ORIGINAL ARTICLE

Prevalence of Poisons in Dead Bodies Reported to Khyber Medical College, Peshawar

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ABSTRACT

Introduction: Poisoning is worldwide leading morbidity and mortality cause, poison is defined as any substance which is taken in any amount and any route injures, endangers or kills a person. The study was focused on types of poisons and frequency of poisoning recorded in different age group.
Objective: To determine the prevalence of poisons in dead bodies reported to Khyber Medical College, Peshawar.
Design and Sitting: A cross sectional descriptive study was conducted at Mortuary section of Forensic Medicine & Toxicology, Khyber Medical College,Peshawar.
Methods: The study was conducted with the help of specifically designed proforma. All the data was entered into statistical software SPSS v25.0. Categorical variables like gender and type of poison calculated.
Results: The study revealed, Morphine (n= 07) was detected in the highest number of cases, followed by Amphetamine (n= 03) and Tetrahydrocannabinol (THC) (n= 03), while the others were found in a minor number of cases in this study. The gender male was the most common (n = 39) and died from poisoning, followed by the female (n= 05). A total of 46 instances were reported as negative, with a male population of (n= 37) and a female population of (n= 09). Young people between the ages of 21 and 40 were found to have the highest number of positive cases (n= 27).
Conclusion: It is concluded that Morphine was found more prevalent in gender male rather than female population in the total number of reported cases.
Keyword: Poisoning, accidental, intentional, type of poisons, Morphine.

INTRODUCTION

The world has seen an up growing trend in acute poisoning and chemical exposure, which is mostly related with increase of industrialization throughout the world particularly the developing countries (1). As per a world renowned registry, Chemical Abstracts Service (CAS), it is proved that about more than 83 million materials or substances which are chemically in nature are presently accessible and it is estimated that about 4000 new chemical are being introduced daily globally (2, 3). Such high existence of chemicals can have drastic impact throughout the world either by intentional or unintentional use.

According to a report published in Global Burden of Disease Study (GBD) that comprise of data from two decades shows that involuntary poisoning is responsible for an estimated 180,000 deaths in alone 2010. The conversion of same number in mortality rate shows about 2.6 per 100000 inhabitants, which makes poisoning to be in top 50 causes of death worldwide. A comparison of the same figures in 1990 shows that this menace has decreased significantly and showed 11% reduction in the casualties caused, while a 34% decrease in the mortality rate(4). In addition another literature vide another study has also recorded over 8.9 million death in 2010, which again is 20% less than what were the numbers in 1990 (5).

Despite the evident data from different parts of the world, it is very much important here to understand that in above number 91% of frequency is from low- and middle-income countries (LMICs) (2).

The other side of the picture shows that with unintentional deaths due to poisoning one cannot deny the intentional deaths due to poisoning which are mostly suicidal. The worldwide figures shows that in suicidal attempts 23% of the cases are found positive for pesticides (6). However, literature shows that type of poison varies with respect to location and availability of poisons. Taking the example of our setup which is in low and middle-income countries, pesticides particularly Organophosphate, Aluminum Phosphate, Carbamate and others are found in abundance. The availability of poisons in low and middle income countries(LMICs) makes 10-20% of suicidal deaths, which is quite more than the developed world, only showing (0.5-1%)(7). Unlike the statistics of the world, where the incidence of unintentional poisoning is

decreasing, in Pakistan this situation has climbed up 4 ratings from 1990 to 2010 by reaching 22nd position from 26th (8, 9).

In Pakistan, ignorance and illiteracy are widespread, contributing to suicidal and accidental poisoning(10). Suicide poisoning is influenced by poverty, socioeconomic concerns, and community cultural habits. The usage of drugs for suicide poisoning has risen in recent years(11, 12). Poisoning types and patterns differ accordingly on socioeconomic class, country, and geographic location(13). In undeveloped countries, poisonous material handling is poorly regulated, and many medications and chemicals are readily available for consumption. In developing countries, easy access to medications, pesticides, organophosphates, and other chemicals has increased the risk of poisoning.

A poison is described as a substance that, regardless of quality or quantity, injures, endangers, or kills a person. Poisons and poisoning-related deaths are dealt with by forensic toxicology (14). The medico-legal application of toxicology is to determine the cause of disease or death is known as forensic toxicology. In poor countries like Pakistan, poisoning is the preferred method of suicide. Homicide poisoning is a rare and not impulsive crime (15) . The discovery of a toxic chemical is the finest evidence for jurisprudence in situations of homicidal poisoning and deaths. Poison detection is complex and difficult to achieve in medico-legal autopsies. It's rare that a poison will be discovered until a specific poison is utilized (16). Homicide poisoning, according to forensic toxicology, is more common yet difficult to detect. There's a lot more to it than crime statistics show (17). Suicide or accidental poisoning are the most common reasons for poisoning in Pakistan, while homicide is not rare. Several factors influence poison selection, including geography, country, culture, and availability.

Acute poisoning is an emergency condition, and it frequently leads in death in the majority of cases. In poorer countries, acute poisoning is on the rise (13). Acute poisoning is either intentional or unintentional. Nowadays most common poisoning is intentional poisoning.

The main objective of this study or research is to evaluate the fatalities due to poisons, reported to Khyber Medical College (KMC) Peshawar, this research will serve to fill in the gaps in the

literature, which may then be utilized to accommodate various policy decisions to combat the poisoning threat.

MATERIALS AND METHODS

This cross-sectional descriptive study was conducted at Mortuary/autopsy section of the Department of Forensic Medicine & Toxicology, Khyber Medical College, Peshawar on 100 samples from 1st January to 30th June 2021. All dead bodies of any age and gender of district Peshawar as well as referral case from whole Khyber Pakhtunkhwa that reported to Mortuary or autopsy section Forensic Medicine Department of Khyber Medical College, Peshawar for post mortem were included having proper documentation (i.e. FIR copy, application for post mortem and Naqsh e Zarar). Cases with incomplete documentation were excluded missing any of these documents (i.e. FIR copy, application for post mortem and Naqsh e Zarar) were excluded.

All the cases were undergone routine autopsy with external examination. The first step before doing autopsy is to check all required documents provided by police at the time of handling of dead body to mortuary section. The documents provided by police include inquest form, hospital and police record. In autopsy first step is external examination of the dead body. Second step in autopsy is internal examination of dead body including opening of all three cavities means cranial, thoracic and abdominal cavities. Sample will be collected accordingly for a specific case as per history and findings under a set guidelines (20). Samples are collected by mortician under my supervision. The containers in which samples are present must be sealed, labelled and signed by medico legal officer to maintain chain of custody, Autopsy staff of Khyber Medical College, Peshawar hand over the samples to the Toxicology Laboratory of the Department of Forensic Medicine, Khyber Medical College, Peshawar for toxicological examination. Routine samples collected in every suspected case of poisoning are (blood, urine, part of liver, stomach along with contents part of lung and half of kidney). For toxicology analysis the samples taken must be preserved in saturated solution of normal saline except blood, urine and alcohol. For histo-pathological examination the samples are preserved in formalin. The amount of samples required for toxicology analysis are blood (50-100cc), urine (all available), stomach whole with its contents, liver (500 gram), kidney (one whole), lung (one whole) (21). The collected sample either blood or organ part was examined in Toxicology Laboratory of the Khyber Medical College, Peshawar.

SPSS V-21.0 used for data analysis. Frequency and percentages were measured for categorical variables. Mean and standard deviation were calculated for numerical variables. Stratified data were cross-tabulated and the Chi-square was applied to check the relationship for which significant value α <0.0.5.

RESULTS

Among 100 documented cases gender wise positive cases were high in male n= 39 (39%), while in the female positive cases were only n= 5 (5%). In the total study cases n=37 (37%) cases of male were found negative, while n= 9(9%) of female cases were found negative. All gender wise distribution shows significant correlation (p<0.001) (Table 4.1 and Figure 4.1). Age wise high (24%) frequency of positive cases were among the age group between 21-40 (mean= 31.5, SD= 5.338539126) followed by age group 41-60 with frequency 10% (mean= 50, SD=6.531973), age group ≤20 with frequency 06% (mean= 10.5, SD=5.916079783) and age group ≥61 with frequency 04% (mean= 05, SD=1.870829). Gender wise distribution shows significant correlation (p<0.001) (Table 4.2 and Figure 4.2). Among the reported cases in the duration of current study a total of 16 poisons were reported in dead bodies shown in Table 4.3. Morphine was highly frequent poison (n =07) followed by Morphine, Tetrahydrocannabinol (THC) (n =04). Poisons wise distribution shows significant correlation (p<0.001) (Table 4.3 and Figure 4.3).

Table 1: Gender wise distribution of poisons among studied dead bodies

Category	Frequency & No. of Positive Cases (%)	Frequency & No. of Negative Cases (%)	P value
Male	39	37	
Female	5	9	<0.001
Total	44	46	

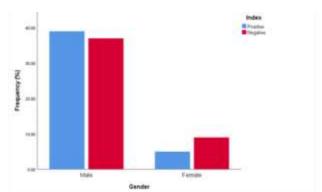Figure 1: Gender wise distribution of poisons among studied dead bodies.

Table 2: Age wise distribution among reported dead bodies

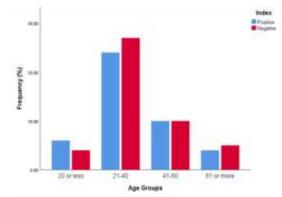| Age Groups	Positive (%)	Negative (%)	Mean	SD±	P value
≤20	6	4	10.5	5.91	
21-40	24	27	31.5	5.33	
41-60	10	10	50	6.53	<0.001
≥61	4	5	63.5	1.87	

Figure 2: Age wise distribution among hundred (100) reported dead bodies

Table 3: Poisons wise distribution among dead bodies reported

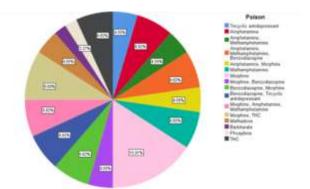| S. No.	Poison	Number and Frequency (%)	P value
1	Tricyclic antidepressant	2	
2	Amphetamine	3	
3	Amphetamine, Methamphetamine	2	
4	Amphetamine, Methamphetamine, Benzodiazepine	3	
5	Amphetamine, Morphine	2	
6	Methamphetamine (crystal meth' or 'ice)	3	
7	Morphine (opium poppy)	7	
8	Morphine, Benzodiazepine	2	
9	Benzodiazepine, Morphine	3	
10	Benzodiazepine, Tricyclic antidepressant	3	<0.001
11	Morphine, Amphetamine, Methamphetamine	3	
12	Morphine, Tetrahydrocannabinol (THC)	4	
13	Methadone (dispersible tablet)	2	
14	Barbiturate (sleeping pills)	1	
15	Phosphine (Wheat Pills)	1	
16	Tetrahydrocannabinol (THC) (marijuana)	3	

Figure 3: Poisons wise distribution among dead bodies reported

DISCUSSION

Poisoning is a serious public health issue around the world and one of the primary causes of illness and mortality in Pakistan. According to the World Health Organization, 873,000 people committed suicide in 2012, making it one of the leading causes of death worldwide (12). Any substance which may be drug or chemical material which produce harmful effects on the body is poison and must be diagnosed and treated to decrease the death ratio. There are numerous causes of self and unintentional poisoning in Pakistan but among them unawareness Ignorance and illiteracy is on the top. In Asian countries especially in India and Pakistan there is easy access to those drugs which are used for committing suicide so the last few years and instead of decreasing, increasing day by day (13) . In third world countries especially in Pakistan the major problem is illiteracy, lack of proper supervision and implementation of laws related to drugs used for committing suicide and homicide. Although there are laws and regulations regarding poisons, their execution is difficult in developing nations, which raises the risk of poisoning (14).

More men were impacted (39.0%) than women. A number of additional research have shown results consistent with this one (15). Males may be more vulnerable to poisoning due to their increased exposure to stress and strain, and because occupational poisoning is more common among men because of carelessness in handling (e.g., spraying with high concentration). Because of prolonged contact, spraying into the wind, or a lack of protective gear, symptoms manifest (16).

Morphine was the most commonly used drug poison (7%) across all age groups, followed by tetrahydrocannabinol (4%) as a close second. The findings of our study corroborated those of Das RK [17], who found that tablet overdose was a leading cause of acute poisoning. However, many studies on poisoning in adolescents found that they frequently used illegal drugs and over-the-counter medicines like paracetamol and antihistamines for self-harm.[18, 19] In terms of age range, the results of this study are consistent with those of Gupta et al.[20], who found that 42.7% of cases occurred in people aged 20–29.

It is recommended that, further studies are suggested to be conducted time to time so it reveals prevalence of deaths due to poisons so the government regulatory agencies/authorities could prevent deaths because of these agents. Already existing rules and regulation regarding drugs must be modified and implemented.s Training of health professionals to arrange workshop for the awareness for better management of such cases.

CONCLUSION

It is concluded that Morphine was found more prevalent in gender male rather than female population in the total number of reported cases. Young guys are especially vulnerable to poisoning. Death rates in Pakistan could be lowered with the aid of early treatment at a tertiary care facility.

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