AFRICA UNIVERSITY
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DETECTION OF ILLICIT DRUGS IN URINE SAMPLES AT
LANCET CLINICAL LABORATORIES, 2024

BY

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A RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE HONOURS DEGREE OF BACHELOR OF
MEDICAL LABORATORY SCIENCES IN THE COLLEGE OF HEALTH,
AGRICULTURE AND NATURAL SCIENCES.

2025

ABSTRACT

The detection of illicit drugs in urine samples is a critical component of public health monitoring, particularly in urban settings where substance misuse poses significant societal challenges. This research aimed to assess the prevalence and patterns of illicit drug use among patients at Lancet Clinical Laboratories in Harare during 2024. Utilizing a retrospective cross-sectional design, a total of 716 urine samples were analysed, revealing a notable positive detection rate of 28.9% for at least one illicit substance. The study highlighted male patients as disproportionately affected, constituting 86.5% of positive cases, with a mean age of 30 years, indicating a significant demographic trend associated with drug use. High-density areas, particularly Kuwadzana, Budiriro, Mbare, and Mabvuku, emerged as major contributors to the overall sample pool, underscoring the urban nature and accessibility of illicit substances in these communities. The most frequently detected substances were marijuana (67.6%), followed by benzodiazepines (30.0%) and opiates (23.2%). Alarmingly, 36.7% of positive cases indicated poly-drug use, primarily involving cannabis in combination with benzodiazepines, reflecting a concerning trend linked to increased health risks and complicating treatment strategies. These findings highlight the urgent need for targeted public health interventions, including educational campaigns to raise awareness about the dangers of drug misuse and the importance of treatment access. Furthermore, community-based harm reduction programs are essential to support individuals struggling with addiction and to mitigate the broader societal impacts of substance abuse. This study provides vital insights into the current landscape of illicit drug use in Zimbabwe, emphasizing the necessity for evidence-based public health policies tailored to combat this growing crisis. Ongoing surveillance and research are essential for adapting strategies to effectively reduce the adverse impacts of substance abuse in high-risk populations.

Keywords: illicit drugs, urine samples, prevalence, public health, poly-drug use, marijuana, benzodiazepines.

Declaration

I Tendai Murendo hereby declare and certify that this dissertation submitted in partial fulfilment of the requirements for the Honours Degree of Bachelor in Medical Laboratory Sciences in the College of Health, Agriculture and Natural Sciences is my original work except where sources have been cited and acknowledged. The work has never been submitted, nor will it ever be submitted to another University for the award of a degree.

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Definition of key terms

Illicit Drugs: Substances that are illegal to use, possess, or distribute (CDC, 2024).

Addiction: A chronic, relapsing disorder characterized by compulsive drug seeking, continued use despite harmful consequences, and long-lasting changes in the brain (Addiction Center, 2024).

Immunoassay: A biochemical test that measures the presence of a substance through antigen-antibody interactions (Dorsey & Emmett, 2017).

Cut-off Level: The predetermined threshold above which a drug is considered positive in a test (Slaughter, 2022).

Screening Test: Preliminary test to identify the potential presence of drugs (McNeil, 2023).

Psychoactive substances: chemicals that alter brain function, leading to changes in mood, perception, consciousness, or behaviour (SAMHSA, 2020).

Health Outcomes: The possible results or effects of health interventions or conditions, particularly in relation to drug use (Lee & Leung, 2017).

Public Health: The science of protecting and improving the health of people and their communities through education, promotion of healthy lifestyles, and research for disease prevention (Syed, 2019).

Drug Trafficking: The illegal trade of drugs, involving their production, distribution, and sale (UNOV, 2024).

Harm Reduction: Strategies aimed at minimizing the negative health, social, and legal impacts associated with drug use (CMHA, 2023).

Abbreviations

ATS   Amphetamine type stimulants

MDMA   3,4-methylenedioxymethamphetamine

SES   Socioeconomic Status

UNODC   United Nations Office on Drugs and Crime

EMCDDA   European Monitoring Centre for Drugs and Drug Addiction

ZCLDN   Zimbabwe Civil Liberties and Drug Network

SAMHSA   Substance Abuse and Mental Health Services Administration

CDC   Centres for Disease Control and Prevention

NPS   New Psychoactive Substances

ADHD   Attention deficit hyperactivity disorder

AUREC   Africa University Research Ethics Committee

WHO   World Health Organization

LIS   Laboratory Information System

MQL   Methaqualone

BZO   Benzodiazepine

COC   Cocaine

THC   Tetrahydrocannabinol

OPI   Opiates

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CHAPTER 1: INTRODUCTION

1.1 Introduction

The overuse and consumption of illicit substances have become a global public health epidemic, with far-reaching implications for individual well-being, societal cohesiveness, and country socioeconomic growth (UNOV, 2024). This Chapter laid the groundwork for understanding the detection of illicit drug use, focusing on urine samples analysed at Lancet Clinical Laboratories in Harare, 2024. This chapter began by contextualizing the rising prevalence of drug use and its public health implications, highlighting the gaps in localized data that this research aims to address. It then looked on the emphasis of the problem statement in the need for comprehensive analysis to inform healthcare providers and policymakers.

This chapter also gave an outline of the broad and specific objectives, while justification for the study underscores the importance of localized data for developing effective public health strategies and interventions.

1.2 Study Background

1.2.1 Overview of illicit drug abuse

Illicit drug abuse is a complex and diverse phenomena that covers the hazardous and uncontrolled use of psychoactive chemicals that are prohibited or strictly regulated by national and international legislation. These chemicals, commonly referred to as "illicit drugs," contain a wide spectrum of substances that are not licensed for legitimate medical use or are taken in a manner that deviates from their specified purposes (CDC, 2024). At the heart of illegal drug addiction is the obsessive and uncontrolled consumption of these substances, despite the detrimental implications it may have on an individual's physical,

mental, and social well-being. The overuse and consumption of illicit substances have become a global public health epidemic, with far-reaching implications for individual well-being, societal cohesiveness, and country socioeconomic growth (UNOV, 2024). In recent years, the frequency of illicit drug use has skyrocketed, particularly among vulnerable populations such as youth and young adults (Addiction Center, 2024). This disturbing trend needs a comprehensive and multidisciplinary approach to understanding the scope and sources of the issue, in order to develop effective preventative and intervention techniques.

Substance misuse has changed significantly in recent years, presenting serious global public health issues. The increasing ubiquity of illegal substances is one of the most alarming trends. These drugs have been linked to disastrous outcomes, such as social unrest, family dissolution, and neurological abnormalities (CDC, 2024). The use of illegal substances, such as cocaine, methamphetamine, amphetamine, benzodiazepines, cannabis, opiates, and methaqualone, can have serious and far-reaching effects on people's health as well as the wellbeing of society. Abuse of amphetamine type stimulants can result in mental health problems, addiction, cardiovascular issues, and brain damage (Govindharaj & Kareem, 2024). Abuse of benzodiazepines can lead to dependence, cognitive decline, and a higher chance of overdoses and accidents, especially when paired with other drugs that depress the central nervous system (Longo & Johnson, 2020). According to Cunha-Oliveira et al. (2022) other substance abuses such as cocaine use can cause serious mental health problems, such as depression and psychosis, as well as neurological and cardiovascular difficulties. Despite being widely believed to be a safe drug, cannabis can nonetheless have an adverse effect on respiratory, mental, and

cognitive health, especially when used repeatedly (Filbey, et al., 2014). Beyond their effects on an individual's health, illicit drug use also raises crime rates, puts a burden on healthcare systems, reduces productivity owing to addiction, and causes social disintegration in the areas it affects (RFI, 2022).

1.2.2 History of Illicit Drug Abuse

Illicit drug abuse has a complex history, shaped by socio-economic factors and changing legal landscapes. This study explores on some of the most common illicit substances contributing to a better understanding of current drug use trends. One of the common illicit substances abused in various populations across the globe is **Amphetamine**, a powerful central nervous system stimulant commonly used to treat attention deficit hyperactivity disorder (ADHD) and narcolepsy, but also frequently abused for its euphoric effects and increased energy which was synthesized in 1887 and gained popularity during World War II for enhancing soldiers' performance. Its derivative, **Methamphetamine**, first synthesized in 1919, was similarly used by military personnel and later became a prescription drug (Sullivan & Mullen, 2018). **Benzodiazepines** are a class of sedative prescription medications used to treat anxiety, insomnia, and seizures, but they are often misused for their calming effects were developed in the 1950s and are now tightly regulated due to addiction risks (Lader, 2015). **Cocaine** which is a white, crystalline powder is classified as a powerful stimulant which produces intense euphoria and increased energy when used was derived from the coca plant and was then isolated in the 19th century for medicinal use, but illicit trafficking emerged in the 20th century (Frazer, Richards, & Keith, 2018). **Marijuana** often consumed as dried flowers or concentrated oils, is a psychoactive plant classified as a mild hallucinogen, has ancient roots, yet its illegal status has fuelled ongoing regulatory debates (Better Health Channel, 2017).

Opiates is also another class of substances which are tired to ancient roots with its first derivatives, Morphin and Heroin being first produced in the 1800's. Opiates is derived from the opium poppy and its substances are classified as a powerful pain-relieving substance. The substance is now available in various forms such as pills, powders, and codeine-based cough syrups, which produce intense euphoria and pain relief but carry a high risk of addiction and overdose (Cruz & Granados-Soto, 2022). Lastly, **Methaqualone** is another class of sedative prescription medications used to treat anxiety, insomnia which was firstly introduced as a safer alternative to barbiturates, became a popular recreational drug in the 1960s and 70s, resulting in significant abuse. However, it is less effective than the benzodiazepines for this indication which has resulted in now being less commonly used in pharmacotherapy due to the availability of safer alternatives (Lader, 2015). These substances illustrate the intricate interplay of social, economic, and political factors in substance misuse.

Over the past century, the global context of illegal substance use has seen significant changes, moving from isolated local traditions to a complex, globally interwoven problem. According to the United Nations Office on Drugs and Crime (UNODC) World Drug Report 2023, approximately 284 million people aged 15-64 used drugs worldwide in 2020, representing a 26% increase from 2010 (UNODC, 2023). While Marijuana remains the one of the most widely used illicit substance, with an estimated 209 million users globally in 2020, Opioid use has reached crisis levels in many regions, with about 62 million users worldwide and accounting for 69% of deaths attributed to drug use disorders in 2019 (Lader, 2015). The global cocaine market has expanded dramatically, with production reaching a record high of 1,982 tons in 2020 and other Synthetic drugs, particularly

methamphetamine, have proliferated, with seizures increasing five-fold between 2010 and 2020 (UNOV, 2024). The emergence of New Psychoactive Substances (NPS) has further complicated the drug landscape, with 1,047 different NPS reported to the UNODC by 2021 (UNODC, 2023). According to Dada et al. (2020), the global COVID-19 pandemic has worsened substance misuse problems with 36% of countries reporting an increase in drug use during the pandemic thereby causing disruptions to treatment programs and elevating psychological discomfort. This dynamic global drug picture highlights the critical need for ongoing research to monitor trends, direct policy choices, and create practical solutions to the many problems that illegal drug usage presents on a global level.

The history of illegal drug usage in Africa is multifaceted and dynamic, and over the past several decades, the continent has seen substantial changes in the illicit drug landscape, moving from a predominantly marijuana-based drug scene to one that is more diversified and complicated. Africa used to be primarily seen as a drug trafficking transit region, but it is now increasingly being used as a destination for drug consumption (National Institute on Drug Abuse, 2024). Methamphetamines, cocaine, heroin, and prescription opioids have all witnessed increases in use across the continent (Nhunzvi, Wilson, & Mhizha, 2023). The United Nations Office on Drugs and Crime (UNODC) estimated that approximately 60 million people in Africa used drugs in 2018, with projections suggesting a 40% increase by 2030 due to population growth (UNODC, 2023). Although Marijuana also remained the most widely used substance according to various studies in Africa with an estimated 45 million users across the continent, the region has seen a surge in the use of other substances, cocaine trafficking through West Africa has led to increased local consumption, with seizures rising from 1.2 tons in 2015 to 4.5 tons in 2019 (Nhunzvi,

Wilson, & Mhizha, 2023). However, the continent has also not been immune to the opioid crisis; nations such as Nigeria have reported considerable increases in the non-medical use of codeine and tramadol (Salm-Reifferscheidt, 2018). Furthermore, methamphetamine usage and manufacture have increased, especially in South Africa (van Hout & Wells, 2016). Africa's drug usage rate was estimated by the United Nations Office on Drugs and Crime (UNODC) to be around 60 million in 2018, and due to population growth, the number is expected to climb by 40% by 2030 (UNODC, 2021).

1.2.3 Illicit Drug abuse in Zimbabwe

Zimbabwe, like many African nations, has grappled with the complexities of illicit drug use, witnessing a shift from traditional substances to a more diverse drug landscape. Historically, marijuana (locally known as mbanje) has been the most commonly used illicit substance in the country, with its use deeply rooted in some cultural practices (Zivira, 2016). The Zimbabwe National Drug Master Plan (2020-2025) reports that marijuana remains the most commonly used illicit substance, with an estimated prevalence of 10.6% among adults (Ministry of Health and Child Care, 2020). However, recent years have seen a concerning diversification in drug use patterns. The Zimbabwe Civil Liberties and Drug Network (ZCLDN) also reported a significant increase in the use of crystal methamphetamine (locally called "mutoriro" or "guka"), particularly among youth in urban areas, estimating that over 30% of young people in high-density areas are now abusing this substance (Machando, et al., 2017). Prescription drug abuse, especially of codeine-based cough syrups, has also become prevalent, with an estimated 10-14% of students in higher education institutions reported to be misusing these medications (Machando, et al., 2017). The country's position as a transit route for drug trafficking, particularly for cocaine and heroin moving from East and Southern Africa to South Africa,

has contributed to increased local availability and consumption (UNODC, 2023). Existing literature has highlighted the devastating consequences of illicit drug use, including the risk of overdose, the spread of infectious diseases, the breakdown of family and social structures, and the strain on national economies without mentioning evidence-based statistical dataset to provide insight on the actual rate of substance use within the region (Maraire & Alif Bin, 2020; Mukwenha, et al., 2021). However, this is mainly due to the true extent of the problem being often obscured by underreporting, social stigma, and limited access to comprehensive data sources. By leveraging the comprehensive dataset from Lancet Clinical Laboratories, this research will provide a more accurate and nuanced understanding of the illicit drug epidemic, paving the way for evidence-based interventions and policy solutions.

1.2.4 Laboratory detection of illicit drugs at Lancet Clinical Laboratories

The detection and monitoring of illicit drug use represent critical components of public health initiatives. The study focuses on the most prevalent and pernicious substances which include, amphetamine, methamphetamine, benzodiazepines, cocaine, marijuana, opiates and methaqualone using the HOMEMED Multi-Drug 7 Panel Integrated Split Cup (Urine) test, a rapid visual immunoassay designed for the qualitative detection of drugs of abuse in urine specimens.

The HOMEMED test principle of immunoassay relies on the specificity of antibodies that bind to target drugs or their metabolites. This method is particularly effective for drug screening due to its ability to provide rapid results while maintaining a high level of sensitivity and specificity. The immunoassay process begins when a urine sample is collected and introduced to the Urine cup (test device). The split cup contains pre-loaded

reagents, including antibodies that are specifically designed to interact with the drugs of interest.

As the urine sample migrates through the test device, any target drug present will bind to its corresponding antibody, forming a drug-antibody complex. This interaction triggers a colour change in the test device, which serves as an indicator of the drug's presence. Each drug class in the panel is associated with a specific antibody, ensuring that the test can effectively differentiate between various substances.

The test is designed with built-in cut-off levels for each drug, which define the minimum concentration required for a positive result. This feature enhances the test's reliability by minimizing false positives and ensuring that only significant levels of drugs are detected. The rapid nature of the test allows for results to be read within 5 to 10 minutes, facilitating timely decision-making for further testing or intervention.

Table 1. Cut-off concentrations of detectable illicit substances in human urine

Test	Calibrator	Cut-off (ng/ml)
Amphetamine (AMP)	d-Amphetamine	500
Methamphetamine (MET)	Methamphetamine	500
Benzodiazepine (BZO)	Oxazepam	300
Cocaine (COC)	Benzoylecgonine	150
Marijuana (THC)	11-nor-A°-THC-9-COOH	50
Opiates (OPI)	Morphine	2000
Methaqualone (MQL)	Methaqualone	300

1.3 Statement of problem

The prevalence of illicit drug use in Zimbabwe, represents a significant and escalating public health crisis that demands urgent attention and comprehensive research. During my observations at Lancet Clinical Laboratories in Harare, a significant increase in the number of urine samples requested for drug testing was noted over the past year from an average of 15 samples per month in 2023 to an average of 30 samples per month in 2024. This surge prompted concerns about the rising prevalence of illicit drug use within the community. Moreover, a number of the positive cases presented a concerning pattern which was characterized a high proportion of positive results for multiple substances, indicating poly-drug use. This trend raises questions about the underlying factors contributing to drug abuse in the region, including socio-economic conditions.

Despite the growing concern, there is a critical lack of up-to-date statistical datasets on the true extent and nature of substance abuse in the country (Chingono, 2021). Current estimates rely heavily on self-reported data, which may not accurately reflect the true extent of the problem

This information gap severely hampers the development and implementation of effective evidence-based prevention and intervention strategies, leaving policymakers, healthcare providers, and community organizations ill-equipped to address this multifaceted issue.

1.4 Research objectives

1.4.1 Broad objective

The main objective of this research project was to conduct a comprehensive analysis of illicit drug use detected through systematic urine sample screening conducted at Lancet Clinical Laboratories in 2024.

1.4.2 Specific Objectives

1. To identify socio-demographic characteristics associated with illicit drug use among patients whose samples were processed at lancet clinical laboratories in Harare, 2024.

2. To analyze the laboratory results of illicit drug screening at Lancet Clinical Laboratories in Harare, 2024.

3. To determine the prevalence of illicit drug use among the study population based on urine sample dataset from Lancet Clinical laboratories in 2024

1.5 Research Questions

1. What are the socio-demographic characteristics associated with illicit drug use among patients whose samples were processed at lancet clinical laboratories in Harare, 2024?

2. What are the laboratory results of illicit drug screening at Lancet Clinical Laboratories in Harare, 2024?

3. What is the prevalence of illicit drug use among the study population based on urine sample dataset from Lancet Clinical laboratories in 2024?

1.6 Justification of the study

In order to address the escalating public health epidemic of illicit drug misuse within the local community, the proposed study was needed. Although the information from national and regional sources offers a general knowledge of substance use trends, more specific, localized research was desperately needed to guide policy changes and tailored treatments. Because of its wide clientele and reach, Lancet Clinical Laboratories was in a unique position to provide a thorough dataset on the detection of illicit drug usage through regular

urine sample screening. Through the examination of this copious amount of anonymized data, the research revealed the concealed scope of the regional drug crisis, pinpointing high-risk groups, new trends, and worrisome surges in drug use. Such empirical data is crucial for attracting the interest of stakeholders, obtaining financing for programs of treatment and rehabilitation, and directing the creation of evidence-based public health policies. In the end, this research encourages prompt action, enabling legislators, medical professionals, and social service providers to counteract the grave social, economic, and public health effects of drug usage.

1.7 Delimitation of the study

This study focused on urine samples analysed at Lancet Clinical Laboratories, a leading diagnostic centre in Harare, ensuring access to a diverse and robust dataset. The use of standardized testing protocols enhances the reliability of the findings, while the specific timeframe of 2024 allows for a targeted examination of current drug use trends. By concentrating on a single laboratory, the research aimed to provide nuanced insights into local patterns of illicit drug use, informing tailored public health interventions and policies.

1.8 Limitations of the study

The study encountered challenges related to limited demographic data. Inconsistent or incomplete demographic information associated with the urine samples could hinder the ability to draw comprehensive conclusions about the characteristics of drug users. This limitation could affect the identification of at-risk populations and the effectiveness of tailored interventions.

The study relied on urine samples collected through Lancet Clinical Laboratories, which may not be entirely representative of the broader population. Individuals who opt to undergo routine urine screening or seek medical services at Lancet may differ in socioeconomic status, health-seeking behaviour, and other demographic characteristics compared to the general public. This inherent sample bias could skew the prevalence rates and demographic trends observed in the data.

1.9 Summary

This chapter provided a comprehensive introduction to the research focused on the detection of illicit drugs in urine samples screened at Lancet Clinical Laboratories in Harare, 2024. It also established the study background, highlighting the increasing prevalence of illicit drug use and its significant public health implications and also identified critical gaps in localized data that this research seeks to address, emphasizing the importance of understanding drug use trends to inform healthcare practices and policy.

Key challenges related to the lack of comprehensive data on drug use and the increase in frequence of urine samples requested for urine drug test were also outlined, underscoring the need for targeted analysis. The chapter further delineates broad and specific research objectives, including the identification of commonly detected substances, demographic factors influencing drug use, and temporal trends over the study period. This study thereby stresses the necessity of localized data for effective public health strategies.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

Literature review is an overview of research on a given topic and answers to related research questions. It summarizes what is known and the unknown about a given topic hence its features include organizing, evaluating, identifying patterns and trends in literature and synthesizing the literature (Lane, 2023). The analysis of illicit drug use is a critical global health concern that continues to evolve and challenge public health systems worldwide. This chapter aims to provide a comprehensive overview of the current knowledge, trends, and gaps regarding the extent of illicit drugs use in Zimbabwe. This chapter will explore several key areas crucial to understanding the landscape of illicit drug abuse by examining the global and regional trends in illicit drug use, highlighting the most commonly abused substances and their changing patterns of use.

2.2 The Conceptual framework for illicit drug usage

INDIVIDUAL LEVEL

Population demographics (age, gender)
Socioeconomic status (SES)
Mental health and genetic predisposition to addiction

SOCIAL LEVEL

Peer influence and networks
Cultural attitudes towards social drug use

Detection of Illicit Drugs in Urine Samples at Lancet Clinical Laboratory, 2024

INSTITUTIONAL LEVEL

Drug prevention and rehabilitation programs
Healthcare system structure and access

ENVIRONMENTAL LEVEL

Geographic location
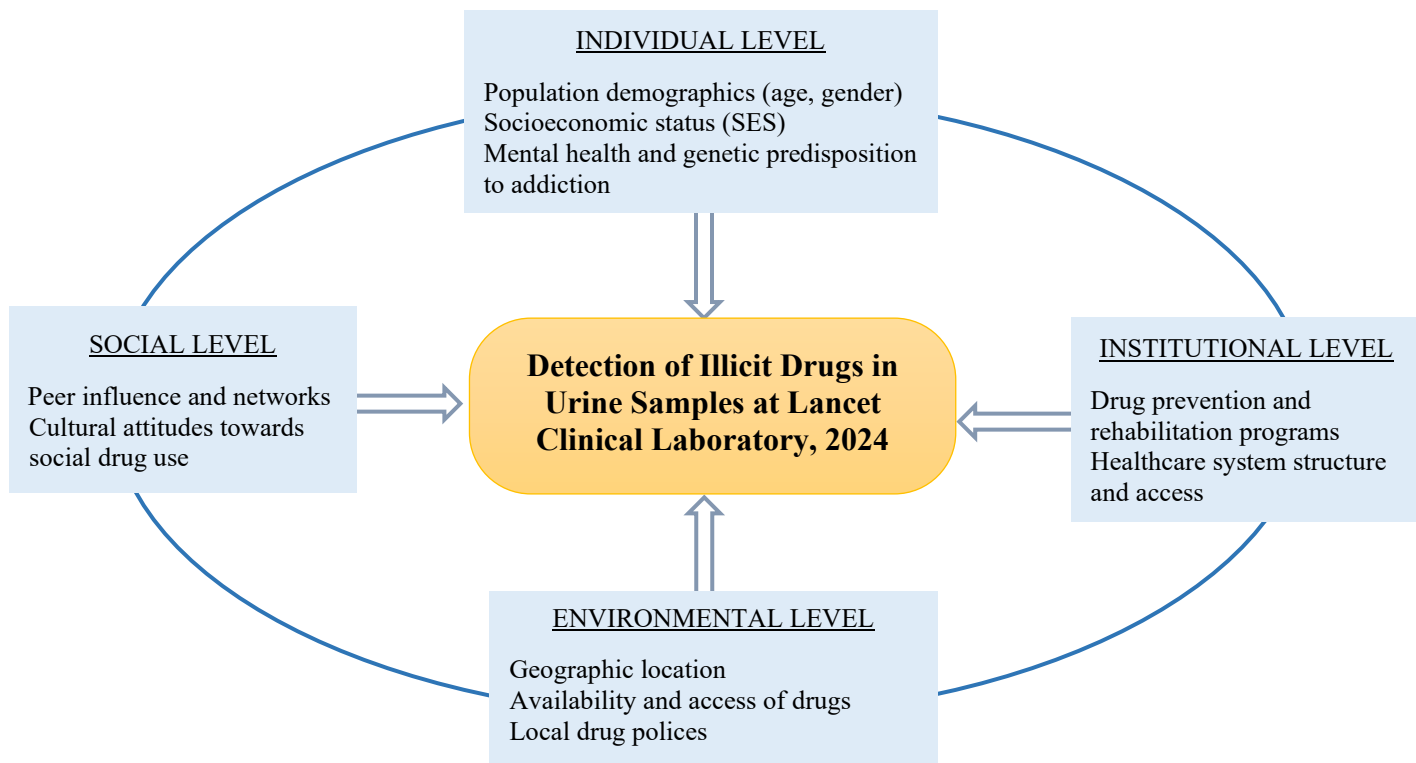Availability and access of drugs
Local drug polices

Figure 1. Conceptual Framework for illicit drug usage

The conceptual framework for this research was grounded in the multi-level determinants model of substance use and abuse, which examines the interplay of various factors influencing illicit drug use and its detection. This framework helped to visualize the complex relationships between different variables and processes involved in the detection of illicit drugs through urine sample screening. This conceptual framework illustrated how the detection of illicit drugs through urine screening at Lancet Clinical Laboratories is not just a matter of laboratory procedures, but a complex interplay of individual, social, environmental, and institutional factors as shown in fig 1.

At the individual level, demographics such as age and gender significantly influence drug use patterns, with younger individuals often more prone to experimentation. Socioeconomic status (SES) also plays a critical role, as those from lower SES backgrounds may have limited resources, increasing their vulnerability to substance abuse. Mental health issues and genetic predispositions further elevate the risk of drug use, particularly for individuals using substances as a coping mechanism. Socially, peer influence and cultural attitudes are pivotal; individuals are more likely to use drugs if their peers do, especially in communities where drug use is normalized. Environmentally, geographic location affects drug access, with urban areas typically exhibiting higher availability and detection rates. Finally, institutional factors, such as effective drug prevention and rehabilitation programs, alongside accessible healthcare, are essential in mitigating drug use and reducing positive detection rates in urine samples (Swaen & Tegan, 2022).

This conceptual framework emphasizes the need for a comprehensive approach to understanding and interpreting the results of drug screening programs. By visualizing these relationships, the framework helps to identify potential areas for intervention, guides the development of research questions and hypotheses, and provides a structure for interpreting the study results in a broader context of substance use and public health.

2.3 Literature review in relation to study objectives

2.3.3 Socio-demographics characteristics associated with illicit drug abuse

In order to effectively treat patients impacted by chronic illicit drug abuse, healthcare providers must have a thorough understanding of the demographics of the patient population they are treating. Numerous studies have shown that patterns of illicit drug usage are significantly influenced by age. In a research of drug use among American children, Johnston et al. (2022) discovered that drug experimentation usually starts in adolescence and peaks in the late teens to early twenties. They observed that whereas the use of "harder" substances like heroin and cocaine tended to emerge later, usually in the mid-twenties, marijuana usage was most common among those aged 18 to 25. In a similar study, McCabe et al. (2019) found substantial regional differences in age-related drug usage trends after evaluating global data. Although their results supported the widespread pattern of drug use beginning in adolescence, they also discovered that drug use started later, typically in the mid to late 20s, in several places, especially in parts of Asia and Africa.

Numerous studies have also examined the gender variations in illicit drug usage, and the results have shown intricate patterns. In a meta-analysis of gender variations in substance use disorders, Dada et al. (2020) discovered that although men are more likely than women

to use illicit drugs in most drug categories, the gender difference has been closing recently, especially in prescription medication usage. They observed that women tended to utilize medications more frequently for self-medication, particularly for pain and mental health conditions. Meyers et al. (2021), in contrast, concentrated on the disparities between genders in treatment-seeking behaviours and results. According to their research, women encounter additional obstacles to receiving treatment, such as stigma and child-rearing obligations, but when they do participate in rehabilitation programs, their treatment outcomes are typically better.

Contrasting research show that patterns of illicit drug usage are considerably influenced by geographic location. The World Drug Report 2023 from the United Nations Office on Drugs and Crime (UNODC) offered a thorough worldwide summary while highlighting unique regional trends in drug availability and preferences. They noted, for example, that cocaine usage was more common in North and South America and Western Europe, whereas higher rates of opiate use were seen in Southwest Asia and Eastern Europe (UNODC, 2023). In a more concentrated investigation, Medina-Mora et al. (2022) looked at variations in drug usage trends between urban and rural areas in multiple nations. They discovered that although drug use in general tends to be greater in cities, rural areas frequently confront particular difficulties, such as restricted access to treatment centres and, in certain cases, higher rates of prescription opioid usage. In comparison, the UNODC report did not go into great detail about urban-rural discrepancies, instead focusing mostly on national and regional differences.

Knowing the dynamics between geographic location and socioeconomic status (SES) complicates the picture of drug usage patterns even further. A thorough evaluation of research investigating the connection between SES and drug use in high-income nations

was carried out by Room et al. (2018). They discovered that, especially in metropolitan areas, lower SES was typically linked to greater rates of drug use and drug-related problems. They did point out that this association did not hold true for all substances, with higher SES groups using "club drugs" like MDMA more frequently.

2.3.2 Laboratory results associated with Illicit drug abuse

The analysis of laboratory results associated with illicit drug use is a critical area of research, given the global rise in substance abuse and its public health implications. Various studies have documented the prevalence of drug use, revealing significant patterns in positive and negative cases across different regions. For instance, a study by Kokot et al. (2019) in Poland demonstrated that among 2,500 urine samples tested, 27% were positive for at least one illicit substance, with cannabinoids being the most frequently detected. In contrast, a similar study by Peltzer et al. (2017) in Southeast Asia found a higher prevalence of methamphetamines, with 31.2% of samples testing positive, indicating regional variations in drug use trends. This marked difference could be attributed to variations in testing protocols and regional drug use patterns, though both studies consistently found higher positivity rates in urban versus rural testing centres.

Moreover, the distribution of multiple drug use presents a crucial aspect of understanding illicit drug consumption patterns, research has shown varying trends across different populations. Schulenberg and Patrick's (2020) comprehensive analysis of 8,900 urine samples in U.S metropolitan laboratories identified that 35.2% of positive cases involved multiple drug use, with the most common combination being opioids and benzodiazepines (18.3%). In contrast, a similar study by Calvo et al. (2022) examining 10,245 samples in Canadian laboratories found a higher multiple drug use rate of 47.6%, with marijuana and

cocaine being the predominant combination (23.5%). Both studies, however, noted an increasing trend in multiple drug use compared to their historical data from the previous five years.

Age distribution patterns among positive cases have shown some consistent trends across studies. A retrospective study by Wang et al. (2022) analysing 20,567 positive cases in Chinese laboratories revealed that 68% of positive cases were among individuals aged 18-35 years, with a peak in the 25-30 age group (34.3%). Similarly, research conducted by Gfroerer and Brodsky (2019) across United States laboratories, examining 18,789 positive cases, found that 71% were within the 18-35 age range, with the highest concentration in the 21-28 age group (38.2%). However other findings illustrate how age-related trends in drug use can vary significantly across different cultural contexts, and can also be influence by the types of drugs being abused for example, a longitudinal study by Mack (2021) in the United States highlighted that the age group most affected by opioid misuse is between 25-34 years, reflecting a demographic shift in illicit drug use patterns.

The types and classes of abused drugs also offer insights into global drug use trends. The distribution of drug classes has shown both regional variations and some universal trends. A comprehensive study by Madruga and Pinsky (2018) analysing 25,678 positive samples in Brazilian laboratories found marijuana as the most prevalent substance (45.3%), followed by cocaine (28.7%), and benzodiazepines (15.4%). In comparison, research by Peltzer et al. (2017) examining 22,456 positive samples in South Korean laboratories identified methamphetamine as the predominant substance (41.2%), followed by opioids (22.8%), and marijuana (18.3%). Despite these regional differences, both studies noted a consistent upward trend in synthetic drug detection rates over traditional substances.

However, such disparities underline the necessity for region-specific research that takes into account local drug markets and user behaviour, as drug use is not only a health issue but also a reflection of the socio-economic environment.

2.3.1 Prevalence of Illicit Drug Use Across the Globe

Many studies have been conducted on the prevalence of illicit drug usage worldwide, revealing both regional variations and global trends. Illicit drug use remains a significant public health and social issue worldwide. Recent reports indicate a significant rise in the prevalence of substance abuse, driven by various factors, including socio-economic conditions, cultural shifts and the evolving dynamics of the drug market. Rise in the prevalence of substances such as opioids, cocaine and other synthetic drugs have been indicated to be due to increase in availability (United Nations, 2024).

The global prevalence of illicit drug use varies significantly across regions and substances. The United Nations Office on Drugs and Crime (UNODC) World Drug Report 2022 estimates that 284 million people aged 15-64 used drugs worldwide in 2020, representing 5.6% of the global population with Marijuana remaining the most widely used illicit substance, with an estimated 209 million users globally (UNODC, 2023). In contrast, Degenhardt and Hall (2017) in their systematic review of global drug use prevalence, estimated that 192 million people used marijuana in 2016, representing 3.9% of the global population aged 15-64. While both studies confirm marijuana as the most prevalent illicit drug, the discrepancy in numbers highlights the challenges in accurately estimating global drug use and the potential increase in prevalence over time. The UNODC report also placed greater emphasis on how the COVID-19 epidemic has affected drug use patterns,

while Degenhardt and Hall (2017) concentrate more on the long-term socioeconomic determinants that have an impact on drug use prevalence.

Opioid use presents a significant global health challenge, with varying prevalence across regions. Peacock et al. (2018) conducted a systematic review of global opioid use and found that approximately 61 million people used opioids in 2019, with the highest prevalence in North America (3.6%) and Oceania (3.3%). Their study highlighted the rising trend of synthetic opioid use, particularly fentanyl and its analogues. In comparison, the UNODC World Drug Report 2023 estimated 62 million opioid users globally in 2020, representing 1.2% of the global adult population (UNODC, 2023). The UNODC report also noted that opioids accounted for 69% of deaths attributed to drug use disorders in 2019. While both studies present similar global estimates, they differ in their regional focus, with Peacock et al. (2018) providing more detailed regional breakdowns and emphasizing the variations in types of opioids used across different regions.

The prevalence of amphetamine-type stimulants (ATS) varies significantly across regions. NIDA (2020) conducted a comprehensive review of global methamphetamine use and found increasing prevalence rates in North America, East and Southeast Asia, and Oceania. They estimated that in 2018, there were approximately 28.9 million amphetamines users globally, with methamphetamine being the primary concern in many regions. In Oceania, they reported a prevalence rate of 1.3% among adults. In comparison, the UNODC World Drug Report provides a more recent estimate of 27 million amphetamines users globally in 2022, representing 0.5% of the global adult population (UNODC, 2023). The UNODC report also highlights regional variations, noting that East and South-East Asia have emerged as the world's largest methamphetamine market, with

seizures increasing from 32 tons in 2011 to 140 tons in 2020. While both studies agree on the growing concern of ATS use, particularly methamphetamine, they differ in their global prevalence estimates and regional focus, reflecting the dynamic nature of ATS use patterns and the challenges in obtaining accurate global data.

2.4 Summary

The global landscape of illicit drug use is a complex and evolving challenge, with variable rates of prevalence across different regions. In the past year, an estimated 5.5% of the global adult population has used illicit substances at least once, which translates to approximately 275 million individuals worldwide, according to recent studies. The persistent nature of substance abuse as a public health issue is underscored by the concerning upward trend of this figure over the past decade.

Marijuana continues to be the most frequently abused illicit substance on a global scale, with narcotics and stimulants like cocaine and amphetamines following in that order. The global prevalence of marijuana use is notably noteworthy, with an estimated 200 million users. Nevertheless, the distribution of substance abuse patterns varies considerably among various geographical regions, as it is influenced by factors such as cultural norms, availability, and law enforcement strategies.

The landscape of illicit substance use is significantly influenced by demographic factors. The prevalence of drug use among young adults (aged 18-25) is consistently the highest across most substances, with age serving as a significant determinant. This gap has been narrowing in recent years, but gender differences are still evident, with males generally exhibiting higher rates of illicit substance use than females. Geographical location significantly influences drug use patterns, with urban areas typically reporting higher rates

of use compared to rural regions. Additionally, socioeconomic factors and educational attainment have been shown to correlate with substance use patterns, though these relationships are complex and often bidirectional.

CHAPTER 3 RESEARCH METHODOLOGY

3.1 Introduction

The Research Methodology chapter was a critical component of this project, providing a comprehensive framework for how the study on the detection of illicit drug use through urine sample screening at Lancet Clinical Laboratories in Harare was conducted. This chapter was designed to outline the systematic approach that was adopted to ensure the reliability and validity of the findings, while also adhering to ethical standards.

The Research Methodology chapter was intended to provide clarity on how the study will be executed, the types of data that will be collected, and the insights we expect to gain regarding the detection of illicit drug use therefore, this chapter, detailed the specific research design, sampling techniques, data collection methods, and analytical procedures that underpinned the study. The methodology encompassed both quantitative and qualitative elements, allowing for the distinct understanding of drug use patterns in the population.

3.2 The Research Design

The study employed a retrospective cross-sectional design that integrated quantitative methodology to assess the detection of illicit drug use through urine sample screening at Lancet Clinical Laboratories in Harare in 2024. This approach allowed for a comprehensive analysis of drug use patterns, providing both statistical data and contextual insights.

A key feature of this research was its retrospective design, which involved analysing existing data collected from past records rather than gathering new data in real time. Specifically, the study examined urine sample results and associated medical records from

patients who visited Lancet Clinical Laboratories prior to the study in the laboratory information system (LIS). In addition to being retrospective, the study also adopted a cross-sectional design whereby it provided a snapshot of a population at a specific point in time. By analysing urine samples that have already been collected, the prevalence of illicit drug use among the population served by Lancet Clinical Laboratories was assessed. This design was particularly effective for identifying the current state of drug use and its associated demographic characteristics, as it captured a wide range of information concurrently.

To enhance the robustness of our findings, the research integrated quantitative methods which focused on the statistical analysis of urine sample results, calculating the prevalence of different illicit substances detected. This involved the use of descriptive statistics to summarize the data and inferential statistics to explore relationships between demographic factors and the detection of drug use.

By employing a retrospective cross-sectional design that integrated quantitative methods, the study aimed to provide a comprehensive understanding of illicit drug use in Harare. This approach enabled the identification of both statistical trends and contextual insights, ultimately informing public health interventions and policy decisions related to substance abuse in the region.

3.3 Study setting

The study was conducted at Lancet Clinical Laboratories, a prominent diagnostic facility known for its comprehensive range of laboratory services, located at 22 Fife Avenue corner Blackiston Street, in Harare, 2024.

3.4 Study population

The study population for this research consisted of individuals whose urine samples were screened for illicit drug use at Lancet Clinical Laboratories in Harare, 2024. This population included participants from all age groups as well as both males and females to ensure gender diversity. Additionally, the study also encompassed individuals from various socioeconomic backgrounds mainly geographical location to provide a comprehensive understanding of the population.

3.5 Inclusion criteria

This included individuals of all ages, from adolescents to adults, as urine drug screening applied across various age groups mainly the participants who had undergone urine screening for illicit drugs at Lancet Clinical Laboratories in 2024.

3.6 Exclusion criteria

Individuals with incomplete data such as those whose medical records lacked sufficient information about their urine test results or demographic details were excluded from the study.

3.7 Sample Size

For this research project, a census data sampling method was utilized to determine the sample size. A census approach involves collecting data from every individual within the defined population that meets the inclusion criteria, rather than relying on a subset. The reason of using a census sampling method was its ability to provide a complete picture of the population, ensuring that all variations in drug use patterns are accounted for. This was particularly critical in illicit drug detection, where less commonly abused substances were underrepresented if a non-census method were employed. For instance, relying on smaller,

random samples could lead to a misleading 0% representation of certain drugs, falsely suggesting their absence in the population. Such inaccuracies could hinder the understanding of drug prevalence and abuse trends, ultimately impacting public health responses and policy-making.

In 2024, the target population encompassed all patients screened for illicit drugs at Lancet Clinical Laboratories, resulting in a total sample size of **716** urine samples collected during this period. Laboratory records were meticulously reviewed to ascertain the exact number of eligible screenings conducted. By incorporating every eligible participant, the study aimed to achieve a high level of accuracy and reliability in the findings, thereby minimizing sampling error and enhancing the representativeness of the data.

3.8 Sampling procedure

The sampling procedure for this research project on the detection of illicit drug use through urine sample screening at Lancet Clinical Laboratories in 2024 employed a census sampling method. This approach ensured a comprehensive analysis of all eligible urine samples processed at Lancet Clinical laboratories in 2024. The study population comprised of all urine samples submitted to Lancet Clinical Laboratories for drug screening throughout the 2024 calendar year, from January 1 to December 31. By utilizing a census method, the study aimed to eliminate sampling bias and obtain the most accurate representation of drug use prevalence within the tested population. Relevant demographic information, such as age, gender, and area of residence, were also recorded.

3.9 Data Collection Instruments

Data collection instruments are essential tools used in research to gather information systematically and accurately. They facilitate the collection of relevant data that can be

analysed to achieve the objectives of the study. In this research, the primary data collection instrument included a structured data extraction form.

The structured data extraction form was a key instrument in this study, designed specifically to capture quantitative data from the laboratory information system. This form was created in Microsoft Excel, leveraging its functionality to organize and analyse data efficiently. The structured format ensured that all relevant variables are consistently recorded, including demographic information such as age, gender, and area of residence, alongside the results of the urine drug screenings.

The use of Excel allowed for the inclusion of predefined categories and codes for various illicit substances detected in the urine samples, facilitating easy data entry and minimizing errors. By structuring the data extraction form in this way, researchers could streamline the process of data collection, making it easier to manage large volumes of information while ensuring that all necessary details were captured.

The purpose of the structured data extraction form was not only to gather data but also to provide a foundation for subsequent statistical analysis. Once the data was collected, it was easily manipulated within Excel to calculate prevalence, perform descriptive statistics, and explore correlations between demographic factors and drug use patterns. This systematic approach enhanced the reliability of the findings and supported the study's overall goals.

3.10 Pilot study

Pre-testing is a critical phase in the research process that involves evaluating the data collection instruments before their actual deployment in the study (Mbokane, 2018). This

step is essential to ensure that the instruments are effective, reliable, and capable of capturing the necessary data accurately. For this research project, a thorough pre-testing process was conducted for the structured data extraction form.

The pre-testing of the structured data extraction form involved administering the form and collecting data to a small sample of laboratory records from the previous year, 2023 since there are not included in the main study. This trial run helped to determine if the form captures all relevant information effectively. Feedback from this pre-test was invaluable in refining the form to enhance its usability and ensure that it functioned as intended within Microsoft Excel.

The insights gained from pre-testing was critical in refining both data collection instruments, ultimately enhancing the overall quality and reliability of the research.

3.11 Analysis and Organisation of Data

Analysis and organisation of Data was the most crucial and important part of research and it summarizes collected Data. According to Dibekulu (2020), Data analysis involves the systematic application of statistical and/or logical techniques to describe, summarize, and evaluate data.

Once data collection was finished, all collected data was analysed using SPSS Version 24. SPSS Version 24 was utilized to organize and manage the collected data, generate tables, graphs, and charts. Moreover, numerical data was represented using measures of central tendency such as means, medians, and standard deviations, while categorical data was presented as frequencies

3.12 Ethical Consideration

Ethical considerations are paramount in conducting research, particularly in studies involving sensitive topics such as illicit drug use. In this research project, several ethical principles were prioritized to ensure the protection of participants and the integrity of the research process.

One of the foremost ethical considerations was the principle of anonymity. The laboratory information system employed by Lancet Clinical Laboratories utilized laboratory numbers instead of patient names, ensuring that the data collected for this study remains anonymous. This system effectively safeguards the identities of participants, minimizing the risk of stigma or discrimination associated with drug use. By using anonymous data, the research adhered to ethical standards that prioritize participant confidentiality and privacy.

In addition to maintaining anonymity, informed consent was a critical component of the ethical framework for this study. While the data was anonymous, it was essential to ask for permission from the study site to use the urine sample results for research purposes. Clear communication regarding the study's objectives, methods, and potential implications was provided to ensure that the site understand the nature of their involvement.

Moreover, the research also adhered to the principles of beneficence and non-maleficence. The study aimed to contribute valuable insights into the prevalence of illicit drug use, which could inform public health initiatives and interventions. By focusing on the broader implications of the research, the study sought to benefit the community while minimizing any potential harm or discomfort to participants. Lastly ethical oversight was ensured

through the review and approval of the research proposal by AUREC. This review process provided an additional layer of careful examination of the project to ensure that all ethical considerations are adequately addressed and that the study complies with relevant regulations and standards

3.13 Summary

The Research Methodology chapter outlines the comprehensive approach that was employed to assess the prevalence of illicit drug use through urine sample screening at Lancet Clinical Laboratories in Harare. The study aimed to provide valuable insights into drug use patterns, contributing to public health initiatives and policy decisions.

The research utilized a retrospective cross-sectional design, while integrating quantitative methodologies. This design allowed for the analysis of historical data gathered from urine samples while providing a snapshot of drug use prevalence at a specific point in time. The census sampling technique which was employed, ensured that data is collected from every individual whose urine sample was screened during the designated period of 2024. This approach enhanced the reliability and validity of the findings by minimizing sampling error and capturing a comprehensive dataset.

Data collection involved a structured data extraction form designed in Microsoft Excel to systematically record demographic information and urine screening results. The study population consisted of all patients who underwent urine screening at the laboratory, ensuring diversity in demographics such as age and gender. Ethical considerations however, were paramount in the study and the use of an anonymous laboratory information system protected participant identities, while informed consent was obtained to ensure transparency regarding the use of data. Furthermore, the research prioritized

beneficence and non-maleficence, aiming to provide community benefits while minimizing harm.

CHAPTER 4: DATA PRESENTATION, ANALYSIS AND INTERPRETATION

4.1 Introduction

This chapter presents a comprehensive analysis and interpretation of data collected from the detection of illicit drugs in urine samples at Lancet Clinical Laboratories in 2024. It serves as the core component of this research, where empirical evidence is systematically analysed and interpreted to address the research objectives established in the first Chapter. Through statistical analysis and detailed interpretation, this chapter bridges the gap between raw data collection and meaningful conclusions, providing insights into the prevalence and patterns of illicit drug use as detected through urinalysis. The chapter is structured to present findings through various analytical tools, including statistical tables, graphs, and detailed narrative explanations.

4.2 Socio-demographic characteristics associated with illicit drug use among study participants

Table 2: Socio-demographic characteristics of study participants

Characteristic	Frequency N (%)
Age (Mean) years	30
Gender	
Men	567(79.2)
Women	149(20.8)
Area of Residence	
High density areas	620(86.6)
Low density areas	96(13.4)

Table 2 above shows the Socio-demographic characteristics of study participants. In total, **716** patients were tested for illicit drugs, comprising a predominance of male patients, which totalled 567 (79.2%). This significant gender disparity highlights the likelihood of illicit drug use being more prevalent among males. The lower representation of female patients (149 or 20.8%) may also indicate differing patterns of drug use between genders, necessitating further investigation into the social and psychological factors influencing female drug users.

Geographical distribution of the patient population further emphasizes the socio-demographic landscape of illicit drug use in Harare. Among the total patients tested, a significant majority resided in high-density areas, with 620 individuals (86.6%) living in these settings, particularly from Kuwadzana, Budiriro, Mbare, and Mabvuku, which accounted for the majority of the samples based on the addresses provided on the patient request forms. In contrast, only 96 patients (13.4%) were from low density areas. This stark contrast suggests that densely populated environments may foster conditions that contribute to higher rates of drug use, such as greater accessibility to illicit substances, diverse social networks that may normalize drug use, and potentially higher levels of stress associated with urban living.

4.3 Analysis of the study participants laboratory results of illicit drug screening

Table 3: Overall results of study participants for illicit drug screening

Gender	Frequency		
	Positive cases for at least one illicit drug N (%)	Negative cases for all drugs N (%)	Total N (%)
Males	179(25.0)	388(54.2)	567(79.2)
Females	28(3.9)	121(16.9)	149(20.8)
Total	207(28.9)	509(71.1)	**716(100)**

*NB data is given as N (%) unless specified

Table 3 above shows the overall results of the study participants for illicit drug screening and out of the 716 patients tested, 207 (28.9%) tested positive for at least one illicit drug, while 509 (71.1%) tested negative. A closer examination of the data reveals a striking gender disparity among those who tested positive for illicit drugs. Of the 207 positive cases, a substantial majority were male, with 179 males (86.5%) compared to 28 females (13.5%). This significant difference suggests that male patients are disproportionately affected by illicit drug use, indicating a potential area for targeted public health interventions aimed at reducing drug use among men.
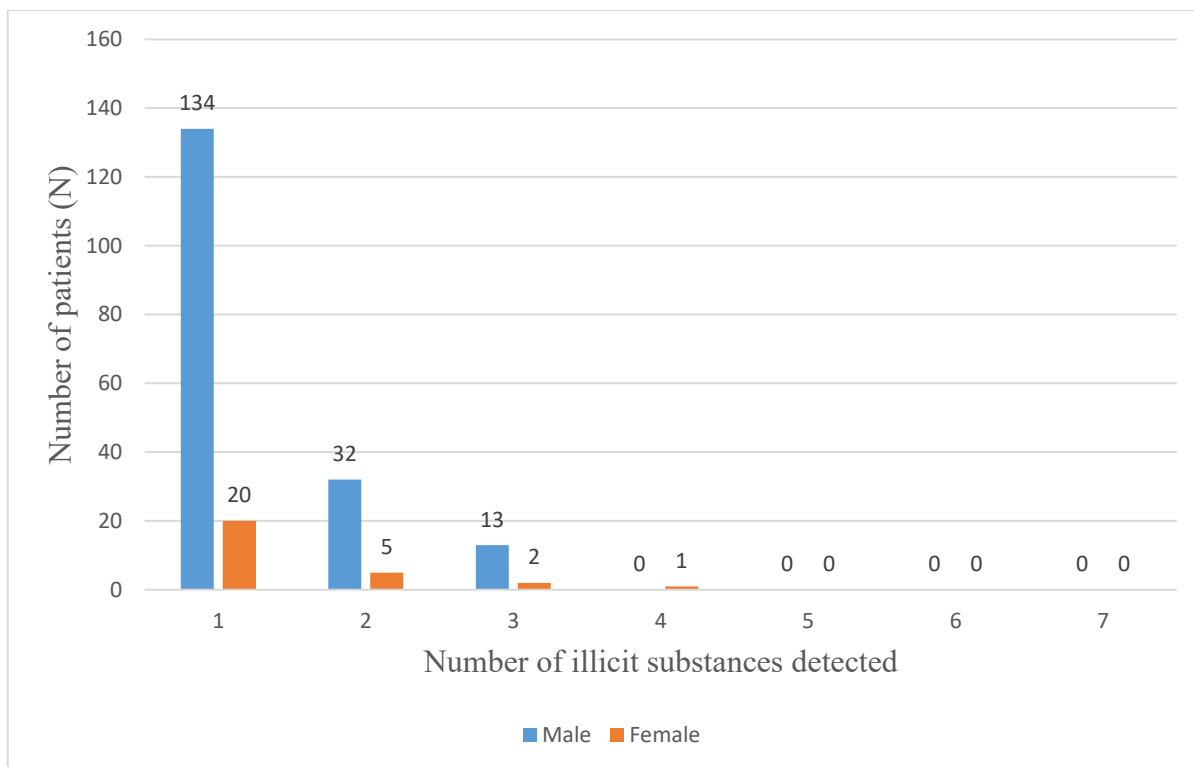
Figure 2: Distribution of multiple drug abuse among study participants

The data in fig 3 above, indicated a clear trend in the distribution of number of drugs abused among the study participants. Out of the total positive cases, 134 male patients (approximately 64.8%) tested positive for only one substance, while 20 female patients (approximately 9.7%) were in the same category. When examining those who tested positive for multiple substances, the data reveals that 32 male patients (15.5%) and 5 female patients (2.4%) tested positive for two substances. This indicates that while some individuals engage in poly-drug use, the majority still tend to use a singular substance. The number of patients testing positive for three substances was significantly lower, with 13 males (6.3%) and 2 females (1.0%). The trend continues with only one female patient (0.5%) testing positive for four substances, while there were no cases of patients testing positive for five or more substances.

This distribution of poly-drug use highlights several important considerations. First, the higher prevalence of poly-drug use among males, particularly for two and three substances, suggests that men may be at greater risk for more complex patterns of substance abuse. Among the positive cases, 76 patients (36.7%) exhibited poly-drug use, defined as the presence of at least two different substances in their urine samples. The analysis of commonly used drug combinations among patients with poly-drug use revealed several notable patterns. Marijuana emerged as the most frequently detected substance, utilized in conjunction with benzodiazepines and opiates.
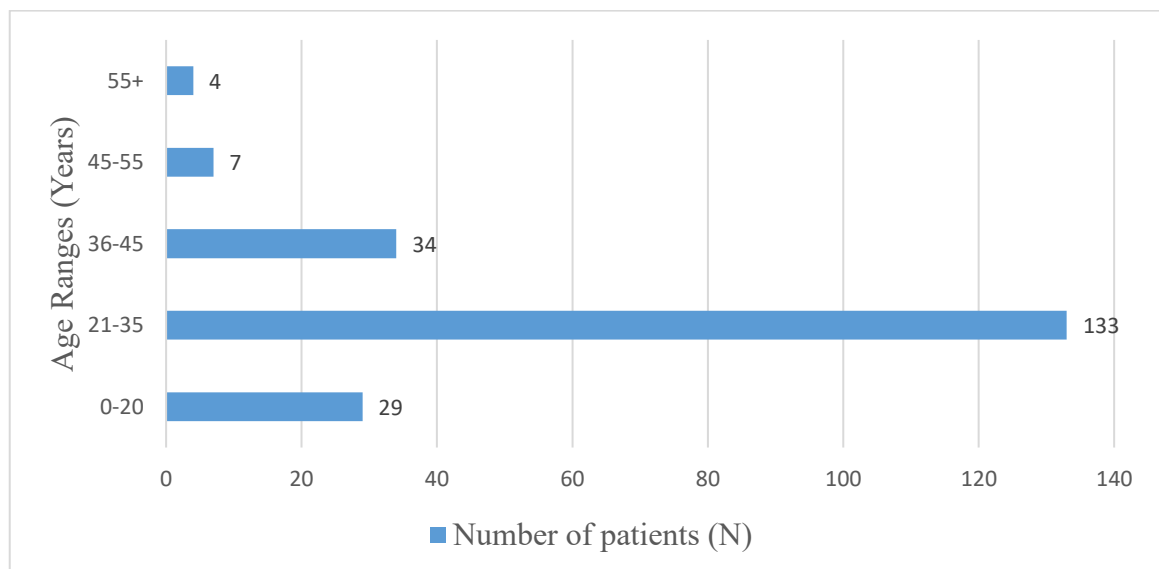

Figure 3: Age distribution among positive cases

The data in fig 4 shows the age distribution among positive cases which further illustrated the demographic profile of illicit drug users in this population. The largest group of positive cases was found in the 21-35 age range, accounting for 133 patients (65.2%). In contrast, younger patients aged 0-20 accounted for 29 cases (13.5%), while those aged 36-45 represented 34 cases (15.9%). The oldest age groups showed markedly lower prevalence, with only 7 cases (3.4%) in the 46-55 category and 4 cases (2%) in the 56 and

above category. This trend indicates that illicit drug use is more prevalent among younger

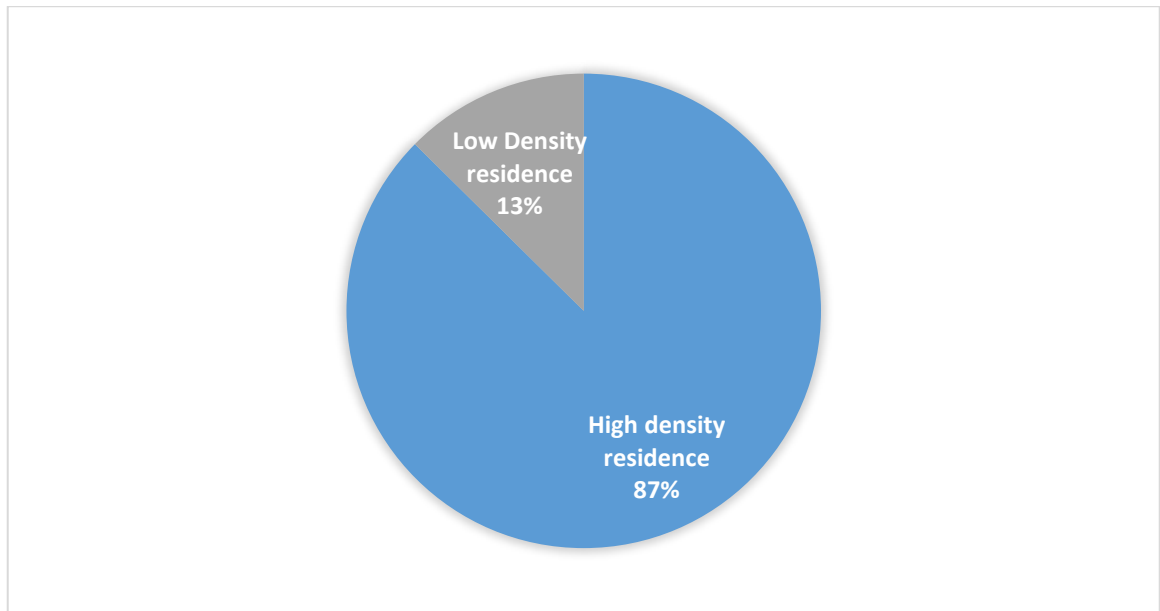adults, suggesting a need for preventive measures targeted at this demographic.

Figure 4: Geographical location associated with positive cases

Figure 5 above shows a pie chart of the Geographical location associated with positive

cases which also plays a crucial role in understanding the socio-demographic

characteristics of illicit drug use. Among the patients who tested positive, 181 (87.4%)

resided in high density areas, while only 26 (12.6%) were from low density areas. This

stark contrast as mentioned previously, highlights the concentration of drug use in highly
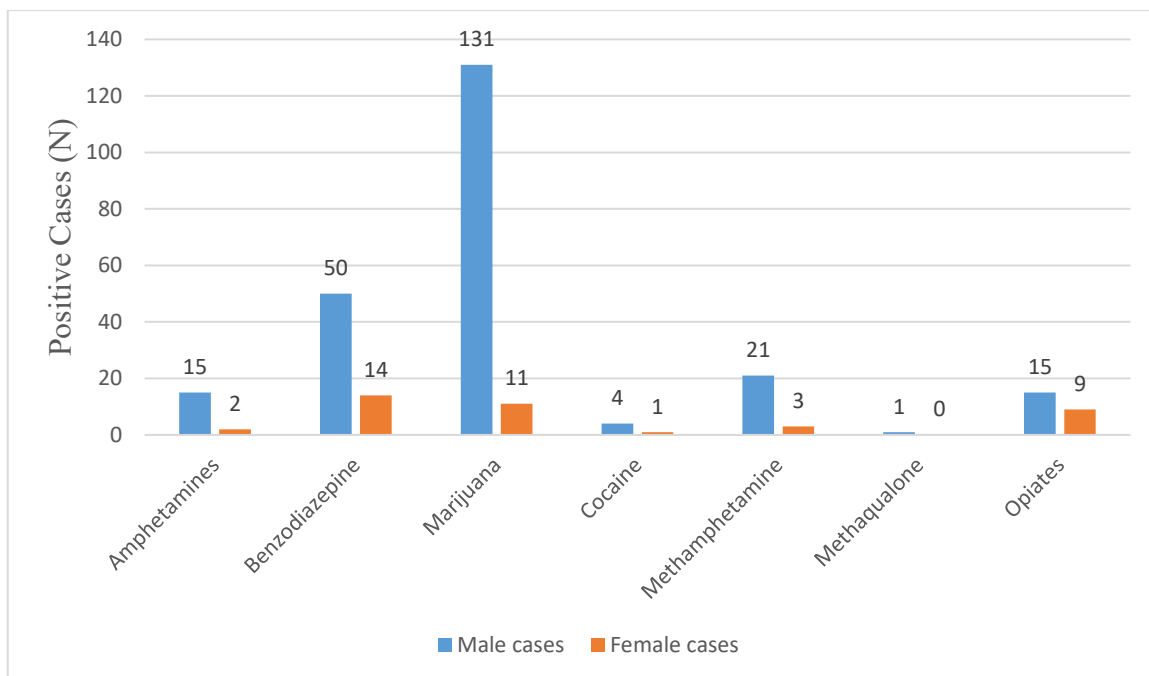
populated settings.

Figure 5: Abused drugs among study population

Fig 6 above shows the abused drugs among the study population. The most frequently detected illicit drug in the urine samples was **Marijuana**, which accounted for an overwhelming **67.6%** of all positive results. Out of the total 207 unique patients who tested positive, **142 patients** were found to have Marijuana in their system with 131 patients being males and only 11 females. This high prevalence of Marijuana use highlights not only its widespread acceptance but also raises concerns regarding its potential health implications and the likelihood of individuals progressing to more harmful substance use.

Following Marijuana, the second most commonly abused illicit drug was **Benzodiazepines**, detected in **30.0%** of the positive cases. Specifically, 50 patients who tested positive were males and 14 were females, indicating a significant trend of use, particularly among individuals seeking to manage anxiety or stress.

Other commonly abused drugs detected in the samples was **Opiates and methamphetamine**, both present in **23.2%** of the positive results with each having a total of **24 patients** tested positive, indicating a notable level of use. The prevalence of Opiate and Methamphetamine use raises alarms about the potential for addiction and overdose, particularly given the current global context of rising Methamphetamine severe physical and psychological consequences as well as Opiates-related fatalities.

Other drugs identified in the analysis included **Amphetamines** which was detected in 8.2% of the total positive results, followed by **Cocaine**, which appeared in **2.4%** of the samples and lastly **Methaqualone** which was only detected in 0.5% of the total positive results making it the least commonly abused illicit drug among the study participants.

4.4 Prevalence of illicit drug use among the study population

4.4.1 Overall prevalence of illicit drug use

Out of a total of 716 patients tested for illicit drugs, 207 individuals tested positive for at least one illicit substance. This indicates a prevalence rate of illicit drug use of 28.9%. significant public health concern, reflecting the extent of substance abuse in the population and highlighting the need for effective interventions.

$$Prevalence = \frac{Number\ of\ Positive\ Cases}{Total\ number\ of\ Patients\ tesed} \times 100$$

$$Prevalence = \frac{207}{716} \times 100$$

$$Prevalence = \textbf{28.9\%}$$

4.4.2 Prevalence of specific drugs detected among study participants

Figure 6 pie chart showing: Amphetamines 8.2, Benzodiazepine 30.9, Marijuana 68.6, Cocaine 2.4, Methamphetamine 11.6, Methaqualone 0.5, Opiates 11.6
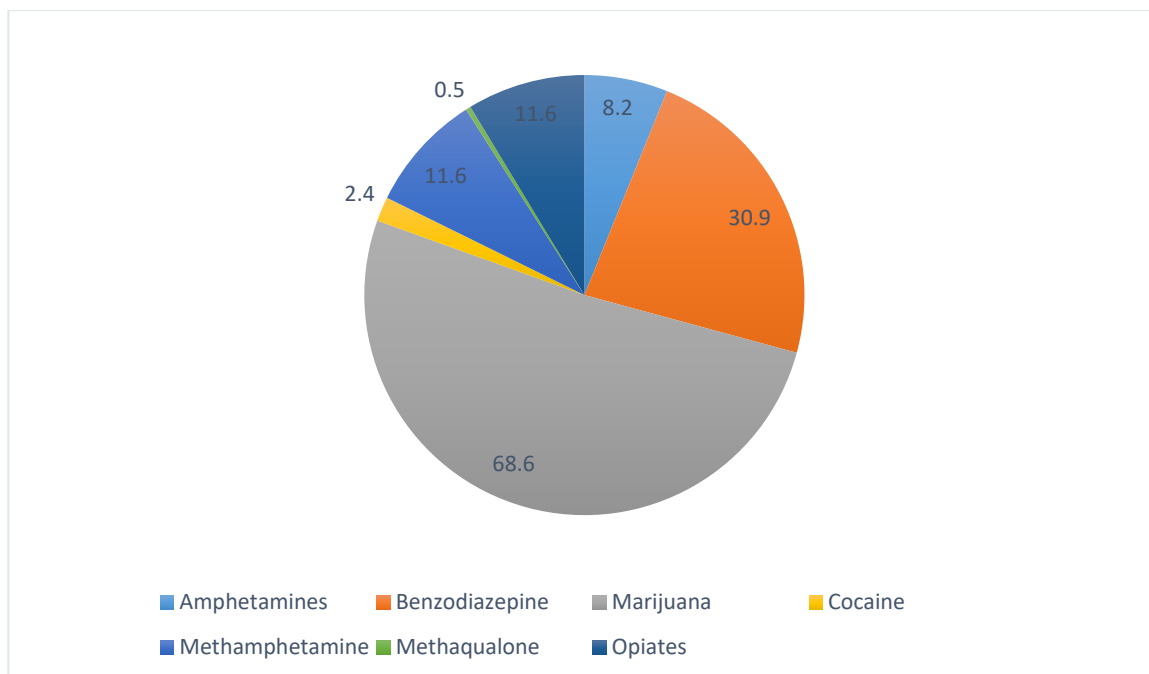
Figure 6: Prevalence of specific drugs detected among study participants

The data in fig 7 shows the Prevalence of specific drugs detected among study participants. These findings reveal that marijuana is the most prevalent illicit substance, accounting for approximately **68.6%** of positive tests, which underscores its widespread use in the community. Benzodiazepines also show a significant prevalence at **30.9%**, indicating a notable pattern of prescription drug misuse or recreational use. In contrast, cocaine has the lowest prevalence at **2.4**%, suggesting it is less commonly used among this population. The data on methamphetamines and opiates show moderate prevalence rates of **11.6%**, indicating these substances also pose a concern within the community. The singular case of methaqualone reflects its limited use, potentially due to reduced availability or awareness among users.

4.5 Summary

Chapter 4 presented a comprehensive analysis of the data obtained from urine samples processed at Lancet Clinical Laboratories in 2024, focusing on the prevalence and socio-demographic characteristics associated with illicit drug use. Out of 716 patients tested, 207 (28.9%) tested positive for at least one illicit substance, emphasizing a significant public health concern. The analysis revealed notable gender disparities, with males comprising 79.2% of the positive cases, and a concentration of drug use among younger adults, particularly those aged 21-35. The presence of poly-drug use among a subset of patients further complicates the landscape of substance abuse, highlighting the need for targeted interventions. Overall, the findings underscore the urgent requirement for public health initiatives tailored to address the specific needs of high-risk demographics, thereby fostering healthier communities and mitigating the adverse effects of illicit drug use in Harare. This chapter sets the groundwork for further exploration of effective strategies to combat drug abuse and its associated health implications.

CHAPTER 5: DISCUSSION, CONCLUSION, AND RECOMMENDATION

5.1 Introduction

This chapter presents a detailed discussion of the main findings from the study on the detection of illicit drugs in urine samples at Lancet Clinical Laboratories. It compares these findings with existing research to highlight similarities, differences, and emerging trends. The discussion is structured around the study objectives, focusing on significant results, potential gaps, and unexpected observations. Furthermore, we will explore the implications of these findings for public health, acknowledge the study's limitations, and offer conclusions and recommendations for future research and policy enhancements. Through this analysis, we aim to advance understanding and improve practices in drug detection and intervention strategies.

5.2 Discussion

5.2.1 Socio-demographic characteristics associated with illicit drug use among study participants

The findings revealed a predominance of male participants, with 567 (79.2%) identified as male and only 149 (20.8%) as female. This significant gender disparity aligns with existing literature, which consistently shows that men are more likely to engage in illicit drug use than women (NIDA, 2020). The male predominance observed in this study corresponds with findings from similar studies conducted in various contexts. For instance, a study in South Africa by Dada et al. (2020) reported that 82% of patients seeking treatment for substance use were male, while only 18% were female. The reasons behind this trend may be rooted in social norms and expectations that often encourage riskier behaviours among men, while societal pressures may inhibit similar behaviours in women (NIDA, 2020).

Age analysis indicated a mean age of 30 years among participants, suggesting that illicit drug use is prevalent among young to middle-aged adults. This finding resonates with research indicating that drug use peaks during late adolescence and early adulthood, a critical developmental period marked by exploration and risk-taking behaviours (McCabe, Veliz, & Dickinson, 2019). Similar age patterns were observed in a Ugandan study by Akello et al. (2020), where the mean age was 31.2 years, suggesting regional consistency in age-related substance use patterns.

Geographic distribution further illuminated the socio-demographic landscape of illicit drug use. A substantial majority of participants 620 (86.6%) resided in high-density areas, compared to just 96 (13.4%) from low-density areas. This stark contrast suggests that urban environments may facilitate higher rates of drug use due to a variety of factors, including greater accessibility to illicit substances and social networks that may normalize drug use behaviours. Densely populated areas often present unique challenges such as elevated stress levels, increased exposure to drug markets, and reduced community cohesion, all of which can contribute to higher rates of substance use (Ezell, Ompad, & Walters, 2021).

The demographic profile of participants raises important questions about the social and psychological factors influencing drug use, particularly among women, who are underrepresented in this study. The lower proportion of female participants (20.8%) may not indicate lower drug use but rather reflect barriers to seeking testing or treatment. This "treatment gap," documented by Meyers et al. (2021), highlights that women face unique obstacles, including stigma, childcare responsibilities, and fear of legal consequences,

especially in African contexts. Their study in Nigeria found that while drug use rates among women might be higher, only 23% sought professional help or testing.

5.2.2 Analysis of the study participants laboratory results of illicit drug screening

Under the analysis of the study participants laboratory results of illicit drug screening, the study revealed that out of 716 patients tested, 207 individuals (28.9%) tested positive for at least one illicit drug, while 509 (71.1%) tested negative. This overall prevalence of positive cases is significant and highlights the ongoing challenge of substance abuse within the community. This finding aligns with research conducted by Peltzer et al. (2017) in Southeast Asia, which reported a positivity rate of 31.2% among 1,200 participants, suggesting similar patterns of drug use across developing regions.

A closer examination of the data indicates a marked gender disparity in positive drug tests, with 179 males (86.5% of positive cases) testing positive compared to only 28 females (13.5%). This disparity underscores the gender-specific patterns of drug use and aligns with existing literature that consistently finds higher rates of substance use among males (NIDA, 2020). This trend may reflect societal norms that promote risk-taking behaviours among men.

The analysis of poly-drug use among participants further illuminates the complexities of drug abuse patterns. Among the positive cases, 134 male patients (approximately 64.8%) tested positive for a single substance, whereas only 20 female patients (approximately 9.7%) did the same. These findings suggest that single substance use is prevalent among males. The prevalence of poly-drug use noted in this study, with 76 patients (36.7%) testing positive for at least two substances, reflects broader trends observed in other research indicating a rise in multi-substance use, particularly in urban settings where drug

availability is higher for a wide variety of drugs. The combination of benzodiazepines with other drugs, particularly marijuana, suggests a pattern of use among individuals seeking relief from anxiety or stress, echoing findings from the literature that identify benzodiazepine misuse as a growing concern, particularly in conjunction with other substances (Calvo & Font-Mayolas, 2022).

Furthermore, age distribution among positive cases revealed that the majority of those testing positive were in the 21-35 age range (65.2%). This finding underscores the need for targeted preventive measures aimed at younger adults, a demographic often at higher risk for substance experimentation and abuse (Vasilenko, Evans-Polce, & Lanza, 2017). This finding is consistent with a Nigerian study by Adegbaju et al. (2024), which reported 61.8% of positive cases in the same age range. The lower prevalence among older age groups (5.4% combined for ages 46 and above) suggests that drug use primarily affects younger populations, a trend also noted by Vasilenko et al. (2017) in their pan-African substance use study. Additionally, the geographical analysis showed that 181 (87.4%) of those who tested positive resided in high-density areas, reinforcing the notion that urban environments with greater drug accessibility may facilitate higher rates of substance use (Ezell, Ompad, & Walters, 2021).

5.2.3 Prevalence of illicit drug use among the study population

Findings for prevalence of illicit drug use among the study population indicated that out of 716 patients tested for illicit drugs, 207 individuals (28.9%) tested positive for at least one illicit substance. This prevalence rate highlights a significant public health concern, as nearly one-third of the population sampled is engaging in illicit drug use. This rate is consistent with findings from similar studies in urban settings. For example, a study

conducted by the Substance Abuse and Mental Health Services Administration (SAMHSA) reported that approximately 28.5% of adults aged 18 or older had used illicit drugs in the past year (SAMHSA, 2020). These statistics underscore the pervasive nature of substance abuse in contemporary society, indicating a need for targeted interventions and preventive measures tailored to at-risk populations, particularly in urban centres where drug availability and social factors may contribute to higher usage rates. The implications of this finding extend beyond individual health, as community-level drug use can lead to increased healthcare costs, heightened crime rates, and broader societal issues that necessitate collaborative responses from public health officials and community organizations (ASEC, 2017).

In terms of specific substances detected, marijuana emerged as the most prevalent illicit drug, accounting for approximately 68.6% of positive tests among the study participants. This finding reflects broader trends observed in drug use patterns globally, where marijuana has become increasingly accepted and widely used. Marijuana is the most prevalent drug abused in Zimbabwe due to its cultural acceptance, economic factors, and easy accessibility since it can be easy grown locally. The drug's cultivation provides income amid economic challenges, while inadequate law enforcement allows widespread availability.

Benzodiazepines are sedative medications used to treat anxiety and insomnia. They can cause drowsiness, and dependence symptoms if misused. The significant prevalence of benzodiazepines, noted at 30.9%, indicates a concerning pattern of prescription drug misuse or recreational use, which has been documented in various studies exploring the intersections of mental health and substance use. For example, a study by Maust et al.

(2018) reported that 8.6% of adults in the United States had misused benzodiazepines in the past year, highlighting the growing concern about prescription drug misuse.

Conversely, cocaine exhibited the lowest prevalence at 2.4%, suggesting it is less commonly used in this population compared to other substances. This trend contrasts with findings from studies in other urban environments, where cocaine use has been more prominent. For instance, a national survey in the United States reported that around 5.5% of adults had used cocaine in the past year (National Institute on Drug Abuse, 2024). The limited availability of cocaine in Zimbabwe significantly contributes to its decreased prevalence. As cocaine is not produced locally, it relies on smuggling routes, which are risky and costly. The high price associated with these illicit operations further deters potential users, making cocaine a less accessible and less appealing option for many (Nhunzvi, Wilson, & Mhizha, 2023).

The moderate prevalence rates of methamphetamines (11.6%) and opiates further underscore the diverse range of illicit drug use within the community. For instance, a report by the Centres for Disease Control and Prevention (CDC) indicated that methamphetamine use has significantly increased, with about 0.6% of the U.S. adult population reporting use in the past year (CDC, 2024). The prevalence of opiate use, particularly in light of the ongoing opioid crisis, is alarming; the National Institute on Drug Abuse reported that approximately 10.1 million people misused prescription opioids in 2019 (National Institute on Drug Abuse, 2024). Overall, the findings on drug prevalence not only illuminate the current landscape of illicit drug use in this population but also emphasize the need for comprehensive strategies that address the complexities of substance use and its underlying socio-demographic influences.

5.3 Conclusion

This study on the detection of illicit drugs at Lancet Clinical Laboratories reveals a troubling prevalence of 28.9% among participants, highlighting substance abuse as a significant public health concern. The pronounced gender disparity, with a higher number of positive cases among males, necessitates gender-sensitive intervention strategies. The predominance of marijuana (68.6%) and benzodiazepines (30.9%) underscores both recreational and prescription drug misuse, indicating the need for targeted educational campaigns and stricter prescription practices. Additionally, the moderate prevalence of methamphetamines and opiates further emphasizes the complexity of illicit drug use patterns.

The concentration of drug use in high-density urban areas suggests that environmental factors play a critical role in substance abuse behaviours. Overall, these findings call for ongoing surveillance and collaborative efforts among healthcare providers, policymakers, and community organizations to develop effective prevention and treatment strategies tailored to at-risk populations, ultimately fostering healthier communities and reducing the impact of illicit drug use.

5.4 Limitation of the study

The study on the detection of illicit drugs in urine samples at Lancet Clinical Laboratories has several limitations. The sample size of 700 individuals, while substantial, may not fully represent the diverse drug-using population in Zimbabwe, especially given the predominance of male participants (79.2%). This gender bias could skew understanding of drug use patterns among women. Additionally, the cross-sectional design only captures

data at a single point in time, limiting the ability to infer causality or changes in drug use over time.

Self-reported data may also be affected by stigma, leading to underreporting among vulnerable populations. Furthermore, the testing methods employed may have varying sensitivities, potentially resulting in false positives or negatives. The study did not extensively explore socio-cultural factors influencing drug use behaviours, and its geographic concentration on urban populations may not reflect trends in rural areas. Addressing these limitations in future research is crucial for developing effective public health strategies.

5.5 Implication of findings to public health

The findings from this study indicate a pressing need for enhanced public health strategies in response to the 28.9% prevalence of illicit drug use among participants. Targeted educational campaigns are essential to raise awareness about the risks associated with marijuana and benzodiazepine misuse. The observed gender disparities highlight the necessity for gender-specific interventions tailored to the distinct needs of males and females.

Localized public health initiatives should focus on high-density urban areas, enhancing access to treatment facilities and harm reduction services. Furthermore, an integrated approach that combines mental health support with substance use treatment is crucial, given the overlap between prescription drug misuse and illicit drug use. Ongoing surveillance and research will be vital for monitoring trends and identifying emerging substances. By adopting a proactive and comprehensive approach, public health

stakeholders can address the complexities of illicit drug use, fostering healthier communities and mitigating the broader societal impact of substance abuse.

5.6 Recommendations

The findings from this study on the detection of illicit drugs at Lancet Clinical Laboratories reveal an urgent need for comprehensive strategies to combat the drug abuse crisis. First, enhanced public education and awareness campaigns are essential, focusing on the risks associated with marijuana and benzodiazepine misuse. Tailored outreach programs targeting youth and vulnerable populations can promote healthier lifestyle choices.

Strengthening treatment and support services is crucial. Developing integrated care models that combine mental health and substance use treatment will provide holistic care for individuals in need. Increasing access to treatment facilities, particularly in high-density urban areas, will ensure that resources are available for those struggling with addiction. Advocacy for supportive legislation that prioritizes treatment over incarceration is vital. Stricter regulations on the prescribing of high-risk medications can help minimize misuse.

Medical laboratories play a critical role in this response by establishing routine drug screening programs to identify at-risk individuals early and engaging in research to improve testing methods for emerging substances. Establishing more illicit drug test panels in laboratories beyond bigger laboratories in Harare especially in high density areas, to improve accessibility, enhance detection capabilities, and reduce stigma surrounding testing, ensuring better support for individuals seeking help with substance abuse.

Additionally, implementing community-based harm reduction strategies, such as peer support networks, will connect individuals to necessary resources. Ongoing research and evaluation are essential to monitor intervention effectiveness and adapt strategies accordingly. By adopting these recommendations, stakeholders can foster healthier communities and mitigate the impact of illicit drug use.

5.7 Suggestions for Further Research

To enhance understanding of substance abuse and inform public health strategies, several avenues for further research are recommended. Longitudinal studies should track changes in drug use patterns over time, allowing for the identification of emerging trends. Additionally, exploring socio-economic determinants of illicit drug use can reveal correlations with factors like income and education, enabling targeted interventions.

Investigating the impact of recent legislative changes on drug use patterns is crucial for assessing policy effectiveness. Comparative studies between urban and rural populations will highlight unique challenges and needs, guiding tailored approaches. Evaluating harm reduction strategies, such as supervised consumption sites, can provide insights into their effectiveness in reducing overdose rates. Furthermore, research on emerging synthetic drugs is essential to keep public health responses relevant. Lastly, integrating technology in drug detection methods can enhance screening efficiency. Together, these research initiatives will contribute to a deeper understanding of substance abuse and its implications for public health.

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APPENDICES

Appendix 1: Data extraction Form

Appendix 2: Study Budget

Item	Unit cost (US$)	Quantity	Total Costs (US$)
Transport	16	2	32
Food	2	16	32
Printing	5	1	5
Stationary	4	2	8
Internet	15	1	15
Total			**92**

Appendix 3: Gannt Chart

	Month	August 2024				September 2024				October 2024				November 2024				December 2024				January 2025			
	Week	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Activity																									
Finalisation of proposal		→	→	→	→	→	→	→	→																
Proposal submission to AUREC										→	→	→	→												
Data Collection														→	→	→									
Data processing and analysis																		→	→	→					
Project writing																						→	→		
Project submission to AU																								→	→

Appendix 4: Study site approval letter

Africa University
P.O.BOX 1320
Mutare

18 November 2024

Mr MAGAISA

LANCET CLINICAL LABORATORIES

22 Fife Ave, Corner Blakiston Street
Harare, Zimbabwe

Dear Laboratory Manager

RE: APPLICATION FOR PERMISSION TO CONDUCT A TOXICOLOGY RESEARCH AT LANCET CLINICAL LABORATORIES

I am writing to formally request permission to conduct a retrospective cross-sectional research study at Lancet Clinical Laboratories on the topic;

"DETECTION OF ILLICIT DRUGS IN URINE SAMPLES SCREENED AT LANCET CLINICAL LABORATORIES, 2024"

I am in my final year at Africa University, currently on attachment here at Lancet Clinical Laboratories. This research aims to enhance the understanding of illicit drug prevalence in our community and to identify any socio-demographic characteristics associated. Given Lancet's reputation for excellence in laboratory services and its commitment to advancing healthcare, I believe that your facility would provide an invaluable resource for this study.

The proposed research will involve the collection and analysis of urine samples, ensuring adherence to all ethical guidelines and regulations. I am committed to maintaining the highest standards of confidentiality and security throughout the research process. Furthermore, I will ensure that all necessary permits and ethical approvals from AUREC are obtained prior to commencing Data collection.

Thank you for considering this request. I look forward to your positive response.

Yours sincerely,

Tendai Murendo
[murendot@africau.edu/+263785750922]

Approved Magaisa
BROr MAGAISA
LAB MANAGER

LANCET
CLINICAL LABORATORIES
22 FIFE AVE / Cnr BLAKISTONE S
P.O. BOX BW260
BORROWDALE, HARARE

Appendix 5: AUREC approval letter

"Investing in Africa's future"

AFRICA UNIVERSITY RESEARCH ETHICS COMMITTEE (AUREC)

P.O. Box 1320 Mutare, Zimbabwe, Off Nyanga Road, Old Mutare-Tel (+263-20) 60075/60026/61611 Fax: (+263 20) 61785 Website: www.africau.edu

Ref: AU 3604/25   7 February, 2025

TENDAI MURENDO
C/O Africa University
Box 1320
MUTARE

RE: *DETECTION OF ILLICIT DRUGS IN URINE SAMPLES AT LANCET CLINICAL LABORATORIES, 2024*

Thank you for the above-titled proposal you submitted to the Africa University Research Ethics Committee for review. Please be advised that AUREC has reviewed and approved your application to conduct the above research.

The approval is based on the following.
a) Research proposal
- **APPROVAL NUMBER**   AUREC 3604/25
  This number should be used on all correspondences, consent forms, and appropriate document

- **AUREC MEETING DATE**   NA
- **APPROVAL DATE**   February 7, 2025
- **EXPIRATION DATE**   February 7, 2026
- **TYPE OF MEETING**: Expedited
  After the expiration date, this research may only continue upon renewal. A progress report on a standard AUREC form should be submitted a month before the expiration date for renewal purposes.
- **SERIOUS ADVERSE EVENTS** All serious problems concerning subject safety must be reported to AUREC within 3 working days on the standard AUREC form.
- **MODIFICATIONS** Prior AUREC approval is required before implementing any changes in the proposal (including changes in the consent documents)
- **TERMINATION OF STUDY** Upon termination of the study a report has to be submitted to AUREC.

Yours Faithfully

MARY CHINZOU
FOR CHAIRPERSON
AFRICA UNIVERSITY RESEARCH ETHICS COMMITTEE