College of Medicine and Health Science

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Department of Emergency Medicine and Critical Care Nursing

Knowledge and Practice towards Initial Management of Acute Poisoning Among Nurses Working at Emergency Department of Sidama Region Hospitals

Msc Thesis

By:

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Knowledge and Practice towards Initial Management of Acute Poisoning Among Nurses Working at Emergency Department of Sidama Region Hospitals

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SCHOOL OF GRADUATE STUDIES

HAWASSA UNIVERSITY ADVISORS' APPROVAL SHEET

This is to certify that the thesis entitled "knowledge and practice towards initial management of acute poisoning among nurses working at emergency department of Sidama Region hospitals" submitted in partial fulfillment of the requirements for the degree of Master's with specialization in Emergency and Critical Care Nursingthe Graduate Program of the School of nursing, and has been carried out by Tamire Adamuunder our supervision. Therefore we recommend that the student has fulfilled the requirements and hence hereby can submit the thesis to the department.

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We, the undersigned, member of the board of examiners of the open defense by Tamire Adamu have read and evaluated her thesis entitled "knowledge and practice towards initial management of acute poisoning among nurses working at emergency department of Sidama Region hospitals" and examined the candidate. This is to certify that the thesis has been accepted in partial fulfillment of the requirements for the degree of Masters of Emergency and critical care nursing.

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DECLARATION

I declare that this thesis is my original work and all sources of materials used for this thesis have been duly acknowledged. I gravely declare that this thesis is not submitted to any other institution anywhere for the award of any academic degree, diploma or certificate.

Name: _____Signature: _____

Place: College of Medicine and Health Science, Hawassa University, Hawassa

Date of Submission: _____

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ABBREVIATIONS

ABC	Airway, Breathing, Circulation
ED	Emergency Department
FMOH	Federal Ministry of Health
ICU	Intensive Care Unit
IRB	Institution Review Board
OPP	Organophosphate Poisoning
SPSS	Statistical Package for Social Science
WHO	World Health Organization

ABSTRACT

Introduction: Acute poisoning remains a common medical emergency worldwide. It is an important health problem, which cause both morbidity and mortality globally.Even though acutely poisoned patients have been visited emergency department and got emergency care, so many people died from poisoning worldwide.Emergency department nurses' knowledge and practice can affect the early management of poisoning. However, limited information is available regarding the level and factors associated with nurses' knowledge and practice on initial management of acute poisoning.

Objective: To assess knowledge, practice and its associated factors of initial management of acute poisoning among nurses at emergency department of hospitals in Sidama Region, Ethiopia.

Methods and Materials: Institutional based cross sectional study was conducted at emergency departments at 10 selected Hospitals found in Sidama Region from April to May 2023 on 182 nurses. Structured and self-administered questionnaire was used for data collection. Collected data were entered in to Epi-data version 3.1 and transported to SPSS version 20 for analysis. Bi-variate and multivariable logistic regression were performed to identify factors. Statistical significances were set at p-value less than 0.25 and less than 0.05 during bi-variate and multivariable logistic regression respectively.

Results: The study was conducted among 182 nurses, with a response rate of 98.4%. From total 99 (54.4%) (Mean =6.6, SD±2.5) and 69 (37.9%) (Mean =6.5, SD±2.3) of nurses had good knowledge and good practice on acute poisoning management respectively.Nurses; 30-39 and ≥40 years old were 93% (AOR=0.066, 95% CI (0.012-0.355)) and 98% (AOR=0.023, 95% CI (0.002-0.247)) less likely knowledgeable compared to nurses 20-29 years old respectively. Trained nurses on acute poisoning management were three times (AOR=3.186, 95% CI (1.553-6.538)to have good knowledgethan those they are not trained. Nurses trained on acute poison management were 5.4 times more likely to have good practice compared with not trained (AOR=5.377, 95% CI (2.595-11.143).

Conclusion: Generally more than half of nurses had good knowledge, but less than half of nurseshad good practice on acute poison management. Age and training are significantly associated factors with knowledge. Training is a significant associated factor with practice of

nurses. We recommend hospital managers to use young adult and trained nurses at emergency department for poison management.

1. INTRODUCTION

1.1. Background

Poison is defined as any substance that can cause morbidity or mortality by producing general or local destruction of parts of the body (Hakim, Khurshid, Mufti, Krishan, & Singh, 2014).It happens when substances ingested, inhaled, injected, or absorbed through the skin into the body to cause damage to the body cells (Kara, Bayir, Degirmenci, Akinci, Ahmet, & Kayis, 2014); which occur during occupationaland environmental exposure or during dailyroutine activities at homeintentionally or accidentally(WHO, 2021).

Exposure to a poison in a short period of time or on one occasioncan cause acute poisoning (Malangu & Ogunbanjo, 2009).It is a life threatening condition; which needs critical care from nurses at emergency department (ED). Initial life support, decontamination, administration antidoteand enhanced elimination are the four main nurses' care elements given for poisoned patients (Mohamed, 2020).

Poisoned patientswith serious toxic consequences require immediate treatment. Like other emergency patients poisoned patients need stabilizing the airway, breathing, and circulation initially. To start initial management for acute poisoning, nurses should identify the poison via history, laboratory test, or toxidrome (Chandran & Krishna, 2019).

Nurses are the first health care providers contact with poisoned patients at emergency department. Early and critical judgments are required from nurses.Nurses' knowledge and skills about acute poisoning and its management are critical to their practice on initial management of acute poisoning and overall patient outcomes. Therefore to identify and treat poisoning properly; all nurses at emergency department must be aware the clinical priorities in

initial poisoning management (health; Rutto, Mwaura, Chepchirchir, & Odero, 2012). So; it is critical to assess nurses' knowledge and practice on initial management on acute poisoning.

1.2. Statement of the Problem

Poisoning is a major health problem causes both morbidity and mortality globally (Susic, Ketis, Grzinic, & Kersnik, 2010).More than three million poisonings andmore than one fourth million deaths occurred worldwide annually and 99% of the death occurred in developing countries (Susic, Ketis, Grzinic, & Kersnik, 2010).

In the United States of America, poison control centers handle an average of one poison exposure every 15 seconds (Betten, Vohra, Cook, & et, 2006). A study done at emergency centers of government hospitals in northwest Ethiopia revealed that the incidence of acute poisoning is 1.1% from all emergency centre presentations with 35% and 25% patients poisoned with organophosphate and bleaching agents respectively (Adinew, Woredekal, DeVos, Birru, & Abdulwahib, 2017).

Information like poison eaten, the dose consumed, the time length since ingestion, clinical aspects, patient variables, and geographic location must be assessed to give emergency management at ED. Emergency department’s nurses should be equipped with the professional knowledge and skills to assess the patients’ and family structure to enable them to deal with a poisoned patient professionally and collect information preferably (Esayas & Belayneh, 2016).

Some studies have mentioned several risk factors of high prevalent morbidity and mortality of poisoned patients, like lack the necessary antidotes, screening tests, proper treatment protocols or low level of professional knowledge and practice about poising management are the most significant factors (Hoving, Veale, & ller, 2011). Although, nurse’s knowledge and practice about poising management play a vital role in the accurate assessment and treatment of

poisoning; the global nurse's level of knowledge and practice towards acute poisoning assessment and treatment still very low (Boyle, Bechtel, & Holstege, 2009).

Socio demographic characteristicsof nurses like level of education, years of experience and training are significantly associated with knowledge and practice of nurses towards initial management of acute poisoning(Rutto, Mwaura, Chepchirchir, & Odero, 2012).A study show lack of training in the facility, professional qualification, lack of updated guidelinesin the hospital, and lack of time to update themselves dueto patient overcrowdingwere some of the factors for nurses to have inadequate knowledge and practice to manage acute poisoning(Degu, Abebe, Gemeda, & Bitew, 2021).

Studiesrevealed that providing consistent training and accessingupdated poisoning management guidelines improved nurses' knowledge and practice of on theinitial management of acute poising(Mohammed, Abdelaziz Ismail, Nagy, Al-Metyazidy, & Allam, 2021; Rayisyan, Zakharova, & Babaskina, 2021).

As far as my knowledge, there are no researches conducted on knowledge, practice and its associated factors of initial management of acute poisoning in Ethiopia at Regional level by including primary, general and referral hospitals. Therefore, this institutional -based cross-sectional study aimed to assess knowledge, practice, and its associated factors towards initial management of acute poisoning by using data from a sample of nurses who works in emergency departments of hospitals in Sidama Region, Ethiopia.

1.3. Significance of the Study

In Ethiopia currently there is increase the incidence of acute poisoning. When we come to the initial and critical assessment and management of poisoned casualties; ED nurses are health professionals often at the forefront. Nurses' knowledge and practice on initial management of

poisoning influence the overall patient outcome. Acute poisoning is one of the major health problems for emergency cases, which results in high morbidity, mortality, and economic burden to the patient, their family, and the community.

Little is known about nurses' knowledge, practice, and its associated factors towards initial management of acute poisoning in some countries, including in Ethiopia. Due to these reasons, I become initiated to know the level of knowledge and practice of nurses' towards initial management of acute poisoning. Therefore, this study assessed nurses' knowledge, practice, and associated factors towards initial management of acute poisoning.

As a result the current study will provide baseline information about nurses' knowledge and practice on initial management of acute poisoning and will identify potential factors associated with nurses' knowledge and practice. The findings will also help the federal ministry of health (FMOH), Sidama Region health office and other stakeholders to set plans to improve nurses' knowledge and practice of acute poison management.

1.4. Literature Review

1.4.1. Overview of acute poisoning

Poisoning is a medical emergency; irrespective of the amount and nature of ingested poison; and patients visited to the hospital at the earliest possible time. It is a common presentation that requires early management decisions by avoiding unnecessary investigation and intervention to ensure an optimal patient outcome. Medical personals at ED give emergency services to save the life of the patient(WHO, 2021).

1.4.2. Prevalence of acute poisoning

The prevalence of acute poisoning varies on differences in socioeconomic and cultural. The prevalence of acute poisoning ranges from 0.77% to 1.2% reported by studies done in

Africa(Mbarouk, Sawe, Mfinanga, & et, 2017; Adinew, Asrie, & Birru, 2017; Adinew, Woredekal, DeVos, Birru, & Abdulwahib, 2017).

A study conducted in North Gondar administrative zone governmental hospital by reviewing chart retrospectively to describe the epidemiology of poisoning show 48,619 patients visited emergency center during the study period. From those 1.1% patients were poisoning cases, 60% females, and 55% were 15 up to 24 years aged patients(Adinew, Woredekal, DeVos, Birru, & Abdulwahib, 2017). Another study done at Ambo University Referral Hospital and Ambo General Hospital in Ethiopia shows the incidence of acute poisoning was 1.7%(Tefera & Teferi, 2020).

1.4.3. Impact of acute poisoning on clinical outcomes of patients

Poisoning is one of the reasons causing morbidity and mortality globally. More than one million illnesses occur per year in the world(Usha, Jose, Sebastian, & Wagle, 2017). Poisoning is the fourth leading cause of accidental injury next to road traffic accidents, burns, and drowning (Usha, Jose, Sebastian, & Wagle, 2017).Poisoning becomes a common public health problem globally. A study done in United Kingdom (UK) shows 10% of acute medical admissions were poisoning cases. This study also showed majority of patients were recovered by good supportive care; less than 1% patients are died from acute poisoning (Malangu, 2008).Another study done in Asia indicates death among 10-50 years old women 44% were due to poisoning (Unnikrishnan, Singh, & Rajeev, 2005).

A study conducted in Addis Ababa at Burn, Emergency, and Trauma Hospital in Ethiopia shows; half (48.9%) of the poisoned patients stayed for more than 24 hours in the ED (Biruktawit, Menbeu, & Ayalew, 2021).Prolonged hospital stays more than 24 hours at ED leads to a higher rate of mortality (Forero, Hillman, McCarthy, Fatovich, Joseph, &

Richardson, 2010). A study done by Biruktawit et al shows 14.2% poisoned patients were admitted to Intensive Care Unit (ICU), and 10.2% poisoned patients were died in the hospital (Biruktawit, Menbeu, & Ayalew, 2021). Another cross-sectional study done in Ethiopia at emergency department of HiwotFana Comprehensive Specialized Hospital from 1 January 2016 to 31 December 2020 revealed that 16.7% poisoning cases died from all poisoned patients visited the ED during the study period (Nigussie, Demeke, Getachew, & Amare, 2022).

1.4.4. Initial management of acute poisoning

Emergency department staff should be aware of the necessity of taking universal measures to prevent cross contamination during the initial evaluation, depending on the nature of the poison (e.g. organophosphates, cyanide). To protect airway, adequate ventilation and hemodynamic stability heath givers should be follow an ABC-approach should be followed(Flomenbaum, Goldfrank, Hoffman, Howland, Lewin, & Nelson, 2006).The two cornerstone of poisoning treatment; supportive and symptomatic care must be given for the poisoned patient by keeping under close observation with frequent re-evaluationof vital signs and level of consciousness(Erickson, Thompson, & Lu, 2007).

1.4.5. Knowledge and practice status of nurses on initial management of acute poisoning

1.4.5.1.Knowledge status of nurses on initial management of acute poisoning

A study done at poisoning center in Al-Mansura city, emergency department in Al-Manzalacentral hospital and El-Salam hospital show that more than half (54.3%) of the study participants have poor knowledge about toxicological emergencies (Amal, Hayat, & Sawsan, 2021).

Based on a result of a study conducted in Egypt, 100% study participants have unsatisfactory knowledge level (< 75%) regarding detection and management of acute drug poisoning (El-Sayed, Youssef, Alshekhepy, & Elfeky, 2015). [26]. Similarly, another study done at emergency department of two Public hospitals in Hawassa town, Southern Ethiopia showed, allnurses (100%) participated in the study havepoor knowledge (Beyene, Kebede, & Abebe, 2016).

1.4.5.2.Practice status of nurses on initial management of acute poisoning

A study done at poisoning center in Al-Mansura city, emergency department in Al-Manzala central hospital and El-Salam hospital revealed that near to one fourth (23.5%) of the study participants havenot acceptable practices about toxicological emergencies (Amal, Hayat, & Sawsan, 2021).Another study done by Hui et al showed that53% of nurses have inadequate practices to manage acute poisoned patients andfail to assess, diagnose, plan, and provide evidence-basedinterventions(Hui, Hon, & Leung, 2021).

An institutional-based cross-sectional study conductedin Bahir Dar city on two public hospitals in Ethiopia shows 37.8% among 422 nurses had no good practice on initial management of acute poisoning(Adal, Hiamanot, Zakir, Regassa, & Gashaw, 2023).Another study conducted in Ethiopia atSouth Gondar zone hospitalsrevealed that more than half of nurses (62.3%) had inadequate practicein the initial management of acute poisoning(Tassew, et al., 2021).

1.4.6. Factors associated with nurses' knowledge and practice on poison management

Health care givers' knowledge and practice about acute poisoning are very essential for initial management of acute poisoning and for good patient outcomes. Knowledge of the typical pattern of poisoning in a given region of the country would help for early diagnosis and care of

poisoning, which is important to reduce morbidity and mortalityof patients in developed countries. However, in most developing countries, preventable deaths happened because of delayed initiation of resuscitative efforts for poisoned patients(RCH, 2021; Chelkeba, Mulatu, Feyissa, Bekele, & Tesfaye, 2018).

A study done in Kenya revealed that socio demographic characteristicsof nurses like level of education, age, gender, years of experience and training have effect on the initial management of acute poisoning(Rutto, Mwaura, Chepchirchir, & Odero, 2012). Conversely, a study at the National Center for Clinical and Environmental Toxicology in Egypt by YahiaEl.Sayed et al revealed no correlations between variables like age, years of experience, total knowledge scores, and total practice scores regarding detection and management of acute drug poisoning.But this study shows that there was a high significant statistical difference between the mean practice scores in relation to qualifications. Diploma nurses' mean practice scores were higher compared to technical institute nurses' mean practice scores(Yahia, Warda, Hisham, & Hanaa, 2010).

1.4.7. Conceptual framework

Figure 1 shows a conceptual framework for assessment of knowledge, practice and associated factors towards initial management of acute poisoning among nurses work at emergency department developed from different studies(Rutto, Mwaura, Chepchirchir, & Odero, 2012; Beyene, Kebede, & Abebe, 2016).

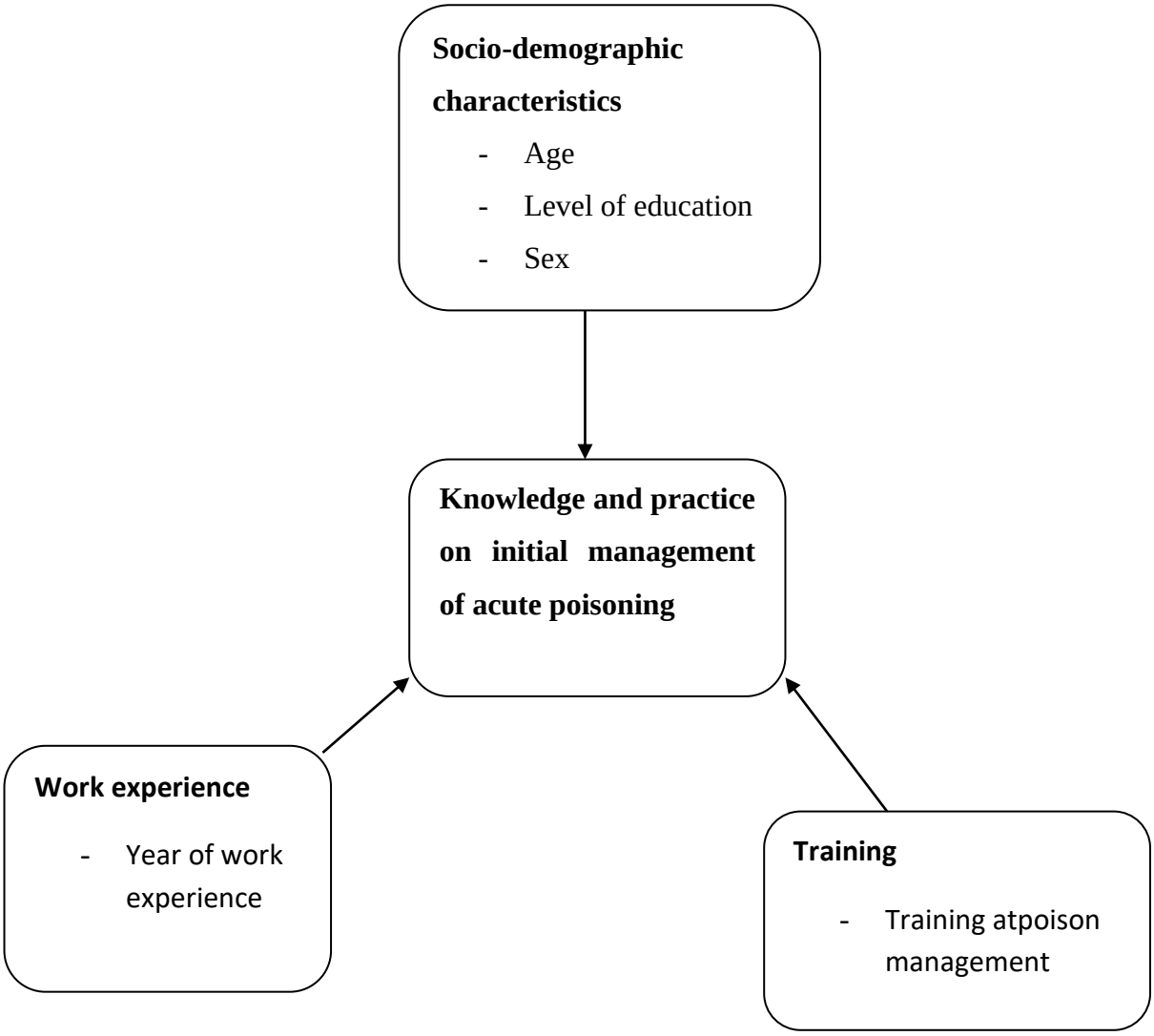

Figure 1: Adapted conceptual framework for assessment of knowledge, practice and associated factors towards initial management of acute poisoning among nurses working at Sidama Region hospitals 2023

2. OBJECTIVES

2.1. General Objective

- To assessknowledge, practice and associated factors towards initial management of acute poisoning among nurses working at emergency department of hospitals in sidama region, Ethiopia 2023

2.2. Specific Objectives

- To assess nurses' knowledge on initial management of acute poisoningamong nurses working at emergency department of hospitals in sidama Region, Ethiopia 2023.
- To assess nurses' practice on initial management of acute poisoningamong nurses working at emergency department of hospitals in sidama Region, Ethiopia 2023.
- To identify factors associated with nurses' knowledge on initial management of acute poisoningamong nurses working at emergency department of hospitals in sidama Region, Ethiopia 2023.
- To identify factors associated with nurses' practice on initial management of acute poisoningamong nurses working at emergency department of hospitals in sidama Region, Ethiopia 2023.

3. METHODS AND MATERIALS

3.1. Study Setting

The study was conducted in 10 public hospitals found in Sidama Region, Ethiopia. Sidama region is a newlyestablished region in Ethiopia. Hawassa city is the capital city of the region, situated at 273 km far from Addis Ababa, the capital city of Ethiopia. Sidama Region has 36 districts (woredas), 674 public health institutions; one comprehensive specialize hospital, five general hospitals, fifteen primary hospitals, one hundred thirty health centers and five hundred twenty two health posts. Three hundred nurses have been working at ED of hospitals in Sidama Region and a total of 155 beds found at ED in 21 hospitals. Nurses who are working in ten selected hospitals at ED were 190; 45 in Hawassa university comprehensive specialized hospital, 21 in Adare general hospital, 17 in Leku general hospital, 19 in Yirgalem general hospital, 17 in Tula primary hospital, 14 in chuko primary hospital, 15 in Dore primary hospital, 13 in Yirba primary hospital, 15 in Aletawondo primary hospital and 14 in Hantate primary hospital.

3.2. Study Design and Period

Institutional based cross-sectional study design was applied from April to May 2023.

3.3. Population

3.3.1. Source population

All nurses who have been working at emergency department of public hospitals found in Sidama Region were the source population.

3.3.2. Study population

All nurses who have been working at selected emergency department of public hospitals found in Sidama Region were the study population.

3.4. Inclusion and Exclusion Criteria

3.4.1. Inclusion criteria

Nurses; working at ED in selected public hospitals found in Sidama Region;during data collection period were included.

3.4.2. Exclusion criteria

Nurses on annual, maternity or sick leave during data collection period were excluded from the study.

3.5.Sample Size Determination

Sample size for the first objective was calculated using a single population proportion formula as follows. Proportion (P) of satisfactory level of knowledge of nurses' on initial management of poisoning among nurses in studies conducted in DessieHospitals in Amhara region, Ethiopia was 42.5%(Abebe, Kassaw, & Shewangashaw, 2019). To calculate the sample size I took the proportion 0.425, which is near to 0.5, since it gives largest sample size. Marginal error (d) 5% and 95% confidence level were considered.

$$n = \frac{(Z\alpha/2)^2 * P\,(1-P)}{d^2}$$

$$= \frac{(1.96)^2 * 0.425(1-0.425)}{(0.05)^2}$$

$$= \frac{3.8416 * 0.2444}{0.0025}$$

$$= 375.555$$

$$= 376$$

Since the source population was less than 10,000; correction formula was used to get representative sample size(Getu D. and Tegbar Y., 2006).

$$Nf = \frac{ni}{(1+(ni/N))}$$

$$= 375.56$$

$$(1+ (375.56/300))$$

$$= 166.78$$

$$= 167$$

After considering, 10% non-response rate the final sample size became 184.

Sample size for the second objective is calculated using a single population proportion formula. Proportion (P) of practice of nurses' on initial management of poisoning among nurses in a study conducted at Debre Tabor Hospitals in Amhara Region, Ethiopia was 52.3% (SheganewFeteneTassew et al., 2022). To calculate the sample size I took the proportion 0.523, and marginal error (d) 0.05 and 95% confidence level were considered.

$$n = \frac{(Z\alpha/2)^2 * P (1-P)}{d^2}$$

$$= \frac{(1.96)^2 * 0.523 (1-0.523)}{(0.05)^2}$$

$$= 3.8416*0.249471$$

$$0.0025$$

$$= 383.347$$

$$= 383$$

Since the source population is less than 10,000, use the correction formula to get representative sample size (Getu D. and Tegbar Y., 2006).

$$Nf = \frac{ni}{(1+ (ni/N))}$$

$$= \frac{383.347}{(1+ (383.347/300))}$$

$$= 168.296$$

$$= 168$$

After considering, 10% of non-response rate the final sample size became 185.

Therefore, the sample size calculated for the second objective 185 was the final sample size used for this study because it was the largest sample size calculated, important to get precise result and sufficient to address the other targeted objectives.

3.6.Sampling Techniquesand Procedures

Nurses who have been working at ED in 21public hospitals found in Sidama Region were 300. Ten hospitals were selected by lottery method after stratifying hospitals as referral, general and primary. By considering ≥30% representatives from stratified hospitals; one, three and six hospitals were selected from referral, general, and primary hospitals respectively. Based on this Hawassa university comprehensive specialized hospital,Adare general hospital, Leku general hospital,Yirgalem general hospital, Tula primary hospital, chuko primary hospital, Dore primary hospital, Yirba primary hospital, Aletawondo primary hospital and Hantate primary hospital were selected.

Since all 10 hospitals have no similar numbers of nurses, the sample was proportionally allocated. Then 185 study participants were selected using simple random sampling technique from nurses working in 10 selected public hospitals.So, the calculated samples from each

hospital were selected by using simple random sampling method after having their respective names of nurses. Nurses (185) from the above selected hospitals were participated in this study.

Table 1: Proportional allocation of sample size

Sr. No.	Hospitals	Total nurses at emergency department	Nurses who will be selected
1	Hawassa university comprehensive specialized hospital	45	44
2	Adare general hospital	21	20
3	Leku general hospital	17	16
4	Yirgalem general hospital	19	18
5	Tula primary hospital	17	16
6	Chuko primary hospital	14	14
7	Dore primary hospital	15	15
8	Yirba primary hospital	13	13
9	Aletawondo primary hospital	15	15
10	Hantate primary hospital	14	14
	Total	**190**	**185**

Figure 2: Schematic representation of sampling procedure to assess knowledge and practice towards initial management of acute poisoning among nurses working at emergency department of Sidama Region hospitals, 2023

3.7. Data Collection Tools and Procedures

Data was collected using self-administered structured questionnaire adapted and modified from previous studies (Abebe, Kassaw, & Shewangashaw, 2019; Rutto, Mwaura, Chepchirchir, & Odero, 2012). First of all a questionnaire was developed in English and translated to Amharic to check its consistency. The data was collected by using the English version questionnaire.

Two diploma holder nurses and one BSc holder nurse were recruited as data collectors and supervisor respectively.Both the data collectors and supervisor were trained for one day before data collection started. Then after every day they were met at a common place by specific time so that the supervisor checked the completeness and the consistency of the collected data. They were discussed about the issues they faced during data collection.

3.8. Study Variables

3.8.1. Dependent variables

- knowledge of nurses
- practice of nurses

3.8.2. Independent variables

- Socio-demographic variables
    - ✓ Age
    - ✓ Level of education
    - ✓ Sex
- Training at poison management
- Work experience

3.9. Operational Definitions

Acute poisoning: When the body is exposed to a toxic substance in a high dose, on one occasion and during a short period of time. Symptoms develop in close relation to the exposure of poison with a short time (Rutto, Mwaura, Chepchirchir, & Odero, 2012).

Knowledge: Nurses have good or poor knowledge when they score ≥75% and <75% from the given knowledge based acute poisoning questions respectively (Adal, Hiamanot, Zakir, Regassa, & Gashaw, 2023; Rutto, Mwaura, Chepchirchir, & Odero, 2012).

Practice: Actual provision of nursing care using the nursing process to poisoned patients. Good and poor practice when nurses score ≥75% and <75% score from the given knowledge based practice questions respectively (Adal, Hiamanot, Zakir, Regassa, & Gashaw, 2023; Rutto, Mwaura, Chepchirchir, & Odero, 2012).

3.10. Data Quality Control Measures

Both the data collectors and supervisor were trained for one day on issues like how to collect data and what to be collect. Further the objective, confidentiality of information, relevance of the study and respondent's rights, informed consent, and techniques of questioner administration were notified for them. The training was strongly emphasizes on the separate role of the supervisor and data collectors. The completeness and consistencies of questionnaires were checked by supervisor to ensure the quality of the collected data. The investigator was assessed the quality of data before data entry and during analysis stage by verify the completeness of the collected data. The questionnaire was prepared in English. The questionnaire was assessed for clarity through pre-test by taking 5% (n=10) of sample size

from outside of selected hospitals and questions that were difficult to understand and respond was rephrased.

3.11. Data Processing and Analysis

Data was checked for completeness and consistence at first, then code was given and entered into Epi-data version 3.1. Then, data was exported to Statistical Package for Social Science (SPSS) version 20 for analysis. Frequency distributions, percentages and ratios were computed to describe variables and presented by numbers, table or figures.

Bi-variate and multivariable logistic regression were used for analysis. Bi-variate analysis wasused to identify candidate variables for multivariable logistic regression. Variables having p-values <0.25 in bivariate analysis were entered into the multivariable logistic regression model to adjust for confounders. Binary logistic regression was employed to determine the odds ratio for both bivariate and multivariate analysis. Multivariate logistic regression analysis with 95% confidence interval was calculated for statistical significance after Homer-Lemeshow checked for model fitness.Those variables having p-value less than 0.05 during multivariable analysis were considered statistically significant associated variable. Adjusted odds ratio (AOR) was computed to assess the strength of association between the dependent and independent variables.

3.12. Ethical Consideration

Ethical approval to start the study was primarily obtained from Institutional Review Board (IRB) of Hawassa University. Then permission was obtained from each selected Hospitals. Informed consent was taken from the nurses before starting data collection. For COVID-19 prevention; standard face mask and sanitizer were used by data collectors. Information was kept confidential using pseudonymous code.

4. RESULTS

4.1. Socio-Demographic Characteristics

Out of the total 185 study subjects providing nursing care at ED; 182 were participated in this study. This shows the response rate was 98.4%. Among 182 respondents majority of them 114 (62.6%) were male nurses. The median age of the respondents was 30 (Range= 21-51) years. Majority, 167 (91.8%) of the study subjects were below the age of 40 year. More than two third, 132 (72.5%) of the nurses were BSc degree holder and above. Half 91 (50.0%) of respondents had <5 years of work experience.The median work experience was 4.5 (range=1-25) years.More than half97 (53.3%) of the nurses were trained on management of acute poisoning after first qualified as a nurse (Table 2).

Table 2: Socio-demographic characteristics of study participants' of public hospitals in Sidama Region, 2023

Variables		Frequency (n)	Percent (%)
Sex	Female	83	37.4
	Male	114	62.6
Age (years)	20-29	85	46.7
	30-39	82	45.1
	≥40	15	8.2
Educational status	Diploma	50	27.5
	BSc degree and above	132	72.5
Work experience	<5 years	91	50.0
	5-10 years	63	34.6
	>10 years	28	15.4
Trained on acute poisoning	Yes	97	53.3
	No	85	46.7

4.2. Knowledge of Nurses on Management of Acute Poisoning

From total respondents, more than half 99 (54.4%) nurses had good knowledge level on initial management of acute poisoning based on 10knowledge assessment questions.The mean score of the general knowledge of nurses on initial management of acute poisoning was 6.6 (SD±2.5). Majority, 168(92.3%) of nurses defined poison as a substance that produce body damage. From the total knowledge related questions; "Dry mouth, abdominal pain and salivation are alimentary signs and symptoms of acute poisoning during early stages include?" was correctly answered by minimum nurses 105 (57.7%) (Table 3).

Table 3: Knowledge towards initial management of acute poising among Nurses in Sidama Region Hospitals, Ethiopia 2023

Knowledge towards initial management of acute poising	Yes N (%)	No N (%)
Poison is any substance capable of producing organ damage or dysfunction by its chemical activity?	168 (92.3)	14 (7.7)
Considering the dose ingested and time of ingestion are very necessary when managing poisoning cases at ED?	125 (68.7)	57 (31.3)
As an emergency department nurse it is always very important to treat the patient not the poison?	113 (62.1)	69 (37.9)
The commonest cause of poisoning in developing countries is pesticide poisoning?	117 (64.3)	65 (35.7)
Women are more likely to take deliberate poison in general population to commit suicide than men?	124 (68.1)	58 (31.9)
Dry mouth, abdominal pain and salivation are alimentary signs and symptoms of acute poisoning during early stages include?	105 (57.7)	77 (42.3)
Table 3 continued		
In case of organophosphate poisoning atropine should be administered in any circumstance?	116 (63.7)	66 (35.3)
Gastrointestinal decontamination is done based upon the specific poison ingested, time from ingestion to presentation and the predicted severity of the poisoning?	106 (58.2)	76 (41.8)
Emesis is considered for an alert and conscious patient who has ingested a substantial amount of a toxic substance within 60 min of presentation?	114 (62.6)	68 (37.4)
Some of the poisonings accident encountered at emergency department have not specific antidote?	106 (58.2)	76 (41.8)

When nurses score ≥75% (≥8) and <75% (<8) from the given knowledge based acute poisoning questions; we say nurses have good and poor knowledge on acute poison management respectively. Generally; more than half 99 (54.4%) nurses and 83 (45.6%) nurses had good and poor knowledge level on initial management of acute poisoning respectively (Fig 3).

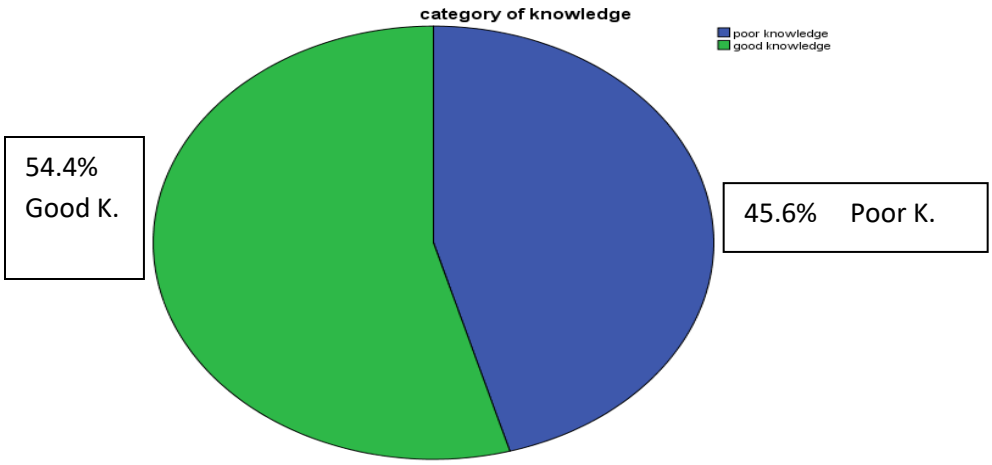

Figure 3: Knowledge level towards initial management of acute poising among Nurses in Sidama Region Hospitals, Ethiopia 2023

4.3. Practice of Nurses towards Initial Management of Acute Poising

From total respondents, near to one third69 (37.9%) nurses only had good practice level on initial management of acute poisoning (Figure 4).The mean score of the general practice of nurses on initial management of acute poisoning was 6.5 (SD±2.3). The mean score was less than the score used to determine the practice level of nurses (7.5). It indicates majority of the practice scores are below the standard.

Majority 166 (91.2%) of nurses always maintaining adequate airway, respiration and circulation as a priority measure during initial management of acute poisoning. More than half105 (57.7%) of nurses administered atropine always in any circumstance of organophosphate poisoning. More than third fourth,148 (81.3%) of nurses always decide to

perform Gastrointestinal (GI) decontamination based upon the specific ingested poison, time gap from ingestion to presentation, and the predicted severity of the poison. Less than half, 61 (33.5%) of nurses do gastric decontamination for patients presenting following ingestion of controlled/ slow released substances even after a longer delay more than 2-4 hours (Table 4).

Table 4: Practice of nurse towards initial management of acute poising among in public hospitals in Sidama Region, Ethiopia 2023

Practice of nurse	Yes N (%)	No N (%)
Did you have given priority always for maintaining adequate airway, respiration and circulation for severe acute poisoning?	166 (91.2%)	16 (8.8%)
Did you have administered atropine in any circumstance in case of organophosphate poisoning?	105 (57.7%)	77 (42.3%)
Did you have performingGastrointestinal decontamination based upon the specific poison(s) ingested, time from ingestion to presentation and the predicted severity of the poisoning?	148 (81.3%)	34 (18.7%)
Did you have doing emesis for an alert and conscious patient ingested a substantial amount of a toxic substance within 60 min of presentation?	150 (82.4%)	32 (17.6%)
Did you haveusing activated charcoal to decrease absorption of a wide range of poisons from the gastro-intestinal tract to the entire human system?	128 (70.3%)	54 (29.7%)
Did not you performing gastric lavage for patient ingested kerosene or corrosive substances within an hour of presentation?	112 (61.5%)	70 (38.5%)
Did not you have performing gastric lavage to increase the effectiveness of gastric lavage for poisons which have large time between ingestion and presentation at ED?	110 (60.4%)	72 (39.6%)
Did you have measure the volume of lavage fluid aspirated and the amount of fluid given?	108 (59.3%)	74 (40.7%)
Did you have doing gastric decontamination for patients presenting following ingestion of controlled/ slow released substances even after a longer delay more than 2-4 hours?	61 (33.5%)	121 (66.5%)
Did you have using your facility's management of acute poisoning guideline during care of acutely poisoned person?	72 (60.4%)	110 (39.6%)

When nurses score ≥75% (≥8) and <75% (<8) from the given practice based acute poisoning questions; we say nurses have good and poor practice on acute poison management respectively. From the total respondents, 69 (37.9%) and 113 (62.1%) of nurses had good practice and poor practice toward initial managements of acute poisoning respectively (Fig 4).

Figure 4: Practice of nurse towards initial management of acute poising among in public hospitals in Sidama Region, Ethiopia 2023

4.4. Factors Affecting Nurses' Knowledge and Practice on poison Management

4.4.1. Factors affecting nurses' knowledge on poison management

Among factors; age, work experience and training were candidate for inclusion in the multivariate model during bivariate logistic regression analysis and entered into multi-variable logistic regression model. In multivariable logistic regression analysis both training and age were significantly associated with knowledge of nurses on management of acute poisoning. Nurses; 30-39 and ≥40 years old were 93% (AOR=0.066, 95% CI (0.012-0.355)) and 98% (AOR=0.023, 95% CI (0.002-0.247)) less likely knowledgeable than nurses who have 20-29 years of age respectively. Poison management trained nurses were 3.2times better knowledge compared with those who are not trained (AOR=3.186, 95% CI (1.553-6.538) (Table 5).

Table 5: Factors associated with knowledge of nurses on initial management of acute poisoning at emergency department in public hospitals, Sidama Region, Ethiopia 2023

Variables		Knowledge of nurses		COR (95% CI)	AOR (95% CI)	P-value
		Good N (%)	Poor N (%)			
Sex	Female	34 (50.0)	34 (50.0)	1	NA	
	Male	65 (57.0)	49 (43.0)	1.237 (0.726-2.42)		

Age	20-29 years	70 (82.4)	15 (17.6)	1		
	30-39 years	25 (30.5)	57 (69.5)	0.094 (0.045-0.195)	0.066 (0.012-0.355)	0.003 *
	≥40 years	4 (26.7)	11 (73.3)	0.078 (0.022-0.278)	0.023 (0.002-0.247)	0.002 *
Educational level	Diploma	30 (60.0)	20 (40.0)	1	NA	
	BSc degree	69 (52.3)	63 (47.7)	0.730 (0.377-1.414)		
Work experience	< 5 years	70 (76.9)	21 (23.1)	1		
	5-10 years	19 (30.2)	44 (69.8)	0.130 (0.063-0.268)	1.494 (0.276-8.082)	0.641
	>10 years	10 (35.7)	18 (64.3)	0.167 (0.067-0.416)	3.944 (0.547-28.45)	0.174
Training	No	31 (36.5)	54 (63.5)	1		
	Yes	68 (70.1)	29 (29.9)	4.085 (2.198-7.590)	3.186 (1.553-6.538)	0.002 *

1: reference category, AOR: adjusted odds ratio, COR: crude odds ratio, CI: confidence interval, NA: not allowed, *: significantly associated variables have p value <0.05

4.4.2. Associated Factors withpractice of nurses on management of poisoning

Among factors; age, work experience and training were thesignificant variablesassociated with practice of nurses on management of acute poisoning during binary logistic regression analysis.

Nurses trained on acute poison management were 5.4times more likely to have better practice compared with those they are not trained(AOR=5.377, 95% CI (2.595-11.143) (Table 6).

Table 6: Factors associated with practice of nurses on initial management of acute poisoning at emergency department in public hospitals, Sidama Region, Ethiopia 2023

Variables		Practice of nurses		COR (95% CI)	AOR (95%CI)	p-value
		Good N (%)	Poor N (%)			
Sex	Female	22(32.4)	46 (67.6)	1	NA	
	Male	47 (41.2)	67 (58.8)	1.467 (0.781-2.755)		

Age	20-29 years	50 (58.8)	35 (41.2)	1		
	30-39 years	13 (15.9)	69 (84.1)	0.132 (0.063-0.275)	0.397 (0.090-1.747)	0.222
	≥40 years	6 (40.0)	9 (60.0)	0.467 (0.152-1.430)	0.733(0.078-6.895)	0.786
Educational level	Diploma	22 (44.0)	28 (56.0)	1	NA	
	BSc degree and above	47 (35.6)	85 (64.4)	0.704 (0.363-1.365)		
Work experience	< 5 years	49 (53.8)	42 (46.2)	1		
	5-10 years	10 (15.9)	53 (84.1)	0.162 (0.073-0.357)	0.736(0.162-3.352)	0.692
	>10 years	10 (35.7)	18 (64.3)	0.476 (0.198-1.143)	1.802(0.262-12.392)	0.549
Training	No	15 (17.6)	70 (82.4)	1		
	Yes	54(55.7)	43 (44.3)	2.692 (1.437-5.043)	5.377(2.595-11.143)	<0.001*

1: reference category, AOR: adjusted odds ratio, COR: crude odds ratio, CI: confidence interval, NA: not allowed, *: significantly associated variables have p value <0.05

5. DISCUSSION

In developing countries, a number of patients suffered from intentional ingestion of poisonous substances come to emergency room; however, the knowledge and practice of nurses in managing those poisoned patients are not sufficiently recognized.

According to this study, 54.4% of nurses had good knowledge of initial management of acute poisoning. This knowledge level is in linedwith the result of the study done at Bahir Dar City; Northwest Ethiopia reported 58.8%(Adal, Hiamanot, Zakir, Regassa, & Gashaw, 2023). The knowledge level of nurses in the current study was also in lined with the study conducted at Dessie referral hospital in Amhara Region showed 57.5% (Abebe, Kassaw, & Shewangashaw, 2019).Level of nurses' knowledge on poison management resulted from our study is higher than the study conducted by Mohammed et al. reported 25% of nurses had satisfactory knowledge (Mohammed, Abdelaziz Ismail, Nagy, Al-Metyazidy, & Allam, 2021). The variation of results occurred between these studies might be due to the differences at sampling methods and study settings. The current study was done on ten hospitals by using a simple random sampling method, whereas, a study done by Mohammed et al. was done on a single institution using a convenience sampling method.The knowledge level of nurses on poison management resulted from the currentstudy is lower than the study done at South Gondar reported 88.5% (Tassew, et al., 2021).These variation of results occurred between our study and a study done at Debre Tabor comprehensive specialized hospital might be due to the differences at sample size and study settings. Ten hospitalsand 185 sample nurses were included to the current study; rather, a study done at Debre Tabor comprehensive specialized hospital involve 149 samples from one hospital only.

The current study showed 37.9% of nurses working at emergency departments had good practice on acute poisoning management. This result was low compared with reports showed from studies conducted in Ethiopia at Bahir Dar City (Adal, Hiamanot, Zakir, Regassa, & Gashaw, 2023), South Gondar Zone(Tassew, et al., 2021) and Dessie referral hospital (Abebe, Kassaw, & Shewangashaw, 2019)given that 62.7%, 62.3% and 45% respectively. This disparity could be explainedby the difference of study setting that these studies were done. The above three studies were done only on nurses working at referral hospitalswhich may limit the generalizability, while the current study was done on those nurses working at primary, general and referral hospitals at regional level.

The current study showed that nurses who are trained on poison management were three times more likely knowledgeable on poison management than nurses who are not trained (AOR=3.186, 95%CI (1.553-6.538)). This is in lined with the previous study conducted in public hospitals of Bahir Dar City, Northwest Ethiopia (Adal, Hiamanot, Zakir, Regassa, & Gashaw, 2023). A study done on 136 health professionals from 33 countries showed that training can improve the knowledge level (Wong, Vohra, & Dawson, 2017).

The current study showed that nurses who are trained on poison management were 5.4 times more likely to have good practice on poison management than those who are not trained (AOR=5.377, 95% CI (2.595-11.143). This is in lined with a study conducted at public hospitals inBahir Dar City, Northwest Ethiopia (Adal, Hiamanot, Zakir, Regassa, & Gashaw, 2023).A study done on 136 health professionals from 33 countries revealed that training can change their medical practice to the higher practice level (Wong, Vohra, & Dawson, 2017).

Strengths of the study

Up to the authors know; this study is a first study done at multi-sectors in Ethiopia including primary, secondary and referral hospitals to assess knowledge, practice, and associated factors towards initial management of acute poisoning among nurses working at emergency department.

Limitation of the study

This cross-sectional study which was conducted at a single point of time makes difficult to determine the causal relationship between variables. The current study did not involve private hospitals because of the restricted time and lack budget could be thelimitation. The study did not use an observational checklist during data collection also can be the limitation of this study.

6. CONCLUSION AND RECOMMENDATION

6.1. Conclusion

In conclusion, even though more than half of nurses had good knowledge toward initial managements of poisoning, less than half of nurses working at emergency department had good practice. Poison management training wassignificantly associated with the knowledge and practice of nurses on acute poison management.

6.2. Recommendation

The data from the present study provides valuable information regarding knowledge and practice of nurses on initial management of acute poisoning and its associated factors. Nurses' knowledge to some extent good, however, practice of initial management of acute poisoning was unsatisfactory. Therefore; the researcher recommends:

- Each health facilities assigned nurses at emergency department who are trained about acute poisoning management; to give knowledge based emergency care for poisoned patients.
- Ministry of health and regional health bureau to prepare trainings related to acute poison management.
- Researchers to do prospective observatory research to minimize the limitation occurred secondary to using cross sectional study design.
- Researchers to do research at public and private health facilities by including representative health centers and hospitals.

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APPENDIXS

Appendix1: Information Sheet and Informed Consent Form for Heads of Hospitals

My name is TAMIRE ADAMU (BSc.) attending my MSc study in Hawassa University. I am here to conduct a study in your health institution. I conduct this study under Hawassa University, College of Medicine and Health Science, School of Nursing for partial fulfillment of master's on Emergency Medicine and Critical Care Nursing. It will also have a paramount importance for your organization to know the problem under study and act accordingly. So I kindly request you to give me time to explain about the study importance, ethical issues and how the study will be conducted. First I would like to thank you for your time and help.

Study title: Institution based cross sectional study will be applied. The title is "To assess nurses' knowledge, practice and associated factors on initial management of acute poisoning at emergency department in hospitals, Sidama Region, Ethiopia 2023".

Purpose of study: The findings of this study will be important for the health system to get valid and reliable information on nurses' knowledge and practice on initial management of acute poisoning. It can also provide important baseline information for further studies. Moreover, the aim of this study is to write a thesis as a partial fulfillment of a master's program.

Procedure and duration: Nurses working at emergency department will be a candidate for this study. The data collection will be held using a questionnaire that contains questions, mainly focusing on knowledge and practice of nurses on initial management of acute poisoning. Totally it will take about 20 minutes.

Risk and benefit: The risk of conducting this study is very minimal; it takes few minutes from nurses' time. There is no any direct payment for participating in this study. But the findings from this research may reveal important information for nurses, hospitals, region, researchers, and health planners concerning poison management.

Confidentiality: The information gathered from this study will not be disclosed to others. There will be no information that will identify the study participant in particular. The findings of the study will be general for the study area and will not reflect anything particular of individual persons. The questionnaire will be coded to exclude showing names. No reference will be made in oral or written reports that could link participants to the study.

Rights: Participation in my study is fully voluntary. The participants have the right to declare to participate or not in this study. If they decide to participate, they have the right to with drawfrom the study at any time and this will not label them for any loss of benefits which you otherwise are entitled. They do not have to answer any question that you do not want toanswer.

Contact address: If you have any questions about the study, the procedure or anything else related to the study, please contact through the following address:

Name of data collector_____ sign_____ date_____

Name of supervisor_____ sign_____ date_____

Mobile phone of investigator: +251912097202 (Tamire Adamu)

Email address of investigator: tameadamu2021@gmail.com

Institutional Health Research Ethics Review Committee (IHRERC) Hawassa University:

Office phone:

P.O.BOX: 05, Hawassa

Appendix 2: Declaration of Informed Voluntary Consent

I have read the participant information sheet. I have clearly understood the purpose of the research, the procedures, the risks and benefits, issues of confidentiality, the rights of participants and the contact address for any requires. I have been given the opportunity to ask questions for things that may have been unclear. I was informed that the participants have the right to with draw from the study at any time or not to answer any question that they do not want. I am also informed that the health institution has the right to stop the study from being conducted in the institution if any misdeeds and unethical procedures are reported during the data collection process in the institutions premises. Also I understand that the health institution has the right to use the result of study as public property.

Therefore; I declare my voluntary consent on behalf of the health institution to allow this study to be conducted in the institution with my initials (signature).

Name and signature of Head of the Health Institution: _____

Signature of data collector: _____

N.B:

This is signed face to face in the presence of data collector.

Thank you for your cooperation!

Appendix 3: Consent Form for Study Subject

Good morning/afternoon, my name _____. I am working as a data collector for the study conducted by Hawassa University, College of medicine and Health Science, Department of Nursing,post graduate student TAMIRE ADAMU. The purpose of this study isto assess nurses' knowledge, practice and associated factors on initial management of acute poisoning at emergency department in hospitals in Sidama Region, Ethiopia 2023.I would like to ask to fill this research questionnaire. There is no payment for this particular study. There is no risk or discomfort you should fear as a result of participating in this study. You do not need to provide your name. Whatever information you provide will be kept strictly confidential and information identifying you will never be released to anyone outside of this information collection activity. I expect this questionnaire may take about 20 minutes.

Participation in this study is voluntary, and you can choose not to answer any individual question or all of the questions. You may stop the answering questions completely at any time you wish without any consequences at all. However, we hope that you will participate in this study and provide the correct information to all questions.

If all the information given on the above is clear to you; can I precede? 1. YES 2. No

If the answer is yes; proceed to data collection.

Name of data collector_____ sign_____ date_____

Name of supervisor_____ sign_____ date_____ Contact Address of Principal investigator: Mobile Phone: (+ 251912097202)

Email address: tameadamu2021@gmail.com

Appendix 4: Research Questionnaire

Questionnaire code _____

Name of the data collector _____

Date _____

A questionnaire developed for a study "assessment of knowledge, practice and associated factors towards initial management of acute poisoning among nurses at emergency department of hospitals in Sidama Region, Ethiopia 2023".

Section 1: Socio-demographic data

Sr. No.	Questions	Responses	Remark
1	Sex	1. Male 2. Female	
2	Age in complete year	_____ years	
3	Educational level	1. Diploma 2. BSc degree 3. Master's degree	
4	Length of work experience	_____ years	
5	Have you ever received training on management of acute poisoning?	1. Yes 2. No	

Section 2: Knowledge questions towards initial management of acute poisoning

Sr. No.	Questions	Responses	Remark
1	Poison is any substance capable of producing organ damage or dysfunctionby its chemical activity?	1. True 2. False	

2	Considering the dose ingested and time of ingestion are very necessary when managing poisoning cases at ED?	1. True 2. False	
3	As an emergency department nurse it is always very important to treat the patient not the poison?	1. True 2. False	
4	The commonest cause of poisoning in developing countries is pesticide poisoning?	1. True 2. False	
5	Women are more likely to take deliberate poison in general population to commit suicide than men?	1. True 2. False	
6	Dry mouth, abdominal pain and salivation are alimentary signs and symptoms of acute poisoning during early stages include?	1. True 2. False	
7	In case of organophosphate poisoning atropine should be administered in any circumstance.	1. True 2. False	
8	Gastrointestinal decontamination is done based upon the specific poison ingested, time from ingestion to presentation and the predicted severity of the poisoning?	1. True 2. False	
9	Emesis is considered for an alert and conscious patient who has ingested a substantial amount of a toxic substance within 60 min of presentation?	1. True 2. False	
10	Some of the poisonings accident encountered at emergency department have not specific antidote?	1. True 2.False	

Section 3: Practice questions towards initial management of acute poisoning

Sr. No.	Questions	Responses	Remark

1	Do you give priority always for maintaining adequate airway, respiration and circulation for severe acute poisoning?	1 . Yes 2. No	
2	Do you administeratropine in any circumstance in case of organophosphate poisoning?	1 . Yes 2. No	
3	Do you perform Gastrointestinal decontamination based upon the specific poison ingested, time from ingestion to presentationand the predicted severity of the poisoning?	1 . Yes 2. No	
4	Do you considered emesisfor an alert and conscious patient who has ingesteda substantial amount of a toxic substance within 60 min of presentation?	1 . Yes 2. No	
5	Do you use activated charcoal to decrease absorption of a wide range of poisons fromthe gastro-intestinal tract to the entire human system?	1 . Yes 2. No	
6	Do not you do gastric lavage for patients who have ingested kerosene orcorrosive substances within an hour of presentation?	1 . Yes 2. No	
7	Do not you perform gastric lavage for poisons have large time between ingestion and presentation at emergency department?	1 . Yes 2. No	
8	Do you measure the volume of gastric lavage fluid aspirated and theamount of fluid given?	1 . Yes 2. No	
9	Do you do gastric decontamination for patients presenting following ingestion of controlled/ slow releasedsubstances even after a longer delay more than 2-4 hours?	1 . Yes 2. No	
10	Do you refer management of acute poisoning guideline during poisoned patient management?	1. Yes 2. 2. No	