THE PROFILE OF THE OVERDOSE PATIENT ADMITTED TO A TERTIARY HOSPITAL IN GAUTENG

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A research report submitted to the Faculty of Health Sciences, University of the Witwatersrand, in partial fulfilment of the requirements for the degree

of

Master of Medicine in Emergency Medicine.

Johannesburg, 2016

DECLARATION

I, Radha Gihwala, declare that this research report is my own work. It is being submitted for the degree of Master of Science in Medicine (Emergency Medicine) at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at this or any other University.

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DEDICATION

To my love, my best friend and soul mate…Anil

Your love has nourished and sustained me for longer than I can remember.

Thank you for believing in me.

ABSTRACT

Background

Overdose is an important health care problem, a subject under-researched in South Africa. The aims of this study are to investigate the demographics, to identify common substances and to ascertain the burden of disease at a tertiary hospital in Gauteng. Data can be used to reduce morbidity, mortality and the substantial costs to health care services related to overdose.

Materials and methods

A retrospective, observational study based on hospital records (16 weeks). The analysis was purely descriptive. Categorical data were compared using the Chi-square test. P value < 0.05 was considered significant.

Results

Of the total of 176 records with a primary diagnosis of overdose, 133 were included. The frequency of overdose was found to be 1.1 cases per day. Females accounted for 64.7%, 82.8% were single, 85% were Black, 78.9% were unemployed and 54.2% resided in poor socio-economic areas. Overdose was highest in the 20-29 years (55.6%) age group with a mean age of 28.1 years. Overdose was intentional in 91% and 12% of the subjects had overdosed previously. A previous medical history was found in 22.6% and HIV was prevalent in 66.7%. The most common substance groups were analgesics (32.3%), pesticides (21.1%), anxiolytics (11.3%), household chemicals (10.5%), vitamins (8.3%), antibiotics (7.5%) and anti-retrovirals (ARV's) (5.3%). In 99.3% the substance was ingested orally and in 23.3% there was

concurrent alcohol consumption. Common precipitating factors were relationship problems, depression, domestic problems and financial. The median delay to hospital presentation was 3.5 hours and patients tended to present during the afternoon and the night with a significant association between time of presentation and age group (p=0.043). An antidote was employed in 35.3% and in 97% of cases, symptomatic treatment was by far the most common. No patients were discharged directly from the ED and in 42.1% the median length of hospital stay was 2 days and a case fatality rate of 1.5%.

Conclusion

The introduction of management protocols is of uttermost importance. Awareness, education and regulations will form part of strategies for the prevention of overdose.

ACKNOWLEDGEMENTS

I would like to acknowledge the following individuals, without whom this study would not have been possible.

- My Supervisor, Professor Efraim Kramer, for your patience, motivation, enthusiasm and immense knowledge.
- My Co-supervisor, Dr Adam Mahomed, for your expert contributions.
- Dr Zeyn Mahomed and Dr Sameer Carim, for sparking my interest in Emergency Medicine.
- Petra Gaylard, for helping me overcome my phobia.
- My friends for all your encouragement.
- Daddy, for always guiding me.
- Mummy, for your unconditional love and support.
- Brother Anil, for your love, support and motivation.
- Dad, Mum, brothers-in-law and the rest of my family for their support and understanding.
- Anil, for your patience, encouragement, understanding and most of all allowing me to follow my dreams.

TABLE OF CONTENTS

DECLARATION 2

DEDICATION 3

ABSTRACT 4

ACKNOWLEDGEMENTS 6

TABLE OF CONTENTS 7

NOMENCLATURE: GLOSSARY 11

ABBREVIATIONS 12

LIST OF FIGURES 14

LIST OF TABLES 15

CHAPTER 1: INTRODUCTION 16

1.1 INTRODUCTION 16

1.2 AIM AND OBJECTIVES 17

1.2.1 STUDY AIM 17

1.2.2 STUDY OBJECTIVES 17

1.3 SUMMARY 17

CHAPTER 2: LITERATURE REVIEW 18

2.1 INTRODUCTION 18

2.2 DEMOGRAPHIC PROFILE 18

2.3 RISK FACTORS AND PRECIPITATING FACTORS 21

2.4 PRESENTATION TO HOSPITAL 24

2.5 SUBSTANCE PROFILE 27

CHAPTER 3: MATERIALS AND METHODS 39
3.1 ETHICS 39
3.2 STUDY DESIGN 39
3.3 STUDY SETTING AND POPULATION 39
3.3.1 INCLUSION CRITERIA 40
3.3.2 EXCLUSION CRITERIA 40
3.4 STUDY PROTOCOL 40
3.4.1 DATA COLLECTION 40
3.4.2 OUTCOME MEASURE 42
3.4.3 SOFTWARE AND DATA ANALYSIS 43
3.4.4 SIGNIFICANCE LEVEL 44
CHAPTER 4: RESULTS 45
4.1 DEMOGRAPHIC DATA 45
4.1.1 AGE 45
4.1.2 GENDER 46
4.1.3 ETHNICITY 46
4.1.4 MARITAL STATUS 46
4.1.5 HIGHEST LEVEL OF EDUCATION 46
4.1.6 EMPLOYMENT 47
4.1.7 RESIDENTIAL AREA 47
4.1.8 MEDICAL HISTORY 48

4.1.9 PSYCHIATRIC HISTORY 48
4.1.10 CHRONIC MEDICATION 49
4.1.11 ALCOHOL AND SMOKING HISTORY 49
4.2 PRECIPITATING FACTORS 50
4.3 OVERDOSE 50
4.3.1 TYPE OF OVERDOSE 50
4.3.2 SUBSTANCES USED IN OVERDOSE 51
4.3.3 ROUTE OF ADMINISTRATION OF SUBSTANCES 53
4.3.4 DAY OF THE WEEK OF OVERDOSE 53
4.3.5 TIME OF OVERDOSE INGESTION 54
4.3.6 FREQUENCY OF DISTRIBUTION FOR TIME OF OVERDOSE FOR WEEKDAY VERSUS WEEKEND 54
4.3.7 ACQUISITION OF SUBSTANCES 55
4.4 PRESENTATION TO HOSPITAL 56
4.4.1 NUMBER OF PATIENTS PER DAY 56
4.4.2 TIME OF PRESENTATION TO THE ED 57
4.4.3 TIME BETWEEN OVERDOSE AND PRESENTATION TO THE ED 58
4.4.4 MODE OF ARRIVAL 58
4.4.5 REFERRAL 58
4.5 MANAGEMENT IN THE ED 58
4.5.1 TREATMENT 58
4.6 DISPOSITION 59

4.6.1 ADMISSION 59

4.6.2 LENGTH OF STAY IN HOSPITAL 60

CHAPTER 5: DISCUSSION 61

5.1 DEMOGRAPHIC PROFILE OF THE OVERDOSE PATIENT 61

5.2 RISK FACTORS FOR OVERDOSE 64

5.3 OVERDOSE CHARACTERISTICS 68

5.4 SUBSTANCE PROFILE 70

5.5 PRESENTATION TO HOSPITAL 74

5.6 MANAGEMENT IN THE EMERGENCY DEPARTMENT 76

5.7 DISPOSITION OF THE OVERDOSE PATIENT 77

5.8 LIMITATIONS OF THIS STUDY 78

5.9 STRENGTHS OF THIS STUDY 79

CHAPTER 6: CONCLUSION AND RECOMMENDATIONS 79

CHAPTER 7: REFERENCES 82

APPENDICES 88

Appendix 1: Ethics clearance certificate 88

Appendix 2: CEO CMJAH permission 89

Appendix 3: Head of Emergency Department permission 90

Appendix 4: Data collection sheet 91

NOMENCLATURE: GLOSSARY

Overdose/ Self-poisoning: the deliberate/intentional use of a substance in an amount that is in excess of that which is normally used or the exposure of an individual by ingestion to an amount of substance associated with the significant potential to cause harm

Self-harm: deliberate/intentional overdose when it is non-fatal, attempted suicide and parasuicide

Substance: chemicals, medications, toxins and recreational drugs

ABBREVIATIONS

ARV – Antiretroviral

BMD – Bipolar mood disorder

CEO – Chief Executive Officer

CMJAH – Charlotte Maxeke Johannesburg Academic Hospital

CXR – Chest x-ray

DRAG – Division of Emergency Medicine Research Protocol Assessor Group

ECG – Electrocardiogram

ED – Emergency Department

GID – Gastrointestinal decontamination

HIV - Human Immunodeficiency Virus

ICU – Intensive Care Unit

IQR – Interquartile range

JHB – Johannesburg

MDAC – Multiple dose activated charcoal

MDD – Major depressive disorder

MDE – Major depressive episode

NSAID – Non-steroidal anti-inflammatory

OP – Organophosphate

OTC – Over the counter

PD – Personality disorder

SDAC – Single dose activated charcoal

SZP – Schizophrenia

TCA – Tricyclic antidepressant

UK – United Kingdom

USA – United States of America

WHO – World Health Organisation

LIST OF FIGURES

Figure 4.1: The frequency distribution of ages

Figure 4.2: The frequency distribution of patients aged 15-29 years (n=92)

Figure 4.3: Residential areas

Figure 4.4: Substances used in overdose

Figure 4.5: Day of the week of overdose

Figure 4.6: Time of overdose ingestion

Figure 4.7: The frequency distribution for time of overdose for weekday vs weekend

Figure 4.8: Means of acquisition of substances

Figure 4.9: Distribution of the number of patients per day

Figure 4.10: Time of presentation in ED

Figure 4.11: The frequency distribution for time of presentation categorised by age group

Figure 4.12: Time between overdose and presentation to the ED

Figure 4.13: Admission wards

Figure 4.14: The frequency distribution of the length of stay in hospital

LIST OF TABLES

Table 2.1: Antidotes and the substances for which they are indicated

Table 4.1: Comorbid diseases

Table 4.2: Psychiatric history

Table 4.3: Chronic medication

Table 4.4: Alcohol and smoking history

Table 4.5: Precipitating factors for overdose

Table 4.6: Type of overdose frequency distribution and number of attempts

Table 4.7: Demographics for analgesic overdose

Table 4.8: Demographics for pesticide overdose

Table 4.9: Demographics for anxiolytic overdose

CHAPTER 1: INTRODUCTION

1.1 INTRODUCTION

Suicidal behaviour is an important public health problem both globally and in Africa. The available statistics are only the tip of the iceberg. Globally, suicidal rates have increased by 60% in the last few decades, and the World Health Organisation (WHO) estimates a worldwide yearly suicide mortality rate of almost one million people, which is projected to increase to 1.5 million by 2020.(1)

A suicide occurs every 40 seconds and there is 1 attempt every 1 to 3 seconds internationally.(2) The global suicide rate is estimated at 11.6 to 16 per 100000 inhabitants. Ninety percent of suicide is attributed to overdose. South African suicide rates range from 11.5 per 100000 to as high as 25 per 100000 of the population.(1)

Despite extensive research internationally, the subject has been under-researched in South Africa and little is known about the occurrence and management of overdose in Gauteng. Studies have generally been confined to observations from single localities.(2–5)

In order for strategies to be put in place to try and reduce morbidity, mortality and substantial costs to health care services related to overdose, it is vital that we develop an understanding of the profile of the overdose patient, knowledge of demographics and common substances used for overdose. This will aid in focused training and education of health care professionals, particularly those working in the emergency department (ED), in the general approach and management of patients who present with overdose.

1.2 AIM AND OBJECTIVES

1.2.1 STUDY AIM

The aim of this study is to investigate the profile of the overdose patient and to ascertain the burden of disease attributable to overdose at the Charlotte Maxeke Johannesburg Academic Hospital (CMJAH), a tertiary hospital in Gauteng.

1.2.2 STUDY OBJECTIVES

- To describe the demographic profile, medical history, time of presentation and precipitating factors of patients admitted with overdose to CMJAH.
- To identify the substances most commonly taken in overdose in the patients admitted to CMJAH with overdose.
- To describe the ED management of patients presenting with overdose and those admitted to CMJAH.
- To identify the total number of patients presenting with overdose to the CMJAH ED and their disposition.

1.3 SUMMARY

Despite global statistics, overdose in South Africa is a perceived common problem, yet not many studies have been done in order to assess the burden of disease and the high costs required in the management of these patients. Inadequate research into overdose, a phenomenon of great public health concern, may lead to poor knowledge of health care professionals in the approach and management of the overdose patient and may in turn result in a poor outcome for the patient.

CHAPTER 2: LITERATURE REVIEW

2.1 INTRODUCTION

Overdose is an important health care problem and constitutes a significant source of morbidity, mortality and health care expenditure. An estimated 2 to 5 million overdoses occur annually in the United States of America (USA).(6) Overdose has become the most frequent reason for deaths with a rate surpassing motor vehicle-related mortalities.(7) Overdose accounts for more than 80% of ED presentations of self-harm and contributes to both completed and attempted suicide.(8,9)

Suicide is defined as taking one's own life intentionally. If one does not succeed in ending one's life, the attempt constitutes a non-fatal suicide. Non-fatal suicide can be categorised into two groups namely attempted suicide and parasuicide. Attempted suicide is defined as "not failing deliberately; in other words those who intended to take their own lives and wished to die."(2) The WHO's definition of parasuicide is: "A act with non-fatal outcome, in which an individual deliberately ingests a substance in excess of the prescribed or generally recognised therapeutic dosage and which is aimed at realising changes which the subject desired via the actual or expected physical consequences".(10)

In the absence of clear intent to self-harm, overdose following on from the recreational use of a substance should ideally be classified as accidental overdose.(10)

2.2 DEMOGRAPHIC PROFILE

The demographic profile of patients with overdose and their choice of substance/s not only depend upon the socio-economic, religious and cultural status, but it also greatly varies between different countries.(11)

A seven country multi-centre investigation of self-harm by Madge et al demonstrated that the lifetime self-harm prevalence for females was 13.5% and 4.3% for males, with a prevalence in females ranging from 3.6% in the Netherlands to 11.8% in Australia with four of the seven countries having a rate of at least 10.4%. For males, the rates were between 1.7% in Hungary and the Netherlands, and 4.3% in Belgium. England, Ireland and Norway did not differ significantly from the other countries for male lifetime prevalence.(12) The 2.9% lifetime prevalence estimate for self-harm among the South African population is close to the rate of 4.6% in the USA.(13)

Weir and Ardagh showed that overdose in Christchurch remains a problem mainly of the young with 70.1% of patients being under the age of 35 years, and with a gender ratio favouring females, a female to male ratio of 1.9:1.0.(14) The majority of persons presenting to a hospital in Melbourne for overdose are female and aged in their 20s or 30s. However, in India, the number of male patients with self-poisoning were significantly greater than the number of women. This was attributed to pesticides being more accesible to men.(9,15)

In Australia 50% of patients were unmarried and 76% had secondary school as their highest level of education. Carter et al also showed an almost equal rate of overdose between the employed and unemployed.(16)

Zaidan et al demonstrated that 78% of patients in Oman were female, 54.1% were between the ages of 20-30 years and 53.1% were unmarried. The most vulnerable persons in this study were students, housewives and the unemployed.(17) However, Bjornaas et al in Oslo demonstrated that the male to female ratio was 2:1 with a mean age of 44 years and a case fatality rate of 3%.(18)

In South Africa, Laubscher and Van Rooyen in the Western Cape, Calitz et al in the Free State and Favara in the Eastern Cape demonstrated that 73.5%, 68.9% and 27.9% of overdose patients were female, respectively.(2,3,5) In the United Kingdom (UK) Donovan demonstrated that 86.1% were female.(19) The age group with the highest number of overdoses were between 18 and 31 years with a median age of 22 years.(2,3) In the UK the median age was 32 years.(20) The unemployment rate for patients between the ages of 18 and 65 was 53.7% and 64% in Paarl and Transkei respectively.(3,21) Calitz et al also found that scholars and students contributed to 30% of overdose patients and 62% of patients were unmarried.(2)

Men are more likely to enact physical self-harm, employing more dangerous and violent methods such as hanging and gunshots compared to females who have a preference to rely on overdose as a means of self-harm.(2,22) More often than not, males succeed in killing themselves.(2,15) Overdose within ethnic groups may fluctuate according to geographic location.(23) A study on overdose in Kuala Lumpur demonstrated that the major ethnic groups were Malay accounting for 40.8%, Chinese 20.9% and Indian 33.2%.(24) In the USA however, Galea et al demonstrated that 32.8% of overdose patients were White, 36.3% Black and 30% Latino.(25)

In a multicentre study in the UK, there was a significantly higher rate ratio for young Black females compared to White females, in contrast, ratios in Black males did not differ from those of White males.(23) Black females were more likely to overdose compared to White and South Asian females.(23) Another study in the UK demonstrated that White patients accounted for 12% of patients presenting with overdose, African-Caribbean 10%, Asian 5%, and 73% had an undetermined ethnic group.(26)

Joe et al demonstrated that in South Africa the rate of attempted suicide varied significantly by ethnic group, with the Coloured group (of mixed racial origin) reporting levels of 7.1%, that were markedly higher than that of the White 2.4%, Black 2.4% and Indian groups 2.5%.(13) This is contrary to ethnicity statistics by Statistics SA, Census 2011 which found that the Black group accounted for 79.2% of the total population, White 8.9%; Coloured 8.9%; Indian/Asian 2.5% and other 0.5%.(27)

2.3 RISK FACTORS AND PRECIPITATING FACTORS

Suicidal ideation forms part of the evolution of the suicidal behaviour process, a complex phenomenon for which risk factors are multifactorial and multidimensional.(1) Suicidal behaviour is an inappropriate problem-solving strategy and method of communication, especially by vulnerable persons when they feel unable to express their troubles in a traditional way or if other problem-solving attempts have been futile.(1,2,28)

Cognitive deficits and head injury are related to aggressive behaviour, impulsivity, poor decision making and brain pathology which can trigger depression, disinhibition and subsequent suicidal ideation or behaviour.(1,29) Suicidal behaviour has also been associated with personality functioning which involves substance abuse, emotional lability, aggression and impulsivity.(28,29)

There is an increased suicide risk in patients with one or more general medical conditions, because the disease/s can equal a life crisis resulting in a range of psychological problems.(1,30) In South Africa, HIV sufferers have been shown to have a high suicide risk.(31,32) A study by Keiser et al in Switzerland (33) and Jia et al in Denmark (34) found that overdose rates decreased significantly with the

introduction of highly active antiretroviral therapy (HAART), but they remain above the rate observed in the general population. HAART however is not a cure, and is associated with adverse effects, including psychiatric disorders.(35) Jia et al also found that HIV/AIDS infection significantly interacted with psychiatric illnesses and their comorbidity increased the risk substantially.(34)

In addition, dietary inadequacy affects suicidality because of potential effects on neurotransmitter functioning, and micronutrient deficiencies can progressively reduce stress tolerance and impact adversely on brain structures with adverse psychophysiological consequences.(1)

Acute and chronic stress, are critical co-morbid aetiological variables and are important in South African society.(1,2) Common precipitators also include interpersonal problems, family or marital problems, financial and socio-economic problems, academic-related problems as well as psychiatric disorders especially mood disorders, and alcohol and substance abuse.(1–3,9,29)

Frustration due to unemployment, breakdown of relationship amongst teenagers and young adults, marital problems and post-traumatic stress disorder (e.g. rape) may lead to feelings of low self-esteem, worthlessness and depression.(36) Similarly, the awareness and treatment burden of diseases like diabetes mellitus, hypertension, HIV infection and cancer may lead to depression.(36)

Suicidal behaviour is approximately 25 times higher amongst persons with major depression disorder (MDD), bipolar mood disorder (BMD) and anxiety disorders.(21,28,36) Bjornaas et al reported 58% of patients to have a previous or existing psychiatric disorder.(37)

All substance abuse disorders increase the risk of suicide.(1,12,36) Long term use of alcohol, which is an intoxicating substance, has been associated with impairment of cognitive processes, increased impulsivity and aggression, and a low threshold for triggers of suicidal behaviour.(36) Suicide victims who suffer from alcohol and other substance use disorders are often young, male, divorced or separated and often suffer from adverse life events.(36)

Clover et al demonstrated in Australia that 82% of self-harm patients were reported to have been exposed to one or more traumatic events in their lifetime and a greater percentage of women, compared to their male counterparts were physically attacked, assaulted, raped and experienced great shock because an unpleasant event, happened to someone close to them.(38)

Zaidan et al showed correlation between self-harm and social destabilisation and poverty.(17) This finding is well corroborated by a WHO declaration in 2001: “suicide rates are stable in periods of socio-economic stability but rise during periods of major economic changes.”(39) Family, social and marital problems were the top three causes of self-harm in Oman. The most frequent conflict with family members related to choice of spouse, inter-generational conflict and family disputes, and accounted for 30.9% of self-harm cases. Social problems accounting for 15.4% of cases involved poor rapport, social isolation and an unresponsive social network. Poor achievement and poor insight and control of life affairs accounted for 10.6% of cases, chronic illness and bereavement 9.8%, marital discord 12.2%, financial problems 10.6% and work related stress 8.1%.(17)

Precipitating factors for overdose identified in South African studies were problematic relationships accounting for 55.4%; financial problems 22.9%; psychiatric problems

22.1%; altercations 19.8%; abuse 18.2%; feelings of low self-esteem, worthlessness, hopelessness and humiliation 16.7%; recent life changes 13.2%; unstable family life 9.3%; lack of social support 9.3%; scholastic problems 9.3%; isolation and rejection 8.9%; chronic medical condition 7.8%; substance use or abuse 7.1%; pregnancy 5.4%; imprisonment and involvement in crime 2.7%; work-related problems 2.3% and childhood trauma 2.3%.(2,3,21) Many of the patients had more than one precipitating factor.(2,3,13)

2.4 PRESENTATION TO HOSPITAL

The frequency of presentation of overdose patients to hospital varies throughout the 24 hour daily cycle, by day of the week, and by month of the year.(40) This may have significant implications for clinical services.(40) It is difficult to estimate the rate of self-harm as evidence suggests that only 10% to 12.4% of patients who self-harm present to hospital for treatment.(12,41)

Calitz et al demonstrated at Pelonomi Hospital in Bloemfontein, that most overdose patients were admitted in descending order of month, with most admissions in January, February, March followed by May, November, August and June.(2) Laubscher and Van Rooyen demonstrated that Sundays and Mondays had the highest incidence of overdose presenting to the hospital, with the lowest incidence on Friday. This may be attributed to overdose patients occasionally presenting to the ED a day after the incident. The average number of cases of overdoses per day was 1.13.(3) However in the UK, Bergen and Hawton demonstrated an even distribution across days of the week: Monday 14.7%; Tuesday 13.5%; Wednesday 13.9%; Thursday 14%; Friday 13.8%; Saturday 14.5% and Sunday 15.6%. There was no difference in variation in day of presentation by gender or age group.(40)

Bergen and Hawton also demonstrated that the number of individuals presenting each hour varied markedly over the 24 hour period, although there was no gender difference in the hourly pattern of presentations. The period with the highest rate was between 8pm and 3am, during which time 46.3% of all presentations occurred with an average hourly presentation of 6.6%. The peak time of presentation was between 11pm and 1am, with the trough in presentations between 4am and 10am with an hourly trough rate of 1.4%. From 10am, numbers increased each hour until the late evening/ early morning peak. From 9am to 5pm, the mean hourly rate of presentation was 3.5%, 5pm to 2am was 6.3%, and between 2am and 9am 2.4%. Seventy-two percent of presentations occurred outside office hours (9am to 5pm).(40)

There is also a variation in the presentation of patients of different age groups. Peak hourly rates of presentations were between 11pm and midnight for adolescents aged 15 to 19 years accounting for 8.3%, 7.2% between 11pm and 1am for those aged 20 to 54 years, and between 6pm and 7pm for those aged above 55 years accounting for 8.2%.(40)

Patients with relationship difficulties and alcohol use were more likely to present during the evening and early morning hours, and those with psychiatric disorders were more likely to present during daytime. However, alcohol use as part of the act of self-harm did not vary over days of the week.(40)

Suicide intent was significantly related to time of presentation, and patients with higher intent were evident for episodes in the daytime hours especially between 8am and midday. High suicide intent accounted for 34% in males and 24.8% in females.(40)

Seventy percent of patients with overdose present to EDs within 4 hours of ingestion, and are treated more urgently and have a longer duration of stay than cases involving other forms of self-injury.(9,42) Bhattarai et al demonstrated that 57.4% of patients presented within 3 hours of ingestion compared to Anthony and Kulkarni demonstrating that only 19% presented within 3 hours and that 66% of cases were referrals.(15,43)

Between 15% and 25% of people who self-harm repeat the self-harm within 6 months to 1 year of an index episode and present to the same hospital.(44,45) Hickey et al demonstrated that 37.5% of patients who did not have a psychiatric assessment with the index presentation, repeated self-harm within 1 year compared to 18.2% of patients who had had a psychiatric assessment at the index presentation.(46)

Zahl followed up patients of self-harm for an average of 11.4 years in which it was demonstrated that 2.6% had died by overdose, 89.7% were still alive and 7.7% had died from a cause other than overdose. At the time of the index episode 23.3% of patients reported at least one previous episode and during the follow up period a total of 39.2% had a repeat episode of self-harm.(44)

Repetition of self-harm increases the risk of suicide over both the short and long term.(44) Repetition was least common in Hungary (44.4%), an average between 51.3% and 55.7% in Australia, Belgium, England and the Netherlands, and high in Ireland (60.2%) and Norway (62.4%).(12)

Survival analysis showed that those who report an episode of overdose prior to their index episode were significantly at greater risk of eventual death by suicide than those whose index episode was their first.(9,42,44,47) Calitz et al demonstrated that

8.5% of all patients had a known previous overdose. (2) In spite of this, those who attend repeatedly for overdose are treated less urgently and have shorter in-hospital stays. (9,42)

2.5 SUBSTANCE PROFILE

The choice of substance for overdose may differ according to the regional and sociocultural characteristics of certain geography.(7) The prevalence of use of a particular substance/s and the availability are factors that affect the choice of substance ingested.(7,48,49) Furthermore, age, gender and ethnicity may also influence the choice of substance. (7,48,49)

The type and number of substances involved in overdose vary internationally averaging 1.2 to 1.8 substances per overdose.(7,8) Use of multiple substances increases the likelihood of a fatal outcome.(8) Townsend et al found that in the UK 37.1% of overdose patients used one substance compared to 62.9% of patients who used more than one substance.(50) However Laubscher and Van Rooyen demonstrated that in 42.3% of overdose cases more than one substance was implicated.(3) Lo et al found that 85% of overdose cases involved the person using their own medication.(51)

Internationally, concurrent alcohol use has been implicated in 28% to 40% of overdose cases and more males than females were found to be under the influence of a recreational substance at the time of the overdose.(8,9,22) However, Madge et al found that in 73.3% of overdose cases, patients were under the influence of alcohol or a recreational substance. For alcohol, 32.8% of males and 15.6% of females were under the influence, compared to 26.2% of males and 8.2% of females who were found to be under the influence of a recreational substance/s.(12)

Bjornaas et al demonstrated that 32% of overdose patients had a history of recreational substance use in Oslo.(37)

The involvement of alcohol, but not recreational substances, varied internationally according to Magde et al.(12) Alcohol least often accompanied overdose episodes in the Netherlands (12.1%) and Belgium (14.7%), and was more common in Ireland (18.9%) and England (19.5%), and was most prevalent in Norway accounting for 25%, 25.4% in Australia, and 26.8% in Hungary.(12) However, Laubscher and Van Rooyen found only 5% of overdose patients to have concurrent alcohol use. (3)

The most frequent substances ingested for overdose in the USA are opiate analgesics accounting for 73.9% of overdose, cocaine 69% and alcohol 42.3%, whereas, benzodiazepines are common in countries such as Iran and India.(11,25,52) Analgesics and antidepressants, which are easily accessible and cheaper than other substance groups, are the most preferred substance for overdose in Turkey.(7)

In Australia and New Zealand, in order of prevalence, benzodiazepines, antidepressants, paracetamol and antipsychotics are frequently used for overdose.(8,14) In the UK non-opioid analgesics account for 33.4%, antidepressants 15.8%, non-steroidal anti-inflammatories (NSAIDs) 13.3%, hypnotics and anxiolytics 8.7%, and opiates 6% of overdose.(20) Townsend et al demonstrated that only 1% of overdose was attributed to household chemicals in the UK.(50) However, in India organophosphate (OP) accounts for 32.5% of overdose, sedatives 21%, antiepileptics 21%, antidepressants 8% and paracetamol 8%.(15)

Bjornaas et al demonstrated that the most common substances for overdose in Oslo were opioids accounting for 65%, followed by ethanol 9%, tricyclic antidepressants

(TCAs) 4%, benzodiazepines 4%, and zopiclone 4%.(18) Methanol, TCAs, and antihistamines had the highest fatality rates; 33%, 14% and 10% respectively.(37)

In the Western Cape the most common substances were TCAs and paracetamol each 20.4%, antibiotics 11.7%, NSAIDs 10.7%, antihypertensives 10.2%, and benzodiazepines 9.7%.(3) In the Free State the most common substances were antidepressants accounting for 19.7% and analgesia 8.2%. The most commonly used household chemicals were sodium hypochlorite (JIK®) accounting for 15.2% and paraffin 36.4% of overdose.(2) However, in the Eastern Cape OP accounted for 55.3% of overdose, unknown substances 17.8%, paracetamol 10.7%, TCAs 8.3% and corrosive substances 3.5%.(5)

2.6 MANAGEMENT OF THE OVERDOSE PATIENT

Acutely poisoned patients are commonly encountered in the ED and they require accurate assessment and prompt therapy.(53) However, treatment of these patients can be quite challenging.(54) The prognosis and clinical course of recovery of the overdose patient depends largely on the quality of care delivered within the first few hours in the ED.(53,55)

The clinical effects encountered in overdose patients are dependent on numerous variables such as the dose of the substance ingested, the length of exposure time, and the pre-existing health of the patient.(54,56)

Details regarding the substance, quantity and timing of exposure are not always immediately available, yet every effort should be made to source an accurate collateral history which should not delay emergency treatment of the patient.(57)

Simultaneous initiation of management should focus on resuscitation and end-organ support while correcting any physiological derangements.(53,55,57)

Clinicians treating overdose patients should have a systematic and consistent approach to evaluation and management.(6) Evaluation involves recognition that overdose has occurred, identification of substances involved, assessment of severity, and prediction of toxicity.(6,54)

Management of overdose utilises methods of gastrointestinal decontamination (GID) to prevent substance absorption along with supportive measures for the patient, the enhancement of elimination of the substance and, where available, the use of specific antidotes.(53-55,57)

Supportive management

The management of any clinically significant overdose should begin with basic supportive measures.(53,55) An ABC-approach should be followed ensuring a protected airway, adequate ventilation and haemodynamic stability, and managing life-threatening complications.(53,55) Supportive and symptomatic care remains the cornerstone of treatment.(53) Anthony and Kulkarni demonstrated that 85% of overdose patients were managed symptomatically with supportive therapy.(15) Erickson et al suggests that intravenous access should be considered in all overdose patients, and this practice should be maintained even when the patient seems stable and asymptomatic because toxins may produce delayed effects.(55)

Gastrointestinal decontamination

GID is the process of preventing or reducing absorption of a substance after it has been ingested. The American Academy of Clinical Toxicology and the European Association of Poisons Centres and Clinical Toxicologists do not recommend the routine use GID.(53) Controversy exists concerning the roles of gastric lavage and activated charcoal in decontaminating the gastrointestinal tract.(53,55) Individual circumstances determine which technique is the most appropriate in a given clinical

situation and healthcare practitioners must always determine whether the benefits outweigh the associated risks.(53,55,57–60) Several experimental and clinical trials have examined gastric emptying techniques and regardless of the method employed a significant amount of toxin remains available for absorption.(58,61)

Gastric lavage

In the 1800's Edward Jukes, a British surgeon, performed gastric lavage on himself following ingestion of laudanum, a tincture of opium. The experiment was considered a success after he survived with no adverse side-effects aside from mild gastrointestinal symptoms followed by a short snooze.(62)

Gastric lavage should not be performed during the routine management of poisoned patients. The serious risks of this procedure usually outweigh the possible benefits.(53) Gastric lavage may be considered if a patient has ingested a potentially life-threatening quantity of a substance/s and presents within 1 hour of ingestion.(53,61) Even if used in an overdose patient who presents within 1 hour, there is no clear evidence that its use improves clinical outcome.(55) It is important to remember that gastric lavage is a procedure with potential complications, and has been associated with aspiration, oesophageal perforation, epistaxis, hypothermia, laryngospasm, fluid and electrolyte disturbances, dysrhythmias and death.(53,61)

Since the publication of the 2004 position statement by Vale et al, there has been continued growth of medical literature showing that gastric lavage can cause harm to patients but very little growth of literature showing gastric lavage could provide benefit.(58)

At present the evidence supporting gastric lavage as a beneficial treatment for the overdose patient is weak and the evidence supporting situations in which it may

provide benefit to patients is either based on theoretical grounds or is based on case reports.(58)

Activated charcoal

French pharmacist P.F. Tovery demonstrated the beneficial effects of charcoal when he survived after ingesting a potentially lethal dose of strychnine mixed with a primitive charcoal preparation in front of the French Academy of Medicine in 1831, but despite this, remained underappreciated.(63)

A position paper by Chyka et al suggests that activated charcoal is more effective than gastric lavage for GID.(59) As a result, the administration of activated charcoal has become the preferred method of decontamination in the overdose patient and is most effective when administered within 1 hour after substance ingestion.(59) Although volunteer studies have demonstrated reduced substance absorption with the use of single-dose activated charcoal (SDAC), it is important to note that there is no evidence that administration improves clinical outcome.(59) There has been a significant decrease in the use of activated charcoal in recent years based on little new evidence and because the overall mortality in overdose patients is low.(64)

Multiple-dose activated charcoal (MDAC) is a potential method of enhanced elimination.(55) Some drugs undergo enterohepatic and enteroenteric recirculation which can be interrupted by MDAC.(55,65,66) Expert opinion suggests that MDAC should only be considered in patients presenting with a potentially lethal dose of carbamazapine, phenobarbitone, theophylline, dapsone or quinine.(53)

A meta-analysis that included 64 controlled trials using activated charcoal in a variety of drug exposures in healthy volunteers, found that activated charcoal was most effective when given within 1 hour of the ingestion, but this analysis also

demonstrated that significant reductions in substance levels could still be seen even if given as long as 4 hours after substance ingestion.(67)

In a large randomised controlled trial that included 4629 overdose patients, Eddleston et al reported that there were no differences in mortality between control, SDAC and MDAC treatment in patients who overdosed on various substances.(66)

Complications of activated charcoal administration, although few and uncommon, include pneumonitis if aspirated, bowel obstruction and perforation, but as with any medical intervention, the risk-to benefit comparison should be assessed carefully.(53,55)

Antidote Therapy

Specific toxic syndromes, toxidromes, are constellations of symptoms that arise from similarities in pharmacology of many substances, permitting treatment to be commenced empirically, with the use of a relevant antidote where indicated, based on clinical presentation without definitive knowledge of the offending substance.(53-55,68)

The classic toxidromes which may be encountered by the emergency physician include opioid, sedative-hypnotic, sympathomimetic, anticholinergic, cholinergic and serotonin syndrome.(53,54,68)

The availability of certain antidotes remains a problem in the South African public healthcare sector and treating physicians should focus on providing optimal supportive care.(53)

Table 2.1: Antidotes and the substances for which they are indicated.(53)

ANTIDOTE	SUBSTANCE
Atropine	Organophosphate and carbamate
Calcium Chloride/Gluconate Glucagon, Insulin and Glucose	Calcium-channel blockers
Desferrioximine	Iron
Ethanol, Folic Acid, Leucovorin	Methanol
Flumazenil	Benzodiazepine
Glucagon, Insulin and Glucose	Beta-blockers
Methylene blue	Methaemaglobinaemia
N-acetylcysteine	Paracetamol
Naloxone	Opioids
Nitrite/Sodium Thiosulphate regime	Cyanide
Pyridoxine	Isoniazid
Sodium Bicarbonate	Tricyclic antidepressants; Salicylates

There are a limited number of effective antidotes and they are not for haphazard use.(55) Antidote therapy should be used carefully and in clinical circumstances when specifically indicated.(53,55) Table 2.1 lists selected antidotes and the substances for which they are indicated. The clinician should be familiar with the indications for use and the availability of antidotes.(55,57,69) With the exception of naloxone, antidote therapy use is limited in the patient who has an unknown overdose.(70)

Although the administration of so called “life-saving” antidotes is often considered to be the exciting aspect of clinical toxicology, antidote therapy is used in a minority of

overdose patients.(53,55,57,71) The majority of overdose patients have an uneventful recovery when routine supportive care is appropriately provided.(55,57)

Laboratory investigations

It is common for health care providers to order excessive laboratory tests when treating an overdose patient. This testing often occurs because the offending substance is unknown or the clinician is unfamiliar with the substance ingested.(55)

Routine tests

Readily available and widely used in many ED settings, is point of care testing which yield accurate results in under 15 minutes and may provide important diagnostic cues in the symptomatic overdose patient. These tests include measurements of electrolytes, blood urea nitrogen, creatinine, serum glucose, arterial blood gases and also urine toxicology screens.(54–56) If the patient is female of childbearing age a pregnancy test is essential.(55)

Toxicology screens

Technology has provided the ability to measure many toxins, but despite this most diagnoses of overdose and therapeutic decisions are made based on history and clinical examination.(54,55)

The application of laboratory measurements are limited by many practical considerations such as laboratory turnaround time can be longer than the critical intervention time course of an overdose, and for many toxins there are no established cut off levels of toxicity which makes interpretation of the results difficult.(72)

Toxicology screens are commonly ordered in a “shotgun” fashion but do have limitations. Immunoassay screens are capable of detecting commonly abused substances such as marijuana and cocaine, therefore a negative screen does not

rule out the possibility of overdose.(54–56) The toxicology screen may have little clinical correlation if specimens are collected too early or too late for detection.(55) Many clinicians unthinkingly order a “tox screen” on all overdose patients.(55,73) This practice should be avoided.(55) Qualitative screening panels should be used when the results will alter patient management or disposition, and quantitative blood tests should be ordered only for those substances for which blood levels predict toxicity or guide specific therapy such as in overdose of paracetamol, salicylates, anticonvulsants and digoxin.(55)

Sporer and Khayam-Bashi recommend a routine quantitative serum paracetamol and salicylate level in all patients with overdose, because many over-the-counter (OTC) preparations contain these agents.(74)

Radiologic studies

Erickson et al recommend that a chest x-ray (CXR) should be performed on overdose patients who have tachypnoea, hypoxia, obtundation or coma.(54)

Electrocardiography

Electrocardiography (ECG) changes are commonly encountered in the patient with overdose.(55) Despite substances having widely varying therapeutic indications, many substances, unrelated, share common cardiac ECG effects if taken in overdose.(6,53,55) The recognition of specific ECG changes associated with other clinical signs and symptoms e.g. toxidromes, can lead the clinician to specific therapies that can potentially be life-saving.(55) Therefore Boyle et al suggest that all overdose patients should have a minimum of an initial ECG.(55)

When evaluating and managing the overdose patient, there is no substitute for a thorough history and physical exam.(55)

2.7 DISPOSITION

Disposition of the overdose patient is based upon the observed and predicted severity of toxicity following initial evaluation, treatment and a short period of observation.(53,67) Many overdose patients require less than 24 hours of observation and unnecessary hospitalisation can be avoided by the use of observation units.(54,74)

Prescott et al demonstrated in a retrospective analysis of 1598 overdose patients in the UK that 59.2% of all episodes led to admission, and 40.8% were sent home directly from the ED, 82.1% of these had a planned discharge and 17.9% self-discharged or refused treatment.(20) For the patients discharged directly from the ED the mean length of stay was 3 hours 17 minutes. 93.8% were discharged within 4 hours and 77.7% of the patients admitted, required admission for less than 1 day.(20)

A retrospective study by Anthony and Kulkarni in India demonstrated that 37.5% of overdose patients required intensive care unit (ICU) admission for a duration of 3.25 ± 0.71 days. (15) The majority of overdose patients were admitted to general wards and 85% were treated symptomatically and overdose was fatal in 2.4% of patients.(15)

Overdose represented 1.2% of all ICU admissions in a 15 year retrospective study by Cachafeiro et al (75) in Spain, with a median length of stay of 3.2 days similar to the mean admission duration of 79.32 hours demonstrated by Favara (5) for overdose patients admitted to an ICU in South Africa. However, in Oman, overdose constituted 3.9% of admissions to ICU.(76)

Laubscher and Van Rooyen demonstrated that 28.1% of overdose patients were discharged the same day, 34.6% were observed overnight, 28.8% were admitted to the medical ward and 8.5% were admitted to high care.(3)

Studies recommend that all overdose patients require a psychiatric evaluation prior to being discharged from hospital.(53,67)

CHAPTER 3: MATERIALS AND METHODS

In this chapter, the research methods and approaches employed by the researcher to collect and analyse the data obtained, in order to investigate the profile of the overdose patient and ascertain the burden of disease attributable to overdose, will be discussed.

3.1 ETHICS

This research was approved by the Human Research Ethics Committee of the Faculty of Health Sciences of the University of Witwatersrand, prior to commencing this study. Ethics clearance certificate number **M130406** (Appendix 1). No informed consent was regarded as necessary, due to the nature of the study design. Permission to conduct research was also obtained from the Chief Executive Officer at CMJAH as well as the Head of the Emergency Department. (Appendix 2 and 3 respectively)

3.2 STUDY DESIGN

This study was a retrospective, observational, transverse and descriptive study.

3.3 STUDY SETTING AND POPULATION

The site for this study was the CMJAH, an accredited 1088 bed tertiary hospital in Parktown Johannesburg, South Africa. It is the main teaching hospital for the University of Witwatersrand, faculty of Health Sciences and offers a full range of tertiary, secondary and highly specialized services. CMJAH is well equipped with modern diagnostic and treatment facilities and serves patients from across Gauteng province and neighbouring provinces.

A 16 week audit was was conducted by the researcher. Data was collected by the researcher, using a standardised data collection sheet (Appendix 4). The data was

obtained from the medical records of consecutive patients identified in the ED register who were admitted via the ED at CMJAH, with a primary diagnosis of overdose or poisoning. The time period selected was from 01 November 2012.

3.3.1 INCLUSION CRITERIA

- Patients had to be entered into the CMJAH ED register.
- All patients older than 16 years were included in this study.
- Patients admitted via the ED with a primary diagnosis of overdose or poisoning were assessed.
- Should a patient have been discharged and readmitted due to deterioration from the original event, the presentation was classified as the original event and not recorded as a repeat presentation.

3.3.2 EXCLUSION CRITERIA

- Patients who presented with overdose and who were discharged home from the ED were excluded from the study.
- Any overdose that took place during a current unrelated hospital admission was excluded from the study.

3.4 STUDY PROTOCOL

The study protocol was submitted to the committee meeting of the Division of Emergency Medicine Research Protocol Assessor Group (DRAG) and subsequently approved on 22 July 2013.

3.4.1 DATA COLLECTION

Data was collected by the researcher who used the CMJAH ED register to establish the total population of 176 from 01 November 2012 over a period of 16 weeks. These constituted the total number of overdoses that presented to the ED in the

stated study period. Using hospital numbers, the researcher was then able to access patient files in the records department of CMJAH. To improve accuracy and minimise incosistencies in medical record reviews, the researcher was the one to physically abstract all information. There was no training of other medical record abstractors. The records reviewed were selected using the inclusion and exclusion criteria and a standardised abstraction form was used to guide the data collection for each case identified in the ED register within the study period. Medical records included patient registration information, ED records, paramedic reports, inpatient records, nursing notes and other clinical records. For the purpose of this study, each patient was assigned a code number and the data collected was kept under lock and key as well as on a password protected computer in order to ensure patient confidentiality.

3.4.1.1 Information collected

3.4.1.1.1 Demographic and clinical history

This included age, gender, ethnicity, marital status, highest level of education, employment, residential area, and the number of dependants and children. It also included information regarding previous medical and psychiatric history, chronic medication as well as alcohol, smoking, and other substance use.

3.4.1.1.2 Overdose

This included information related to suicide intent, substance/s taken as well as the route, dose, date and time of overdose, and how the substance/s was acquired by the patient. The precipitating factor/s for the overdose was also recorded. The precipitating factor was identified by the researcher by reviewing the clinical records and recorded on a standard list. For example, if a patient had recently been declared

bankrupt, this would be recorded as “financial”. Following an altercation with a partner or family member this would be recorded as “relationship”.

3.4.1.1.3 Presentation to hospital

The date and time of day that the patient presented to the hospital was obtained from the information entered routinely on the emergency department triage form. How the patient arrived at the hospital and whether the patient was referred was also recorded.

3.4.1.1.4 Management in the ED

This included the general management of the patient such as symptomatic treatment, intubation and ventilation; and the use of antidotes.

3.4.1.1.5 Disposition

This included information about the discipline to which the patient was referred; the date and time of admission; the admission ward e.g. general medical or surgical ward versus ICU; and the date of discharge.

3.4.2 OUTCOME MEASURE

All data was electronically captured which allowed for further analysis and calculation of additional parameters. Information obtained from the completed data sheets were used to determine patient demographics, identify substances used for overdose, ED management and diagnostic investigations.

The weekday of overdose was determined from the date of overdose. The delay to presentation was derived from the time of overdose and the time of presentation to the ED. The length of stay in hospital was calculated from the dates of admission and discharge.

3.4.3 SOFTWARE AND DATA ANALYSIS

All data was captured electronically onto a Microsoft Excel® (Microsoft Office 2012, Microsoft Corporation) spreadsheet which was then used for statistical analysis.

All data analysis was carried out in Statistical Analysis Software® Version 9.3 (SAS Software Inc, Cary N.C., USA).(78) The analysis was descriptive, making use of simple statistics, such as frequencies, means and percentages.

The Chi-squared test was used to assess the relationships between categorical variables. Fisher's exact test was used for 2 x 2 tables or where the requirements for the Chi-squared test could not be met. The strength of the associations was measured by Cramer's V and the phi coefficient respectively. The following scale of interpretation was used:

0.50 and above: high/strong association

0.30 to 0.49: moderate association

0.10 to 0.29: weak association

below 0.10: little if any association

The relationship between continuous and categorical variables was assessed by the t-test. Where the data did not meet the assumptions of these tests, a non-parametric alternative, the Wilcoxon rank sum test was used. The strength of the associations was measured by the Cohen's d for parametric tests and the r-value for the non-parametric tests. The following scale of interpretation was used:

0.80 and above: large effect

0.50 to 0.79: moderate effect

0.20 to 0.39: small effect

below 0.20: near zero effect

3.4.4 SIGNIFICANCE LEVEL

A p-value < 0.05 was considered to be significant for all statistical tests.

CHAPTER 4: RESULTS

The 16 week audit of this study commenced on 01 November 2012. During this specified period, 176 cases with a primary diagnosis of overdose or poisoning were recorded in the ED register. This was the total population of the study. However, out of the 176 cases identified by the researcher, the sample size comprised of only 133, as 5 files were deemed misplaced or lost from the records department, 12 had an incorrect diagnosis of overdose or poisoning entered in the ED register, and 26 patients did not meet the study criteria because they were discharged home from the ED.

4.1 DEMOGRAPHIC DATA

4.1.1 AGE

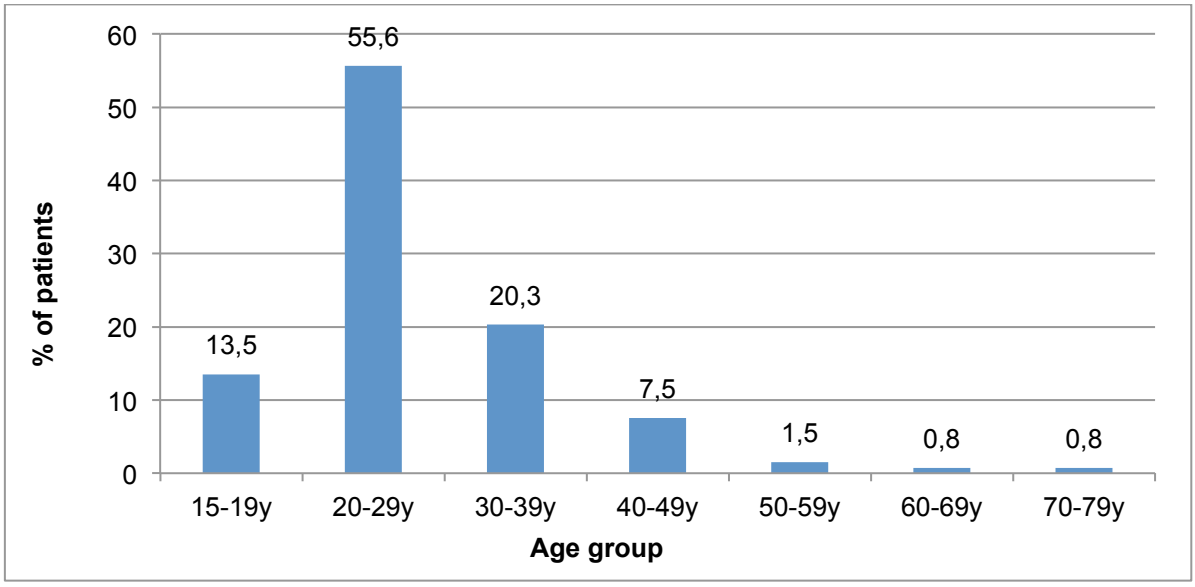

Figure 4.1: The frequency distribution of ages

Seventy four of overdose cases (55.6%) occurred amongst the age group of 20-29 years. The mean age was 28.1 years (SD=9.4 years; range=16-74 years; median=26 years; interquartile range 22-31 years).

4.1.1.1 FREQUENCY DISTRIBUTION OF PATIENTS AGED 15-29 YEARS

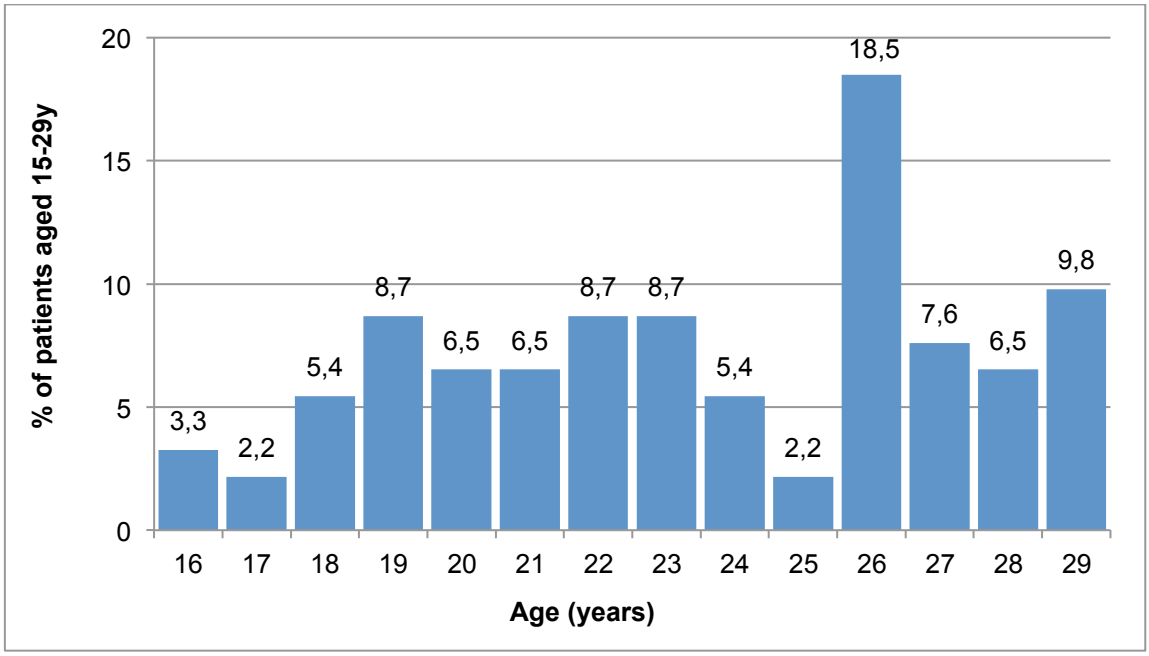

Figure 4.2: The frequency distribution of patients aged 15-29 years (n=92)

4.1.2 GENDER

Of the 133 cases studied by the researcher, 64.7% (n=86) of the sample was female.

4.1.3 ETHNICITY

The majority of overdose cases occurred in the Black population which accounted for 85% (n=113); White 10.5% (n=14); Asian 3.8% (n=5) and Coloured 0.8% (n=1).

4.1.4 MARITAL STATUS

One hundred and ten patients (82.8%) were single. Twenty patients (15%) were married, two patients (1.5%) engaged and one patient (0.8%) divorced.

4.1.5 HIGHEST LEVEL OF EDUCATION

One hundred and seven patients (80.5%) had a secondary education. Six patients (4.5%) had a primary education, fifteen patients (11.3%) a tertiary education and in five patients (3.8%) the highest level of education was unknown.

4.1.6 EMPLOYMENT

Twenty eight patients (21.1%) were employed. Of the 78.9% (n=105) unemployed, 85 patients (63.9%) were truly unemployed and the remainder referred to students who accounted for 6.8% (n=9); scholars 5.3% (n=7), pensioners 2.3% (n=3), other 16.5% (n=22) and it was unknown in 5.3% (n=7). (Percentages have been rounded off to the nearest decimal)

4.1.7 RESIDENTIAL AREA

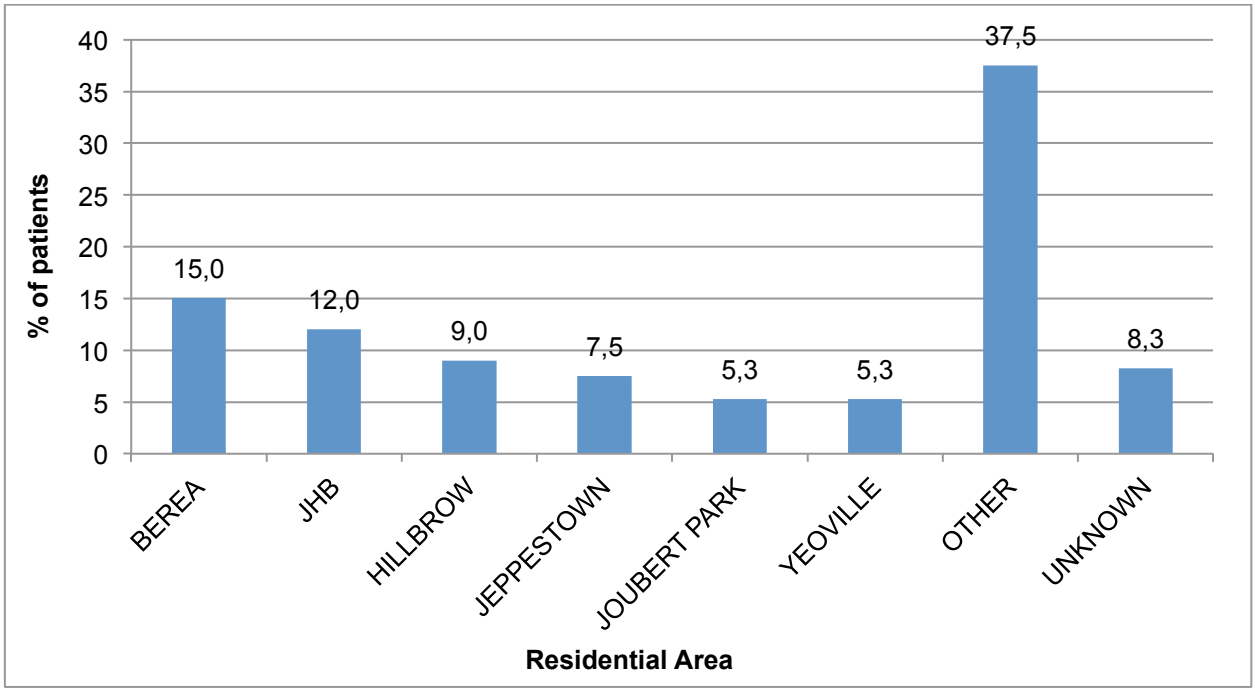

Figure 4.3: Residential areas

Seventy two patients (54.2%) came mainly from areas near the hospital. Fifty patients (37.5%) came from other residential areas, while in 8.3% (n=11) the residential area was unknown.

4.1.8 MEDICAL HISTORY

Table 4.1: Co-morbid diseases

Variable	Category	n	%
Co-morbid diseases	No	103	77.4
	Yes	30	22.6
Condition (n=30)	HIV	20	66.7
	Hypertension	5	16.7
	Diabetes mellitus	2	6.7
	Epilepsy	2	6.7
	Asthma	2	6.7
	Tuberculosis	2	6.7
	Pregnant	2	6.7
	Anaemia	1	3.3
	Arthritis	1	3.3
	Hypercholestrolaemia	1	3.3
Number of conditions	1	23	76.7
	2	6	20.0
	3	1	3.3

4.1.9 PSYCHIATRIC HISTORY

Table 4.2: Psychiatric history

Variable	Category	n	%
Psychiatric history	No	115	86.5
	Yes	18	13.5
Psychiatric diagnosis (n=18)	No	4	22.2
	Yes	14	77.8
Psychiatric condition (n=14)	MDD	7	50.0
	BMD	5	35.7
	SZP	4	28.6
	MDE	2	14.3
	PD	2	14.3

4.1.10 CHRONIC MEDICATION

Table 4.3: Chronic medication

Variable	Category	n	%
Chronic Medications	No	105	79.0
	Yes	28	21.1
Chronic Medications (n=28)	Antiretroviral	11	39.3
	Antiepileptic	6	21.4
	Antidepressant	6	21.4
	Antipsychotic	5	17.9
	Anxiolytic	5	17.9
	Antihypertensive	4	14.3
	Vitamin	3	10.7
	Antibiotic	2	7.1
	Antihistamine	2	7.1
	Antimycobacterial	2	7.1
	Analgesia	1	3.6
	Antiasthma	1	3.6
	Antidiabetic	1	3.6
	Antiparkinsonian	1	3.6
	Lipid-reducing	1	3.6

Note that percentages do not sum to 100%, since a patient could take more than one type of medication.

4.1.11 ALCOHOL AND SMOKING HISTORY

Table 4.4: Alcohol and smoking history

Variable	Category	n	%
Alcohol history	No	67	50.4
	Yes	66	49.6
Gender of those with alcohol history (n=66)	Female	35	53.0
	Male	31	47.0
Smoking history	No	81	60.9
	Yes	52	39.1
Gender of those with smoking history (n=52)	Female	21	40.4
	Male	31	59.6

4.2 PRECIPITATING FACTORS

Table 4.5: Precipitating factors for overdose

Variable	Category	n	%
Precipitating factors	Relationship	69	51.9
	Depression	50	37.6
	Domestic	49	36.8
	Financial	23	17.3
	Unemployment	21	15.8
	Illness	9	6.8
	Stress	6	4.5
	Education/school	5	3.8
	Pregnancy	4	3.0
	Postpartum	1	0.8

Note that percentages do not sum to 100%, since some patients had more than one precipitating factor for overdose.

4.3 OVERDOSE

4.3.1 TYPE OF OVERDOSE

Table 4.6: Type of overdose frequency distribution and number of attempts

Variable	Category	n	%
Overdose type	Intentional	121	91.0
	Accidental	8	6.0
	Unintentional	3	2.3
	Poisoning	1	0.8
First attempt	No	16	12.0
	Yes	105	79.0
Subsequent attempt no. (n=16)	2	11	68.8
	3	2	12.5
	4	3	18.8

Accidental – incidental or by chance implying that the tragic result could not have been foreseen, so it could not have been prevented with forethought.

Unintentional – not intended or deliberate implying some critical factor that lead to a tragic result was overlooked. If that critical factor had been properly addressed the result could have been avoided.

4.3.2 SUBSTANCES USED IN OVERDOSE

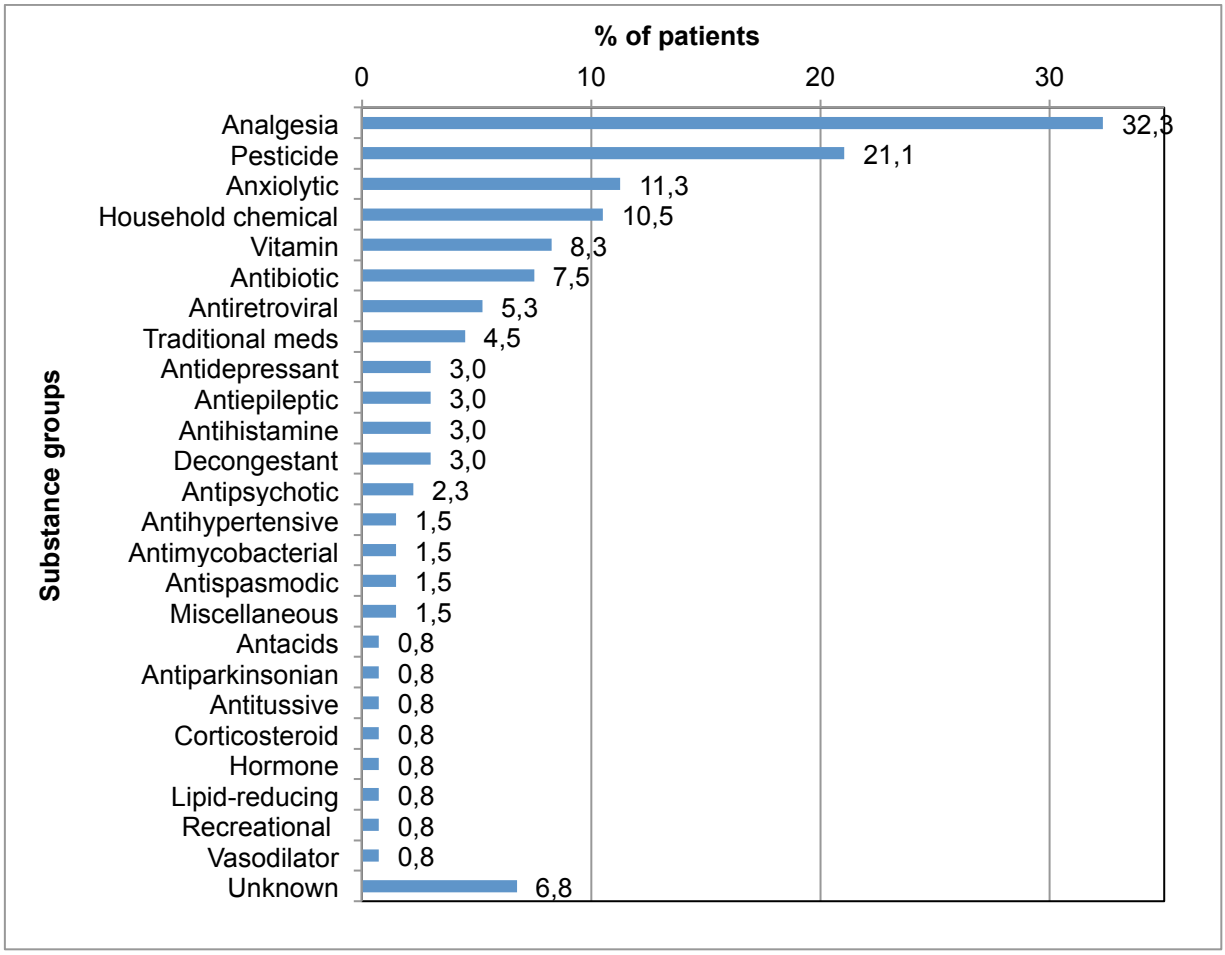

Figure 4.4: Substances used in overdose

There was a wide variety of substances (n=89) used for overdose, which were divided into 25 substance groups. Seventy seven patients (57.9%) used one substance, while fifty six patients (42.1%) used more than one substance, and in nine patients (6.8%) the substance was unknown. Note that percentages do not sum to 100%, since a patient could take more than one type of substance.

Table 4.7: Demographics for analgesic overdose

Variable	Category	Analgesic used (n=42)		p-value for H0: no significant difference between groups (phi coefficient)
Age	mean (sd)	26.8 (11.2)		0.07
	median (IQR)	26 (20-29)		
		n	**%**	
Age	15-19y	8	19.0	0.33
	20-29y	24	57.1	
	30-39y	8	19.0	
	40+y	2	4.8	
Gender	Female	34	81.0	0.011 (0.23)
	Male	8	19.0	
Ethnicity	Black	38	90.5	0.30
	Other	4	9.5	
Employed	No	35	83.3	0.50
	Yes	7	16.7	
Medical history	No	35	83.3	0.37
	Yes	7	16.7	
Psychiatric history	No	37	88.1	0.79
	Yes	5	11.9	

Table 4.8: Demographics for pesticide overdose

Variable	Category	Pesticide used (n=28)		p-value for H0: no significant difference between groups (phi coefficient)
Age	mean (sd)	26.1 (5.9)		0.51
	median (IQR)	26.5 (21-29.5)		
		n	**%**	
Age	15-19y	5	17.9	0.55
	20-29y	16	57.1	
	30-39y	6	21.4	
	40+y	1	3.6	
Gender	Female	14	50.0	0.08
	Male	14	50.0	
Ethnicity	Black	28	100.0	0.008 (0.22)
	Other	0	0.0	
Employed	N	23	82.1	0.80
	Y	5	17.9	
Medical history	N	24	85.7	0.31
	Y	4	14.3	
Psychiatric history	N	26	92.9	0.36
	Y	2	7.1	

Table 4.9: Demographics for anxiolytic overdose

Variable	Category	Anxiolytic used (n=15)		p-value for H0: no significant difference between groups (phi coefficient)
Age	mean (sd)	36.5 (16.6)		0.024 ( )
	median (IQR)	32 (26-47)		
		n	**%**	
Age	15-19y	2	13.3	0.013 (0.29)
	20-29y	4	26.7	
	30-39y	4	26.7	
	40+y	5	33.3	
Gender	Female	9	60.0	0.78
	Male	6	40.0	
Ethnicity	Black	7	46.7	<0.0001 (0.38)
	Other	8	53.3	
Employed	N	10	66.7	0.31
	Y	5	33.3	
Medical history	N	13	86.7	0.52
	Y	2	13.3	
Psychiatric history	N	9	60.0	0.0062 (0.28)
	Y	6	40.0	

4.3.3 ROUTE OF ADMINISTRATION OF SUBSTANCES

One hundred and thirty two patients (99.3%) administered the overdose substance orally. The remaining patient had injected an accidental overdose of heroine. Thirty one patients (23.3%) had concurrent alcohol consumption at the time of overdose of which 52% (n=16) were male.

4.3.4 DAY OF THE WEEK OF OVERDOSE

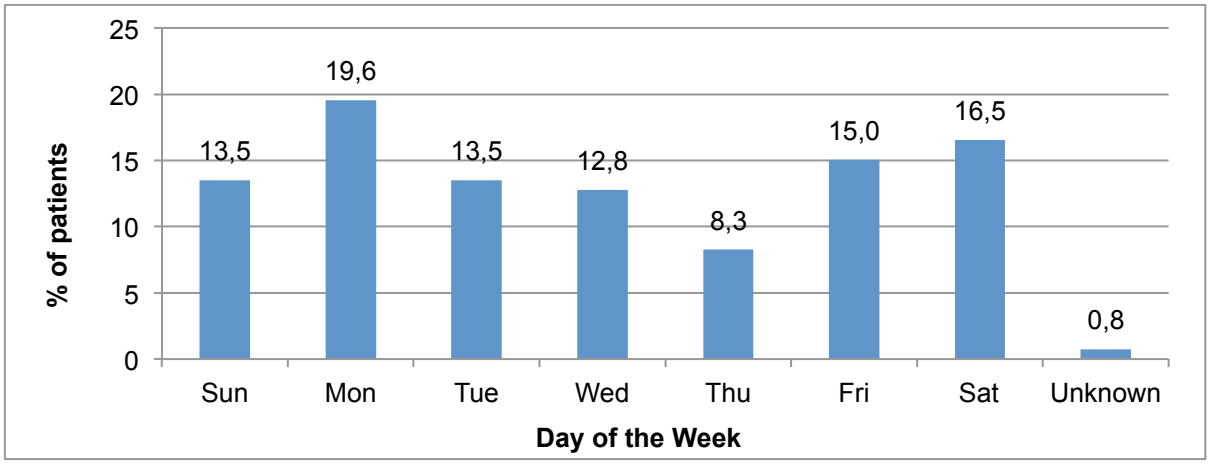

Figure 4.5: Day of the week of overdose

The proportion of overdoses, were fairly evenly spread across the days of the week.

4.3.5 TIME OF OVERDOSE INGESTION

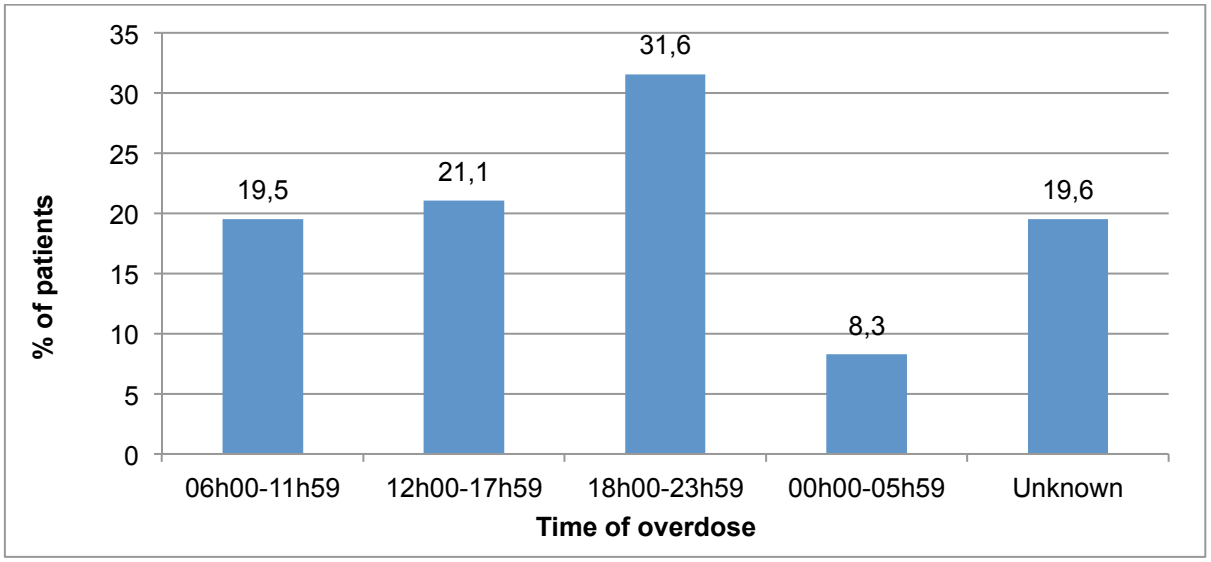

Figure 4.6: Time of overdose ingestion

4.3.6 FREQUENCY OF DISTRIBUTION FOR TIME OF OVERDOSE FOR WEEKDAY VERSUS WEEKEND

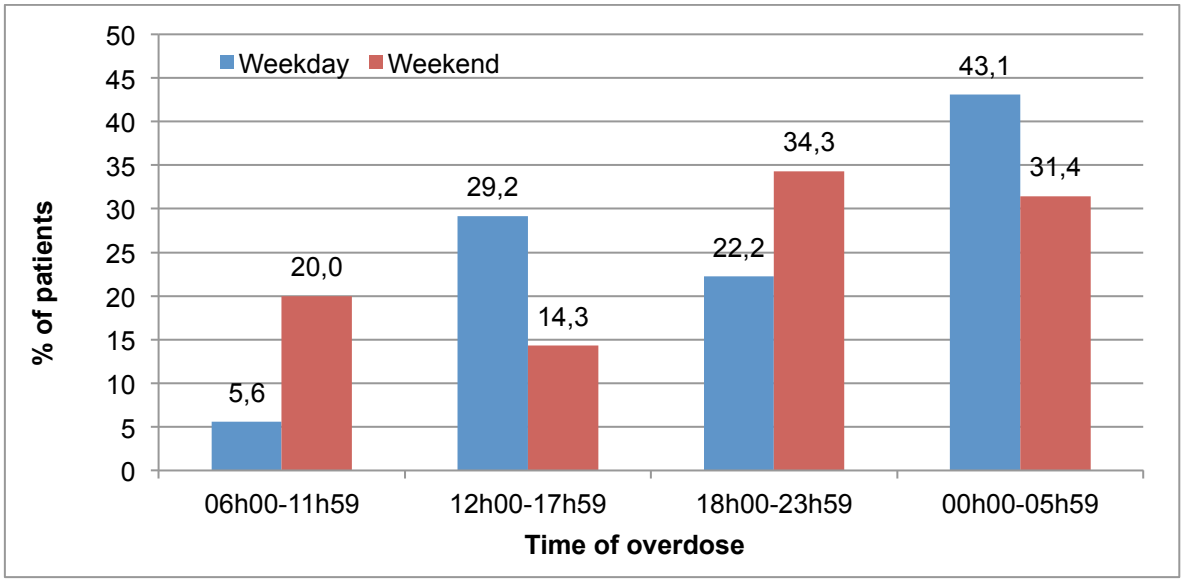

Figure 4.7: The frequency distribution for time of overdose for weekdays vs. weekends

On the weekends, the pattern of time of overdose was shifted to the 00h00 – 05h59 and 12h00 – 17h59 time periods, compared to the pattern observed during the week (chi-square test; p=0.029).

4.3.7 ACQUISITION OF SUBSTANCES

4.3.7.1 MEANS OF ACQUISITION

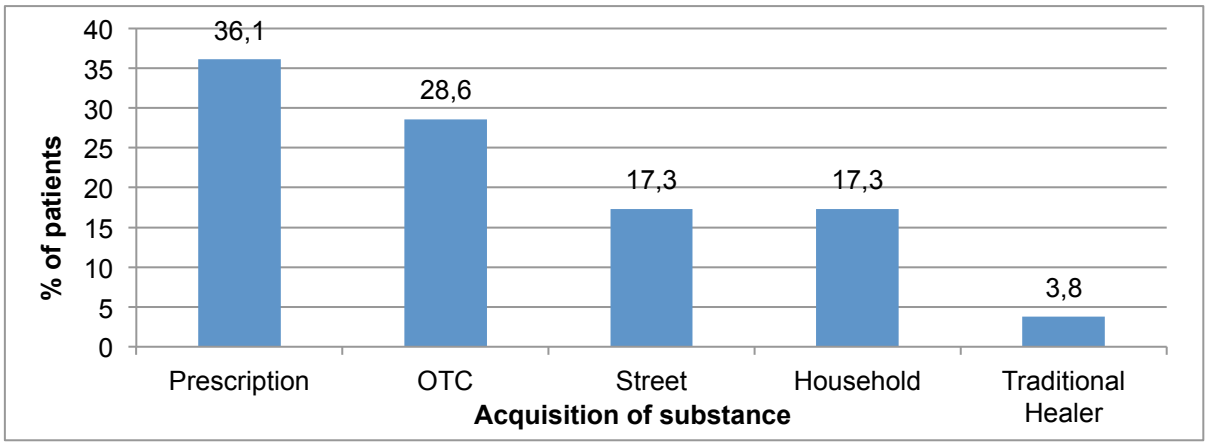

Figure 4.8: Means of acquisition of substances

Note that percentages do not sum to 100%, since some patients acquired substances in more than one manner.

Of those who acquired their substances by prescription (n=48), 70.8% (n=34) used their own prescription medication, 27.1% (n=13) used someone else's prescription medication, while 2.1% (n=1) used a combination of own and someone else's prescription medication.

4.4 PRESENTATION TO HOSPITAL

4.4.1 NUMBER OF PATIENTS PER DAY

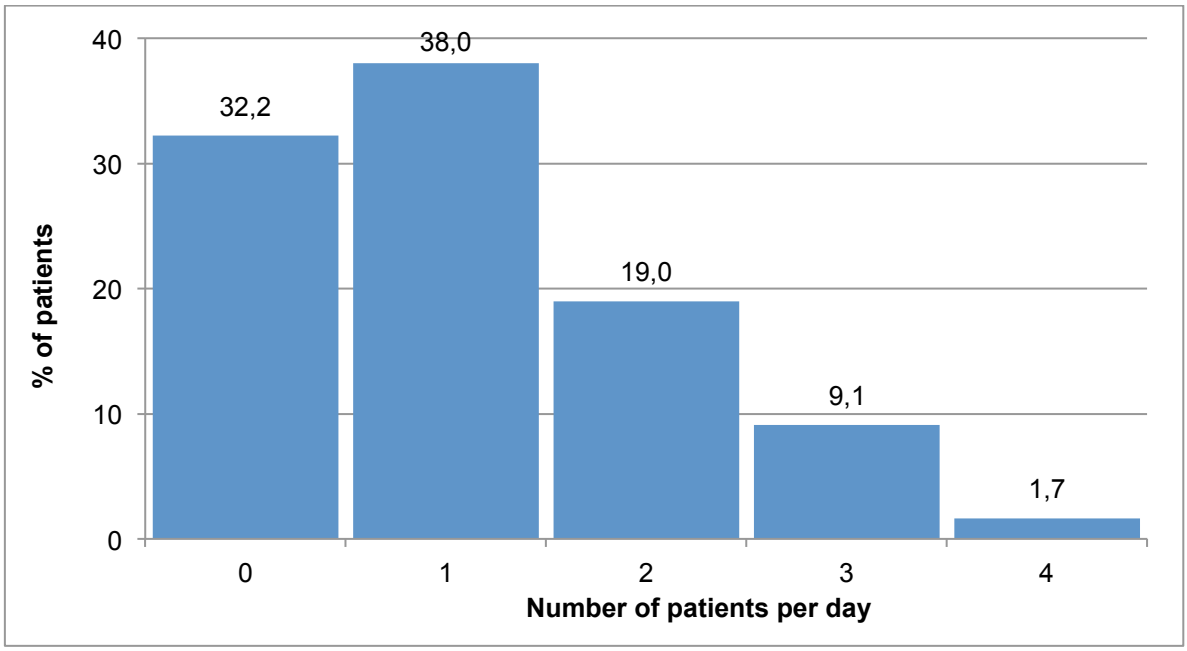

Figure 4.9: Distribution of the number of patients per day

The mean number of patients per day was 1.1 (sd=1.0; range=0-4; median=1; interquartile range 0-2).

4.4.2 TIME OF PRESENTATION TO THE ED

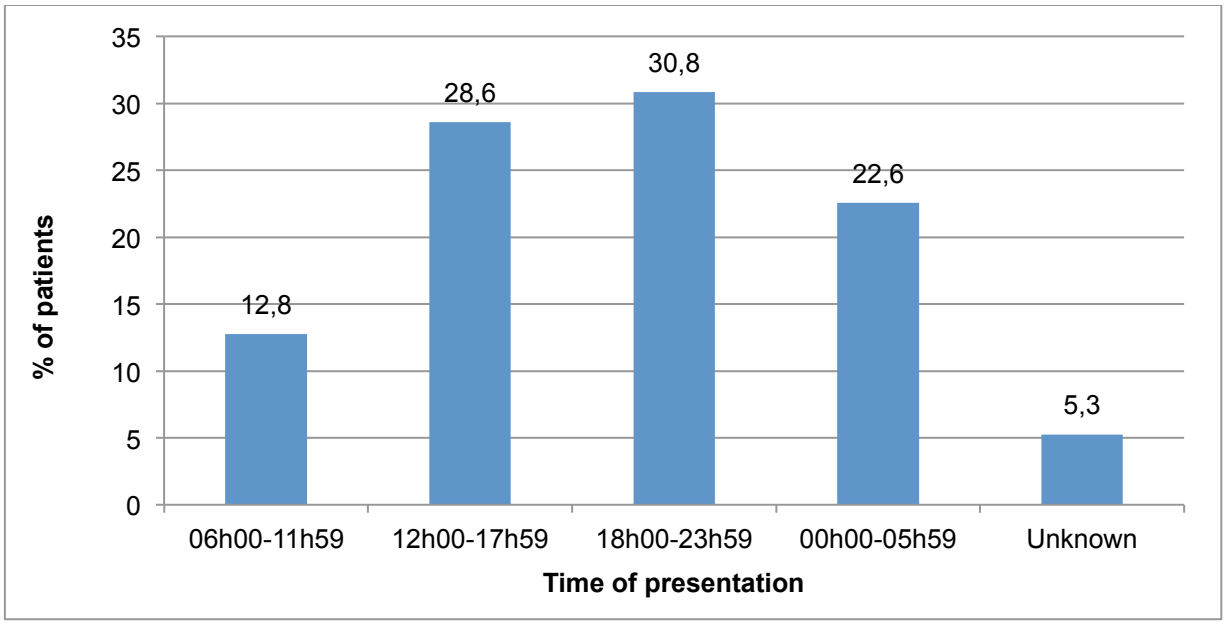

Figure 4.10: Time of presentation in ED

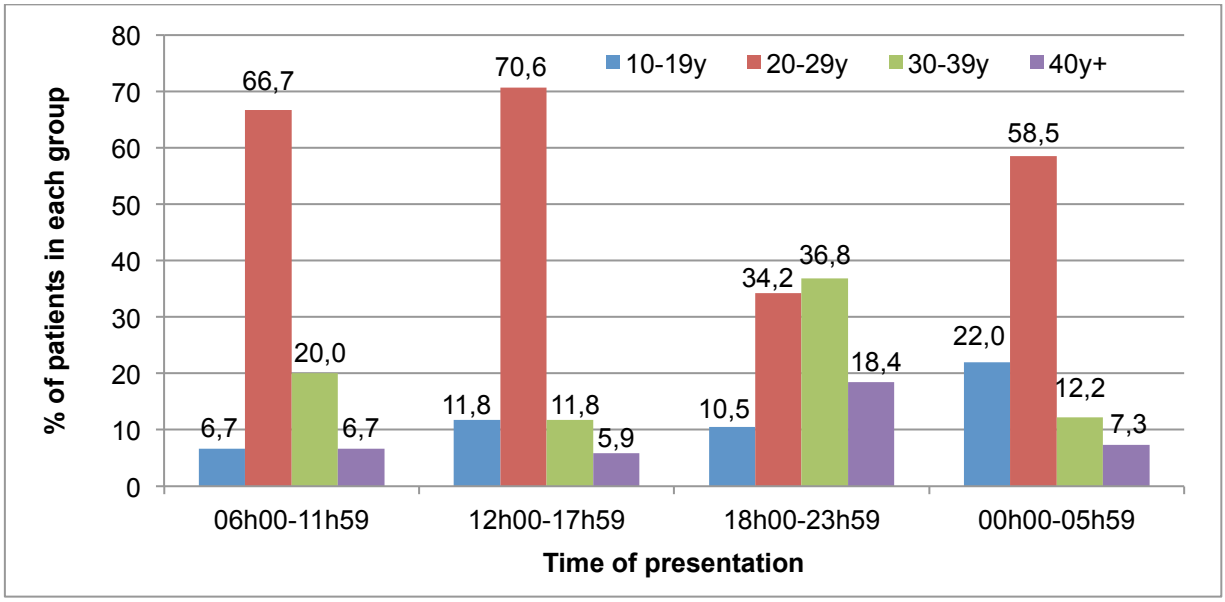

Figure 4.11: The frequency distribution for time of presentation categorised by age group

The association between time of presentation and age group was significant (chi-square test: p=0.043).

4.4.3 TIME BETWEEN OVERDOSE AND PRESENTATION TO THE ED

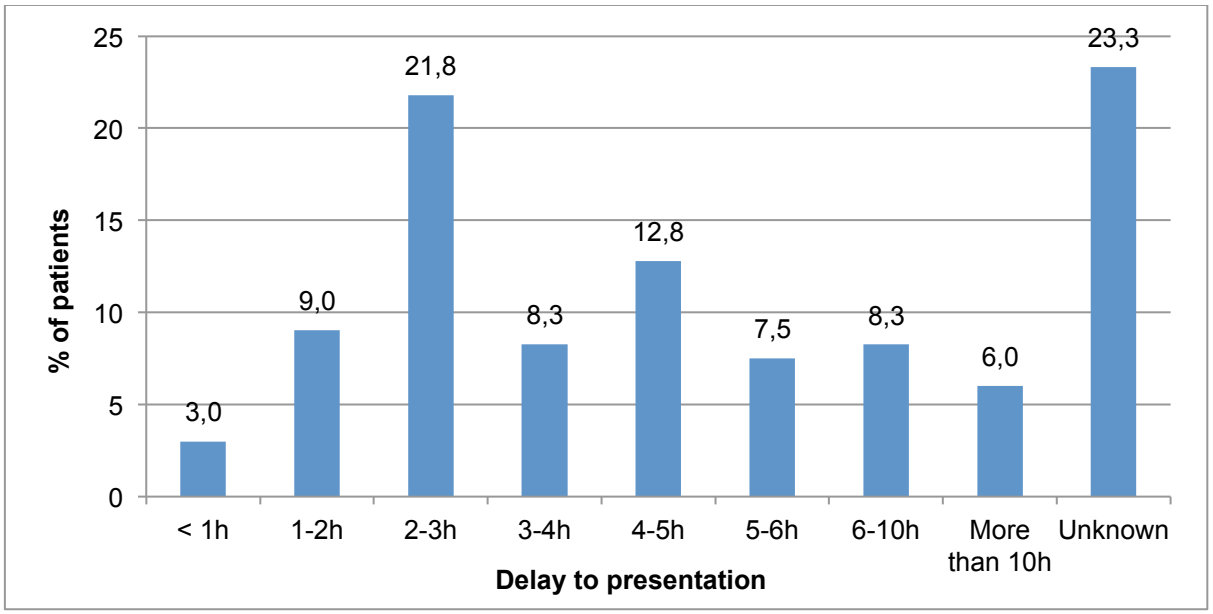

Figure 4.12: Time between overdose and presentation to the ED

The median delay to presentation was 3.5 hours (IQR: 2.1 – 5.1 hours).

4.4.4 MODE OF ARRIVAL

Seventy two patients (54.1%) arrived by private means, while fifty eight patients (43.6%) arrived by ambulance and the mode was unknown for 3 patients (2.3%).

4.4.5 REFERRAL

Seventy six patients (57.1%) were referred by family, thirty two (24.1%) were self-referrals, eighteen (13.5%) were referred from other institutions and for seven patients (5.3%) referral was unknown.

4.5 MANAGEMENT IN THE ED

4.5.1 TREATMENT

4.5.1.2 ANTIDOTE USE

An antidote was used in 35.3% (n=47) of cases. In these cases N-acetylcysteine accounted for 46.8%, atropine 40.4%, flumazenil 6.4% and naloxone 6.4%.

4.5.1.2 TREATMENT EMPLOYED

Symptomatic treatment was by far the most common choice of treatment accounting for 97% (n=129), intubation and ventilation in 5.3% (n=7), activated charcoal 1.5% (n=2) and CPR in 0.8% (n=1). Note that the percentages do not sum to 100%, since some patients had more than one form of treatment.

4.6 DISPOSITION

4.6.1 ADMISSION

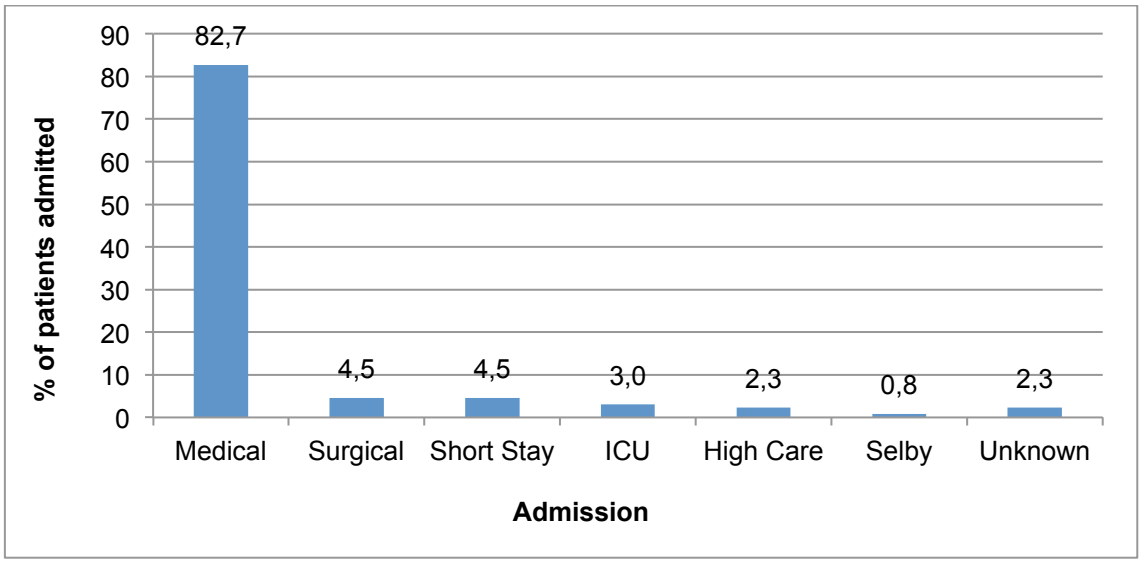

Figure 4.13: Admission wards

No patients were discharged from the ED. One hundred and ten patients (82.7%) were admitted to the medical ward. One hundred and thirty patients (97.7%) were ultimately discharged, while two died (1.5%) and one (0.8%) refused hospital treatment. Selby Park Hospital, a stepdown facility offering a level one health service in partnership with the Gauteng Department of Health.

4.6.2 LENGTH OF STAY IN HOSPITAL

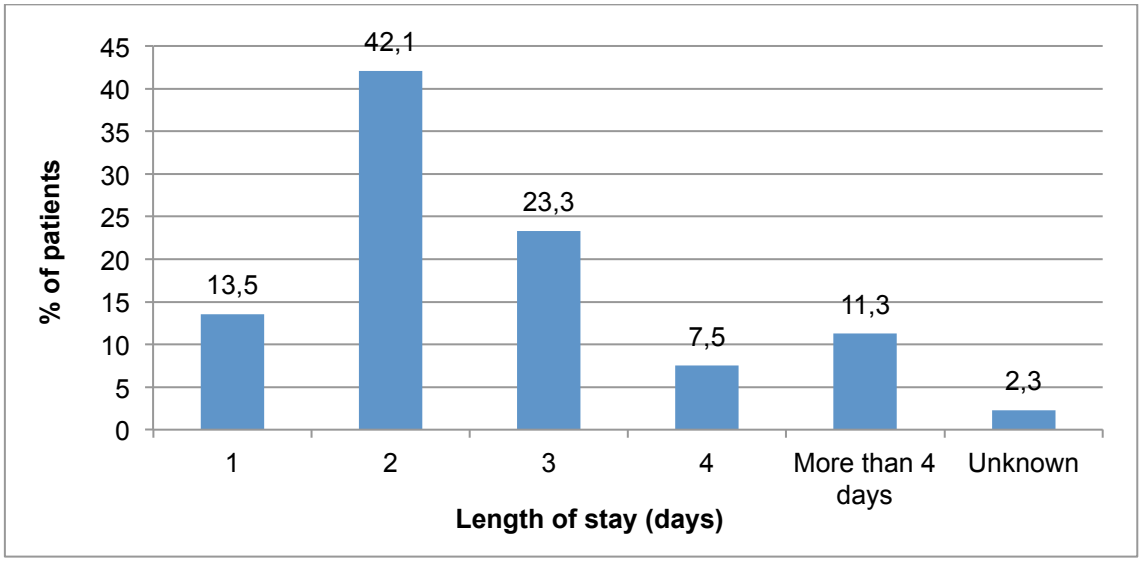

Figure 4.14: The frequency distribution of the length of stay in hospital

The median length of stay in 42.1% of patients admitted was 2 days (IQR: 2 – 3 days).

CHAPTER 5: DISCUSSION

International data shows that overdose is common. The results of the present study show that overdose remains a major public health concern.

5.1 DEMOGRAPHIC PROFILE OF THE OVERDOSE PATIENT

The incidence of overdose decreases with age. The age group between 20-29 years had the highest incidence of overdose accounting for 55.6% of overdose cases followed by 20.3% amongst the 30-39 year age group. The incidence was significantly less in the extremes of age. The frequency distribution of patients aged 15-29 years comprised of a total of 92 patients with 26 years of age having the highest incidence of 18.5%.

These results are consistent with a study in Oman (17) demonstrating that 54.1% of overdose occurred between the ages of 20-30 years. Calitz et al (2) demonstrated that in Bloemfontein the majority of cases were between the ages of 18 and 31 years with a median age of 22 years. However, in Paarl, Laubscher and Van Rooyen (3) demonstrated that the highest incidence was between the ages of 10-19 years accounting for 29.4% followed by the 30-39 year age group and the 20-29 year age group accounting for 27.5% and 25.6% respectively.

The higher incidence amongst these age groups could be attributed to these groups being subjected to a substantial amount of stress and strain during this life period. These age groups are associated with many life determining, life-altering decisions and increasing responsibilities which vary from studies, employment, relationships, marriage, pregnancy and children.

The gender ratio for overdose in this study favours females, with a female to male ratio of 1.8:1.0 close to rates of 1.9:1.0 in Australia.(14) The higher incidence of

overdose amongst females, accounting for 64.7% of overdose patients in this study was expected, and is similar to studies both internationally and locally. In Australia, Buykx et al (9) found 63.6% of overdose cases to be female compared to 78% and 86.1% demonstrated by Zaidan et al (17) in Oman and Donovan et al (19) in the UK, respectively. Calitz et al (2) found that in 68.9% of cases in Bloemfontein patients were female compared to 73.5% found by Laubscher and Van Rooyen (3) in Paarl.

Males tend to employ more violent methods of self-harm and succeed in killing themselves(2,15,22). Another reason may be that attempts in males are under reported due to the stigma associated with such behaviour. This might be the reason why males are less represented in the statistics of overdose patients presenting to the ED. It could also be that females have greater suicidal tendencies and therefore attempt overdose more frequently.

The major ethnic groups for overdose patients in Kuala Lumpur was Malay which accounted for 40.8%, Indian 33.2% and Chinese 20.9% (24). However, in the USA, Galea et al (25) found that the Black population accounted for 36.3%, White 32.8% and Latino 30% compared to the 12% of White and 5% Asian populations in a study by Neeleman et al (26) in the UK.

In this study the majority of overdose occurred in the Black population accounting for 85%; White 10.5%; Asian 3.8% and Coloured 0.8%. These results were expected. According to Statistics SA, Census 2011(27) , 77.4% of Gauteng's population is Black, 15.6% White, 3.5% Coloured and Asian 2.9%. We can therefore deduce that overdose within ethnic groups fluctuates according to geographic locations.

In 82.8% of the study population, patients were single. This might be attributed to the cultural marital practices amongst some Black South Africans. One cultural practice

is the “Lobolo”, a dowry given to the bride’s parents as a token of appreciation and gratitude for bringing their daughter into the world. The dowry involves giving a cow and a monetary gift. Some however prefer to have an entirely monetary gift. This practice is sometimes a deterrent towards marriage for those who cannot afford to pay “Lobolo”. This percentage however, differs when compared to single overdose patients in Australia (16) and Oman (17) accounting for only 50% and 53.1%, respectively, closer to rates of 62% demonstrated by Calitz et al in Bloemfontein (2).

The highest level of education in this study was a secondary level education for 80.5% of patients in this study. This is similar to the 76% demonstrated by Carter et al in Australia. (16) The unemployment rate of subjects in this study was 78.9%, higher than that demonstrated by Laubscher and Van Rooyen (3) in Paarl and Meel (21) in Transkei where the rate of unemployment was 53.7% and 64%, respectively. However, this differed markedly when compared to Carter et al (16) who found an almost equal rate of overdose between the employed and unemployed in Australia. In this study, of the 78.9% unemployed, 6.8% were students and 5.3% scholars which is lower compared to rates of 30% ascribed to students and scholars in Bloemfontein.(2)

Jobs are scarce and many companies are resorting to retrenchments due to the slowing down of economic growth. The cost of living is on the rise and with the ever increasing fuel and electricity price hikes the consumer is inevitably impacted. The high incidence of overdose amongst the unemployed can be attributed to the increased financial burdens and stress. Frustrations due to unemployment, financial and socio-economic problems are critical co-morbid aetiological variables for overdose.(1-3,9,29,39)

Patients were grouped according to their area of residence on admission. The highest number of overdoses were found to occur in Berea (15%), Johannesburg town (12%), Hillbrow (9%), Jeppestown (7.5%), Joubert Park (5.3%) and Yeoville (5.3%).

These suburbs are all near the CMJAH and close to Johannesburg central business district. The existing infrastructure is insufficient to meet housing demands in the area, and as a result, many under-utilised or abandoned buildings have been taken over by informal settlers, illegal immigrants, refugees or have been converted into low income residential housing units that cater for those of poor socioeconomic status. The low socioeconomic groups are more vulnerable to overdose which may be due to the continuous financial burdens and other stressors in life.(1-3,9,29,36)

From the data in this study, 64.7% of overdose cases were female, 85% of Black ethnicity and 82.8% single. The majority of patients were unemployed and in the 20-29 year age group (See Figure 4.1), living in areas of poor socioeconomic status. Therefore, it can be inferred that the majority of overdose cases were Black females, who were single, unemployed and residing in areas of poor socioeconomic status.

5.2 RISK FACTORS FOR OVERDOSE

The disease profile of the world is changing rapidly. We live in an era of unhealthy diets, smoking, lack of exercise and inactivity as well as excessive stress. Socio-economic, cultural, political and environmental determinants such as urbanisation, globalisation and population ageing all increase the risk of chronic lifestyle diseases such as hypertension, diabetes, hypercholestrolaemia and obesity.

As described by Schlebusch (1) and Druss and Pincus (30), there is an increased risk for suicide in patients with one or more comorbidity. In this study 22.6% had a

comorbid disease. Among this group, 76.7% had one comorbidity, 20% two and 3% had three comorbidities.

The most common condition was HIV which accounted for 66.7%. This result was expected when compared to studies by Govender and Schlebusch (31,32) in South Africa, Keiser et al (33) in Switzerland and Jia et al (34) in Denmark who found that people with HIV/AIDS infection tend to have an increased risk.

Social isolation, stigma and discrimination associated with HIV/AIDS may possibly contribute to suicidal tendencies and an increased risk of overdose. Patients who are infected with HIV/AIDS are also prone to psychiatric disorders e.g. depression which could also increase their risk of overdose. HAART also has adverse effects and sometimes toxic effects which could be a major burden that could impair the patients' quality of life. Not only do these patients have the burdens associated with their disease, they also have the strains and stressors of the general population which could provoke and increase their risks of overdose.(34,35)

Meel (21), Eddleston and Phillips (28) and Wasserman et al (36) have all demonstrated that suicidal behaviour is 25 times higher amongst persons with psychiatric diagnoses such as MDD and BMD. In this study 13.5% of overdose patients had a psychiatric disorder of which 50% was MDD, consistent with 50.9% found by Calitz et al (2) with MDD. However, the total number of overdose patients with a psychiatric disorder is less when compared to 22.1% found by Calitz et al (2).

In this study however, 86.5% of patients were found not to have a psychiatric diagnosis. This could probably be attributed to a multitude of factors. A large proportion, possibly overdose to gain social acceptance. Many have poor coping and communicating skills and use overdose as a means of seeking help, escaping a

situation, alleviating distress or even obtaining relief from a terrible state of mind. This could also be due to impulsivity and attention seeking behaviour. Manipulative reasons could also be a possible explanation because overdose evokes sympathy and this results in significant others feeling considerable guilt and remorse.

There were 21.1% of patients using chronic medication. This result was expected since 22.6% of patients had a comorbid disease. ARV's were the most common medication taken by 39.3% of patients on chronic medications, followed by 21.4% taking antiepileptics, 21.4% antidepressants, 17.9% antipsychotics, 17.9% anxiolytics and 14.3% antihypertensives.

We live a fast-paced life and with the ever increasing responsibilities and demands of society there may be no time for people to visit doctors. The cost of private healthcare is expensive. Due to the majority of the population being unemployed, the government health care facilities are overwhelmed on a daily basis with patients being turned away to come back another day. The burden and the inability to cope with chronic medical and psychiatric conditions can be overwhelming and be contributing factors to suicidal ideation.

HIV is rife in South Africa and there has been an expansion of the ARV programme which allows people with HIV to live significantly longer, leading to a greater percentage of the HIV-infected population remaining in society. However, of the 20 patients who had HIV in this study only 11 of these patients were on ARV's. Could this possibly be due to patient factors such as denial of their medical condition or defaulting medication or could this be attributed to a failure of the healthcare system in initiating ARV's and following up patients with HIV? Or maybe they did not meet CD4 criteria for ARV's? Or could it also be attributed to health care facilities being

overwhelmed with many patients and this could result in inadequate patient care and management?

There was a history of alcohol use amongst 49.6% of overdose patients. Of the total females in the study 41% consumed alcohol compared to 66% of total males. The total percentage of overdose patients with a smoking history was 39.1%. Of the total females in the study 24.4% had a history of smoking compared to 66% of total males.

Executive cognitive functioning includes a number of higher order cognitive skills such as attention, abstract reasoning, organisation and planning, mental agility, self-monitoring and the ability to use external responses to control personal behaviour. Smoking and alcohol causes an overall decline in global cognition and executive functioning. The increased incidence of overdose in patients who smoke and consume alcohol can be attributed to the impairment of frontal lobe functioning, increasing impulsivity, aggression, and decreasing the threshold for triggers of suicidal behaviour, as described by Schlebusch (1), Madge et al (12) and Wasserman et al (36).

The most common precipitating factors for overdose identified in this study were relationship problems (51.9%), depression (37.6%), domestic (36.8%), financial (17.3%), unemployment (15.8%) and illness (6.8%). Some patients had more than one precipitating factor for overdose.

Most of the relationship and domestic problems were as a result of infidelity, altercations, misunderstandings, unwanted pregnancies, sexual dissatisfaction and relationship breakdown. These were also the root causes of many patients presenting with depression. Financial problems were mostly due to job loss,

bankruptcy and unemployment which meant patients were unable to afford the high costs of daily living. Illness was due to HIV and HIV-related diseases as well as patients who were recently diagnosed with HIV.

These bio-psycho-social-economic stressors are similar to factors identified for overdose internationally by Zaidan et al (17) and Clover, Carter and Whyte (38); and locally by Calitz et al (2), Laubscher and Van Rooyen (3), and Meel (21).

5.3 OVERDOSE CHARACTERISTICS

The majority of overdoses were intentional (91%). In 16 (12%) of the total number of patients it was not their 1st overdose. Of the 16 patients, in 11(68.8%) it was their 2nd, 2 (12.5%) and 3 (18.8%) their 3rd and 4th overdoses, respectively. This is slightly higher than the 8.5% demonstrated by Calitz et al (2) in patients known to have a previous overdose. However, much less when compared to a seven country multi-centre study by Madge et al (12) exhibiting rates of 44.4%, 60.2% and 62.4% in Hungary, Ireland and Norway, respectively.

People attempt suicide when they are in a particularly stressful period in their lives. For most persons, this type of crisis period passes and they move on with their lives. Most individuals are resilient or they seek professional help and are unlikely to self-harm again.

However, the minority attempt recurrently over extended periods of time. Could this be due to a persistent or serious psychiatric illness, attention seeking or manipulative behaviour, poor coping skills or possibly due to a failure in the health care system in recognising and following up those patients who are vulnerable to recurrent attempts?

All but one of the patients (99.3%) consumed the overdose substance orally. There was concurrent alcohol consumption in 23.3% (n=31) of patients at the time of overdose. This is consistent with Doak et al (22) and Buykx et al (8,9). However, this is more than the percentage that Madge et al (12) found in the Netherlands (12.1%) and Belgium (14.7%).

In this study 23.3% of overdose patients had concurrent alcohol consumption, 52% (n=16) male and 48% (n=15) female, which was much higher when compared to Madge et al (12) who found 32.8% of males and 15.6% of females to have concurrent alcohol consumption. The percentage of patients with concurrent alcohol consumption was much less than expected, considering that 49.6% (n=66) of the total number of patients in the study had a history of alcohol use.

The involvement of alcohol varied internationally according to Madge et al (12) who demonstrated that alcohol least often accompanied overdose episodes in the Netherlands (12.1%) and Belgium (14.7%), was more common in Ireland (18.9%) and England (19.5%) and most prevalent in Norway (25%), Australia (25.4%) and Hungary (26.8%). Laubscher and Van Rooyen (3) however only found 5% of patients to have concurrent alcohol use. This could be attributed to regional and sociocultural characteristics of certain geography.

The proportion of overdoses in this study were fairly evenly spread across the days of the week, consistent with that demonstrated by Bergen and Hawton (40) in the UK. However, this differed compared to Laubscher and Van Rooyen (3) in Paarl who demonstrated that Sundays and Mondays had the highest incidence, with the lowest incidence of overdose on Fridays.

Although the time of overdose was unknown for 19.6% of patients, the data (see Figure 4.10) indicated that more overdoses occurred in the early evening (18h00-23h59) than very late at night (00h00-05h59). The frequency distribution for time of overdose for weekday versus weekend (see Figure 4.11) was significant (p=0.029) showing that on weekends, the pattern for time of overdose was shifted to the 00h00-05h59 and 12h00-17h59 time periods, compared to the pattern observed during the week.

The majority of patients were unemployed and single in this study. The inactivity and idleness associated with this might have allowed for these patients to consume alcohol, ponder about previously discussed bio-psycho-socio-economic stressors which may have led to a depressed state of mind and may have prompted these patients to overdose.

5.4 SUBSTANCE PROFILE

The substances ingested were primarily acquired through prescriptions (36.1%) or OTC (28.6%) and some patients acquired substances in more than one manner. Of the 36.1% who acquired their substances by prescription, 71% used their own prescription medication which is less than 85% described by Lo et al (51). In 78.2% of patients the primary reason for acquisition of substances in this study, was overdose.

The use of multiple substances increases the likelihood of a fatal outcome. (8) There was a wide variety of substances ingested for overdose in this study and 57.9% of patients ingested one substance while 42.1% ingested more than one. In 6.8% of the patients the substance was unknown. This is similar to Laubscher and Van Rooyen (3) who demonstrated that 42.3% of patients in Paarl used more than one substance

for overdose, however, this differs compared to Townsend et al (50) in the UK who demonstrated that 37.1% of patients used one substance compared to 62.9% who used more than one substance.

The most common substance groups in this study were analgesics accounting for 32.3%; pesticides 21.1%; anxiolytics 11.3%; household chemicals 10.5%; vitamins 8.3%; antibiotics 7.5%; ARVs 5.3%; traditional medications 4.5%, and antidepressants, antiepileptics, antihistamines and decongestants each accounting for 3%.

For patients who used analgesics for overdose, there was a higher incidence in the 20-29 year age group with a median age of 26. There was a significant difference in gender ($p=0.011$). The proportion of females was higher amongst analgesic users (81%) than amongst non-analgesic users (57%), however the effect size was weak. The ethnicity for 90.5% was Black and 83.3% were unemployed. Of the analgesic users, 16.7% had a comorbid disease and 11.9% had a psychiatric history.

Most analgesics contain paracetamol. A study in the UK (20) showed that paracetamol and paracetamol-containing compounds were implicated in 33.4% of overdose cases compared to 8% in India (15) The frequency of paracetamol for overdose varied across SA. Laubscher and Van Rooyen (3) demonstrated that paracetamol was the second most common substance following TCA's and was implicated in 20.4% of cases compared to a study which was done by Favara (5) in which paracetamol accounted for only 10.7%.

Analgesics containing paracetamol, are found in almost every household and are readily available over the counter, used mostly for the treatment of aches, pains and

pyrexia. This may be the reason why analgesics were the substance with the highest frequency of use for overdose in this study.

For patients who used pesticides for overdose, there was an incidence of 57.1% in the 20-29 year age group with a median age of 26.5 years. There was an equal distribution between males and females. There was a significant difference in ethnicity (p=0.008). The proportion of black patients was higher amongst pesticide users (100%) than amongst non-pesticide users (81%), however the effect size was weak. Eighty-two percent were unemployed, 14.3% had a comorbid disease and 7.1% had a psychiatric history.

In India (15) OP accounted for 32.5% of overdose compared to 55.3% in SA.(5) Pests and rodents are nuisances of densely populated areas. This could account for the increased incidence of pesticides in this study because the majority of patients lived in such areas. Due to this, household pesticides are easily accessible and readily available OTC and can also be purchased on the streets because currently no restrictions for the sale of pesticides in SA exist.

In the UK, anxiolytics accounted for 8.7% (20), whilst in Norway (18) for only 4% of overdose cases. However, this is much less when compared to Laubscher and Van Rooyen (3) in which anxiolytics were implicated in only 9.7% of overdose cases.

For anxiolytic users in this study, there was a significant difference in median ages (p=0.024). The median age for anxiolytic users was 32 years, higher than the rest of the sample. The effect size however, was small. Similarly, there was a significant difference in age categories (p=0.013). There were a large proportion of patients over the age of 30 years in the anxiolytic user group compared to the rest of the sample however, the effect size was weak.

There was also a significant difference in ethnicity ($p<0.0001$). The proportion of Black patients was lower amongst anxiolytic users (47%) than non-anxiolytic users (90%). The effect size was moderate. For patients with a previous psychiatric history there was also a significant difference ($p=0.0062$). The proportion of those with a psychiatric history was higher amongst anxiolytic users (40%) than amongst non-anxiolytic users (10%). The effect size however was weak.

Anxiolytics have sedating, relaxing, anticonvulsant and amnestic properties. They are prescribed for a range of medical and psychiatric conditions such as epilepsy, alcohol withdrawal, anxiety and sleep disorders, depression, as well as for the treatment of some antipsychotic medication side-effects. Due to their wide range of use they are commonly prescribed and easily available. They can also easily cause physiological dependence and as a result are often misused and can be purchased illegally. These reasons could account for the increased incidence in this study.

Household chemicals were implicated in 10.5% of overdose cases in this study. This is ten times higher than 1% attributed to household chemicals in the UK (50) and less than 15.2% demonstrated by Calitz et al in Bloemfontein (2).

Household chemicals are used for cleaning and are readily available with little or no restrictions to their purchase. In moments of impulsivity and weakness patients may grab and ingest the first substance which they encounter and this could be the reason for the frequency of its use in overdose.

Vitamins were implicated in 8.3% of cases in this study. Many patients are prescribed these for acute or chronic medical conditions such as influenza, HIV and malnutrition; or purchase them OTC for dietary supplementation to provide nutrients

that may otherwise not be consumed in sufficient quantities and this could be the reason for their frequency in overdose in this study.

Antibiotics were implicated in 7.5% of cases in this study less than 11.7% demonstrated by Laubscher and Van Rooyen.(3) The frequency of use for overdose may be attributed to antibiotics being prescribed for the treatment of a variety of common infections such as upper and lower respiratory tract infections, urinary tract infections and sexually transmitted infections.

ARVs were implicated in only 5.3% of cases in this study. This was much lower than anticipated considering HIV was the most common medical condition (66.7%), 39.3% of patients were using ARVs as chronic medication and it was demonstrated that 71% of patients in the study used their own prescription medication for overdose.

As previously mentioned, the majority of the patients in this study were Black of poor socio-economic status. Black patients, many of whom cannot afford western-style healthcare, visit traditional healers for basic health care. This could be the reason for the frequency of traditional medication (4.5%) for overdose in this study.

The prevalence and frequency of the choice of substances utilised for overdose in this study can be assumed to be attributed to the availability and easy accessibility of the substances as well as sociocultural characteristics of the patients and the region.

5.5 PRESENTATION TO HOSPITAL

There were an average number of 1.1 (range 0-4 per day) overdose cases presenting to the ED per day. This was consistent with that found by Laubscher and Van Rooyen in Paarl. (3)

Overdose patients in this study tended to present more frequently between 18h00-23h59 (30.8%), 12h00-17h59 (28.6%) and 00h00-05h59 (22.6%) with the trough in presentation between 06h00-11h59 (12.8%). The times of presentation differed compared to Bergen and Hawton (40) who demonstrated a peak in presentation between 11pm and 1am, however was similar to the trough in presentation between 4am and 10am.

The association between time of presentation and age groups was significant (p=0.043). The 10-19 year group tended to present more after 18h00 compared to earlier in the day; the 20-29 year age group more before 12h00 compared to later in the day; the 30-39 year and 40 year plus age groups more between 12h00 and 17h59 compared to other time periods. These variations differed compared to the peak rates for age groups demonstrated by Bergen and Hawton. (40)

The 10-19 year group are of school going age. Poor school performance and peer pressure may predispose this age group to hopelessness and depression which may trigger overdose and therefore they tend to present more after 18h00 because schools usually dismiss around 15h00.

As previously mentioned, 55.6% of overdose was amongst the 20-29 year age group and 78.9% of patients in the study were unemployed. The inactivity and idleness makes this age group vulnerable to overdose and therefore they tend to present more before 12h00 compared to later in the day.

Time between overdose and presentation to the ED was unknown for 23.3% of the patients mostly due to the time of overdose being unknown. For those whose delay to presentation was known, 21.8% presented within 2-3 hours after overdose. The median delay to presentation was 3.5 hours (IQR: 2.1-5.1 hours). This is similar to

19% who presented to hospital within 3 hours demonstrated by Anthony and Kulkarni (15). Fifty-four percent of patients arrived with private transport, while 43.6% arrived by ambulance. Fifty-seven percent were referred by family, 24.1% were self-referrals and 13.5% were referred from another institution.

A delay in presentation to the ED could possibly be the result of time that lapsed between ingestion and seeking help but also time that lapsed before the patient was found and suspected to have overdosed.

Time wasted while waiting for an ambulance to arrive on scene and time lapsed on scene before transfer to hospital could also be a contributing factor to a delay in presentation. Many patients rely on family and friends for transport and this could also be a reason for a delay in presentation. The delay for patients referred from other institutions might be due to time that lapsed while waiting to be attended to at that institution and then again during transport from that particular institution. This highlights that early presentation to hospital depends on multiple factors.

5.6 MANAGEMENT IN THE EMERGENCY DEPARTMENT

Symptomatic treatment was by far the most common choice of treatment in 97% of patients compared to 85% mentioned in the literature.(15) As suggested by Von Hoving, Veale and Muller (53) and Erickson and Thompson (55), intravenous access was established in all overdose patients in this study, even when the patients were stable and asymptomatic. Only 5.3% of patients required intubation and ventilation.

An antidote was used in 35.3% of cases in this study. N-acetylcysteine (46.8%), atropine (40.4%) and flumazenil (6.4%) were the antidotes most commonly utilised. This was expected considering that the most common substances used for overdose

in this study were analgesics containing paracetamol, pesticides containing OP and anxiolytics which included benzodiazepines.

Of the 3% of patients in the study who presented within 1 hour of overdose, gastric lavage was not employed. This can be attributed to the literature by Von Hoving, Veale and Muller (53) and Erickson and Thompson (55) who mentioned that even if performed within 1 hour there is no evidence that its use improves clinical outcome. Activated charcoal was employed in 1.5% of patients only but this can be attributed to the delay in presentation of patients to the ED after substance ingestion. As mentioned by Von Hoving, Veale and Muller (53) and Jürgens, Hoegberg and Graudal (67), activated charcoal is most effective when given within 1 hour of substance ingestion.

5.7 DISPOSITION OF THE OVERDOSE PATIENT

Overdose patients that are attended to in CMJAH ED are referred to either the medical or surgical registrar on duty for further management, depending on the substance ingested.

No patients in this study were discharged home from the ED. This differed compared to 40.8% and 28.1% of overdose patients discharged home in Nottingham (20) and Paarl (3), respectively.

The majority (82.7%) of patients were admitted to the medical ward, 4.5% to a general surgery ward and 4.5% to a short stay ward. This is more than both Anthony and Kulkarni (15) and Laubscher and Van Rooyen (3) who demonstrated that 62.5% and 28.8% of overdose patients respectively were admitted to general wards.

In Paarl (3) 8.5% of patients were admitted to high care, however in this study only 2.3% of patients required a high care admission. In India (15) 37.5% of patients

required ICU compared to only 3% in this study which was similar to 3.9% in Oman (77).

The median length of stay in 42.1% of patients admitted was 2 days (IQR: 2-3 days). Only 13.5% of patients required an admission for 1 day compared to 77.7% of patients described by Prescott et al (20). The majority (97.7%) of patients were ultimately discharged. Overdose was fatal in 1.5% (n=2) of patients in this study compared to 2.4% in India. (15) The fatalaties were both single black males, one who ingested traditional medication and the other organophosphate. Deaths could be attributed to the delay in seeking medical attention as both patients presented to the ED after twelve hours post-ingestion in a critical condition. Both deaths occurred within two hours of hosiptal arrival. One patient refused hospital treatment.

5.8 LIMITATIONS OF THIS STUDY

The results should be interpreted carefully because they are restricted to one institution in Gauteng over a relatively short period of time. This was a retrospective study and a range of missing data was encountered. The ED is a department that is generally busy by nature and the condition of the overdose patient at the time of arrival may have prevented complete recording of all required and relevant data. Patients that may have been admitted to another sub-speciality may have been overlooked especially if their overdose was insignificant or already treated in the ED.

The researcher, also the abstractor, was however not blinded to the study. Data that was conflicting, ambiguous, missing or unknown was managed uniformly. A second reviewer, blinded to the information obtained by the researcher as well as the data that was electronically captured, was not employed to reabstract a sample of medical records in an effort to assess interrater reliability of the data.

Time constraints limited the study to a 16-week period, which included the festive period and the New Year, so these findings may not be representative of annual figures. To have data applicable to an infinite population a longer study period is required at multiple institutions and this has been identified as an area for future research.

5.9 STRENGTHS OF THIS STUDY

The findings from this study have implications for the provision of support and treatment of the population identified to be vulnerable and most at risk for overdose. This offers an opportunity to reduce costs for both the hospital and society.

CHAPTER 6: CONCLUSION AND RECOMMENDATIONS

In conclusion, emergency physicians frequently encounter patients who have overdosed under a variety of circumstances. In this study overdose occurred mostly amongst females (64.7%) aged between 20-29 years with a median age of 28.1 years. The highest incidence was amongst the Black population accounting for 85%. Most patients were single, unemployed and residing in areas with poor socio-economic status.

An increased risk was demonstrated amongst patients with a medical condition (22.6%) and psychiatric disorder (13.5%). There was a history of alcohol use amongst 49.6% of overdose patients with an incidence of 66% in males. The most common precipitating factors identified were relationship problems (51.9%), depression (37.6%), domestic (36.8%), financial (17.3%), unemployment (15.8%) and illness (6.8%).

Overdose was intentional in 91% of patients and in 12% of the total number it was not their 1st overdose. The overdose substance was consumed orally in 99.3% of patients and in 23.3% of patients there was concurrent alcohol consumption.

The substances ingested were primarily acquired through prescriptions (36.1%) or OTC (28.6%). One substance was ingested in 57.9% of patients and 42.1% of patients ingested more than one substance. The most common substance groups were analgesics (32.3%), pesticides (21.1%), anxiolytics (11.3%), household chemicals (10.5%), vitamins (8.3%), antibiotics (7.5%), ARVs (5.3%), traditional medicines (4.5%), antidepressants (3%), antiepileptics (3%), antihistamines (3%) and decongestants (3%).

The average number of overdoses per day was 1.1 with an even distribution across days of the week. Patients tended to present most frequently between 18h00-23h59 (30.8%) and 12h00-17h59 (28.6%). Patients presented within 2-3 hours after overdose in 21.8% of cases.

Symptomatic treatment was the most common choice of treatment and an antidote was used in 35.3% of cases. All patients were admitted to hospital with a median length of stay of 2 days in 42.1% of patients. The case fatality rate in this study was 1.5%. The mortality rate is low which reflects on good management of these emergencies at a tertiary care institution.

This study serves to demonstrate that overdose is a common public health concern. Management protocols and training of emergency personnel from first responders to ED physicians is of uttermost importance as the outcome of these patients depends on multiple factors. Awareness and educational programs, regulation on medication

prescriptions, pesticides and substance availability will form part of strategies for the prevention of overdose.

CHAPTER 7: REFERENCES

1. Schlebusch L. Suicide prevention: a proposed national strategy for South Africa. Afr J Psychiatry. 2012 Nov;15(6):436–40.

2. Calitz FJW, Phil D, Philane L, Joubert G, Du Toit EH, Kruger JM, et al. The profile analysis of attempted-suicide patients referred to Pelonomi Hospital for psychological evaluation and treatment from 1 May 2005 to 30 April 2006. South African J Psychiatry. 2008;14(1):20–5.

3. Laubscher C, Van Rooyen EE. The profile of the overdose patient presenting at Paarl Hospital Emergency Department. South African Fam Pract. Medpharm Publications; 2007;49(2):16.

4. Gunnell D, Bennewith O, Peters TJ, House A, Hawton K. The epidemiology and management of self-harm amongst adults in England. J Public Health (Oxf). 2005 Mar;27(1):67–73.

5. Favara D. 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. SAMJ. 2013;103(1):40–6.

6. Burns M. General approach to drug poisoning in adults. UpToDate. 2013. p. 1–29. Available from: http://www.uptodate.com/contents/general-approach-to-drug-poisoning-in-adults

7. Koylu R, Dundar ZD, Koylu O, Akinci E, Akilli NB, Gonen MO, et al. The experiences in a toxicology unit: a review of 623 cases. J Clin Med Res. 2014 Feb;6(1):59–65.

8. Buykx P, Loxley W, Dietze P, Ritter A. Medications used in overdose and how they are acquired - an investigation of cases attending an inner Melbourne emergency department. Aust N Z J Public Health. 2010 Aug;34(4):401–4.

9. Buykx P, Dietze P, Ritter A, Loxley W. Characteristics of medication overdose presentations to the ED: how do they differ from illicit drug overdose and self-harm cases? Emerg Med J. 2010 Jul;27(7):499–503.

10. Camidge DR, Wood RJ, Bateman DN. The epidemiology of self-poisoning in the UK. Br J Clin Pharmacol. 2003 Aug 4;56(6):613–9.

11. Singh O, Javeri Y, Juneja D, Gupta M, Singh G, Dang R. Profile and outcome of patients with acute toxicity admitted in intensive care unit: Experiences from a major corporate hospital in urban India. Indian J Anaesth. 2011 Jul;55(4):370–4.

12. Madge N, Hewitt A, Hawton K, de Wilde EJ, Corcoran P, Fekete S, et al. Deliberate self-harm within an international community sample of young people: comparative findings from the Child & Adolescent Self-harm in Europe (CASE) Study. J Child Psychol Psychiatry. 2008 Jun;49(6):667–77.

13. Joe S, Stein DJ, Seedat S, Herman A, Williams DR. Prevalence and correlates of non-fatal suicidal behaviour among South Africans. Br J Psychiatry. 2008 Apr;192(4):310–1.

14. Weir P, Ardagh M. The epidemiology of deliberate self poisoning presenting to Christchurch Hospital Emergency Department. N Z Med J. 1998;111:127–9.

15. 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 Jul;16(3):130–5.

16. Carter GL, Safranko I, Lewin TJ, Whyte IM, Bryant JL. Psychiatric hospitalization after deliberate self-poisoning. Suicide Life Threat Behav. 2006;36:213–22.

17. Zaidan ZAJ, Burke DT, Dorvlo ASS, Al-Naamani A, Al-Suleimani A, Al-Hussaini A, et al. Deliberate self-poisoning in Oman. Trop Med Int Health. 2002;7(6):549–56.

18. Bjornaas M a, Teige B, Hovda KE, Ekeberg O, Heyerdahl F, Jacobsen D. Fatal poisonings in Oslo: a one-year observational study. BMC Emerg Med. 2010 Jan;10:13.

19. Donovan S, Clayton A, Beeharry M, Jones S, Kirk C, Waters K, et al. Deliberate self-harm and antidepressant drugs: Investigation of a possible link. Br J Psychiatry. 2000 Dec;177(6):551–6.

20. 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 Aug;68(2):260–8.

21. Meel BL. Incidence of suicide among teenagers and young adults in Transkei, South Africa. African J Prim Heal Care Fam Med. 2009 Apr 14;1(1):71–6.

22. Doak MW, Nixon AC, Lupton DJ, Waring WS. Self-poisoning in older adults: patterns of drug ingestion and clinical outcomes. Age Ageing. 2009 Jul;38(4):407–11.

23. Cooper J, Murphy E, Webb R, Hawton K, Bergen H, Waters K, et al. Ethnic differences in self-harm, rates, characteristics and service provision: three-city cohort study. Br J Psychiatry. 2010 Sep;197(3):212–8.

24. Marzilawati A-R, Ngau Y-Y, Mahadeva S. Low rates of hepatotoxicity among Asian patients with paracetamol overdose: a review of 1024 cases. BMC Pharmacol Toxicol. 2012 Jan;13(1):8.

25. Galea S, Ahern J, Tardiff K, Leon A, Coffin PO, Derr K, et al. Racial/ethnic disparities in overdose mortality trends in New York City, 1990-1998. J Urban Health. 2003 Jun;80(2):201–11.

26. Neeleman J, Wilson-Jones C, Wessely S. Ethnic density and deliberate self harm; a small area study in south east London. J Epidemiol Community Health. 2001 Feb;55(2):85–90.

27. Statistics South Africa, Census 2011, P0301.4. 2012. Available from: www.statssa.gov.za. Accessed June 09, 2016

28. Eddleston M, Phillips MR. Self poisoning with pesticides. BMJ Br Med J. 2004;328:42–4.

29. Hawton K, van Heeringen K. Suicide. Lancet. 2009;373:1372–81.

30. Druss B, Pincus H. Suicidal ideation and suicide attempts in general medical illnesses. Arch Intern Med. 2000;160:1522–6.

31. Govender R, Schlebusch L. Suicidal ideation in seropositive patients seen at a South African HIV voluntary counselling and testing clinic. African Journal of Psychiatry. 2012 Mar;15(2):94-8.

32. Govender RD, Schlebusch L. Hopelessness, depression and suicidal ideation in HIV-positive persons. South African J Psychiatry. 2012;18:16–21.

33. Keiser O, Spoerri A, Brinkhof MWG, Hasse B, Gayet-Ageron A, Tissot F, et al. Suicide in HIV-infected individuals and the general population in Switzerland, 1988-2008. Am J Psychiatry. 2010;167:143–50.

34. Jia CX, Mehlum L, Qin P. AIDS/HIV infection, comorbid psychiatric illness, and risk for subsequent suicide: A nationwide register linkage study. J Clin Psychiatry. 2012;73:1315–21.

35. Clifford DB, Evans S, Yang Y, Acosta EP, Goodkin K, Tashima K, et al. Impact of efavirenz on neuropsychological performance and symptoms in HIV-infected individuals. Ann Intern Med. 2005;143.

36. Wasserman D, Rihmer Z, Rujescu D, Sarchiapone M, Sokolowski M, Titelman D, et al. The European Psychiatric Association (EPA) guidance on suicide treatment and prevention. European Psychiatry. 2012. p. 129–41.

37. Bjornaas MA, Hovda KE, Heyerdahl F, Skog K, Drottning P, Opdahl A, et al. Suicidal intention, psychosocial factors and referral to further treatment: a one-year cross-sectional study of self-poisoning. BMC Psychiatry. 2010;10:58.

38. Clover K, Carter GL, Whyte IM. Posttraumatic stress disorder among deliberate self-poisoning patients. J Trauma Stress. 2004;17:509–17.

39. World Health Organisation. Mental health: new understanding, new hope. Geneva. WHO; 2001.

40. Bergen H, Hawton K. Variations in time of hospital presentation for deliberate self-harm and their implications for clinical services. J Affect Disord. 2007 Mar;98(3):227–37.

41. De Leo D, Heller TS. Who are the kids who self-harm? An Australian self-report school survey. Med J Aust. 2004;181:140–4.

42. Taylor DM, Cameron PA, Eddey D. Recurrent overdose: patient characteristics, habits, and outcomes. J Accid Emerg Med. 1998 Jul;15(4):257–61.

43. Bhattarai N, Rauniyar a, Chaudhary D, Jaiswal S, Banthia P, Rana BBS. Patterns of organophosphorous poisoning attending a teaching hospital. JNMA J Nepal Med Assoc. 2006;45(162):228–32.

44. Zahl DL. Repetition of deliberate self-harm and subsequent suicide risk: long-term follow-up study of 11 583 patients. Br J Psychiatry. 2004 Jul 1;185(1):70–5.

45. Cooper J, Kapur N, Webb R, Lawlor M, Guthrie E, Mackway-Jones K, et al. Suicide after deliberate self-harm: a 4-year cohort study. Am J Psychiatry. 2005 Feb;162(2):297–303.

46. Hickey L, Hawton K, Fagg J, Weitzel H. Deliberate self-harm patients who leave the accident and emergency department without a psychiatric assessment: a neglected population at risk of suicide. J Psychosom Res. 2001 Feb;50(2):87–93.

47. Oh SH, Park KN, Jeong SH, Kim HJ, Lee CC. Deliberate self-poisoning: factors associated with recurrent self-poisoning. Am J Emerg Med. 2011;29:908–12.

48. Schlebusch L, Vawda NBM, Bosch BA. Suicidal behavior in black South Africans. Crisis. 2003;24:24–8.

49. Spiller HA, Appana S, Brock GN. Epidemiological trends of suicide and attempted suicide by poisoning in the US: 2000-2008. Leg Med (Tokyo). 2010;12:177–83.

50. Townsend E, Hawton K, Harris L, Bale E. Substances used in deliberate self-poisoning 1985 – 1997 : trends and associations with age , gender , repetition and suicide intent. Soc Psychiatry Psychiatr Epidemiol. 2001;36(5):228–34.

51. Lo A, Shalansky S, Leung M, Hollander Y, Raboud J. Patient characteristics associated with nonprescription drug use in intentional overdose. Can J Psychiatry. 2003;48:232–6.

52. Bose A, Sandal Sejbaek C, Suganthy P, Raghava V, Alex R, Muliyil J, et al. Self-harm and self-poisoning in southern India: choice of poisoning agents and treatment. Trop Med Int Health. 2009;14:761–5.

53. Von Hoving DJ, Veale DJH, Muller GF. Clinical Review: Emergency Management of Acute Poisoning. AfJEM. 2011;1:69-78.

54. Frithsen IL, Simpson WM. Recognition and management of acute medication poisoning. Am Fam Physician. 2010 Feb 1;81(3):316–23.

55. Erickson TB, Thompson TM, Lu JJ. The approach to the patient with an unknown overdose. Emerg Med Clin North Am. 2007;25:249–81; abstract vii.

56. Boyle JS, Bechtel LK, Holstege CP. Management of the critically poisoned patient. Scand J Trauma Resusc Emerg Med. 2009;17:29.

57. McGlone MM, Teece SC. Management of the poisoned patient. Anaesth Intensive Care Med. Elsevier Ltd; 2013 Oct;14(10):453–6.

58. Benson BE, Hoppu K, Troutman WG, Bedry R, Erdman a, Höjer J, et al. Position paper update: gastric lavage for gastrointestinal decontamination. Clin Toxicol (Phila). 2013 Mar;51(3):140–6.

59. Chyka P a, Seger D, Krenzelok EP, Vale J a. Position paper: Single-dose activated charcoal. Clin Toxicol (Phila). 2005 Jan;43(2):61–87.

60. Shen F, Coulter C V, Isbister GK, Duffull SB. A dosing regimen for immediate N-acetylcysteine treatment for acute paracetamol overdose. Clin Toxicol (Phila). 2011;49:643–7.

61. Vale JA, Kulig K. Position paper: gastric lavage. J Toxicol Clin Toxicol. 2004;42:933–43.

62. Moore S. A case of poisoning by laudanum successfully treated by means of a Juke's syringe. New York Med Physician J. 1835;4:91–2.

63. Holt LE, Holz PH. The black bottle: A consideration of the role of charcoal in the treatment of poisoning in children. J Pediatr. 1963;63(2):306–14.

64. Isbister GK, Kumar VVP. Indications for single-dose activated charcoal administration in acute overdose. Curr Opin Crit Care. 2011;17:351–7.

65. Albertson TE, Owen KP, Sutter ME, Chan AL. Gastrointestinal decontamination in the acutely poisoned patient. Int J Emerg Med. 2011;4:65.

66. Eddleston M, Juszczak E, Buckley N a, Senarathna L, Mohamed F, Dissanayake W, et al. Multiple-dose activated charcoal in acute self-poisoning: a randomised controlled trial. Lancet. 2008 Feb 16;371(9612):579–87.

67. Jürgens G, Hoegberg LCG, Graudal NA. The effect of activated charcoal on drug exposure in healthy volunteers: a meta-analysis. Clin Pharmacol Ther. 2009;85:501–5.

68. Levine M, Brooks DE, Truitt C a, Wolk BJ, Boyer EW, Ruha A-M. Toxicology in the ICU: Part 1: general overview and approach to treatment. Chest. 2011 Sep;140(3):795–806.

69. Marraffa JM, Cohen V, Howland MA. Antidotes for toxicological emergencies: A practical review. Am J Heal Pharm. 2012;69:199–212.

70. Woolf AD, Chrisanthus K. On-site availability of selected antidotes: Results of a survey of Massachusetts hospitals. Am J Emerg Med. 1997;15:62–6.

71. Bradberry S, Vale A. Management of poisoning: Antidotes. Medicine (Baltimore). 2012;40:69–70.

72. Osterloh JD. Utility and reliability of emergency toxicologic testing. Emerg Med Clin North Am. 1990;8:693–723.

73. Holstege CP, Dobmeier SG, Bechtel LK. Critical Care Toxicology. Emergency Medicine Clinics of North America. 2008. p. 715–39.

74. Sporer K, Khayam-Bashi H. Acetaminophen and salicylate serum levels in patients with suicidal ingestion or altered mental status. Am J Emerg Med. 1996;14:443–7.

75. Lemke T, Wang R. Emergency department observation for toxicologic exposures. Emerg Med Clin North Am. 2001;19:155–67, viii.

76. Cachafeiro L, Manzanares J, Yus S, Soriano C, Oliveros M, Jimenez M. Acute drug overdose in an ICU: 15 years experience. Crit Care. 2010;14 (Suppl 1):P418.

77. Jayakrishnan B, Al Asmi A, Al Qassabi A, Nandhagopal R, Mohammed I. Acute drug overdose: clinical profile, etiologic spectrum and determinants of duration of intensive medical treatment. Oman Med J. 2012 Nov;27(6):501–4.

78. SAS Institute Inc. SAS Software, version 9.3 for Windows. Cary, NC, USA: SAS Institute Inc.

APPENDICES

Appendix 1: Ethics clearance certificate

R14/49 Dr Radha Gihwala

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M130406

NAME: (Principal Investigator)	Dr Radha Gihwala
DEPARTMENT:	Division of Emergency Medicine Medical School
PROJECT TITLE:	The Profile of the Overdose Patient Admitted to a Tertiary Hospital in Gauteng
DATE CONSIDERED:	26/04/2013
DECISION:	Approved unconditionally
CONDITIONS:	
SUPERVISOR:	Dr Zeyn Mahomed
APPROVED BY:	Professor PE Cleaton-Jones, Chairperson, HREC (Medical)

DATE OF APPROVAL: 26/04/2013

This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Secretary in Room 10004, 10th floor, Senate House, University.

I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated, from the research protocol as approved, I/we undertake to resubmit the application to the Committee. **I agree to submit a yearly progress report**.

Principal Investigator Signature Date 30/04/2013

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

Appendix 2: CEO CMJAH permission

GAUTENG PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA

CHARLOTTE MAXEKE JOHANNESBURG ACADEMIC HOSPITAL

Enquiries:
Ms. L. Mngomezulu
Tell: (011): 488-3793
Fax: (011): 488-3753
15 August 2013

Dr. Radha Gihwala
Division of emergency Medicine
Medical School

Dear Dr. Gihwala

RE: "The profile of the overdose patient admitted to a tertiary hospital in Gauteng"

Permission is granted for you to conduct the above research as described in your request provided:

1. Charlotte Maxeke Johannesburg Academic hospital will not in anyway incur or inherit costs as a result of the said study.
2. Your study shall not disrupt services at the study sites.
3. Strict confidentiality shall be observed at all times.
4. Informed consent shall be solicited from patients participating in your study.

Please liaise with the Head of Department and Unit Manager or Sister in Charge to agree on the dates and time that would suit all parties.

Kindly forward this office with the results of your study on completion of the research.

Approved / not approved

Ms. Gladys Bogoshi
Chief Executive Officer

Appendix 3: Head of Emergency Department permission

GAUTENG PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA

CHARLOTTE MAXEKE JOHANNESBURG ACADEMIC HOSPITAL (CMJAH)

CMJAH
ED
EMERGENCY DEPARTMENT

To Whom it My Concern

RE: Dr R Gihwala Student No : 587735

Title of MMed : The profile of the overdose patient admitted to a tertiary hospital of Gauteng

Permission is hereby granted to the above Doctor, to conduct the above study in the Emergency Unit of the Charlotte Maxeke Johannesburg Academic Hospital (CMJAH) . This permission is subject to approval from the Health Sciences Ethical Committee of the University of the Witwatersrand.

Please do not have any hesitation to conduct me for any further enquiries.

Thank you

Dr F Motara (CMJAH)
19/3/13

C.M.J.A HOSPITAL
19-03-2013
KL5030
C.M.J.A HOSPITAL

Charlotte Maxeke Johannesburg Academic Hospital, Accident & Emergency Department Area 165, 17 Jubilee Road, Parktown, 2193
Mobile: 076 130 2683 Tel: 011 488 3165 * drferozamotara@telkomsa.net

Appendix 4: Data collection sheet

Name:

Folder Number:

Date of Admission:
Date of Discharge:

Date of Death:

1	Age:					
2	Gender	M	F			
3	Race	Black	Coloured	White	Asian	Other: Specify
6	Marital Status	Single	Married	Divorced	Widowed	Separated
7	Highest level of Education	Primary	Secondary	Tertiary		
8	Employed	Yes	No			
9	Occupation:					
10	Residential area:					
11	Number of Dependants:					
12	Number of Children:					
13	Previous medical history	Diabetes Mellitus	Epilepsy	Asthma	Rheumatic Fever	
		Tuberculosis	Hypertension	Other: Specify		
14	Chronic medication:	1-		2-		3-
		4-		5-		6-
		7-		8-		9-
15	Alcohol history	Yes	No	Quantity:		
16	Smoking	Yes	No	Quantity:		
17	Other substance/s use	Yes	No			
	If yes:	Cannabis	Heroine	Cocaine	Ecstasy	Metamphetamine
		Benzodiazepine	Other: Specify			
18	Previous Psychiatric History	Yes	No	Diagnosis:		
19	Overdose	Intentional	Unintentional	Accidental	Poisoning	
20	1st Attempt?	Yes	No	If No, Subsequent number		
21	Polypharmacy?	Yes	No			
22	Specify substance/s:	1-		2-		3-
		4-		5-		6-
		7-		8-		9-
23	Dose/Quantity:	1-		2-		3-
		4-		5-		6-
		7-		8-		9-
24	Route of Administration	Oral	Inhalation	Injected	Other: Specify	
25	With Alcohol?	Yes	No			
26	Date of ingestion:					
27	Time of ingestion:					
28	Acquisition	Prescription	OTC	Other: Specify		
	If prescription:	Patient's own	Other person's			
29	Reason for acquisition	Treatment	Recreational	Overdose	Other: Specify	
30	Precipitating factors	Depressed	Domestic	Education/School		
		Financial	Illness	Relationship	Other: Specify	
31	Time of Arrival in Emergency Department(ED):					
32	How did patient arrive?	Ambulance	Private			
33	Referral	Self	Family	Other Institution		
34	Date of examination in ED:		Time of examination in ED:			
	Management in ED:					
35	*Antidote?	Yes	No			
	If yes:	Atropine	Desferrioxamine	Digoxin immune fab	Ethanol	
		Flumazenil	Methylene blue	N-acetylcysteine	Other: Specify	
36	*Treatment	Activated charcoal	Gastric lavage	Intubation & Ventilation	Symptomatic	Urine Alkalinization / Dialysis
		Other: Specify				
37	*Investigations	CXR	ECG	Bloods	Other: Specify	
38	If Bloods:	FBC	U&E	ESR	CRP	LFT's
		Toxicology Screen	Paracetamol level	Salicylate level	RBC Acetylcholinesterase level	Other: Specify
39	Time bloods drawn?					
40	Discharged from ED?	Yes	No			
41	Admitted from ED to?	Ward	High care	ICU		
		Short Stay	Selby	Other: Specify		
42	Date of examination by Medical Registrar:		Time of examination by Medical Registrar:			
43	Psychiatric consultation	Yes	No	Diagnosis:		