Yekatit 12 Hospital Medical College and Ras Desta Damtew Memorial Hospital. Saint Paul's Hospital Millennium Medical College is affiliated to Federal Ministry of Health, Ethiopia whereas the other hospitals are to Addis Ababa City Administration Health Bureau. Being referral hospitals to all neighboring regions, these four hospitals are estimated to give clinical service to about 9.5 million. SPHMMC has the highest population coverage, 5 million (MOH Ethiopia, 2016).

Data were collected on all cases registered between September 10, 2010 and September 10, 2015.

The study population was comprised of pregnant and non-pregnant women who had acute poisoning within the last five years in the four government hospitals and had a medical card with the required information. Pregnant and nonpregnant women were eligible to be included in the study if they were diagnosed and managed for acute poisonings and aged 15-45 years. Pregnant and non-pregnant women with food poisoning and chronic poisoning, or women with acute poisoning and incomplete information were ineligible.

We used a descriptive retrospective study design to extract the poisonous agents, the availability of specific antidotes, and socio-demographic and clinical characteristics of pregnant and non-pregnant women with acute poisoning who were admitted to the emergency department of Addis Ababa government hospitals in the study period.

All women with acute poisoning during the study period, complete data and who fulfilled the inclusion criteria were included. A data extraction form was used to record all relevant information from the medical files of female patients with confirmed poisoning in the logbook. Each patient chart was assigned a code number and the data collected were kept on a password-protected computer in order to ensure confidentiality.

The study evaluated demographic variables, including age and residence, and clinical variables (poisoning data) such as chronic illness history; gestational age (distribution over trimesters); gravidity; mode of poisoning (intentional or non-intentional poisoning); admission time and previous history; reason for poisoning; route of administration; cause of acute poisoning; type of management (availability of antidote, gut

decontamination and oxygen therapy or others); pre-hospital intervention; duration of hospitalization; treatment outcomes. Acute poisoning refers to any poisonous effect produced from a single or short exposure (24 to 96 hours) resulting in severe biological harm or death.

Data collectors were trained. The data extraction questionnaire was piloted two weeks before data collection. During data collection, the principal investigator and supervisors were making spot-checks, evaluating and organizing collected data to check the progress of the study.

To analyze the collected data, descriptive statistical methods were applied. For descriptive statistics frequency distribution, tables were used. Data were cleaned for inconsistencies and missing values. Data were analyzed using SPSS version 20 (SPSS Inc, Chicago, IL, USA) software.

The study was conducted after obtaining ethical clearance from the Hospitals' Research and Ethical Review Board. For all study participants, ethical issues, privacy, and confidentiality were strictly observed.

RESULTS

During the study period, 998 acutely poisoned women cases were listed in the hospital registries. Of these, only 592 women had complete data to be included in the study. There were a total of 188,514 patient visits to these four hospitals emergency departments, with acute poisoning comprising 0.53%, and cases included in the study accounting for 0.31%.

Of all 592 women with acute poisoning, 228 (38.5%) were admitted at SPHMMC and 218 (36.8%) at Yekatit 12 Hospital Medical College. 215 (36.3%) of the study participants were in the age group of 20-24 years, and their mean (\pm SD) age was 23.03 (\pm 6.3). 479 (80.9%) of the women came from Addis Ababa; 27 (4.6 %) were pregnant (Table 1).

Table 1. Socio-demographic characteristics of study participants

Variable	Frequency (N)		Percent (%)
Age (years)	15-19	185	31.3
	20-24	215	36.3
	25-29	104	17.6
	30-34	42	7.1
	35-39	26	4.4
	40-45	20	3.4
Total emergency visits	St. Paul's Hospital Millennium Medical College	67642	35.9
	Ras Desta Damtew Memorial Hospital	45102	23.9
	Zewditu Memorial Hospital	40471	21.5

	Yekatit 12 Hospital Medical College	35299	18.7
Hospital	St. Paul's Hospital Millennium Medical College	228	38.5
	Ras Desta Damtew Memorial Hospital	39	6.6
	Zewditu Memorial Hospital	107	18.1
	Yekatit 12 Hospital Medical College	218	36.8
Acute poisoning	Pregnant	27	4.6
	Non-pregnant	565	95.4
Residency	Addis Ababa	479	80.9
	Outside Addis Ababa	113	19.1

Mode of poisoning

Intentional self-poisoning was the most common mode of poisoning: 96.3% (26) of the pregnant women and 85% (480) of the non-pregnant women suffered from acute poisoning from their own hand. 0.5% of nonpregnant women and none of the pregnant women were intentionally poisoned by others (Table 2). Intentional self-poisoning among all cases was 506 (85.5%).

Table 2. Mode of acute poisoning during pregnancy and in other non-pregnant women

		Mode of poisoning				Total	
		Intentional self	Intentional by others	Non-intentional self	Non-intentional by others		
Pregnancy status	Yes	Count	26 (96.3%)	0 (0.0%)	1 (3.7%)	0 (0.0%)	27 (100.0%)
		% within mode of poisoning	5.1%	0.0%	1.4%	0.0%	4.6%
	No	Count	480 (85.0%)	3 (0.5%)	71 (12.6%)	11 (1.9%)	565 (100.0%)
		% within mode of poisoning	94.9%	100.0%	98.6%	100.0%	95.4%
Total		Count	506 (85.5%)	3 (0.5%)	72 (12.2%)	11 (1.9%)	592 (100.0%)
		% within mode of poisoning	100.0%	100.0%	100.0%	100.0%	100.0%

	poisoning					
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Treatment outcomes of acute poisoning

249 (42.1%) of the study subjects were discharged without complication: 4 (14.8%) of pregnant women and 245 (43.4%) of nonpregnant women. 12 (2.1%) non-pregnant women were admitted from the ED to different units of the hospitals for further treatment and follow up, while 1 (37%) of pregnant women was referred. 4 (14.8%) pregnant women and 77 (13.6%) non-pregnant women did not have clear treatment outcomes. Only 7 (25.9%) of the pregnant women and 213 (37.7%) of nonpregnant women had received psychiatric care for their acute poisoning (Table 3).

Seven women died: three by organophosphate poisoning, one by rodenticide, one by herbicide, one by antiepileptic drug, and one by an unknown poisonous chemical. The case fatality rate of organophosphate poisoning in pregnant and non-pregnant women was 20 and 1.87%, respectively (Table 3).

Type of poisons

The most common causative agents to induce acute poisoning in both pregnant and non-pregnant women were regular household items rather than pharmaceutical drugs. Bleach (used by 7/25.9% of pregnant women and 184/32.6% of nonpregnant women) was used most frequently, followed by organophosphates (5/18.5% of pregnant women and 107/18.9% of non-pregnant women) (Table 3).

Other poisonous substances included carbon monoxide, rodenticides, herbicides, alcohol and detergents. The proportion of women poisoned by pharmaceutical drugs (antiretrovirals, antiepileptics, antidepressants, antibiotics, paracetamol, antipsychotics or a combination) was 12.6% (Table 3).

Table 3. Treatment outcomes and type of poisons in women treated at emergency departments of government hospitals, Addis Ababa, Ethiopia, from September 10, 2010 to September 10, 2015

Sr. No.		Pregnancy status		Total
		Yes (%)	No (%)	
Treatment outcomes				
1	Discharged without complication	4 (14.8%)	245 (43.4%)	249 (42.1%)
2	Discharged against medical consultation	0	4 (0.7%)	4 (0.7%)
3	Admitted and Discharged	10 (37.0%)	12 (2.1%)	22 (3.7%)
4	Died	1 (3.7%)	6 (1.1%)	7 (1.2%)
5	Not stated	4 (14.8%)	77 (13.6%)	81 (13.7%)
6	Referred to other hospitals	0	5 (0.9%)	5 (0.8%)
7	Referred to gynecology and psychiatry	1 (3.7%)	0	1 (0.2%)

8	Referred to psychiatry	7 (25.9%)	213 (37.7%)	220 (37.2%)
9	Other	0	3 (0.5%)	3 (0.5%)
	Total	27 (100.0%)	565 (100.0%)	592 (100.0%)
Type of poison		Yes (%)	No (%)	Total
1	Organophosphate	5 (18.5%)	107 (18.9%)	112 (18.9%)
2	Antiretroviral drugs	0 (0.0%)	3 (0.5%)	3 (0.5%)
3	Antiepileptic drugs	0 (0.0%)	11 (1.9%)	11 (1.9%)
4	Antidepressants drugs	0 (0.0%)	6 (1.1%)	6 (1.0%)
5	Antibiotic drugs	3 (11.1%)	26 (4.6%)	29 (4.9%)
6	Paracetamol	0 (0.0%)	14 (2.5%)	14 (2.4%)
7	Carbon monoxide	1 (3.7%)	83 (14.7%)	84 (14.2%)
8	Not stated	2 (7.4%)	9 (1.6%)	11 (1.9%)
9	Rodenticides	2 (7.4%)	36 (6.4%)	38 (6.4%)
10	Bleach	7 (25.9%)	184 (32.6%)	191 (32.3%)
11	Herbicides	2 (7.4%)	5 (0.9%)	7 (1.2%)
12	Alcohol	1 (3.7%)	26 (4.6%)	27 (4.6%)
13	Detergents	0 (0.0%)	12 (2.1%)	12 (2.0%)
14	Antipsychotic drugs	0 (0.0%)	4 (0.7%)	4 (0.7%)
15	Antibiotics plus paracetamol	0 (0.0%)	7 (1.2%)	7 (1.2%)
16	Other	4 (14.8%)	32 (5.7%)	36 (6.1%)
	Total	27 (100.0%)	565 (100.0%)	592 (100.0%)

Gravidia and gestational age of poisoned pregnant women

Most of the pregnant women who arrived at emergency departments for treatment of acute poisoning were in first trimester and had multi-gravidia pregnancy. As indicated in Table 4, acute poisoning during pregnancy decreased as gestational age increased, from first to second, and from second to third trimester, 14 (51.9%), 7 (25.9%) and 6 (22.2%), respectively.

Table 4. Cross tabulation of gravidia over trimester of pregnancy in women treated at emergency departments of government hospitals, Addis Ababa, Ethiopia, from September 10, 2010 to September 10, 2015

Gravidia	Gestational age or trimester			Total
	First trimester	Second trimester	Third trimester	
Primigravida	5 (62.5%)	1 (12.5%)	2 (25.0%)	8 (100.0%)

Multigravida	7 (53.8%)	3 (23.1%)	3 (23.1%)	13 (100.0%)
Not stated	2 (33.3%)	3 (50.0%)	1 (16.7%)	6 (100.0%)
Total	14 (51.9%)	7 (25.9%)	6 (22.2%)	27 (100.0%)

Pre-hospital intervention of acute poisoning

Of the 592 women in the study, only 101 (17%) had some sort of pre-hospital intervention to minimize the poisoning. 71 (12.0%) used milk, with the remaining interventions including water or a combination of milk and water. 20 (74.1%) of the pregnant women and 471 (83.4%) of the non-pregnant women did not mention a pre-hospital intervention practice (Table 5).

Table 5. Pre-hospital intervention against acute poisoning in women treated at emergency departments of government hospitals, Addis Ababa, Ethiopia, from September 10, 2010 to September 10, 2015

		Pre-hospital intervention of poisoning					total
		Milk	Water	Milk + water	Nothing	Other	
Pregnancy status	Yes	1 (3.7%)	3 (11.1%)	1 (3.7%)	20 (74.1%)	2 (7.4%)	27 (100.0%)
	No	70 (12.4%)	13 (2.3%)	4 (0.7%)	471 (83.4%)	7 (1.2%)	565 (100.0%)
	Total	71 (12.0%)	16 (2.7%)	5 (0.8%)	491 (82.9%)	9 (1.5%)	592 (100.0%)

Acute poisoning-related factors

None of the pregnant women who came to the ED had a history of chronic disease, whereas 44 (7.8%) of the nonpregnant women did. The mean arrival time of all women to the ED after poisoning was 4.14 hours. 21 (77.8%) of the pregnant women and 81.8% of the non-pregnant women had a hospital stay of 24 hours or less. The most common route of poison exposure was oral 508 (85.8%). Only 4 (0.7%) had a history of acute poisoning (Table 6).

Table 6. Acute poisoning-related factors

		Pregnant	Not pregnant	Total
Length of hospital stay	≤24 hours	21 (77.8%)	462 (81.8%)	483 (81.6%)
	> 24 hours	6 (22.2%)	103 (18.2%)	109 (18.4%)
	Total	27 (100.0%)	565 (100.0%)	592 (100.0%)
Chronic Disease	Yes	0 (0.0%)	44 (7.8%)	44 (7.4%)
	No	27 (100%)	521 (92.2%)	548 (92.6%)
	Total	27 (100.0%)	565 (100.0%)	592 (100.0%)
Route of exposure	Oral	26 (96.3%)	482 (85.3%)	508 (85.8%)
	Inhalation	1 (3.7%)	83 (14.7%)	84 (14.2%)

	Total	27 (100.0%)	565 (100.0%)	592 (100.0%)
History of poisoning	Yes	2 (7.4%)	2 (0.4%)	4 (0.7%)
	No	25 (92.6%)	563 (99.6%)	588 (99.3%)
	Total	27 (100.0%)	565 (100.0%)	592 (100.0%)

Antidote and supportive therapy during poisoning

Table 7. Antidote and supportive therapy during acute poisoning in all cases

Organophosphate poisonings were treated with atropine antidotes in 44 patients, depending on the severity of the toxicity. With the exception of carbon monoxide poisoning, the rest of the acute poisonings were treated only by supportive therapies instead of using antidotes for specific agents. Acute bleach poisoning was treated in many different ways compared to other poisonous agents. One pregnant woman who was acutely poisoned by iron sulphate was treated with deferoxamine as an antidote in the third trimester. One non-pregnant woman was treated with a sodium bicarbonate antidote for phenobarbital (antiepileptic drugs) poisoning (Table 7).

Sr. No.	poison	emesis	atropine injection	gastric lavage	iv fluids	cimetidine injection	oxygen therapy	antacid suspension	metoclopramide	omeprazole	tramadol
1	OP	1	44	45	42	46	5	29	2	24	
2	Highly active antiretroviral therapy				1			1			
3	Antiepileptic drugs			3	6	3	2	1			2
4	Antidepressant drugs			4	5	1					
5	Antibiotics drugs	1		15	17	13		10	1	8	2
6	Paracetamol			10	5	3		6		3	
7	other		3	12	19	17	1	11	1	6	1
8	Carbon monoxide				46	1	79	1	1		3
9	not stated		1	1	3	5	2	4	1	1	
10	Rodenticides		10	9	19	20	1	8	3	5	
11	Bleach	1	11	44	77	124	2	106	6	86	
12	Herbicides		1	2	6	3					
13	Alcohol			1	25	12	1	1	3	4	1
14	Detergents			1	4	4	1	5	1	7	
15	Antipsychotic drugs			1	4		1				
16	Antibiotic + paracetamol			6	3	3		2		4	

Drug management of acute poisoning during pregnancy

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Among all pregnant women with acute poisoning, only 23 received drug treatment during emergency visit. Most treatment was in the first trimester of pregnancy. Of all drug treatments, the most commonly used drugs or techniques were intravenous (IV) fluids, cimetidine 200mg injections, antacid suspension, and gastric lavage, respectively (Table 8A).

Sr. No.	Poison treatment during pregnancy	First trimester	Second trimester	Third trimester	total
1	Hospital treatment (received)	13	5	5	23
2	Atropine injection	2	0	1	3
3	Gastric lavage	3	0	3	6
4	Iv fluids	6	4	2	12
5	Cimetidine inj.	5	3	0	8
6	Oxygen therapy	1	1	0	2
7	Antacid suspension	6	0	1	7
8	Omeprazole	1	0	0	1
9	Biscodyle tablet	1	0	0	1
10	Vitamin B complex	1	0	0	1

Table 8A. Treatment of acute poisoning during pregnancy

11	Defroxamine tablet	0	0	1	1
12	Diclofenac injection	1	0	0	1

Frequency of drug prescription for acute poisoning treatment

Use of antibiotics was the most common, followed by non-steroidal anti-inflammatory drugs and analgesics, to treat the acute poisoning. In the hospital, emergency treatment for bleach acute poisoning and other detergents included doctors' orders of drinking water for patients to neutralize the toxicity (Table 8B).

Table 8B. Frequency of drug prescription on reported exposures involving all women from september 10, 2010 to september 10, 2015.

Sr. No	Poisoning agents	Treatments (number of cases)	Frequency
	Organophosphate	Cefalexine	1
		Dexamethasone	1
		Metronidazole injection	2
		Ceftriaxone	2
		Diazepam	1
		Diclofenac	2
		Antiepileptic drugs	Activated charcoal
		Haloperidol	1
		Diazepam	1
		Sodium bicarbonate	1
		Metronidazole	1
		Vancomycin	1
	Antidepressant drugs	Furosamide tablets	1
	Antibiotics	Vitamin B injection	1
		Bisacodyl	1
	Paractamol	Activated charcoal	1

		Ciprofloxacin	1
	Others	Defroxamine	1
		Flouxetine	1
		Antihistamine	1
	Carbomonoxide	Diclofenac	10
		paractamol	8
	Not stated	Azithromycine	1
		Water intake in hospital	1
	Rodenticides	Ceftriaxone	1
		Metronidazole	1
		Diclofenac	1
		Water intake in hospital	1
	Bleach poisoning	Diclofenac	3
		Chlorpromazine	1
		Water intake in hospital	4
		Multivitamin	1
		Norfloxacilline	1
		Prednisolone	1
	Herbicides	Dexamethasone	1
		Paractamol	1
		Metronidazole injection	1
	Alcohol	Diazepam	1
		Diclofenac injection	1
	Detergents	Water intake in hospital	1
	Antipsychotic - paractamol	Diazepam	2
		Diclofenac	1

DISCUSSION

This study revealed that the incidence of acute poisoning in the emergency departments of four referral hospitals of Addis Ababa was at least 0.53%. This finding is in line with previous studies which found a 0.45% incidence (Abula and Wondmikun, 2006; Se and Ayogilu, 1999). Due to incomplete data for analysis of all cases recorded in emergency center log books, the poisonings included in our study account for 0.31% among all cases visited the emergency departments. Among study cases the proportion of acute poisoning during pregnancy was 4.6%. Pregnant women were with a lower risk of acute poisoning than non-pregnant

women, 95.4%, corroborating studies in the USA (McClure *et al.*, 2010), and Turkey (Uzkeser *et al.*, 2012; Karadaş *et al.*, 2011).

The majority of our study cases were under 30 years of age; this is in line with other studies carried out in Oman and India; most of them had self intentional acute poisoning occurring in the age-group of 20-30 years (Zaidan *et al.*, 2002; Bajracharya *et al.*, 2008; Chala *et al.*, 2015), and this result is further supported by a previous summary (Gebremariam and Gelaw, 2016).

The mean (\pm SD) age of the women who attended emergency departments was 23.03 (\pm 6.3) years. This finding was similar to studies in Ethiopia (Desalew *et al.*, 2011; Chala *et al.*, 2015), Turkey (Karadaş *et al.*, 2011) and Kenya (Bundotich and Gichuhi, 2015). This might be due to the women's socio-psychological problems such as marital disharmony, family conflicts, and loss of family members (Nair and Revi, 2015; Sharma *et al.*, 2010) and disease history which may render them more likely to poison themselves rather than seek another solution.

Bleach and organophosphates were the most common poisons, as seen in previous retrospective studies done of females dominating over male cases of acute poisoning at Tikur Anbessa Specialized Teaching Hospital, Addis Ababa, Ethiopia (Desalew *et al.*, 2011) and Jimma, Ethiopia (Teklemariam *et al.*, 2016). Bleach is easily available in most households. It is also sometimes stored in a cup, water bottle or unmarked spray bottle for cleaning, increasing the risk of non-intentional poisoning (Arizona Poison and Drug Information Center, 2017). However, it was different finding from a previous retrospective study review done between July 2001 and June 2004 in Gondar University Hospital, Ethiopia (Abula and Wondmikun, 2006).

The most common route of exposure for the acute poisoning in 508 (85.8%) of the women was through oral route. This finding was similar to a previous retrospective study done in northwest Ethiopia (Adnew and Asrie, 2016), which was 83.6%.

Pregnant women had a 1 (3.7%) death ratio because of acute organophosphorus pesticides (OP). This finding was similar to a retrospective analysis of outcomes in seven cases of suicidal ingestion of OP in pregnant women done in Tunisia which said acute organophosphorus pesticides caused the loss of the fetus (Barhoumi *et al.*, 2016). This finding is further supported by previous studies such as systematic review done by Shafiullah (2014) and a retrospective study done in Iran (Hassanian-Moghaddam *et al.*, 2014).

From a clinical toxicological point of view, pesticides include insecticides, herbicides, rodenticides, and fungicides, which are the most frequent chemicals causing acute poisoning. In our study, organophosphate insecticide was the second most common cause of poisoning and caused the death of three women (1 pregnant and 2 non-pregnant); followed by rodenticide, herbicide, antiepileptic drug, and an undefined chemical, each killing one woman. Organophosphate poisoning was also found to be a common poisonous agent and cause of death in another systematic review conclusion of acute poisoning in Ethiopia (Gebremariam and Gelaw, 2016).

In this study, there was a total of 249 (42.1%) female patients who came to the emergency departments due to acute poisoning and had a treatment outcome of discharged without complication. This find-

ing was substantiated by other previous epidemiological studies done on acute poisoning and their treatment outcome assessments in Ethiopia (Challa *et al.*, 2015). The death proportion of pregnant and non-pregnant women after acute poisoning emergency management was calculated as 0.17 and 1.01%, respectively, which was much lower than in American and UK studies of suicide attempts presenting to emergency departments. There, self-poisoning had a fatality rate of 1.5% in USA (Spicer & Miller, 2002) and 0.5% in UK (Gunnell *et al.*, 2004).

In terms of gestational week in this present study, 14 (51.9%) of acutely poisoned pregnant women were within the first trimester. This study finding was in agreement with a previous retrospective analytical study on acute poisoning during pregnancy done in Turkey (Karadaş *et al.*, 2011). The majority, with a stated gravida stage in the medical records of the cases, of acutely poisoned pregnant women 13 (48.15%) had multi-gravida pregnancy (i.e. women have been pregnant two or more times (gravida 2, gravida 3, and above)). This current finding was lower than a previous retrospective poisoning study on pregnant women population done in Hungary, 12.2% (Czeizel, 2011).

44 (7.4%) of all women with acute poisoning had a medical history of chronic diseases and all of them were nonpregnant. This was similar to a study at the Emergency Department of Ataturk University in Erzurum-Turkey, where a total of 309 women were registered as suicide attempts with drug intoxication. The pregnant women had a lower rate of a past history of psychiatric illness as compared to non-pregnant women (Uzkeser *et al.*, 2012).

The mean arrival time to the emergency department was 4.14 hours and the duration of hospital stay in most of the cases (483/81.6%), was 24 hours or less. The mean arrival time and duration of hospital stay were closely similar to the acute poisoning study of both sexes in the Gonder teaching hospital, Ethiopia (Adnew and Asrie, 2016).

This study suggests that physicians attempted to manage acute poisonings bases on the clinical toxicology principles. However, there was a lack of approved treatment protocols at both hospital and national levels to guide them, and there was often variation from the international best practices (Aggarwal *et al.*, 2004; HSMDGHS, 2017). For example, gastric decontamination is not recommended as toxicity management for bleach poisoning. However, similar to this study, dilution with milk and water may be attempted in bleach-poisoned patients who are able to tolerate fluid (MOH Singapore, 2011; Anon, 2017; ATSDR, 2014) but there is no specific antidote for bleach poisoning, only supportive therapy. To reduce stricture formation, the following treatments may be considered: bowel rest, proton pump inhibitor, intravenous antibiotics and intravenous steroids (MOH Singapore, 2011).

In most situations, gastric lavage for decontamination of acutely poisoned patients is typically recommended only for a patient presenting within one hour of ingesting a potentially life threatening agent (Greene *et al.*, 2005; American Academy of Clinical Toxicology, 2004). Unfortunately in this study, clinicians used gastric lavage irrespective of time of ingestion; only 38.9% documented as receiving gastric lavage within the recommended one hour period starting from exposure, and in two cases up to 24 h after. This

might be due to lack of training and knowledge, lack of other treatment options, or lack of available specific antidotes at the time of management.

In our study, the use of gut decontamination techniques such as gastric lavage (38.9%) was common and similar to a study done in Spain in 2007 which showed that gut decontamination was done for acute poisoning in 29.84% of the study sample (Putze *et al.*, 2008). Treatment of OP poisoning, secondary to decontamination efforts by gastric lavage, is primarily aimed at reversing the effects of the compound through atropine administration, and was regularly administered. This finding is similar to previous studies (Shaikh *et al.*, 2008; Eddleston *et al.*, 2008; Adinew *et al.*, 2017).

In this study, emesis was used to flush out unabsorbed organophosphates from the stomach of acutely poisoned patients by the practitioners. This finding contrasts with that of Sundaray *et al.* (2010) who stated forced emesis, as gut decontamination technique in oral exposure of organophosphate acute poisoning, had no role. Gastric lavage should not be performed during the routine management of poisoned patients. The serious risks of this procedure usually outweigh the possible benefits. It is unethical to use gastric lavage as a punitive measure (American Academy of Clinical Toxicology, 2004).

In the current study, 3 (11.1%) of the pregnant women came to the emergency department seeking service had taken water as means of pre-hospital intervention of acute poisoning complications. However, 70 (12.4%) of the non-pregnant women had taken milk. According to (Heyerdahl *et al.*, 2008) milk and water are suggested to be useful in the acute phase (the first 1-3 hours) but their effectiveness has not been proven in controlled studies. Milk may compromise urgent esophagogastroduodenoscopy and the heat produced during the chemical reaction might cause additional post-corrosive injuries.

In this study, some management of acute poisoning required administration of antibiotics. This finding is in agreement with Sundaray *et al.* (2010). The possible explanation of using antibiotics during acute poisoning is considering the risk of infection due to frequent and multiple interventions. However, according to Munoz-Bonerand and Gornet (2002), many authors do not recommend antibiotics in the treatment of caustic intoxication due to unconfirmed prescription and fear of antibiotic resistance.

Our study emphasizes acute poisoning and related information in pregnant women, and describes antidotes used. Due to poor documentation in emergency log books, some data were lost. This, in combination with the fact that the study was only on females, may have led to an underestimate of the epidemiology.

CONCLUSION

Acute poisoning, either intentional or non-intentional, in both pregnant and non-pregnant women was common in our community. Some cases of acute poisoning could be preventable through education, and the chemicals used in the community require monitoring. Antidotes for some toxins, including drugs, were not available, and treatment was entirely supportive. Thus we recommend that the following measures be taken:

- Prepare guidelines to manage self-harm patients, train medical personnel, and ensure the availability of cheap antidotes in households and hospitals to reduce the acute poisoning-related morbidity and mortality.
- Female patients coming to emergency department services due to an acute poisoning should have pregnancy tests before any treatment.
- Antidotes for acute poisoning treatment should be available for all women.
- A national monitoring system of self-poisoned pregnant women and other non-pregnant should be established to provide a larger data base.
- A prospective cohort study is vital to assess the full period of the gestational age effects of pregnancy exposure to toxic chemicals up to delivery, and to evaluate chemicals' effects after delivery and during child development.
- The outpatient emergency departments in Addis Ababa government hospitals should implement technology-assisted record-keeping to improve the quality of data management

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