Research Article

The clinical profile, management, and outcomes of deliberate self-poisoning in a tertiary care hospital, Pretoria, South Africa

Anna John Medayil Chacko, Mmakoma Becky Kgole, Matlawene John Mpe*

Department of Internal Medicine, Sefako-Makgatho Health Sciences University, Ga-Rankuwa, Pretoria, South Africa

***Corresponding Author:** *john.mpe@smu.ac.za*

ABSTRACT

Introduction: Deliberate self-poisoning is a major public health problem globally and constitutes a significant proportion of emergency department presentations. The purpose of the study was to determine the clinical profile, management, and outcomes of patients admitted with deliberate self-poisoning to a tertiary public academic center in South Africa.

Methods: A review of the clinical records of medical admissions for deliberate self-poisoning over one year was conducted.

Results: A total of 140 patient records were analysed. The mean age of the group was 25.7 ± 9.4 years of whom 75.6% were females. The majority (96.4%) of patients were unemployed. Pharmaceutical agents were the most common (75%) form of poisoning, taken orally by most (99%). Psycho-social stressors were responsible for deliberate self-poisoning in 49% of the patients. None of the patients had evidence of significant organ dysfunction at admission. Two patients were admitted to the intensive care unit. All patients survived. The median length of stay in the hospital was 5 days (IQR 4–7 days). Treatment consisted of supportive care and, where appropriate, gastric decontamination, administration of antidotes/reversal agents, and referral to psychosocial services.

Conclusion: In this study, a high proportion of the patients were female, unemployed, and single. Psycho-social stressors were the predominant reasons for deliberate self-poisoning and pharmaceutical agents were the main form of poisoning in the majority of cases. Improving the mental health and coping skills of young females could potentially reduce episodes of deliberate self-poisoning among this vulnerable group.

Keywords: deliberate, self-poisoning, substances, clinical profile, outcomes

INTRODUCTION

Deliberate self-poisoning is a significant public health issue in developing and developed countries.(1,2). It constitutes a significant proportion of presentations to emergency departments (EDs) worldwide.(3–6)

Globally, the incidence of deliberate self-poisoning is estimated to be between 0.4% and 10% and has been associated with significant morbidity and mortality.(1,7,8). A South African study carried out in the Free State reported a 2.5% intensive care unit (ICU) admission rate for deliberate self-poisoning.(9) In two South African studies, the mortality associated with deliberate self-poisoning ranged from 1% to 2.1%.(5,9)

The care provided to patients with deliberate self-poisoning often imposes a significant economic burden on health services.(10,11) The hospital cost of managing these patients is expensive.(11,12) The cost estimate of managing such patients from a single-center study in Britain was approximately 1.6 million pounds per year.(13) In a large Belgian hospital, deliberate self-poisoning cases constituted 0.6% of all emergency department visits, and the cost per patient was calculated to be 872 euros.(7)

Intentional self-poisoning is a strong predictor of subsequent suicide and premature death.(14) Deliberate self-poisoning has been described by others as intentional acts by patients to free themselves from the pressures caused by distressing life circumstances.(15) In South Africa, suicide is a serious public health concern and accounts for approximately 9.6% of unnatural deaths, yielding an annual prevalence rate of 13.25 per 100,000.(1)

The choice of the agent for self-poisoning varies from country to country and seems to depend mainly on availability rather than potency.(3,9) The use of more than one substance for self-poisoning has also been reported.(9,10)

While some studies report an equal prevalence of deliberate self-poisoning among men and women, others have

claimed a female preponderance.(9,16) An analysis of cases of self-poisoning in Kampala, Uganda, reported more men were involved in the act of self-poisoning.(17) As there is a relative dearth of studies assessing the impact of deliberate self-poisoning in South Africa, we aimed to study the epidemiology and outcomes of patients admitted with deliberate self-poisoning to a tertiary academic hospital in South Africa.

METHODOLOGY

We reviewed the clinical records of all deliberate self-poisoning cases admitted to the Internal Medicine department at Dr. George Mukhari Hospital (DGMH), a 1000-bed tertiary care centre in Pretoria, South Africa over 12 months (1 July 2020–30 June 2021).

Patients were identified from the emergency department register. The study population consisted of consecutive files of patients assessed as cases of deliberate self-poisoning by the medical staff in the ED warranting hospital admission during the 12 months formed the study population. The relevant information was extracted from their files and transcribed onto a data collection sheet.

Data collection, Procedure, and Analysis

The following data were collected: Patient demographics, reasons for deliberate self-poisoning, type of poison used, route of poisoning, presence of significant organ dysfunction at admission, primary site of patient care, patient therapeutics, length of hospital stay, and patient outcome: death or discharge. The presence of significant organ dysfunction was defined as follows: hepatic dysfunction >3-fold the upper limit of normal transaminases, neurologic dysfunction: any Glasgow coma scale <15, respiratory dysfunction: need for supplemental oxygen therapy, renal dysfunction (any reduction in eGFR below 60), and cardiovascular dysfunction which was defined as admission mean arterial pressure below 60mmhg.

Data was entered into a statistical package for social sciences (Statistical Product and Service Solutions", IBM, Inc. USA; Version 27.0). Descriptive statistics were used to analyze the data. Non-parametric data are described by frequency, ratio, and percentage calculations. Means, medians, interquartile ranges, and standard deviation describe parametric data. The Sefako Makgatho University Research Ethics Committee and the DGMH hospital management approved the study.

RESULTS

A total of one hundred and forty case records of deliberate self-poisoning were identified for evaluation. The mean age of the study population was 25.7 ± 9.4 years. The patients were predominantly female (n = 103; 73.6%). Four (2.9%) of the patients had an underlying pre-diagnosed mental health disorder, and 8 (5.7%) patients had previously attempted suicide. Twenty percent of the patients gave a history of previous substance abuse.

One hundred and thirty-eight patients (98.5%) were well enough to be managed in the general ward. None of the patients had evidence of significant organ dysfunction at admission. Two patients were admitted to the intensive care unit: one for concomitant self-inflicted body injuries and the other for ingestion of an unknown poison.

Most patients (n = 75; 53.6%) were unemployed, and 96% (n = 135) were single. Figure 1 summarizes the occupational status of the patients in this series. Information on four of the patients was not available.

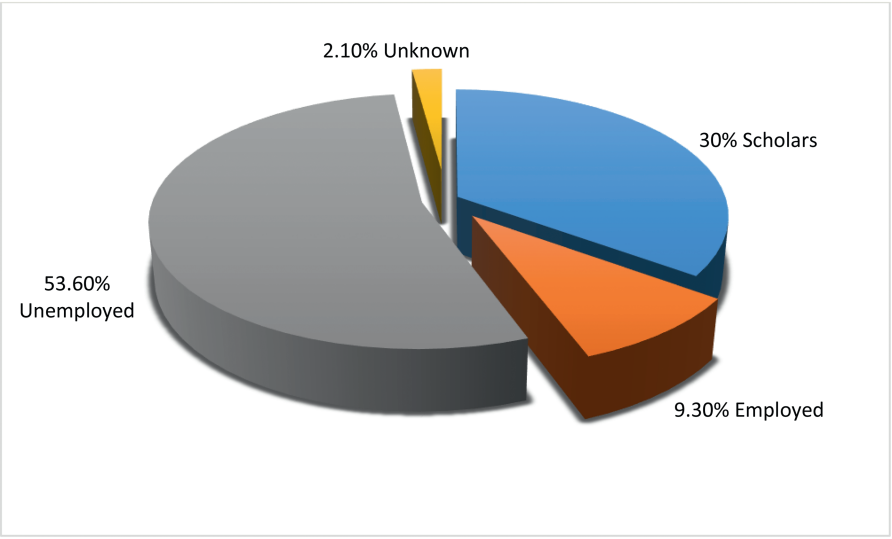

Figure 1: Occupational status of deliberate self-poisoning patients at admission.

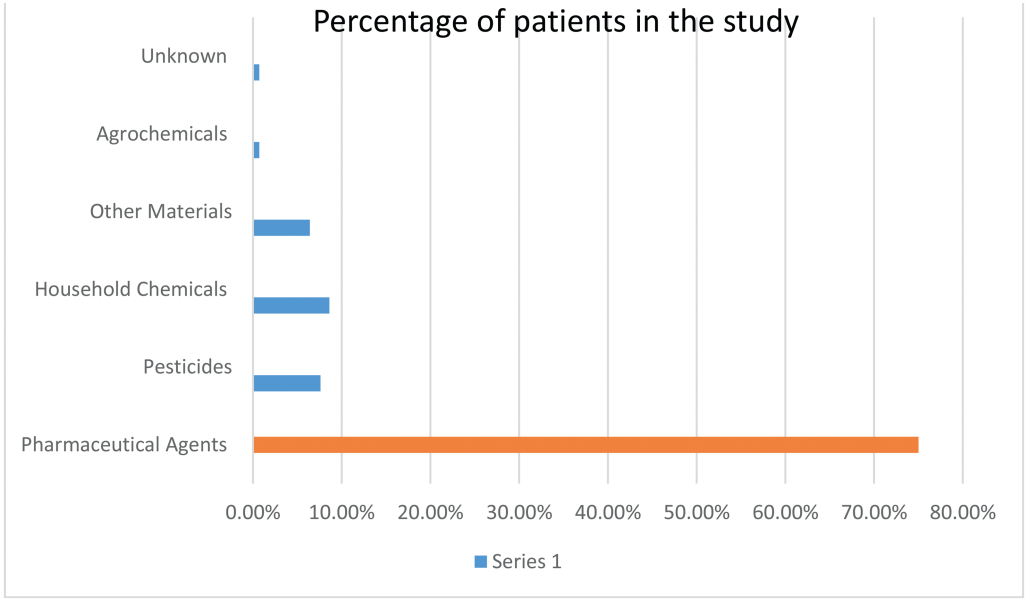

Figure 2: The variety of substances used for parasuicide.

Pharmaceutical agents were the most common mode for self-poisoning (n = 105; 75%). Other substances used and their frequency of usage are listed in Figure 2. One patient took the poisonous substance intravenously; the rest were ingested orally.

Although the patients were aware they had ingested some form of medication, they were unable to identify their precise names. When identification was possible, paracetamol was the commonest agent used for self-poisoning. A breakdown of the pharmaceutical agents used when identification was possible is listed in Table 1:

Table 1: Pharmaceutical agents used for self-poisoning

Pharmaceutical	***n* (%)**
Paracetamol	18 (17%)
INH (Isoniazid)	9 (0.9%)
Benzodiazepines	7 (0.66%)
Anti-convulsants	4 (0.4%)
Anti-depressants	2 (0.2%)
Metformin	3 (0.3%)
ARVs	5 (0.5%)
Anti-hypertensives	4 (0.4%)
Multivitamins	2 (0.2%)
Unknown	51 (49%)

Information regarding reasons for self-poisoning was available in 102 (73%) of the patients. The findings are listed in Table 2. In one patient, the poison was taken by mistake.

Table 2: Reasons for Self-poisoning

	***n* (%)**
Family conflicts	41 (40.1)
Marital issues	2 (1.9)
Academic problems	2 (1.9)
Relationship issues	5 (4.9)
Psycho-social stressors	50 (49.0)
HIV diagnosis	1 (0.09)
Inadvertent	1 (0.09)
Others	7 (6.0)

A small number of patients (n = 28; 20%) had underlying co-morbid illnesses. HIV was the commonest underlying medical illness.

The patients' management consisted of antidotes or reversal agents where appropriate, as well as supportive care, particularly administration of intravenous fluids acids and gastrointestinal decontamination.

All the patients were subsequently referred for counseling (clinical psychologists and social workers) within the hospital.

The patients' hospital stays ranged from 1 to 35 days, with a median of 5 days (IQR: 4–7 days). All patients survived.

DISCUSSION

The study confirms previous findings that acts of deliberate self-harm are more common in women.(10,18–21) The explanation for this remains unclear. Some have suggested that males are either not adequately represented as they use different methods to achieve the same aims or that they are

more successful at ending their lives as their means tend to be more violent.(18,22,23) Of interest is that studies from the Asia-Pacific region report a predominance of males in their cases of deliberate self-poisoning.(24,25)

In this study, the mean age of the group (25.7 yearswas a little lower than in other studies, with a reported range from 31 to 43 years.(26,27) A study from Botswana study reported a lower mean age of only 21.2 years.(28) The fact that many of the patients are young adults in their productive ages is a cause for concern.

Underlying psychiatric illness was found in only a fraction of patients in our study (2.9%). In a study in Cape Town, underlying psychiatric illness was found in 7.3% of their cases.(5) In a later study of deliberate self-harm at the Groot Schuur hospital in Cape Town, 60.1% of the cases had an underlying psychiatric illness.(4) Psychiatric disorders are reported to be present in 80% to 90% of suicide deaths in high-income countries.(29) This association remains less clear in low to middle-income countries. A systematic review and meta-analysis of psychiatric morbidity and suicidal behavior in low- and middle-income countries found a lower prevalence of psychiatric disorders, although this analysis was compromised by the availability of few high-quality studies.(29) The review also found wide variability in the proportion of psychiatric disorders and overall, 58% of those who succeeded and 45% of those who engaged in nonfatal suicidal behavior had a psychiatric disorder.(29) Over five percent of the patients (5.6%) in this study had previously attempted suicide. In the 2 studies from Cape Town, the attempted suicide rate ranged from 6.8% to 37.4%.(4,5) Of concern is that previous attempts at suicide are thought to predict future completed suicides.(30)The unemployment rate amongst cases in this study was just over 53.6%. This figure was 65.6% in the study from the Free State.(9) Among the cases reviewed by Laher and his group in Johannesburg, the unemployment rate was reported to be 62.8%.(19) It is well known that unemployment is a risk factor for suicide. A previous longitudinal study undertaken in England and Wales found a strong and independent association between suicide and unemployment, with an odds ratio of 2.6.(31)

Being single appears to be another predisposing factor to self-harm. In the current study, the majority (96%) were single. Laher and colleagues reported 88.9% in their study at an academic hospital in Johannesburg.(19) A similar trend was observed in the study by Benedict and colleagues at the Pelonomi Hospital in South Africa and in the KwaZulu Natal province of South Africa.(9,21) There have been exceptions to this trend in other countries, as evidenced by a study from Pakistan in which married individuals engaged in acts of self-harm more frequently compared to their single counterparts.(32) Another study of patients with self-poisoning presenting to a tertiary care hospital in Iran also found a predominance of married individuals.(23) Twenty percent of the patients in the current study had a history of other substance abuse. In the Cape Town study of cases of deliberate self-harm, the proportion of cases with a substance disorder was 37.4%.(4) The current study's pharmaceutical agents were the most common strategy for deliberate self-poisoning. This has been a consistent finding in other intentional self-poisoning studies in South Africa.(4,10) In Uganda, agrochemicals were more commonly used for self-poisoning.(18) Studies indicate that in many cases, the pharmaceutical agent used for intentional self-poisoning is either unknown or unspecified by the patient.(4) The type of medication taken was known by the patients in just over half of the patients in the current study. When the drug ingested is unknown, it poses significant management challenges for clinicians. When the drug consumed is known, therapeutic guidance is more precise. In our study, paracetamol was the most common drug ingested. In studies of patients with acute poisoning admitted to ICU in South Africa, tricyclic anti-depressants were the most commonly ingested drugs.(33,34)

None of the patients in this study had any evidence of significant organ dysfunction at admission, and none died. In a study from India, a retrospective analysis of cases of deliberate self-poisoning found an in-hospital mortality rate of 3%, and 185 of the cases required intubation in the ED.(26) A study of 408 patients with intentional self-poisoning in Gaborone, Botswana, reported a mortality rate of 1.5%.(28) An earlier study in 2016 from Gaborone, Botswana, reported a case fatality rate for deliberate self-poisoning at 0.7%.(22) A study of poisonings presenting to a tertiary care hospital in Iran reported a mortality rate of 1%.(20) A recent study of cases of acute poisoning admitted to a tertiary hospital in Eastern Ethiopia reported a much higher mortality of 16.7%.(35) It is challenging to compare mortality rates from deliberate self-poisoning across different regions of the world due to wide variations in socioeconomic conditions in contrasting parts of the world.

LIMITATIONS

This study has a few limitations. It is a single-center and retrospective study, thereby compromising the generalisability of the results. The profile of individuals at risk is limited to the region of patient recruitment. The fact that most patients were not able to identify the drugs taken may skew the results, which may lead to a misplaced emphasis on preventive measures.

CONCLUSION

This research showed that a high percentage of the patients who intentionally self-poisoned were young, unemployed, single females. Pharmaceutical agents were the most commonly used method, although the specific drug couldn't be identified in about half of the cases. The survival rate was excellent. The main reasons for self-poisoning were psycho-social stressors. This study suggests that improving mental health and coping skills could help reduce deliberate self-poisoning incidents. A more extensive, more

comprehensive prospective study is recommended, with the recruitment of patients from multiple emergency departments in Pretoria, to gain better insights into deliberate self-poisoning in this region.

REFERENCES

1. Spiller HA, Ackerman JP, Smith GA, et al. Suicide attempts by self-poisoning in the United States among 10–25 year olds from 2000 to 2018: substances used, temporal changes and demographics. Clin Toxicol (Phila). 2020;58(7):676–687.
2. Khurram M, Mahmood N. Deliberate self-poisoning experience at a medical unit. J Pak Med Assoc. 2008;58(8):455–457.
3. Jegaraj MK, Mitra S, Kumar S, et al. Profile of deliberate self-harm patients presenting to Emergency Department: a retrospective study. J Family Med Prim Care. 2016;5(1):73–76.
4. Pieterse D, Hoare J, Louw KA, et al. Methods of deliberate self-harm in a tertiary hospital in South Africa. S Afr J Psychiat 2020;26(0):a1399.
5. van Hoving DJ, Hunter LD, Gerber REJ, Lategan HJ, Marks CJ. The burden of intentional self-poisoning on a district-level public Hospital in Cape Town, South Africa. Afr J Emerg Med. 2018;8(3):79–83.
6. Zhang Y, Yu B, Wang N, Li T. Acute poisoning in Shenyang, China: a retrospective and descriptive study from 2012 to 2016. BMJ Open 2018;8(8):e021881.
7. Hendrix L, Verelst S, Desruelles D, Gillet JB. Deliberate self-poisoning: characteristics of patients and impact on the emergency department of a large university hospital. Emerg Med J 2013;30(1):e9
8. Eddleston M. Patterns and problems of deliberate self-poisoning in the developing world. QJM. 2000 Nov;93(11):715–731.
9. Benedict MOA, van Loggerenberg CJ, Steinberg WJ. The profile of deliberate self-poisoning cases presenting at the emergency department of Pelonomi Regional Hospital, Bloemfontein. S Afr Fam Pract. 2019,61(1):11–17.
10. Favara DM. The burden of deliberate self-harm on the critical care unit of a peri-urban referral hospital in the Eastern Cape: a 5-year review of 419 patients. S Afr Med J. 2013:103(1):40-43.
11. Kapur N, House a, Dodgson K, et al. Management and costs of deliberate self-poisoning in the general hospital: a multi-center study. J Ment Health 2002;11(2):223–230.
12. Serinken M, Karcioglu O, Sengul C, Turkcuer I, Keysan MK. Hospital costs of managing deliberate self-poisoning in Turkey. Med Sci Monit. 2008;14(3):CR152–CR158.
13. Prescott K, Stratton R, Freyer A, Hall I, Le Jeune I. Detailed analyses of self-poisoning episodes presenting to a large regional teaching hospital in the UK. Br J Clin Pharmacol. 2009; 68(2):260–268.
14. Finkelstein Y, Macdonald EM, Hollands S, et al. Canadian Drug Safety and Effectiveness Research Network (CDSERN). Risk of suicide following deliberate self-poisoning. JAMA Psychiatry 2015;72(6):570–575.
15. Kalankesh LR, Farahbakhsh M, Fein RA, Moftian N, Nasiry Z. Exploring complexity of deliberate self-poisoning through network analysis. Psychiatry J. 2017; 2017:3619721.
16. Bantje J, Kagee A. Epidemiology of suicide in South Africa: setting an agenda for future research. S Afr J Psychol. 2013;43(2):238–251.
17. Veale DJH, Wium, CA, Muller GJ, 2013. Toxicovigilance I: a survey of acute poisonings in South Africa based on Tygerberg Poison Information Centre data. S Afr Med J. 2013;103(5):293–297.
18. Malangu N. Acute poisoning at two hospitals in Kampala-Uganda. J Forensic Leg Med. 2008;15(8):489–492.
19. Laher AE, Motara F, Gihwala R, Moolla M. The profile of patients presenting with intentional self-poisoning to the Charlotte Maxeke Johannesburg Academic Hospital emergency department, South Africa. S Afr Med J. 2022;112(5):347–351.
20. Kazemifar AM, Mirakbar SM, Yazdi Z, Bitazar B, Soleimani P. Clinicoepidemiologic profile of patients with poisoning presenting to a tertiary care hospital; a one-year preliminary descriptive study. J Prev Epidemiol 2020;5(1):e15–e15.
21. Ani JO, Ross AJ, Campbell LM. A review of patients presenting to accident and emergency department with deliberate self-harm, KwaZulu-Natal, South Africa. Afr J Prim Health Care Fam Med 2017;9(1):e1–e7.
22. Rodriguez A, Shibata J, Pon-Pon, et al. Acute poisonings presenting to the accident and emergency department in Botswana. Rev Cub Med Int Emerg. 2017;16(3):103–115.
23. Anthony L, Kulkarni C. Patterns of poisoning and drug overdosage and their outcome among in-patients admitted to the emergency medicine department of a tertiary care hospital. Indian J Crit Care Med. 2012;16(3):130–135.
24. Singh B, Unnikrishnan B. A profile of acute poisoning at Mangalore (South India). J Clin Forensic Med. 2006;13(3):112–116.
25. Rajapakse T, Griffiths KM, Christensen H. Characteristics of non-fatal self-poisoning in Sri Lanka: a systematic review. BMC Public Health. 2013;13(1):1–15.
26. Abhilash KPP, Murugan S, Rabbi NAS, et al. Deliberate self-poisoning and harm: a meticulous quest of methods in vogue. J Family Med Prim Care. 2022;11(1):233–239.
27. Brajković AV, Grgat M, Bielen I, et al. Self-poisoning as a cause of admission in a medical intensive care unit and a question of misuse of prescription medications. Heart Lung. 2022;51:17–21.
28. Mbongwe B, Moinami J, Masupe T, et al. Nature and sources of poisoning in patients admitted to a referral hospital in Gaborone, Botswana; findings and implications. Hosp Pract. 2020;48(2):100–107.
29. Knipe D, Williams AJ, Hannam-Swain S, et al. Psychiatric morbidity and suicidal behavior in low- and middle-income countries: a systematic review and meta-analysis. PLoS Med 2019;16(10):e1002905
30. Bostwick JM, Pabbati C, Geske JR, McKean AJ. Suicide attempt as a risk factor for completed suicide: even more lethal than we knew. Am J Psychiatry 2016;173(11):1094–1100.
31. Lewis G, Sloggett A. Suicide, deprivation, and unemployment: record linkage study. BMJ. 1998;317(7168):1283–1286.
32. Shekhani SS, Perveen S, Hashmi DE. Suicide and deliberate self-harm in Pakistan: a scoping review. BMC Psychiatry 2018;18(1): 44.
33. Goga R, de Vasconcellos K, Singh D. Acute poisonings presenting to King Edward VIII hospital intensive care unit in Durban, South Africa. South Afr J Crit Care. 2021;37(1):10.7196/SAJCC.2021.v37i1.408.
34. Rowe K. The burden of drug overdose on critical care units in East London, South Africa. S Afr Med J. 2016;106(3):227–228.
35. Nigussie S, Demeke F, Getachew M, Amare F. Treatment outcome and associated factors among patients admitted with acute poisoning in a tertiary hospital in Eastern Ethiopia: a cross-sectional study. SAGE Open Med 2022;10:20503121221078155.