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Ibisomi, Fathullah

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Substance use among emergency department patients in a South African tertiary public institution

Fathullah Ibisomi

A dissertation submitted to the Faculty of Health Science, University of the Witwatersrand, Johannesburg, in fulfilment of the requirements for the degree of Master of Pharmacy.

Date: 18/01/2021

Supervisors:

Stephanie Leigh

Rubina Shaikh

Zelna Booth

Declaration

I, Fathullah Ibisomi, declare that this Dissertation is my own, unaided work. It is being submitted for the Degree of Masters in Pharmacy at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at any other University.

_____

Fathullah Ibisomi

15th Day of March, 2020 in Johannesburg

Abstract

Substance use disorder (SUD) is a medical condition wherein the use of one or more substances leads to a clinically significant impairment in an individual. The psychoactive nature of alcohol, nicotine, illicit substances, and some prescriptions medicines, can result in accidents and injuries due to a substance abuser's inability to exercise control of his/her mental state. The high prevalence of substance-related injuries, which is estimated to be half of South African emergency department (ED) cases, gives us an opportunity to investigate substance misuse with the use of a substance use screening interview.

Aim: To investigate the prevalence and sociodemographic risk factors of substance use in patients presenting to the emergency department of Charlotte Maxeke Johannesburg Academic Hospital (CMJAH).

Method: This cross-sectional study made use of a screening tool that included a sociodemographic information sheet as well as the World Health Organization (WHO) Alcohol, Smoking and Substance Involvement Screening Tool (ASSIST). In this study, a total of 237 ED patients were interviewed between the 2nd of September and the 1st of December 2019. The study was ethically approved by the Human Research Ethics Committee (HREC) (Appendix A).

Results: For participants that ever used a substance in their lifetime (lifetime use), alcohol use had a prevalence of 66,2% among study participants. This was followed by tobacco (46,8%), cannabis (33,8%), opioids (13,1%), cocaine and sedatives (9,3% each), amphetamine type stimulants (ATS) (7,6%), hallucinogens (4,2%), and inhalants (3,8%). For patients that used a substance within three months of being interviewed (past 3-month use), prevalence of use in alcoholic beverages was 40,1%, with the prevalence of use in tobacco product at 32,1%; cannabis at 16,9%; opioid at 4,6%, ATS at 2,1%; sedatives at 2,1%; cocaine at 0,8%; and lastly hallucinogens and inhalants with a 0,0% prevalence of use among interviewed patients. Multivariable logistic regression showed that tobacco, alcohol and cannabis use were predominantly associated among male patients and participants of younger age for both lifetime and past 3-month substance use. Assessments on the health and social risk involved with the use of substances found that 54,9% of the study sample was classified as low risk, 27,4% as medium risk, and 17,7% classified as high risk.

Conclusion: Alcohol remains the most used substance in South Africa, with cannabis being the most prevalent illicit drug. Efforts to reduce substance use and prevent SUD are integral to reducing the occurrence of substance-related cases in the ED.

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List of Abbreviations

ACh	Acetylcholine
AIHW	Australian Institute of Health and Welfare
AOD	Alcohol and other drugs
ASSIST	Alcohol, Smoking and Substance Involvement Screening Tool
ATS	Amphetamine-type stimulants
AUD	Alcohol use disorder
AUDIT	Alcohol use disorders Identification Test
BI	Brief Intervention
BMI	Brief Motivational Interview
BNI	Brief Negotiation Interview
CAGE	Cut-down, Annoyed, Guilt and Eye-Opening
CBD	Cannabidiol
CBT	Cognitive behavioural therapy
CDA	Central Drug Authority
CM	Contingency Management
CMJAH	Charlotte Maxeke Johannesburg Academic Hospital
CNS	Central Nervous System
CUD	Cannabis Use Disorder
DSM-V	The Fifth Edition of the Diagnostic Statistical Manual
ED	Emergency Department
EML	Essential Medicines List

FHSA	Family History of Substance Abuse
GYTS	Global Youth Tobacco Survey
HCPs	Health Care Professionals
HED	Heavy Episodic Drinking
HSRC	Health Sciences Research Council
HUD	Heroin use disorder
IHME	Institute for Health Metrics and Evaluation
KZN	Kwa-Zulu Natal
MAST	Michigan Alcohol Screening Test
MI	Motivational Interview
MET	Motivational Enhancement Therapy
NDML	National Drug Master Plan
NDoH	National Department of Health
NiDS	National Income Dynamics Study
NIMH	National Institute of Mental Health
NRT	Nicotine Replacement Therapy
OUD	Opioid use Disorder
OTC	Over-the-counter
PE	Port Elizabeth
PI	Principal Investigator
PIT	Pharmacist-initiated therapy
RCT	Randomized Controlled Trial

SA	South Africa
SABSSM	South African National HIV Prevalence, Incidence, Behaviour and Communication
SACENDU	South African Community Epidemiology Network on Drug Use
SADHS	South Africa Demographic Health Survey
SAGE	Study of Ageing and Global Health
SAHPRA	South African Health Products Regulatory Authority
SALDRU	Southern Africa Labour and Development Research Unit
SAMHSA	Substance Abuse and Mental Health Services Administration
SANCA	South African National Council on Alcoholism and Drug Dependence
SANHANES	South African National Health and Nutrition Examination survey
SASHS	South African Stress and Health Survey
SBI	Screening and Brief Intervention
SBIRT	Screening, Brief Intervention and Referral to Treatment
SEC	Socio-economic class
SID	Study Information Document
SOPs	Standard Operating Procedures
STGs	Standard Treatment Guidelines
SUD	Substance Use Disorder
TAAD	Triage Assessment for Addictive Disorders
THC	Tetrahydrocannabinol
UNODC	United Nations Office on Drugs and Crime
US	United States

WHO	World Health Organization
YRBS	Youth Risk Behaviour Survey

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Chapter 1: Introduction and Background

The physical, psychological, and social harms of substance abuse represent a significant public health problem (Barbosa et al., 2015). There is a higher prevalence of SUD in healthcare facility patients as compared to that in the general population, but this disorder is usually not diagnosed (Espi Martinez et al., 2013). Around half of emergency care unit cases in South Africa involve some sort of substance abuse (Sorsdahl et al., 2017). Furthermore, the South African Community Epidemiology Network on Drug Use (SACENDU) reported a 12,5% increase in substance-related hospital admissions from 2016 (8 787 admissions) to 2017 (10 047 admissions) in South Africa (Dada et al., 2017a). These statistics, amongst others, show a strong correlation between substance abuse and emergency department (ED) visits.

Substance use disorder, or substance abuse, is a medical condition wherein the use of one or more substances leads to a clinically significant impairment in an individual (Substance Abuse and Mental Health Services Administration (SAMHSA), 2016). It is a form of substance-related disorder that involves addiction and is subject to a list of diagnostic criteria in accordance with the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-V). The eleven criteria featured in the DSM-V detail a patient's quantity, frequency and urge of substance use, the presence of drug withdrawal and/or tolerance, as well as the degree of negative social and occupational impact of the disorder. The presence of two or three symptoms of the diagnostic criteria represents a diagnosis of mild SUD, with four or five symptoms representing a moderate degree of the disorder and the presence of six or more symptoms being classified as severe (Martin, Chung and Langenbucher, 2008; Hasin et al., 2013). Appendix B details the official DSM-V criteria for substance use disorder (Hasin et al., 2013).

1.1) Substance abuse

Substance abuse involves the use of different types of substances, namely licit (legal) substances, illicit substances, and pharmaceutical medications. These substances are psychoactive in nature, meaning that when they are administered, they alter mental processes such as cognition and perception (Reuter and Pardo, 2017). The psychoactive nature of substances contributes to their addiction potential. Substance addiction is a neuropsychiatric disorder characterized by continued use of a substance despite its harmful effects (Zou et al., 2017).

Alcohol and tobacco products represent the two licit psychoactive substances in South Africa. Tobacco is said to be the most addictive psychoactive drug and alcohol is the most used substance globally as well as the one attributed to the most negative health and social consequences (Crane, 2007; Dome et al., 2010; WHO, 2019a). Around the world, both of these substances are controlled by regulations such as restrictions on advertisement, taxation, provision of licensing for sale, and the legal age to purchase and consume these products. Even with these regulations in place, these substances are extensively misused and constantly lead to negative socio-economic consequences, disease burden, and death. The South Africa Demographic Health Survey (SADHS) of 2016 estimates that 15,9% of South African men and 2,7% of South African women have alcohol dependence (NDoH, 2019). The South African National Health and Nutrition Examination Survey (SANHANES) of 2012 reported that 26,6% of males and 6,5% of females smoke cigarettes almost every day (Shisana et al., 2014). These trends put millions of South Africans at risk of developing negative health and social consequences such as multiple organ disease, mood and anxiety disorders, accidents and injury, and interpersonal violence (Rehm, 2011; Strate et al., 2016; Sudano, Barthelmes and Kubli, 2018; Donovan and Bird, 2019).

Prescription and over-the-counter (OTC) medication, or pharmaceutical substances, are examples of legal substances that are controlled by health professionals through the guidelines of the South African Health Products Regulatory Authority (SAHPRA) (Senkubuge et al., 2018). Examples of these include opioids such as codeine and tramadol, sedatives such as benzodiazepines and barbiturates, and stimulants such as methylphenidate. These substances are permitted for use provided that a prescription from a practicing physician is provided or records of the sale of an OTC product are made and stored (Klinck, 2003). However, these substances have the potential to be abused, usually occurring when the prescribed dose is exceeded in quantity and/or frequency (Van Hout et al., 2017). Illegal scripts as well as irrational prescribing have also contributed to the abuse of these substances (Rassool, 2005; Van Hout et al., 2017; White, Ready and Katz, 2016). Additionally, prescription medication has made its way into the black market, and can be purchased without a prescription or medical recommendation (Grzybowski, 2004). Abuse of prescription medication can lead to various effects, such as immunosuppression and respiratory depression in opioid use disorder (OUD), suicidal ideation and depression in benzodiazepine dependence, and hallucinations and paranoia in methylphenidate (psychostimulant) abuse (Morton and Stockton, 2000; Ricardo Buenaventura, Rajive Adlaka and Nalini Segal, 2008; Weaver, 2015). Abuse of codeine (an opioid) is particularly significant due to the fact that, in South Africa, most codeine products can be purchased over-the-counter without a prescription (Van Hout et al., 2017). Codeine phosphate as an analgesic and cough suppressant is registered as a schedule 2 medication and can therefore be purchased

without a prescription. This is different from other pharmaceutical opioids as products such as tramadol (Schedule 5), oxycodone (Schedule 6) and morphine sulphate (Schedule 6), which all require a script from a certified physician and are therefore less accessible to the general public. There are currently no effective systems in place to ensure control over frequent purchasing of OTC codeine products as several patients have found ways to circumvent pharmacy practice legislation. Many people who purchase codeine products are also unaware of its potential for abuse and dependence (Van Hout et al., 2017). The SACENDU found that the treatment demand for non-medical codeine use has increased between 2015 and 2018 across South Africa (Dada et al., 2016a; Dada et al., 2019b). This is a cause for concern in terms of the incidence of substance abuse and dependence in the country.

Illicit substances are drugs that have been prohibited for use around the world due to their harmful psychoactive nature (Uutela, 2001). These substances can stimulate the central nervous system (CNS) in the form of psychostimulants (cocaine and amphetamine), cause hallucinogenic effects (psilocybin, mescaline etc), or inhibit the CNS in the form of cannabis, opioids (heroin, methaqualone, fentanyl etc.), sedative-hypnotics (flunitrazepam), and inhalants (Uutela, 2001; Fantegrossi, Murnane and Reissig, 2008; MacIver, 2009). Globally, cannabis is the most used illicit substance and opioid use is associated with the most substance-related deaths among individuals with a drug use disorder (Degenhardt et al., 2015; UN, 2019). The non-medical use of cannabis has been fully legalized in a few regions in the Americas, Europe, and Asia; however, it is still an illegal substance in most of the world (Bewley-Taylor et al., 2016). Approximately 27 million people indulge in the regular use of illicit drugs worldwide, with about 60,0% of them injecting these substances (Dasgupta, 2017). Heroin (an opioid) is the most commonly injected illicit drug; however, sedative-hypnotics and psychostimulants are also being injected by drug users (Baciewicz, 2016). The culture of injecting illicit drugs increases the risk of HIV and hepatitis infection due to needle sharing practices (Vlahov, 2010; Pasa et al., 2016). In South Africa, the treatment demand for illicit substances has seen a rise between the early 2000s and 2018, especially for substances such as cannabis, methamphetamine and heroin (Dada et al., 2019c). This sheds some light on the state of illicit substance abuse in the country.

1.2) Epidemiological measures of substance use

Disease prevalence and risk factors (or associations) are two major epidemiological concepts in substance use research. Substance use prevalence is the proportion of a particular population that indulges in drug

use at a certain point in time (National Institute of Mental Health (NIMH), 2017). Substance use risk factors are individual characteristics that potentiate the likelihood of developing SUD (Hawkins, Van Horn and Arthur, 2004). These include demographic factors such as being male and an adolescent, and medical factors such as having a psychiatric condition (Thatcher and Clark, 2008; Beaudoin et al., 2015; Welsh et al., 2017; Khokhar et al., 2018). The documenting of substance use prevalence and risk factors is important for population health surveillance, which is used to plan, implement, and evaluate national policies and public health practice (Nsubuga et al., 2006; Bagley and Altman, 2016). The ongoing systematic collection, analysis and interpretation of disease and injury trends has contributed several effective policies and intervention programs for substance use in South Africa (Nsubuga et al., 2006; Young et al., 2017). A few examples of these include the taxation of tobacco products, the scheduling and increased control of prescription medication, the establishment of drug awareness organizations such as the South African National Council on Alcoholism and Drug Dependence (SANCA), and the informed implementation of harm reduction strategies for substance use in specialized clinics (Klinck, 2003; Van Walbeek, 2003; WHO, 2005; Substance Misuse: Advocacy, Research and Training, 2008; Scheibe et al., 2017). It is important to know how severe the state of substance use is in a particular setting to evaluate and improve upon such measures.

Historically, relevant information on substance use in South Africa came from mortuaries, police arrests, drug seizures, school surveys, and single location cross-sectional studies (van Heerden et al., 2009). In the late 1990s, the increased burden of drug use brought about a need for improved and more accurate methods of identifying and reporting substance use and abuse data (van Heerden et al., 2009). This led to a rise in reports on substance use cases with the aid of national surveys such as the SADHS, the South African Stress and Health Survey (SASHS), and the Youth Risk Behaviour Survey (YRBS) (van Heerden et al., 2009). There is, however, still a need for substance use detection and monitoring in different public healthcare settings in South Africa.

1.3) Substance abuse in the emergency department

The emergency department is often the first point of contact between patients and healthcare professionals (HCPs); it provides critical access to patient care and is seen as the “front door” to the hospital (SoRelle, 2002). The emergency department can be used as a point of early identification of patients that are at risk of developing SUD as well as a link to healthcare for patients that are affected by

the disorder (Hawk and D'Onofrio, 2018). There are several substance-related cases within South African emergency departments due to the potential of drugs to cause accidents and injuries (e.g. driving under the influence) as well as the high prevalence of substance use within the country (Vitale and van de Mheen, 2006; van Heerden et al., 2009). These cases can come in the form of, or put individuals at risk of, substance-induced disorders or SUD (American Psychiatric Association, 2013). Substance-induced disorders occur when all or most of the symptoms expressed by the user is a direct result of substance intoxication or withdrawal whereas SUD involves the effects of frequent and continuous substance use and catalogs the consequences of addiction progression (Sacks, Ries and Ziedonis, 2005; American Psychiatric Association, 2013). It is important to distinguish these two substance-related disorders due to the fact that easily identifiable cases of substance induction (e.g. drug overdose) directly resulting from intoxication or withdrawal that can be seen in blood and urine tests, physical and neurological exams, and a review of body systems- do not meet the criteria for a diagnosis of SUD (Donovan and Bird, 2019; Milios, 2019). Documenting an individual's pattern of substance use is a much more suitable marker for a diagnosis or potential development of SUD. However, a number of these cases are difficult to identify as their clinical presentation can be very subtle. Substance use disorder is largely undetected in clinical settings (Sallaup et al., 2016). This limitation to diagnosing SUD can be rectified with the use of an interview-based screening tool for substance use.

1.4) Substance use screening

Screening tools for substance use such as the 1970 Cut-down, Annoyed, Guilt and Eye-Opening (CAGE) test, the 1971 Michigan Alcohol Screening Test (MAST) and the 1989 Alcohol Use Disorders Identification Test (AUDIT) were initially created and implemented to identify cases of problematic alcohol consumption (SAMHSA, 2020). More recent screening tools such as the 1995 Triage Assessment for Addictive Disorders (TAAD) and the 1997 WHO ASSIST include criteria for illicit drug use and even tobacco use (SAMHSA, 2020). These screening tools for substance use have been found to be reliable and feasible in several clinical settings, predominantly in primary healthcare clinics and emergency departments (Fiellin, Reid and O'Connor, 2000; WAW Group, 2002; Konstantopoulos et al., 2014; SAMHSA, 2020). The use of a screening test for SUD in the emergency department can prove significant as it is a straightforward and accurate method of determining patients who indulge in risky substance use in a population who would otherwise not be tested (Smith et al., 2010; Sorsdahl et al., 2017). This ensures that these patients can

receive intervention to prevent, manage or treat their condition, whether they have SUD or are at risk of developing it (Agerwala and McCance-Catz, 2012).

A screening tool can serve as a pre-cursor to a patient referral and intervention system in order to optimize patient care and put more emphasis on disease prevention (Agerwala and McCance-Catz, 2012). This procedure is known as screening, brief intervention, and referral to treatment (SBIRT) for SUD and is a developing practice in hospital emergency departments around the world (Bernstein et al., 2009). This practice has the potential to reduce substance-related injury recurrence as well as repeat ED visits (Désy and Perhats, 2008). It also slows down the progression of alcohol and other drug use (AOD) disorder (Désy and Perhats, 2008; Agerwala and McCance-Katz, 2012; Ino and Cho, 2013). The SBIRT method has been found to be a cost-effective approach to providing preventative treatment services and has the potential to reduce future healthcare expenses at a national level (Clemans-Cope et al., 2018).

1.5) Rationale

1.5.1) Role of the pharmacist in substance use monitoring

The use, misuse, and abuse of prescription medications is a major problem in the country. Irrational prescribing by physicians, improper dispensing practices in the pharmacy, and a lack of effective control measures in pharmacy practice legislation all contribute to the alarming substance abuse cases in the country. Pharmacists are experts in the effects of licit, pharmaceutical and illicit substances, and thus have the ability to provide information to patients that are at risk of developing SUD. Pharmacists are also key healthcare professionals in conducting public health research and their professional discipline is necessary for policy making at a national and healthcare service level. Ultimately, these measures are important for the revision and updating of legislation specific to pharmacy; as more stringent rules on the dispensing of pharmaceutical substances, better implementation of control measures, and more involvement in the discussion of prescribing practices with physicians, can help reduce the cases of substance abuse stemming from the pharmacy setting.

1.5.1) The use of screening to determine substance use prevalence

Substance use screening is certainly important for individuals, but also has significance on a national scale. Screening tests for substance use can be utilized to determine the prevalence of substance use and SUD

within healthcare settings. Similar to how national cross-sectional surveys estimate the prevalence of substance use in an entire country, substance use screening uses the principle of self-reported drug use to elicit the same information in a population of healthcare patients. Determining how prominent substance use is in the public healthcare setting helps us formulate and modify policies, treatment strategies, standard operating procedures (SOPs) and standard practices to control substance use rates and prevent subsequent healthcare, legal, and socio-economic burdens. The documentation of sociodemographic risk factors of substance use is also important in order to identify, educate and monitor population groups that are at risk of using and misusing substances.

1.5.2) Bridging the South African public healthcare gap

There are currently no protocols or SOPs to attempt or encourage SUD diagnosis in emergency departments of South African public hospitals. South African public hospital emergency departments focus on cases of substance intoxication and overdose, using urine and/or blood tests to determine whether a patient engaged in recent substance use. Overdose and toxin-related cases are remediated by referring patients to the gastrointestinal department for detoxification, or otherwise the psychiatric department for appropriate pharmacological and counselling-based intervention. These strategies are necessary and should be used when appropriate, however, these do not focus on disease progression in patients that are at risk of developing negative substance-related consequences. As aforementioned, there is a possibility of SUD or risky substance use in patients that present to the ED with cases that are unrelated to substance use. Identifying these cases and promptly engaging these patients with the necessary treatment services can result in decreased repeat ED visits, improvement in the well-being of a patient, and ultimately a reduction in substance abuse prevalence.

This study seeks to use an interview-based screening procedure to identify the prevalence and sociodemographic risk factors of substance use within the emergency department of Charlotte Maxeke Johannesburg Academic Hospital (CMJAH). The study also states a case for the implementation of SBIRT in South African public hospital settings.

1.6) Aim of the study

This study aims to determine the prevalence of and risk factors associated with substance misuse in patients presenting to the ED of CMJAH.

1.7) Objectives

- To assess the substance involvement profile of ED patients using the WHO ASSIST screening tool. This will elicit both the prevalence of each substance category and the percentage of participants that fall under the low, medium, and high risk categories for substance use-associated risk.
- To elucidate the risk factors associated with substance use by assessing sociodemographic characteristics of ED patients that undergo screening.
- To determine the licit and illicit substances most frequently misused within the area of Johannesburg.

1.8) Overview of chapters for the dissertation

This introductory chapter is followed by a review of literature on the prevalence, risk factors and management of licit, pharmaceutical and illicit substances in South Africa. The methods employed in capturing, analyzing and presenting the data required for this study are then discussed. The results yielded from the data collected, including the prevalence and risk factors of lifetime and past 3-month non-medical use of each substance, as well as the substance-related risk profile of study participants, is then presented in the results chapter and further discussed. The limitations, recommendations, and overall conclusion of the study complete the write-up.

Chapter 2: Literature review

2.1) Introduction

Global trends in substance use are characterized by high prevalence rates and prominent contributions to morbidity and mortality. In 2016, it was estimated that 2,3 billion and 1,1 billion individuals were past-month alcohol and tobacco consumers respectively (WHO, 2017; WHO, 2019a; WHO, 2019b). Roughly 271 million people used a pharmaceutical or illicit drug for non-medical purposes in the year of 2017, with approximately 35 million people suffering from a drug use disorder within the year (United Nations (UN), 2019). Additionally, an estimated 1,5% of the global disease burden and 11,8 million deaths per year are attributed to substance use disorder (Peacock et al., 2018). These statistics show that substance use is a significant threat to public health on a global scale. Substance use data in South Africa follows the same trend, with alcohol and other drug (AOD) prevalence and treatment demand putting millions of people at risk for negative health and socio-economic outcomes (Dada et al., 2019c; National Department of Health (NDoH), 2019).

Substance use in South Africa has led to a rise in the prevalence of illicit drug use, hazardous use of alcohol, and non-medical use of prescription medication (Dada et al., 2019c). Linked to these trends is the high prevalence of cannabis use in younger populations, the ever-growing treatment demand for methamphetamine, the healthcare burden of harmful drinking in South African adults, and the misuse of codeine-containing products (Peltzer and Ramlagan, 2007; Peltzer, Davids and Njuho, 2011; Ayo-Yusuf, Olutola and Agaku, 2015; Dada et al., 2015a). These cases are largely unidentified and unresolved in the country's public healthcare system (Sorsdahl et al., 2017).

There is a large gap in healthcare services for substance use and SUD in South Africa (Corrigall and Matzopoulos, 2012; Sorsdahl et al., 2012). The country relies heavily on high-threshold treatment services by specialist clinics as opposed to low-threshold early intervention services at basic levels of healthcare (Sorsdahl et al., 2012). The implementation of SBIRT may be useful to fill this gap in healthcare provision, as it can be used to identify and manage patients that wouldn't normally seek substance use or abuse treatment in order to reduce the risk of recurring AOD-related visits (Myers et al., 2012). There are also shortcomings in relevant legislation for legal substances, the amount of trained staff and resources available for specialist treatment, and the use of certain pharmacological interventions in South African hospitals and clinics. These areas need to be considered for research and development in the country.

This literature review looks at the prevalence data, trends and sociodemographic risk factors of substance use in South Africa. The review also looks at prevention, management and treatment strategies for substance use such as SBIRT and pharmacological interventions.

2.2) Licit substances

2.2.1) Alcohol

2.2.1.1) Prevalence data

Alcohol use in South Africa has been consistently high over several years, evident in population-based cross-sectional surveys (Parry, 2005). The prevalence of past-year alcohol use has seen an overall increase from 28,0% in the SADHS of 1998 to 32,8% in the SADHS of 2016 (Figure 1) (NDoH, 1998; SALDRU, 2008; Peltzer, Davids and Njuho, 2011; Vellios and Walbeek, 2018; NDoH, 2019). These trends are different to global findings that show a consistent decrease in current (past-month) alcohol use prevalence rates in all regions of the world apart from the Western Pacific and South-East Asian regions (WHO, 2019a). The global average prevalence of past-month drinkers decreased from 47,6% to 43,0% between 2000 and 2016 (Figure 1) (WHO, 2019a). It can be concluded that, within the 21st century, prevalence rates in South Africa have been lower than global average rates and are experiencing an opposing trend to the rest of the world i.e. as the global alcohol use prevalence decreases, South Africa's alcohol use prevalence increases (Figure 1).

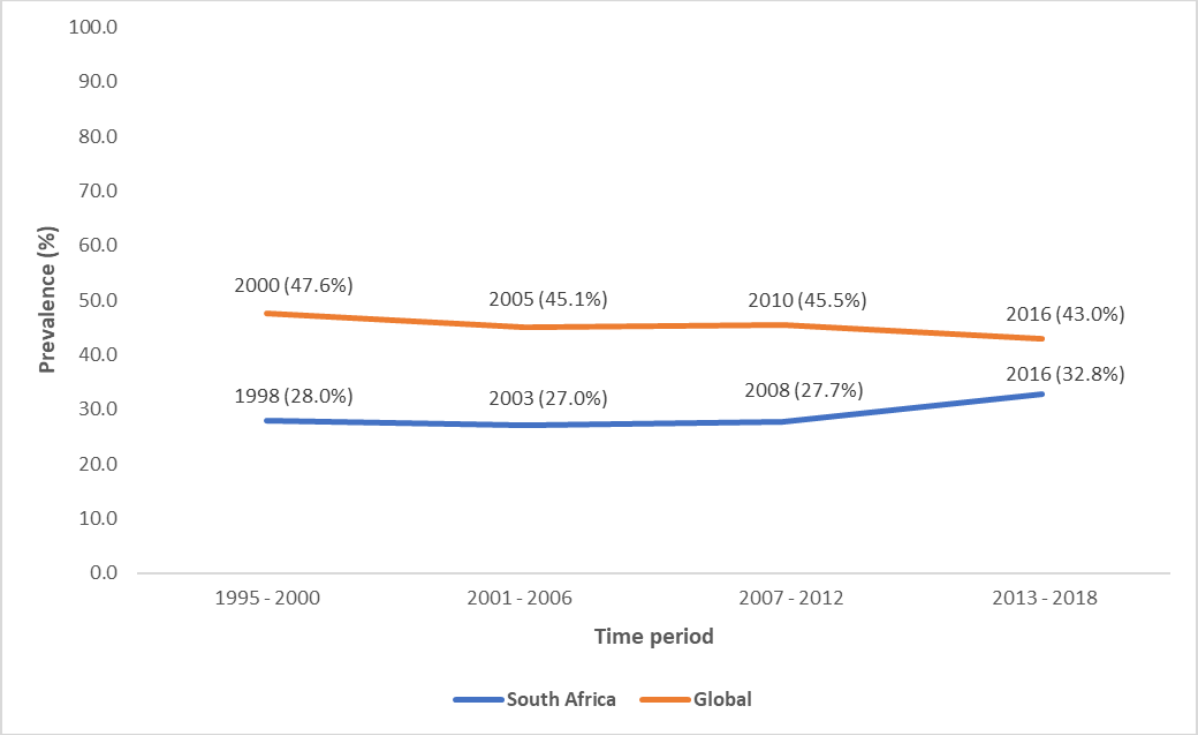

Figure 1: Line graph depicting both South African and global trends in alcohol use prevalence between 1998 and 2016.

Findings similar to that of alcohol use prevalence are seen in problematic drinking (binge-drinking and harmful drinking) trends in South African adults. Binge-drinking is defined as a pattern of drinking that involves excessive alcohol consumption in a short period of time whereas harmful drinking is alcohol consumption that results in adverse health events (Fink et al., 2002; Miller et al., 2007). In South Africa, the prevalence of binge-drinking, or heavy episodic drinking (HED), saw an increase from 7,4% in 2005 to 14,1% in 2015 and the prevalence of harmful drinking increased from 5,0% in 2004 to 9,3% in 2016 (HSRC, 2007; Peltzer and Ramlagan, 2009; Peltzer, Davids and Njuho, 2011; Vellios and Walbeek, 2018; NDoH, 2019). The global prevalence of HED was 18,2% in 2016, this is slightly higher than that of South Africa in 2015 (14.1%) (WHO, 2019a). However, an overall decline in HED prevalence was seen in all continents of the world between 2000 and 2016, unlike the trend seen in South Africa between 2005 and 2015 (WHO, 2019a). As for harmful drinking, the South African estimate of 9,3% in 2016 is significantly higher than the global average of 6,4% in the same year, however, it's increasing trend in prevalence opposes the decreasing global trend (WHO, 2019a; NDoH, 2019).

2.2.1.2) Sociodemographic risk factors

The sociodemographic profile of alcohol users in South Africa has remained relatively consistent across national population-based surveys. The 1998 and 2003 SADHS reports found the highest alcohol use prevalence in males, white and coloured ethnicities, individuals with lower and higher levels of education, middle-aged people (35-54-year age group), and urban residents (Parry et al., 2005a; NDoH, 2007). The 2008 South African National HIV Prevalence, Incidence, Behavior and Communication (SABSSM), and 2015 National Income Dynamics Study (NiDS) reports found similar trends in terms of sex, race, age and residence, however the two surveys found higher alcohol use rates in secondary and tertiary education levels (Peltzer, Davids and Njuho, 2011; Vellios and Walbeek, 2018).

Dissimilarly, sociodemographic trends in problematic drinking saw a drastic change after 1998. The 1998 SADHS reported higher levels of risky drinking in females, non-urban areas and the black population whereas the 2003 SADHS, 2005 SABSSM, 2008 SABSSM, and 2016 SADHS reported higher levels of risky drinking in males, urban areas and the coloured population (Parry et al., 2005a; NDoH, 2007; Peltzer and Ramlagan, 2009; Peltzer, Davids and Njuho, 2011; NDoH, 2019). Risky drinking in younger age groups (15-24-year age group) has seen a rise over the years, with 3,2% of men and 1,4% of women being hazardous/harmful drinkers according to the 2003 SADHS and 13,0% of men and 3,1% of women having problematic alcohol consumption patterns according to the 2016 SADHS (NDoH, 2007; Ramsoomar and Morojele, 2012; NDoH; 2019).

2.2.1.3) Management of alcohol use

As part of screening and brief intervention (SBI), patients that show signs of risky drinking are reviewed for the presence of alcohol use disorder (AUD). Patients that are diagnosed as at-risk individuals should receive a brief intervention consisting of objective feedback on the patient's level of risk associated with their alcohol use. Patients that are found to have AUD should be referred to specialized care. These patients receive a comprehensive physical assessment involving a patient history, mental assessment and physical examination. The likelihood of AUD to result in mental and physical co-morbidity is high, hence these assessments are necessary. Evaluating the extent of alcohol withdrawal and performing a urine drug screening test are also done to guide the physician with further management and rule out or confirm the presence of other substance use (Ramjee et al., 2015).

Patients may be referred for in-patient detoxification, whereby the general care procedures that are performed include monitoring vital signs, correcting fluid and electrolyte deficiencies, administering thiamine and magnesium supplementation, and providing psychological support. Pharmacological intervention is mainly given for alcohol withdrawal and relapse prevention. Benzodiazepine therapy is the first line regimen for alcohol withdrawal usually given as a fixed diazepam or oxazepam dose. Gabapentin, Carbamazepine and Valproic acid can also be given as adjunct therapies to manage the symptoms of alcohol withdrawal. Relapse prevention strategies for AUD include disulfiram and acamprosate to increase abstinence in alcohol users, as well as naltrexone to decrease the reinforcing effects of alcohol use (Ramjee et al., 2015; Winslow, Onysko and Herbert, 2016).

2.2.2) Tobacco

2.2.2.1) Prevalence data

The prevalence of current (past-month) tobacco use in South African adults saw a significant decrease from 32,6% in 1993 to 19,3% in 2018 (Figure 2) (SALDRU, 2012; WHO, 2013; Reddy et al., 2015; SALDRU, 2015; SALDRU, 2018; NDoH, 2019). As of 2016, the global prevalence of current (past-month) tobacco smoking among adults was estimated to be 21,9% (Figure 2), with Europe having the highest prevalence rate (28,7%) and Africa having the lowest (13,9%) (WHO, 2019b). South Africa's age-standardized prevalence of past-month tobacco use was 20,7% in 2016, lower than European, American and global estimates, but higher than African and Australian prevalence rates (WHO, 2019b). The global prevalence of tobacco use in adults aged 15 - 64 years, decreased by approximately 6,7% between 2000 and 2015 (Figure 2), this follows the same decreasing trend seen in South Africa as well as all continents in the world (WHO, 2017; WHO, 2019b).

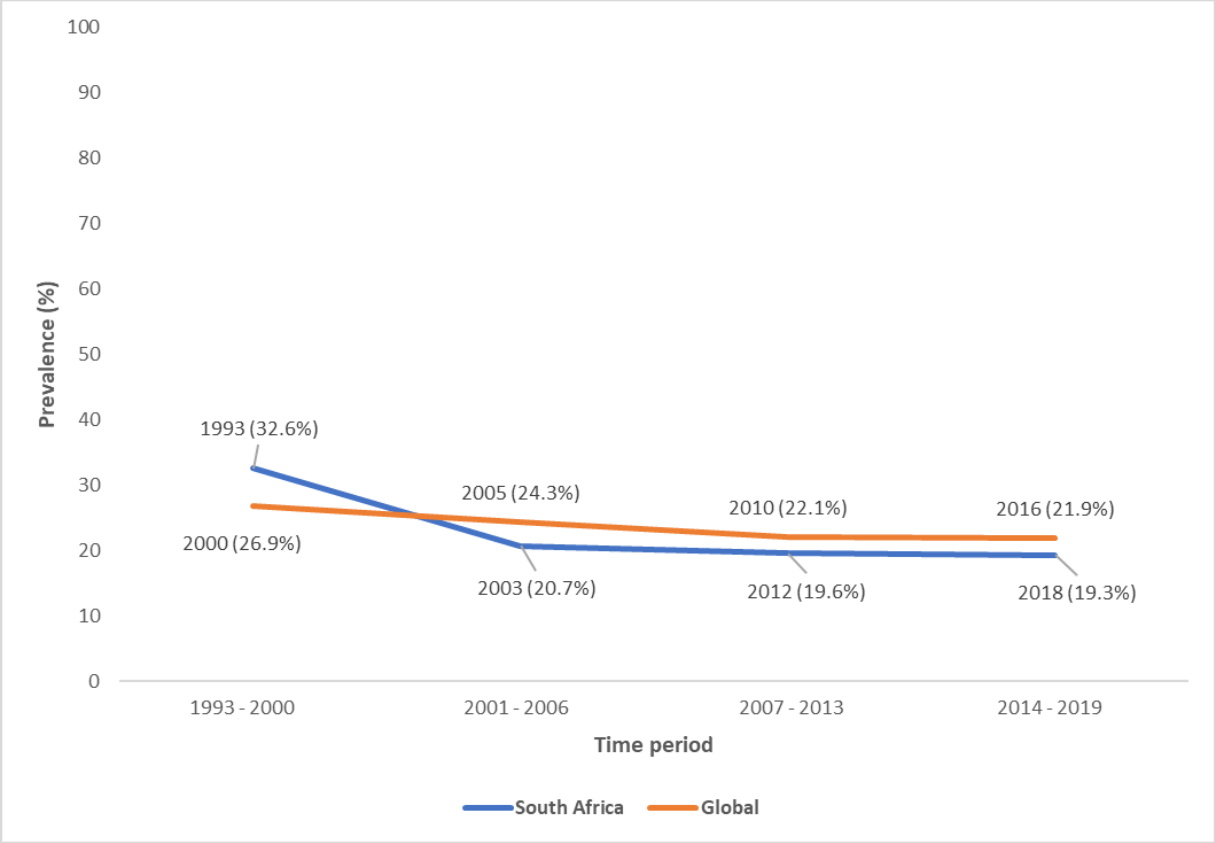

Figure 2: Line graph depicting both South African and global trends in tobacco use prevalence between 1993 and 2018.

2.2.2.2) Sociodemographic risk factors

There is a higher prevalence of both lifetime and past-month tobacco smoking in males compared to females, with South African population-based reports from 1993 to 2017 showing a significant difference in tobacco use between the two sexes (WHO, 2013; SALDRU, 2012; SALDRU; 2015; Reddy et al., 2015; SALDRU, 2018; NDoH, 2019; WHO, 2019b). Pertaining to age group, national population-based surveys report that middle-aged groups (45 - 54 years old) contribute the most to tobacco smoking prevalence, whereas the youngest (<25 years old) and most elderly age groups (≥65 years old) contribute the least (WHO, 2011; SALDRU, 2012; Biritwum et al., 2013; Reddy et al., 2013a; Reddy et al., 2015; NDoH, 2019). The ethnicity group that contributes the highest to tobacco smoking in South Africa is the coloured population, with the 2011 YRBS, 2012 SANHANES, 2015 NiDS and 2016 SADHS all reporting the highest prevalence rates among males in coloured men and among females in coloured women (Reddy et al.,

2013a; Reddy et al., 2015; SALDRU, 2015; NDoH, 2019). The same reports found the lowest current tobacco smoking prevalence rates in the black population (Reddy et al., 2013a; Reddy et al., 2015; SALDRU, 2015; NDoH, 2019). This is in line with findings that provinces with a high density of the coloured population have higher prevalence rates of current tobacco smoking, whereas provinces with a high density of the black population have lower rates of current tobacco smoking. The Northern and Western Cape have the highest coloured population densities among South African provinces with 40,3% and 42,4% respectively, whereas Limpopo has the highest black population density (96,7%) and North West has the third highest black population density (89,8%) (Stats SA, 2011; Dada et al., 2019c). Plausibly, the 2012 SANHANES, 2016 SADHS and 2018 NiDS reports found the highest tobacco use prevalence rates in the Northern and Western Cape and the lowest prevalence rates in North West (except the 2018 NiDS) and Limpopo (Reddy et al., 2015; SALDRU, 2018; NDoH, 2019).

2.2.2.3) Management of tobacco use

As part of clinical interventions used to initiate and sustain smoking cessation, screening and brief intervention is initially employed to identify tobacco users, assist users that are ready to make a quit attempt, alert the patient to the benefits of quitting tobacco use, and arrange follow-up sessions and referrals. Motivational interviewing (MI) can be used for patients that are not as willing to quit tobacco use; this involves discussing the pros and cons of tobacco use to reinforce the subjective benefits of smoking cessation in a patient. This method focuses on eliciting self-motivational statements rather than instructing the patient on what to do, posing that the patient will view themselves as experts of their own life and minimizing the patient's resistance to change (van Zyl-Smit et al., 2013).

Pharmacologically, nicotine replacement therapy (NRT) is used to address nicotine withdrawal. Using a nicotine patch as a 'controller' and a nicotine gum/spray as a 'reliever' is said to be the most effective way of using NRT. Bupropion is an effective antidepressant that can be used in combination with NRT for smoking cessation. It also decreases the seizure threshold and reduces the likelihood of long-term relapse. Nortriptyline is a second line agent that can be given when NRT and bupropion fail. Varenicline (Champix) acts as a partial agonist that stimulates dopamine release and decreases withdrawal symptoms. It is important to note that pharmacological intervention does not address underlying addiction, hence the need for psychosocial support in both brief and intensive intervention (van Zyl-Smit et al., 2013).

2.2.3) Licit substances: Discussion

Alcohol and tobacco are the two most used substances in South Africa (Peltzer and Phaswana-Mafuya, 2018; NDoH, 2019). As they are legal for use, easily accessible, and are socially accepted, South Africans are more inclined to use and report the use of licit substances. An overall increase in alcohol use prevalence (Figure 3), binge-drinking and harmful drinking was observed between the early 2000s and 2016. Alcohol use and problematic drinking are major problems in South African public healthcare contributing to just under 40,0% of substance-related clinic admissions in four South African provinces (Dada et al., 2019c). Pharmacological and SBIRT strategies for AUD and alcohol dependence represent gaps in South African public healthcare services as they are almost exclusively used in specialist substance abuse treatment centers (Myers et al., 2012). These specialist treatment centers are unaffordable and inaccessible to millions of South Africans; implementing these strategies in public hospital settings and primary healthcare will be more suitable for nationwide access (Corrigall and Matzopoulos, 2012). In terms of legislation, alcohol sale and advertising can be controlled further to restrict airing times (television and radio) of product commercials and to include warning labels on alcohol beverages and packaging.

Tobacco use is a major public health priority in South Africa (Peer, 2018). A reduction in current (past-month) tobacco use prevalence between 1993 and 2010 (Figure 3) was observed in the country partially due to the implementation of the first South African tobacco regulations in 1993 (WHO, 2013). This trend continued into 2018 (NDoH, 2019). Regulations such as the prohibition of smoking in public areas, the inclusion of required health warnings on cigarette boxes, and the prohibition of advertising tobacco products, have all been effective in reducing the use of tobacco (Sanyanga, 2005; WHO, 2013). The high taxation on tobacco products since the early 1990s has also helped reduce the frequency of tobacco use in certain populations in South Africa (Peer et al., 2009; Ayo-Yusuf, Olutola and Agaku, 2015; WHO, 2013). Efforts to enforce and maintain these legislative measures would further reduce the health burden of tobacco in South Africa. NRT is available over-the-counter and in stores, whereas nicotine receptor agonist therapy is available on prescription. This represents an easily accessible step-down approach to nicotine use in South Africa. The use of SBIRT for tobacco use in the form of screening, MI and NRT has shown efficacy in clinical settings in other countries (Bernstein et al., 2011; Lemhoefer et al., 2017). The implementation of this strategy in South African public healthcare settings should be considered in order to fill the healthcare gaps of the country.

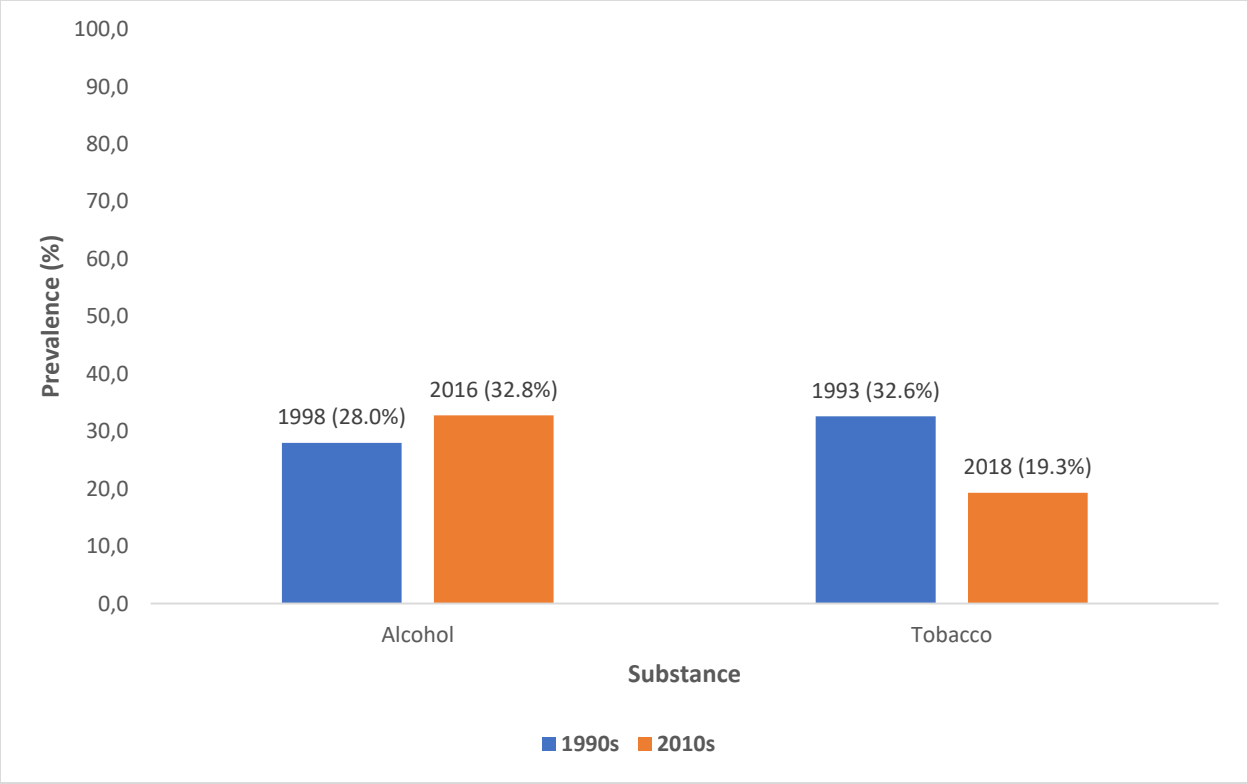

Figure 3: Clustered bar graph depicting the increasing alcohol use trend and decreasing tobacco use trend in South Africa between the 1990s and the 2010s

2.3) Prescription and over-the-counter medication

2.3.1) Prevalence data

There is limited data on the national prevalence of non-medical use of pharmaceutical substances in South Africa, however, the 2016 SADHS estimated a past-year prevalence of 2,0% of codeine misuse in South African adults of 15 - 64 years of age (NDoH, 2019). This is lower than prevalence data on codeine misuse in Australia (2,8%) in 2016 but higher than the estimated codeine misuse prevalence of 0,9% in the United States (US) in 2018 (Chan, Leung and Hall, 2019; SAMHSA, 2019). There is data that suggests an increasing trend in pharmaceutical opioid misuse in several regions in the world. The treatment demand for non-medical codeine in South Africa has seen a slight increase from approximately 2,0% between January 2015 and June 2017 to 3,0% between July 2017 and December 2018 according to SACENDU (Dada et al., 2016b; Dada et al., 2017b; Dada et al., 2018b; Dada et al., 2019b). In the US, the misuse of psychotherapeutics increased from 1,4% of the population (aged 12 years and over) for all pharmaceutical pain relievers in

2015 to 2,0% of the population for hydrocodone alone in 2018 (Bose et al., 2016; SAMHSA, 2019). In Australia, the past-year prevalence of opioid analgesic misuse increased from 2,5% in 2007 to 3,5% in 2016 (AIHW, 2008; Chan, Leung and Hall, 2019). Furthermore, tramadol is widely illicitly trafficked in North, Central and West Africa, where it is used non-medically (UN, 2019). These three regions, as well as Middle East Asia, reported high past-year prevalence rates of tramadol use in their adult population e.g. 4,4% in Nigeria (2018) and 3,0% in Egypt (2016) (UN, 2019).

Non-medical sedative use is common in Western and Central Europe, with past-year prevalence rates among adults (aged 15-64) going as high as 19,5% in Czechia (2015), 14,0% in Italy (2013), and 13,0% in Lithuania (2016) (Figure 4) (UN, 2019). Other past-year prevalence rates of non-medical sedative use around the world include 2,2% in North America (2017), approximately 1,0% in both India (2018) and Pakistan (2013), 0,6% in Algeria (2010) and 0,5% in Nigeria (2018) (Figure 4) (UN, 2019). The South African national population-based survey of 2012 found a past 3-month prevalence for sedative use of 0,4% among South African adults (Figure 4), which is low compared to other regions in the world (Peltzer and Phaswana-Mafuya, 2018). However, South African estimates are based on self-reported sedative use three months prior to data collection whereas estimates in other countries document past-year prevalence rates. This means that South African prevalence rates may be underestimated in comparison to other countries. Reports from SACENDU indicate that prescription and OTC treatment demand decreased between 2000 and 2018 in most regions in South Africa (Dada et al., 2019c). This can be attributed to a decrease in the non-medical abuse of sedatives in South African adults.

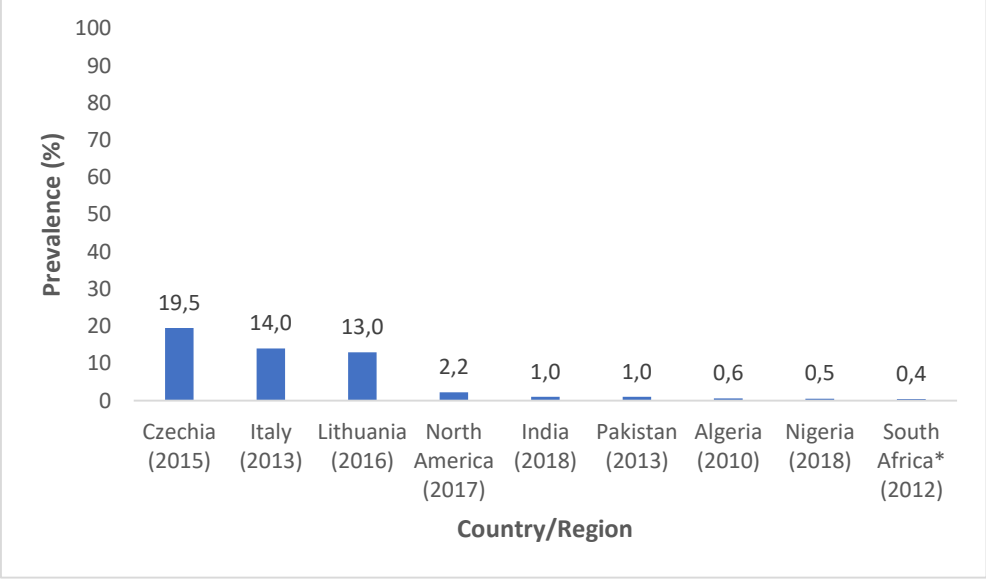

Figure 4: Bar graph showing the prevalence rates of non-medical sedative use in different countries.

2.3.2) Sociodemographic risk factors

The SADHS of 2016 found that codeine misuse was more prevalent in females, the coloured population, urban dwellers, middle-to-higher levels of education, and the Gauteng province (NDoH, 2019). The population group that used codeine-containing products the most (both medically and non-medically) was the Indian female population, with 30% of the total sample of Indian females using a pharmaceutical codeine product at least once within 2016 (NDoH, 2019). Although prevalence rates for misuse (using the substance for non-medical reasons) are higher in females, cases of abuse (use of codeine that results in clinically significant ailment) seem to be higher in males. The SACENDU report of 2014 found that male patients made up 74,9% of codeine admissions across all regions of South Africa, with 64,0% of these admitted patients being unemployed (Dada et al., 2015a). The report also found that people aged 20 - 39, Gauteng residents, and middle-to-higher levels of education all contributed to higher levels of admission (Dada et al., 2015a).

According to the 2008 SABSSM, sedative use was more prevalent in urban areas and higher education levels (Peltzer and Ramlagan, 2010). Additionally, the 2012 national population-based survey found higher sedative use prevalence in urban areas, people with psychological distress, harmful alcohol use, and risky sexual behaviour (Peltzer and Phaswana-Mafuya, 2018). One interesting finding in both cross-sectional surveys was the high prevalence of sedative use in the Indian population among the different ethnicity groups (Peltzer and Ramlagan, 2010; Peltzer and Phaswana-Mafuya, 2018). This is similar to the high rates of codeine use found in Indian populations according to the 2016 SADHS. This suggests that the non-medical use of pharmaceutical medication is among South African Indians, which is dissimilar to majority of other psychoactive substances.

2.3.3) Management of pharmaceutical substance misuse

At a national level, preventative measures such as legislative changes in the provision and sale of codeine (e.g. up-scheduling of codeine-containing products), improvement and implementation of the 'Codeine Care Initiative' (CCI), and general education of customers and patients on the dangers of codeine misuse can help combat the levels of opioid misuse in the country (Dada et al., 2015a; Parry et al., 2017). There is a lack of specialist training and operating procedures in the field of codeine misuse and abuse at treatment centers; efforts towards training healthcare professionals to deal with codeine-related problems will help strengthen the available treatment for codeine abuse and will reduce the cases of

opioid dependence (Parry et al., 2017). This will lead to better implementation of therapeutic approaches such as cognitive behavioural therapy (CBT), MI, psychodynamic therapy and detoxification (Parry et al., 2017). Research into SBIRT strategies for opioid use has found that pharmacological interventions, in comparison to brief negotiation interview (BNI), are more effective in reducing the illicit use of opioids, increasing engagement in addiction treatment, and limiting the use of inpatient addiction services within a month of treatment (D'Onofrio et al., 2015). This pharmacological intervention can be in the form of symptomatic or substitute pharmacotherapy using methadone or buprenorphine (Dos Santos et al., 2010). Additionally, naloxone can be used in opioid overdose situations (Marco et al., 2018). A study conducted in West Virginia on the use of naloxone emergency kits found that 70% of participants were either more willing to seek medical care following naloxone kit use or had reduced their opioid use following the acquisition of a naloxone kit (Marco et al., 2018). Subsequently, a change in pharmacy legislation to introduce naloxone kits as an over-the-counter (OTC) medical tool for opioid overdoses can help in the long-term reduction of opioid abuse.

Sedative use disorder can be managed by different counselling and brief intervention (BI) techniques such as MI, CBT and relapse prevention strategies (Brett and Murnion, 2015). However, sedative abuse can be a severe issue in the long term that requires both counselling and expert pharmacological attention (Weaver, 2015). Sedatives like benzodiazepines can cause severe withdrawal symptoms if their use is abruptly stopped following a long term spell of either medical or non-medical use (Weaver, 2015). A step-down approach to sedative use (dose tapering), that sees the patient gradually reduce their use of sedatives over several weeks, is necessary for a safe reduction and eventual conclusion of use (Weaver, 2015). Substituting benzodiazepines that have a short half-life with ones that have a long half-life can help to reduce the potential for misuse and withdrawal (Brett and Murnion, 2015). Additionally, flumazenil can be used to reverse the effects of benzodiazepine overdose (An and Godwin, 2016). These strategies largely require referral to specialist centers; this can be done once screening and brief intervention procedures are performed on patients in the public healthcare setting. Hence, the training of healthcare professionals in South Africa on procedures involving sedative therapy and abuse is important.

2.3.4) Pharmaceutical substances: Discussion

The non-medical use of prescription medication is becoming increasingly popular all over the world. Prescription and OTC drugs are seen as non-harmful by users, and majority of misuse cases stem from the gradual increase in the daily dosage of medication for legitimate purposes (Van Hout et al., 2017).

Particularly in South Africa, codeine abuse represents approximately 3.0% of substance-related treatment admissions, with a large number of admitted patients being unemployed, middle-aged men (Dada et al., 2015b; Dada et al., 2019b). This calls for action on both a national scale and in healthcare settings. Screening and brief intervention strategies for non-medical opioid use has largely been limited, however, there are other means of controlling the misuse of prescription and OTC opioids. Up-scheduling of codeine products and implementation of the CCI will ensure that pharmacists and licensed dispensers restrict the availability of codeine products for all patients and consumers. Another legislative measure that can potentially combat opioid abuse is the introduction of naloxone medical kits as an OTC product for overdose cases. Furthermore, the allocation of resources to train and specialize HCPs in the field of opioid abuse will ensure the expert implementation of pharmacotherapeutic solutions to the ever-increasing treatment demand for opioid use.

Sedative abuse may have seen a decreasing trend in South Africa between the early 2000s and 2018, however, it is significantly prevalent in Europe, North America and some areas in Asia and Africa (UN, 2019). To ensure the continuous reduction of sedative misuse, sedative-related hospital admission and emergency department visits, South Africa requires specialized staff and resources to deal with the complex therapeutic demands of long term sedative use. Screening and brief intervention can also be used to promptly identify and temporarily manage cases of sedative abuse prior to referral.

2.4) Illicit substances

2.4.1) Cannabis

2.4.1.1) Prevalence data

"Cannabis is the most common illicit substance used in South Africa" (Peltzer and Ramlagan, 2007). The SABSSM of 2005 reported a past 3-month cannabis use prevalence of 2,1% in the South African population, this increased to 3,3% in the SABSSM of 2008 (Peltzer and Ramlagan, 2010). The subsequent South African national population-based survey of 2012 reported a past 3-month cannabis use prevalence of 4,0% (Peltzer and Phaswana-Mafuya, 2018). This is comparable to the global past-year prevalence of 3,8% found in 2017 (UN, 2019). The increasing trend observed in South Africa is similar to the one observed around the world between 1998 and 2007 (UN, 2019). However, the global average prevalence of cannabis use stayed consistent after 2007, meaning that the observed increase between the 2008

SABSSM and 2012 population-based survey was dissimilar to the stable global average prevalence within that same period (UN, 2019).

2.4.1.2) Sociodemographic risk factors

In South Africa, both cannabis use and abuse are more prevalent in younger populations. This is evident from the higher prevalence estimates in youth surveys compared to national population-based surveys (Reddy et al., 2003; Reddy et al., 2010; Reddy et al., 2013a). Additionally, higher proportions of cannabis-related patient admissions were recorded among individuals under the age of 20 in all provinces of South Africa between 2016 and 2018 (Peltzer and Phaswana-Mafuya, 2018; Dada et al., 2019a; Dada et al., 2019b). Cannabis use is also more prevalent in males, with the 2005 and 2008 SABSSM studies as well as the 2002, 2008 and 2011 YRBS studies finding higher rates of cannabis use in men in comparison to women (Reddy et al., 2003; Peltzer and Ramlagan, 2007; Reddy et al., 2010; Peltzer and Ramlagan, 2010; Reddy et al., 2013a). Treatment demand for cannabis use as a primary substance of abuse is more prevalent in males than in females according to SACENDU reports between January 2016 and December 2018 (Dada et al., 2019b). National population-based cross-section surveys have also found higher rates of cannabis use in urban areas and the coloured population (van Heerden et al., 2009; Peltzer and Ramlagan, 2007; Reddy et al., 2010; Peltzer and Ramlagan, 2010; Reddy et al., 2013a; Peltzer and Phaswana-Mafuya, 2018). Other demographic factors that contribute to higher cannabis prevalence include the Gauteng province, lower education levels, psychiatric disorders, risky sexual behaviour, and unemployment (Koen et al., 2009; Peltzer and Ramlagan, 2010; Okpataku et al., 2014; Saban et al., 2014; Peltzer and Phaswana-Mafuya, 2018).

2.4.1.3) Management of cannabis use

Cannabis use disorder (CUD) is a substance-related condition that can benefit the most from SBIRT strategies. Pharmacological interventions for cannabis abuse are in the preliminary stages of research and implementation, with substances like Bupropion, Baclofen, Lithium and Nabilone reducing the symptoms of cannabis use withdrawal in clinical trials (Sherman and McRae-Clark, 2016). This prioritizes the efficacy of brief intervention, which is mainly done through CBT, motivational enhancement therapy (MET), and contingency management (CM) (Sherman and McRae-Clark, 2016). A few foreign studies found efficacy

in brief intervention strategies. Mitchell et al. (2013) conducted a systematic review on the effectiveness of SBIRT for alcohol and substance use in adolescent populations. The study found three randomized controlled trials (RCT) between the years 2005 and 2009 that yielded decreased cannabis use within 3-month or 12-month periods following patient screening, BI and MI for substance use (Mitchell et al., 2013). The first RCT, conducted by Bernstein et al. (2009), found that 45% of participants that were given brief intervention and motivational interviewing for substance use were cannabis abstinent after 12 months, whereas 22% of participants in the control group were cannabis abstinent in the same respect. A similar study conducted in an American primary care clinic found that brief MI intervention significantly decreased marijuana use, intention to use, and prevalence estimates of marijuana use at a 3-month baseline (D'Amico et al., 2008). Lastly, Gray, McCambridge and Strang (2005) found similar efficacy in these strategies, wherein cannabis use decreased (at 3-month follow up) in a population of adolescents in London following the implementation of an SBI model. These findings show that SBIRT strategies in healthcare settings are effective in reducing cannabis use. These strategies are primarily psychosocial and require good patient monitoring and specialist psychotherapy. The presence of this in the South African public hospital setting is limited.

2.4.2) Heroin

2.4.2.1) Prevalence data

Heroin is the most frequently used illicit opioid in the country and made up the majority of the past 3-month opioid use prevalence rates found in the 2005 SABSSM (0,1%), 2008 SABSSM (0,5%) and the 2012 South African national population-based survey (0,3%) (Peltzer and Ramlagan, 2010; Peltzer and Phaswana-Mafuya, 2018). Heroin treatment demand is a major problem in South Africa's healthcare population, with its contribution to substance-related admissions increasing from 12,9% in 2016 to 17,7% in 2018 (Dada et al., 2017b; Dada et al., 2019b). In 2017, approximately 0,6% of the global population aged 15-64 used heroin/opiates, with the highest prevalence rates found in Asia, North America and Europe (UN, 2019). South African estimates, similar to other African estimates, are considerably lower than the global average as well as the prevalence in most global regions (Peltzer and Ramlagan, 2010; Peltzer and Phaswana-Mafuya, 2018; UN, 2019).

2.4.2.2) Sociodemographic risk factors

Both the YRBS studies of 2008 and 2011 found heroin use to be more prevalent in males and the coloured population (Reddy et al., 2010; Reddy et al., 2013a). These two population groups also contributed heavily to heroin admissions between 2015 and 2018 (Dada et al., 2019c). As of 2012, the South African national population-based survey found higher rates of illicit opioid use (mainly heroin) in younger age, coloured race, unemployment, psychological health distress, hazardous/harmful alcohol use, and risky sexual behaviour (two or more sexual partners) (Peltzer and Phaswana-Mafuya, 2018).

2.4.2.3) Management of heroin use

Pertaining to heroin use, information and education was cited as a significant priority in intervention implementation and management. Brief intervention in the form of MI helps to facilitate cognitive restructuring in heroin users. This strategy also holds significance in the SUD treatment field, where the improvement of therapeutic skills and professional qualifications of healthcare professionals and treatment service providers is of utmost importance for South Africa. Cases of chronic heroin use disorder (HUD) can be met with high level early intervention and long-term care. Increased accommodation and facilities for heroin use disorder patients (such as halfway houses) can contribute to the long-term care of patients. Similar to the misuse of pharmaceutical opioids, heroin addiction can be managed with the use of buprenorphine or methadone as substitution therapy. Needle exchange programs are also useful in reducing the risk of contracting HIV, hepatitis and infectious diseases in users that share needles (Dos Santos et al., 2010).

2.4.3) Psychostimulants

2.4.3.1) Prevalence

The SABSSM survey of 2008 reported a past 3-month prevalence of 0,7% for amphetamine-type stimulants (ATS) use and 0,6% for cocaine use (Peltzer and Ramlagan, 2010). These rates decreased by the 2012 South African national population-based survey to past 3-month prevalence rates of 0,3% for both ATS and cocaine use (Peltzer and Phaswana-Mafuya, 2018). South Africa's recorded past 3-month cocaine use prevalence of 0,3% in 2012 is similar to both the average global past-year prevalence (0,4%) in 2018,

however, global cocaine use prevalence rates increased from the early 2000s to 2018, unlike the trend seen between 2008 and 2012 in South Africa (Peltzer and Ramlagan, 2010; Peltzer and Phaswana-Mafuya, 2018; UN, 2019). This trend is true from ATS use as well, with the global prevalence showing an increasing trend within the 21st century and the South African prevalence showing a decrease between the two most recent national cross-sectional surveys (Peltzer and Ramlagan, 2010; Peltzer and Phaswana-Mafuya, 2018; UN, 2019). It is important to note that the recorded prevalence rates globally and in South Africa were done differently, with global studies recording past-year prevalence rates and South African cross-sectional surveys recording past 3-month prevalence rates. Cocaine treatment demand also experienced a decrease between 2007 and 2018 according to SACENDU (Phase 45) and the South African National Council on Alcoholism and Drug dependence (Ramlagan, Peltzer and Matseke, 2010; Dada et al., 2019b). Inversely, methamphetamine treatment demand increased between 2002 and 2018, with significant increments in the Eastern and Western Cape regions (Dada et al., 2016; Dada et al., 2019c).

2.4.3.2) Sociodemographic risk factors

The 2008 SABSSM and 2012 national population-based survey found high methamphetamine use rates in young and middle-aged groups, coloureds, urban areas and the Western Cape (Peltzer and Ramlagan, 2010; Peltzer and Phaswana-Mafuya, 2018). The same two surveys found the highest prevalence rates of cocaine use in young and middle-aged groups, whites, urban areas, and the Kwa-Zulu Natal (KZN) province (Peltzer and Ramlagan, 2010; Peltzer and Phaswana-Mafuya, 2018). Higher prevalence rates were found in men for both cocaine and methamphetamine (Peltzer and Ramlagan, 2010; Peltzer and Phaswana-Mafuya, 2018). Additionally, the 2012 national population-based survey found higher prevalence rates in both substances in individuals with risky sexual behaviour and hazardous/harmful drinking, as well as individuals with psychological health distress in methamphetamine use only (Peltzer and Phaswana-Mafuya, 2018).

2.4.3.3) Management of psychostimulant use

There is evolving evidence for the effectiveness of SBIRT on illicit substance use (Ciccarone, 2011). This is supported by two RCTs that effected reductions in heroin, cocaine and other illicit drug use by utilizing brief motivational intervention and referral to specialty treatment (Bernstein et al., 2005; Madras et al.,

2009). McKetin et al. (2012) found that a residential rehabilitation strategy involving integrated services and therapeutic activities was effective in reducing methamphetamine use in the long term. Antidepressants, anxiolytics, and neuroleptics can all be used (in methamphetamine abuse) for symptomatic relief, recent use, intoxication, and marginally for withdrawal symptoms (Rawson, 2013). The initiation of abstinence and prevention of relapse are in the development stage for methamphetamine-associated treatment goals; with substances like bupropion, modafinil and baclofen exhibiting slight efficacy in treating methamphetamine addiction (Rawson, 2013). Modafinil has also shown efficacy in the management of cocaine use, with it having significant effects in reducing the weekly use of cocaine (in patients without a history of alcohol dependence), prolonging the maximum duration of cocaine abstinence, and reducing cocaine cravings (Anderson et al., 2009). Additionally, methylphenidate has shown effectiveness as a stimulant substitution therapy for cocaine, with a 2006 study reporting that methylphenidate associated with improvement in ADHD symptoms was associated with a reduction in cocaine use (Levin et al., 2007).

2.4.4) Inhalants

2.4.4.1) Prevalence

The SABSSM survey of 2008 reported a past 3-month prevalence of 0,5% for inhalant use among South African adults (Peltzer and Ramlagan, 2010). A lower prevalence rate of 0,2% was found in the 2012 South African national population-based survey (Peltzer and Phaswana-Mafuya, 2018). This decreasing trend in inhalant use prevalence is similar to the decreasing trend in the treatment demand for inhalant abuse in South African clinics. The SACENDU reports that, between 2000 and 2018, the treatment demand for inhalants as a primary substance of abuse decreased to less than 1,0% in most regions of South Africa (Phase 45) (Dada et al., 2019b). The prevalence rates observed in the two national surveys are slightly lower than the past-year prevalence rate of 0,7% observed in the US in 2015, however, the difference between recording past 3-month and past-year prevalence data may mean that South Africa's prevalence rates are underestimated.

2.4.4.2) Sociodemographic risk factors

Risk factors involved with inhalant use varies between two surveys, with the 2008 SABSSM reporting higher rates in middle-aged, low-income black individuals in KZN and the 2012 national population-based survey reporting higher rates in young-to-middle-aged coloured individuals in Free State (Peltzer and Ramlagan, 2010; Peltzer and Phaswana-Mafuya, 2018). Inhalant use is significantly higher in adolescents (12 - 18 year olds) in comparison to any other age group, as the prevalence of inhalant use in the YRBS studies of 2008 and 2011 were much higher than national population-based surveys (Reddy et al., 2010; Reddy et al., 2013a).

2.4.4.3) Management of inhalant use

With inhalant abuse, prevention and early intervention is the main therapeutic strategy. Primary prevention methods (such as educational strategies on the harms of the substance), secondary prevention methods (early identification and intervention for patients with preclinical symptoms or risk factors associated with use, however no confirmed diagnosis), and tertiary prevention methods (reducing the negative effects and treating substance-related side effects) are strategies that clinicians should be aware of for effective inhalant prevention and intervention. Treatment during inhalant intoxication includes medical monitoring and supportive care, such as airway monitoring, hydration, and cardiorespiratory stabilization. Inhalant abuse and intoxication are difficult to diagnose using clinical assessments, urine screening, and lab tests, therefore verbal screening of patients in healthcare settings can help identify cases of risky inhalant use. This shows that the use of a screening interview tool is actually necessary in identifying both inhalant-induced disorder and inhalant use disorder (Nguyen, 2016).

2.4.5) Illicit substances: Discussion

The prevalence of illicit drug use is not well documented in the general adult population of South Africa. There are not enough cross-sectional surveys representing national prevalence data and the latest population-based survey (2012) is years behind studies in other countries. The most recent trend seen in the South African adult population was an increase in past 3-month illicit drug use prevalence from 3,7% in 2008 to 4,4% in 2012 (Peltzer and Ramlagan, 2010; Peltzer and Phaswana-Mafuya, 2018). This was characterized by a drastic incline in cannabis use and a slight decline in the use of other illicit substances

(Figure 5). Cannabis is the most used illicit substance in the world, and the prevalence of its use has shown significant increases over the years in most global regions (Patel et al., 2016). Cannabis use gained a large following in South Africa partially due to its proven therapeutic efficacy in certain medical conditions, its minimal physical harm to users in comparison to other psychoactive substances, and its social acceptance predominantly among youth (Reiman, 2009; Pierre, 2019; Schrader et al., 2019). Cannabis was decriminalized for home use in South Africa in 2018 (Parry, Myers and Caulkins, 2019). The treatment demand for cannabis use is, however, still a major problem in South Africa as it is the highest substance-related treatment demand in Gauteng, Western Cape and the Northern Region of South Africa (Dada et al., 2019c). With the treatment demand outweighing the supply, public healthcare services can make use of SBIRT strategies for cannabis abuse. Its application is far more researched than in other illicit substances and has shown its efficacy in both short-term and long-term reduction of cannabis use (Mitchell et al., 2013). Brief intervention for cannabis use, generally in the form of MI, CBT and motivational enhancement therapy (MET), is a timeous and cost-effective manner of managing and preventing cannabis abuse (Halladay et al., 2018).

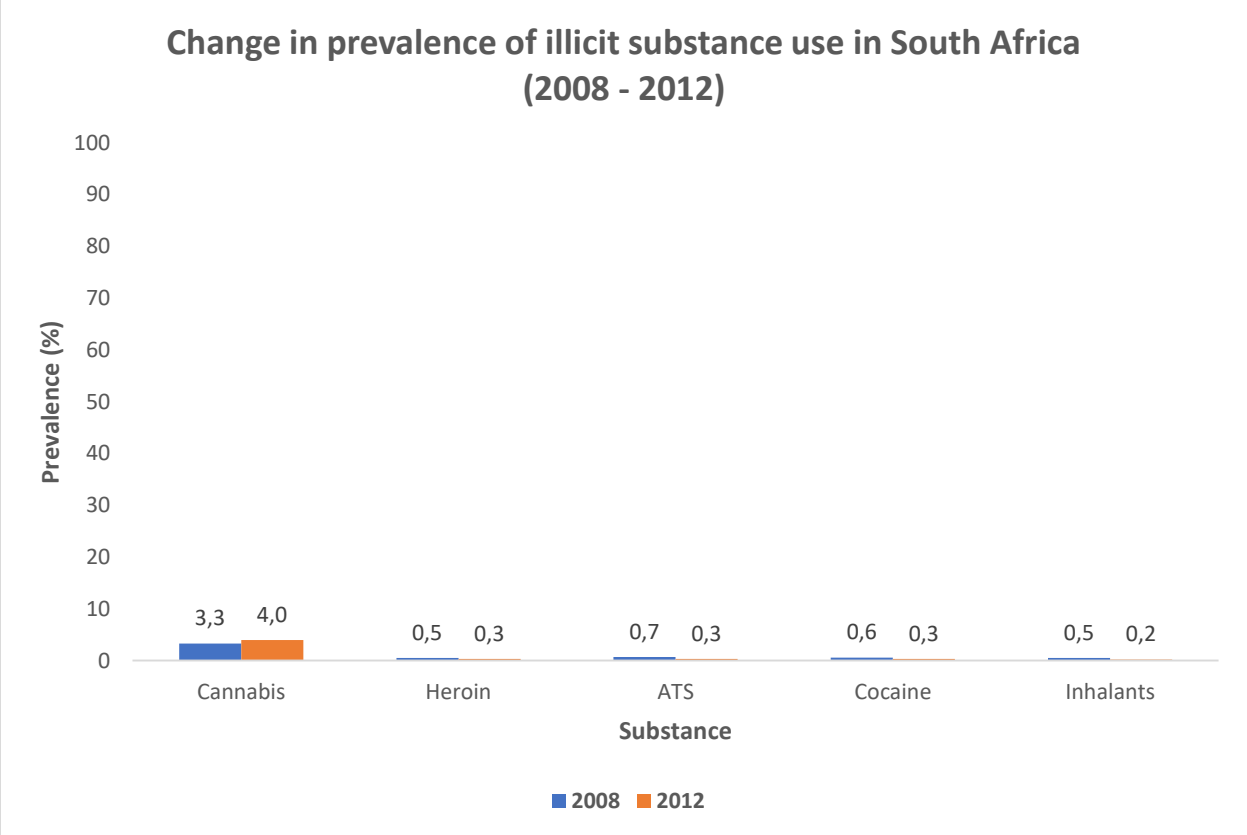

Figure 5: Trends in illicit substance use in South Africa.

Methamphetamine and heroin abuse contribute significantly to South Africa's substance-related treatment demand. This is largely due to the fact that both substances can lead to very severe medical problems, mainly characterized by methamphetamine-induced psychosis and HIV contraction in heroin needle use (Plüddemann et al., 2008; Thomas et al., 2016). Methamphetamine has largely been a substance abused in Western and Eastern Cape whereas heroin abuse is high in substance-related clinic admissions in KZN, Gauteng and the Northern region of South Africa (Dada et al., 2019c). Cocaine and inhalant abuse represent two substance-related admission categories that experienced treatment demand decreases between 2000 and 2018 in most regions of the country (Dada et al., 2019c). Research into SBIRT for all four aforementioned substances is growing but sparse; and treatment of illicit substance intoxication, dependence, abuse and withdrawal focuses on specialist rehabilitation, CBT and pharmacological replacement therapy (Saitz, 2014). Patient screening (in the form of interviews) is however, a gap in the approach to providing therapy for these cases, as the diagnosis of SUD or identification of patients at risk of developing SUD is not as prioritized as the remediation of substance intoxication, overdose or withdrawal. This is particularly true in the South African public healthcare sector. By introducing screening interviews to public healthcare services, informed decisions can be made regarding the allocation of resources and referral for certain illicit substance abuse cases.

2.5) Conclusion

Alcohol is currently the most prevalent substance identified as being misused at a national level in South Africa, with 32.8% of the population consuming alcohol within the year of 2016 (NDoH, 2019). This high prevalence is partly due to the fact that alcohol is legal, extensively advertised, and is not a public health priority (Snopek et al., 2018; Dasgupta, 2019). However, these rising trends have led to an increase in risky drinking, which is a risk factor for alcohol dependence and other drug use (Peltzer and Phaswana-Mafuya, 2018). Cannabis is the most prevalent illicit substance in South Africa, with a past 3-month cannabis use prevalence of 4.0% being recorded in the 2012 national population-based survey (Peltzer and Phaswana-Mafuya, 2018). Research into cannabis use has found various health and therapeutic benefits for both tetrahydrocannabinol (THC) and cannabidiol (CBD), two of the main psychoactive constituents in cannabis (Pierre, 2019; Schrader et al., 2019). These findings may have contributed to an increasing trend in cannabis use prevalence in South Africa. The substance has now been decriminalization for home use in South Africa (effective September 2018), suggesting that more recent prevalence findings may be higher

than expected (Parry, Myers and Caulkins, 2019). Another substance that saw a form of increasing trend is methamphetamine. The substance saw a decrease in national prevalence of use; however, it has seen a drastic increase in treatment demand after the year 2002 (Dada et al., 2019c). These findings are primarily due to the increase of methamphetamine abuse in Western Cape and Eastern Cape (Dada et al., 2016a). Tobacco, opioids, cocaine and inhalants saw no significant increases in prevalence according to national cross-sectional surveys, however, tobacco is the second most used substance in South Africa. Non-medical use of codeine saw a slight increase in treatment demand between 2015 and 2018, and inhalant use is still quite prevalent in the low-income black population of KZN (Dada et al., 2017b; Dada et al., 2019b). Efforts to control the use of these substances is still of utmost importance.

Males, the coloured population, and young individuals contribute significantly to substance use in South Africa. These represent population groups that need to be targeted for intervention. Other notable findings include the contribution of psychological distress to illicit drug use, the high prevalence of pharmaceutical medication misuse in the Indian population, and the non-medical use of codeine among females. Table 1 describes the factors that potentiate substance use in South Africa according to national cross-sectional surveys. The table only summarizes what was found on the population groups that highly contributed to the prevalence of use for each substance according to epidemiological data in South Africa. Row 10 of Table 1 comments on the effect of psychological distress, risky sexual behaviour, and hazardous/harmful drinking on the use of illicit and pharmaceutical substances only. The information on these three factors is adapted from the national population-based survey of 2012, which did not include information on licit substances.

Table 1: Sociodemographic factors and medical conditions that contribute heavily to the prevalence of each substance category in South Africa

	LICIT SUBSTANCES		**PHARMACEUTICAL SUBSTANCES**		**ILLICIT SUBSTANCES**				
	Alcohol	**Tobacco**	**Codeine**	**Sedatives**	**Cannabis**	**Heroin**	**Methamphetamine**	**Cocaine**	**Inhalants**
Sex	Male	Male	Female	-	Male	Male	Male	Male	-
Age	Middle-aged	Middle-aged	-	-	Younger age	Younger age	Younger and middle-aged	-	Younger age
Race	White and Coloured	Coloured	Coloured and Indian	Indian	Coloured	Coloured	Coloured	White	Coloured
Settlement	Urban	-	Urban	Urban	Urban	-	Urban	Urban	-
Province	-	Northern and Western Cape	Gauteng	-	Gauteng	-	Western Cape	KwaZulu-Natal	KwaZulu-Natal
Education level	-	-	Middle-to-higher	Higher	Lower	-	-	-	-
Employment status	-	-	-	-	Unemployed	Unemployed	-	-	-
Presence of psychological distress, risky sexual behaviour and hazardous/harmful alcohol use?	-	-	-	Yes	Yes	Yes	Yes	Yes	-

Several healthcare and legislative strategies can be employed to combat substance use within South Africa. The introduction or modification of laws, SBIRT, pharmacological interventions and the training of healthcare professionals are just some of the areas that show gaps in South Africa's substance-related healthcare services. Ultimately, raising awareness of substance-related problems as well as consumer and patient education on the negative consequences of substance misuse is important in limiting the prevalence and treatment demand of substance use in South Africa. A key South African framework aimed at achieving these substance use harm reduction strategies is the National Drug Master Plan (NDMP).

2.5.1) The National Drug Master Plan

The NDMP, managed by the Central Drug Authority (CDA) and influenced by United Nations Conventions, outlines South Africa's response to the problem of substance abuse. It is in line with The Prevention of and Treatment for Substance Abuse Act, which provides from substance abuse demand and harm reduction by way of prevention, early intervention, treatment and re-integration strategies (Government Gazette, 2009). The vision and mission of the NDMP is to free South Africa of substance abuse by investing in, coordinating and delivering drug prevention and minimization strategies. They plan to control the demand and supply of substances with a potential for abuse including therapeutic substances. Ultimately, the NDMP has a socio-economic focus and seeks to achieve outcomes such as reduced levels of poverty and inequality, sustainable communities and improved well-being of children. With regards to demand for drugs, the NDMP proposes educational programs, specialized clinical services and community-based information campaigns in order to, for example, train people on how to counter social pressures, provide them with therapy and medical treatment, and assist individuals in the early detection of risky drug use. The supply of drugs is primarily combatted through policing; the role of the NDMP here is to coordinate liaison between the public health sector and the criminal justice system as well as maintain public order by promoting communal awareness on the consequences of criminal activity. The NDMP also focuses on the control of therapeutic and scheduled substances, wherein their main role is to increase the supply of therapeutic medicines for people who need them and simultaneously preventing the misuse and abuse of these medicines. They achieve this by mainly providing an effective supply chain for controlled substances and updating the Standard Treatment Guidelines (STGs) and Essential Medicines List (EML). They also provide for effective research procedures in the field of South African substance abuse by optimizing routine data collection and conducting surveys (Geyer, 2013).

2.6) Study importance

The use of AOD is heavily linked with accidents and injuries, and is thus prevalent in casualty and trauma hospital departments (van Heerden et al., 2009; Myers et al., 2012). This study synthesizes data on the prevalence and sociodemographic risk factors of substance use in one of the most primary areas of South African public healthcare, the emergency casualty unit. In doing so, the study quantifies the extent of substance use in a general emergency department population as opposed to the prevalence of substance use in patients seeking substance-related or psychiatric treatment. This helps shed light on the presence of risky substance use or SUD in patients that are deemed to only have an injury at the time they present to the emergency department. It is a more analytical and integrated approach to healthcare as HCPs will be able to identify links between a patient's substance use and their health problems. To aid this practice, this study also seeks to identify patients that are at-risk of developing SUD or substance-related problems.

Chapter 3: Study methodology

This chapter explains the overall approach of the study, including the nature of the research methodology, the means of data collection, and the procedures employed to store, analyze and present the data. This study was conducted according to the study protocol finalized in June 2019 (Appendix C). It was a cross-sectional descriptive study that used quantitative research methodology. A screening interview was used to facilitate data collection and STATA was the main tool used to analyze the data.

In this study, 'substance use' and 'substance involvement' were both defined as the non-medical use of psychoactive substances. Lifetime substance use refers to substance use that has occurred at any point in a user's life. Past 3-month substance use refers to substance use within three months of the reporting of information. Treatment demand refers to the percentage of hospital/clinic admissions for a certain substance of the total substance-related admissions. Amphetamine-type stimulants include club drugs, ecstasy, tik and methamphetamine. Other drug use refers to illicit drug use. Substance use-associated risk is interchangeable with substance-related risk. 'Risk factor' and 'association' are interchangeable. A protective factor is the opposite of a risk factor, whereby the association found is significantly less likely to result in substance use. 'Risk profile' and 'risk category' are interchangeable. Population group refers to a group of people that fall under a particular sociodemographic characteristic, for example, the black population group falls under the sociodemographic factor of race/ethnicity.

3.1) Study design and instrumentation

The cross-sectional descriptive study made use of a screening interview that included a sociodemographic and patient condition information sheet (Appendix D) and the WHO ASSIST screening tool (Appendix E). The sociodemographic information sheet was used to record patient details that represent the potential risk factors for substance use in the study. The WHO ASSIST form comprised of nine different classes of drugs (tobacco products, alcoholic beverages, cannabis, cocaine, ATS, inhalants, sedatives or sleeping pills, hallucinogens, and opioids) that were assessed for substance involvement among patients. The use of this screening tool elicited the prevalence of substance use and the presence of substance use-associated risk. The WHO ASSIST form is also linked to two manuals that guide HCPs on how to provide counselling and brief intervention to substance abuse patients (Appendix F). This was effective in managing and counselling study participants once interviews were complete.

3.1.1) Reliability and Validity

The WHO ASSIST screening tool has been used in various studies for data collection and is generally suitable for the identification of patients that are at risk of health and/or social problems due to their substance use. The screening tool was successfully used previously in two Western Cape studies for the purpose of determining the willingness of substance use disorder patients to receive intervention as well as formulating a hospital-based SBIRT model for substance abuse patients (Sorsdahl et al., 2012; Sorsdahl et al., 2017). The logic of the questions asked in the interview was relatively simple and the time it took to complete the questionnaire (15 to 45 minutes) was suitable enough for the emergency department. Pertaining to the sociodemographic profile of patients recorded in the screening procedure, cross-sectional surveys have been used in several studies that investigated the risk factors associated with substance use and abuse. These include foreign research projects and national population-based surveys (Cleveland et al., 2008; Swendsen et al., 2009; Demirci et al., 2014). The recording of sociodemographic characteristics allows us to compare different groups of a population within the context of substance use.

3.2) Study site

The study was conducted in the ED of Charlotte Maxeke Johannesburg Academic Hospital in Parktown, Johannesburg. The hospital attends to approximately 48 000 ED visits per year from varying demographics and represents a viable government body wherein the study can be executed. The institution has an average patient population of 781 843, annually. The institution's large patient population in comparison to other public hospitals, its proximity to the Wits University Health Sciences Campus, and its location in a multi-ethnic part of Johannesburg, were the main reasons why the hospital was selected for this study.

3.3) Study sampling

A sample size of 237 patients was calculated for the study. The sample size was calculated using the formula for difference in proportions (Z score test), which accounts for variability, effect size and desired level of statistical significance. The Z score test is used to determine whether two populations differ significantly on a single characteristic. The ratio used in the calculation was a ratio of 2:3. This represents

the proportion of substance abusers to non-abusers based on literature (Patston, Travers and Newcombe, 2017). Equation 1 shows the formula for difference in proportions.

Equation 1: Sample size calculation

$$Z = \frac{\widehat{p_1} - \widehat{p_2}}{\sqrt{\hat{p}(1-\hat{p})(\frac{1}{n1} + \frac{1}{n2})}}$$

Z= Difference between two population proportions

p1= Proportion from the first population

p2= Proportion from the second population

n1= sample size of first sample

n2= sample size of second sample

3.3.1) Inclusion criteria

Patients between the ages of 18 and 80 that presented to the ED of CMJAH were approached to participate. The study looked to identify the prevalence of substance use within the ED patient population and did not focus only on the selection of patients who presented with clinical signs of substance induction. There was a possibility of substance involvement within any patient that presented to the ED and it was imperative to identify risky substance use in as many patients as possible for the purpose of accurate data collection. The principal investigator (PI) only screened patients that gave consent, were completely coherent and responsive, and understood the interview and its requirements based on the study information document (SID).

3.3.2) Exclusion criteria

Patients that were physically and mentally incapable of completing the interview, such as unconscious, semi-conscious, and cognitively impaired patients, were excluded from selection. These patients may not have been in the right state of mind to give consent, understand the SID, or understand the interview. The state of the patient was confirmed by an ED doctor. Patients below the age of 18 were not screened due to the legal implications relevant to screening minors, for example, the difficulty of withholding patient information from the parent/legal guardian. Patients above the age of 80 were also not screened as they had a higher risk of experiencing adverse events whilst in the emergency department.

3.4) Study procedure

The study was conducted between the 2nd of September and the 1st of December in 2019. The ethics committee and the casualty unit of the hospital granted permission (Appendix G) to conduct the study. The screening interviews were performed by the principal investigator (PI) of the study. The staff within the casualty unit received a briefing well before the commencement of data collection. The need for this was to familiarize the ED staff that elected to partake in the study with the purpose and requirements of the research study. Doctors and nurses who elected to partake in the study had the task of helping identify patients for screening and in a few cases, attending to patients that required brief intervention. Screening forms, SIDs (Appendix H), and informed consent forms (Appendix I) were printed by the PI. Patients in the casualty unit who met the inclusion criteria were approached with an informed consent form and SID detailing the purpose and procedure of the study. The content of the SID included information on the purpose of the study, a description of the study, the benefits and risks of participating in the study, as well as the approximate time the study would take. The informed consent form was simply a means for the participant to give signed permission to the PI to conduct the interview. All questions and concerns participants had about the study procedure were answered prior to the signing of the consent form. Patients who signed the consent form were subsequently interviewed. This procedure continued until the desired 237 study participants sample was met. All interviews were conducted by the PI. Most interviews took place within the demarcated area where the patient was treated, however all patients were asked if they wanted to conduct the interview in a private area in order to maintain privacy and confidentiality, of which some patients elected to conduct the interview privately. Interviews lasted between 15 to 45 minutes, this was dependent on how well the participant detailed their substance use experiences and how long it took to explain the purpose of the study.

In the case of patients that exhibited problematic substance use, the PI (a pharmacist) used information from the WHO ASSIST-linked intervention manuals to provide counselling and brief intervention. The WHO ASSIST-linked manual provides a model for brief intervention in the form of motivational interviewing. This type of interviewing uses empathy, open-ended questions, reflective listening, and summarizing to provide counselling to patients that are at least of medium risk for SUD development. The PI indicated in the patient's record that the interview was conducted and that counselling was provided. Additionally, the PI provided high risk participants with a list of community clinics in the Johannesburg area (Appendix J) as well as a list of resources entailing services for addiction, crisis intervention, counselling, and mental health support groups (Appendix K). These resources were given to the PI by the

psychiatric department of the hospital. All parameters of a high risk patient's substance use were made apparent to the doctor that treated the patient. Figure 6 illustrates the steps taken after identifying the risk category of a patient.

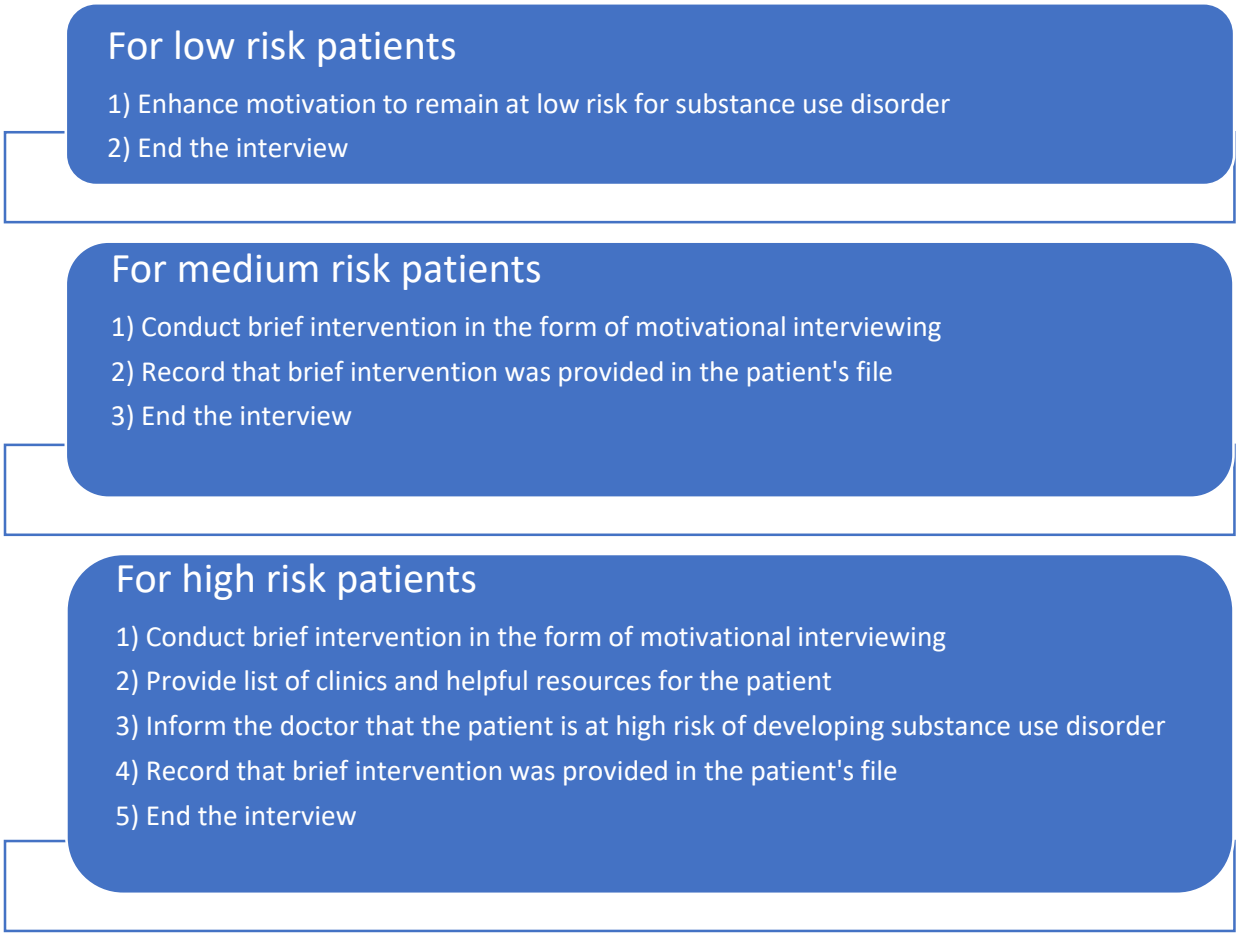

Figure 6: Procedure employed after determining the risk category of a participant.

A distress protocol (Appendix L) was also included in the study for the purpose of remediating any psychological stress that the interview may have inflicted on the patient. The distress protocol is a stepwise guideline that helps determine whether a patient is fit to continue an interview without putting his/her mental health in jeopardy. It includes conditions for stopping the interview and providing help for the patient or encouraging the patient to seek care.

During the interview, the researcher ensured that participant confidentiality was maintained by excluding any identifying information about the participant when completing the interview. Instead, data collection

was facilitated by means of numbering each interview e.g. 1,2,3 up to 237. Once all interviews were conducted, the results were entered into a password protected REDcap database. Only the PI had access to the password thereby maintaining confidentiality and security of data. The lifetime and past 3-month substance use prevalence in the population of screened patients were then recorded as percentages. This was done for each substance category. The general information recorded for all patients was categorized under each sociodemographic heading, namely, sex, age, race, family history of substance abuse (FHSA), employment, socio-economic class (SEC), and education. Substance-related health and/or social risk was also measured in each interview. Patients were classified into different risk categories (low-risk, medium-risk, or high-risk) based on their interview responses to questions on the quantity, frequency, and degree of negative impact of a patient's substance use. A total of seven questions contributed to determining a patient's risk score. Each question was given a numerical score and the sum of all seven scores represented the total risk score of the patient. For alcohol, a score of 0-10 meant that the patient was at low-risk of developing substance-related health or social problems. The score for medium risk for alcohol was 11 – 26. For all other substances, a low-risk score was 0-3 and medium-risk score was 4-26. A score of 27 and above for any substance classified the patient as high-risk for developing substance-related problems. A patient's risk score and category were determined by the highest scoring substance. The significance of identifying a participant's risk category was to determine the patient's likelihood of developing a substance use dependence/disorder as well as the patient's likelihood of experiencing substance-related health and/or social problems. Once the interview was completed, the results were electronically recorded for the purpose of data analysis.

3.5) Data analysis

The Research Electronic Data Capture (REDCap) was used for data collection. The data was transferred to excel and then STATA for analysis. Cross tabulation of substance use against the sociodemographic factors were done to calculate prevalence of lifetime and past 3-month substance use. With the use of binary logistic regression, lifetime and past 3-month substance use in the context of each sociodemographic factor were analyzed for statistical significance (A *p*-value of less than 0,05 is considered as statistical significant). Multinomial logistic regression was conducted to determine the significant associations for each substance of use as well as for the different substance-related risk categories. Odds ratios obtained from the logistic regression calculations were used to determine associations. The use of this method

determined the risk factors for substance use. In determining the substance use risk factors for the study, the sample size of each population group was taken into account when calculating which sociodemographic characteristic was statistically significant, ensuring more accurate results.

3.6) Ethical considerations

Permission to conduct the study was granted by the Wits University Human Research Ethics Committee (HREC) (Ethics number: M190475). Participants of the study signed informed consent sheets, acknowledging that they consented for the interview to take place and that they understood the content of the study. To ensure confidentiality, no information that could identify the study participants was recorded or used in the study.

Chapter 4: Results

This chapter depicts findings among the 237 selected study participants in accordance with the study objectives. A description on the characteristics of the study participants as well as the percentage distribution of participants by substance category is first given. Lifetime and past 3-month substance use prevalence are described by both substance category and sociodemographic characteristic. Sections detailing the sociodemographic factors that were determined to be risk factors for substance use as well as the number of participants that were at risk of developing substance-related problems are also included. In this chapter, the words 'sociodemographic subgroup' and 'population group' are interchangeable. 'Sociodemographic factor' or 'sociodemographic characteristic' encompasses the aforementioned groups (e.g. sex encompasses male and female).

4.1) Characteristics of study participants

This variable looks at the demographics contributing to the study sample as well as how each sociodemographic factor contributed to each substance category. Study participants were categorized by their sex, age, ethnicity/race, whether they had a family history of substance abuse, socio-economic class, employment status, and highest level of education. Figure 7 shows the percentage of each population group within the total sample.

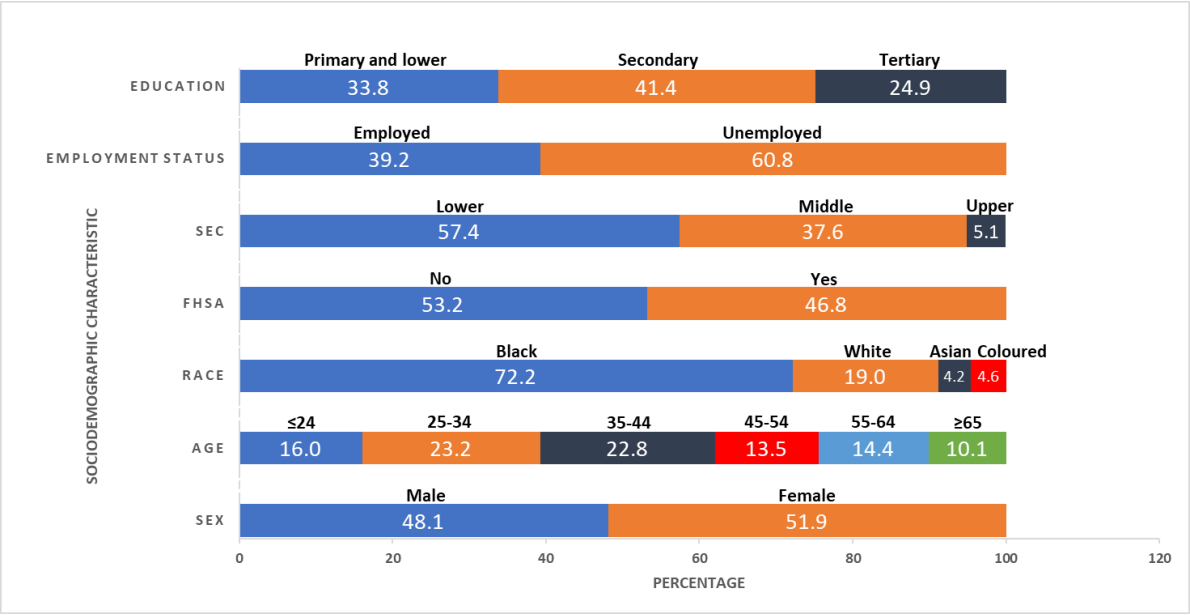

Figure 7: Stacked bar graph showing the percentage distribution of study participants.

Table 2 presents the distribution of the study participants by substance category. Columns 2-10 show the percentage distribution by substance category whereas column 11 shows the percentage distribution among subgroups of each sociodemographic characteristic that makes up the total sample. Of the 237 study participants screened for substance use (Column 11), 51,9% of them were females and 48,1% were males. The age group with the highest percentage of participants was 25-34 years (23,2%), while participants aged 65 and above had the lowest percentage (10,1%). Most of the participants were black (72,2%), had no family history of substance abuse (53,2%), were of lower socio-economic class (57,4%), and were unemployed (60,8%). Regarding highest level of education, 33,8% of participants had primary schooling or lower, 41,4% had secondary schooling, and 24,9% had tertiary schooling.

Table 2: Percentage distribution of the characteristics of study participants by substance use (n=237)

Sociodemographic characteristic	Tobacco (%) (n=111)	Alcohol (%) (n=157)	Cannabis (%) (n=80)	Cocaine (%) (n=22)	Amphetamine type stimulants (%) (n=18)	Inhalants (%) (n=9)	Sedatives (%) (n=22)	Hallucinogens (%) (n=10)	Opioids (%) (n=31)	Total (%) (n=237)
Sex										
Male	64,0	56,7	62,5	40,9	50,0	77,8	50,0	40,0	51,6	48,1
Female	36,0	43,3	37,5	59,1	50,0	22,2	50,0	60,0	48,4	51,9
Age										
18-24	19,8	19,8	31,3	27,3	38,9	44,4	31,8	30,0	48,4	16,0
25-34	23,4	27,4	30,0	27,3	33,3	33,3	36,4	20,0	19,4	23,2
35-44	17,1	18,5	13,8	22,7	22,2	22,2	9,1	30,0	19,4	22,8
45-54	12,6	12,7	12,5	13,6	5,6	0,0	9,1	10,0	0,0	13,5
55-64	15,3	11,5	8,8	9,1	0,0	0,0	13,6	10,0	9,7	14,4
65-80	11,7	10,2	3,8	0,0	0,0	0,0	0,0	0,0	3,2	10,1
Race										
Black	60,4	68,2	71,3	40,9	50,0	88,9	59,1	40,0	67,7	72,2
White	31,5	24,2	18,8	40,9	33,3	11,1	36,4	50,0	19,4	19,0
Asian	2,7	1,9	3,8	0,0	0,0	0,0	4,6	0,0	3,2	4,2
Coloured	5,4	5,7	6,3	18,2	16,7	0,0	0,0	10,0	9,7	4,6
Family history of substance abuse										
No	42,3	44,0	36,3	40,9	44,4	22,2	27,3	30,0	38,7	53,2
Yes	57,7	56,1	63,8	59,1	55,6	77,8	72,7	70,0	61,3	46,8
Socio-economic class										
Lower	55,9	51,0	50,0	50,0	61,1	55,6	31,8	40,0	48,4	57,4
Middle	37,8	43,3	41,3	45,5	27,8	22,2	50,0	40,0	41,9	37,6
Upper	6,3	5,7	8,8	4,6	11,1	22,2	18,2	20,0	9,7	5,1
Employment status										
Employed	33,3	36,3	28,8	45,5	44,4	22,2	31,8	30,0	19,4	39,2
Unemployed	66,7	63,7	71,3	54,6	55,6	77,8	68,2	70,0	80,7	60,8
Level of education										
Primary and lower	37,8	30,6	26,3	18,2	16,7	22,2	4,6	0,0	25,8	33,8
Secondary	36,9	41,4	46,3	40,9	44,4	44,4	63,6	40,0	58,1	41,4
Tertiary	25,2	28,0	27,5	40,9	38,9	33,3	31,8	60,0	16,1	24,9

4.2) Lifetime substance use

This variable looks at the prevalence of participants that ever used psychoactive substances in their lives. The variable is divided into prevalence by substance category and prevalence by sociodemographic factor. The total number of users in each substance category was calculated as a percentage of the total sample to elicit the prevalence rate by type of substance. The number of substance users within a population group (e.g. male or unemployed individuals) was divided by the total number of study participants that make up the same group to determine the substance use prevalence within each sociodemographic subgroup.

4.2.1) Lifetime use prevalence by substance category

Figure 8 shows the prevalence of lifetime substance use. Lifetime substance use prevalence of any substance was 73,4%. In order of highest to lowest prevalence, lifetime prevalence of alcoholic beverages was 66,2%, tobacco products 46,8%, cannabis 33,8%, opioids 13,1%, cocaine 9,3%, sedatives 9,3%, ATS 7,6%, hallucinogens 4,2%, and inhalants 3,8%.

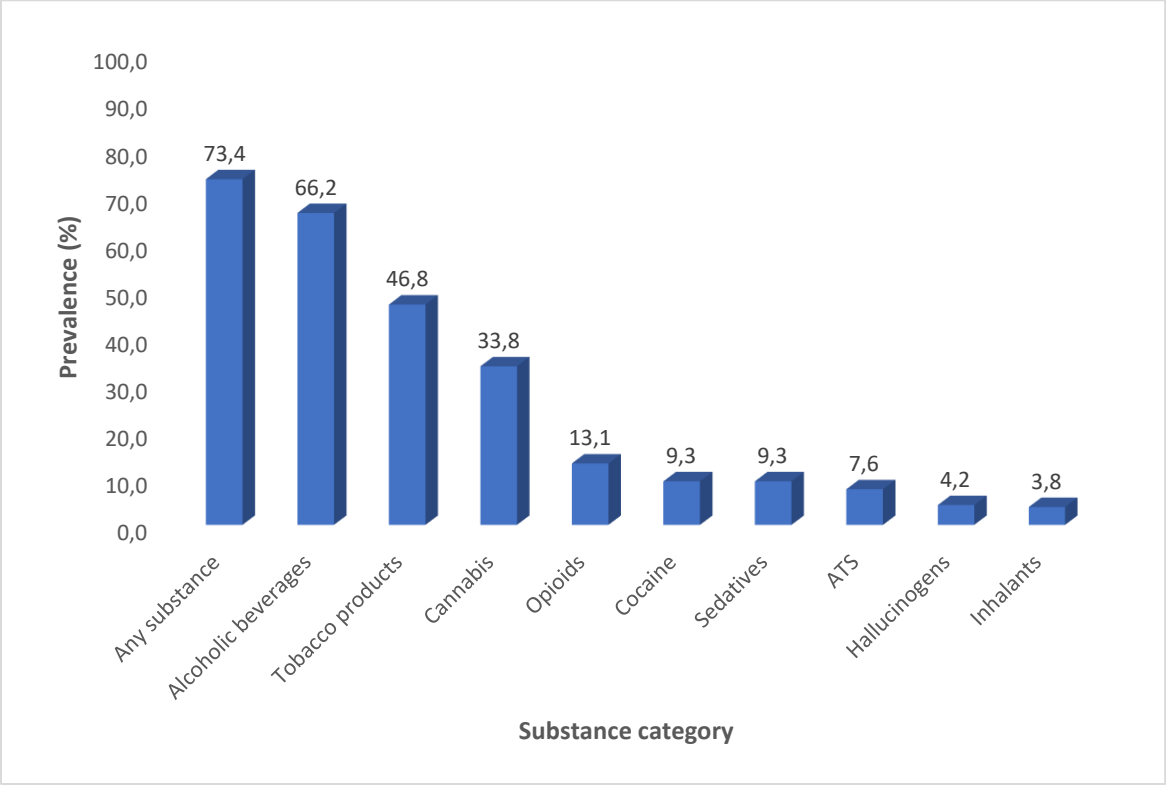

Figure 8: Bar graph showing the prevalence of lifetime substance use by substance category.

4.2.2) Lifetime use prevalence by sociodemographic characteristic

Table 3 shows the prevalence of lifetime substance use by sociodemographic characteristic. For most substances, prevalence of use in males was higher than in females, namely tobacco (62,3%), alcohol (78,1%), cannabis (43,9%), ATS (7,9%), inhalants (6,1%), sedatives (9,7%), and opioids (14,0%). Cocaine and hallucinogen use were the only substances more prevalent in the female sample with 10,6% of women and 7,9% of men using cocaine and 4,9% of women and 3,5% of men using hallucinogens.

Lifetime prevalence of substance use for all substances was highest in the 18-24 age group as well as in people with a family history of substance abuse.

The highest prevalence of lifetime tobacco (77,8%), alcohol (84,4%), sedative (17,8%), and hallucinogen (11,1%) use were seen among the white population compared to other ethnicities. On the other hand, lifetime prevalence of cannabis (45,5%), cocaine (36,4%), ATS (27,3%), and opioid (27,3%) use were highest in coloured participants while lifetime inhalant use was highest among black participants with a prevalence of 4,7%.

Participants belonging to the upper-class had the highest prevalence of tobacco (58,3%), cannabis (58,3%), ATS (16,7%), inhalants (16,7%), sedatives (33,3%), hallucinogens (16,7%), and opioid (25,0%) use among socio-economic groups while participants from the middle-class had the highest prevalence of alcohol (76,4%) and cocaine (11,2%) use.

Unemployed participants had a higher prevalence of substance use for tobacco (51,4%), alcohol (69,4%), cannabis (39,6%), inhalants (4,9%), sedatives (10,4%), hallucinogens (4,9%), and opioids (17,4%) in comparison to employed participants. However, employed participants had higher rates of cocaine (10,8%) and ATS (8,6%) use.

The education level of participants with the highest prevalence of tobacco use was primary and lower schooling with 52,5% of participants within this category having ever used tobacco. Participants with secondary level schooling had the highest lifetime prevalence of sedative and opioid use in the sample with rates of 14,3% and 18,4%, respectively. Participants with tertiary education had the highest prevalence of alcohol (74,6%), cocaine (15,3%), ATS (11,9%), inhalant (5,1%), and hallucinogen (10,2%) use. Prevalence of cannabis use was similar among participants with secondary (37,8%) and tertiary levels of schooling (37,3%). (Table 3)

Table 3: Prevalence of lifetime substance use (Percentage)

Sociodemographic characteristic	Tobacco	Alcohol	Cannabis	Cocaine	Amphetamine type stimulants	Inhalants	Sedatives	Hallucinogens	Opioids
	46,8	66,2	33,8	9,3	7,6	3,8	9,3	4,2	13,1
Sex	*	*	*						
Male (n=114)	62,3	78,1	43,9	7,9	7,9	6,1	9,7	3,5	14,0
Female (n=123)	32,5	55,3	24,4	10,6	7,3	1,6	8,9	4,9	12,2
Age		*	*		*				*
18-24 (n=38)	57,9	81,6	65,8	15,8	18,4	10,5	18,4	7,9	39,5
25-34 (n=55)	47,3	78,2	43,6	10,9	10,9	5,5	14,6	3,6	10,9
35-44 (n=54)	35,2	53,7	20,4	9,3	7,4	3,7	3,7	5,6	11,1
45-54 (n=32)	43,8	62,5	31,3	9,4	3,1	0,0	6,3	3,1	0,0
55-64 (n=34)	50,0	52,9	20,6	5,9	0,0	0,0	8,8	2,9	8,8
65-80 (n=24)	54,2	66,7	12,5	0,0	0,0	0,0	0,0	0,0	4,2
Race	*	*		*	*			*	*
Black (n=171)	39,2	62,6	33,3	5,3	5,3	4,7	7,6	2,3	12,3
White (n=45)	77,8	84,4	33,3	20,0	13,3	2,2	17,8	11,1	13,3
Asian (n=10)	30,0	30,0	30,0	0,0	0,0	0,0	10,0	0,0	10,0
Coloured (n=11)	54,6	81,8	45,5	36,4	27,3	0,0	0,0	9,1	27,3
Family history of substance abuse	*	*	*				*		
No (n=126)	37,3	54,8	23,0	7,1	6,4	1,6	4,8	2,4	9,5
Yes (n=111)	57,7	79,3	46,0	11,7	9,0	6,3	14,4	6,3	17,1
Socio-economic class		*				*	*		
Lower (n=136)	45,6	58,8	29,4	8,1	8,1	3,7	5,2	2,9	11,0
Middle (n=89)	47,2	76,4	37,1	11,2	5,6	2,3	12,4	4,5	14,6
Upper (n=12)	58,3	75,0	58,3	8,3	16,7	16,7	33,3	16,7	25,0
Employment status			*						*
Employed (n=93)	39,8	61,3	24,7	10,8	8,6	2,2	7,5	3,2	6,5
Unemployed (n=144)	51,4	69,4	39,6	8,3	6,9	4,9	10,4	4,9	17,4
Level of education							*	*	
Primary & lower (n=80)	52,5	60,0	26,3	5,0	3,8	2,5	1,3	0,0	10,0
Secondary (n=98)	41,8	66,3	37,8	9,2	8,2	4,1	14,3	4,1	18,4
Tertiary (n=59)	47,5	74,6	37,3	15,3	11,9	5,1	11,9	10,2	8,5

***= significance (p<0,05)**

4.3) Past 3-month substance use

This variable looks at the prevalence of using psychoactive substances between the day of data collection and three months prior. As with lifetime substance use, this section looks at prevalence by both substance category and sociodemographic characteristics.

4.3.1) Past 3-month use prevalence by substance category

Figure 9 shows the prevalence of past 3-month substance use. Past 3-month substance use prevalence of any substance was 52,3%. In order of highest to lowest past 3-month use prevalence, prevalence of use in alcoholic beverages was 40,1%, tobacco products 32,1%, cannabis 16,9%, opioids 4,6%, ATS 2,1%, sedatives 2,1% cocaine 0,8%, hallucinogens 0,0%, and inhalants 0,0%.

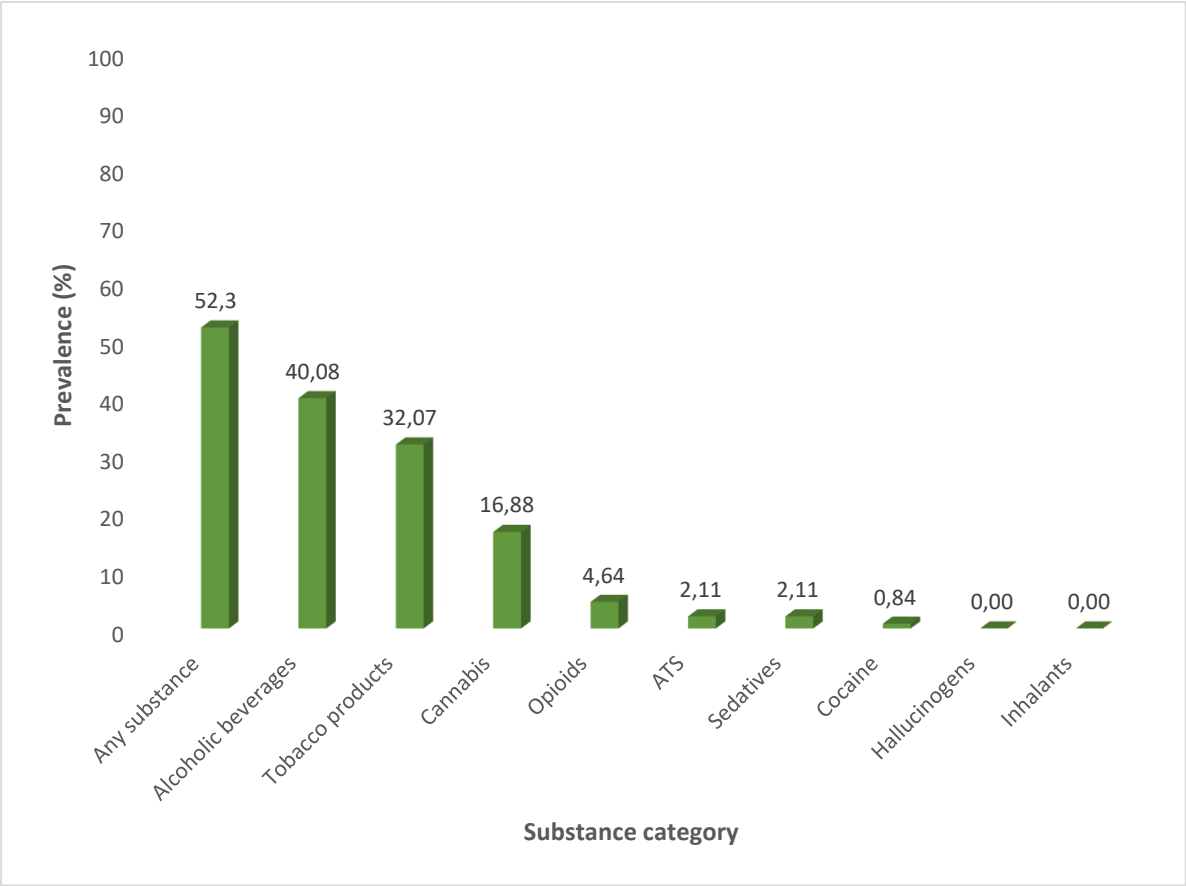

Figure 9: Bar graph showing the prevalence of past 3-month substance use by substance category.

4.3.2) Past 3-month use prevalence by sociodemographic characteristic

Table 4 shows the prevalence of past 3-month substance use by sociodemographic characteristic. No past 3-month inhalant and hallucinogen use was found in the sample, hence past 3-month substance use will be focused on tobacco, alcohol, cannabis, cocaine, ATS, sedatives, and opioids.

Prevalence of substance use within three months prior to participants screening showed that males had higher prevalence for all substance categories.

Likewise, the 18-24-year age group had the highest past 3-month substance use prevalence in all substance categories.

Black participants had the highest past 3-month rates of cannabis and cocaine use, white participants had the highest past 3-month rates of tobacco, alcohol and sedative use, and coloured participants had the highest past 3-month rates of ATS and opioid use.

Participants without a family history of substance abuse had a higher past 3-month prevalence of cocaine use while participants with a family history of substance abuse had higher past 3-month prevalence of use for all other substances.

Tobacco, alcohol, cannabis, and sedative use were more prevalent in the upper class; ATS and opioid use were more prevalent in lower class while cocaine is more prevalent among the middle-class participants.

The prevalence of alcohol and sedative use were marginally higher among the employed participants while higher prevalence of tobacco, cannabis, cocaine, ATS, and opioid use were seen among the unemployed participants. Participants with secondary schooling had the highest prevalence rates of alcohol, cannabis, cocaine, ATS and opioid use; those with primary and lower levels of education had a higher prevalence of tobacco use and those with tertiary education had a higher rate of sedative use. (Table 4)

Table 4: Prevalence of past 3-month substance use per sociodemographic characteristic (Percentage)

Sociodemographic characteristic	Tobacco	Alcohol	Cannabis	Cocaine	Amphetamine type stimulants	Inhalants	Sedatives	Hallucinogens	Opioids
	32,1	40,1	16,9	0,8	2,1	0,0	2,1	0,0	4,6
Sex	*	*	*		*				*
Male (n=114)	43,0	51,8	24,6	1,8	4,4	0,0	2,6	0,0	8,8
Female (n=123)	22,0	29,3	9,8	0,0	0,0	0,0	1,6	0,0	0,8
Age	*	*	*		*				*
18-24 (n=38)	50,0	65,8	50,0	2,6	10,5	0,0	5,3	0,0	13,2
25-34 (n=55)	40,0	49,1	21,8	1,8	1,8	0,0	3,6	0,0	1,8
35-44 (n=54)	27,8	31,5	11,1	0,0	0,0	0,0	1,9	0,0	7,4
45-54 (n=32)	31,3	40,6	0,0	0,0	0,0	0,0	0,0	0,0	0,0
55-64 (n=34)	17,7	20,6	5,9	0,0	0,0	0,0	0,0	0,0	2,9
65-80 (n=24)	16,7	25,0	4,2	0,0	0,0	0,0	0,0	0,0	0,0
Race	*								
Black (n=171)	26,9	41,5	19,3	1,2	2,3	0,0	1,8	0,0	4,7
White (n=45)	53,3	42,2	11,1	0,0	0,0	0,0	4,4	0,0	2,2
Asian (n=10)	30,0	30,0	10,0	0,0	0,0	0,0	0,0	0,0	0,0
Coloured (n=11)	27,3	18,2	9,1	0,0	9,1	0,0	0,0	0,0	18,2
Family history of substance abuse	*	*	*						
No (n=126)	25,4	31,0	8,7	0,8	2,4	0,0	0,8	0,0	3,2
Yes (n=111)	39,6	50,5	26,1	0,9	1,8	0,0	3,6	0,0	6,3
Socio-economic class			*				*		
Lower (n=136)	33,1	36,0	12,5	0,7	2,9	0,0	0,7	0,0	5,9
Middle (n=89)	28,1	43,8	18,0	1,1	1,1	0,0	2,3	0,0	3,4
Upper (n=12)	50,0	58,3	58,3	0,0	0,0	0,0	16,7	0,0	0,0
Employment status			*						
Employed (n=93)	30,1	40,9	10,8	0,0	1,1	0,0	2,2	0,0	2,2
Unemployed (n=144)	33,3	39,6	20,8	1,4	2,8	0,0	2,1	0,0	6,3
Level of education									
Primary and lower (n=80)	33,8	35,0	13,8	0,0	2,5	0,0	0,0	0,0	5,0
Secondary (n=98)	30,6	43,9	22,5	2,0	3,1	0,0	3,1	0,0	6,1
Tertiary (n=59)	32,2	40,7	11,9	0,0	0,0	0,0	3,4	0,0	1,7

***=significance (p<0,05)**

4.4) Risk factors of substance use

This variable looks at the sociodemographic characteristics that were found to be associated with both the lifetime and past 3-month use of all substances. Univariable logistic regression was used to compare each population group that made up a single sociodemographic characteristic with the use of each substance category (Appendix M). Multivariable logistic regression was then used to determine the population groups that contributed significantly to the use of substances in a model that considered the presence of all sociodemographic characteristics (Table 5).

4.4.1) Risk factors of lifetime use

In the adjusted multivariable logistic regression model for lifetime substance use in Table 5, tobacco and alcohol use were associated with being male, white, and of younger age. Alcohol use was also associated with having a family history of substance abuse. Cannabis use was associated with being male, of younger age, having a family history of substance abuse, and being unemployed. Cocaine and ATS use were both associated with being white or coloured. Sedative use was associated with being white, having a family history of substance abuse, and having secondary or tertiary schooling as the highest level of education. Hallucinogen use was associated with being white and opioid use was associated with younger age. No associations were found for inhalant use.

Table 5: Multivariable Logistic Regression of sociodemographic characteristics associated with lifetime substance use (Adjusted Odds Ratio)

Sociodemographic classification	Tobacco *	Alcohol *	Cannabis *	Cocaine *	Amphetamine type stimulants *	Inhalants	Sedatives *	Hallucinogens *	Opioids *
Sex									
Male	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0
Female	0,3*	0,3*	0,3*	1,3	0,9	0,2	1,4	2,4	0,8
Age									
18-24	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0
25-34	0,6	1,0	0,6	0,4	0,3	0,8	1,4	0,5	0,3*
35-44	0,2*	0,3*	0,2*	0,2	0,1*	0,6	0,2	0,5	0,3*
45-54	0,5	0,6	0,4	0,2	0,0*	1,0	0,5	0,2	1,0
55-64	0,3*	0,2*	0,1*	0,1*	1,0	1,0	0,5	0,1	0,1*
65-80	0,4	0,5	0,0*	1,0	1,0	1,0	1,0	1,0	0,0*
Race									
Black	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0
White	7,6*	3,4*	1,5	10,7*	11,4*	0,2	4,2*	7,9*	2,2
Asian	0,7	0,2*	1,2	1,0	1,0	1,0	2,8	1,0	1,2
Coloured	1,9	2,1	2,9	25,8*	21,4*	1,0	1,0	6,3	5,1
Family history of substance abuse									
No	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0
Yes	1,8	2,6*	2,7*	1,4	0,8	3,9	5,0*	1,8	1,5
Socio-economic class									
Lower	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0
Middle	1,1	2,2	1,4	0,7	0,2*	0,5	1,4	0,7	1,1
Upper	1,0	1,6	2,5	0,2	0,4	6,7	5,1	3,9	1,2
Employment status									
Employed	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0
Unemployed	1,5	2,1	3,1*	0,8	0,9	3,0	1,9	3,4	2,7
Level of education									
Primary and lower	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0
Secondary	0,6	1,2	1,4	1,5	2,2	1,9	22,0*	1,0	1,5
Tertiary	0,7	2,0	1,8	2,9	4,8	3,8	11,5*	1,0	0,8

***= significant value (p<0,05)**

4.4.2) Risk factors of past 3-month use

In adjusted multivariable logistic regression for past 3-month substance use prevalence in Table 6, tobacco, alcohol, and cannabis use were all associated with being male and of younger age. Tobacco use was additionally associated with being white whereas alcohol and cannabis use were additionally associated with having a family history of substance abuse. Opioid use was associated with being male and coloured. No associations were found for cocaine, ATS, inhalant, sedative, and hallucinogen use.

Table 6: Multivariable Logistic Regression of sociodemographic characteristics associated with past 3-month substance use (Adjusted Odds Ratio)

Sociodemographic characteristics	Tobacco *	Alcohol *	Cannabis *	Cocaine	Amphetamine type stimulants	Inhalants	Sedatives	Hallucinogens	Opioids *
Sex									
Male	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0
Female	0,3*	0,3*	0,2*	1,0	1,0	1,0	1,2	1,0	0,1*
Age									
18-24	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0
25-34	0,6	0,5	0,3*	0,5	1,0	1,0	1,2	1,0	0,1
35-44	0,2*	0,2*	0,2*	1,0	1,0	1,0	0,5	1,0	0,5
45-54	0,3*	0,4	1,0	1,0	1,0	1,0	1,0	1,0	1,0
55-64	0,0*	0,1*	0,1*	1,0	1,0	1,0	1,0	1,0	0,1
65-80	0,0*	0,2*	0,0*	1,0	1,0	1,0	1,0	1,0	1,0
Race									
Black	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0
White	12,3*	1,5	0,4	1,0	1,0	1,0	3,4	1,0	2,0
Asian	3,8	0,9	0,2	1,0	1,0	1,0	1,0	1,0	1,0
Coloured	1,6	0,3	0,4	1,0	1,0	1,0	1,0	1,0	24,7*
Family history of substance abuse									
No	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0
Yes	1,7	2,2*	3,9*	0,8	1,6	1,0	4,1	1,0	2,1
Socio-economic class									
Lower	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0
Middle	0,6	1,1	1,9	2,9	1,0	1,0	1,3	1,0	0,4
Upper	0,6	1,3	19,6	1,0	1,0	1,0	8,4	1,0	1,0
Employment status									
Employed	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0
Unemployed	1,0	1,0	2,6	1,0	1,0	1,0	1,9	1,0	2,6
Level of education									
Primary and lower	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0
Secondary	0,6	1,2	1,6	1,0	5,9	1,0	1,0	1,0	2,6
Tertiary	0,7	1,1	0,7	1,0	1,0	1,0	1,0	1,0	0,2

***=significance (p<0,05)**

4.5) Substance-related risk profile of study participants

This chapter shows the percentage distribution of participants that were at risk of developing substance-related problems such as substance dependence, substance use disorder, and the co-morbidities associated with substance misuse. This is referred to as the risk profile or risk category of a participant and is described by both percentage distribution in the total study sample and by sociodemographic characteristic. Figure 10 shows the percentage distribution of the study population by risk profile/category. 54,9% of the sample was classified as low risk, 27,4% was classified as medium risk, and 17,7% was classified as high risk.

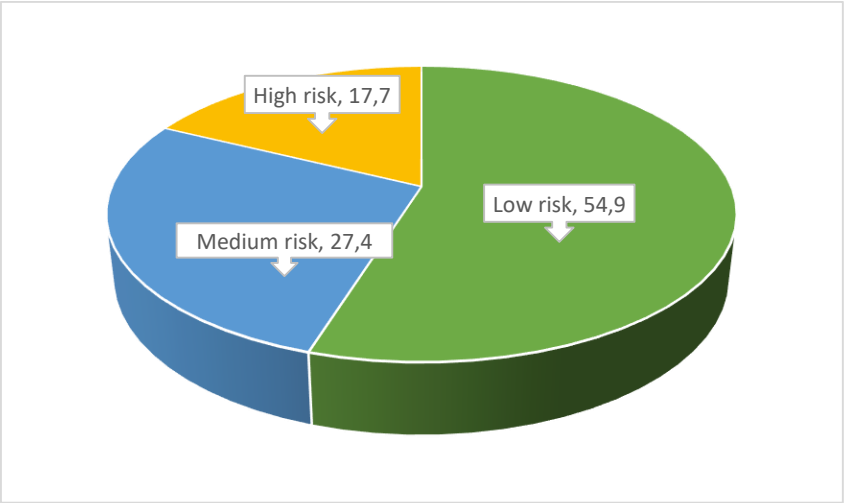

Figure 10: Pie chart showing the percentage distribution of the study population by risk profile.

4.5.1) Substance-related risk profile by sociodemographic characteristic

Table 7 shows the total number of participants classified as low, medium, and high risk as well as their respective percentages within the total sample. All three categories were mostly made up of black participants, people of lower socio-economic class, and unemployed individuals. Additionally, low risk participants were mainly made up of females and people without a family history of substance abuse. The age group that contributed most to the low risk category was the 35-44-year age group. Medium risk and high risk participants were mainly made up of males and people with a family history of substance abuse. Both the medium and high risk categories had more participants aged 25-34 in comparison to other age groups. The most prevalent education level in all three categories was secondary education.

Table 7: Percentage distribution of sociodemographic characteristic of study participants by their risk profile

Sociodemographic characteristic	Low risk (Freq & %)	Medium risk (Freq & %)	High risk (Freq & %)
	n=130 (54,9)	n=65 (27,4)	n=42 (17,7)
Sex			
Male (n=114)	47 (36,2)	38 (58,5)	29 (69,1)
Female (n=123)	83 (63,8)	27 (41,5)	13 (30,9)
Age			
18-24 (n=38)	14 (10,8)	15 (23,1)	9 (21,4)
25-34 (n=55)	24 (18,5)	18 (27,7)	13 (30,9)
35-44 (n=54)	33 (25,4)	13 (20,0)	8 (19,1)
45-54 (n=32)	22 (16,9)	6 (9,2)	4 (9,5)
55-64 (n=34)	21 (16,1)	7 (10,8)	6 (14,3)
65-80 (n=24)	16 (12,3)	6 (9,2)	2 (4,8)
Race			
Black (n=171)	100 (76,9)	43 (66,2)	28 (66,7)
White (n=45)	17 (13,1)	16 (24,6)	12 (28,5)
Asian (n=10)	7 (5,4)	2 (3,1)	1 (2,4)
Coloured (n=11)	6 (4,6)	4 (6,1)	1 (2,4)
Family history of substance abuse			
No (n=126)	84 (64,6)	25 (38,5)	17 (40,5)
Yes (n=111)	46 (35,4)	40 (61,5)	25 (59,5)
Socio-economic class			
Lower (n=136)	78 (60,0)	34 (52,3)	24 (57,1)
Middle (n=89)	48 (36,9)	28 (43,1)	13 (31,0)
Upper (n=12)	4 (3,1)	3 (4,6)	5 (11,9)
Employment status			
Employed (n=93)	53 (40,8)	25 (38,5)	15 (35,7)
Unemployed (n=144)	77 (59,2)	40 (61,5)	27 (64,3)
Level of education			
Primary and lower (n=80)	41 (31,5)	23 (35,4)	16 (38,1)
Secondary (n=98)	55 (42,3)	25 (38,5)	18 (42,9)
Tertiary (n=59)	34 (26,2)	17 (26,1)	8 (19,1)

4.6) Summary of main findings

The following diagram (Figure 11) shows the prevalence and sociodemographic risk factors of each substance assessed in the study.

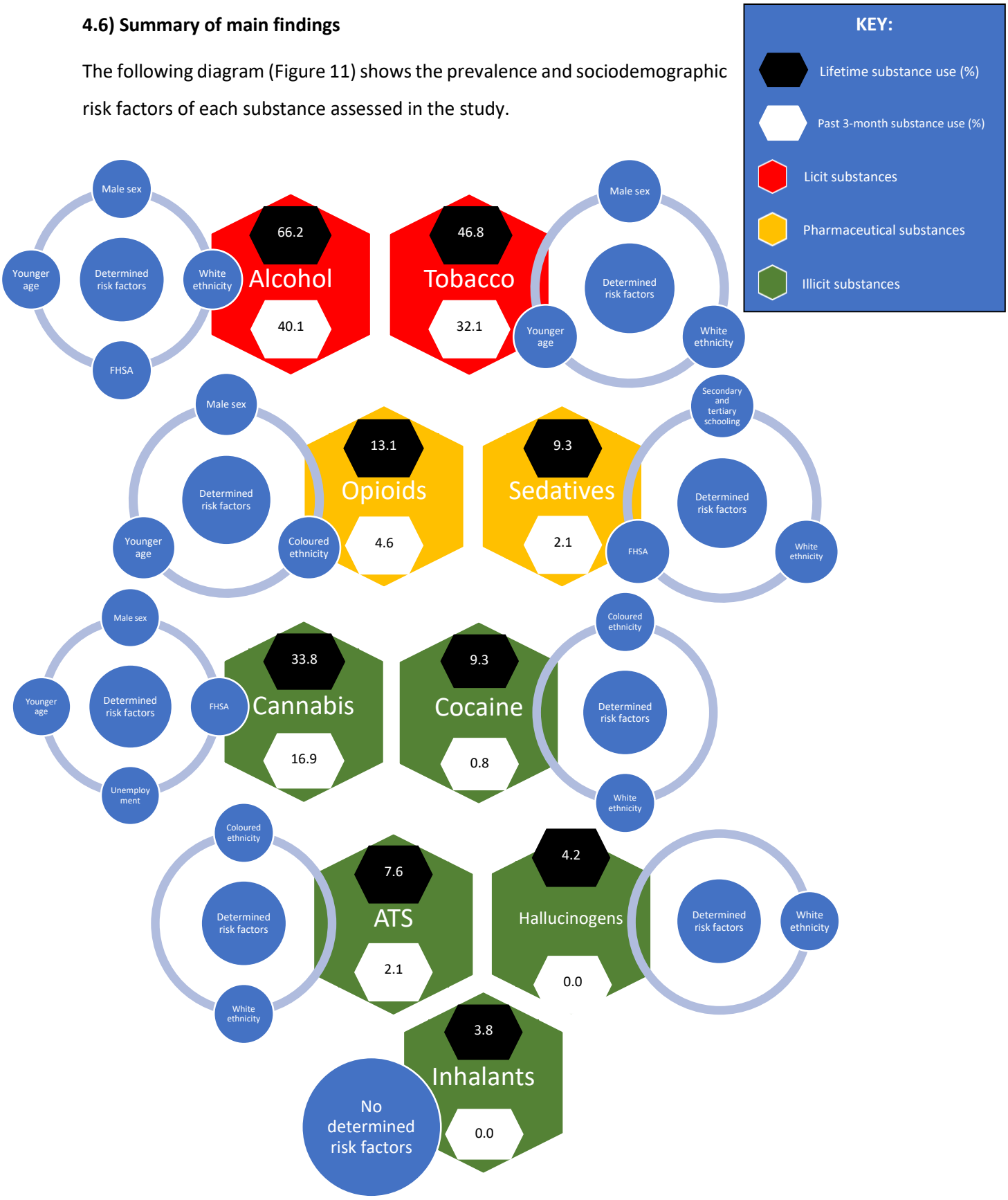

Figure 11: A diagram of notable results found in the study.

Chapter 5: Discussion

This chapter interprets the findings in the results within the context of substance use in South Africa. The discussion compares the results found in this study with national cross-sectional surveys and treatment demand data to describe trends and draw conclusions on the use of licit, pharmaceutical and illicit substances in the Johannesburg public hospital emergency department setting. In this chapter, the opioid class of drugs included both prescription and OTC opioids (such as codeine and tramadol) as well as illegal opioids i.e., heroin/opiates. The two classes of opioid substances were not distinguished in the study, and so both classes contribute to the 13,1% of lifetime opioid use and 4,6% of past 3-month opioid use. Hence the category of opioid substances will be discussed separately from other substances. Cannabis use, although partially decriminalized, is described as illicit substance use due to the fact that cannabis was illicit at the time of data collection in the national cross sectional surveys that are discussed in this study. Additionally, 'other illicit substance use' refers to the use of illicit substances exclusive of cannabis.

5.1) Prevalence of lifetime and past 3-month substance use

This variable ranks the different substance categories (licit, pharmaceutical and illicit) in order of the most prevalent to the least prevalent. It also compares these findings to national cross-sectional surveys and explores reasons for certain substances being more prevalent than others and also provides explanations as to why there may be an anomaly between this study and national surveys. Brief discussions on each substance are then provided, with particular focus on the difference between substance use prevalence in the clinical setting and the general national adult population.

5.1.1) Difference in prevalence rates between substance categories

The order in which substances were ranked from most prevalent to least prevalent in this study was similar to findings in national cross-sectional surveys. Alcohol and tobacco were the first and second most prevalent substances respectively in both this study and various national surveys (SALDRU, 2015; SALDRU, 2017; NDoH, 2019). Cannabis was found to be the most prevalent illicit substance and the third highest substance of use behind the two licit drugs in both lifetime and past 3-month use. This is similar to findings among South African youth in the YRBS studies of 2008 and 2011 as well as the general adult population in the SABSSM reports of 2005 and 2008 as well as the 2012 national population-based survey (Reddy et al., 2010; Peltzer, Davids and Njuho, 2011; Reddy et al., 2013a;

Peltzer and Phaswana-Mafuya, 2018). Similar to this study, these five national reports also found less substance use among other illicit drugs and prescription/OTC medication compared to the three most prevalent substances. These are represented by low prevalence rates in sedative and psychostimulant (cocaine and ATS) use and very low prevalence rates in hallucinogen and inhalant use (Reddy et al., 2010; Peltzer, Davids and Njuho, 2011; Reddy et al., 2013a; Peltzer and Phaswana-Mafuya, 2018). The one finding in this study that goes against national trends is the high prevalence of both lifetime and past 3-month opioid use in comparison to sedative and other illicit substance use. One reason for the elevated non-medical opioid use prevalence in this study could be the fact that a good number of public hospital patients are prescribed tramadol or codeine for severe pain (Khan, 2018; Fynn et al., 2020). These patients were likely experiencing severe pain from accidents, injuries or conditions that require screening and treatment procedures within the casualty unit, hence a few of them participated in the study.

There are several reasons for the difference in prevalence between the highly used licit substances and the rarely used illicit and pharmaceutical substances. Alcohol and tobacco products are easily accessible for South African adults due to their commercial sale; hence they are more likely to be used. Through socialism, licit substances have also gained a ceremonial and leisurely culture of use in South African adults that has resulted in trends such as harmful drinking and 'social smoking' in adolescents (Young and De Klerk, 2008; Schane, Glantz, and Ling, 2009; Mager, 2010). Having a direct root of influence to substance use is a major contributor to the development of frequent use in an individual, and licit substance use is more likely to be practiced in a person's household and amongst their peers in comparison to pharmaceutical substances and illicit drugs. Licit substance products also undergo fixed methods of pricing and taxation, making their prices more reliable and sales more common in comparison to the fluctuating black market pricing of illicit drugs (Rhodes et al., 2000).

The limited but growing use of pharmaceutical substances through the procurement of OTC codeine and psychoactive prescription substances mainly stems from legitimate medical advice and treatment options (Van Hout et al., 2017). However, a dependence to these substances can develop after a long term of taking the medication or cases where the recommended dose was exceeded, resulting in SUD (Van Hout et al., 2017). These cases have been on the rise in recent times partially due to the misconception that pharmaceutical substances are safe and solely therapeutic (Ling, Mooney and Hillhouse, 2011). There is a possibility that prescription and OTC medication abuse is more prevalent than illicit substance abuse because users are more likely to report using pharmaceutical substances as they do not expect to receive backlash or judgement for something that is "safe".

Illicit substance use is less likely to be reported in a screening interview due to the negative stigmatization against drug use and the fear of legal implications involved with sharing information on the criminal use of a substance (Palamar, Halkitis and Kiang, 2013). Under-reporting of illicit drug use can also happen in individuals that are dependent or addicted to these substances as these individuals tend to avoid admitting to having a drug abuse problem (Payne and Gainey, 2007). Illicit substance use is also limited by the campaigning of negative effects of these substances which discourages people from indulging in illegal drug use (Allara et al., 2015). As for the relatively high and constantly growing prevalence of cannabis use, the substance has been reported to be therapeutic for different ailments such as cancer and glaucoma (Pergam et al., 2017; Rafuse and Buys, 2019). It is also said to be less harmful than other psychoactive substances and is hence not negatively campaigned as much as other illicit drugs (Spackman et al., 2017).

5.1.2) Tobacco products

The lifetime prevalence of tobacco use found in the study was 46,8%, which is higher than the 2017 NiDS estimate of 23,3% (SALDRU, 2017). The study found that 32,1% of study participants engaged in past 3-month tobacco use. This prevalence rate is higher than the 2016 SADHS and 2017 NiDS estimates for current smoking of 22,6% and 19,3% respectively (SALDRU, 2017; NDoH, 2019). This suggests a presence of higher tobacco use rates in the screened healthcare population, compared to a sample representative of the national population. The sample for this study also had a different age set to that of the 2016 SADHS and the 2017 NiDS. Both the SADHS and the NiDS included people from the age of 15 years and above, whereas this study's sample was made up of people between the ages of 18 and 80 (SALDRU, 2017; NDoH, 2019). This may partially explain the difference in findings as the 15-19-year age group in both the 2016 SADHS and the 2017 NiDS had the lowest rate of tobacco smoking (SALDRU, 2017; NDoH, 2019).

5.1.3) Alcoholic beverages

Alcohol use prevalence was found to be 66,2% for participants who ever used alcohol in their lives and 40,1% for participants who used alcohol within three months prior to screening. The NiDS of 2015 reported a lifetime alcohol use prevalence of approximately 45,9% in a sample representative of the nation, this is markedly lower than the lifetime use prevalence found in this study (SALDRU, 2015). The SADHS of 2016 found that 61,0% of men and 26,0% of women had ever consumed alcohol at the time of the study, this is lower than the 78,1% of men and 55,3% of women that indulged in lifetime

alcohol use in this study (NDoH, 2019). These findings can be explained by alcohol's high burden on healthcare over the years. Between 1999 and 2001, two-thirds of trauma death cases were attributed to alcohol-related mortality (Peltzer and Ramlagan, 2009). A study conducted in 2006 found that approximately 20,0% of rural primary care out-patients were involved in hazardous/harmful drinking (alcohol use disorder) (Peltzer, 2006). Binge-drinking, which is a major risk factor for alcohol-related problems such as violent crimes, sexual risk, and traffic-related accidents, had a prevalence of 30,0% in male and 20,0% in female adolescents in the YRBS of 2011 (Reddy et al., 2013a). Furthermore, the SACENDU brief of 2019 found that alcohol is the highest contributing substance to specialist treatment services in Eastern Cape, Kwa-Zulu Natal, and the Central Region of South Africa (Dada et al., 2019c). Alcohol use clearly has a high treatment demand, partly due to its contribution to accidents and injuries. It is therefore more likely to be seen in a sample of emergency department patients compared to a sample representative of the national population.

5.1.4) Prescription and OTC substances- Sedative use

The past 3-month prevalence of sedative use was 2,1%. This was significantly higher than estimates found in the 2012 national population-based survey of 0,4% (Peltzer and Phaswana-Mafuya, 2018). The non-medical use of sedatives has decreased between 2000 and 2018 according to SACENDU (Dada et al., 2019c). However, due to high occurrence of substance-related ED visits in South Africa, the presence of sedative misuse is still more likely in a healthcare setting as opposed to the general population (Sorsdahl et al., 2014). Additionally, the contribution of prescription and OTC substance abuse to clinic admissions (of which sedative use is prominent) is the third-highest in Gauteng compared to other provinces (Dada et al., 2019c). As this study was conducted in Gauteng, findings were likely to reflect the higher contribution of sedative use to treatment demand in the province. Relative to this, the small and very localized sample of this study may have also contributed to the study's higher sedative use prevalence rate.

5.1.5) Illicit substances

5.1.5.1) Cannabis

The past 3-month prevalence of cannabis use was found to be 16,9% in the sample. This is significantly larger than the SABSSM of 2008 and the national population-based survey in 2012 which found past 3-month cannabis use prevalence rates of 3,3% and 4,0% respectively (Peltzer and Ramlagan, 2010).

SACENDU found that the treatment demand for cannabis use (as of June 2019) in the Gauteng region was the highest (36,0%) in comparison to other substances (Dada et al., 2019a). Higher rates of cannabis use are also associated with increased ED visits (Yogendran et al., 2018). Furthermore, cannabis in South Africa is now less costly and more accessible (Peltzer and Phaswana-Mafuya, 2018). These factors may explain the presence of a much larger cannabis use prevalence found in the emergency department and in more recent studies compared to the prevalence found nationally in 2008 and 2012. It is also important to note that the act of cannabis cultivation and use within a private space was decriminalized in South Africa on the 18th of September 2018 (Parry, Myers and Caulkins, 2019). This may have led to the emergence of more cannabis users and the reporting of more cannabis use cases.

5.1.5.2) Other illicit substances

The study found no inhalant and hallucinogen use within three months prior to patient screening. The prevalence of ATS use was 2,1%, much higher than estimates found in the 2012 national population-based survey of 0,3% (Peltzer and Phaswana-Mafuya, 2018). Past 3-month prevalence of cocaine use was found to be 0,8%, higher than the 2012 national population-based survey which found a prevalence rate of 0,3% (Peltzer and Phaswana-Mafuya, 2018). The occurrence of substance-related ED visits (such as interpersonal violence and injuries) in South Africa is very high, hence the increased prevalence rates in the casualty unit compared to national surveys (Sorsdahl et al., 2014). ATS use may also contribute largely to this increase as the treatment demand for Methamphetamine increased from 2,5% to 8,0% between 2012 and 2018 in Gauteng, showing an increasing trend of Methamphetamine abuse and hence ATS clinic admissions which are likely to be seen in the emergency department (Dada et al., 2019c). The sample in this study was also very small in comparison to national surveys, this may point to an inaccuracy in the results of this study.

5.1.6) Opioids

Past 3-month prevalence of opioid use was found to be 4,6% which is significantly higher than the 0,3% prevalence found in the 2012 national population-based survey (Peltzer and Phaswana-Mafuya, 2018). A major contributor to this large discrepancy in prevalence rate between this study and the 2012 national population-based survey is the presence of heroin abuse among opioid users. The treatment demand for heroin abuse is the highest in the Gauteng province with approximately 27,3% of substance-related clinic admissions in 2018 (June to December) being caused by heroin as a primary

substance of abuse (Dada et al., 2019b). Furthermore, pharmaceutical opioids such as codeine and tramadol contribute to the substance abuse and treatment demand of prescription and OTC substances in Gauteng, which as mentioned before, is the third highest treatment demand percentage among provinces in South Africa (Dada et al., 2019c). Additionally, the potential for opioid abuse to lead to fatal overdose and premature death is very high, hence its major contribution to emergency cases (Morgan, Daniels and Subramaney, 2019).

5.2) Lifetime and past 3-month sociodemographic risk factors

This variable looks at the associations (sociodemographic risk factors) that were found in the study for each substance and provides reasons as to why substance use is more prevalent when these factors are present. This variable is discussed with the aid of South African cross-sectional surveys, South African treatment demand data, and substance-related scientific articles.

5.2.1) Tobacco products

The study found that tobacco use was associated with being male, white, and of younger age. The association between tobacco use and males corresponds with several national studies (Reddy et al., 2013a; Ayo-Yusuf, Olutola and Agaku, 2015; Reddy et al., 2015). Differences in tobacco use prevalence between men and women can partly be explained by the socio-cultural view that cigarette smoking is more acceptable in men as opposed to women (Reddy et al., 2013b). Additionally, men generally have a more disposable income and are more involved in health risk behaviour (Croisant et al., 2013; Reddy et al., 2015). Furthermore, smoking activates men's neurological reward pathways more than women's, meaning that men are more likely to smoke for the reinforcing effects of nicotine whereas women, with less frequency, smoke to regulate mood or in response to social cues (Cosgrove et al., 2014).

The association between tobacco use and being white goes against national findings of the coloured population being significantly more inclined to smoke compared to other race groups (Ayo-Yusuf, Olutola and Agaku, 2015; Reddy et al., 2015). National population-based surveys such as the 2011 YRBS and 2016 SADHS have also found a higher prevalence in coloured populations relative to other races (Reddy et al., 2013a; NDoH, 2019). This study had a large discrepancy between the number of participants that contributed to the total sample from each race group, with the coloured population

only being 11 out of 237 participants. This may have influenced the results to reflect something dissimilar to national findings.

Pertaining to age, national surveys found associations between tobacco use and middle-aged populations, with the 45-54-year age group having the most prevalence (SALDRU, 2012; Reddy et al., 2015). The prevalence of tobacco use is generally lower in the 18-24 age group and people aged 65 and over (Reddy et al., 2015). The Study of Ageing and Global Health (SAGE) survey of 2008 as well as the Global Youth Tobacco Survey (GYTS) and YRBS of 2011, found markedly lower prevalence rates in the youngest and most elderly age groups compared to middle-aged groups in relation to tobacco use (Biritwum et al., 2013; Reddy et al., 2013a). The association between tobacco use and young age found in this study may reflect a difference between the tobacco use trends in the Johannesburg area compared to national findings. A finding that suggests higher tobacco use in Johannesburg youth is the fact that lifetime tobacco use prevalence in Gauteng is the second-highest in secondary school students (Grade 8-11 students) among all provinces with a rate of 41,8% (Reddy et al., 2013a). This rate is markedly higher than lifetime use prevalence rates found in national surveys (Reddy et al., 2013a; SALDRU, 2017; NDoH, 2019). If the study population included participants below the age of 18 in this study, perhaps the risk associated with tobacco use in younger age groups would be stronger. Increased tobacco use in younger age groups can result from behavioural disinhibition, which is a lack of impulse control that generally heightens in adolescent and teenage years (Peer et al., 2009; Harrop et al., 2013). The occurrence of peer pressure and the occasion of adolescent parties also contribute to an increase in tobacco use (Simons-Morton et al., 2001; Schane, Glantz, and Ling, 2009). These factors result in more substance misuse cases and hence more emergency incidents for young substance users (Peer et al., 2009). Substance-related ED cases may also involve tobacco use as a gateway drug, meaning that the associations between young age and the use of other substances that are found throughout this study may involve the presence of tobacco use (Kandel and Kandel, 2014; Ren and Lotfipour, 2019). The uneven sampling across age groups in this study may have also contributed to the deviation in results from national findings.

5.2.2) Alcoholic beverages

In this study, the risk factors contributing to both lifetime and past 3-month alcohol use were being male, of younger age, and having a family history of substance abuse. Additionally, being white was associated with lifetime alcohol use, but not past 3-month use. The high prevalence of alcohol consumption in white South Africans is partly due to the fact that people of white ethnicity are more affluent and have a more disposable income (Oosthuizen, 2019). White South Africans are also less

likely to have stringent cultural practices and religious affiliations compared to other race groups, enabling them to use, with more frequency, substances that are deemed to be "unlawful" according to certain practices (Pillay, 2017). This factor may also explain the under-reporting of alcohol and other substance use in non-White individuals as they do not want to receive backlash or stigmatization for their actions. The lack of an association between white ethnicity and past 3-month alcohol use can partly be explained by the 2015 NiDS findings that alcohol use in white individuals was the highest among race groups, however, binge-drinking of alcohol (≥ 5 drinks per drinking session) in white individuals was the lowest among age groups (SALDRU, 2015). Similar findings in the 2016 SADHS show that both white men and women were significantly more likely to drink alcohol at least once in their life and within the past year (NDoH, 2019). However, their rates of binge-drinking and problematic drinking were much lower than their actual alcohol consumption prevalence, unlike all other race groups (NDoH, 2019). Alcohol use in the South African white population is hence more likely to be in moderation and may involve periods of abstinence. This reduces the possibility that an association between past 3-month alcohol use and being of white ethnicity is significant.

According to national surveys, males contribute more to alcohol use in comparison to females (Reddy et al., 2013a; SALDRU, 2017; NDoH, 2019). The difference between the two sexes in terms of alcohol use prevalence, binge-drinking, and alcohol use disorder (AUD), were found to be significant in several studies (Parry et al., 2005a; Ceylan-isik, McBride and Ren, 2010; Peltzer, Davids and Njuho, 2011; Vellios and Walbeek, 2018). Differences in the dopaminergic systems between the two sexes can contribute to males developing substance-related desensitization, addiction, and complications (Ceylan-isik, McBride and Ren, 2010). Men are also more likely to undergo peer pressure and socialization towards heavier alcohol consumption (Ceylan-isik, McBride and Ren, 2010). Alcohol use in African women is uncommon and culturally unacceptable and therefore contributes to the reduced alcohol use in women (Martinez et al., 2011). This cultural factor can also explain an under-reporting of alcohol use by female participants as they do not want to be viewed negatively.

The association between lifetime alcohol use and younger age found in this study is similar to the findings in the 2016 SADHS report, wherein the 20-24-year age group was found to have the highest lifetime and past-year alcohol use prevalence (NDoH, 2019). However, the NiDS of 2015 reported that past-month alcohol consumption was highest in the 25-34 and 35-44-year age groups, whereas past-month binge-drinking was highest in the 15-24 and 25-34-year age groups (Vellios and Walbeek, 2018). This suggests that the past 3-month alcohol use findings in this study may account for more episodes of binge-drinking in the 18-24-year age group in comparison to the 35-44-year age group, which would be more prevalent in a hospital ED as binge-drinking is a risk factor for accidents, injuries and health problems (Levinson et al., 2017). This may explain the slight deviation in past 3-month

prevalence of alcohol use being highest in younger populations in this study, and the past-month alcohol use prevalence being highest in more middle-aged populations according to the 2015 NiDS national survey. As for young people's inclination towards binge-drinking and problematic alcohol use; behavioural disinhibition, conduct disorder, socialization, and peer pressure, represent genetic and environmental factors of substance use that are prevalent in younger age groups (Marshall, 2014).

In this study, having a family history of substance abuse was found to be associated with lifetime and past 3-month alcohol use. The effects of parental substance abuse can result in unmet developmental needs, economic and financial problems, emotional distress, and the perpetration of violence for the child (Brook et al., 2006; Lander, Howsare and Byrne, 2013; Marshall, 2014; Raitasalo and Holmila, 2017). More importantly, the child can develop a substance use disorder from the direct influence of family members or as a result of impaired attachment and a damaged family system (Lander, Howsare and Byrne, 2013). This increases the likelihood that study participants with a family history of substance abuse were more likely to use any substance, in this case, the sedative class of drugs.

5.2.3) Prescription and OTC (Sedative use)

Lifetime sedative use was associated with being white. This is in line with the 2012 national population-based survey wherein the white population contributed the most to sedative use prevalence. As the white South African population is more affluent, they are more likely to obtain prescriptions as part of a better healthcare plan (Mhlanga and Garidzirai, 2020). This is evident in a study that shows that white South Africans had the most access to private healthcare through health insurance (Mhlanga and Garidzirai, 2020). As most sedative substances have high prescription schedules, these substances are mainly prescribed by psychiatrists and family practitioners. These physicians are expensive to consult, and the sedative substances they prescribe are sometimes expensive to obtain. With more white people using these substances, there is an increased likelihood that a dependence or addiction to sedatives like benzodiazepines and barbiturates develops in the white population. This may have reflected in the results of this study.

Lifetime sedative use was also associated with having a family history of substance abuse. As with alcohol use, people with a positive family history of alcohol problems are more likely to use substances and develop a SUD compared to people with negative family history of alcohol problems due to negative family dynamics (Brook et al., 2006; Lander, Howsare and Byrne, 2013; Marshall, 2014).

Lastly, secondary and tertiary education were found to be risk factors for sedative use. This is in line with both the 2008 SABSSM and the 2012 national population-based survey. It has been established

that people with higher education are more likely to drink and use cannabis, which is a potential marker that education levels affect substance use across every substance category (Galea et al., 2007; Thompson, Homel and Leadbeater, 2015). Although this study did not find any other associations in terms of highest level of education, sedative use in higher education levels may have shown as a significant association. The entrance into college campuses and residences may also offer a more experimental mode of substance use (Cho et al., 2015; Skidmore, Kaufman and Crowell, 2016). This may result in people using and misusing the less popular substances such as pharmaceutical sedatives instead of the sole use of the more popular licit substances and cannabis. This phenomenon is aided by substance-related peer pressure and socialism throughout the education system, contributing to the progression of substance use to more neurologically rewarding drugs such as sedatives (Ceylan-isik, McBride and Ren, 2010; Marshall, 2014).

5.2.4) Illicit substances

5.2.4.1) Cannabis

Past 3-month cannabis use was found to correlate with males, younger age groups, and having a family history of substance abuse. Research has found that cannabis use has more positive effects on men as compared to women, with men reporting that cannabis is good for migraine/headache treatment, feeling enthusiastic, and improving memory (Cuttler, Mischley and Sexton, 2016). It was also found that cannabis use in women is more likely to cause nausea, anxiety, and decreased appetite (Cuttler, Mischley and Sexton, 2016). These findings suggest that cannabis use in males is more likely to persist into long term use as the effects of cannabis between both sexes are more favourable for men. Social stigmatization against substance use in women as well as peer pressure in men also contribute to the cannabis use differences in both sexes (Ceylan-isik, McBride and Ren, 2010).

Cannabis use in adolescents and young adults may be high due to the publicity that cannabis use gets. Claims that cannabis is less harmful than both tobacco and alcohol may stem from emerging research in the therapeutic advantages of cannabis as well as the limited information furnished about the dangers, treatment demand, and gateway effects of cannabis (Pergam et al., 2017; Spackman et al., 2017; Rafuse and Buys, 2019). Efforts to destigmatize cannabis use have focused on the therapeutic nature of the substance without shedding light on the harms of it (Spackman et al., 2017). Young individuals are more likely to upgrade their experimentation of cannabis to consistent use due to this phenomenon that cannabis does little harm. Cannabis is also used in young populations as an attempt to alleviate mental conditions (rather than seek professional help) as well as to feel high (Bottorff et

al., 2009; Hanna, Perez and Ghose, 2017). Young individuals are more prone to enjoying the rewarding feeling of cannabis as well as the temporary removal of their psychological problems (Farrugia and Fraser, 2017). Peer pressure is also a factor in young populations. Other factors that contribute to adolescent cannabis use, abuse and dependence include early trauma, abuse and maltreatment, family history of substance abuse, and childhood disruptive behaviour disorders (Charach et al., 2011).

Children living in a household with substance dependent parents are more likely to indulge in substance use themselves, hence the association between cannabis use and family history of substance abuse (Brook et al., 2006; Lander, Howsare and Byrne, 2013). Cannabis use is also associated with an array of psychological and psychiatric problems such as mood disorder, apathy and depression (Pedersen et al., 2015; Dorard and De Lisle, 2017; Lac and Luk, 2018). These factors, along with substance addiction, are more likely to lead to an abusive or neglectful parenting style compared to families with no substance abuse history (Lipari and Van Horn, 2017). These conditions can drive children towards problem behaviours such as cannabis use.

5.2.4.2) Psychostimulants (ATS and Cocaine)

Being coloured was found to be a risk factor for lifetime ATS and cocaine use. This is in line with national prevalence findings as well as treatment demand data (Peltzer and Phaswana-Mafuya, 2018; Dada et al., 2019c). Methamphetamine use is strongly linked to and heavily researched in the peri-urban coloured population of Cape Town (Puljevic and Learmonth, 2014). It contributes the most to substance-related treatment demand in the Western Cape and the province has the most methamphetamine-related admissions in South Africa (Akindipe, Wilson and Stein, 2014; Dada et al., 2016b). Reasons for the peri-urban (township) community of the Western Cape to use illicit drugs include machoism, the alleviation of distress caused by poverty and exposure to violence, and a lack of education on the harms of substance abuse (Puljevic and Learmonth, 2014). The culture of using methamphetamine in coloured populations may have reflected in this study. Furthermore, the South African coloured population is not particularly a risk factor for cocaine use according to national surveys, however, the ethnicity's high contribution to substance-related treatment demand in the Gauteng province may account for its association with both lifetime cocaine and ATS use in this study. The coloured population of Gauteng is approximately 4.0%, however, 15.0% of substance-related clinic admissions in Gauteng is made up of coloured individuals (Figure 12) (Dada et al., 2019c). This means that coloured individuals are the most likely to be admitted for substance abuse in Gauteng, which may have reflected in this study's results, particularly with psychostimulant use.

		Black African	Indian	Coloured	White
WESTERN CAPE	Population	33%	1%	49%	16%
	In treatment	20%	1%	66%	13%
KWAZULU-NATAL	Population	89%	7%	1%	4%
	In treatment	69%	18%	6%	7%
EASTERN CAPE	Population	86%	<1%	8%	5%
	In treatment	54%	2%	20%	24%
CENTRAL REGION	Population	83%	1%	8%	8%
	In treatment	59%	0%	14%	26%
GAUTENG	Population	77%	3%	4%	16%
	In treatment	69%	9%	15%	7%
NORTHERN REGION	Population	94%	<1%	1%	5%
	In treatment	82%	1%	3%	14%

Figure 12: Census Data vs Proportion of substance abusers in treatment (adapted from Dada et al., 2019c).

The white population was associated with lifetime ATS and cocaine use. These associations are in line with two national cross-sectional surveys, wherein the white population contributed the most to cocaine use prevalence in the 2008 SABSSM and the 2012 national population-based survey (Peltzer, Davids and Njuho, 2011; Peltzer and Phaswana-Mafuya, 2018). The white ethnicity was also the second highest contributing race to methamphetamine use in both surveys (Peltzer, Davids and Njuho, 2011; Peltzer and Phaswana-Mafuya, 2018). Ecstasy-type substances (synthetic psychostimulant and hallucinogen), cocaine and methamphetamine are the most expensive drugs in South Africa according to United Nations Office on Drugs and Crime (UNODC) World Drug Report in 2019 (UN, 2019). This may explain why these substances are more prevalent among high-income white individuals (Peltzer and Phaswana-Mafuya, 2018; Oosthuizen, 2019). The use of psychostimulants (ATS and cocaine) is also high among the white population in foreign multicultural countries such as the United States (including the illicit use of methylphenidate) (McCabe et al., 2007).

5.2.4.3) Hallucinogens

Lifetime hallucinogen use was associated with the white ethnicity. This is in line with the 2008 SABSSM, the 2011 YRBS, and the 2012 national population-based survey as the white ethnicity

contributed the highest prevalence of hallucinogen use among all race groups in all three surveys (Peltzer, Davids and Njuho, 2011; Reddy et al., 2013a; Peltzer and Phaswana-Mafuya, 2018). As mentioned before, ecstasy-type substances, which is both a psychostimulant and a hallucinogen, is one of the most expensive drugs in South Africa. It is also one of the most common drugs contributing to hallucinogen use in South Africa (Dada et al., 2019c). The use of this substance, which is more prevalent in the white population due to them having a more disposable income, may have contributed to the lifetime hallucinogen use association found in this study. Other hallucinogens such as mescaline and psilocybin are also quite costly to attain (UN, 2019).

5.2.4.4) Inhalants

No associations were found for inhalant use. This may be due to the very limited prevalence of both inhalant use and inhalant treatment demand in South Africa. Inhalant use is generally associated with the low income black population (according to national cross-sectional surveys) however the treatment demand for inhalant use has drastically reduced in all provinces and the prevalence of inhalant use is the lowest among all substances in South Africa, making it difficult to find significant sociodemographic associations (Peltzer, Davids and Njuho, 2011; Dada et al., 2017b; Peltzer and Phaswana-Mafuya, 2018).

5.2.5) Opioids

Lifetime opioid use was associated with younger age, similar to the 2008 SABSSM (Peltzer, Davids and Njuho, 2011). This may be as a result of the increase in treatment demand for heroin as a primary substance of abuse in Gauteng from 3.2% in the first half of 2017 to 24.8% in the second half of 2018 for patients under the age of 20 (Dada et al., 2018a; Dada et al., 2019b). This may show a new drug culture in the Gauteng youth and can partially be explained by a global increase in illicit drug use in younger populations (Degenhardt et al., 2016). Furthermore, the treatment demand for the misuse of OTC and prescription medication as a primary drug of abuse in Gauteng increased from approximately 0.3% in late 2015 to 1.4% in 2018 (Dada et al., 2016b; Dada et al., 2019b). This category of drug is partially made up of pharmaceutical opioids such as codeine and tramadol. These increases in both illicit and pharmaceutical opioid abuse in Gauteng are relevant to the risk factors of opioid use that were established in this study.

Past 3-month opioid use was associated with being male. As with various psychoactive substances, women are less likely to progress to drug dependence after first use in comparison to men, hence the use in men is more frequent and more likely to become clinically significant (Neale, 2004). The fact that women experience more substance-related social stigma compared to men does not only mean that they are less likely to partake in or report substance abuse, but are also less likely to seek treatment for it as well (Neale, 2004). These factors hold true for heroin use in South Africa and partially contribute to over 80,0% of heroin-related clinic admissions in Gauteng being male patients since 2012 (Dada et al., 2015a; Dada et al., 2019b; Dada et al., 2019c). As for OTC and prescription opioids, SACENDU treatment demand data of late 2018 in Gauteng found that approximately 45,0% of the pharmaceutical drug-related clinic admissions were female (Dada et al., 2019b). This may partially be due to approximately 17,7% of codeine-using females in Gauteng using the substance for non-medical reasons whereas 13,0% of codeine-using males in the same province use it for non-medical reasons (NDoH, 2019). As mentioned above, men are more likely to indulge in problematic substance abuse, however, the fact that the use of pharmaceutical substances receives less stigmatization, is deemed to be safer, and is medically recommended, may contribute to the higher prevalence of non-medical misuse of codeine in the Gauteng female population as well as an increased reporting and seeking of treatment for pharmaceutical opioid abuse in South African women (Neale, 2004; Ling, Mooney and Hillhouse, 2011; Van Hout et al., 2017). Another reason that South African women use codeine is for weight loss, whereby they sometimes combine it with diet pills (Van Hout et al., 2017). The use of illicit heroin may thus be the determining factor that brought about an association between opioid use and the male sex in this study, as the use of pharmaceutical opioids in the female population of Gauteng is similar to, if not higher, than that of the male population.

Past 3-month opioid use was also associated with being coloured, similar to the 2012 national population-based survey (Peltzer and Phaswana-Mafuya, 2018). Among codeine-using study participants in the 2016 SADHS, coloured individuals were more likely to use codeine for non-medical reasons in both the male and female study populations (NDoH, 2019). Additionally, despite the limited population of coloured people in Gauteng (4.0%), the coloured population contributed 14.0% of heroin admissions in Gauteng (Dada et al., 2019c). This pattern of opioid abuse in the coloured population may have been apparent in this study, bringing about the association between the coloured ethnicity and opioid use.

5.3) Substance-use associated risk

Approximately 45,2% of the sample were either at medium risk or high risk to develop substance-related health and social problems. The most prevalent sociodemographic factors involved with the medium and high risk categories were males, people with a family history of substance abuse, and the 25-34-year age group. Men and people with a family history of substance abuse were found to be sociodemographic risk factors for the use of certain substances in this study. The fact that these two groups also contribute to higher levels of substance-related health and social risks suggest that substance use is not only more prevalent in these populations, but also more frequent and more problematic. Pertaining to age, people aged 25 to 34 contributed more to both the medium and high risk categories compared to the 18-24-year age group, suggesting that substance use in the 25-34-year age group is more harmful than in the youngest population group. The 25-34- year age group had the highest number of lifetime and past 3-month alcohol users, and with binge-drinking and problem drinking being highest in males aged 25 to 34 according to the SADHS of 2016, the 25-34-year age group may have contributed to at-risk populations through harmful alcohol consumption (NDoH, 2019).

Chapter 6: Conclusion

This chapter culminates the study by providing the information on the factors that may have limited the accuracy and procedure of the study. Based on the data established and the literature reviewed, the chapter also highlights certain recommendations to suggest ways in which substance use identification, monitoring, research, prevention, and treatment can be optimized. A concluding paragraph is then given to summarize the main points of the study.

6.1) Limitations

The study had a much smaller sample than national surveys, this meant that some percentages were affected more drastically by the presence or absence of only a few participants, hence prevalence rates were less accurate. The sample was predominantly made up of the black ethnicity, therefore other race groups were not accurately represented. The study was confined to one hospital in the Johannesburg area, meaning that the results of the study may not be an accurate depiction of prevalence rates in Johannesburg or Gauteng. The study was a screening interview that required patients to self-report their substance use. Any under-reporting of information or general dishonesty from participants affected the results. The study also involved only casualty patients; no trauma patients were screened. The WHO ASSIST form is limited in the sense that it records the use of different classes of drugs and not individual substances. This disabled the PI from investigating some of the individual substances on their own and classifying them into licit, pharmaceutical and illicit substances. The study also excluded the age group of 15 - 18 years. In the province of Gauteng, the 15 - 19 year age group had the highest number of patient admissions for substance-related ailments in late 2017 and the third highest in early 2018 amongst all age groups (Dada et al., 2019c). It is likely that including participants under the age of 18 would have significantly changed the results of this study and given us a more accurate marker of substance use prevalence in the public hospital setting.

6.2) Recommendations

6.2.1) Implementation of SBIRT in South African public healthcare:

Efforts to implement SOPs geared towards screening, brief intervention and referral to treatment can help healthcare professionals identify, prevent and treat risky substance use, SUD, and substance-related complications. Patient screening, in the form of both interviews and lab tests, should be done

on an ongoing basis for outpatients that frequent health facilities to monitor a patient's health risk behaviours over time. Private and specialized clinics should weigh in on the formulation of screening procedures for substance use in a public setting.

6.2.2) Educational campaigns, intervention strategies and the promotion of health:

The SANCA drug awareness week between 24th and 30th of June, gathers healthcare professionals, social workers and government bodies to promote good health by educating the public on the dangers of drug use and on the link between substance abuse and mental health (SANCA, 2019). Targeting at-risk groups with education on the effects of substance use should be a priority for healthcare professionals and policy makers. In 2019, the Department of Social Development embarked on a campaign to eradicate substance abuse in tertiary institutions by educating the public on the harmful effects of AOD use, providing the community with helpful resources and support systems for substance abuse, and holding exhibitions that detail how substance abuse contributes to gender-based violence and HIV infection (SAnews, 2019; South African Government, 2019). Efforts to uphold these campaigns can help reduce substance use among the youth in the long term. Puljevic and Learmonth (2014) conducted a study in the peri-urban areas of Cape Town to identify the features of an effective AOD abuse prevention program (Puljevic and Learmonth, 2014). The study found that paying attention to the problems in the community, challenging the social norms that enable/perpetuate substance abuse within the community, and coaching trainers in the provision of effective MI and life skills training, all help in promoting a substance-free community. Additional campaigns that focus on other at-risk groups (such as men and people with a family history of substance abuse) will also markedly control substance abuse and drug treatment demand.

6.2.3) Methods of substance use reporting:

There have been several cross-sectional and cohort studies that give prevalence data on tobacco and AOD use in South Africa since the late 1990s. However, there is a need for more reports on the state of illegal substance use at a national level. The South African National population-based survey of 2012 was the last survey that recorded the prevalence rates of all illicit substances (alongside each other) in a sample representative of the nation. Substance use trends have most likely changed since then and it is imperative that these changes are documented and analyzed. With regard to healthcare populations, SACENDU is consistent with providing information on the treatment demand and number of admissions of alcohol and illicit substance abuse cases and it is important for this

documentation to be upheld. The reporting of cannabis use trends in terms of prevalence, treatment demand and sociodemographic associations is now very significant as the decriminalization of personal cannabis use was passed in 2018. More cases of cannabis use will be reported and the healthcare burden of cannabis use may also rise.

6.2.4) Legislation and Pharmacy practice:

There are various rules and regulations controlling tobacco and alcohol use that are currently in place. The Tobacco Control Act of 1993 resulted in a significant decrease in national tobacco use prevalence over approximately two decades (WHO, 2013). Ayo-Yusuf, Olutola and Agaku (2015) recommend that South African legislation should focus on the taxation of tobacco products, as this brought about a significant decrease in tobacco use amongst people of the lower and middle socio-economic class. Another regulation (targeting the youth) that aims to control tobacco use is the emergence of smoke-free campuses at tertiary institutions. The Stellenbosch Tygerberg campus was the first smoke-free campus among South African tertiary institutions and this rule was implemented on the 1st of January 2019 (VIVUS, 2018). Pertaining to alcohol, the Liquor Act of 2003 provides stringent conditions for liquor manufacturing, licensing, registration, distribution, and taxation which inevitably controls the accessibility of alcohol to the public, especially underage individuals (Manamela, 2019). There are also restrictions on the airing time of alcohol commercials, prohibition of alcohol use in certain public areas, as well as more assertive measures against alcohol consumption whilst driving. Potential changes in alcohol use regulations may include changing the legal age for alcohol use to 21 and over, indicating the harms of alcohol use on liquor packaging, and applying more stringent rules on the advertisement of alcohol. Pertaining to OTC medication, implementation of the codeine care initiative, which uses a national registry for all consumers/patients in order to monitor the use of codeine from any dispensing software, can be beneficial to the control of codeine misuse and the reduction of codeine abuse (van Rugge, 2016). The up-scheduling of codeine is another potential regulation. The implementation of naloxone kits as OTC medical devices can remediate cases of opioid overdose. Further legislative measures against illicit substances are limited, due to the fact that these substances are already prohibited for commercial sale and use. Increasing the policing and legal consequence against illicit substance use can discourage the misuse of these products.

6.3) Conclusion

Alcohol remains the most used substance in South Africa with cannabis being the most prevalent illicit drug. Patient screening in the emergency department yielded high prevalence rates of substance use in comparison to national studies. This is unsurprising as substance abuse is a risk factor for injury and other disorders. All but one substance (inhalants) had significant associations for lifetime use, with sex, age, race, and having a family history of substance abuse, being the most determinant sociodemographic factors across the various substances. Associations were more difficult to find for past 3-month substance use, with only tobacco, alcohol, cannabis and opioid use having sociodemographic risk factors. These factors were similar to the ones seen in lifetime use, with race and family history of substance abuse having weaker associations. Over half of the study population were categorized as low risk for substance-related health and/or social risk, however the 17.7% of patients that were classified as high risk patients shows a large proportion of participants that may require intense interventions and close monitoring. This calls for the formulation and implementation of SBIRT strategies, improvement in national policies, the use of awareness campaigns for consumer education, and better methods of substance use reporting.

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Appendices

Appendix A: Ethics approval form

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG	HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

Office of the Deputy Vice-Chancellor (Research & Post Graduate Affairs)

TO: Mr F Ibisomi
School of Therapeutic Sciences
Department of Pharmacy and Pharmacology
Medical School
University

E-mail: 1117190@students.wits.ac.za

CC: Supervisor: Mesdames S de Rapper, R Shaikh, Z Booth, et al
<Stephanie.deRapper@wits.ac.za>
and <HREC-Medical.ResearchOffice@wits.ac.za>

FROM: Iain Burns
Human Research Ethics Committee (Medical)
Tel: 011 717 1252

E-mail: Iain.Burns@wits.ac.za

DATE: 2019/08/13

REF: *R14/49*

PROTOCOL NO: **M190475** *(This is your ethics application study reference number. Please quote this reference number in all correspondence relating to this study)*

PROJECT TITLE: *Substance use amongst emergency department patients in a South African tertiary public institution*

Please find attached the Clearance Certificate for the above project. I hope it goes well and that an article in a recognized publication comes out of it. This will reflect well on your professional standing and contribute to the Government funding of the University.

MSWorks2000/Iain0007/Clearscan.wps

UNIVERSITY OF THE
WITWATERSRAND,
JOHANNESBURG

R14/49 Mr F Ibisomi

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)
CLEARANCE CERTIFICATE NO. M190475

NAME: (Principal Investigator)	Mr F Ibisomi
DEPARTMENT:	School of Therapeutic Sciences Department of Pharmacy and Pharmacology Medical School University
PROJECT TITLE:	Substance use amongst emergency department patients in a South African tertiary public institution
DATE CONSIDERED:	2019/04/26
DECISION:	Approved unconditionally
CONDITIONS:	
SUPERVISOR:	Mesdames S de Rapper, R Shaikh, Z Booth, et al
APPROVED BY:	Dr CB Penny, Chairperson, HREC (Medical)
DATE OF APPROVAL:	2019/08/13

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 Research Office Secretary on the 3rd Floor, Phillip Tobias Building, Parktown, University of the Witwatersrand, Johannesburg.

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 submit details to the Committee. **I agree to submit a yearly progress report**. When a funder requires annual re-certification, the application date will be one year after the date when the study was initially reviewed. In this case, the study was initially reviewed in **April** and will therefore reports and re-certification will be due early in the month of **April** each year. Unreported changes to the application may invalidate the clearance given by the HREC (Medical).

Principal Investigator Signature _____ Date _____

PLEASE QUOTE THE CLEARANCE CERTIFICATE NUMBER IN ALL ENQUIRIES

Appendix B: DSM-V criteria

DSM-V criteria for substance use disorder
Hazardous use: Using the substance in ways that endanger your life and/or the life of others
Social or Interpersonal problems related to use: Having relationship conflicts that stem from the use of a substance
Neglected major roles to use: Failing to meet one's responsibilities at work, school, or home due to substance abuse
Withdrawal: Experiencing withdrawal symptoms once the patient has stopped using a substance
Tolerance: Building up a tolerance towards a substance and having to use more than usual to elicit the same effect
Used larger amounts: The amount, duration and/or frequency of substance use increases
Repeated attempts to control use or quit: Unsuccessful attempts to quit or cut back on the use of a substance
Much time spent using: Spending a lot of time using a substance
Physical or psychological problems related to use: Physical health problems (e.g. liver damage, lung cancer, psychological issues etc.) that stem from one's use of a substance
Activities given up to use: Skipping and/or stopping the activities you once enjoyed for the sake of using the substance
Cravings: Experiencing a craving for the substance

Appendix C: Protocol

1) Background

The physical, psychological, and social harms of substance abuse represent a significant public health problem (Barbosa et al., 2015). There is a higher prevalence of substance use disorder (SUD) in healthcare facility patients as compared to that in the general population, but this disorder is usually not diagnosed (Espi Martinez et al., 2013). Around half of emergency care unit cases in South Africa involve some sort of substance abuse (Sorsdahl et al., 2017). Furthermore, the South African Community Epidemiology Network on Drug Use (SACENDU) reported a 12.5% increase in substance-related hospital admissions from 2016 (8 787 admissions) to 2017 (10 047 admissions) in South Africa (SACENDU, 2017). These statistics, amongst others, show a strong correlation between substance abuse and emergency department (ED) visits.

Substance use disorder is an ailment involving addiction and is subject to a list of diagnostic criteria in accordance with the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-V). The eleven criteria featured in the DSM-V detail a patient's quantity, frequency and urge of substance use, the presence of drug withdrawal and/or tolerance, as well as the degree of negative social and occupational impact of the disorder. The presence of two or more of the diagnostic criteria represents a diagnosis of substance use disorder, with four or five symptoms representing a moderate degree of the disorder and the presence of six or more symptoms being classified as severe (Martin et al., 2008; Hasin et al., 2013). Appendix A details the official DSM-V criteria for substance use disorder (Hasin et al., 2013).

There are a number of risk and protective factors that contribute to the development of SUD. Risk and protective factors contributing to SUD are mainly seen at the socio-demographic level with variables including age, gender, race, province of origin, societal and communal involvement, socio-economic status, level of education, occupation, and health condition of an individual (Kilpatrick et al., 2000; Lamptey, 2005; Demirci et al., 2014; Okpataku et al., 2014).

The emergency department (ED) is the first point of contact between patients and healthcare professionals; it provides critical access to patient care and is seen as the "front door" to the hospital. The ED can be used as a point of early identification of patients that are at risk of developing SUD as

well as a link to healthcare for patients that are affected by the disorder (Hawk and D'Onofrio, 2018). There are several substance-related cases within the ED due to the potential of drugs to cause accidents/injuries (e.g. driving under the influence) as well as the high prevalence of substance use within the country (Vitale and van de Mheen, 2006; van Heerden et al., 2009). There are frequent obvious cases of substance induction, such as a drug overdose, that can easily and promptly be identified. Certain patients may present with negative clinical manifestations of substance abuse that are much less discernable than a drug overdose. Some patients may even present to the emergency department for something completely unrelated to substance abuse, but happen to knowingly or unknowingly have a substance addiction. These scenarios can all be identified with the use of an interview-based screening tool for substance involvement. A screening tool can serve as a pre-cursor to a patient referral and intervention system in order to optimize patient care and put more emphasis on disease prevention. This procedure is known as screening, brief intervention, and referral to treatment (SBIRT) for substance use disorder and is a developing practice in hospital emergency departments around the world (Bernstein and Bernstein, 2009). "Screening, Brief Intervention, and Referral to Treatment (SBIRT) is a comprehensive and integrated approach to the delivery of early intervention and treatment services through universal screening for persons with substance use disorders and those at risk" (Babor et al., 2007).

The use of a screening test for substance use disorder in the emergency department can prove significant as it is a straightforward method of determining patients who indulge in risky substance use in a population whom would otherwise not be tested. Provided that screened patients give honest disclosure of their personal information, the results of a screening test elucidate the substance abuse patterns (frequency and duration of substance abuse) of each patient. This is a much more suitable marker of a potential development of SUD than blood and urine tests that are currently being used in South African public hospital emergency departments, which only show the presence of abused substances within the body. Currently, South African public hospitals remediate drug overdose and toxin-related cases by referring patients to the gastrointestinal department for detoxification, or otherwise the psychiatric department for appropriate pharmacological and counselling-based intervention. The strategy is effective and should be used when appropriate, however, patient screening can reduce the incidence of such cases by using early identification of substance misuse to encourage prompt intervention before the occurrence of drug overdose plagues the life of a patient. Overall, a screening test allows for timeous and accurate identification of SUD, which results in a greater opportunity to halt the disorder, prevention of further ED visits, improvement in the well-being of the patient, and a reduction in national health costs. Documentation of socio-demographic

risk factors that pertain to SUD also gives us information on certain populations that need to be targeted with relevant education, further screening, and intervention programs.

The apparent lack of substance use screening and monitoring procedures at the South African public hospital emergency department level is partly due to a number of theoretical limitations. The limitations involved with providing screening tests at the emergency care unit include the willingness of patients to participate, the lack of time to comprehensively execute questionnaires and counselling, the relative lack of privacy in the emergency department, the difficulty in developing a rapport with patients, and the effect of any of these factors on the workload of the healthcare professional (HCPs) and the quality of healthcare being provided (Patston, Travers and Newcombe 2017). It is imperative that the screening strategy implemented is suitable enough to avoid the burden of healthcare limitations as well as effect a strong and reliable tool for the identification of SUD and the documentation of substance use risk factors.

Why does this fall in the scope of pharmacy?

The use, overuse, and abuse of prescription medications is a major problem in the country. This is largely due to irrational prescribing and lenient/improper pharmacy dispensing practices. Pharmacists are partly responsible for the alarming substance abuse cases within the country. Furthermore, information on the effects of nicotine, alcohol, prescription and illicit substances are fully within the scope of a pharmacist. Pharmacists are therefore experts in patient education pertaining to the harms caused by these substances. Keeping abreast with trends relating to healthcare and disease within the country to ensure continuous professional development is also a significant aspect of pharmacy practice.

In what ways can pharmacists contribute?

Pharmacy practice legislation can be altered significantly to suit a system that favours more stringent regulations on the distribution and dispensing of over-the-counter and/or prescription medications that have the potential of being abused. Through pharmacist-initiated therapy (PIT), pharmacists can promote personal health by providing educational information to patients that are at risk of developing SUD. Pharmacists can partake in a multidisciplinary healthcare team that conducts population studies for the purpose of yielding imperative information about the substance abuse patterns of individual communities and the country at large. Data such as the local percentage prevalence of substance abuse, the main drugs of abuse within an area, and the risk factors involved

with substance abuse, are all important for the continued professional development of all healthcare professionals. Pharmacists can also inform physicians about the importance of rational prescribing, particularly when it comes to medication that can be abused.

What is the impact of this contribution?

Patients will be better educated about the dangers of substance abuse and physicians will improve their practice in rational prescribing. This leads to a potential decrease in the overuse/misuse of prescription medication, and eventually, a reduction in substance dependence cases. There is a decreased possibility of patients getting access to "dangerous" over-the-counter medicines with an increase in the stringency of pharmacy practice regulations and an increased monitoring of pharmacy professionals. Through counselling and patient education, there is also potential for a decrease in the use of gateway drugs (nicotine, alcohol and cannabis), which ultimately decreases the risk of illicit substance abuse. All in all, patients will reduce their substance use which will lead to a reduced potential for health and/or social problems. There will subsequently be less substance-related ED visits, an improvement in the lives of patients at risk of SUD, and an overall reduction in national health costs as less patients will require patient care (emergency, psychotherapeutic, gastrointestinal, etc.).

2) Aim

This study aims to determine the prevalence of and risk factors associated with substance use in the emergency department of Charlotte Maxeke Johannesburg Academic Hospital (CMJAH).

3) Objectives

3.1 To assess the substance involvement profile of emergency department patients using the World Health Organization alcohol, smoking and substance involvement (WHO ASSIST) screening tool.

3.2 To elucidate the risk factors associated with substance use by assessing sociodemographic characteristics of ED patients that undergo screening.

3.3 To determine the substances most frequently used within the area.

4) Study design and instrumentation (Screening interview)

The cross-sectional descriptive study makes use of a screening interview that includes a sociodemographic and patient condition information sheet (Appendix B) and the WHO ASSIST

screening tool (Appendix C). The WHO ASSIST form comprises of nine different classes of drugs that are assessed for substance involvement among patients. Patients are classified into different substance involvement categories (low-risk, medium-risk, or high-risk) based on their interview responses. Each category is a direct reflection of the quantity, frequency, and degree of negative impact that are characteristic of a patient's substance use. The significance of identifying substance involvement is to determine the patient's risk of experiencing health and social problems due to a patient's substance use. Depending on how severe the risk is, the patient may qualify for intervention in the form of counselling, brief intervention, or referral. The necessity, type and extent of any patient intervention that is to be implemented will be influenced by the WHO ASSIST-linked intervention manuals (Appendix D) and will be in accordance with the policy of the public hospital. These manuals give healthcare practitioners guidance in providing brief intervention and counselling for patients that have a problematic substance involvement profile. These measures can ultimately decrease the likelihood of repeat emergency department visits by substance users. No permissions are required for the use of the WHO ASSIST screening tool (Appendix E). The screening interview also includes questions about the health condition and socio-demographic characteristics of each patient in order to determine the sociodemographic and medical risk factors associated with substance use disorder.

5) Study site

The study will be conducted in the emergency department of Charlotte Maxeke Johannesburg Academic Hospital in Parktown, Johannesburg. The hospital attends to several emergency department visits from varying demographics and represents a viable government body wherein the study can be executed.

6) Study participants

Inclusion criteria: Any patient that presents to the emergency department between the ages of 18-80 years of age are eligible for screening. The study will be looking to identify the percentage prevalence of substance use within the ED patient population and will not focus only on the selection of patients who present with clinical signs of substance induction. There is a possibility of substance involvement within any patient that presents to the ED and it is imperative to identify risky substance use in as many patients as possible for the purpose of accurate data collection. Only patients who are completely coherent and responsive can be interviewed, this includes patients who understand and respond soundly to information provided about the study (via the SID) and patients who are capable of completing the interview and understanding any counselling or brief intervention given after the interview is done. The state of the patient will be confirmed by an ED doctor. Patients below the age

of 18 will not be screened. This is due to the legal implications relevant to screening minors, for example, the difficulty of withholding patient information from the parent/legal guardian. Patients above the age of 80 will also not be screened as they have a higher risk of experiencing an adverse event whilst in the emergency department.

Exclusion criteria: Any patient that is physically and mentally incapable of completing the screening interview will not be screened. These include patients that are unconscious, semi-conscious, intellectually disable and cognitively impaired. These patients may not be in the right state of mind to give consent, understand the SID, or understand the interview. The state of the patient will be confirmed by an ED doctor.

7) Sample size

A sample size of 237 patients has been calculated for the study. This was calculated at a 2:3 ratio of substance abusers to non-abusers based on literature (Patston, Travers and Newcombe, 2017). The sample size was calculated using the formula for difference in proportions, which accounts for variability, effect size, desired level of statistical significance, and desired power.

8) Reliability and Validity

The WHO ASSIST form has been used in various studies for data collection and is generally suitable for identification of patients that are at risk of health and/or other problems due to their substance abuse. The screening tool was used in two Western Cape studies for the purposes of determining the willingness of substance use disorder patients to receive intervention as well as formulating a hospital-based SBIRT model for substance abuse patients (Sorsdahl et al., 2012; Sorsdahl et al., 2017). The logic of the questionnaire is relatively simple and the time it takes to complete the questionnaire (thirty-to-forty minutes) is suitable enough for the emergency department. The WHO ASSIST form is also linked to two manuals that guide HCPs on how to provide counselling and brief intervention to substance abuse patients. This will be effective for managing patients that are screened once all the data has been collected. Pertaining to the sociodemographics involved in the screening procedure, cross-sectional surveys were used in several studies that investigated the risk factors associated with substance use disorder (Cleveland et al., 2008; Swendsen et al., 2009; Demirci et al., 2014). The socio-demographic characteristics elucidated within these studies allow us to compare different groups of a population within the context of substance abuse.

9) Study procedure

Application to the Human Research Ethics Committee (HREC) and the CEO of the hospital has been submitted (Appendix F) and is under review. Once the ethics committee and the hospital grants permission to conduct the study, the screening of trauma and casualty patients at Charlotte Maxeke Academic Hospital will commence. Liaison with the healthcare practitioners within the ED has been agreed upon in writing (Appendix G) and the emergency department staff is willing to be a part of the study. The screening interviews will be performed by the principal investigator (PI) of the study. The emergency department staff will also be involved in the study for the purposes of attending to any patient that may need intervention or referral. For this reason, ED doctors that participate in the study will have a briefing on the purpose and requirements of the screening form well before commencement of data collection. Screening forms, study information documents (Appendix H), and informed consent forms (Appendix I) will be printed by the PI. The PI will identify a patient to be screened. The eligibility of this patient will be decided upon by a doctor; an expert in determining the clinical state of a patient. The study information document and informed consent forms will only be read and signed, and the interview will only take place, once the doctor ensures that the patient is coherent and safe for ED discharge. If the patient meets the inclusion criteria, the PI will approach this patient with the relevant documentation (study information documents, informed consent and/or assent form) once the patient has been treated for their incident and has been deemed safe to leave the emergency department. The consent form and study information document have both been translated to Zulu and Afrikaans and attached to their relevant appendices. Zulu and Afrikaans are two of the most common and widely spoken official languages in South Africa, hence their use in this study. In the case of a patient that does not understand or speak English, the patient may request for Zulu or Afrikaans to be used. A nurse that is fluent in the requested language will explain the purpose of the study and ask the patient for consent using the study information document and consent form. The nurse will also be included in the interview for the purposes of translating the screening questionnaire. The interview will take place within the room where the patient is treated, however, the patient will be asked whether he/she wants a private consultation room. During the interview, the researcher will ensure that participant confidentiality will be maintained. The researcher will not note down any identifying information about the participant when completing the interview. In order to facilitate data collection each interview sheet will be given a number e.g. 1,2,3 up to 100. The results from each interview will be stored on REDcap and will be password protected. Statistical data will be reviewed on excel. Only the researcher and the supervisors will have access to the password thereby maintaining confidentiality and security of data. A study information document will be given to all patients that wish to participate in this study, this document will include information on the purpose

of the study, a description of the study, the benefits, risks of participating in the study, as well as the approximate time it will take for the researcher to complete the study. The participants will be informed that confidentiality and anonymity will be maintained (Appendix I). Once a patient is screened, a patient record detailing the patient's sociodemographics, the patient's incident (that led to the need for the emergency department visit), their questionnaire responses, their drugs of abuse, and the presence/absence of any counselling or intervention, is drawn up. The prevalence of substance use disorder in the population of screened patients is then recorded as a percentage. The general information recorded for all patients will be categorized under each sociodemographic heading. The population groups that feature as the biggest contributor to substance abuse under each subheading will represent risk factors for substance use disorder. Medical conditions and medication history will be inspected alongside a substance use disorder diagnosis, with the most prominent disorders and medications being listed as risk factors. All drugs that are abused by each patient will be recorded and analysed in conjunction with the patient's demographic information to identify the main drugs of abuse in and around the study site, the substances most prevalent amongst the varying population groups, and whether multiple risk factors correlate with the abuse of multiple substances.

How will I get patient consent and participation?

- Create a rapport with patients.
- Inform them that confidentiality and anonymity will be maintained.
- Suggest a private area to conduct the interview.
- Inform patients that there are ways to help them.
- Detail the benefits of the study to them.
- Inform them that they are part of an important study that contributes to the public healthcare system of the entire country.

How will the patient be treated?

The entire basis of the study is simply to collect data on the percentage prevalence and risk factors associated with substance abuse within the emergency department. However, as healthcare professionals, we must ensure that any patient taking part in the study undergoes the necessary intervention that they need. The PI (a pharmacist) will use information from the WHO ASSIST-linked intervention manuals to provide counselling and brief intervention to patients with a problematic substance involvement. This will occur immediately after the screening interview. A doctor will either

be included in the interview room or called upon to take note of the patient's substance involvement. All parameters of a patient's substance use will be made apparent to the doctor. The doctor will then act on receival of this information; deciding whether or not to give advice or refer the patient. The decision made by the doctor will be relayed back to the PI in order to be recorded. These measures are practiced to ensure accurate patient counselling from both sides of the interdisciplinary healthcare team. As an additional measure, the emergency department staff will be informed about and trained on the WHO ASSIST-linked intervention manuals before the commencement of data collection. Every practice involving patient interaction will be in accordance with the policies of the ED and the hospital at large. A distress protocol (Appendix J) will be included in the study for the purpose of remediating any psychological stress that the interview may inflict on the patient. A list of community clinics in the Johannesburg area (Appendix K) as well as list of resources entailing services for addiction, crisis intervention, counselling, and mental health support groups (Appendix L) will be offered to patients in cases of distress and if they require additional help.

10) Data analysis

The results will be entered independently on the data collection sheet on Microsoft Office Excel Software 2016 by the researcher and analysed. The information gathered will assist the researcher in determining incidence patterns. The data collected will be transferred and analysed using REDcap, as well as Statistica. In this study, frequency and percentages will be used to measure prevalence. A logistic regression can be used to determine the relationships and correlations. Odds ratios can be obtained from logistic regression which determines "likelihood". Odds ratios can be calculated as a measure of association (Setia, 2016) and is therefore appropriate for the nature of data to be obtained from the latter two objectives mentioned above.

11) Ethics

Permission to perform the study will be applied for through the Human Research Ethics Committee (HREC). Ethics clearance is required for the screening of hospital patients and for drawing up patient records.

12) Funding

Funding will be provided by the Department of Pharmacy and Pharmacology of the University of Witwatersrand through the Clinical Training Grant (CTG). Applications for funding will also be made with the National Research Foundation (NRF).

13) Budget

Description	**2019**	**2020**	
Printing costs	R2700	R1800	
REDcap	R0	R0	
Transport	R1840	R1360	
External Wi-Fi	R2600	R2860	
Total	R7140	R6020	**R13 160**

14) Timing

2019	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Protocol preparation and submission												
Literature review												
Ethics application and approval												
Data collection												

2020	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Data collection												
Data analysis												
Write-up preparation and presentation												

Appendix D: General patient information for screening interview form

Socio-demographic details of patient	
Gender	
Age	
Race	
Family history of substance abuse	
Socio-economic class/status	
Co-morbidities	
Medication	
Province of residence	
Highest level of education	
Employment status	

Appendix E: WHO ASSIST screening form

A WHO - ASSIST V3 .0

INTERVIEWER ID		COUNTRY	CLINIC
PATIENT ID		DATE	

INTRODUCTION ***(Please read to patient)***

Thank you for agreeing to take part in this brief interview about alcohol, tobacco products and other drugs. I am going to ask you some questions about your experience of using these substances across your lifetime and in the past three months. These substances can be smoked, swallowed, snorted, inhaled, injected or taken in the form of pills (show drug card).

Some of the substances listed may be prescribed by a doctor (like amphetamines, sedatives, pain medications). For this interview, we will not record medications that are used as prescribed by your doctor. However, if you have taken such medications for reasons other than prescription, or taken them more frequently or at higher doses than prescribed, please let me know. While we are also interested in knowing about your use of various illicit drugs, please be assured that information on such use will be treated as strictly confidential.

NOTE: BEFORE ASKING QUESTIONS, GIVE ASSIST RESPONSE CARD TO PATIENT

Question 1

(if completing follow-up please cross check the patient's answers with the answers given for Q1 at baseline. Any differences on this question should be queried)

In your life, which of the following substances have you ever used? *(NON--MEDICAL USE ONLY)*	No	Yes
a. Tobacco products (cigarettes, chewing tobacco, cigars, etc.)	0	3
b. Alcoholic beverages (beer, wine, spirits, etc.)	0	3
c. Cannabis (marijuana, pot, grass, hash, etc.)	0	3
d. Cocaine (coke, crack, etc.)	0	3
e. Amphetamine type stimulants (speed, diet pills, ecstasy, etc.)	0	3
f. Inhalants (nitrous, glue, petrol, paint thinner, etc.)	0	3
g. Sedatives or Sleeping Pills (Valium, Serepax, Rohypnol, etc.)	0	3
h. Hallucinogens (LSD, acid, mushrooms, PCP, Special K, etc.)	0	3
i. Opioids (heroin, morphine, methadone, codeine, etc.)	0	3
j. Other - specify:	0	3

"Not even when you were in school?"

Probe if all answers are negative:

If "No" to all items, stop interview.

If "Yes" to any of these items, ask Question 2 for each substance ever used.

Question 2

In the past three months, how often have you used the substances you mentioned *(FIRST DRUG, SECOND DRUG, ETC)*?	Never	Once or Twice	Monthly	Weekly	Daily or Almost Daily
a. Tobacco products (cigarettes, chewing tobacco, cigars, etc.)	0	2	3	4	6
b. Alcoholic beverages (beer, wine, spirits, etc.)	0	2	3	4	6
c. Cannabis (marijuana, pot, grass, hash, etc.)	0	2	3	4	6
d. Cocaine (coke, crack, etc.)	0	2	3	4	6
e. Amphetamine type stimulants (speed, diet pills, ecstasy, etc.)	0	2	3	4	6
f. Inhalants (nitrous, glue, petrol, paint thinner, etc.)	0	2	3	4	6
g. Sedatives or Sleeping Pills (Valium, Serepax, Rohypnol, etc.)	0	2	3	4	6
h. Hallucinogens (LSD, acid, mushrooms, PCP, Special K, etc.)	0	2	3	4	6
i. Opioids (heroin, morphine, methadone, codeine, etc.)	0	2	3	4	6
j. Other - specify:	0	2	3	4	6

If "Never" to all items in Question 2, skip to Question 6.

If any substances in Question 2 were used in the previous three months, continue with Questions 3, 4 & 5 for each substance used.

Question 3

During the past three months, how often have you had a strong desire or urge to use *(FIRST DRUG, SECOND DRUG, ETC)*?	Never	Once or Twice	Monthly	Weekly	Daily or Almost Daily
a. Tobacco products (cigarettes, chewing tobacco, cigars, etc.)	0	3	4	5	6
b. Alcoholic beverages (beer, wine, spirits, etc.)	0	3	4	5	6
c. Cannabis (marijuana, pot, grass, hash, etc.)	0	3	4	5	6
d. Cocaine (coke, crack, etc.)	0	3	4	5	6
e. Amphetamine type stimulants (speed, diet pills, ecstasy, etc.)	0	3	4	5	6
f. Inhalants (nitrous, glue, petrol, paint thinner, etc.)	0	3	4	5	6
g. Sedatives or Sleeping Pills (Valium, Serepax, Rohypnol, etc.)	0	3	4	5	6
h. Hallucinogens (LSD, acid, mushrooms, PCP, Special K, etc.)	0	3	4	5	6
i. Opioids (heroin, morphine, methadone, codeine, etc.)	0	3	4	5	6
j. Other - specify:	0	3	4	5	6

Question 4

During the past three months, how often has your use of *(FIRST DRUG, SECOND DRUG, ETC)* led to health, social, legal or financial problems?	Never	Once or Twice	Monthly	Weekly	Daily or Almost Daily
a. Tobacco products (cigarettes, chewing tobacco, cigars, etc.)	0	4	5	6	7
b. Alcoholic beverages (beer, wine, spirits, etc.)	0	4	5	6	7
c. Cannabis (marijuana, pot, grass, hash, etc.)	0	4	5	6	7
d. Cocaine (coke, crack, etc.)	0	4	5	6	7
e. Amphetamine type stimulants (speed, diet pills, ecstasy, etc.)	0	4	5	6	7
f. Inhalants (nitrous, glue, petrol, paint thinner, etc.)	0	4	5	6	7
g. Sedatives or Sleeping Pills (Valium, Serepax, Rohypnol, etc.)	0	4	5	6	7
h. Hallucinogens (LSD, acid, mushrooms, PCP, Special K, etc.)	0	4	5	6	7
i. Opioids (heroin, morphine, methadone, codeine, etc.)	0	4	5	6	7
j. Other - specify:	0	4	5	6	7

Question 5

During the past three months, how often have you failed to do what was normally expected of you because of your use of *(FIRST DRUG, SECOND DRUG, ETC)*?	Never	Once or Twice	Monthly	Weekly	Daily or Almost Daily
a. Tobacco products					
b. Alcoholic beverages (beer, wine, spirits, etc.)	0	5	6	7	8
c. Cannabis (marijuana, pot, grass, hash, etc.)	0	5	6	7	8
d. Cocaine (coke, crack, etc.)	0	5	6	7	8
e. Amphetamine type stimulants (speed, diet pills, ecstasy, etc.)	0	5	6	7	8
f. Inhalants (nitrous, glue, petrol, paint thinner, etc.)	0	5	6	7	8
g. Sedatives or Sleeping Pills (Valium, Serepax, Rohypnol, etc.)	0	5	6	7	8
h. Hallucinogens (LSD, acid, mushrooms, PCP, Special K, etc.)	0	5	6	7	8
i. Opioids (heroin, morphine, methadone, codeine, etc.)	0	5	6	7	8
j. Other - specify:	0	5	6	7	8

Ask Questions 6 & 7 for all substances ever used (i.e. those endorsed in Question 1)

Question 6

Has a friend or relative or anyone else ever expressed concern about your use of *(FIRST DRUG, SECOND DRUG, ETC.)?*	No, Never	Yes, in the past 3 months	Yes, but not in the past 3 months
a. Tobacco products (cigarettes, chewing tobacco, cigars, etc.)	0	6	3
b. Alcoholic beverages (beer, wine, spirits, etc.)	0	6	3
c. Cannabis (marijuana, pot, grass, hash, etc.)	0	6	3
d. Cocaine (coke, crack, etc.)	0	6	3
e. Amphetamine type stimulants (speed, diet pills, ecstasy, etc.)	0	6	3
f. Inhalants (nitrous, glue, petrol, paint thinner, etc.)	0	6	3
g. Sedatives or Sleeping Pills (Valium, Serepax, Rohypnol, etc.)	0	6	3
h. Hallucinogens (LSD, acid, mushrooms, PCP, Special K, etc.)	0	6	3
i. Opioids (heroin, morphine, methadone, codeine, etc.)	0	6	3
j. Other – specify:	0	6	3

Question 7

Have you ever tried and failed to control, cut down or stop using *(FIRST DRUG, SECOND DRUG, ETC.)?*	No, Never	Yes, in the past 3 months	Yes, but not in the past 3 months
a. Tobacco products (cigarettes, chewing tobacco, cigars, etc.)	0	6	3
b. Alcoholic beverages (beer, wine, spirits, etc.)	0	6	3
c. Cannabis (marijuana, pot, grass, hash, etc.)	0	6	3
d. Cocaine (coke, crack, etc.)	0	6	3
e. Amphetamine type stimulants (speed, diet pills, ecstasy, etc.)	0	6	3
f. Inhalants (nitrous, glue, petrol, paint thinner, etc.)	0	6	3
g. Sedatives or Sleeping Pills (Valium, Serepax, Rohypnol, etc.)	0	6	3
h. Hallucinogens (LSD, acid, mushrooms, PCP, Special K, etc.)	0	6	3
i. Opioids (heroin, morphine, methadone, codeine, etc.)	0	6	3
j. Other – specify:	0	6	3

Question 8

	No, Never	Yes, in the past 3 months	Yes, but not in the past 3 months
Have you ever used any drug by injection? ***(NON- MEDICAL USE ONLY)***	**0**	**2**	**1**

IMPORTANT NOTE:

Patients who have injected drugs in the last 3 months should be asked about their pattern of injecting during this period, to determine their risk levels and the best course of intervention.

PATTERN OF INJECTING	INTERVENTION GUIDELINES
Once weekly or less or Fewer than 3 days in a row	**Brief Intervention including "risks associated with injecting" card**
More than once per week or 3 or more days in a row	**Further assessment and more intensive treatment***

HOW TO CALCULATE A SPECIFIC SUBSTANCE INVOLVEMENT SCORE.

For each substance (labelled a. to j.) add up the scores received for questions 2 through 7 inclusive. Do not include the results from either Q1 or Q8 in this score. For example, a score for cannabis would be calculated as: Q2C + Q3c + Q4c + Q5c + Q6c + Q7c

Note that Q5 for tobacco is not coded, and is calculated as: Q2a + Q3a + Q4a + Q6a + Q7a

THE TYPE OF INTERVENYION IS DETERMINED BY THE PATIENT'S SPECIFIC SUBSTANCE INVOLVEMENT SCORE

	Record specific substance score	no intervention	receive brief intervention	more intensive treatment *
a. tobacco		**0 - 3**	**4 - 26**	**27 +**
b. alcohol		**0 - 10**	**11 - 26**	**27 +**
c. cannabis		**0 - 3**	**4 - 26**	**27 +**
d. cocaine		**0 - 3**	**4 - 26**	**27 +**
e. amphetamine		**0 - 3**	**4 - 26**	**27 +**
f. inhalants		**0 - 3**	**4 - 26**	**27 +**
g. sedatives		**0 - 3**	**4 - 26**	**27 +**
h. hallucinogens		**0 - 3**	**4 - 26**	**27 +**
i. opioids		**0 - 3**	**4 - 26**	**27 +**
j. other drugs		**0 - 3**	**4 - 26**	**27 +**

NOTE: *FURTHER ASSESSMENT AND MORE INTENSIVE TREATMENT may be provided by the health professional(s) within your primary care setting, or, by a specialist drug and alcohol treatment service when available.

B. WHO ASSIST V3 .0RESPONSE CARD FOR PATIENTS

Response Card - substances

a. Tobacco products (cigarettes, chewing tobacco, cigars, etc.)
b. Alcoholic beverages (beer, wine, spirits, etc.)
c. Cannabis (marijuana, pot, grass, hash, etc.)
d. Cocaine (coke, crack, etc.)
e. Amphetamine type stimulants (speed, diet pills, ecstasy, etc.)
f. Inhalants (nitrous, glue, petrol, paint thinner, etc.)
g. Sedatives or Sleeping Pills (Valium, Serepax, Rohypnol, etc.)
h. Hallucinogens (LSD, acid, mushrooms, PCP, Special K, etc.)
i. Opioids (heroin, morphine, methadone, codeine, etc.)
j. Other - specify:

Response Card (ASSIST Questions 2 – 5)

Never:: not used in the last 3 months

Once or twice: 1 to 2 times in the last 3 months.

Monthly: 1 to 3 times in one month.

Weekly: 1 to 4 times per week.

Daily or almost daily: 5 to 7 days per week.

Response Card (ASSIST Questions 6 to 8)

No, Never

Yes, but not in the past 3 months

Yes, in the past 3 months

C. ALCOHOL, SMOKING AND SUBSTANCE INVOLVEMENT SCREENING TEST (WHO ASSIST V3.0) FEEDBACK REPORT CARD FOR PATIENTS

Name_____**Test Date**_____

Specific Substance Involvement Scores

Substance	Score	Risk Level
a. Tobacco products		0-3 Low 4-26 Moderate 27 + High
b. Alcoholic Beverages		0-10 Low 11-26 Moderate 27 + High
c. Cannabis		0-3 Low 4-26 Moderate 27 + High
d. Cocaine		0-3 Low 4-26 Moderate 27 + High
e. Amphetamine type stimulants		0-3 Low 4-26 Moderate 27 + High
f. Inhalants		0-3 Low 4-26 Moderate 27 + High
g. Sedatives or Sleeping Pills		0-3 Low 4-26 Moderate 27 + High
h. Hallucinogens		0-3 Low 4-26 Moderate 27 + High
i. Opioids		0-3 Low 4-26 Moderate 27 + High
j. Other - specify		0-3 Low 4-26 Moderate 27 + High

What do your scores mean?

Low:

Moderate: You are at risk of health and other problems from your current pattern of substance use.

High: You are at high risk of experiencing severe problems (health, social, financial, legal, relationship) as a result of your current pattern of use and are likely to be dependent

Are you concerned about your substance use?

a. tobacco	Your risk of experiencing these harms is:…… Low ☐ Moderate ☐ Hiigh ☐ (tick one) Regular tobacco smoking is associated with:
	Premature aging, wrinkling of the skin
	Respiratory infections and asthma
	High blood pressure, diabetes
	Respiratory infections, allergies and asthma in children of smokers
	Miscarriage, premature labour and low birth weight babies for pregnant women
	Kidney disease
	Chronic obstructive airways disease
	Heart disease, stroke, vascular disease
	Cancers

b. alcohol	Your risk of experiencing these harms is:…… Low ☐ Moderate ☐ Hiigh ☐ (tick one) Regular excessive alcohol use is associated with:
	Hangovers, aggressive and violent behaviour, accidents and injury
	Reduced sexual performance, premature ageing
	Digestive problems, ulcers, inflammation of the pancreas, high blood pressure
	Anxiety and depression, relationship difficulties, financial and work problems
	Difficulty remembering things and solving problems
	Deformities and brain damage in babies of pregnant women
	Stroke, permanent brain injury, muscle and nerve damage
	Liver disease, pancreas disease
	Cancers, suicide

c. cannabis	Your risk of experiencing these harms is:…… Low ☐ Moderate ☐ Hiigh ☐ (tick one) Regular use of cannabis is associatted wiith:
	Problems with attention and motivation
	Anxiety, paranoia, panic, depression
	Decreased memory and problem solving ability
	High blood pressure
	Asthma, bronchitis
	Psychosis in those with a personal or family history of schizophrenia
	Heart disease and chronic obstructive airways disease
	Cancers

d. cocaine	Your risk of experiencing these harms is:…. Low ☐ Moderate ☐ Hiigh ☐ (tick one) Regular use of cocaine is associated with:
	Difficulty sleeping, heart racing, headaches, weight loss
	Numbness, tingling, clammy skin, skin scratching or picking
	Accidents and injury, financial problems
	Irrational thoughts
	Mood swings - anxiety, depression, mania
	Aggression and paranoia
	Intense craving, stress from the lifestyle
	Psychosis after repeated use of high doses
	Sudden death from heart problems

e. amphetamine type stimulants	Your risk of experiencing these harms is:……. Low ☐ Moderate ☐ Hiigh ☐ (tick one) Regular use of amphetamine type sttiimula ntssiss associated with:
	Difficulty sleeping, loss of appetite and weight loss, dehydration
	jaw clenching, headaches, muscle pain
	Mood swings –anxiety, depression, agitation, mania, panic, paranoia
	Tremors, irregular heartbeat, shortness of breath
	Aggressive and violent behaviour
	Psychosis after repeated use of high doses
	Permanent damage to brain cells
	Liver damage, brain haemorrhage, sudden death (ecstasy) in rare situations

f. inhalants	Your risk of experiencing these harms is:……. Low ☐ Moderate ☐ Hiigh ☐ (tick one) Regular use of inhalants is associated with:
	Dizziness and hallucinations, drowsiness, disorientation, blurred vision
	Flu like symptoms, sinusitis, nosebleeds
	Indigestion, stomach ulcers
	Accidents and injury
	Memory loss, confusion, depression, aggression
	Coordination difficulties, slowed reactions, hypoxia
	Delirium, seizures, coma, organ damage (heart, lungs, liver, kidneys)
	Death from heart failure

g. sedatives	Your risk of experiencing these harms is: Low ☐ Moderate ☐ High ☐ (tick one) Regular use of sedatives is associated with:
	Drowsiness, dizziness and confusion
	Difficulty concentrating and remembering things
	Nausea, headaches, unsteady gait
	Sleeping problems
	Anxiety and depression
	Tolerance and dependence after a short period of use.
	Severe withdrawal symptoms
	Overdose and death if used with alcohol, opioids or other depressant drugs.

h. hallucinogens	Your risk of experiencing these harms is:…….. Low ☐ Moderate ☐ High ☐ (tick one) Regular use of hallucinogens is associated with:
	Hallucinations (pleasant or unpleasant) – visual, auditory, tactile, olfactory
	Difficulty sleeping
	Nausea and vomiting
	Increased heart rate and blood pressure
	Mood swings
	Anxiety, panic, paranoia
	Flash-backs
	Increase the effects of mental illnesses such as schizophrenia

i. opioids	Your risk of experiencing these harms is: Low ☐ Moderate ☐ High ☐ (tick one) Regular use of opioids is associated with:
	Itching, nausea and vomiting
	Drowsiness
	Constipation, tooth decay
	Difficulty concentrating and remembering things
	Reduced sexual desire and sexual performance
	Relationship difficulties
	Financial and work problems, violations of law
	Tolerance and dependence, withdrawal symptoms
	Overdose and death from respiratory failure

D. RISKS OF INJECTING CARD – INFORMATION FOR PATIENTS

Using substances by injection increases the riisk of harm from substance use.

This harm can come from:

- **The substance**
  - **If you inject any drug you are more likely to become dependent.**
  - **If you inject amphetamines or cocaine you are more likely to experience psychosis.**
  - **If you inject heroin or other sedatives you are more likely to overdose.**
- **The injecting behaviour**
  - **If you inject you may damage your skin and veins and get infections.**
  - **You may cause scars, bruises, swelling, abscesses and ulcers.**
  - **Your veins might collapse.**
  - **If you inject into the neck you can cause a stroke.**
- **Sharing of injecting equipment**
  - **If you share injecting equipment (needles & syringes, spoons, filters, etc.) you are more likely to spread blood borne virus infections like Hepatitis B, Hepatitis C and HIV.**

♦ **It is safer not to inject**

♦ **If you do inject:**

√ **always use clean equipment (e.g., needles & syringes, spoons, filters, etc.)**
√ **always use a new needle and syringe**
√ **don't share equipment with other people**
√ **clean the preparation area**
√ **clean your hands**
√ **clean the injecting site**
√ **use a different injecting site each time**
√ **inject slowly**
√ **put your used needle and syringe in a hard container and dispose of it safely**

♦ **If you use stimulant drugs like amphetamines or cocaine the following tips will help you reduce your risk of psychosis.**

√ **avoid injecting andsmoking**
√ **avoid using on a daily basis**

♦ **If you use depressant drugs like heroin the following tips will help you reduce your risk of overdose.**

√ **avoid using other drugs, especially sedatives or alcohol, on the same day**
√ **use a small amount and always have a trial "taste" of a new batch**
√ **have someone with you when you are using**
√ **avoid injecting in places where no-one can get to you if you do overdose**
√ **know the telephone numbers of the ambulance service**

E TRANSLATI ON AND ADAPTATI ON TO LOCAL LANGUAGES ANDCULTURE: A RESOURCE FOR CLINICIANS AND RESEARCHERS

The ASSIST instrument, instructions, drug cards, response scales and resource manuals may need to be translated into local languages for use in particular countries or regions. Translation from English should be as direct as possible to maintain the integrity of the tools and documents. However, in some cultural settings and linguistic groups, aspects of the ASSIST and it's companion documents may not be able to be translated literally and there may be socio-cultural factors that will need to be taken into account in addition to semantic meaning. In particular, substance names may require adaptation to conform to local conditions, and it is also worth noting that the definition of a standard drink may vary from country to country.

Translation should be undertaken by a bi-lingual translator, preferably a health professional with experience in interviewing. For the ASSIST instrument itself, translations should be reviewed by a bi-lingual expert panel to ensure that the instrument is not ambiguous. Back translation into English should then be carried out by another independent translator whose main language is English to ensure that no meaning has been lost in the translation. This strict translation procedure is critical for the ASSIST instrument to ensure that comparable information is obtained wherever the ASSIST is used across the world.

Translation of this manual and companion documents may also be undertaken if required. These do not need to undergo the full procedure described above, but should include an expert bi-lingual panel.

Before attempting to translate the ASSIST and related documents into other languages, interested individuals should consult with the WHO about the procedures to be followed and the availability of other translations. Write to the Department of Mental Health and Substance Dependence, World Health Organisation, 1211 Geneva 27, Switzerland.

Appendix F: Cover pages of the WHO-ASSIST linked intervention manuals



Appendix G: Approval from CMJAH emergency department to conduct study



12:07:2019

To: Whom it may concern

This letter will serve as authorization of Mr. Fathullah Ibisomi to conduct the research project entitled "Substance use disorder among emergency department patients in a South African tertiary public institution" at the Charlotte Maxeke Johannesburg Academic Hospital (CMJAH) emergency department. Upon review of the study protocol, we are glad to offer you an opportunity to conduct the research study in the emergency department. The consent forms, study information document, and screening interviews are all approved for use in screening emergency department patients and the emergency department staff will support and assist the principal investigator to conduct the study.

Yours sincerely,

Thank you

Professor Feroza Motara
BA, MBBCh, MFamMed, FCFP, ACEM, DipHIVMan, CAHM
HOD: Division of Emergency Medicine, Faculty of Health Sciences, University of the Witwatersrand &
HOD: Charlotte Maxeke Johannesburg Academic Hospital
Johannesburg, South Africa

Department of Emergency Medicine, Faculty of Health Sciences, University of the Witwatersrand & Charlotte Maxeke Johannesburg Academic Hospital, 7 York Road, Parktown, 2193. Tel: +27761302683 *feroza.motara@wits.ac.za

Appendix H: Study Information document

STUDY INFORMATION DOCUMENT

Study title: Substance use among emergency department patients in a South African tertiary public institution

Dear Sir/Madam

Introduction:

I, Fathullah Ibisomi, am doing a research project on the identification of problematic substance use in the emergency department of a South African tertiary public institution. In this study we are trying to determine the percentage prevalence of and risk factors associated with substance use in patients that report to the emergency department of Charlotte Maxeke Academic hospital. We also plan to determine the substances most frequently used within this same population.

Invitation to Participate: I would like to invite you to participate in this research study. Participation in this study is entirely voluntary.

What is involved in the study?

Questionnaires

The cross-sectional descriptive study makes use of a screening interview that includes the World Health Organization alcohol, smoking and substance involvement screening tool (WHO ASSIST) as well

as a sociodemographic and patient condition information sheet. The principal investigator of the study will conduct the screening interviews.

The person conducting the interview will commence it with recording general information about the patient. This includes variables such as Age, Sex, Race etc. The interview will then continue with the WHO ASSIST form. The researcher will ask the patient a series of questions pertaining to the patient's substance use, for example, the frequency of substance usage, the presence of withdrawal symptoms, the severity of cravings etc. The resulting substance involvement score will determine the patient's risk of experiencing health (and/or other) problems according to the WHO ASSIST score criteria. The researcher will then make a patient record for each patient interviewed. The interview will take approximately thirty-to-forty minutes to complete including patient counselling and brief intervention after the screening questionnaire is done.

Risks

There are no risks in participating in this study.

Benefits

You will be granted the opportunity to be counselled and receive brief intervention for substance use. This will be given by the principal investigator as well as by a doctor within the emergency department. You may be given a referral for further treatment by one of the doctors.

Participation is voluntary

Your participation in this study is completely voluntary, and all your opinions will be kept anonymous. You have the right not to participate in this study. Completing the interview will be regarded as informed consent to participate in this study.

Confidentiality

Confidentiality will be maintained in this study. The questionnaire does not require any personal identifying information to be divulged. The results from the study will be stored on REDcap and will

be password protected. Only the researcher and the supervisors will have access to the password thereby maintaining confidentiality and security of data.

Who has reviewed the study and given Ethical approval for this study?

This study will be sent to the Wits University Human Research Ethics Committee for approval.

Approximate time that the study will be completed in

September 2019 to December 2020

For more information or questions regarding the study, or if you would like to report any problems, please contact:

Researcher: Fathullah Ibisomi
073 354 7431
1117190@students.wits.ac.za

Supervisor: Stephanie De Rapper
082 310 4898
Stephanie.derapper@wits.ac.za

If you have any concern over the way the study is being conducted, please contact the Chairperson of this Committee who is Professor Clement Penny, who may be contacted on telephone number 011 717 2301, or by e-mail on Clement.Penny@wits.ac.za. The telephone numbers for the Committee secretariat are 011 717 2700/1234 and the e-mail addresses are Zanele.Ndlovu@wits.ac.za and Rhulani.Mukansi@wits.ac.za

Thank you for reading this Study Information Sheet.

ISIHLOKO SOKWENZA ULWAZI

Ukusetshenziswa kwezidakamizwa ezigulini zoMnyango Wezimo eziphuthumayo esikhungweni semfundo ephakeme saseNingizimu Afrika

Mnumzane othandekayo / Madam

Isingeniso:

Mina, Fathullah Ibisomi, ngenza ucwaningo ngokutholwa kokusetshenziswa kwezinkinga kwezidakamizwa emnyangweni ophuthumayo wesikhungo semfundo ephakeme saseNingizimu Afrika. Kulolu cwaningo sifuna ukunquma ukuphakama kwesilinganiso samaphesenti nezingozi ezihlobene nokusetshenziswa kwezidakamizwa ezigulini ezibika emnyangweni ophuthumayo esibhedlela seCharlotte Maxeke Academic. Siphinde sihlele ukunquma izinto ezivame ukusetshenziselwa ngaphakathi kwalaba bantu.

Isimemo sokubamba iqhaza: Ngingathanda ukumema ukuba uhlanganyele kulolu cwaningo lokucwaninga. Ukubamba iqhaza kulolu cwaningo kuphelele ngokuzithandela.

Yini ehilelekile esifundweni?

Imibuzo

Ucwaningo oluchazayo lwesigaba esilandelayo lusebenzisa inkhulumomphendvulo yokuhlola ehlanganisa iWorld Health Organization utshwala, ukubhema nokusebenza kokuhlolwa kokuzibandakanya komzimba (WHO ASSIST) kanye neshidi lesimo somphakathi nesimo sesiguli. Umphenyi oyinhloko wesifundo uzoqhuba izingxoxo zokuhlola.

Umuntu oqhuba le ngxoxo uzoqala ngokurekhoda ulwazi olujwayelekile mayelana nesiguli. Lokhu kufaka phakathi iziguquko ezifana nobudala, ubulili, umjaho njll. Ingxoxo izoqhubeka neFomu le-WHO ASSIST. Umcwaningi uzokucela isiguli uchungechunge lwemibuzo ephathelene nokusetshenziswa kwezidakamizwa zesiguli, isibonelo, imvamisa yokusetshenziswa kwezidakamizwa, ukutholakala

kwezibonakaliso zokuhoxiswa, ukukhwabanisa kwezifiso njll. Umphumela obangelwa ukubandakanya izidakamizwa uzothola ingozi yesiguli yokubhekana impilo (kanye / noma enye) izinkinga ngokusho kwe-WHO ASSIST criteria. Umcwaningi uzobe enza irekhodi lesiguli ngesiguli ngasinye esibuzwayo. Ingxoxo izothatha imizuzu ecishe ibe ngamashumi amathathu kuya kwamashumi amane ukuze uqede kufaka phakathi ukwelulekwa ngesineke nokungenelela okufushane ngemuva kokuba kwenziwe uhlu lwemibuzo lokuhlaziya.

Izingozi

Azikho izingozi zokuhlanganyela kulolu cwaningo.

Izinzuzo

Uyonikezwa ithuba lokuthola iseluleko futhi uthole ukungenelela okufishane kokusetshenziswa kwezidakamizwa. Lokhu kuzonikezwa umphenyi oyinhloko kanye nodokotela ngaphakathi komnyango ophuthumayo. Unganikezwa ukudluliselwa kokwelashwa okunye ngodokotela.

Ukubamba iqhaza kukuzithandela

Ukuhlanganyela kwakho kulolu cwaningo ngokuzithandela ngokuphelele, futhi yonke imibono yakho izogcinwa engaziwa. Unelungelo lokungahlanganyeli kulolu cwaningo. Ukuqedela lolu daba kuzothathwa njengemvume enolwazi lokubamba iqhaza kulolu cwaningo.

Ukuyimfihlo

Imfihlo izogcinwa kulolu cwaningo. Lemibuzo ayidingi noma yiluphi ulwazi lomuntu siqu lokukhomba oluzochazwa. Imiphumela evela ocwaningweni izogcinwa ku-REDcap futhi izovikelwa ngephasiwedi. Umcwaningi kanye nabaphathi kuphela abazokwazi ukuthola iphasiwedi ngaleyo ndlela balondoloze imfihlo nokuphepha kwedatha.

Ubani obuyekeze isifundo futhi unikeze imvume yokuziphatha kwalolu cwaningo?

Lolu cwaningo luzothunyelwa kwikomidi le-Wits University Human Ethics Research Ethics ukuvunyelwa.

Isikhathi esithile ukuthi isifundo sizoqedwa

September 2019 kuya kuDisemba 2020

Ukuze uthole olunye ulwazi noma imibuzo ephathelene nokucwaninga, noma uma ungathanda ukubika noma yiziphi izinkinga, sicela uthinte:

Umcwaningi: Fathullah Ibisomi
073 354 7431
1117190@students.wits.ac.za

Umphathi: Stephanie De Rapper
082 310 4898
Stephanie.derapper@wits.ac.za

Uma unenkinga mayelana nendlela okuqhutshwa ngayo isifundo, sicela uxhumane noSihlalo weKomidi oProfesa Clement Penny, ongathintana naye kwinombolo yocingo 011 717 2301, noma nge-imeyili ku-Clement.Penny@wits. ac.za. Izinombolo zocingo zeNobhala weKomidi ziyi-011 717 2700/1234 kanti amakheli e-mail yiZanele.Ndlovu@wits.ac.za noRhulani.Mukansi@wits.ac.za

Siyabonga ngokufunda leli shicilelo lolwazi lokufunda.

STUDIE INLIGTINGSDOKUMENT

Stofgebruik onder pasiënte met noodgevalle in 'n Suid-Afrikaanse tersiêre openbare instelling

Liewe Meneer / Mevrou

Inleiding:

Ek, Fathullah Ibisomi, is besig met 'n navorsingsprojek oor die identifisering van problematiese middelgebruik in die noodafdeling van 'n Suid-Afrikaanse tersiêre openbare instelling. In hierdie studie probeer ons die persentasie voorkoms van en risikofaktore wat met substansgebruik verband hou, vasstel by pasiënte wat aan die noodafdeling van die Charlotte Maxeke Akademiese Hospitaal rapporteer. Ons beplan ook om die stowwe wat meestal binne dieselfde populasie gebruik word, te bepaal.

Uitnodiging om deel te neem: Ek wil u graag uitnooi om aan hierdie navorsingstudie deel te neem. Deelname aan hierdie studie is heeltemal vrywillig.

Wat is daar by die studie betrokke?

Vraelyste

Die kruisverdelende beskrywende studie maak gebruik van 'n siftingsonderhoud wat die Wêreldgesondheidsorganisasie-alkohol, rook- en substansbetrokkenheid-keuringsinstrument (WHO ASSIST), asook 'n sosiodemografiese en pasiëntvoorwaarde-inligtingsblad insluit. Die hoofondersoeker van die studie sal die keuringsonderhoude uitvoer.

Die persoon wat die onderhoud voer, sal dit begin met algemene inligting oor die pasiënt. Dit sluit in veranderlikes soos Ouderdom, Geslag, Ras, ens. Die onderhoud sal dan voortgaan met die WGO ASSIST-vorm. Die navorser sal die pasiënt 'n reeks vrae rakende die pasiënt se substansgebruik, byvoorbeeld die frekwensie van stofgebruik, die teenwoordigheid van onttrekkingsimptome, die erns van drange, ens., Vra. Die gevolglike substansie-betrokkenheids telling bepaal die pasiënt se risiko om

te ervaar gesondheid (en / of ander) probleme volgens die WHO ASSIST tellingskriteria. Die navorser sal dan 'n pasiëntrekord maak vir elke pasiënt wat gevoer word. Die onderhoud sal ongeveer dertig tot veertig minute neem om te voltooi, insluitend pasiëntberading en kort intervensie nadat die keuringsvraelys gedoen is.

Risiko's

Daar is geen risiko's om aan hierdie studie deel te neem nie.

Voordele

U sal die geleentheid kry om berading te gee en kort ingryping vir substansgebruik te ontvang. Dit sal deur die hoofondersoeker sowel as deur 'n dokter in die noodafdeling gegee word. U kan 'n verwysing kry vir verdere behandeling deur een van die dokters.

Deelname is vrywillig

U deelname aan hierdie studie is heeltemal vrywillig en al u menings sal anoniem gehou word. U het die reg om nie aan hierdie studie deel te neem nie. Die voltooiing van die onderhoud sal as ingeligte toestemming beskou word om aan hierdie studie deel te neem.

Vertroulikheid

Vertroulikheid sal in hierdie studie gehandhaaf word. Die vraelys vereis nie dat enige persoonlike identifiserende inligting bekendgemaak word nie. Die resultate van die studie sal op REDcap gestoor word en sal beskerm word deur wagwoorde. Slegs die navorser en die toesighouers sal toegang tot die wagwoord hê en sodoende vertroulikheid en sekuriteit van data handhaaf.

Wie het die studie hersien en etiese goedkeuring vir hierdie studie gegee?

Hierdie studie sal ter goedkeuring aan die Wits Universiteit se Navorsingsetiekkomitee gestuur word.

Geskatte studietyd sal voltooi word

September 2019 tot Desember 2020

AFRIKAANS

Vir meer inligting of vrae rakende die studie, of as u enige probleme wil rapporteer, kontak asseblief:

Navorser: Fathullah Ibisomi

073 354 7431

1117190@students.wits.ac.za

Toesighouer: Stephanie De Rapper

082 310 4898

Stephanie.derapper@wits.ac.za

As u enige besorgdheid het oor die manier waarop die studie uitgevoer word, kontak asseblief die voorsitter van hierdie Komitee, wat Professor Clement Penny is, wat kontak kan word by telefoonnommer 011 717 2301, of per e-pos op Clement.Penny@wits. ac.za. Die telefoonnommers vir die Komiteesekretariaat is 011 717 2700/1234 en die e-posadresse is Zanele.Ndlovu@wits.ac.za en Rhulani.Mukansi@wits.ac.za.

Dankie vir die lees van hierdie Studieinligtingsblad.

Appendix I: Participant informed consent form

PARTICIPANT INFORMED CONSENT FORM

Research Project entitled: Substance use among emergency department patients in a South African tertiary public institution

I hereby confirm that I have accurately read and understood the information sheet provided by the researcher, and I understand that the following will be done:

1. I will participate in the study towards the research project.

2. I will remain anonymous.

3. I will be required to answer a questionnaire about my substance use.

4. I confirm that I have given consent freely and willingly and that I may withdraw at any time during the study.

5. I confirm that I was given the opportunity to ask questions, and all the questions have been answered to my satisfaction by the researcher.

• I hereby agree that I understand the requirements of this project and am willing to participate and provide feedback for research purposes.

Sign: _____ Date: _____

IFOMU LOKUPHAKATHI LOKUQALA LOKWENZA

Iphrojekthi Yokucwaninga enesihloko: Ukusetshenziswa kwezidakamizwa ezigulini zoMnyango Wezimo eziphuthumayo esikhungweni semfundo ephakeme saseNingizimu Afrika

Ngiyaqinisekisa ukuthi ngifunde ngokunembile futhi ngiyiqonda ishidi lwazi olunikezwe umcwaningi, futhi ngiyaqonda ukuthi okulandelayo kuzokwenziwa:

1. Ngizobamba iqhaza kulolu cwaningo ngokuqondene nomsebenzi wokucwaninga.
2. Ngizohlala ngingaziwa.
3. Ngizodingeka ukuthi ngiphendule iphepha lemibuzo ngokusetshenziswa kwami kwezidakamizwa.
4. Ngiyaqinisekisa ukuthi nginikeze imvume ngokukhululekile nangokuzithandela nokuthi ngingase ngihoxise nganoma isiphi isikhathi phakathi naleso sifundo.
5. Ngiyaqinisekisa ukuthi nginikezwe ithuba lokubuza imibuzo, futhi yonke imibuzo iye yaphendulwa ukwaneliseka kwami ngumcwaningi.

• Ngiyavuma ukuthi ngiyaqonda izidingo zalolu hlelo futhi ngizimisele ukubamba iqhaza futhi nginikeze impendulo ngezinjongo zocwaningo.

Uphawu: _____ Usuku: _____

DEELNEMER INLIGTING TOESTEMMINGSVORM

Navorsingsprojek getiteld: Stofgebruik onder pasiënte met noodgevalle in 'n Suid-Afrikaanse tersiêre openbare instelling

Hiermee bevestig ek dat ek die inligtingblad wat deur die navorser verskaf is, akkuraat lees en verstaan het en ek verstaan dat die volgende gedoen sal word:

1. Ek sal deelneem aan die studie na die navorsingsprojek.
2. Ek sal anoniem bly.
3. Daar sal van my verwag word om 'n vraelys oor my dwelmgebruik te beantwoord.
4. Ek bevestig dat ek vrywillig en gewillig toestemming gegee het en dat ek enige tyd gedurende die studie kan terugtrek.
5. Ek bevestig dat ek die geleentheid gekry het om vrae te stel, en al die vrae is tot my bevrediging deur die navorser beantwoord.

• Ek stem hiermee saam dat ek die vereistes van hierdie projek verstaan en bereid is om deel te neem en terugvoer vir navorsingsdoeleindes te gee.

Teken: _____ Datum: _____

Appendix J: List of community clinics in Johannesburg Metro District Area

COMMUNITY CLINICS

1.1 Johannesburg Metro District Area

(1) JMD - Adult Specialist Psychiatric Clinics

CLINICS	ADDRESS	TELEPHONE	REPEAT CLINICS	DR. CLINICS
Brixton	77 Ingelby Rd Crosby	(011) 837-7449	A. Patel (Mon-Fri)	Tuesday
Chiawelo	17 Rihlampfu St Chiawelo	(011) 984-8336	S.Dlalisa | K. Manthoko| C.Seguba (sessional) (Tues-Thurs)	Monday
Discoverers	Discoverers Hospital, Corner Goldman &Mitchell Street	(011) 674-1200	T.Manana | R. Singo Mon-(Wednesday)	Thursday
Dobsonville	34 Elias Motsoaledi Road, Soweto	(011) 988-1820	J.Mavundla | C. Diyane| Z Melato (sessional) (Mon, Wed, Thursday)	Tuesday
East bank	Corner Impala & Springbok Rd	(011) 443-7828	K.Moagi | P.Mhlambi (Mon- Fri)	Tuesday
Eldorado Park	21 Ascot Road, Ext 8, Eldorado Park	(011) 342- 1164	V.Nyembe | L. Mthethwa (Mon-Thurs)	Friday
Ennerdale Ext 9	Corner Katz &Smith Walk ,Ext9, Ennerdale	0730069508, 0828575972	M.Latedisa | R. Kantoro (Mon-Wed)	Friday

Hillbrow	Hillbrow Community Health Centre, Corner Smith and Klein Str	(011) 694-3755	E.Gatlane | E. Mabaso (Mon-Fri)	Tuesday
Jeppe	34 Ford Str, Jeppestown	(011) 614- 7233	B. Ndlazi | J. Makgatho (Monday-Thurs)	Friday
Lenasia	95 Nirvana Drive, Lenasia	(011) 852-3823	N.Khumalo |G.Khan (Tues-Thurs)	Monday
Lenasia South	3 Cosmos Str, Lenasia South	(011) 213-9600/9631	T. Gamede (Mon-Thurs)	Friday
Meadowlands	Hekroodt Circle, Zone 2, Meadowlands	(011) 936-4613	S.Mnguni | R. Yumba (Mon-Thurs)	Friday
Lillian Ngoyi	Old Potch Rd Kwa-Xuma 1804	(011) 938-1556	W.Melato | L.Gova (Mon-Fri)	Thursday
Mofolo	1412 Elias Motsoaledi Rd, Mofolo South	(011) 982 5542	N.Tsotetsi | M.Mnembe| K. Konyane (sessional) (Mon&Wed)	Tuesday
Orange Farm	Bristlecone Nursery	(011) 850-0094 0761125362	D. Kunene | S. Mahoa |M. Kunene (Mon-Thurs)	Fri Adult Wed Child
Orlando	Corner Rathebe & Mooki Str, Orlando East	(011) 935-1163	G.Stemar | N.Mabuya (Mon –Wed)	Thursday
Pimville	3623 Amtagala Str Zone 3 Pimville	(011) 933-2503	T. Ramokonopi (Mon-Wed)	Thursday at Lillian Ngoyi
Riverlea	Health Center Colorado Drive	(011) 474-2881	D.Shomang (Wednesday)	No Doctor

South Rand	North road	(011) 435-3829	J. Orritt | R. Letsoalo Tues-Friday)	Monday
Westbury	Corner Du Plessis Str & Chrisma Rd	(011) 673-1002	D.Shomang (Thursdays)	Monday
Zola	Health Center, Bendile Street	(011) 934-1719	L Mdhluli | S. Manzini (Mon, Tues & Thurs)	Wednesday
Randburg	c\o Braamfischer &Selkirk	(011) 787-9393	V. Ncapayi | P. Tsotetsi (Monday-Thursday)	Friday
Bophelong	Stand 3699, Ivory Park	(011) 261-1212	P. Koenaite (Fridays)	Friday
Halfway House	18 Market street, Halfway house	(011) 805-3112	G. Maswanganyi (Mon-Friday)	Monday
Mpumelelo	Stand 13985 Ivory Park	(011) 203-3445\3439 (011) 261-0910	G. Sithole (Fridays)	No Doctor
Rabie Ridge	Erf 1074, c\o Korhaan &Stilt Street, Rabie Ridge	(011) 310-1977	M. Lepuwane (Mon-Friday)	Friday

Appendix K: Helpful service resources

HELPFUL RESOURCES		
Addiction		
SANCA	011 447 3528 National Office; 086 147 2622	www.sancanational.org.za
Alcoholics Anonymous	011 683 9101 – Central Office 0861 435 722 – helpline	www.aasouthafrica.org.za
Narcotics Anonymous	083 900 6962 – helpline;	www.na.org.za
Gamblers Anonymous	0861 233 578 – helpline; 0800 006 008	www.cghub.co.za
Alcoholics Anonymous (Family support)	0861 252 666 – helpline;	www.alanon.org.za
Tough Love (family Support)	011 886 3344	
Narcotics Anonymous- (Family support)	088 129 6791 – helpline;	www.naranon.org.za
Crisis Intervention		
Lifeline	0861 322 322 - helpline 0800 12 322 – national office	
Child Abuse	0800 055 555 – helpline - Childline 0800 123 321 – child emergency 011 481 5118 / 61 – teddy bear clinic	www.ttbc.org
Trauma Centre	011 403 5102 – CSVR	

	021 465 7373 – support for survivors of violence and torture	
Domestic Violence	POWA: 011 642 4345/6; 0800 567 567; a/h 083 765 1235; Stop Violence: 0800 150 150	www.stopwomenabusehelpline.org.za www.powa.co.za
Rape Crisis Support	011 642 4345	www.rapecrisis.org.za
Suicide Prevention & Awareness	051 444 5000 – crisis support	www.preventsuicidenow.com
SADAG	0800121314	Call back service SMS 31393
Akeso Psychiatric Response Unit (Private Facility)	0861435787	
Destiny Help Line (Youth/Students)	0800414243	
Counselling Services		
FAMSA - Family & Marriage Society Counselling & Support	011 788 4784 (.Jhb) 011 933 0301 (Soweto)	www.famsa.org.za
SA Sexual Health Association - Marriage counsellors and sex therapists	0860 100 262	www.sasha-health.co.za
Sexual Orientation Issues - Online counselling & information & support		www.out.org.za
Islamic Careline – Counselling Service	011 838 6085/6	www. islamsa.org.za

Sophiatown Community Psychological Services – numerous branches	Tel: +27 11 4828530 – head office (Westdene) Fax: +27 11 4828530	
SADAG Counselling Services	011 234 4837	zane@sadag.org
Mental Health Support Groups		
Anxiety & Depression	011 783 1474 /6 0860 103 645	www.anxiety.org
Autism Spectrum		www.asperger.org.za www.autism-sa.org
ADHD / ADD	011 4251308 – Edenvale 011 888-7655 – Randburg	www.adders.org
Bipolar Disorder	082 551 44592	www.bipolar.co.za
Eating Disorders - Patient and family support groups	011 640 1965 011 884 1797	
Anger Management	0861 100 618	
SADAG support group	0800212223	
South African Schizophrenia and Bipolar Disorders Alliance (SABDA)	011 326 0661 011 268 1166	72 Mackay Ave, Blairgowrie info@sabda.org.za

Appendix L: Distress protocol

Distress

- A participant indicates they are experiencing a high level of emotional distress OR
- exhibit behaviours suggestive that the discussion/interview is too stressful such as uncontrolled crying, shaking etc

Stage 1: Response

- Stop the discussion/interview.
- The PI or one of the emergency department staff will offer immediate support
- Assess mental status:
    1) Tell me what thoughts you are having?
    2) Tell me what you are feeling right now?
    3) Do you feel you are able to go on about your day?
    4) Do you feel safe?

Stage 2: Review

- If participant feels able to carry on; resume interview/discussion
- If participant is unable to carry on Go to stage 3

Stage 3: Response

- Remove participant from discussion and accompany to quiet area or discontinue interview
- Encourage the participant to contact the nearest adult specialist psychiatric clinic OR
- With participant consent, contact a member of the health care team treating them for further advice/support

References – modified from

Draucker C B, Martsolf D S and Poole C (2009) Developing Distress Protocols for research on Sensitive Topics. Archives of Psychiatric Nursing 23 (5) pp 343-350

Appendix M: Univariable logistic regression for lifetime substance use and past 3-month substance use (Results)

Table 8: Univariable Logistic Regression (lifetime substance use) of sociodemographic characteristics (Unadjusted Odds Ratio)

Sociodemographic characteristic	Tobacco products	Alcoholic beverages	Cannabis	Cocaine	Amphetamine type stimulants	Inhalants	Sedatives	Hallucinogens	Opioids
Sex	*	*	*						
Male	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Female	0.29*	0.34*	0.41*	1.38	0.92	0.25	0.92	1.41	0.85
Age		*	*						*
≤24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
25-34	0.65	0.82	0.40*	0.65	0.54	0.49	0.75	0.44	0.19*
35-44	0.39*	0.26*	0.13*	0.54	0.35	0.33	0.17*	0.69	0.19*
45-54	0.57	0.38	0.24*	0.55	0.14	1.00	0.30	0.38	1.00
55-64	0.73	0.25*	0.13*	0.33	1.00	1.00	0.43	0.35	0.15*
≥65	0.86	0.45	0.07*	1.00	1.00	1.00	1.00	1.00	0.07*
Race	*	*		*	*			*	
Black	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
White	5.43*	3.25*	1.00	4.5*	2.77	0.46	2.63*	5.22*	1.10
Asian	0.67	0.26	0.86	1.00	1.00	1.00	1.35	1.00	0.79
Coloured	1.86	2.69	1.67	10.29*	6.75*	1.00	1.00	4.18	2.68
Family history of substance abuse	*	*	*				*		
No	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Yes	2.29*	3.16	2.84*	1.72	1.46	4.17	3.37*	2.76	1.96
Socio-economic class		*					*		*
Lower	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Middle	1.07	2.27*	1.41	1.44	0.68	0.60	2.60	1.55	1.38
Upper	1.67	2.1	3.36*	1.03	2.27	5.24	9.21*	6.6*	2.69*

Employment status			*						*
Employed	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Unemployed	1.60	1.44	1.99*	0.75	0.79	2.32	1.43	1.53	3.05*
Education							*		
Primary and lower	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Secondary	0.65	1.31	1.70	1.92	2.28	1.66	13.17*	1.00	2.03
Tertiary	0.82	1.96	1.67	3.42*	3.46	2.09	10.63*	1.00	0.83

***= significant value (p<0,05)**

Appendix M continued

Table 9: Univariable Logistic Regression (past 3-month substance use) of sociodemographic characteristics (Unadjusted Odds Ratio)

Sociodemographic characteristic	Tobacco products	Alcoholic beverages	Cannabis	Cocaine	Amphetamine type stimulants	Inhalants	Sedatives	Hallucinogens	Opioids
Sex	*	*	*						*
Male	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Female	0.37*	0.39*	0.33*	1.00	1.00	1.00	0.61	1.00	0.09*
Age	*	*	*						
≤24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
25-34	0.67	0.50	0.28*	0.69	1.16	1.00	0.68	1.00	0.12
35-44	0.38*	0.24*	0.13*	1.00	1.00	1.00	0.34	1.00	0.53
45-54	0.45	0.36*	1.00	1.00	1.00	1.00	1.00	1.00	1.00
55-64	0.21*	0.13*	0.06*	1.00	1.00	1.00	1.00	1.00	0.20
≥65	0.20*	0.17*	0.04*	1.00	1.00	1.00	1.00	1.00	1.00
Race	*								
Black	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
White	3.11*	1.03	0.52	1.00	1.00	1.00	2.60	1.00	0.46
Asian	1.16	0.60	0.46	1.00	1.00	1.00	1.00	1.00	1.00
Coloured	1.02	0.31	0.42	1.00	4.18	1.00	1.00	1.00	4.53
Family history of substance abuse	*	*	*						
No	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Yes	1.93*	2.27*	3.70*	1.14	0.75	1.00	4.67	1.00	2.05
Socio-economic class			*				*		
Lower	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Middle	0.79	1.38	1.53	1.53	0.38	1.00	3.10	1.00	0.56
Upper	2.02	2.49	9.80*	1.00	1.00	1.00	27.00*	1.00	1.00

Employment status									
Employed	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Unemployed	1.16	0.95	2.18*	1.00	2.63	1.00	0.97	1.00	3.03
Education							*		
Primary and lower	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Secondary	0.87	1.45	1.82	1.00	1.23	1.00	1.00	1.00	1.24
Tertiary	0.93	1.27	0.84	1.00	1.00	1.00	1.00	1.00	0.33

***=significance (p<0,05)**