ORIGINAL ARTICLE

Toxicological Analysis's Importance in Treating Acute Poisoning Patients with Unclear Exposure Histories

PUSHPA PARKASH[1], TEHREEM ABAID[2], TALHA NAEEM CHEEMA[3], AHMAD RAZA KHURRAM[4], NADIR ALI[5], AFSHEEN SIDDIQI[6]

[1]Lecturer Department of forensic medicine and toxicology People's university of medical and health sciences for women Nawabshah
[2]Assistant professor Department of Forensic medicine and toxicology department Quaid e Azam medical college Bahawalpur
[3]Associate Professor department of Forensic medicine and Toxicology Quaid-e-Azam Medical College Bahawalpur
[4]Assistant Professor Department of Forensic medicine and toxicology DG khan medical college Dera Ghazi khan
[5]Assistant Professor/ HOD Department of Forensic Medicine & Toxicology Sargodha Medical College, Sargodha
[6]Associate Professor department of Pharmacology Ayub medical college Abbottabad
Correspondence to: Afsheen Siddiqi, Email: drafsheenfaisal@gmail.com

ABSTRACT

Objective: Examining the clinical features of patients with acute poisoning whose exposure history was ambiguous from a toxicological analysis standpoint was the purpose of this study.
Methods: This descriptive study was comprised of 140 patients. Inclusion criteria were patients who had toxicological testing done and whose exposure histories were unclear. Clinical symptoms and toxicant categories were examined.
Results: Among 140 cases, 105 cases has positive toxicological results and 35 cases had negative. Majority of the cases had age 31-40 years. Frequency of males were 86 (61.4%) and females were 54(38.6%). Accident was the most common exposure found in 108 (77.1%) cases. Oral was the most common route. Disturbance of consciousness was the most common etiology observed. Among the positive toxicological patents, the most common types of compounds were sedatives, insecticides, herbicides, and psychiatric pharmaceuticals.
Conclusion: Acute poisoning can present with a wide variety of nonspecific symptoms in individuals whose exposure history is unclear; in these cases, toxicological testing is essential for making a diagnosis or ruling out other possible causes.
Keywords: Toxicological analysis, Clinical manifestation, Acute poisoning

INTRODUCTION

As a leading cause of illness and death in the United States, poisoning is a major concern[1] More than 1,300 persons died in 2018 due to poisoning, out of more than 2.0 million instances reported by the American Association of Poison Control Centers' National Poison Data System.The mortality rate for poisoned patients in hospitals is approximately 0.5%.the third The Poison Control Center only received reports of 5% of all poisoning-related deaths in the US.The number of patients in the Republic of Korea who seek treatment at emergency rooms due to poisoning has been steadily rising; in 2015, more than 32,000 people did so.The in-hospital mortality rate for poisoned individuals was 1.6-7.9%[5].six, seven

The substance that produced the poisoning and how long it takes for the patient to reach the hospital after exposure are factors that influence their prognosis.Some substances may require special attention to ensure proper decontamination or antidote administration[8]. And even if a medicine doesn't improve treatment outcomes, it may still help doctors narrow down the options for patients with unclear diagnoses.Assuming a patient has been poisoned, it is difficult to determine which toxins were responsible. Typically, this is revealed by the findings of a patient's physical exam and medical history. An accurate diagnosis of pesticide poisoning requires a comprehensive patient history.But poisoning might be accompanied by a variety of clinical symptoms, and they might be the only signs that aid in diagnosis[8] As a result, clinical symptoms alone may not be sufficient to differentiate poisoning from other diseases, and several toxic agents may produce symptoms that are very similar to one another. Plus, a lot of poisoning victims don't want to talk about what happened. In such cases, it is possible to run additional tests that aren't necessary. When patients do not receive the necessary therapy in a timely manner, they may find themselves spending additional time in the emergency room.

If a patient has been poisoned, it may be difficult to determine which poisons caused the poisoning. Typically, this is revealed by the findings of a patient's physical exam and medical history. An accurate diagnosis of pesticide poisoning requires a comprehensive patient history.the twelfth But there are a few clinical signs that could point to poisoning and be the only clues to a diagnosis.8 As a result, clinical symptoms alone may not be sufficient to differentiate poisoning from other diseases, and several toxic agents may produce symptoms that are very similar

to one another. Plus, a lot of poisoning victims don't want to talk about what happened. In such cases, it is possible to run additional tests that aren't necessary. When patients do not receive the necessary therapy in a timely manner, they may find themselves spending additional time in the emergency room. It is difficult for a single hospital to dedicate sufficient resources to a toxicology lab in order to treat poisoned patients with the wide variety of toxins they may arrive with[12] Despite their creation and execution, toxicological screening techniques have limited usefulness for differentiating poisoned persons.

Toxicological examination is crucial for the diagnosis and treatment of persons with suspected poisoning and an incomplete exposure history.six, nine, and eleven For a variety of reasons, including a lack of sample volume, a lengthy testing procedure, a high price tag, and trouble getting to testing facilities, toxicological analysis is still not widely employed in clinical practice.From two different places: Two sources: [10,11] It is currently impractical to equip every hospital with a dedicated toxicological analysis lab. It is reasonable, though, to set up a regional toxicological analysis service[10] A regional center for toxicological analysis is the laboratory of the Institute of Poisoning at Nanjing Medical University.Both[12,13] As we have shown, toxicological analysis is underrepresented in clinical trials. The objective of this research was to examine the clinical manifestations of acute poisoning in patients with positive toxicological findings and hazy exposure histories. Our hope is that by shedding light on these patients' conditions, we might aid in their clinical diagnosis.

MATERIALS AND METHODS

This retrospective and descriptive study was conducted at Department of forensic medicine and toxicology People's university of medical and health sciences for women Nawabshah during march 2022 to March 2023. Total 140 patients were presented. The toxicological testing included blood and urine samples collected from patients examined in the emergency rooms of nearby hospitals.

All patients were eligible for inclusion if they fulfilled three conditions: 1) there was no discernible exposure history; 2) toxicological testing was conducted; and 3) poisoning events were evaluated by toxicologists. Patients were not included in the study if their exposure histories were certain but still lacked details.

The demographic data and exposure characteristics collected included sex, age, location, significant clinical symptoms,

exposure history, exposure route, cause, and toxicological study results.

Toxicological examination is carried out using equipment from Agilent Technologies, USA, including a gas chromatography-mass spectrometer (7890B-7000D), a headspace-gas chromatography system (7697A-7890B), and a liquid chromatography-mass spectrometer (XEVO TQS-Micro) from Waters, USA.

Both the China Metrology Accreditation and the China National Accreditation Service for Conformity Assessment have granted dual accreditation to the toxicological analysis laboratory at Nanjing Medical University's Institute of Poisoning. This facility is authorized to test for and identify toxic substances. Analytical approaches can be used to identify toxins from a variety of sources. Medications, herbicides, pesticides, gaseous toxins, volatile compounds (such as methanol), plant toxins (such as aconitine), and animal toxins (such as tetrodotoxin) are all part of this category. A general evaluation of these seven domains was performed on all patients whose exposure history was not well defined.works cited in 12 and 13. In most cases, the toxicological analysis lab will return their findings to you in less than a day.

For the statistical analysis, we utilized SPSS (version 24.0, IBM Corp, Chicago, USA). Two common tests used to compare numerical categorical variables are Fischer's exact test and a Chi-square test. If the p-value on both sides was less than 0.05, then the statistics were considered significant.

RESULTS

Among 140 cases, 105 cases has positive toxicological results and 35 cases had negative. Majority of the cases had age 31-40 years. Frequency of males were 86 (61.4%) and females were 54(38.6%). Accident was the most common exposure found in 108 (77.1%) cases. Oral was the most common route.(table 1)

Table-1: Demographics of the presented cases

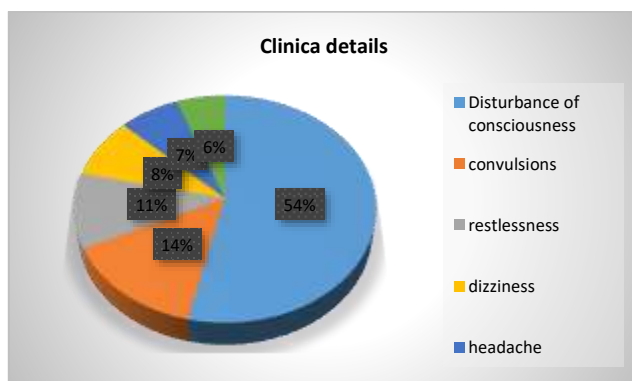| Variables	Frequency (140)	Percentage
Toxicological analysis		
Positive	105	75
Negative	35	25
Age		
1-20 years	15	10.7
21-30 years	30	21.4
31-40 years	65	46.4
>40 years	30	21.4
Gender		
Male	86	61.4
Female	54	38.6
Cause		
Accident	108	77.1
Suicide	32	23.1
Route		
Oral	97	69.3
Inhalation	15	10.7
Unknown	28	20

Figure-1: Clinical manifestations among all cases

Disturbance of consciousness was the most common etiology observed followed by convulsions, restlessness, dizziness, headache and visual disturbances.(figure 1)

Among the positive toxicological patents, the most common types of compounds were sedatives, insecticides, herbicides, and psychiatric pharmaceuticals.(table 2)

Table-2: Positive toxicological cases with usage of compounds

Positive Toxicological analysis	Frequency (105)	Percentage
Drugs used		
sedatives	27	25.7
insecticides	15	10.7
herbicides	16	11.4
psychiatric pharmaceuticals	48	34.3

DISCUSSION

The symptoms, causes, and locations of poisoning might vary greatly. Acute poisoning patients may also exhibit violent or uncooperative conduct, loss of consciousness, alcohol intoxication, or mental disease[14]. Without clinical experience, it can be very difficult to identify poisoned individuals and treat them[15]. To combat this issue and ensure that poisoned patients receive competent care, several nations have established regional poison centers. In China, poison centers have only recently been set up. Nanjing Medical University's Institute of Poisoning opened to the public in 2021. Our best information indicates that this is one of the earliest regional poisoning centers in China, established with the fundamental objective of improving poisoning patients' diagnosis and treatment[16,17]

At the time of initial diagnosis, the doctor may not have all of the patient's hazardous exposure history. The situation is complicated for a number of reasons, including patients who are suicidal, patients whose consciousness is impaired, patients who are uncooperative, patients who are unaware that they have been poisoned, and patients who refuse to provide detailed information[18]. In this study, 76.4% of patients had symptoms that could be related to poisoning; however, issues like unconsciousness, refusal, and lack of participation made it difficult to acquire more specific information. There was also a lack of awareness regarding poisoning status among 23.6% of patients. Clinicians begin to suspect poisoning as a possible explanation for these patients' symptoms since no recognized disease fits them. This suspicion was validated by subsequent toxicological studies. There are several scenarios in which the Chinese expert consensus recommends treating the patient as if poisoning were possible when the patient's toxic exposure history is unknown.[19] Similar results have been reported in related literature, suggesting that toxicological investigation could aid in poisoning diagnosis in individuals with an unclear history of hazardous exposure.

Indicators for early poisoning screenings may be provided by the categories of toxic exposures among different age groups in the local population. Research out of Australia's Poisons Information Centers found that people between the ages of 20 and 74 were disproportionately exposed to painkillers (15.1% of the population) and mental medicines (17.8%). Prescription errors involving cardiovascular (23.6%), anticoagulant (4.6%), or antidiabetic (4.1%) drugs were more common among patients older than 74 years[20] Based on toxicological analysis, psychiatric drugs (23.1%), sedatives (20.5%), insecticides (13.8%), and herbicides (12.8%) were the most common toxins among patients in our sample who had unknown exposure histories. Toxic effects from pharmaceuticals were more common than those from pesticides, whereas those from other sources happened rarely. According to multiple studies, the most common kind of poisoning in industrialized nations is medication poisoning[21,22]

Acute poisoning patients with unknown exposure histories but positive toxicological test findings can happen to people of all ages, according to this study. No matter the patient's age, doctors should always rule out poisoning as a possible cause and seek toxicological testing as necessary while making a differential

diagnosis. This study's unique conclusion is that 76.1% of these individuals died in accidents rather than suicides (compared to 23.1% in the general population). When it comes to acute poisoning, the usual story is that most of the cases are caused by suicide.the numbers[23,24] One possible explanation for this phenomena is the variation among poisoned populations.

The following steps can help provide clues about the possibility of poisoning: a patient's medical history, a comprehensive physical examination, knowledge of the clinical manifestations of common poisonings, and familiarity with the area's prevalent categories of exposures. It is challenging to diagnose poisoning cases when the exposure history is uncertain.

Poisoning with an unknown exposure history is a neglected but critically relevant area, and this study fills that need. The data also came from a toxicological analysis lab, which sets it apart from most prior research that has come out of emergency departments.

CONCLUSION

Acute poisoning can present with a wide variety of nonspecific symptoms in individuals whose exposure history is unclear; in these cases, toxicological testing is essential for making a diagnosis or ruling out other possible causes.

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