

PATTERN OF SELF-POISONING AND TOXICITY IN SUICIDAL DEATHS PRESENTING FOR AUTOPSY AT THE TEACHING HOSPITAL OF THE COSMOPOLITAN CITY OF PAKISTAN.

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Abstract

Background & Objective: Suicide is a common cause of death among teenagers and young adults and day by day, an increase has been observed in this trend. In most cases, home-based materials are used for this purpose. Hence, we aim to determine the frequency of various poisonous agents used for suicide and the pattern of presentation of such suicidal death for autopsies at a teaching hospital in a cosmopolitan city of Pakistan.

Methods: This cross-sectional study was conducted at the Toxicology and Forensic Medicine Department, Allama Iqbal Medical College, Lahore over a 1-year period from January 2022 to January 2023. About 60 dead bodies of deceased committing suicide were included through non probability consecutive sampling. Poisonous material used for suicide was inquired from family or next of kin and was verified with a toxicology report. Data was then recorded in proforma and analyzed in SPSS version 25.

Results: The mean age of dead bodies at the time of death was 29.51 ± 14.92 years. There were 37 (61.7%) male bodies and 23 (38.3%) female bodies. The mean duration between death and body received for autopsy was 2.4 ± 1.7 days. Out of 60 cases, 37 (61.7%) cases had a history of depression before suicide, 6 (10.0%) were taking anti-psychiatric treatment, 2 (3.3%) had schizophrenia, 4 (6.7%) had depressive disorder, while 11(18.3%) had no depressive symptoms or relatives were unaware of that. Out of 60 cases; 12 (20.0%) committed suicide with organophosphates, 10 (16.7%) took over-the-counter drugs, 8 (13.3%) ingested household chemicals or acid, 6 (10.0%) took kala pather, 6 (10.0%) ingested wheat pills, 5 (8.3%) took cocaine in overdose, 5 (8.3%) had methamphetamines overdose, 3 (5.0%) had cannabinoids, 2 (3.3%) had methadone, 2 (3.3%) benzodiazepines and 1 (1.7%) had alcohol overdose.

Conclusion: Organophosphate (pesticide) is the most commonly used suicidal poisoning agent, followed-by household acids in cosmopolitan cities (urban areas). Stringent regulations are needed to regulate the sale of these toxic materials to avoid unnatural deaths of our youth.

Keywords: poisonous material, suicide, Organophosphates, over the counter drugs.

How to cite: Ahmad A, Chaudhry SH, Farooq U, Waheed I, Junaid A, Ali A. Pattern of self-poisoning and toxicity in suicidal deaths presenting for autopsy at the teaching hospital of the cosmopolitan city of Pakistan. JAIMC2023; 21(1): 55-60

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Submission Date: 10-02-2023
1st Revision Date: 25-02-2023
Acceptance Date: 16-03-2023

Suicide is defined as “act of deliberately injuring or intoxicating own-self with the intention to cause one's own death. On the other hand, a suicide attempt is an action in which someone causes harm to themselves with the intent to die, but does not succeed in doing so.¹ From 2000 to 2021, the rate of suicide increased by approximately 36%. In 2021, suicide accounted for 48,183 deaths, which equates to approximately one death every 11 minutes. Suicidal ideation and attempts are more widespread than actual suicide. According

to estimates for 2021, about 12.3 million American adults seriously contemplated suicide, 3.5 million planned to suicide, and 1.7 million tried an attempted suicide.^{2,3} Suicide ranked as second among leading causes of death of People aged as 10-14 and 20-34.^{3,4}

Pakistan has the fifth largest population (207 million) in the world. While, predominantly, people are attached with agriculture, with about 64% of its population is residing in rural areas, according to the 2017 National Census.⁵⁻⁷ Due to the absence of vital registrations, Pakistan does not have precise statistics on deaths by suicide.⁸ However, compared to the international suicidal deaths rate per 100,000 people for both genders in 2017 of 9.98, Pakistan has an estimated age-standardized suicidal death rate of 4.4 per 100,000 people.⁹ The suicide death rates, in neighboring South Asian countries like Sri Lanka, India and Bangladesh, are 13.33, 5.73 and 7.55 per 100,000 people, respectively. Suicide is emerging as significant problem of public health as per recent data despite estimated rates of suicide are low.^{10,11}

Even in advanced countries having modern and latest data collection systems of health of population, obtaining reliable information of morbidity and mortality due to poisoning is challenging. Although interpreting available data can be difficult, some general observations can be made about poisoning epidemiology. Childhood poisoning is typically accidental and is usually associated with smaller rates of morbidity and mortality.¹² There has been a concerning increase in suicide attempts through self-poisoning over time, indicating a need for greater attention to this issue. To address the risk factors that contribute to such suicide attempts, it is important to direct efforts towards prevention and intervention measures.¹³

To find the most common poisoning agent involved in suicidal deaths observed during autopsies of suicidal deaths was rationale of this study. Literature showed an increasing trend in poisoning agents that are available in homes and work places in Pakistan to be used for self-intoxication. Therefore, there is a need to find the major source of poisoning substances in our local population. Thus, this study was conducted with

an objective to determine the frequency of poisoning agents used for suicide and pattern of their presentation for autopsies at teaching hospital of cosmopolitan city of Pakistan.

METHODS

This was Cross sectional study carried out at Toxicology and Forensic Medicine Section of Allama Iqbal Medical College, Lahore for a period of one-year from January 2022 to January 2023. Sample size calculated was 60 suicidal autopsies. (with 95% confidence level, 10% margin of error and percentage of swallowing wheat pills i.e. 19.1% for suicide in Pakistani population)¹⁴ Non-Probability, Consecutive Sampling technique was used. Dead bodies of 16-65 years of both genders received within 1-5 days of suicidal deaths brought for autopsy were included. Bodies with history of prolonged use of toxic drugs or narcotics, putrefied dead bodies or burned after chemical suicide were excluded.

After obtaining approval from ERB of institution, autopsy report of sixty dead bodies brought for autopsies was studied. Informed consent was obtained from next of kin. Demographical data like age, gender, ethnicity, occupation before death, education level, stress level, dependency, smoking, history of alcoholism, duration / time of death, residence, and location of death were noted. Cause or poisonous material used for suicide was also inquired from family or next of kin and that was counter checked from toxicology report of autopsy. Proper examination of clothes with external and internal examination of the body was done. Findings were recorded in a proforma. Data were analyzed through SPSS version 25. Qualitative variables were presented as percentage and frequency while numerical variables were presented as mean and standard deviation.

RESULTS

The mean age of dead bodies at the time of death was 29.51 ± 14.92 years. There were 37 (61.7%) male bodies and 23 (38.3%) female bodies. The male to female ratio was 1.6: 1. There were 28 (46.7%) cases

who belonged to Punjab ethnicity, 12(20.0%) cases belonged to Sindh ethnicity, 11(18.3%) cases belonged to KPK ethnicity and 9 (15.0%) cases were from Baluchistan. The occupation of deceased was majorly business [11(18.3%)], followed by 8 (13.3%) who were doing jobs, 15(25.0%) were students, 9(15.0%) were housewives, and 17 (28.3%) were jobless. Out of 60

Table 1: Baseline features of patients

Feature (n=60)	Mean±SD: f(%)
Age (in years)	29.51 ± 14.92
Gender	
Male	37 (61.7%)
Female	23 (38.3%)
Ethnicity	
Punjabi	28 (46.7%)
Sindhi	12 (20.0%)
KPK	11 (18.3%)
Baluchistan	9 (15.0%)
Occupation of deceased	
Business	11 (18.3%)
Job	8 (13.3%)
Student	15 (25.0%)
Housewife	9 (15.0%)
Jobless	17 (28.3%)
Education level	
Illiterate	23 (38.3%)
Under matric	14 (23.3%)
Under-graduate	9 (15.0%)
Graduate	8 (13.3%)
Post-graduate	6 (10.0%)
Dependency	12 (20.0%)
Smoking	15 (25.0%)
History of alcoholism	7 (11.7%)
Duration / time of death (days)	2.4 ± 1.7
Residence	
Rural	19 (31.7%)
Urban	41 (68.3%)
Stress level	
Depressed before suicide	37 (61.7%)
Was taking psychiatric treatment	6 (10.0%)
Schizophrenia patients	2 (3.3%)
Depressive disorder	4 (6.7%)
No depression	11 (18.3%)
Location of death	
Home	26 (43.3%)
Work place	12 (20.0%)
School	14 (23.3%)
Unknown place	6 (10.0%)
Friend's home	2 (3.3%)

cases, 23 (38.3%) were illiterate, 14(23.3%) were under matric, 9(15.0%) were under graduate, 8(13.3%) were graduate and 6 (10.0%) were post-graduate. Out of 60 cases, 12 (20.0%) were dependent on their relatives for finances, 15(25.0%) were smokers, and 7(11.7%) were alcoholics. The mean duration between death and body received for autopsy was 2.4±1.7 days. Out of 60 cases, 19(31.7%) bodies were received from rural area and 41 (68.3%) were from urban areas. Out of 60 cases, 37(61.7%) cases had history of depression before suicide, 6(10.0%) were taking anti-psychiatric treatment, 2 (3.3%) had schizophrenia, 4 (6.7%) had depressive disorder, while 11(18.3%) had no depressive symptoms or relatives were unaware of that. The most common location of death was home [26 (43.3%)], while 12 (20.0%) were found dead at work place, 14(23.3%) were found at school, 6(10.0%) were found at unknown place and 2(3.3%) at friend's home. Table 1

Out of 60 cases; 12 (20.0%) done suicide with organophosphates, 10 (16.7%) took over the counter drugs, 8 (13.3%) took household chemical or acid, 6 (10.0%) took kala pathar, 6 (10.0%) took wheat pills, 5(8.3%) took cocaine overdose, 5(8.3%) took methamphetamines overdose, 3 (5.0%) had cannabinoids, 2 (3.3%) took methadone, 2 (3.3%) took benzodiazepines and 1 (1.7%) took alcohol. Figure 1

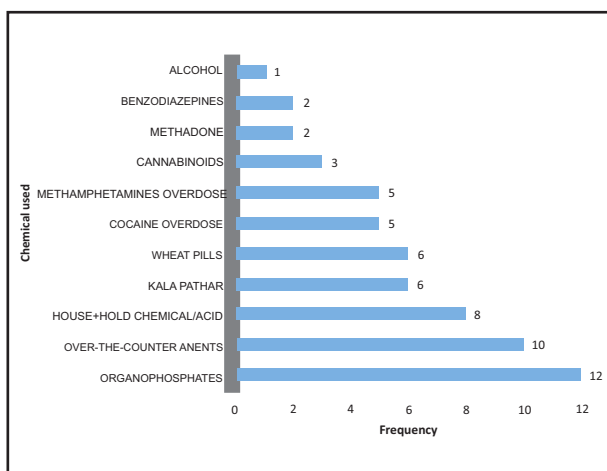


Figure 1: Chemical involved in suicide

DISCUSSION

Forensic autopsies often require the expertise of

related scientific disciplines, in addition to forensic pathology, to diagnose crucial forensic issues. For instance, identifying the chemical compounds or natural toxins involved in a case of poisoning is essential to determine the cause of death, while genetic analysis of material obtained from an unidentified autopsied body is necessary for personal identification. Forensic medicine, in a broader sense, encompasses various forensic sciences and can be categorized into three primary fields: forensic toxicology, forensic biology, and forensic pathology.¹⁵

Hospital populations are more likely to engage in self-poisoning, whereas self-cutting is more prevalent in the general population. In adolescents, self-cutting may be up to twice as common as self-poisoning. The methods used for self-harm vary depending on gender and age group. Social, legal, and religious factors can inhibit reporting or result in underreporting of suicide and self-harm. Recent reports indicate that suicide and self-harm rates in the country are rapidly increasing despite these factors.¹⁶

Shekhani and colleagues observed that there is a stigmatization of suicidal behavior that can impede research on the subject.¹⁷ Self-poisoning is a prevalent method of suicide, with one in five suicides in the United States involves poisoning as the primary method. Additionally, almost 70% of individuals consume a substance prior to their suicidal death.¹⁸ The prevalence of attempted self-poisoning has increased and easier access and availability of drugs and chemicals has also replaced traditional methods of suicide. Pesticides alone are responsible for a quarter of global suicide rates.¹⁹ Psychotropic drugs, sedative-hypnotics, analgesics, antihistamines, antidepressants and, psychoactive drugs are widely used for self-poisoning in suicidal attempts in developed countries.²⁰

In our study, we observed that; 12(20.0%) done suicide with organophosphates, 10(16.7%) took over the counter drugs, 8(13.3%) took household chemical or acid, 6(10.0%) took kala pathar, 6(10.0%) took wheat pills, 5(8.3%) took cocaine overdose, 5(8.3%) took methamphetamines overdose, 3(5.0%) had cannabinoids, 2(3.3%) took methadone, 2(3.3%) took benzo-

diazepines and 1 (1.7%) took alcohol. Tahir et al., found that toxic substance was involved in 36% cases, followed by pesticides 31%, drug overdose 11%.²¹

The higher case fatality rate of self-poisoning with pesticide ingestion is the most probable explanation for the prevalence of pesticide related suicides in developing countries. In comparison, substances commonly used for self-poisoning in the West have lower case fatality rate. In England and Wales, for instance, the case fatality rate among individuals hospitalized for self-poisoning treatment is less than 0.5%, while in rural areas of Sri Lanka, it is 7%.²²

Typically, it involves an intended overdose of many substances. The primary drugs involved in poisoning incidents are anxiolytics like benzodiazepine, tranquilizers and hypnotics, drugs used for epilepsy such as carbamazepine and valproic acid and antidepressants like TCAs and SSRI, as well as various types of neuroleptics. Drug poisoning is particularly prevalent among individuals with psychiatric conditions and drugs and alcohol addiction, as they may turn to psychotropic drugs during periods of intensified withdrawal symptoms or acute alcohol intoxication.²³

Other psychoactive substances including over the counter available drugs capable of affecting consciousness, behavior, and emotions can be used for suicidal drives when consumed in large amounts. Among these substances, opioids and their derivatives are commonly used.²⁴ It has been noted that since 2017, another group of brain-stimulating substances called "legal highs" have been present in the statistics of suicides and suicide attempts as available with Polish police. These substances contain psychoactive compounds such as N-benzylpiperazine, which is used as substitute for amphetamine, as well as synthetic cannabinoids and cathinone derivatives such as mephedrone and naphyrone.²⁵

There is scarcity of the literature on comparison of regional trends of suicide and self-harm within Pakistan as well as urban and rural variation.¹⁴ But in our study, most of the cases were from urban region 41(68.3%) with organophosphates being the most common poison used for self-poisoning among suicidal deaths.

Since suicidal deaths brought for autopsy were from urban areas only, many suicidal deaths from rural areas have not been taken account of, that limits our study.

CONCLUSION

Organophosphate (pesticide) is the most commonly used poisoning agent for suicide, followed-by house hold acids in cosmopolitan city (urban area) hence stringent regulations are needed to regulate the sale of these toxic materials to avoid unnatural deaths of our youth.

Conflict of interest: *None*

Funding Source: *None*

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