WOLKITE UNIVERSITY

COLLEGE OF MEDICINE AND HEALTH SCIENCE

DEPARTMENT OF PUBLIC HEALTH

ASSESSMENT OF MAGNITUDE, TREATMENT OUTCOMES AND ASSOCIATED FACTORS OF ACUTE POISONING CASES ADMITTED TO WOLKITE UNIVERSITY SPECIALISED HOSPITAL EMERGENCY DEPARTMENT, SOUTHWEST ETHIOPIA, 2022: A RETROSPECTIVE FOLLOWUP STUDY

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A RESEARCH SUBMITTED TO THE DEPARTMENT OF PUBLIC HEALTH WOLKITE UNIVERSITY IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR BACHELOR OF SCIENCE IN PUBLIC HEALTH

ADVISORS: MR. ANTENEH KASSA (BSc. PH, MPH IN EPIDEMIOLOGY)

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MAY, 2022

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Acronyms and abbreviations

ED: Emergency Department

DALYs: Disability Adjusted Life Years

OP: Organophosphate

LMIC: Low and Middle Income Country

HHP: Highly Hazardous Pesticide

WHO: World Health Organization

WUSH: Wolkite University Specialized Hospital

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Abstract

Background: Poisoning is a qualitative term used to define the potential of a chemical substance in acting adversely or deleteriously on the body. It is a common cause of morbidity and mortality worldwide. It is a public health challenge in low and middle income countries including Ethiopia.

Objective: to assess magnitude, treatment outcomes and associated factors of acute poisoning cases admitted to Wolkite university specialised hospital, southwest Ethiopia, 2022.

Method and material: A retrospective follow up study was conducted on acutely poisoned patients admitted to Wolkite University Specialized Hospital from September 2013 to May 2014. Data were collected from a total of 284 records of poisoned patients using semi structured abstraction tool and then coded and entered to Epi data version 3.02 and exported to SPSS Version 26 Software for analysis. Bivariable and multivariable binary logistic regression was done. Variables that had significance association with the dependent variable were reported using odds ratios and 95% confidence level at $p<0.05$. The study findings were summarized using median, frequency, proportions, and presented by texts, graphs and tables.

Result: About half (50.7%) of cases were females, and (51.1%) were in the age group of 15–29 years. Organophosphates were the most common poisoning agents (64.8%). About half (50.7%) poisoning cases were self-poisoned intentionally, while the 27.5% had an unknown manner of poisoning. Quarrel with family, (22.1%); income problem, (4.9%); and marital and love disharmony (4.6%) were the three most common causes of intentional poisoning. Both pharmacological and non-pharmacological treatment approaches were used. Medication other than antidote was the most commonly used pharmacologic treatment (31.5%). In the multivariable analysis, type of poisons (organophosphate) (AOR=21.07; 95% confidence interval= 1.86, 238.26) and patient status at admission (AOR= 46.31; 95% confidence interval= 7.1, 301.87) were factors significantly associated with treatment outcome of acutely poisoned patients at $p< 0.05$.

Conclusion: the prevalence of acute poisoning in the study was 2.6% per total emergency cases. Young and adults (15-29) were accounted for the majority of poisoning cases. In this study deliberate self-poisoning was a problem mainly of the young adults below 30 tears. Moreover, majority of the cases were from rural areas and quarrel was main reason for intentional poisoning. Furthermore prevalence of poor treatment outcome was 8%. Organophosphates were leading cause of poisoning with most prevalence of death.

Key Words: Acute poisoning, treatment outcome, organophosphates, Wolkite University

1. INTRODUCTION

1.1 Background

Poison is a substance capable of producing damage or dysfunction in the body by its chemical activity. It can enter the body in various ways to produce general or local effects (limited to the eyes, skin, lungs, etc.). Poisoning is a qualitative term used to define the potential of a chemical substance in acting adversely or deleteriously on the body. Acute poisoning is an injury in which the toxic effects occur almost immediately, usually within hours from the time of exposure (1)

It is a common reason worldwide for visits to emergency departments and for hospitalization and its morbidity and mortality is becoming a major public health issue in many countries. It is estimated that some types of poisons are directly or indirectly responsible for more than 1 million illnesses worldwide annually. However, since most poisoning cases in the world go unreported, the exact number of incidences can be even higher (2). World Health Organization (WHO) estimates that the total number of acute accidental poisonings throughout the world ranges from 2-3 million cases annually; of which 1 million are severe poisonings resulting in 20, 000 deaths annually; while the estimated annual intentional poisoning number is about 2 million resulting in 200,000 suicides (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 the extensive use in medicine, agriculture, industry and residential environments. Pesticides and Drugs are the common agents causing the incidence. Whether intentional or accidental, it is the easy access to these substances that significantly adds to the incidence. Pesticides like methyl parathion (metacid) are very commonly used for intentional poisoning. Pesticides like aluminium phosphide, having mortality rate more than 50% are easily available in the market. (4)

The nature of poisons varies in different parts of the world and may vary even in different parts of the same country depending on the socioeconomic factors and cultural diversity. Management of these critically ill patients will greatly improve if the common causes of poisoning are properly defined (12).Exposure to agrochemicals, medicines and environmental agents are the major causes of poisoning. Distress due to loss in the business, failure in romance or differences with the intimate partner or examination, emotional disturbances and chronic diseases are the common reasons for intentional poisoning (13).

Although there are good data bases in developed countries concerning poisoning such as the toxic exposure surveillance system; for most of the low income countries there are no formal and well established poison control centres to collect such data. Hence information on this very important public health issue remains insufficient (14). Substantial differences in socioeconomic and cultural situations in different countries cause various patterns of poisoning with different poisonous agents. The epidemiology of acute poisoning varies between countries and different regions, so epidemiological studies specific for each country

and each region is necessary to determine the extent and characteristics of the problem and how this health problem can be prevented (15). Poisoning by means of hazardous chemicals through ignorance, mishap or intentionally is becoming a serious health problem worldwide. Epidemiological data on this important health issue are, however, scarce in Ethiopia (16).

1.2 Statement of the problem

The WHO reports estimate poisoning as one of the most common causes of increased morbidity and mortality rate world-wide. Various agents such as pesticides, drugs have been used for intentional and accidental poisoning in different countries (17)**.** A World Health Organization report in 2016 revealed that, there were 106,683 deaths and loss of 6.3 million years of healthy life (disability-adjusted life years) worldwide from unintentional poisoning in 2016 (18). A recent report by the American association of Poison Control Centers'National Poison Data System (NPDS) showed that in 2020, there were 2,128,198 human exposures. Total encounters showed a 28.9% increase from 2019 (19).

Suicide is a major global public health problem with estimated 700,000 deaths every year, 79% of which occur in low- and middle-income countries (LMICs) (5, 6). Pesticide self-poisoning accounts for about one in five of global suicides (7). In Low and middle income countries, self-poisoning with pesticide is a common method to attempt suicide (8-9). Pesticide self-poisoning with highly hazardous pesticides (HHPs) often leads to death, particularly in a situation where medical facilities are distant or antidotal therapy or intensive care unavailable (10). Ingestion of less harmful pesticides rarely results in death. There is, therefore, a wide variation in case fatality after pesticide self-poisoning irrespective of the level of intent (11).

The incidence of poisoning cases is increasing due to changes in the lifestyle and social behaviour of humans. The prevalence and types of poisoning vary considerably across the world and depend on socioeconomic status and cultural practices, as well as on local industrial and agricultural activities. Household chemical agents and prescribed drugs are the most common poisoning agents in the developed world, but agrochemicals are the most common poisoning agents in developing countries. Poisoning is very common in developing countries, and because of the weak regulations and poor health-care services, the consequences of poisoning are much worse than in the developed world. Pesticides are the most common chemicals used to inflict self-harm in developing countries. (20)

Significant morbidity and mortality is associated with acute pesticide poisoning, especially in developing countries. In these countries no reliable data is available as to how many people per year suffer from pesticide-related health effects. For this several reasons have been hypothesized including a lack of standardized case definition (21-23). As part of the developing world, even though the burden of poisoning exposures in Africa is a significant public health concern, only ten of 58 countries (17.2%) have poisons information centres (PICs). In this region, since poisoning cases are usually poorly documented, the genuine epidemiology and accurate figures of acute poisoning is unknown. The underlying reasons are lack of resources and knowledge to diagnose poisoning, the fact that only certain acute poisoning cases are required to be reported to the local or national department of health, and low levels of death. Based on data from 2012, WHO estimated that unintentional poisoning accounts for 39,800 deaths and 27,949,000 DALYs in the Africa region (24).

In Ethiopia, epidemiological data on acute poisoning is extremely few and it is very difficult to find primary data. The culprits of this problem are unavailability of well-organized poison

control center and routine screening & confirmatory tests. Few published epidemiological studies with small sample size exist concerning acute poisoning. The existing little hospital based studies revealed that the case fatality rate was reported to range from 2.4% to 8.6%. Despite the rapidly growing role of chemicals in the country, lack of poison centers and toxicological expertise among health professionals may increase the likelihood of adverse health impacts of acute poisoning to the public (25,26).

So the objective of this study is to assess the magnitude, treatment outcomes and associated factors of acute poisoning cases admitted to Wolkite university specialised hospital emergency department, southwestern Ethiopia, 2022

1.3 Significance of the study

Acute poisoning is a common reason for visits to emergency departments and hospitalizations worldwide, and it is a common cause of morbidity and mortality worldwide. Understanding the epidemiology of poisoning and its changes is important to both emergency physicians and public health practitioners. It improves quality of health care, helps to disseminate the information regarding antidotes or treatment methods, newer management options and identify the risk factors in managing the poisoned patients. It will also help to identify the places which are potentially at risk of poisoning. Furthermore, no satisfactory data on demographical and etiological characteristics of acute poisoning were provided by the annual performance reports and other published documents of the Federal Ministry of Health (FMOH). Continuous surveillance of cases of acute poisoning is important for planning and evaluating public health interventions.

2. Conceptual framework

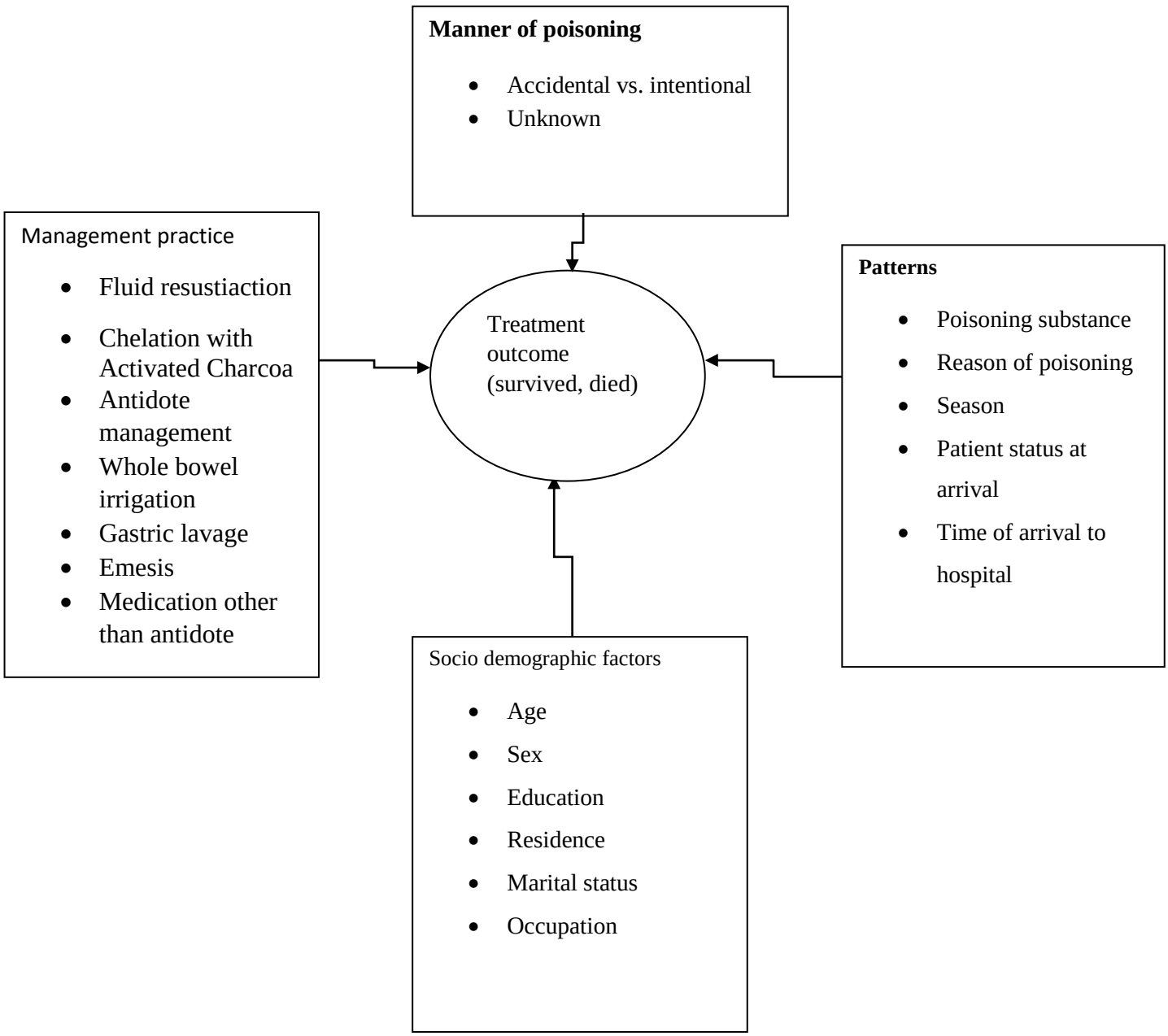

Figure 1. Conceptual framework to assess the magnitude, treatment outcomes and associated factors of acute poisoning cases admitted to Wolkite university specialised hospital emergency department, southwestern Ethiopia, 2022

3. LITERATURE REVIEW

3.1. Overview of poisoning

Poison is a substance capable of producing damage or dysfunction in the body by its chemical activity. It can enter the body through various ways and produce general or local effects. Poisoning is a qualitative term used to define the potential of a chemical substance in acting adversely or deleteriously on the body (1).

In most cases, the detailed mechanism of poisoning is unknown, but the time between the exposure and the elucidation of the resulting toxic effects determines whether an exposure is acute or chronic. In an acute toxicity or poisoning, the effects occur almost immediately after an exposure. Whether the effects follow a single dose or a series of doses or exposures, when the effects appear within 24 hours, this is termed "acute poisoning. Acute poisoning results from exposures to toxic agents that may lead to harmful effects based on the reaction of the body to these agents. Exposures may be through ingestion, transdermal, injection, or inhalation. The resulting effects of the exposure may be localized, or generalized; they may also be topical or systemic (28).

Poisoning may occur either intentionally (deliberately) or unintentionally (accidentally). Intentional poisoning is the result of a person taking or giving a substance with the intention of causing harm while unintentional poisoning occurs if a person taking or giving a substance did not mean to cause harm (29). Unintentional poisoning may result from error in judgment, carelessness, negligence, or an unexpected situation in the home, or at workplace as in the case of intoxication due to treatment, referred to as 'iatrogenic intoxication" (30).

In intentional poisoning, the victim is intoxicated on purpose, either by their own doing, this is called "deliberate self-poisoning", it may be para suicide or suicide; or at own request, as in euthanasia, or by being the unwitting victim of intoxication orchestrated with criminal intent (31). When the distinction between intentional and unintentional is unclear, poisonings are usually regarded "undetermined" in intent (30). It has been shown that consequences of deliberate self-poisoning outweigh those of accidental poisoning by far. WHO estimate that intentional and unintentional injuries constitute about 6.8% (770,000) of all deaths in low and middle income countries. Poisoning is responsible for about 8.5% (42,000) of these unintentional deaths due to injuries and self-inflicted injuries is responsible for about 18.3% (50,000) of the deaths due to intentional injuries (273,000) (32).

Poisoning can result from exposure to a variety of substances. The substances used in poisonings vary depending on the area and the culture. Typical agents used in poisonings include, pesticides, rodenticides, herbicides, pharmaceutical products, household chemicals, foods, alcohols, plants, traditional medicines and illegal street drugs (33). Over the last few decades, agricultural pesticides have become the main source of poisoning in the developing world. Pesticides particularly Organophosphorus compounds are widely used for agriculture, vector control and domestic purposes. Because of their easy availability organophosphorus poisoning has assumed major global health challenge. Pesticide poisoning accounts for about one third of the world's suicides and deliberate self-poisoning involving these chemicals have

been reported in many countries including Ethiopia (34, 35, and 36). Indeed, besides pesticides, other toxic agents such as pharmaceuticals are involved in acute poisoning. Both prescription and non-prescription medicines have been used throughout the world for self-poisoning mainly in urban areas. The most commonly used medicines are central nervous system acting drugs such as antipsychotics, antidepressants, barbiturates, and benzodiazepines; followed by analgesics mainly paracetamol; anti-epileptic drugs such as carbamazepine; antiseptics and disinfectants; antimalarial drugs such as chloroquine and others (33).

Household products and chemicals, like paraffin, cleaning agents such as bleach and cetrimide, acids and bases used for drain cleaning, shampoos and soaps, disinfectants such as potassium permanganate and creosote; are the most toxic chemicals that can potentially be involved in acute poisoning incidents (33). Food is another common cause of acute poisoning but due to the lack of effective surveillance systems, its incidence is not well established. Moreover, food poisoning is often confused with food allergy and food adverse effects, which are respectively an immune-mediated reaction, and a clinically abnormal response, attributed to an exposure to a food or food additive. Poisoning from plants is due to their toxic constituents, mainly alkaloids. Historically plants containing alkaloids such as aconitine, strychnine, and others have been used in criminal poisoning (31). Moreover, many traditional medicines especially in the tropical regions of Africa contain plants or plant materials that can produce acute poisoning. Snake bite is also a major problem worldwide. It cause considerable death and injury and pose an important yet neglected threat to public health (34, 35, and 36).

3.2 Prevalence of poisoning

The prevalence of acute poisoning in the general population is unknown because of lack of population-based studies. Several studies have reported the prevalence of acute poisoning based on the number of people attending the emergency departments, or people admitted in the hospital wards with a diagnosis of acute poisoning. The figures reported vary widely with the size of the denominator used (34). World Health Organization estimates that 2 million people attempt suicide and one million accidental poisoning cases occur every year worldwide. According to WHO report of Regional distribution of the global poisoning injury burden (DALYs lost), the total number of DALYs lost was 8,235,000 and Europe (28%) and South-East Asia (28%) together account for over one-half of the total number of DALYs lost globally to poisoning. While the rest were, in America (5%), Africa (15%), west pacific region (17%), and middle east region (7%) (37).

According to a study conducted at Shenyang; in a tertiary medical centre in Northeast China In total, 5009 patients aged ≥11 years presented to the ED with acute poisoning during the study period. These cases comprised 0.6% of all emergency admissions. In Ethiopia, a study was conducted in the emergency centres of Gondar Teaching Referral Hospital and Metema and Debark district hospitals, from September 2010 to December 2014. There were 344

poisoning cases. There were 48,619 emergency centre visits during the study period, with poisoning cases accounting for 1.1% (38, 39).

3.3 Patterns of poisoning

The pattern of acute poisoning changes with time, and differ from country to country, and even between geographical areas within the same country. Substantial differences in socioeconomic and cultural situations in different countries also cause various patterns of poisoning with different poisonous agents (33). Various literatures have shown variations in age and sex distribution of poisoning cases. Males in low and middle income countries of Europe account for the highest number of poisoning worldwide (37). Different retrospective hospital based studies conducted in southern part of India (69.6%), Iran –Teheran (51%), Saudi Arabia (73.6%) and Kenya have also shown higher incidence of acute poisonings in male (40,41,42,42). While in Ethiopia, studies showed that there is high prevalence in female that male, Gondar (60%), jimma (52.4%) and dessie (55%) (39,46,47).

Concerning the distribution age, Over 60% of the poisoning occurs among adolescents and adults aged between 15–59 years and the majority of cases were in the age range of 21–30 years (37). This was supported by many literatures. For example, a retrospective analysis of acute poisoning conducted in India showed 42.63% were aged 20-30 years, while in Iran (38%) of cases were in the age range of 21–30 years (40, 44). Many studies also have revealed that children are particularly at risk for accidental poisoning (45). In a study, which was carried out in Botswana and South Africa, acute poisoning incidents occurred mostly in children younger than 12 years old, then decreased among teenagers, and increased again among young adults, before decreasing among patients over 30 years old (34, 35, 36). In Ethiopia, a study conducted in the emergency centres of Gondar Teaching Referral Hospital and Metema and Debark district hospitals, Patients between 15 and 24 years of age accounted for 55% of the cases. And on another retrospective analysis in JUSH, The highest prevalence of poisoning was observed in persons aged 12–20 years (70, 67.96%).

Variation also observed on the patterns of the circumstances of poisoning which were intentional, accidental and unknown. Literatures showed that intentional poisoning is the major cause of death in many developing and developed countries. In Turkey overdose and accidental or intentional poisoning has become a problem for emergency care centers (33). In India, Morocco, Iran and Kenya 90.2%, 85%, 79% & 48.96% of Cases were intentional poisonings respectively, while unintentional poisoning has been reported to commonly occur among children (5, 40, 41, 43).

Differences have also seen in studies from different parts of the world regarding place of residence. A retrospective study conducted in India showed that acute poisoning is more common in rural area (55.8 %) as compared to urban area (44.2%) (11). another retrospective study done in the same country also reported a similar pattern with prevalence being 52.6% in rural areas and 42.8 % in urban areas (8). In contrast to the above, a retrospective study done in Gondar University hospital, Ethiopia showed that urban areas had higher incidence of acute poisoning (75.9%) than rural (24.0%) (39).

Regarding pattern of poisonous agents among the various causes of poisonings, pesticides are the most common cause of self-poisoning worldwide, with the proportion ranging from 4% in the European region to over 50% in the Western Pacific region (30). A survey conducted in 8 referral hospitals in Zimbabwe revealed that pesticides and pharmaceuticals were the most common toxic agents responsible for hospital admissions (31). In another study conducted in Hong Kong, sleeping pills and analgesics were the most commonly used poisons (32). Sedative hypnotic drugs, opioids and pesticides were common agents in Tehran-Iran (6). In Francistown and Gaborone, Botswana; household chemicals and pharmaceuticals were the predominant cause of acute poisoning (35). In Kampala-Uganda, most of the poisoning cases were due to agrochemicals and household chemicals respectively (20). Medications and pesticides were in descending order the common agents used in Fujian-China (29). In Riyadh-Saudi Arabia, drugs and household chemicals were most prevalent among the cases (26). In ethiopia Organophosphates and household cleaning agents were the predominant agents of acute poisoning. (39)

Seasonal variation of acute poisoning was also seen in studies from different part of the world. In a study conducted in Iran the seasonal distribution in poisoning patients suggested a peak in spring (28% of presentations) and summer (27.5%) and lower numbers in winter (23.6%) and autumn (20.8%). It was also seen that intentional poisoning occurred mostly during spring (28.2% of intentional cases), whereas unintentional poisoning was more frequent during autumn (33.3% of unintentional cases) (27). While in Qatar Seasonal differences were observed with most victims being seen in summer and autumn (28). However, in china there was no significant difference in season distribution. In month distribution, January showed the highest incidence (11.33%), whereas March had the lowest (6.35%) (29).

3.4 Determinants of Acute Poisoning

Several factors can contribute to the wide difference in poisoning pattern such as climate (for carbon monoxide poisoning), socioeconomic factors, cultural (traditional remedies versus medical advice and products), ethnic variations and religious beliefs prevalent in the community. In addition, a different prescribing practice between physicians, the type of medications involved and their availability can vary from one country to another (35). There are also many precipitating factors for the occurrence of acute poisoning; Anxiety, depression, isolation, unemployment, failure in examination, marital disharmonies are the common ones (40). It is possible to retain some key risk factors that can lead to defining a “high-risk” group. For acute poisoning, the youth, from teenagers to young adults, particularly those with any psychiatric or psychological disorder, those with history of child abuse, and those who are addicted to any substance, constitute a high-risk group for para- and suicide (36). A systematic review study reported that intentional self-poisoning may occur at all ages, yet adolescents and young adults are at a higher risk. From the same authors, they reported that that there is an association between current self-harm behaviour and a history of childhood sexual abuse as well as negative emotions such as anxiety, depression, and aggressiveness (36). While in retrospective hospital study conducted in India, Academic failure and discord within the family or with loved ones were the most commonly cited

reasons for suicidal poisoning in the younger age group. Economic hardships and marital discord were important precipitating causes in the middle aged and endogenous depression or the loss of a spouse in the majority of the elderly. In Ethiopia other factors reported as associated with intentional poisoning include mental illness and ill health (37).

Many literatures also revealed the mortality/morbidity in any case of acute poisoning depends on a number of factors such as nature of poison, dose consumed, level of available medical facilities and the time interval between intake of poison and arrival at hospital (40, 42).

3.5 Outcomes of Acute Poisoning

Unless a short period of medical observation is performed, the management of acute poisoning often requires hospitalization, whose outcomes are the length of stay and the associated costs. If the treatment is successful, the patient would have survived and will be discharged from the hospital. When the treatment is not successful, acute poisoning may lead to death. This outcome is measured as the case fatality rate (34).

Mortality from acute poisoning is a major public health issue in many countries. In developing countries, the mortality related to acute poisoning is very high than developed countries (7). In 2000, an estimated 315 000 people worldwide died as a result of unintentional poisoning. Suicide is an important cause of premature mortality, accounting for an estimated mortality, accounting for an estimated 877 000 deaths every year (21, 38). More than 94% of fatal poisonings occurred in low- and middle-income countries (21). WHO(2008) reported in its Regional distribution of global poisoning mortality that results in Africa (8%), America (7%),Europe(5%), Eastern Mediterranean region (19%), south east Asian region (7%) and in west pacific region (7%) of the total injury mortality (32).

Many studies also revealed that in developed countries, the rate of mortality from poisoning is 1% to 2%, but in developing countries the mortality is very high. In India the mortality due to poisoning varies between 15 to 30% and the poisoning is the fourth most common cause of mortality in rural India (23, 34).while in Sri Lanka the reported mortality of 10% is significantly higher than the 0.5% reported in high income countries and in the country acute poisoning is among the leading ten causes of hospital death (39). Rates are increasing in USA; the age-adjusted death rate for the United States rose from 4.4 deaths per 100,000 U.S. populations in 1999 to 10.6 deaths in 2010. Unintentional deaths from poisoning comprise the majority of all poisoning deaths. Of the 14,068 poisonings between the years 1999-2012, 78 percent were unintentional, 19 percent were intentional self-inflicted, three percent were of undetermined intent, and less than one percent were intentional assaults (19).

4. OBJECTIVES

4.1 General objective

To assess the magnitude, treatment outcomes and associated factors of acute poisoning cases admitted to Wolkite university specialised hospital emergency department, southwestern Ethiopia, 2022

4.2 Specific objectives

To determine the prevalence of acute poisoning cases WUSH between 2013 and 2014 EC.

To describe patterns of acute poisoning in WUSH between 2013 and 2014

To assess treatment outcomes of acute poisoning cases

To identify associated factors of acute poisoning and treatment outcomes

5. METHODS AND MATERIALS

5.1 Study area

The study was conducted at WKUSH, located in Gurage zone, Wolkite town south west Ethiopia. Wolkite is one of the developing towns in Ethiopia with total population of about 28,856 based on 2007 census conducted by Central Statistical Agency of Ethiopia. The town is located 158 km from Addis Ababa to the south west and the hospital is situated around 10km away from wolkite town. Geographically the hospital is located in wolkite town; Gubre kebele south west Ethiopia.The hospital started delivering service in 2012E.C. The hospital serves 4 zones with 4,000,000 total cluster population, in which 2,040,000 are females

5.2. Study Design

A retrospective study was conducted

5.3 Population

5.3.1 Source Population

All patients who had visited the emergency department of WKUSH with the assessment of acute poisoning from 2019 to 2022 were the source population for this study.

5.3.2 Study Population

All patients who had visited the emergency department of WKUSH due to acute poisoning from September 2021 to May 2022 were the study population

5.4 Eligibility Criteria

5.4.1 Inclusion Criteria

All acutely poisoned patients who had visited the emergency department and were listed in the registry emergency cases

5.4.2 Exclusion Criteria

Patients whose dependent variable was not recorded and patients whose medical records found to be completely lost or misplaced during the study will be excluded.

5.5 Sampling and Sample size determination

There were 350 poisoning cases in the follow-up period registered on patient registration book and on the hospital's HMIS database from 2019 to 2022. Among registered cases, patient charts were lost/ misplaced and 284 charts were included in the study.

5.6 Study Variable

5.6.1 Independent Variable

Age, sex, marital status, residence, district, level of education, living condition, season of poisoning, type/s of poisons, route of poisoning, reasons of poisoning, time from exposure to arrival to the emergency department, patient status at admission, type of treatment given

5.6.2 Dependent Variable

Treatment outcome (survived or died)

5.7 Data Collection Instrument and Technique

5.7.1 Data Collection Instrument

A semi structured quantitative data collection/abstraction tool was prepared after reviewing of different literatures (48). It was used to collect relevant data from patient cards. The data extraction tool were prepared in English language and it consists of socio demographic variables like age, sex, residence, marital status, educational status, living condition; poisoning substance, reasons for taking the poison, season of poisoning route/s of poisoning, mode of poisoning, time from exposure to arrival to the hospital, patient status at admission, type of treatment given, treatment outcomes.

5.7.2. Data Collection Technique and Procedure

The information available on the eligible patients' medical records was observed and then recorded using a data extraction tool. The medical record numbers of acutely poisoned patients were identified from patient registration book and from the HMIS. The emergency medical registration book for the year 2019 was not obtained and the HMIS were not started/ functional at that time. As a result, we identified the medical record number of poisoned patients from September 2013 to May 2014. There were 350 poisoning cases in the follow-up period of which 66 cards were lost/ not obtained in the card room and data were collected from 284 medical charts of patients. The data will be collected from the patient card using the pretested data collection tool by selecting the card number of poisoning cases from the registration manual of the emergency department.

5.8 Data Processing and Analysis

The collected data were coded and entered to Epi data version 3.02 statistical software and exported to SPSS Version 26 Software for analysis. Data were described and summarized by using frequencies, proportions and median with interquartile range and presented by using texts, tables and graphs. Patient's age was categorized according to literatures while other categorical variables were further categorized based on literatures. Bivariable binary logistic

regression analysis was conducted to identify variables that have crude association with treatment outcome and were included to multivariable logistic regression at $p \leq 0.25$. Multivariable logistic regression was done to identify predictors included in the final model at p-value < 0.05. Variables were selected by the enter method and variables that had significant association with the dependent variable were reported by using odds ratios (ORs) with their 95% confidence level (CL) and corresponding p-values.

5.9. Data quality assurance

Data quality control measures were conducted before, during and after data collection. Before data collection a validated semi-structured data abstraction tool was prepared. In addition, pre-test was done on 5% (15) participants in Butajira hospital and necessary modifications were done on the tool. Data collectors (3 graduating public health professionals) and supervisor (Bsc in public health) were trained for a day on the objectives the study, contents of the checklist, and abstraction process. Data were checked daily by the supervisor for completeness, eligibility and consistency. Any inconsistent and/or missing data were returned to the data collectors for checks and corrections.

5.10 Ethical Consideration

Before data collection, an ethical clearance was obtained from Ethical Review Board (IRB) of WKU CMHS. A permission letter to conduct the study was obtained from WUSH. Informed consent from each patient was not obtained from each patient since it is difficult/ impossible to get individuals. Confidentiality was kept by removing all personal details pertaining to the patients prior to descriptive analysis, to ensure anonymity of individuals. The data was only used for the intended purpose and patient's information was not exposed for any risk. As a result we asked an exemption/waiver of consent from the Hospital administration. All patient charts and registrations were returned to their original place (card room) in a secured manner.

5.11 Definition of Terms and operational definitions

- Poisoning: this refers to the development of harmful effects following exposure to chemicals, drugs, or other xenobiotics (1).

- Intentional poisoning: this is the result of a person taking or giving a substance with the intention of causing harm (5).

- Unintentional poisoning: this is poisoning that occurs if a person taking or giving a substance did not mean to cause harm (5).

- Organophosphate poisoning: this is poisoning due to organophosphate compounds which are the organic derivatives of phosphorous containing acids that have an effect on neuromuscular junction and autonomic ganglia. (8)
- Outcome of acute poisoning: in this study outcome of acute poisoning could be death or survival with disability or without disability.
- Prevalence of acute poisoning: prevalence in this study was defined as the proportion of a population who were poisoned from the total number of people attending the emergency department or from the total people admitted at the emergency ward of the hospital.

6. RESULT

A total of 350 acute poisoning cases were found in the HMIS of the hospital at emergency wing of Wolkite University Teaching Hospital. However, due to information incompleteness and lost cards, only 284 patient medical charts were found to be usable and hence included in the final analysis.

6.1 Socio-Demographic Characteristics

Slightly higher proportions (50.7%) of the acutely poisoned patients were females. The median age of patients with acute poisoning was 23.5 years (IQR=50). Of the total cases, young adults and adults (15-59 years of age) made up the highest proportion (83.5%) while 38 (13.4%) were children less than 14 years old. Regarding their marital status, (47.2%) and 38 (13.4%) were married and not eligible respectively. Regarding living condition of the victims, 56% of them have reported that they were living with their family in rural areas (61.3%. One hundred (35.2%), 16.5% and 11.6% of participants were students, farmers and unemployed by their occupation respectively. More than one-third (37.7%) of patients attained primary education and about 17% were illiterate. Regarding living condition of the victims, 56% of them have reported that they were living with their family in rural areas (61.3%). (Table 1)

Table1: Socio-demographic characteristics of patients with acute poisoning at the emergency ward of WUSH, 2013-2014 EC, (n =284).

Variables	Category	Frequency	Percentage
Age	<=5	22	7.8
	6-14	16	5.9
	15-29	145	51.1
	30-59	91	32.4
	>=60	10	3.7
Sex	Male	140	49.3
	Female	144	50.7
Marital status	Married	134	47.2
	Single	107	37.7
	Divorced	3	1.1
	Widowed	2	0.7
	Not eligible	38	13.3
Education level	Illiterate	48	16.9
	Primary	107	37.7
	Secondary	60	21.1
	Higher	45	15.8
	Not eligible	25	8.5
Residence	Rural	174	61.3
	Urban	110	38.7
Occupation	Unemployed	33	11.6
	Farmer	47	16.5
	Government employee	30	10.5
	Merchant	24	8.5
	Student	100	35.2

	Daily labourer	8	2.8
	Housewife	31	10.9
	Other	11	3.9
Living condition	Lives in a house alone	91	32
	Lives on street alone	9	3.2
	Lives with family	159	56
	Lives with friends	13	4.6
	Other	12	4.2

6.2 patterns of Poisoning

Of the 284 poisoned cases, the oral route is the most common route of exposure (96.1%). Moreover, all clients had a record of known poisoning agents, of which organophosphate was the most common poisoning agent (64.8%). Intentional poisoning was the most common (50.7%) manner of poisoning, of which (66.2%) of cases had a known reason for poisoning. Among intentional poisoning cases, the most common cues for self-harm were Quarrel with family, followed by financial problems in 22.1% and 4.9%, respectively, among intentional poisoning. Regarding the distribution of acute poisoning by seasons of occurrence, the highest proportion (29.2%) of acute poisoning cases occurred from Dec-Feb (Bega) followed by from June-Aug (Kiremt) 28.2% and from March-May (Tseday) (20.8%). More than half of the patients (56%) arrived to hospital within 2-4 hours, 24.6% arrived in less than 2 hours and the rest 19.4% arrived after 4 hours. Regarding to patient status on arrival 71.5% of them were conscious and 28.5% were unconscious.

Table 2: patterns of poisoning at the emergency ward of WUSH, 2013-2014 EC, (n =284)

Poisoning substance	Organophosphate materials	142	50
	Bleach agents	19	6.7
	Pharmaceuticals	25	8.8
	Rat poisoning	30	10.6
	Alcohol intoxication	12	4.2
	Carbon monoxide	3	1.1
	Snake bite	12	4.2
	Traditional medicine	15	5.3
	Other	12	4.2
	Food poisoning	14	4.9

Reason	Unemployment	3	1.1
	Quarrel with family	63	22.1
	Income problem	14	4.9
	Failure in exam	9	3.2
	Marital and love disharmonies	13	4.6
	Unspecified reason	104	36.6
	Other	17	6
	Unintentional	61	21.5
Time spent from exposure to arrival to hospital	<2 hours	70	24.6
	2-4 hours	159	56

	Greater than or equal to 4 hrs.	55	19.4
Route of poisoning	Oral ingestion	273	96.1
	Direct contact	0	0
	Inhalation	4	1.4
	Injection	0	0
	Unknown	7	2.5
Manner of poisoning	Intentional	144	50.7
	Accidental	61	21.5
	Unspecified	79	27.8
Patient status at admission	Conscious	203	71.5
	Unconscious	81	28.5

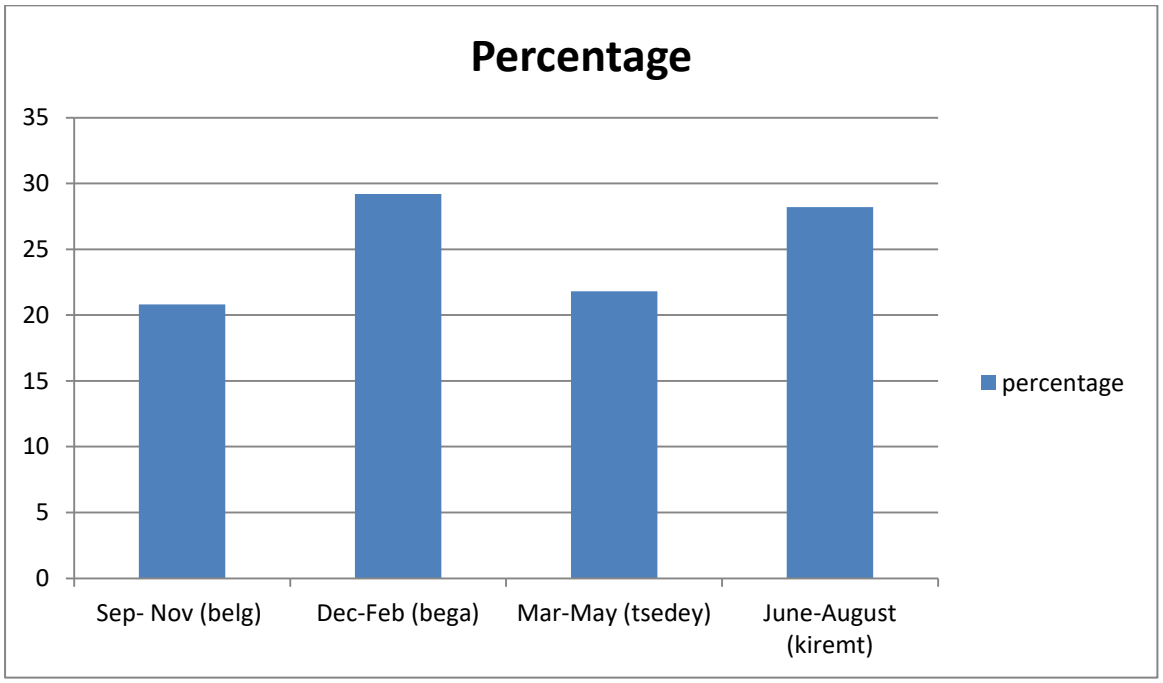

Figure 2. Seasonal variation of poisoning cases at the emergency ward of WUSH, 2013-2014 EC, (n =284)

6.3 Prevalence of Acute Poisoning

A total of 11058 patients visited emergency department. Among them 2.6% of them were poisoning cases.

6.4 Management Practice of Poisoning

It was noted that large proportion (31.5%) of the acutely poisoned patients medications other than antidote (Table 3). The other 26.6% were given fluid resuscitation with or without additional medication. Gastric lavage was done for 22.2% mostly for those who arrived to the hospital in 2 hours. Regarding the outcome of poisoning, while majority (258, 91.9%) of the patients Survived. The case fatality or death rate of acute poisoning in the hospital was 8%.

Table 3: treatment given and outcome of poisoning cases in the emergency ward of WUSH, 2013-2014 EC, (n =284)

Treatment given	Fluid resuscitation	75	26.4
	Chelation with activated charcoal	11	3.9
	Antidote management	10	3.5
	Whole bowel irrigation	15	5.3
	Gastric lavage	63	22.2
	Emesis	10	3.5
	Medications other than antidote	89	31.5
	Other	11	3.9
Treatment outcome	Survived	258	91.9
	Died	23	8.1

6.5 Associated factors of treatment outcome of acute poisoning patients

Variables	Category	Treatment outcome		COR	P-value
		Survived	Dead		
Sex	Male	125	15	Reference	
	Female	136	8	0.49	0.12
Marital status	Married	120	14	Reference	
	Single	100	7	0.60	0.29
	Divorced	2	1	4.28	0.25
	Widowed	2	0	----	0.99
	Not eligible	37	1	0.23	0.16
Education level	Higher	42	3	Reference	
	Illiterate	41	7	2.39	0.22
	Primary	100	7	0.98	0.97
	Secondary	55	5	1.27	0.75
	Not eligible	23	1	0.60	0.67
Living condition	Lives with family	149	10	Reference	
	Lives in a house alone	82	9	1.63	0.30
	Lives on street alone	9	0	----	0.99
	Lives with friends	21	4	0.06	0.10
Poisoning substance	Poisons other than Organophosphates	100	1	Reference	
	Organophosphate	184	22	13.44	0.01
Reason	Unintentional	60	1	Reference	
	Unspecified reason	89	15	10.11	0.02
	Intentional	112	7	3.75	0.22
Time spent from exposure to arrival to hospital	<2 hours	67	3	Reference	
	2-4 hours	150	9	1.34	0.66
	Greater than or equal to 4 hrs	44	11	5.58	0.11
Patient status at admission	Conscious	201	2	Reference	
	Unconscious	60	21	35.17	0.00
Season of poisoning	Sep- Nov (autumn)	54	5	Reference	
	Dec-Feb (winter)	80	3	0.40	0.22

	Mar-May (spring)	50	12	2.59	0.09
	June-July (summer)	77	3	0.42	0.24

Table 4: Bivariable analysis of associated factors of treatment outcome acute poisoning patients treated at Wolkite university teaching hospital, gurage zone, 2022 (n=284)

On bivariable binary logistic regression analysis, sex of patient, marital status, education level, living condition, poisoning substance, reason for poisoning, time spent from exposure to arrival to hospital, patient status at admission and season of poisoning were found to be significant at p <0.25 and were included in to multivariable analysis model.

Multivariable analysis was done to identify variables included in the final model. Only type of poisoning substance (organophosphates) and patient status at admission (unconscious) were found to be significant in the multivariable binary logistic regression analysis at p-value of less than 0.05.

In this regard, patients who were poisoned by organophosphates were 21.07 (AOR = 21.07; 95% CI: (1.86, 238.26) times more like likely to die after treatment than the odds of patients taking non-organophosphates. Patients who were unconscious at admission were 46.31 times more likely to die after treatment (AOR = 46.31; 95% CI: (7.10, 301.87) as compared to patients who were admitted consciously.

Table 5: Multivariable analysis of associated factors of treatment outcome among acute poisoning patients treated at Wolkite university teaching hospital, Ethiopia, 2022 (n= 284)

Variables	Category	Treatment Outcome		AOR(95% CI)	P-value
		Survived	Dead		
Poisoning substance	Poisons other than Organophosphates	100	1	Reference	

	Organophosphate	184	22	21.07 (1.86, 238.26)	< 0.010
Patient status at admission	Conscious	201	2	Reference	
	Unconscious	60	21	46.31(7.10, 301.87)	<0.001

7. Discussion

The current study was conducted to assess the magnitude, treatment outcomes and associated factors of acute poisoning cases admitted to Wolkite university specialised hospital emergency department. The ultimate goal of this research is to show the magnitude of the problem for the health care professionals, government bodies and for the community, so that the necessary interventions could be designed and put in place. In this study, a prevalence of 2.6% per total emergency cases in two years was found in the hospital during the study period. However, this result is higher as compared to the study done in Gondar, Ethiopia (0.67%) (39). On the other hand, this result was found to be lower as compared to a study done in Iran-Tehran (5.4 %) (40). This might be because of the difference in the sample size (the latter study includes 1342 acute poisoning cases while the present one was 284). In this study, the highest proportion of acute poisoning occurred in young adults with the age of 15-29 years (51.1%). This result is comparable with a study done in Kenya (41). However, this result was different as compared to a study conducted in Taiwan, which reported age 65 years or older to have the highest rate (29.4%) for acute poisoning (38). This may be related to the fact that this population has a lower literacy rate, resulting in a lack of knowledge and skills related to handling items safely. In addition, the existence of multiple illnesses, multiple drug medication and poor physical conditions may also increase the risk of poisoning. The rise in the number of self-poisonings at the age category of 15-29 years might be because of repeated quarrels with family. This is evidenced by the fact that the most common reason of poisoning at this age category in the present study was quarrel with family (22.1%) at the hospital. This result was comparable with other studies conducted in Jimma-Ethiopia (46) and Turkey (33). The sex distribution of acute poisoning in this study revealed that the preponderance to be relatively higher (50.7%) in females. This finding appears to be concordant with other studies conducted in Iran-Teheran (55.7%) (40), Turkey (60%) (33) and Gondar-Ethiopia (63.5 %) (39). However, there are other studies that have indicated higher incidence of acute poisonings in males including those conducted in southern part of India (81.2%) (8), Iran-Teheran (51%), (40), and Kenya (58.33%) (41). Regarding the residential place of poisoning, the results of the present study indicated that majority of the cases (61.3%) were from the rural areas. This result seems comparable with a retrospective study conducted in India that showed acute poisoning in rural areas of 55.8 % (8). Another retrospective study done in India also pointed out that rural area accounted for higher proportion of acute poisoning (11). However, this result is found to be different from a result in a study conducted in Gondar-Ethiopia that most of the poisoned cases were from urban areas (75.9%) (39). This might be because of the difference in the proportion of rural and urban catchment areas of the studied hospital. Regarding the type of poisoning, this study revealed that 50.7% patients were poisoned intentionally. Different studies also reported that intentional poisoning is the major mode of poisoning in many countries (13). When the data was analysed by seasons most of the patients had intoxication and admitted at the hospital in Bega (29.2%) and Kiremt (28.2%). This is probably because these seasons are periods of preparation for agricultural farming and the availability of common poisoning agents such as pesticides in the rural areas will be higher due to obvious reasons. Among the poisoning agents identified in this study, OPs represent the highest percentage (64.8%) followed by

pharmaceuticals (8.8%) and bleaching agents (6.7%). Similar reports are available in multiple places. In Kampala- Uganda, most of the poisoning cases were due to agrochemicals and household chemicals respectively (12). Many of the studies in Ethiopia also support this result in one way or another .A retrospective case study at Gondar hospital showed that, Ops, rat poison and alcohol were mostly encountered as poisoning agents (in about 70% of cases) in adults possibly with suicidal or Para- suicidal intention (39). A case study done in TASH also showed that household cleansing agents were the leading causes of poisoning (43.1%) followed by organophosphate (21.6%) and phenobarbitone (10.3%) (26). The highest percentages of these chemicals might be because of the availability and open sales of pesticides and rat poison in the street of urban and rural areas as observed during this study. India also reported that pesticides particularly Ops are widely used for agriculture, vector control and domestic purposes. Because of their easy availability, OPs poisoning has assumed major global health challenge (11). However, this result is different from a study done in Iran that the most common involved toxic agents were drugs (60.8%) (40). This difference might be because both prescription and non-prescription medicines have been used throughout the world for self- poisoning mainly in urban areas. However, in this study the major proportion of poisoning cases identified were from rural areas (61.3%). It is known that poisonous agents show geographical variations depending on economic status. In developed and middle income countries, poisonings are mostly due to drugs, cosmetics and beauty products, household cleansing products and alcohol, while in developing countries, where the economy is based on agriculture, common causes of poisoning are hydrocarbons, pesticides, traditional medicines and mushrooms (3).

Regarding the management practice in the studied hospital, there was no standard guideline or protocol prepared and utilized for the management of acute poisoning during the study period. Most patients were treated with supportive measures mainly using medication other than antidotes (31.5%) and fluid resuscitation (26.4%). This is because a poisoned or an overdosed patient is primarily managed based on symptomatic and supportive care (45). Supportive care to maintain fluid, electrolyte and acid base status was widely utilized. Almost, 3.5% patients were given atropine as a management for pesticides poisoning cases, due to its action as a competitive antagonist at both central and peripheral muscarinic receptors and antagonize the cholinergic effects of excess acetyl choline at these sites (10). The current study also revealed that charcoal use “universal antidote “as chelation agent was 3.9 %. Different studies showed that the use of activated charcoal as chelation or gastric decontamination agent prevents absorption of substances in the gastrointestinal tract, thereby decreasing systemic absorption of potentially toxic agents when given to a poisoned patient within an hour of ingestion (3). Besides, all snake bite cases were not managed by the standard method of treatment. The cases were managed by TAT injection and Anti pain medications. This might be because of the unavailability of antivenom at the hospital. Patients with drug overdoses were treated using fluid resuscitation, supportive medications, gastric lavage and intranasal oxygen. Even though it is not possible to say that these approaches are not recommended for the management of drug overdoses, antidotes could have played an important role in treatment of such poisonings. Unavailability of antidotes in the hospitals forced the use of only general management. Good supportive care and

elimination techniques may, in many cases, restore a poisoned patient to good health and stabilize his or her body functions; the appropriate use of antidotes and other agents may greatly enhance elimination and counteract the toxic actions of the poison. In certain circumstances, they may significantly reduce the medical resources otherwise needed to treat a patient, shorten the period of therapy, and, in some cases, save a patient's life. Thus, antidotes may sometimes reduce the overall burden on the health service of managing cases of poisoning (18). It is also important to remember that antidote administration is appropriate when there is a poisoning for which an antidote exists, the actual or predicted severity of poisoning warrants its use, expected benefits of therapy outweigh its associated risk, and there are no contraindications (19).

On the other side, it was a good practice that a total of 62 patients were linked to psychiatry OPD. Moreover, even though this practice could be taken as a good start, it is not adequate. Because, it is recommended that, in all cases, patients who have deliberately self-poisoned require appropriate mental health assessment before disposition and discharge. All acts of deliberate self-harm must be taken extremely serious. This assessment and disposition planning should begin before the clinical resolution of acute poisoning.

With respect to outcome of acute poisoning in this study, majority (91.9%) of the cases survived. Moreover, the case fatality rate (death) in the hospital was 8%. However, this result was different as compared to a study conducted in India, which reported that the case fatality rate to be 13.2% (11). This variation in mortality may be explained due to lack of early diagnosis and treatment of the cases by the latter study. But the case fatality rate of this study similar with other studies conducted in TASH-Ethiopia (26) and Botswana (12) Moreover, this study revealed that, among 184 patients poisoned with OPs, 22 of them died, making its mortality rate 11.9%. This might be because of the inherent toxic nature of the poisoning agent, the place of residency for these individuals, type of poisoning (intentional versus accidental) or unavailability of antidotes.

Limitation of the study

The fact that data was collected retrospectively, it was not possible to find complete information in all patient medical charts. In addition, socioeconomic factors like religion and level of income were not considered among the factors in measuring prevalence and outcome of acute poisoning. As the findings are obtained from health facilities alone, the results may not be the true reflection of the problem of the general population.

8. Conclusion and recommendation

8.1 Conclusion

Even though this study was a hospital based study, the result suggests that acute poisoning is a public health problem in the community. This study also revealed that youths and adults in the community (15-29 years) remain very vulnerable for poisoning with higher prevalence in females. Deliberate self-poisoning is a problem mainly of the young adults aged below 30 years and once again females are more prone. Moreover, majority of the cases were from rural areas and quarrel was the main reason for individuals to poison themselves. Mishandling of fertilizers in agricultural areas, eating contaminated food items, and easy accessibility of household chemicals and medicines have caused majority of the poisoning in this study area. Furthermore, OPs pesticides are the leading cause of poisoning with most prevalence of death.

8.2 Recommendations

Based on the results of the present study, the following are recommended:

For the community: we recommend the community to handle chemicals in the house properly so they can reduce unintentional poisoning.

For WUSH: special follow up should be given for patients poisoned by OP and who were unconscious at admission. Appropriate documentation and improving the record-keeping practice is also suggested for a better information access and utilization.

For Wolkite university: should strengthen counselling services during exam time and reproductive issues (love)

For health extension workers and woreda health office: to create awareness on the consequences of poisoning and also on proper handling of chemicals in the house especially organophosphates

For researchers: we recommend for further research on why more cases are from rural areas.

For policy makers: Ministry of Agriculture must control agrochemical substances to minimize their open market sales and promote their rational use, which in turn might contribute in reducing the prevalence of acute poisoning. Ensuring availability and easy accessibility of antidotes and antivenoms by suppliers especially, PFSA and placing regular monitoring and evaluation system through the hospital's DTC is also recommended.

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Annexes

Annex 1: Information Sheet

Title of the Research Project: Assessment of magnitude, treatment outcomes and associated factors of acute poisoning cases admitted to wolkite university specialised hospital emergency department, southwest Ethiopia, 2022: a retrospective follow-up study

Name of Investigator:

Name of the Organization: Wolkite University, College of Health Science and Medicine, Department of Public Health

Introduction: This information sheet is prepared for WUSTH. The form aims to make the above-concerned office clear about the purpose of the research, data collection procedures and get permission to conduct the research.

Purpose of the Research Project: To assess magnitude, treatment outcomes and associated factors of acute poisoning cases admitted to Wolkite university specialised hospital emergency department, southwest Ethiopia, 2022

Procedure: To achieve the above objective, information that is necessary for the study will be taken from selected medical records of emergency registry and patient chart.

Risk and /or Discomfort: Since the study will be conducted by taking appropriate information from the medical chart, it will not inflict any harm on the patients. The name or any other identifying information will not be recorded on the data extraction tool and all information taken from the chart will be kept strictly confidential and in a safe place. The information retrieved will only be used for the study purpose.

Benefits: The research has no direct benefit for one whose document/ record will be included in this research.

Confidentiality: To assure confidentiality the data on the chart will be collected without the name of the clients and the information will be collected from this research project. Besides, it will not be revealed to anyone except the investigators.

Person to contact: This research project will be reviewed and approved by the institutional review board of College of Health Science, school of public health, Wolkite University. If you have any questions you can contact any of the following individuals (Investigator and Advisors) and you may ask at any time you want.

Annex 2: Data abstraction format from patient medical charts

Socio demographic factors

Characteristics	
Age (yrs)	_____
Sex	1. Male 2. Female
Marital status	1. Single 2. Married 3. Divorced 4. Widowed
Education level	1. Illiterate 2. Primary 3. Secondary (9-12) 4. Higher
Place of residence	1. Rural 2. Urban
Occupation	1. Unemployed 2. Farmer 3. Government employee 4. Merchant 5. Student 6. Daily labourer 7. House wife 8. Other (specify) _____
Living condition	1. Living in house alone
	2. Living alone on street
	3. Living with family
	4. friends
	5. Others

Patterns of poisoning

Poisoning substance	1. Organophosphate materials
	2. Bleach agents
	3. Pharmaceuticals (specify)
	4. Rat poisoning chemicals
	5. Alcohol intoxication
	6. Carbon monoxide
	7. Snake bite
	8. Traditional medicines
	9. Other (specify)
Reasons of poisoning	1. Unemployment
	2. Quarrel with family
	3. Income problem
	4. Failure in exam
	5. Marital and love disharmonies
	6. Unspecified reason
	7. Other (specify)
Add routes of poisoning	1. Oral ingestion
	2. Direct contact
	3. Inhalation
	4. Injection
	5. Unknown
Time spent from exposure to arrival at hospital	< 2 hours
	2-4 hours
	≥4 hours
Mode of poisoning	
	1. Intentional
	2. Accidental
	3. Unspecified
Season poisoning	1. Sep-Nov (autumn)

	2. Dec-Feb (winter)
	3. Mar-May (spring)
	4. June-Aug (summer)

Type of Treatment Given/Management Practices

Treatments given	
	1. Fluid Resuscitation
	2. Chelation with Activated Charcoal
	3. Antidote Management
	4. Whole Bowel irrigation
	5. Gastric Lavage
	6. Hemodialysis
	7. Emesis
	8. Medications other than Antidote
	9. Others (Specify)

Treatment outcome of poisoning

Outcome	1. Survived without disability
	2. Survived with disability
	3. Death