PREVALENCE OF CANNABIS USE AMONG PATIENTS ATTENDING THE METHADONE CLINIC AT MATHARI NATIONAL TEACHING & REFERRAL HOSPITAL: A RETROSPECTIVE STUDY

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H58/88190/2016

A THESIS SUBMITTED IN PARTIAL FULFILLMENT FOR THE AWARD OF DEGREE OF MASTERS OF MEDICINE IN PSYCHIATRY AT THE UNIVERSITY OF NAIROBI

2019

DECLARATION

I declare that this work is original and has been authored by me. It has not been submitted for an academic award or qualification in any institution of higher learning. Appropriate referencing has been made when citation of other people's work has been done.

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APPROVAL

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ACKNOWLEDGEMENT

DEDICATION

I dedicate this research to my parents and siblings for their unwavering support during

this process.

LIST OF ABBREVIATIONS

APA	American Psychiatric Association
CDC	Centers for Disease Control and Prevention
CDR	Crude Death Rate
CSO	Civil Society Organisation
DALY	Disability-Adjusted Life Year
EU	European Union
FDA	Food and Drug Administration
MAT	Medically Assisted Therapy
MMT	Methadone Maintenance Treatment
MNTRH	Mathari National Teaching & Referral Hospital
NACADA	National Authority for the Campaign Against Alcohol and Drug Abuse
OP	Outpatient
OST	Opioid Substitution Therapy
OUD	Opioid Use Disorder
PEPFAR	President's Emergency Plan for AIDS Relief
PWID	People who inject drugs
SPSS	Statistical Package for Social Sciences
UDS	Urine Drug Screen
UHC	Universal Health Care
UNODC	United Nations Office on Drugs and Crime
USAID	United States Agency for International Development
WHO	World Health Organization
YLD	Years Lost due to Disability
YLL	Years of Life Lost

OPERATIONAL DEFINITIONS

Drug use	Taking a psychotropic substance for non-medical purposes
Drug use disorder	Drug use that is harmful to an individual which requires treatment
Opioids	Compounds that are derived or chemically synthesized from opium poppy plant. They activate the CNS opioid receptors. Include heroin, morphine, fentanyl and methadone
Methadone maintenance therapy	The medical administration of methadone in a supervised manner which equates to the opioid dependence of an individual. The methadone reduces the cravings and withdrawal symptoms of opioids while ensuring a stable and non-euphoric effect
Methadone	Is a liquid form administered to opioid users daily on a dose determined by healthcare professionals at the methadone clinic

TABLE OF CONTENT

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

Background: There is a dearth of evidence on cannabis use among patients receiving methadone in Kenya as the medically assisted therapy (MAT) program is still fairly new in the country. However, polysubstance use especially cannabis is the most commonly used illegal drug by patients on methadone therapy resulting in compromised treatment outcomes.

Study Objectives: This study sought to determine the prevalence of cannabis use among patients on methadone treatment at Mathari National Teaching & Referral Hospital. The objectives were to determine the prevalence of cannabis use and the socio-demographic characteristics of patients receiving methadone who use cannabis at MNRTH methadone clinic from December 2014 to November 2018.

Methods: This was a retrospective study of 984 patients on methadone therapy at Mathari National Teaching & Referral Hospital from December 2014 to November 2018, using their medical records. We collected data on socio-demographics and drug use through urine drug screens. Data was analyzed using SPSS for windows version 23.0. We used frequency and proportions, chi-square and Fischer Exact test for analysis.

Results: The prevalence of cannabis use in participants was 62.8%. Majority of cannabis users were male (88.1%), aged 28-37 years (42.2%), unemployed (74.3%), had low level of education (87.7%) and single (72.4%). Comparing cannabis users and non-cannabis users, statistical differences were observed in the proportions for age, university education and participants who were married.

Conclusion: The high prevalence of cannabis use among patients in Nairobi receiving methadone underscores the need for addressing this public health burden. Mental health care professionals in MAT clinics should exercise due diligence in the monitoring and screening of cannabis use through administering the cannabis use disorder identification test (CUDIT) questionnaire to assess for dependence among patients on methadone therapy. Better clinical interventions such as targeted psychotherapy and social support should be conducted to promote MAT retention and long-term recovery outcomes. Policy makers such as Ministry of Health and other agencies should develop appropriate protocols and comprehensive programs for targeted management of this population.

Recommendation: To build upon our study findings, we recommend exploratory studies on the drivers for cannabis use in patients receiving methadone and interventions for this gateway drug. Future researchers need to conduct longitudinal studies to assess which pattern of cannabis use results in cannabis use disorder. In our study, more individuals were lost to follow up due to cannabis use compared to non-cannabis use thus, more prospective cohort studies on the impact of cannabis use on treatment outcome would be necessary.

CHAPTER ONE: INTRODUCTION

1.1 Introduction

According to the United Nations Office on Drugs and Crime (UNODC), substance use disorders especially drugs, give rise to increased burden of disease and mortality globally, disabling mental health of individuals, sustainable development and security of nations. The global disease burden and mortality due to drugs is estimated at 79% and 66%, respectively for opioid use disorders (UNODC, 2019). Opioid use disorders (OUD) have 15 times higher mortality due to overdoses compared to other mental illnesses (Chesney, Goodwin, & Fazel, 2014). The World Health Organization (WHO) found opioid use disorders caused 76% of deaths globally compared to other substances. In Africa, 10% of deaths resulted from drug use disorders and the Crude Death Rate (CDR) was 1.8 and 2.3 globally. Drug use disorders caused 57% of Years of Life Lost (YLL), 10% of Disability-Adjusted Life Year (DALY) and 6% of Years Lost due to Disability (YLD) globally. The DALY from drug use disorders in Kenya was 0.1 (WHO, 2017).

In 2017, one in every 18 people between 15 to 64 years had used drugs at least once. This represented an estimated 5.5% of the population globally, approximately 271 million. Of that population, 35 million or nearly 13%, were affected by drug use disorders that necessitated treatment. Of all the drugs, cannabis was the most commonly used by 188 million people worldwide at a prevalence of 3.8%. This was followed by opioids used by 53 million, opiates and stimulants by 29 million, ecstasy by 21 million and cocaine by 18 million. Teenagers between 15 to 16 years worldwide were reported to use cannabis at a rate of 4.7%, estimated at 11.3 million individuals. This rate is higher than prevalence of cannabis use among global

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population aged 15-64. The risk of developing dependence or cannabis use disorder is 17% after first use in adolescence (UNODC, 2019). This is depicted in figure 1.1.
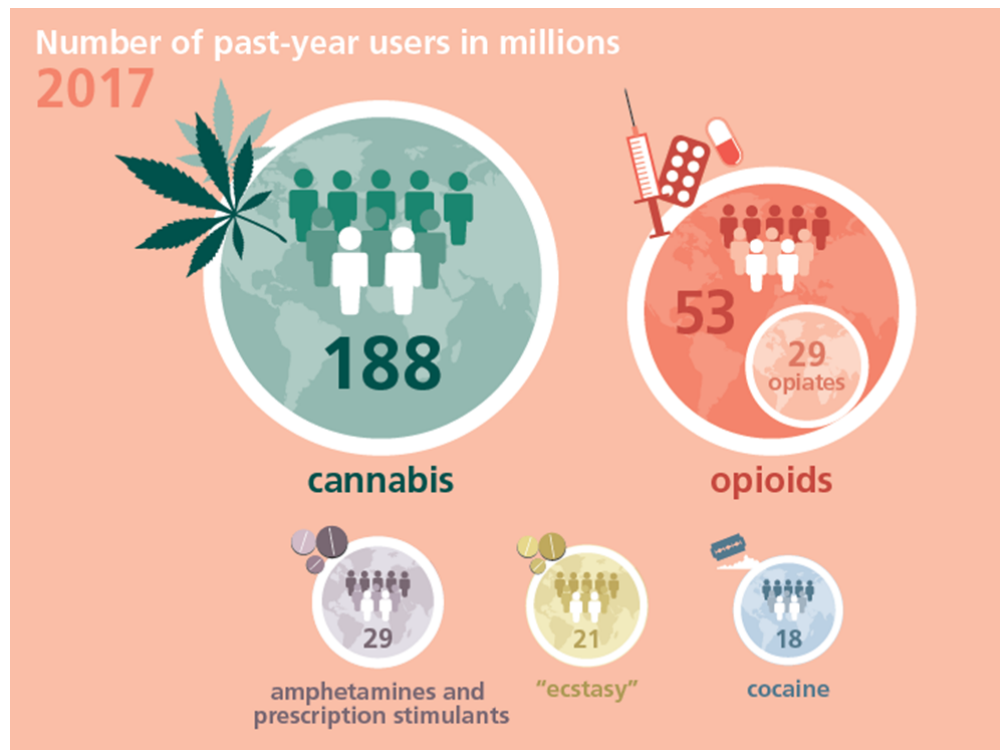
Figure 1.1 Drug users in 2017 (UNODC, 2019)

To decrease the incidence of drug use disorders, Kenya setup the National Authority for the Campaign Against Alcohol and Drug Abuse (NACADA). It steers the battle against substance abuse through deterrence, making policies, implementation of regulations, conducting research and provision of drug treatment facilities. It was set-up to direct a multi-disciplinary effort focusing on deterrence, regulation and attenuating substance abuse by concentrating on reducing demand and suppressing supply of drugs and substances. The major stakeholders in drug treatment facilities are rehabilitation centres and Medically Assisted Therapy (MAT) clinics. The MAT clinics are outpatient centres for treatment of opioid use and addiction (NACADA, 2018).

Opioid use disorders are characterized by an individual having a strong desire to take the opioid, impaired control while using, continued use despite problems it causes, excessive amounts of time spent trying to acquire it, neglecting their responsibilities, withdrawal symptoms on reducing use and tolerance to the opioid effects. Other substances are frequently used with opioids to alleviate withdrawal symptoms or heighten the opioid effects such as marijuana, alcohol, anxiolytics and sedatives, nicotine and stimulants (APA, 2013).

Polysubstance use is common among patients on methadone therapy globally. The substances used include opiates, cocaine, cannabis and benzodiazepines (Taylor, 2015). Cannabis is the most frequently used illegal drug in this population (Epstein & Preston, 2015). This common use is because it is widely available, has widespread domestic production and presumed to be harmless (Volkow, Baler, Compton, & Weiss, 2014). However, cannabis use is associated with an increase in hospital casualty visits, admissions, dependence, psychiatric morbidity and traffic fatalities (UNODC, 2019).

1.2 Background

In the mid-1980s and early 1990s, East Africa became a connecting route for international drug trafficking of heroin, amphetamines, valium and mandrax from Asia and Middle East to Europe and USA. Heroin and mandrax infiltrated Kenya in the mid-1990s (Ross, McCurdy, Kilonzo, Williams, & Leshabari, 2008). However, brown heroin had been prevalent in Mombasa, Kenya, for more than a quarter of a decade. It was substituted by white heroin from Asia which resulted in a trend of injecting and coined users as people who inject drugs (PWID) (Beckerleg, Telfer, & Sadiq, 2006).

Globally, heroin is the most abused opioid by nearly 13 million people at 375 tons. In Africa, approximately 45 tons of heroin was trafficked and 34 of this was consumed in East Africa. Europe and Asia have nearly 70% of drug treatment centres related to heroin. Africa is currently receiving heroin from Afghanistan. East Africa has 533,000 heroin users and 120,000 PWID in Kenya (UNODC, 2011). Research supports the use of methadone as opioid substitution therapy (OST) as an effective long term measure in decreasing injection drug use, opioid deaths and comorbid illnesses while enhancing adherence and retention in the methadone programs. In sub-Saharan Africa, the first methadone maintenance treatment (MMT) clinic that is government funded was opened in 2006 in Mauritius. Tanzania was the second country to open a publicly funded OST clinic in 2011 at Muhimbili National Hospital. The first published study in Tanzania found the methadone program was a success with retention rates similar to America and Europe. In addition, positive OST outcomes were possible in low-income countries with appropriate program support and strong political will (Lambdin, et al., 2014).

In response to the increasing opioid use problem, Kenya initiated harm reduction interventions to minimize the health, societal and economic losses. These interventions are part of Kenya's agenda for attainment of Universal Health Care (UHC) (Ministry of Health, 2018). The UHC means that all individuals receive health care services they need without suffering financial constraints. The WHO recommends harm reduction as the best approach to address illicit drug use (WHO, 2015). The Ministry of Health, therefore, introduced needle and syringe exchange programs (NSP), OST with methadone and prevention and treatment of infectious diseases (Ministry of Health, 2018). Other African countries that have adopted harm

reduction interventions are Tanzania, Uganda, Mauritius, Senegal and South Africa (Abdool, 2016).

To combat the growing opioid disease burden in Kenya, the first OST known as the Medically Assisted Therapy (MAT) clinic was opened at Mathari National Teaching & Referral Hospital (MNTRH) in Nairobi on December 2014. It became the third sub-Saharan country to introduce methadone for OST (Rhodes, et al., 2015). The clinic was supported by Centers for Disease Control and Prevention (CDC) Kenya, the U.S President's Emergency Plan for AIDS Relief (PEPFAR), U.S Agency for International Development (USAID) and University of Maryland. These agencies worked collaboratively with the Government of Kenya to get approval to initiate the use of methadone. The clinic was the first in Kenya to be urban, publicly-funded and university-sponsored to provide OST for PWID. The PWID are linked to the methadone program by civil society organizations (CSO). Currently, there are eight MAT clinics; two in Nairobi, one in Kiambu, four at the Coast (Malindi, Kisauni, Lamu and Ukunda) and one in Kisumu. The clinics use prescribed methadone under medical supervision as a substitute for intravenous heroin. Methadone reduces the craving of opioids, severity of withdrawal symptoms, opioid mortalities and promotes recovery (CDC, 2016).

In Kenya, there is an estimated number of PWID at more than 50,000 (UNODC, 2011). Of this population, 92% are heroin addicts while 8% are using other opiates (Ministry of Health, 2018). It is estimated that one in seven drug users receive opioid substitution therapy (OST). This shows the need to scale up more methadone therapy programs (UNODC, 2019). According to NACADA, the rate of heroin use in Kenya among people between 15 to 65 years decreased from 0.7% to 0.3% between 2012

and 2017. The knowledge of heroin among similar group of individuals was 51% countrywide and Nairobi was 54.7%. The knowledge level of a MAT clinic stood at 13.4% countrywide while Nairobi had the highest rate at 24.8% (NACADA, 2017).

1.3 Problem Statement

Polysubstance use is common globally among patients undergoing methadone therapy (Taylor, 2015). Cannabis is the most commonly used illegal drug by methadone patients (Epstein & Preston, 2015). The prevalence of cannabis use in patients on methadone therapy is estimated at more than 50%. The prevalence is high because cannabis is viewed as harmless and is thus, not monitored during methadone therapy. However, cannabis use has adverse health outcomes. It causes psychosis, mood disorders, anxiety, dependence and high attrition rates in MMT clinics. It was recommended as a further study to monitor cannabis use during MMT (Zielinski, et al., 2016). This was supported by White et al (2014) who found illicit drug use compromised MAT treatment outcomes. During methadone therapy, use of one illicit drug or multiple drugs doubled and quadrupled the attrition rate, respectively (White, et al., 2014).

In Tanzania, a retrospective study to investigate the predictors of attrition from the first MMT clinic to be setup found the prevalence of polysubstance use of heroin mixed with alcohol, cocaine, benzodiazepine or amphetamine was 34% (Lambdin, et al., 2014). Cannabis use was not measured showing a gap in literature for local studies. In addition, this high prevalence requires intervention by healthcare professionals and the Ministry of Health (Haysom, Gastrow, & Shaw, 2018).

There is a dearth of evidence on cannabis use among patients receiving methadone in Kenya as the MAT program is still fairly new in the country. With this in mind, there was need to determine prevalence of cannabis use among patients receiving methadone.

CHAPTER TWO: LITERATURE REVIEW

2.1 Overview

This chapter focused on the theoretical framework of the study, literature review and developed the conceptual framework.

2.2 Self-regulation theory

The self-regulation theory explains the development of harmful drug problems. This theory was proposed by Frederick Kanfer who described self-regulation as three phases where an individual is able to develop, implement and maintain actions towards achieving goals (Kanfer, 1970). This theory was developed further to describe polysubstance use. It posits that self-regulation is a planned intentional action towards health behavior change. High levels of self-regulation lead to well-adjusted behaviours in adults. Low levels of self-regulation result in polysubstance abuse. An individual with reduced levels of self-regulation will have excessive reliance on drug use to maintain physical and psychological balance. This is seen in opioid drug use disorders where cannabis is used to alleviate opioid withdrawal symptoms (Miller & Brown, 1991).
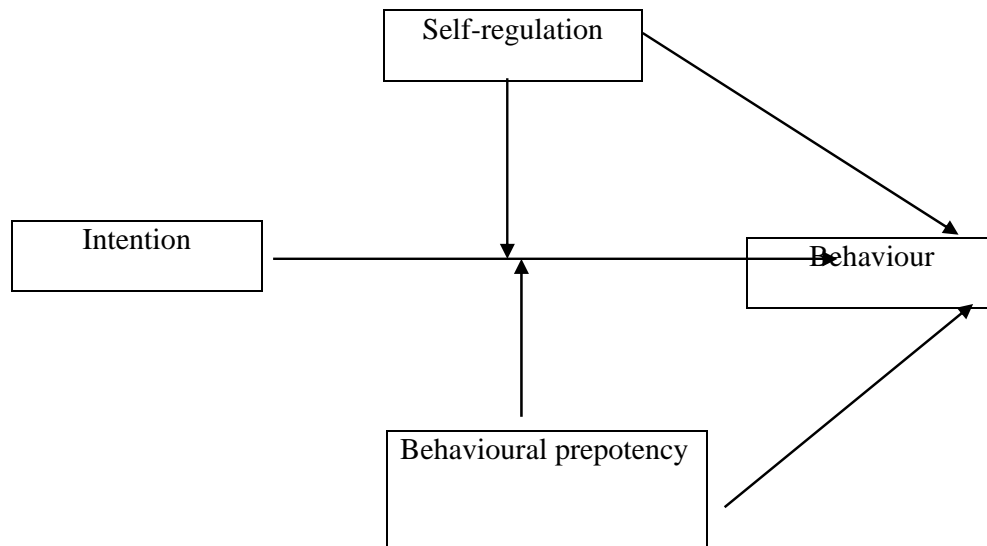
Figure 2.1 **Self-regulation theory**   **Source: (Miller & Brown, 1991)**

2.3 Methadone

The Food and Drug Administration (FDA) approved methadone, a mu-opioid receptor agonist, as the most commonly used pharmacological agent for opioid substitution therapy (OST) thus assisting in opioid cessation. It is administered orally as a syrup daily. The other pharmacological agents are buprenorphine which is administered sublingually and suboxone (Gowing, Farell, Bornemann, Sullivan, & Ali, 2008). Methadone aids in the reduction of strong desire for opioids, dependence, withdrawal symptoms and opioid response through receptor coverage without producing the euphoric effects (Scheibe, et al., 2018). More than 40 years of research has proven that MMT reduces attrition in the program, illegal heroin use, crime rates, frequency of injection drug use thus decreasing HIV incidence, mortality rates and improves psychosocial functioning and quality of life (Degenhardt, et al., 2018).

In Tanzania, it was replicated in their setting that appropriate dosing of methadone has been proven as fundamental in promoting high retention in MMT programs (Lambdin, et al., 2014).

In Sub-Saharan Africa, methadone has been implemented in Mauritius, Tanzania, Kenya and South Africa (Rhodes, Closson, Paparini, Guise, & Strathdee, 2016). In Africa, OST services are offered in Zanzibar, Côte d'Ivoire, South Africa, Tanzania, Kenya, Mauritius, Senegal, Seychelles, Uganda and Mozambique (Harm Reduction International, 2018). It is only in South Africa where MMT is privately funded but are currently lobbying for government funding (Scheibe, et al., 2018). In Kenya, methadone is provided daily to opiate users in selected government facilities where the MAT clinics are established. In Nairobi, there are two MAT clinics at the Mathari National Teaching & Referral Hospital and Ngara Health Centre (Guise, Rhodes, Ndimbii, Ayon, & Nnaji, 2016). In 2011, a study looking at the coverage of OST in several countries, found Mauritius and Tanzania had 32.8% and 0.7% of PWID receiving MMT. The poor coverage of OST in Tanzania is explained by its recent MMT implementation in 2011 as compared to Mauritius in 2006 (Petersen, Myers, Van Hout, Plüddermann, & Parry, 2013).

The standard procedure for methadone initiation involves a monitoring and evaluation tool with six steps. The first step is referral of an opiate-dependent individual to a MAT clinic by an addiction counselor from a CSO drop-in-centre. The second step occurs in the MAT clinic where the opiate-dependent individual is received by the health records information officer who documents socio-demographic data at the Records department. The third step is triage by the MAT nurse who documents drug use history, presenting complaints and takes vital signs, body mass

index and Clinical Opiate Withdrawal Score (COWS). The opiate-dependent individual then undergoes a laboratory testing for infections and urine drug screen. The clinician then reviews the laboratory results and clerks the patient. Patient history, physical exam, diagnosis and treatment plan is conducted. The patient is then inducted by taking his first prescribed dose of methadone then observed for three hours for any negative side effects. The methadone patient is then assigned a social worker and psychologist at the MAT clinic who document drug use, psychosocial and family history, social functioning and assess behavioural outcomes at 1, 3, 6, 9 and 12 month intervals. Methadone dosing is slowly titrated by the clinician over several days, weeks and months until a maintenance dose is reached and strong desire for opioid ceases (UNODC, 2016).

Patients in MMT programs are required to be on methadone for a minimum of 2 years then weaned off but research shows patients are on treatment for longer (Roberts, 2009). This long duration of treatment and high transport costs incurred due to daily dosing is a limitation which is associated with high attrition rates in the MMT program (Kelly, O'Grady, Mitchell, Brown, & Schwartz, 2011). Globally, it has been found that there are more men than women in MAT programs, a ratio of 5:1 (UNODC, 2019).

In Kenya, less than 10% of PWID have access to MMT (Harm Reduction International, 2018). The enablers of access to methadone were positive social support system and lack of police interference. Barriers to access were location and timing of methadone services, transport costs and economic hardship (Guise, et al., 2019).

2.4 Cannabis use among patients receiving methadone

Patients in MMT clinics use a wide range of substances such as cocaine, opiates, cannabis and benzodiazepines. Cannabis is the most prevalent illegal drug used by patients on methadone therapy (Epstein & Preston, 2015). Marijuana is the most frequently used illicit drug because it is presumed to be harmless (Volkow, Baler, Compton, & Weiss, 2014). However, cannabis may not cause mortality directly but it contributes to morbidity through other adverse health outcomes. It causes dependence, psychosis and other psychiatric disorders (Degenhardt & Hall, 2012). A strong positive correlation is reported between psychosis and cannabis use where risk of psychosis increases as frequency of cannabis use increases (Moore, et al., 2007). Other psychiatric disorders associated with cannabis use are mood disorders and anxiety (Wittchen, et al., 2007). In addition, chronic use of cannabis results in poor school performance and reduced quality of life (Volkow, Baler, Compton, & Weiss, 2014). Cannabis use by patients receiving methadone impacts therapy in a negative manner due to associated high attrition rates from MAT programs (White, et al., 2014).

A study of 107 opiate-dependent patients enrolled in a MAT clinic found 66% used cannabis, most were unemployed and less likely to be married (Budney, Bickel, & Amass, 1998). Another study of 152 patients on methadone therapy reported a prevalence of 66.9% of cannabis use (Hill, et al., 2013). At a MAT clinic in Philadelphia, U.S, a retrospective study was carried out to investigate the impact of cannabis use during methadone stabilization treatment of 91 patients. At intake into the methadone program, cannabis was used by 71.5% of patients. During the nine-month study, cannabis was used by 61.5% of the patients in the treatment program. Males were more than females at 60.4%. Almost 80% were Caucasian, 13.5% were

African American and 6.7% were Hispanic. The patients were aged between 20-62 years and average age was 39 years (Scavone, Sterling, Weinstein, & Van Bockstaele, 2013).

In 2015, thirteen MMT clinics in Canada were studied for substance use. Cannabis use was highest at 47% of the patients (Bawor, et al., 2015). A systematic review conducted the subsequent year in Canada on the relationship between cannabis use and treatment outcomes in a methadone clinic, found cannabis use in patients on methadone maintenance treatment had increased with a prevalence of more than 50% (Zielinski, et al., 2016). A follow up study by similar researchers on sex differences among cannabis users in 16 MAT clinics found cannabis use was prevalent at 52.1% of the methadone users (Zielinski, et al., 2017). A retrospective study in Finland, investigated 60 MAT patients for polysubstance use and 30% were found to use cannabis (Heikman, Muhonen, & Ojanperä, 2017).

In Northern Ontario, a study conducted across 58 MAT clinics investigated the treatment outcome. It studied 644 patients and reported the rate of use of marijuana was 60.2%. The males were more likely to use cannabis compared to females (62.8% vs. 56.3%). Cannabis users had a median age of 29 years and mostly lived in rural regions (10.1% vs. 8.2%) (Franklyn, Eibl, Gauthier, & Marsh, 2017).

A study done in an urban methadone clinic by Epstein and Preston (2003) to determine if cannabis use predicts poor outcome for methadone patients found it did not promote retention and heroin use relapse. However, they found a weak link between cannabis use and poor psychosocial functioning where it increased rates of incarceration and poor family relationships. They recommended that there should be

no concern if MMT patients had used cannabis unless they complained of problems (Epstein & Preston, 2003).

Some authors have found beneficial outcomes on the association between methadone therapy and cannabis use such as less amounts of time and money spent on acquiring heroin (Scavone, Sterling, Weinstein, & Van Bockstaele, 2013). These positive outcomes contradicted a study to determine the factors associated with heroin relapse in MMT clinics, which found cannabis use contributed a great risk (Wasserman, Weinstein, Havassy, & Hall, 1998).

In Israel, the lifetime prevalence of cannabis use was 75% while the current prevalence was 25% in an MMT clinic. The methadone patients who used cannabis were found to be abusing multiple drugs compared to pure heroin users. There was no associated increase in cannabis use, psychopathology or retention during the study period of one year compared to pure heroin users. Thus, it was recommended that since there was no evidence of psychological or medical issues following cannabis use, then, the MAT patients should be managed as polydrug abusers (Weizman, Gelkopf, Melamed, Adelson, & Bleich, 2004). In contrast, a study investigating the burden of cannabis use found psychosis and psychiatric disorders are consequences (Degenhardt & Hall, 2012). An investigation into the causal association between opioid use disorder and cannabis use found it to be weak (Degenhardt, et al., 2018).

In 2014, a study conducted in Washington, D.C. on patterns of use of multiple substances and treatment outcome in a MAT clinic found 23% of patients used cannabis illicitly. Cannabis users dropped out of the MAT program three times more than non-users (White, et al., 2014). It was reported that males used more cannabis but females developed cannabis use disorder more and experienced worse

psychopathology and social functioning (Aspis, et al., 2015). In Canada, cannabis use by females during methadone treatment was a predictor for continued illicit opioid use in the program (Zielinski, et al., 2017). This is supported by the UNODC that showed women start using substances later than men but tend to increase cannabis and opioid use more rapidly than men and have a faster trajectory to substance use disorder. This is known as telescoping (UNODC, 2018). This is illustrated in figure 2.2.
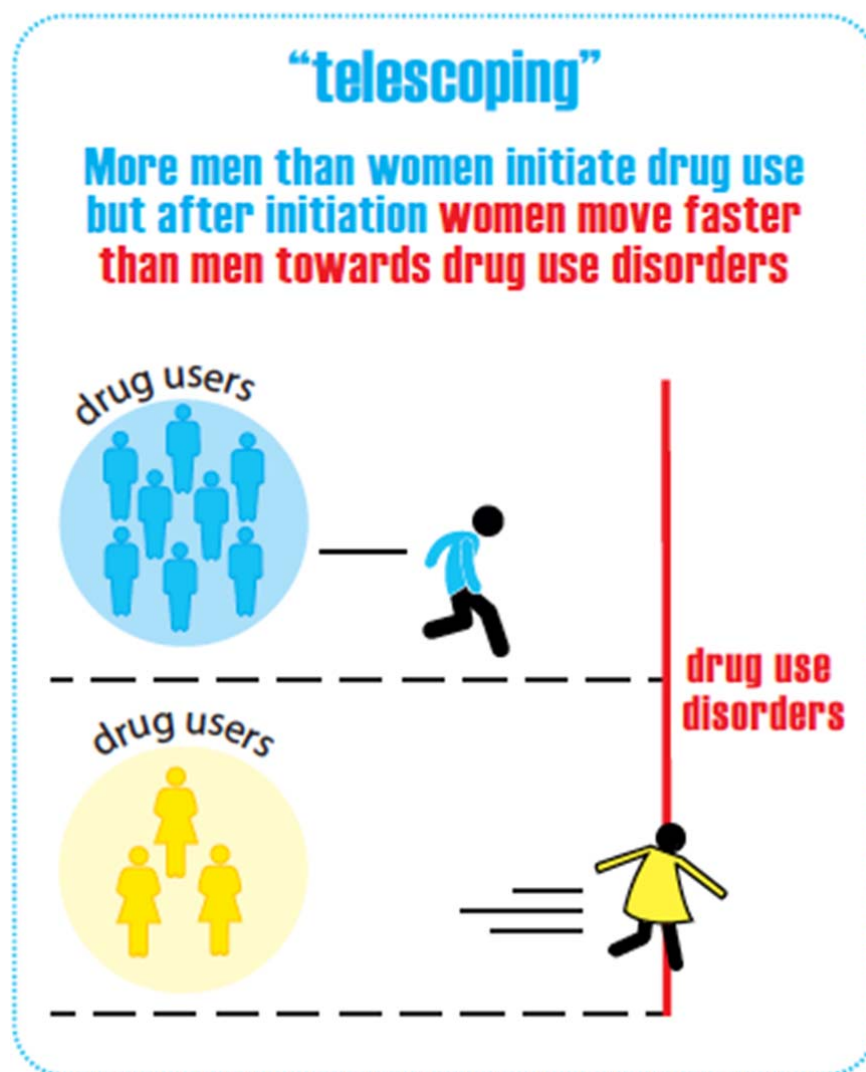
Figure 2.2 **Drug use between men and women (UNODC, 2018)**

In 2015, 492 participants from thirteen MMT clinics in Canada were studied for substance use. Prevalence of cannabis use was 46.9%. Males used cannabis more at 53.8% compared to females at 41.2%. Other predictors of cannabis use were unemployment at 64.4%, secondary level of education at 27.9% and being unmarried at 68.2%. Onset of opioid use was a mean of 25 years while enrollment into MAT clinics was 32 years. The mean dose of methadone was 77.6 mg (Bawor, et al., 2015). In the same year in Maryland, U.S, a retrospective one year study of polysubstance use of 60 patients from an MMT clinic found 25% used cannabis. The patients continued to use heroin at 53% (Taylor, 2015).

A study conducted in 16 MAT clinics on sex differences among cannabis users on methadone therapy found cannabis use was a predictor for opioid use in women during methadone treatment. This resulted in poor psychopathology and quality of life in females. Males had higher use of cannabis at 61% while females 39%. Cannabis users had a mean age of 36.5 years and were mostly Caucasian at 81.8%. The mean dose of methadone was 75.44 mg and duration of treatment was 48.55 months. More than half of the participants had secondary level of education or less at 54.5% and 52.1% had never been married. Less than half of the participants were employed at 34.8% (Zielinski, et al., 2017).

In Iran, a study was conducted to investigate sex differences in a MAT clinic. Males were highly likely to use cannabis compared to females (25.7% vs. 5%). The rate of marijuana use among the 260 patients was 16.2% (Ghaderi, Motmaen, Abdi, & Rasouli-Azad, 2017).

In Tanzania, Lambdin et al (2014) conducted a retrospective study to investigate the predictors of attrition from the same MMT clinic in Muhimbili National Hospital and found the prevalence of polysubstance use of heroin mixed with alcohol, cocaine, benzodiazepine or amphetamine was 34% and substance dependence was high at 81%. The mean age at entry into the MAT program was 32 years and 93% of the participants were males. Only 64% had attained primary level of education or less and 13% were married (Lambdin, et al., 2014).

In Tanzania, longitudinal study carried out on methadone clients enrolled between 2011-2012 at the first MMT clinic that was established at Muhimbili National Hospital found prevalence of cannabis use in 385 patients was 98.9% at intake. Cannabis use was not measured during methadone therapy. The mean age at entry was 34.1 years and 89.4% of the participants were males. More than half had attained only primary level of education and 74.5% were unmarried. The participants were unemployed at 21.8%. The low rate of unemployment was explained by factoring elementary work into the study. Elementary work meant simple and routine works like selling goods in a street or door-to-door or selling metal and plastic scrapers (Ubuguyu, et al., 2016).

2.5 Study Justification

Use of cannabis among patients receiving methadone compromises treatment outcome. If this population is not monitored for their cannabis use, the results are high attrition rates and poor outcomes in the MAT clinics. This study needed to be carried out to reduce psychopathology, promote high retention rates, improving long-term recovery outcomes through better clinical interventions by mental healthcare professionals.

2.6 Significance of the Research

The findings from this study added to the body of knowledge on patients receiving methadone and the prevalence of cannabis use. They will help mental healthcare professionals have a better understanding of the characteristics of cannabis users in methadone patients leading to provision of better clinical interventions such as targeted psychotherapy and social support to promote MAT retention and long-term recovery outcomes. This study will assist the Ministry of Health in the development of appropriate policy frameworks for cannabis screening and management in MAT programs.

2.7 Study Questions

1. What is the prevalence of cannabis use among patients receiving methadone at MNTRH methadone clinic from December 2014 to November 2018?

2. What are the socio-demographic characteristics of patients receiving methadone who use cannabis at MNTRH methadone clinic from December 2014 to November 2018?

2.8 Study objectives

2.8.1 Broad Objective

To determine the prevalence of cannabis use among patients attending the methadone clinic at Mathari National Teaching & Referral Hospital.

2.8.2   Specific Objectives

1. To determine the prevalence of cannabis use among patients receiving methadone at MNTRH methadone clinic from December 2014 to November 2018.

2. To determine the socio-demographic characteristics of patients receiving methadone who use cannabis at MNTRH methadone clinic from December 2014 to November 2018.

2.9 Conceptual Framework

The framework depicted a causal relation between the exposure and outcome variables. The arrow from intervening variable indicated a relationship with outcome variable.

Independent variable   Dependent variable

| EXPOSURE |

| OUTCOME |

| METHADONE PATIENTS | ⟹ | CANNABIS USE |

| Age
Gender
Education level
Marital status |

Intervening variable
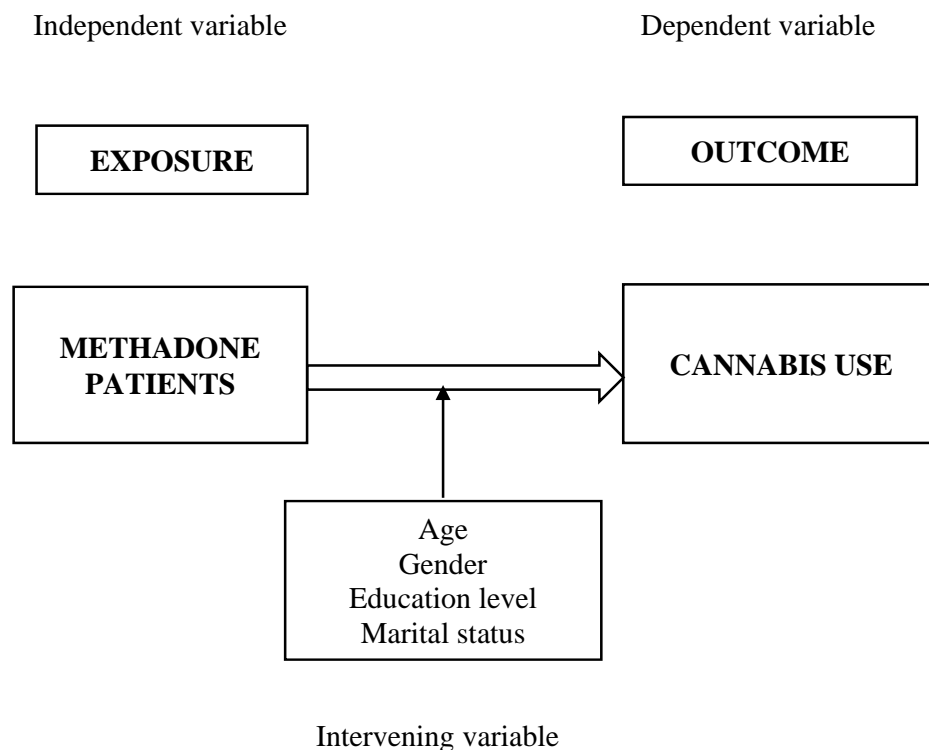
Figure 2.3 **Conceptual framework   Source: Researcher (2019)**

19

CHAPTER THREE: METHODOLOGY

3.1 Study Design

This was a retrospective study that determined the prevalence of cannabis use among patients on methadone therapy seen at the MAT clinic at Mathari National Teaching & Referral Hospital from December 2014 to November 2018.

3.2 Study Area Description

In December 2014, the Ministry of Health with support from CDC, PEPFAR, USAID and University of Maryland launched the first public-funded MAT clinic in Kenya at the Mathari National Teaching & Referral Hospital. The proposed study was conducted at the MAT clinic in Mathari National Teaching & Referral Hospital which was the first urban, publicly funded and university-sponsored located in Nairobi. It provided methadone maintenance therapy to individuals who were opiate dependent. Enrollment into the MAT clinic required referral from a CSO. Individuals were required to attend sessions on HIV, medication compliance, sexually transmitted diseases and supportive services. The eligibility criteria for MAT initiation were individuals presenting with opiate dependence, testing positive for opiates through urine drug screening and evidence of recent drug injection.

The standard procedure for methadone initiation involved a monitoring and evaluation tool with six steps. The first step was referral of an opiate-dependent individual by an addiction counselor from a CSO drop-in-centre. The second step occurred in the MAT clinic where the opiate-dependent individual was received by the health records information officer who documented socio-demographic data at the Records department. Thirdly, the MAT nurse triaged the patient and documented drug

use history, presenting complaints, vital signs, body mass index and Clinical Opiate Withdrawal Score (COWS).

The opiate-dependent individual was tested at the laboratory for urine drug screen and infections. The clinician then reviewed the laboratory results and clerked the patient. Patient history, physical exam, diagnosis and treatment plan was conducted. The patient was then inducted by taking his first prescribed dose of methadone then observed for three hours for any negative side effects. The methadone patient was then assigned a social worker and psychologist at the MAT clinic who documented drug use, psychosocial and family history, social functioning and assessed behavioural outcomes at 1, 3, 6, 9 and 12 month intervals.

The opiate dependent individuals were then enrolled into MAT and provided with methadone every day. The clients attended the MAT clinic daily to receive their prescribed methadone dose which was directly observed. The operating times were 7AM-1PM on weekdays, and up to 12PM on weekends. The pharmacy did not allow patients to take methadone doses home. The government of Kenya had declared it illegal to receive methadone from centres other than the government-approved facilities. Other supportive services provided were HIV counselling and testing and treatment, tuberculosis testing and treatment and psychosocial support. Methadone dosing was slowly titrated until a maintenance dose was reached and strong desire for opioid ceased.

3.3 Study Population

The study population targeted the patients undergoing methadone treatment at Mathari National Teaching & Referral Hospital's MAT clinic. The study participants included all patients who were enrolled into the MAT clinic from December 2014 to

November 2018 at MNTRH and had urine drug screen results. The standard procedure for MAT enrollment and induction was baseline urine drug screen tests are performed at intake. During the methadone maintenance therapy, random urine drug screens were performed every three months. The urine drug screen results were attached in the patient files.

3.4 Sample Size

The targeted sample size was files of all patients who were enrolled into the MAT clinic from December 2014 to November 2018 at MNTRH. The patients enrolled within the study period were 984. The researcher documented data from 984 files for this study.

3.5 Sampling Procedure

The researcher collected information from 984 files for this study. The researcher documented data from all files for patients that were enrolled into the MAT clinic within the study period from December 2014 to November 2018.

3.6 Inclusion and exclusion criteria

The inclusion criteria were participants (1) undergoing treatment in the MAT clinic at MNTRH (2) who were enrolled and initiated methadone therapy within the study period (December 2014 to November 2018) (3) who had urine drug screen results. The exclusion criteria were participants (1) not enrolled within the study period (2) with missing information on bio data and urine drug screens.

3.7 Variables

The dependent variable was cannabis use. The independent variable was the methadone patients. The intervening variable were socio-demographic variables such as age, gender, education level, marital status and occupation.

3.8 Research Instruments

The researcher used a data collection form to document data retrieved from the patient files at the records department in the MAT clinic. The data collected included age, gender, education level, marital status, occupation and urine drug screen results. The patients' files at the MAT clinic had an outpatient number that helped in locating the files from the shelves. The outpatient number was a distinct number given to each patient on enrollment into the MAT clinic. The data collection form is attached in **Appendix A.**

3.9 Pretesting of research instrument

A pilot study was carried out at the MAT clinic records department prior to the study to ensure validity and reliability of the study tool. A sample size of 20 files with outpatient numbers indicating enrollment from December 2018 was used. This pilot study was conducted to assess for any ambiguity and feasibility of study in terms of costs and other logistics.

3.10 Data Collection Procedures

The study participants were recruited from methadone patients who were enrolled into the MAT clinic at MNTRH from December 2014 to November 2018. The study utilized the medical records files stored at the records department and the electronic database. There were no interruptions of service delivery at the MAT clinic. The files and registers were not in active use but archived at the records department. The researcher entered the Records Department. The researcher retrieved the outpatient numbers (OP) of patient files from the Ministry of Health patients' register book at the records department for the study period. The researcher confirmed the OP numbers from the electronic database. The researcher used the OP numbers to retrieve

the files for all methadone patients enrolled during the study period from the shelves. The patient files contained baseline surveys filled by the health records information officer during enrollment to collect demographic and drug history data. The baseline surveys included name, date of enrollment, age, gender, education level, marital status and occupation. The standard procedure for enrollment into the methadone program was conducting urine drug screens at intake and the results attached in the file.

During the course of the patients' methadone therapy, random urine drug screens were performed every three months and results attached in the file. The researcher did not record names but unique study identification numbers were used to protect the confidentiality and anonymity of participants. The researcher screened the files for those that met the inclusion criteria and excluded those that did not. The patients' socio-demographic data and urine drug screen results were retrieved from the selected files that met the inclusion criteria then documented in the data collection forms.

In addition to the baseline urine drug screen done at intake, there were random urine drug screens performed every three months. All urine drug screen results were attached in the patient files. Objective one was achieved by documenting the urine drug screen results done at intake and the latest urine drug screen performed.

When documentation in the data collection form was completed, the researcher exited the records department. The completed data collection forms were kept in a locked cabinet with access controlled by the principal investigator. Data was stored into a computer and protected with a password that only the principal investigator was privy to ensure data security.

3.11 Data Collection Flow Chart

The cycle flows through the following steps:

1. Entered the Records Department at the MAT clinic

2. Accessed the patient register book and electronic database to retrieve OP numbers for study period

3. Used the OP numbers to retrieve files for all methadone patients enrolled during the study period

4. Screened for inclusion criteria
   • Excluded those who did not meet inclusion criteria

5. Documented socio-demographic data and urine drug screen results from the selected files

6. Researcher exited

Figure 3.1 **Data collection flow chart**

3.12 Quality Assurance

1. Institutional approval from the University of Nairobi and Kenyatta National Hospital Ethics and Research Committee (KNH-UON ERC) was obtained before starting data collection.

2. Written permission to carry out the study was obtained from the medical superintendent to allow researcher to collect data at Mathari National Teaching & Referral Hospital's MAT clinic. The clearance was presented to the methadone program administration and approval by the MAT clinic was given and data was collected.

3. The study was done under supervision of two lecturers at University of Nairobi's Department of Psychiatry.

4. A serialised system was used to facilitate confidentiality.

5. The researcher ensured data collected as hard copies was stored in a lock and key cabinet and researcher had sole access. The soft copies were stored in a Microsoft database which was password protected to ensure confidentiality of all participants.

6. Double entry and checking procedures were done in entry of data to minimize error.

7. Results were presented at the University of Nairobi Department of Psychiatry. The study will be published in a peer reviewed journal.

3.13 Data Management

Data entry and analysis was done using SPSS for windows version 23.0 and stored into a password protected database. The completed data collection forms were locked in a cabinet with access controlled by the principal investigator. Data entered in SPSS was protected with password to which only the principal investigator was privy. Each data collection form had a clinic code number of the participant. The sole purpose of the code was to enable confidentiality.

This study utilized univariate and bivariate analysis. In univariate analysis, demographic data was presented by frequency and proportions. Distribution of data was shown by central tendency measurements. In bivariate analysis, chi square and Fischer Exact test were used to represent the nature of cannabis use among methadone patients and test the significance of the association between the variables. The threshold for statistical significance was set at $p \leq 0.05$. The results were presented using narratives, tables, charts and graphs.

3.14 Ethical Consideration

1. Ethical approval to conduct this study from Scientific Ethics and Research Committee of University of Nairobi, Kenyatta National Hospital (KNH-UON ERC) was obtained before conducting the study.

2. The management of MNTRH and the MAT clinic were informed on the intention to carry out the study at their institution and the purpose of the study was explained.

3. Written permission to carry out the study was obtained from the medical superintendent of MNTRH.

4. Names were not recorded but unique study identification numbers were used to protect the confidentiality and anonymity of participants. The completed data collection forms were kept in a locked cabinet with access controlled by the principal investigator. Data stored into computer was protected with a password that only the principal investigator was privy to ensure data security.

CHAPTER FOUR: RESULTS

4.1 Introduction

This chapter presents the results of the study according to the objectives. It discusses the socio-demographic profiles and drug use by the participants. The results are presented in tables and figures as appropriate.

4.2 Enrollment Figures

A total of 984 OP numbers were extracted from the record books of MNTRH methadone clinic on the study period December 2014 to November 2018. The number of opiate dependent participants enrolled into the methadone program varied monthly with the highest number of participants enrolled in July 2015 at 70 and the lowest being zero. The annual enrollment figures had 2015 with the highest at 534 participants while 2017 was the lowest with 4 participants. The monthly enrollment figures are shown in table 4.1.
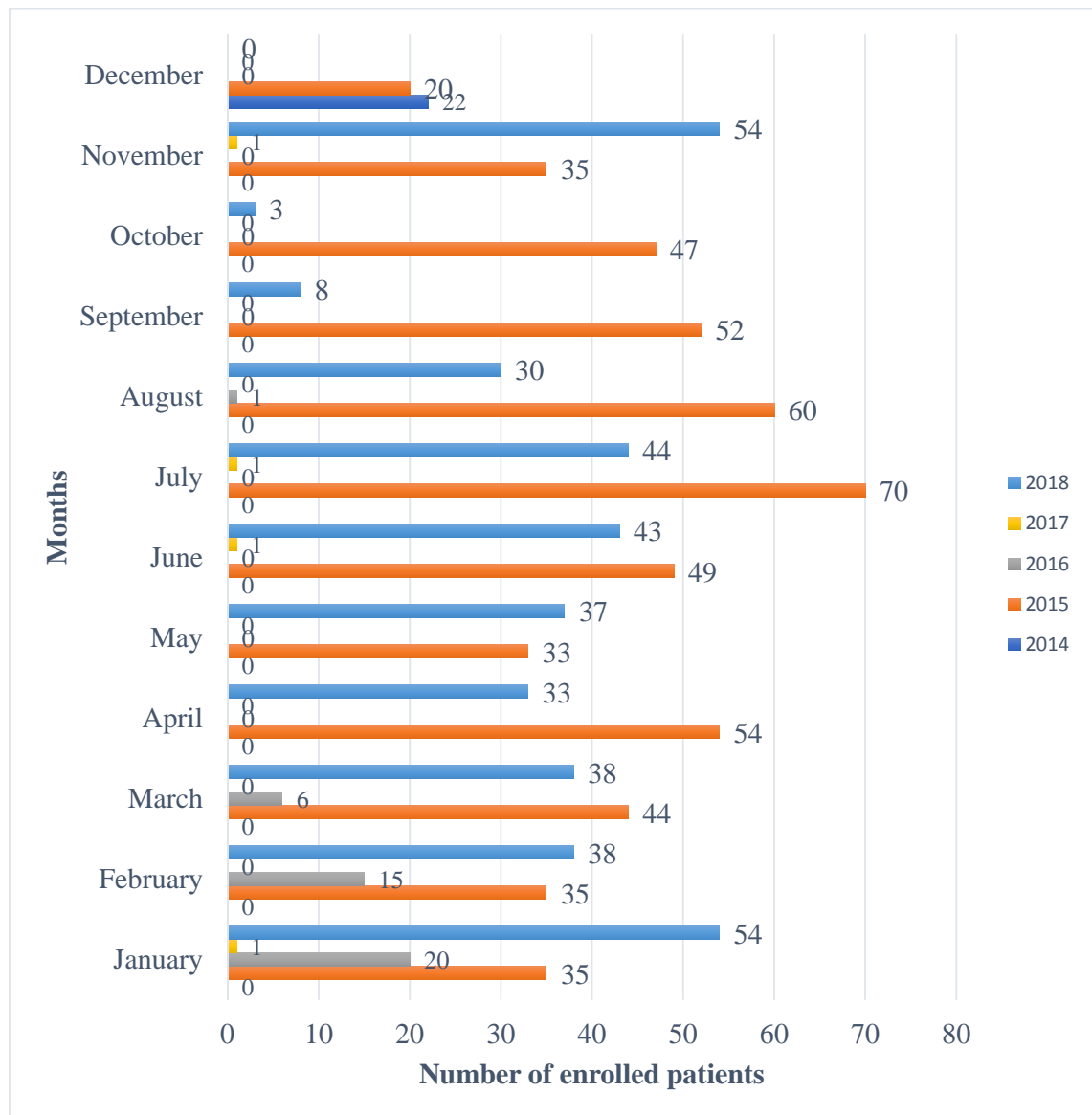
Figure 4.1 **Number of participants enrolled during study period**

4.3 Status of the participants

The status of the 984 participants as at November 2018 varied according to being active in the methadone program, lost to follow up, deceased, transferred out to another MAT clinic, weaned off methadone, involuntarily discontinued and voluntarily discontinued. Involuntarily discontinued clients were those discharged/expelled from the program due to bad behavior such as fighting, carrying

weapons and peddling drugs within the clinic. The lost to follow up clients were those who missed taking their methadone doses for more than 30 days. The status of the participants is depicted in table 4.1.

Table 4.1
Status of participants receiving methadone as at November 2018

Status	Frequency	Percentage (%)
Active	620	63.0
Lost to follow up	238	24.2
Deceased	34	3.5
Transferred out	15	1.5
Weaned off	64	6.5
Involuntarily discontinued	4	0.4
Voluntarily discontinued	9	0.9
Total	984	100.0

4.4 Socio-demographic characteristics of participants receiving methadone

The average age (mean) of the 984 participants enrolled at the MNTRH methadone clinic during the study period was 35.165 (SD 9.032) years with a median age of 35 years. The age range was between 18 and 81 years with 35 being the commonest age at 6.1% (n=60) of the total. The highest number of participants was between 28 and 37 years old (41.4%). Majority of participants in the MAT clinic were males at 87.3% (859). Majority of the participants had a low education status, with only 7.9% and 1.0% having attained tertiary and university education, respectively. Most of the participants were separated (45.8%), followed by single (25.6%), married (22.7%) and 2.2% were widowed. Majority of the participants were unemployed (73.5%). This is shown in table 4.2.

Table 4.2
Socio-demographic characteristics of participants receiving methadone

Variable	Category	Frequency (N=984)	Percentage (%)
Gender	Female	125	12.7
	Male	859	87.3
Age	18-27	204	20.7
	28-37	408	41.5
	38-47	291	29.6
	48-57	65	6.6
	58-67	13	1.3
	> 68	3	0.3
Marital Status	Single	252	25.6
	Married	223	22.7
	Separated	451	45.8
	Widowed	22	2.2
	No data	36	3.7
Education Level	Primary	483	49.1
	Secondary	361	36.7
	Tertiary	78	7.9
	University	10	1.0
	No formal education	16	1.6
	No data	36	3.7
Employment Status	Employed	165	16.8
	Business	61	6.2
	Unemployed	723	73.5
	No data	35	3.6

4.5 Prevalence of substances used at intake into the MAT program

The baseline urine drug screens carried out at intake of the 984 opiate dependent participants into the MAT clinic revealed multiple drugs of abuse. The enrolled participants frequently used heroin, cannabis, benzodiazepines, cocaine, barbiturates, amphetamines, phencyclidine and pethidine. The dominant substance used at intake was heroin by 98.6% (n=970) of participants, followed by cannabis 84.8% (n=834), benzodiazepines (45.2%), barbiturates (10.5%), cocaine (5.7%), amphetamines (0.4%), pethidine (0.3%) and phencyclidine (0.1%). This is illustrated in figure 4.2.
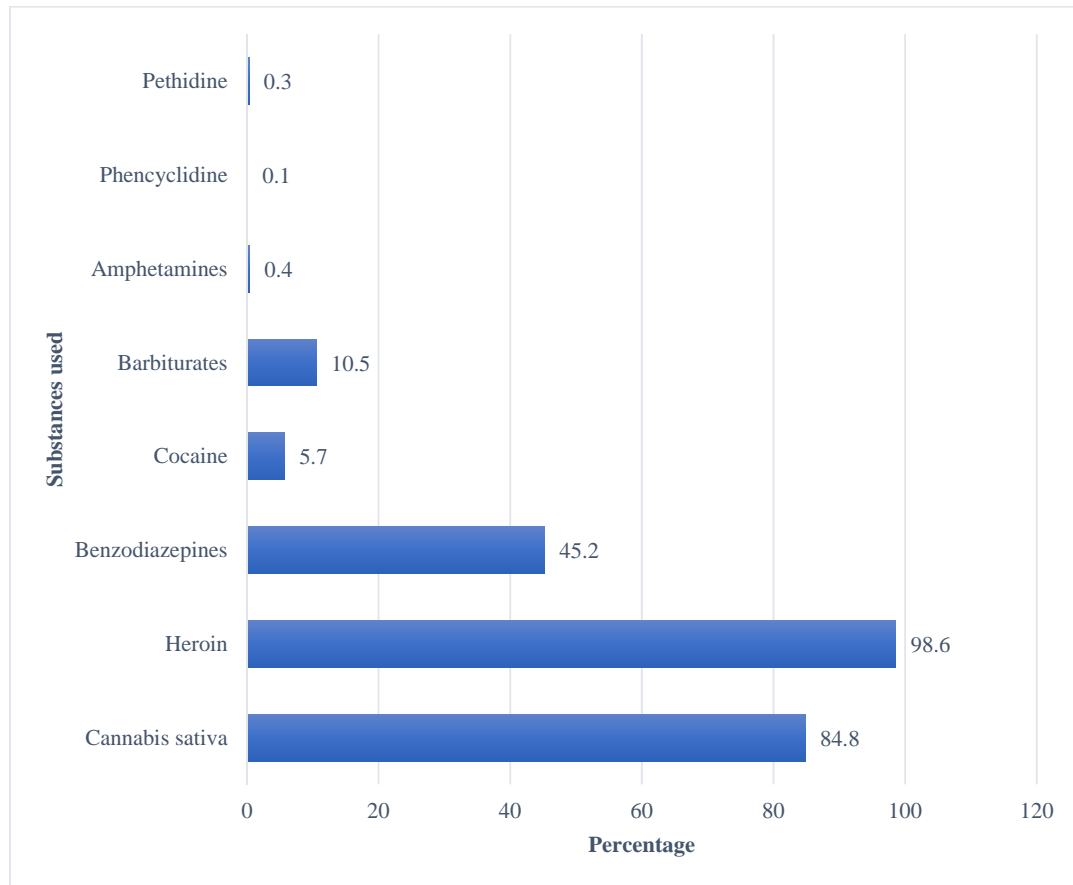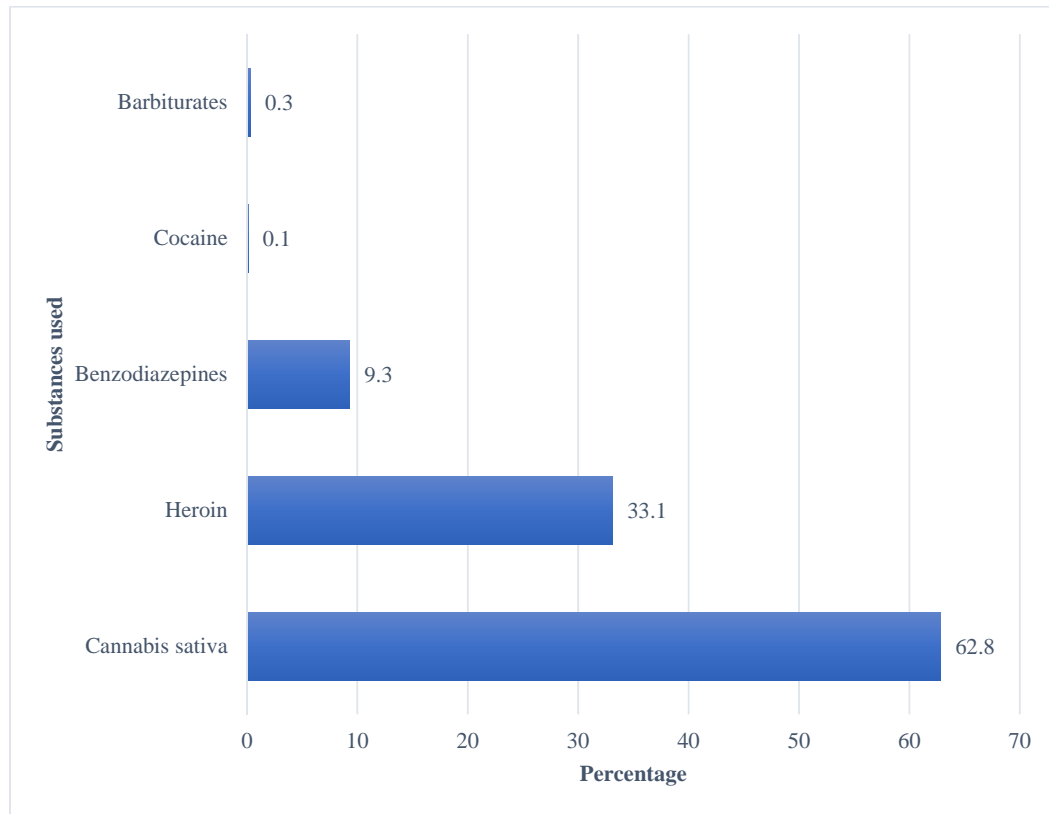
* prevalence does not total to 100% due to multiple substance use

Figure 4.2 **Prevalence of substances used at intake**[*]

4.6 Prevalence of substances used during methadone therapy

Of the 984 files selected for the study period, only 894 had repeat urine drug screen results. The 90 participants on methadone therapy who had no repeat urine drug screens carried out was because they were either lost to follow up or were not eligible for the random three monthly repeat urine drug screen. The latest repeat urine drug screens carried out during methadone therapy showed polysubstance use, but, a decline in the number of substances compared to intake. The participants were using cannabis, heroin, benzodiazepines, cocaine and barbiturates. The most prevalent substance was cannabis at 62.8% (n=561), followed by heroin at 33.1%, benzodiazepines (9.3%), barbiturates (0.3%) and cocaine (0.1%). Pethidine, phencyclidine and amphetamines were not used. This is illustrated in figure 4.3.

* prevalence does not total to 100% due to multiple substance use

Figure 4.3 Prevalence of substances used during methadone therapy[*]

4.7 Prevalence of cannabis and non-cannabis users

Cannabis users are defined as those using cannabis only or with other substances, while non-cannabis users are users of other substances which also includes those on methadone only. The prevalence of cannabis use by participants receiving methadone was 62.8% (n=561). This is depicted in figure 4.4.

37%

63%

■Cannabis users
■Non-cannabis users
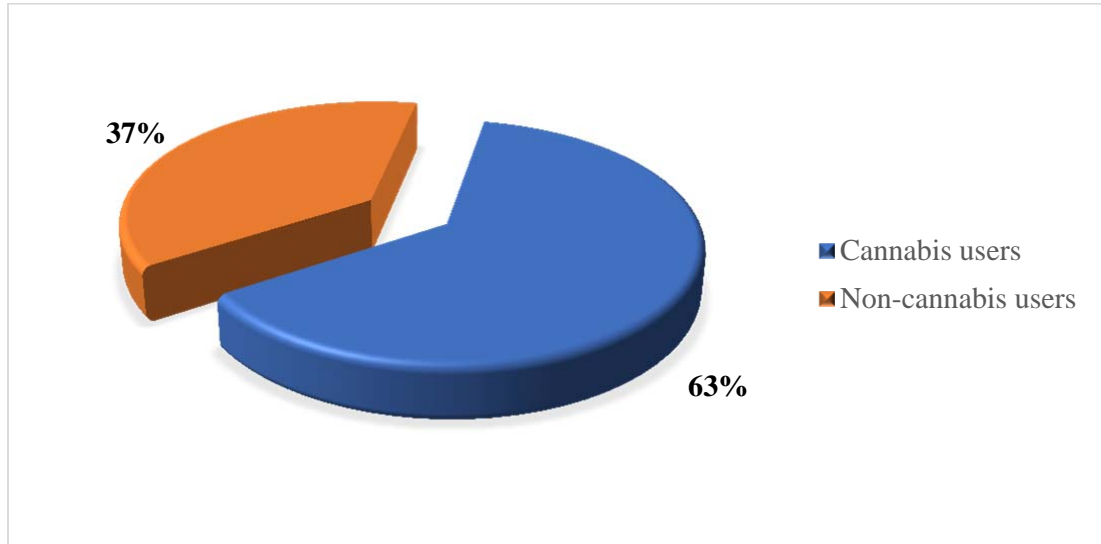
Figure 4.4 **Prevalence of cannabis users**

4.8 Prevalence of pure cannabis users

Pure cannabis users are defined as those using cannabis and on methadone only. Non-cannabis users are users of other substances which also included those on methadone only. The prevalence of pure cannabis use by participants on methadone therapy was 38.6%. This is shown in figure 4.5.

Figure 4.5 **Prevalence of pure cannabis users**

4.9 Polysubstance use

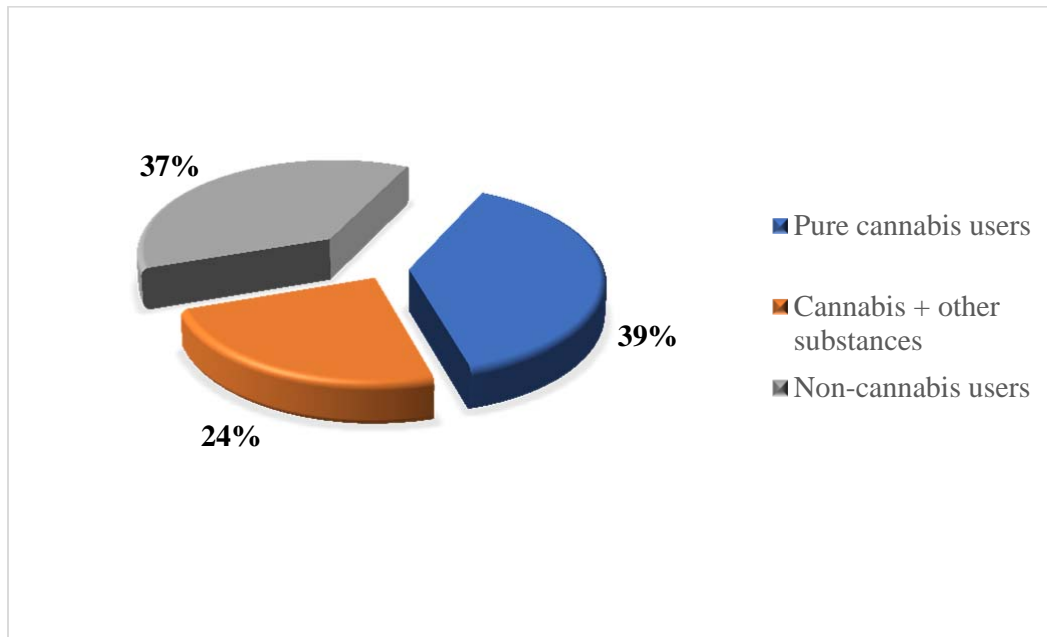The participants receiving methadone therapy used cannabis mixed with other substances. The most common combination was cannabis with methadone (61.3%) followed by cannabis mixed with heroin and methadone (28.2%). This is shown in table 4.3.

Table 4.3
Polysubstance use

Substance	Frequency	Percentage (%)
Cannabis and Heroin	14	2.5
Cannabis, Methadone, Heroin, Benzodiazepines	22	3.9
Cannabis and Methadone	344	61.3
Cannabis, Methadone, Heroin	158	28.2
Cannabis, Methadone, Benzodiazepines	17	3.0
Cannabis, Heroin, Benzodiazepines	3	0.5
Cannabis, Methadone, Cocaine	1	0.2
Cannabis, Heroin, Benzodiazepines, Barbiturates	1	0.2
Cannabis only	1	0.2
Total	561	100.0

4.10 Pattern of Cannabis use

Of the 984 participants at baseline, 84.8% (n=834) used cannabis and 50.4% (n=496) of this population continued to use cannabis. Two out of every five cannabis users continued to use cannabis during the methadone program. In addition, 27.3% who tested cannabis-positive at intake stopped using cannabis during the methadone program. New cannabis users during methadone therapy were 6.6% of the population. A total of 64 participants (6.5%) had never used cannabis at intake or during treatment. However, 90 participants who had no repeat urine drug screen results consisted of 7% who tested cannabis-positive at intake and 2.1% who used other substances at intake. This is shown in figure 4.6.
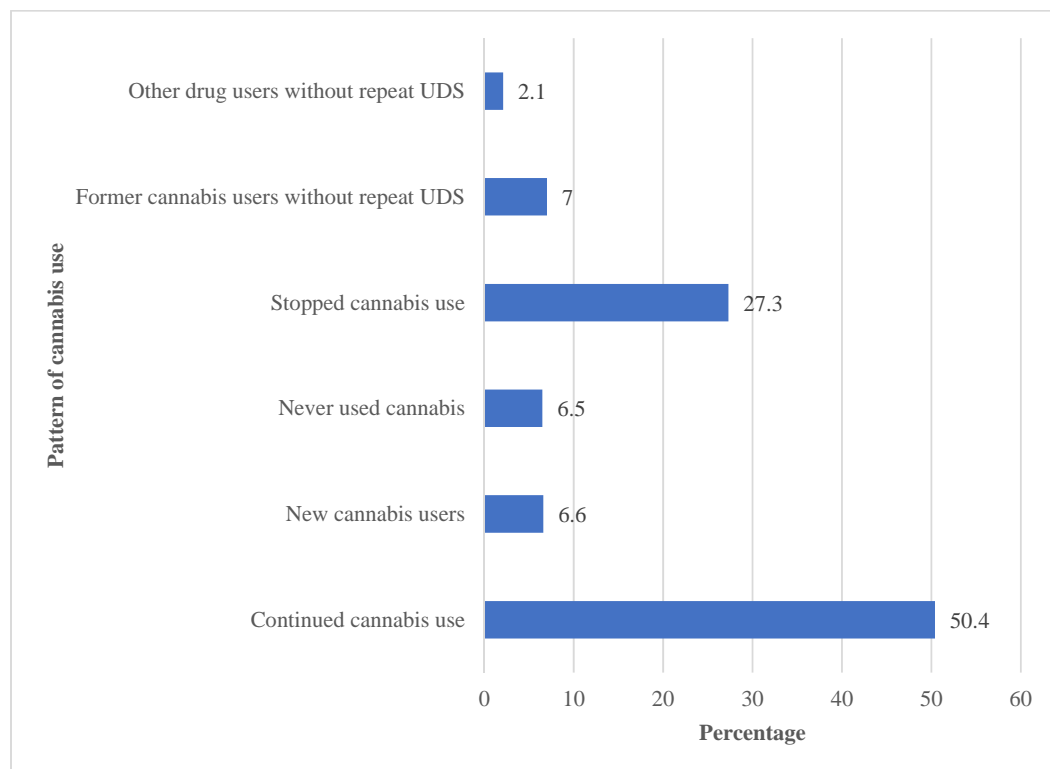
Figure 4.6 **Pattern of cannabis use**

4.11 Pattern of cannabis use by gender

Females were more likely to be new cannabis users than males (8.8% vs. 6.3%). Males continued to use cannabis during methadone therapy more than females at 51.2%. Females were more likely to never use cannabis than males (8% vs. 6.3%). Slightly more males stopped cannabis use during methadone therapy than females (27.7% vs. 24.8%). Female cannabis users were more likely to drop out of the program than males (9.6% vs. 6.6%). This is shown in table 4.4.

Table 4.4
Pattern of cannabis use by gender

Pattern	Male	Female	Total
Continued cannabis use	440 (51.2)	56 (44.8)	496 (50.4)
New cannabis users	54 (6.3)	11 (8.8)	65 (6.6)
Never used cannabis	54 (6.3)	10 (8.0)	64 (6.5)
Stopped cannabis use	238 (27.7)	31 (24.8)	269 (27.3)
Former cannabis users without repeat UDS	57 (6.6)	12 (9.6)	69 (7.0)
Other drug users without repeat UDS	16 (1.9)	5 (4.0)	21 (2.1)
Total	859 (100.0)	125 (100.0)	984 (100.0)

4.12 Pattern of cannabis use by status of participants

Of the 984 participants at baseline, 238 were lost to follow up, of which, 81.9% (n=195) used cannabis (p<0.001). Participants who tested positive for cannabis at intake 84.8% (n=834), continued to use cannabis at 50.4% (n=496). Two out of every five cannabis users continued to use cannabis during the methadone program. As at November 2018, 894 out of 984 participants had repeat urine drug screens, of which, 190 were lost to follow up and 70% (n=133) used cannabis (p<0.001). Of note, 13 non-cannabis users were lost to follow up. There were more participants lost to follow up due to cannabis use compared to non-cannabis use, tabulated in table 4.5.

Table 4.5
Pattern of cannabis use by status of participants

Pattern of cannabis use	Active	LTFU	Deceased	TO	Weaned off	Inv. Discontinued	Vol. Discontinued	Total
Continued cannabis use	344	114	13	5	12	3	5	496
New cannabis users	40	19	1	2	3	0	0	65
Former cannabis users without repeat UDS	18	37	3	3	8	0	0	69
Other drug users without repeat UDS	4	11	2	1	2	0	1	21
Never used cannabis	41	13	4	1	4	1	0	64
Stopped cannabis use	173	44	11	3	35	0	3	269
Total	620	238	34	15	64	4	9	984

4.13 Socio-demographic characteristics of cannabis users

The mean age for cannabis users was 34.0 (SD=8.9) years with a median age of 34.0 (IQR=12) years. Most of the cannabis users were in the age group 28-37 years (42.2%). Majority of cannabis users were males (88.1%) and had a low level of education, with only 7.8% and 0.4% having attained tertiary and university education, respectively. Majority of cannabis users were unemployed at 74.3% and single at 72.4%. This is shown in table 4.6.

Table 4.6
Socio-demographic characteristics of cannabis users

Variable	Categories	Frequency (N=561)	Percentage (%)
Age	18-27	142	25.3
	28-37	237	42.2
	38-47	146	26.0
	48-57	27	4.8
	58-67	7	1.2
	> 68	2	0.4
Gender	Male	494	88.1
	Female	67	11.9
Education	Primary	284	50.6
	Secondary	208	37.1
	Tertiary	44	7.8
	University	2	0.4
	No formal education	10	1.8
	No data	13	2.3
Marital status	Single	144	25.7
	Married	142	25.3
	Separated	252	44.9
	Widowed	10	1.8
	No data	13	2.3
Employment	Employed	92	16.4
	Business	39	7.0
	Unemployed	417	74.3
	No data	13	2.3

4.14 Comparison of cannabis and non-cannabis users

Statistical differences were observed in the proportions for the age groups 18-27, 38-47, and 48-57 years. Also, notable significant differences were observed in the proportions for university education and participants who were married. This is shown in table 4.7.

Table 4.7
Comparison of cannabis and non-cannabis users

Characteristic	Cannabis users	Non-cannabis users	Total	p-value
Age				
18-27	142 (78.9)	38 (21.1)	180 (100)	**<0.001**
28-37	237 (64.2)	132 (35.8)	369 (100)	0.413
38-47	146 (53.5)	127 (46.5)	273 (100)	**<0.001**
48-57	27 (47.4)	30 (52.6)	57 (100)	**0.013**
58-67	7 (58.3)	5 (41.7)	12 (100)	0.744
> 68	2 (66.7)	1 (33.3)	3 (100)	0.890
Sex				
Male	494 (62.8)	292 (37.2)	786 (100)	0.870
Female	67 (62.0)	41 (38.0)	108 (100)	
Education				
Primary	284 (63.3)	165 (36.7)	449 (100)	0.756
Secondary	208 (62.7)	124 (37.3)	332 (100)	0.962
Tertiary	44 (64.7)	24 (35.3)	68 (100)	0.729
University	2 (20.0)	8 (80.0)	10 (100)	**0.005**
None	10 (66.7)	5 (33.3)	15 (100)	0.750
No data	13 (65.0)	7 (35.0)	20 (100)	0.832
Marital status				
Single	144 (63.4)	83 (36.6)	227 (100)	0.805
Married	142 (69.6)	62 (30.4)	204 (100)	**0.021**
Separated	252 (59.4)	172 (40.6)	424 (100)	0.051
Widowed	10 (52.6)	9 (47.4)	19 (100)	0.356
No data	13 (65.0)	7 (35.0)	20 (100.0)	0.832
Employment				
Employed	92 (59.4)	63 (40.6)	155 (100)	0.336
Business	39 (69.6)	17 (30.4)	56 (100)	0.271
Unemployed	417 (62.8)	247 (37.2)	664 (100)	0.958
No data	13 (68.4)	6 (31.6)	19 (100)	0.605

CHAPTER FIVE: DISCUSSION, CONCLUSION AND

RECOMMENDATIONS

5.1 Introduction

This chapter presents a discussion of the findings of this study in the context of the literature reviewed in the second chapter, the conclusions drawn and recommendations.

5.2 Discussion

5.2.1 Prevalence of cannabis use

Our study found the prevalence of cannabis use during MAT therapy was 62.8%. This prevalence is consistent with similar studies done in the rest of the world. In the USA, at a MAT clinic in Philadelphia, Scavone et al (2013) found a prevalence of 61.5% in 91 patients (Scavone, Sterling, Weinstein, & Van Bockstaele, 2013). In Canada, Bawor et al (2015), Zielinski et al (2016), Zielinski et al (2017) and Franklyn et al (2017) found the prevalence of cannabis use was 46.9%, 50%, 52.1% and 60.2%, respectively (Bawor, et al., 2015) (Zielinski, et al., 2016) (Zielinski, et al., 2017).

These findings differed from other studies. In Israel, Weizman et al (2004) found the prevalence was 25% (Weizman, Gelkopf, Melamed, Adelson, & Bleich, 2004). In the US, White et al (2014) and Taylor (2015) found a prevalence of 23% and 25%, respectively (White, et al., 2014) (Taylor, 2015). In Finland, this prevalence was 30% (Heikman, Muhonen, & Ojanperä, 2017). In South Africa, the prevalence of cannabis use at intake was 98.9% (Ubuguyu, et al., 2016). The differences in prevalence can be explained by the low education level of participants in our study. Our study found that two out of every five cannabis users continued to use cannabis during the methadone program.

5.2.2 Sociodemographic characteristics of cannabis users

Our study found the mean age for cannabis users was 34.0 (SD=8.9) years with a median age of 34.0 (IQR=12) years. This was similar to several studies. In the U.S, it was reported the average age was 39 years (Scavone, Sterling, Weinstein, & Van Bockstaele, 2013). In Canada, cannabis users had a mean age of 36.5 years (Zielinski, et al., 2017) and a median age of 29 years (Franklyn, Eibl, Gauthier, & Marsh, 2017).

Majority of cannabis users were males at 88.1%. This differed slightly from prior studies around the world. In U.S, males were more than females at 60.4% (Scavone, Sterling, Weinstein, & Van Bockstaele, 2013). In Canada, Bawor et al (2015), Zielinski et al (2017) and Franklyn et al (2017) found males used cannabis more at 53.8%, 59.7% and 62.8%, respectively (Bawor, et al., 2015) (Zielinski, et al., 2017) (Franklyn, Eibl, Gauthier, & Marsh, 2017). In Iran, males used cannabis more at 66.8% (Ghaderi, Motmaen, Abdi, & Rasouli-Azad, 2017).

Majority of the participants had a low level of education at 87.7%. Less than half of the cannabis users had attained secondary level of education at 37.1%. These findings are similar to Bawor et al (2015) who found that 27.9% of patients who used cannabis on methadone therapy had attained secondary level of education (Bawor, et al., 2015). This differed slightly from a study in Canada, that found 54.5% had attained secondary level of education (Zielinski, et al., 2017). This can be explained by cannabis use at an early age compared to non-cannabis users who have attained university education.

This study found majority of cannabis users in the MAT program were unemployed at 74.3%. This finding is comparable to Bawor et al (2015) and Zielinski et al (2017) who found 64.4% and 65.2% of cannabis users were unemployed, respectively (Bawor, et al., 2015) (Zielinski, et al., 2017). This can be explained by the low level of education resulting from cannabis use at an early age.

This study found that more than half of the cannabis users were single (72.4%). This finding is similar to what was reported by Bawor et al (2005) that cannabis users were single at 68.2% (Bawor, et al., 2015). This differed slightly from Zielinski et al (2017) who reported 52.1% were single (Zielinski, et al., 2017).

Our study found females were more likely to be new cannabis users, unable to stop cannabis use and drop out of the program than males. This is similar to a report by the Aspis et al (2015) and UNODC (2018) that stated women start using substances later than men but develop drug use disorders faster which results in high attrition from MAT programs (Aspis, et al., 2015) (UNODC, 2018). This is emphasized by Zielinski et al (2017) that cannabis use by females on methadone therapy was a predictor for continued illicit drug use (Zielinski, et al., 2017).

Among the sociodemographic factors that were analyzed, having university level of education, being married and being in the age groups 18-27, 38-47, and 48-57 years were found to be significant.

5.3 Conclusion

To our knowledge, this is the first study to determine prevalence of cannabis use among patients receiving methadone retrospectively in a methadone clinic in Kenya. Our results are consistent with prior research conducted in other settings showing high prevalence in a population with low education level and high

unemployment rate. This underscores the need for addressing the public health burden of the high prevalence. This high rate of cannabis use compromises treatment outcomes shown by the high numbers of participants lost to follow up. Mental health care professionals in MAT clinics should exercise due diligence in the monitoring and screening of cannabis use through administering the cannabis use disorder identification test (CUDIT) questionnaire to assess for dependence among patients on methadone therapy. Better clinical interventions such as targeted psychotherapy and social support should be conducted to promote MAT retention and long-term recovery outcomes. Policy makers such as Ministry of Health and other agencies should develop appropriate protocols and comprehensive programs for targeted management of this population.

5.4 Recommendations

To build upon our study findings, we recommend exploratory studies on the drivers for cannabis use in patients receiving methadone and interventions for this gateway drug. Future researchers need to conduct longitudinal studies to assess which pattern of cannabis use results in cannabis use disorder. In our study, more individuals were lost to follow up due to cannabis use compared to non-cannabis use thus, more prospective cohort studies on the impact of cannabis use on treatment outcome would be necessary.

5.5 Limitations

Some of the patient files were not well documented thus had missing information.

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Serial Number:

Date of enrollment

Gender

☐ Male   ☐ Female

Age

Education level

☐ Primary   ☐ Secondary   ☐ Tertiary (Certificate, Diploma)   ☐ University (1st degree, 2nd degree, 3rd degree etc.)

Marital status

☐ Single   ☐ Married   ☐ Separated   ☐ Widowed

Employment status

☐ Employed   ☐ Business   ☐ Unemployed

Urine drug screen results

At intake:

Latest:

Current methadone dose

☐ 40-60mg   ☐ 60-80mg   ☐ 80-100mg   ☐ more than 100mg