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HIV INFECTION AMONG INJECTING DRUG USERS IN KINONDONI MUNICIPALITY, DAR ES SALAAM

By

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A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTERS OF PUBLIC HEALTH IN THE UNIVERSITY OF DAR ES SALAAM

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CERTIFICATION

The undersigned certifies that he has read and hereby recommends for acceptance by the University of Dar es Salaam a dissertation entitled: **HIV infection among injecting drug users in Kinondoni Municipality, Dar es Salaam** in partial fulfillment of the requirements for the degree of Master of Public Health.

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DECLARATION

I, Amani Msami, declare that this dissertation is my original work and that it has not been presented and will not be presented to any other University for similar or for any other degree award.

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DEDICATION

This dissertation is dedicated to my parents whose encouraging words inspired me to successfully produce this document.

TABLE OF CONTENTS

ITEM **PAGE**

Certification ii

Declaration and Copyright iii

Acknowledgement iv

Dedication vi

Table of contents vii

List of Tables xii

Abstract xiii

List of Abbreviations and Acronyms xv

Chapter 1: Introduction 1

1.1 Background 1

1.2 Statement of the problem 3

1.3 Research questions 5

1.4 Rationale 5

1.5 General objective 6

1.6 Specific objectives 6

Chapter 2: Literature review 7

2.1 Geographical prevalence of injecting drug use 7

2.2 Demographic characteristics of injecting drug users 8

2.3 Sociodemographic factors that facilitate transmission of HIV among IDUs 10

2.4 Social progression of injecting drug use 12

2.5 HIV risk behaviours among IDUs 13

2.6 Factors that facilitate HIV transmission among IDUs 18

2.7 Levels o f HIV infection among injecting drug users in developing countries 22

Chapter 3: Methodology 25

3.1 Study area 25

3.2 Study population 26

3.3 Study design 26

3.4 Sample size estimation 27

3.5 Recruitment of research assistants 27

3.6 Recruiting volunteers 28

3.7 Eligibility of the volunteers 28

3.8 Procedure and results of pilot testing 29

3.9 Data collection 29

3.10 Research instrument for data collection 30

3.11 HIV testing 30

3.11.1 Sample collection 30

3.11.2 Laboratory testing 31

3.11.3 Dissemination of results 31

3.12 Data management and analysis 32

3.13 Ethical issues 32

3.14 Study constraints, biases and limitations 33

3.15 Definition of terms 34

Chapter 4: Results 36

4.1 Study population social characteristics 36

4.2 Drug use 42

4.2.1 Drugs injected 42

4.2.2 Drug most commonly injected 42

4.2.3 Age of injection initiation 42

4.2.4 Time from first drug use to first injection 42

4.2.5 Frequency of injection 44

4.2.6 Injection duration 44

4.2.7 First substance of abuse used 44

4.2.8 Trends of drug use modes 45

4.2.9 Reasons for shifting from one drug to another 46

4.2.10 Reasons for starting injecting 46

4.3 Injecting behaviours 48

4.3.1 Injecting with used needles/syringes 48

4.3.2 Injecting with other used injecting equipment 48

4.3.3 Administration of injection 49

4.3.4 Preparation of drug with contaminated water 49

4.3.5 Injecting places 49

4.3.6 Sources of needles/syringes 50

4.3.7 Disposal of needles/syringes 50

4.3.8 Cleaning of used needles/syringes 51

4.3.9 Number of people shared needles/syringes with IDUs 51

4.4 HIV seropositivity among study population 53

4.4.1 HIV seropositivity among study population by sex 53

4.4.2 Sociodemographic characteristics and HIV seropositivity . 53

4.4.3 Drug injecting practices and HIV seropositivity 57

Chapter 5: Discussion 62

5.1 Demographic characteristics of study group 62

5.2 Drug use 64

5.3 Injecting behaviour 66

5.4 HIV seroprevalence 68

5.5 A comparison of HIV prevalence with selected demographic characteristics and drug injecting practices 70

5.6 Limitation of the study 71

Chapter 6: Conclusions and Recommendations 72

6.1 Conclusions 72

6.2 Recommendations 73

References 75

Appendices 81

Appendix A: English version Questionnaire 81

Appendix B: Swahili version Questionnaire 90

Appendix C: English version informed consent form for interview..... 99

Appendix D: Swahili version informed consent form for interview..... 105

Appendix E: English version informed consent form for HIV testing ... 111

Appendix F: Swahili version informed consent form for HIV testing... 117

LIST OF TABLES

Table 1: Distribution of the respondents by age and sex 36

Table 2: Distribution of the respondents by marital status, education levels, occupation and sex 38

Table 3: Distribution of the respondents by income, living arrangements and sex..... 40

Table 4: Distribution of injecting drug use characteristics among the respondents by sex 43

Table 5: Distribution of first substance of abuse used by the respondents by sex 45

Table 6: Distribution of sequence of drug use modes reported by the respondents by sex 46

Table 7: Distribution of reasons viewed by the respondents for shifting from one drug to another and for injection initiation by sex..... 47

Table 8: Distribution of injecting behaviours of the respondents by sex.... 48

Table 9: Distribution of injecting behaviours among the respondents who share needles/syringes..... 52

Table 10: Distribution of HIV status of the respondents by sex 53

Table 11: Distribution of selected sociodemographic characteristics and HIV seroprevalence among the respondents by sex..... 54

Table 12: Distribution of drug injecting practices and HIV seroprevalence among the respondents by sex..... 59

ABSTRACT

The emergency of injecting drug use and the possibility of transmission of human immunodeficiency virus (HIV) among injecting drug users (IDUs), their partners and their children, is a major public health concern. Recent researches have shown that one of the core risk behaviours that is behind the spread of HIV through injecting drug use is the sharing of injecting equipment, which is greatly influenced by drug injecting practices.

Most of the studies conducted suggest an extensive occurrence of risk injecting practices and a high potential of escalation of HIV epidemics among injecting drug users. However, available information does not provide exact explanation on HIV risk characteristics of IDUs, levels of risk drug injecting practices and the extent of HIV infection among IDUs. This information is essential in designing appropriate HIV interventions and prevention strategies among IDUs.

This study was therefore conducted to investigate drug injecting practices and HIV seropositivity among selected injecting drug users in Kinondoni Municipality, Dar es Salaam. This cross-sectional study was carried out in May, 2004 and involved 201 consenting IDUs who were recruited by snowballing method. Structured interviews covering demographic characteristics, social development of injecting drug use, current HIV risk drug use behaviour in the last 6 months were administered. Serum samples were collected for HIV antibody testing.

Respondents ranged from 18 to 48 years of age (mean =29.4) and 84.1% of them were males. The first common substance of abuse reported was cigarette (56.2%). Mean age of injection initiation was 25.5 years. Heroin was the most common used drug by all respondents. Multiple unsafe injecting practices were common. Over 73% of the respondents injected 3 times a day. The reported needles/syringes sharing was high, 40.3% of IDUs reported using a syringe previously used by another IDUs. A great proportion (45.7%) of the respondents shared injecting equipment with 2 to 5 people. Of those who shared 95.1% cleaned the needles/syringes before use, however, the procedure they used was not sufficient to kill any virus present. The overall HIV prevalence among the respondents was 31.3%. Females had a higher HIV seroprevalence of 75% than males who had a seroprevalence of 23.1%.

The high HIV prevalence and the existence of high-risk drug injecting practices indicate a potential for rapid HIV spread in IDUs in Kinondoni Municipality. Preventive measures that will target specifically IDUs to reduce the high risk injecting practices are urgently needed to reduce HIV transmission among IDUs and from IDUs to the general population. One would recommend that harm reduction approach be adopted that will involve needle exchange programmes.

LIST OF ABBREVIATIONS AND ACRONYMS

AIDS:	Acquired Immunodeficiency Syndrome
CSWs:	Commercial sex workers
DIT:	Dar es Salaam Institute of Technology
HIV:	Human Immunodeficiency Virus
IDU:	Injecting drug Use
IDUs:	Injecting drug users
NGO:	Non-Governmental Organisation
SDA:	Seventh Day Adventist
UKIMWI:	Upungufu wa Kinga Mwilini
UNAIDS:	The United States Agency for International Development
UNDCP:	United Nation Drug Control Programme
UNODC:	United Nation Office for Drugs and Crimes
USA:	United States of America
VVU:	Virusi vya UKIMWI
WAMATA:	Walio katika Mapambano ya Ukimwi Tanzania
WHO:	World Health Organisation

CHAPTER 1: INTRODUCTION

1.1 Background

Drug use plays a critical role in the spread of HIV in developing countries. The spread is associated with all forms of drug use including smoking, inhalation, nasal ingestion and drug injecting. However, the injecting drug use poses the most common, direct and immediate mode of drug related HIV transmission.

The injecting drug use has spread worldwide and has led to massive outbreaks of HIV infection among injecting drug users (IDUs), their sexual partners and their children. About 114 countries including Tanzania are now experiencing HIV transmission among injecting drug users more than double the number in 1992 (Ball et al., 1999). The global HIV prevalence among injecting drug users varies between 5% and 80% with annual incidence range between 1% and 50% (Hagan et al., 2000).

Moreover, HIV epidemics among IDUs are often characterized by rapid and even explosive spread. Once HIV prevalence reaches a threshold of 10% it can surpass a 40-50% within one to four years (Stimson et al., 1996). Reports indicate that in many countries HIV prevalence has increased from 5% to more than 40% in less than one year (Brown et al., 1994; Des Jarlais et al., 1992; Stimson et al., 1996). The most rapid increases in HIV among IDUs have been in developing countries and in countries in transition from communism to capitalism (Riehman, 1996). In Ukraine, for example, until 1995 approximately 50 HIV infections were reported annually, after which there

was a rapid increase among IDUs in several cities. By the end of 1996, the number of HIV infections reported had increased to 12,228, at least half of them among IDUs (Ball et al., 1998). The rapid spread of HIV in injecting drug-using populations has also occurred in many other countries including Thailand, India and China (Rhodes et al., 1999).

In addition to being behind the explosive HIV epidemics, drug injecting is proving to be a major factor in initiating and sustaining widespread of HIV epidemics (Crofts et al., 1998, Reid, 1998). In Asia, for example, injecting drug use is the major mode of HIV transmission, representing 80% of HIV cases in Kazakhstan, 75% in Malaysia, 75% in Vietnam, and 50% in China. Injecting drug use is also a major mode of HIV transmission in South, East and Central Asia, Northern Africa and increasingly Latin America and West Africa (Rhodes et al., 1999).

Injecting drug use primarily spread HIV through direct transmission by sharing of injecting equipment and indirectly by sexual contact with the HIV-positive injecting drug user. The transmission by sharing of injecting equipment is particularly the most direct means of spreading HIV and is greatly influenced by various factors that are individual, community, and structural related.

These factors include drug use characteristics which involve the type of drug taken, frequency of injection, injection duration and drug use behaviours that encompass re-use

and sharing of injecting equipment, number of people sharing, cleaning of used needles/syringes and the preparation of the drug using water.

Appearance of injecting drug use among drug users in Tanzania has been reported in a study carried out in 2000 in all zones of Tanzania (Kilonzo et al., 2002). This was especially reported in Zanzibar and Dar es Salaam, raising concern of fuelling the HIV and hepatitis epidemics.

The study raised concern over the potential risk of transmission of HIV among injecting drug users that might lead to explosive HIV epidemics in the country. Understanding of drug injecting practices that lead to the spread of HIV and the extent of HIV among injecting drug users is therefore essential in developing appropriate HIV intervention and prevention strategies.

1.2 Statement of the problem

The relationship between injecting drug use and HIV infection has emerged as a major public health concern in the country as indicated in the recently conducted rapid situational assessment of drug use covering all zones of Tanzania (Kilonzo et al., 2002).

Injecting drug use plays a potential role in the spread of HIV. Main risk behaviours that are behind the spread of HIV through injecting drug use include sharing of injecting equipment and unprotected sexual behaviour. However, HIV infection occurs mainly

through sharing of injecting equipment. The equipment that are shared include needles/ syringes and other paraphernalia, such as spoons or containers for dissolving the drug, cotton wool for filtering drugs solutions, and water which is used to rinse needles/syringes and dissolve drugs. The sharing behaviours are broadly influenced by various factors that are grouped into individual, community, and structural levels.

In Tanzania as in other developing countries, injecting is a relatively new way of transmitting HIV. It is also a behaviour about which relatively little published information is available. Most of the studies conducted suggest an extensive occurrence of injecting practices and a high potential of escalation of HIV and AIDS epidemics among drug users. For example, a recent study conducted in Dar es Salaam showed that the practice of sharing syringes has resulted in a high proportion of used syringes containing HIV-positive blood residue (Kilonzo et al., 2004). However, available information does not provide exact explanation on the levels of risk and the extent of HIV infection among IDUs.

Despite IDUs being a target sample in both the National Multilateral AIDS Control Strategy and the National Drug Control Master Plan, very little published information is known about seroprevalence in this group. There was a need to obtain comprehensive information about the relationship between the two phenomena.

This study was conducted to provide valuable information on the prevalence of HIV risk injecting practices and HIV infection among IDUs. The information obtained would be useful in developing appropriate policies, designing interventions and prevention strategies for HIV control among IDUs.

1.3 Research questions

This study seeks to respond to the following questions:

- What are the social demographic characteristics of IDUs?
- What are the levels of HIV risk drug-injecting practices among injecting drug users?
- To what extent has HIV spread among IDUs?

1.4 Rationale

The findings of this study would provide valuable information on:

- Injecting drug users' practices specifically regarding those contributing to the spread of HIV, which will enable the concerned authorities to tackle the problem.
- Designing appropriate HIV intervention and prevention strategies among IDUs.
- Developing appropriate policies on control of drug abuse and HIV/AIDS in the country.
- Areas for further research.

1.5 General objective

The broad objective of this study was to investigate drug injecting practices and HIV seropositivity among selected injecting drug users (IDUs) population in Kinondoni Municipality, Dar es Salaam.

1.6 Specific objectives

Specifically the study intended: -

- To identify sociodemographic characteristics of injecting drug users.
- To determine the level of risk drug use characteristics including type of drug, frequency of drug injecting and injection duration among injecting drug users.
- To determine the level of risk injecting behaviours including sharing of injecting equipment among injecting drug users.
- To determine the proportion of injecting drug use population infected with HIV.

CHAPTER 2: LITERATURE REVIEW

2.1 Geographical prevalence of injecting drug use

Injecting drug use (IDU) is occurring in an increasing number of countries. In 1992 it was estimated there were as many as 5.5 million injecting drug users (IDUs) living in at least 80 countries. By the end of May 1998 the number of countries and territories reporting injecting drug use had increased to at least 129 (Ball et al., 1998). Similar study done by Crofts in 1999 has revealed that IDU is increasing around the world and in 1999 it was estimated to involve 20 million people in 134 countries.

By the end of 1996, over 50 developing countries had reported the existence of IDU. High prevalence of injecting drug use exist in countries in both Asia and South America, and is beginning to be seen in some countries in Africa including Tanzania, Kenya Uganda, Zambia, Mauritius, South Africa and Nigeria (Stimson et al., 1996, UNODC, 2004).

In Tanzania, a study done in Dar es Salaam but confined to those high-density areas where the crime rate is high, commercial sex is common and HIV a major problem indicates that 18.3% of all 924 drug users interviewed reported to be injecting drug users (Muhondwa et al., 2002).

Heroin is the main drug injected among drug users in Asian countries while in South America drug users primarily injects cocaine (Riehman, 1996). A recent study done in all the four zones of Tanzania revealed the appearance of heroin injecting among IDUs (Kilonzo et al., 2002).

2.2 Demographic characteristics of injecting drug users

Studies indicate that worldwide the majority of IDUs are men (usually upward of 75%), and are relatively young, typically in their twenties to late thirties. Many IDUs are married to non-injecting partners, and their education levels vary depending on the country. Socioeconomic status of IDUs varies across countries. In some areas, such as Bangkok, IDUs seems better off (e.g. have higher level of education and higher rate of employment). While in others including Yunnan Province, China IDUs have very low levels of education (Riehman, 1996). However, in many developing countries, IDUs are mainly economically deprived, although they tend to be employed as unskilled workers (Des Jarleus et al., 1992).

A study done in London in 1991 that involved 534 IDU showed that their characteristics match the findings of other studies whereby mean age at interview was 28.4 years, age of first injection was 19.3 years, mean length of drug use by injection was 9.1 years (Crosier, 1991). Another study done by Dorman in Ireland showed that the mean age of the 185 subjects recruited was 24 years and mean age of first injecting was 18 years of

age. The majority, 170 (91.9 %) were unemployed, 109 (58.9%) relied mainly on illegal income to support their habit and 124 (67.0%) had a history of imprisonment (Dorman et al., 2000).

Another study done in 1996 indicated that samples of IDUs in Manipur, India are also fairly well educated and tend to be employed, with 78% in Manipur able to read up to high school or college levels and 53 % employed (Riehman, 1996).

Numerous studies have showed that there are socio-economic and demographic factors among drug users that are associated with injecting drug use. Such factors include high-risk behaviours such as income generation via illegal modes, non-sharing of income with family (which suggest IDUs are isolated from the social network) and presence of suicidal thoughts (Agha et al., 2003).

Injecting drug use affects more social groups. Groups most likely to start injecting drugs if and when they become available include truck drivers, commercial sex workers (CSWs), unemployed young people and people in the military (PANOS, 1998).

Injecting drug users are not homogenous group: people inject drugs in most countries, among various racial and ethnic groups, and in both rural and urban areas. Common to many IDUs in developing countries is a set of socio-economic conditions, which include

homelessness, inadequate consideration of the needs of young people, unemployment and poverty, poor health and human rights abuses, widespread stigma and discrimination, marginalization from the broader community. In urban setting drug users are often uneducated, homeless or living in slum conditions (Deany, 2000).

2.3 Sociodemographic factors that facilitate transmission of HIV among IDUs

A socioeconomic status can be considered to be a risk factor in that it is related to HIV seropositivity in some areas. A study in Buenos Aires, Argentina revealed that 66.2% of IDUs of low socioeconomic status were infected, compared to only 36.6 % of drug injectors of higher socioeconomic status. Des Jarlais et al (1992) noted that social intergration, as reflected in socioeconomic status, influences HIV risk behaviour among IDUs. In one study in the United States, IDUs with extremely low incomes were more likely to be infected with HIV. In addition, of the 5000 street addicts interviewed through the WHO Multi- City Study, IDU who lived in shelters or boarding houses were more likely to be infected with HIV. Being a member of an ethnic minority has also associated with higher seroprevalence among IDUs in the United States and Amsterdam (Reihman, 1996).

Injecting drug use among street-based sex workers has been shown to be a high risk factor for HIV infection. A study done by Nguyen et al in 2004 among street based sex workers in the city of Ho Chi Minhi indicated that injecting drugs and being younger

than 25 years of age were independently associated with HIV seropositivity (Nguyen et al., 2004).

Jobless and low knowledge on AIDS have been shown to be associated with HIV infection among IDUs in Vietnam (Le Ngoc et al., 2001).

Researchers in Thailand have showed that ethnicity, age between 20 and 39 years, being unmarried, having more education, and being unemployed to be associated with prevalent HIV. However, several of these risks were confounded with age (Razak et al., 2003).

HIV prevalence in a particular population is also considered to be associated with risk of HIV infection. The Ministry of Health of Tanzania estimates the national HIV prevalence at 12%, with significant regional variation (as high as 15-20% in Kagera, Iringa, and Mbeya) (National AIDS Control Progaramme, 2002). The HIV seroprevalence in urban areas of Tanzania among the most vulnerable population is said to be 24.4% and 15.8% in less vulnerable population (UNAIDS, US. Census Bureau).

2.4 Social progression of injecting drug use

Transition from non-injecting mode of drug use (snorting or inhaling or sniffing) to injecting depends on contextual factors, including economic, political, and normative influences as well as individual behavioural factors and individual relationships. Understanding changes in route of drug administration is important for considering HIV prevention programmes. Interventions may need to be tailored to specific type of drug users in different stages of their drug careers (Riehman, 1996).

Increases in the number of drug users in Asia and Central and Eastern Europe have been closely linked to situations of massive unemployment, high demand for drug together with expansion of informal economies including drug trafficking (Deany, 2000).

Injecting drug use increases with social and economic dislocation, rising unemployment, psychological stress and inadequate health care. These are exacerbated by the social, economic and political changes in Asia and Central Eastern Europe. Shifts in trade, communication and migration, for example, facilitate the transfer of knowledge about techniques of drug consumption, encouraging new routes of drug administration such as injecting (Deany, 2000).

Several other factors contribute to the trend towards injecting drugs. These include the presence of other forms of drug taking, the influence of migrating drug users, the custom of injecting for self-medication, involvement in the cultivation and manufacture of drugs, proximity to drug trafficking routes and the availability of drugs which are easy to inject (UNDCP, 1998). Economic factors also influence drug use patterns. People inject drugs because they are cheaper and faster acting. When illicit drugs become more scarce as a results of drug control efforts, it becomes uneconomical for the drug user to smoke or inhale the drug as much of it is lost in smoke. Injectable forms of drug are also more easily concealed.

2.5 HIV risk behaviours among IDUs

Injecting related and sexual behaviours fuels the spread of HIV among IDUs. Injecting related behaviour cause direct transmission through sharing of injecting equipment (needles and syringes) while indirect transmission occurs through sexual contact with HIV positive injecting drug user. The equipment includes needles, syringes, and other paraphernalia, such as "cookers" (spoons or containers for dissolving the drug), "cotton" (filters), and washing water used to rinse needles and syringes and dissolve drugs (Riehman, 1996).

The sharing (borrowing and lending) of needles and syringes is a well established as the most common means of acquiring HIV infection among IDUs. The level of risk through

this way is thought to be higher than from unprotected sexual intercourse because the HIV is injected directly into the blood or body tissue.

In South and East Asia, IDU contributes disproportionately to the national epidemics in the region. In China, 2001 data indicates that 70% of all HIV cases were due to IDU. In Viet Nam, infections among IDUs accounted for 65% of the total reported HIV cases in 2000.

In Northern Africa, recent reports indicate that IDUs constituted 91.7% of the registered 4,439 HIV and AIDS cases in Libya in 2001, 34% in Tunisia (1999) and 18.4% in Algeria (2000) (UNODC, 2004).

The sharing of needles and syringes, which have traces of HIV-infected blood, can transmit HIV. HIV can even survive for more than 1 week in a closed syringe or needle, which has not been cleaned (James, 1993).

A study done in England in 2000 revealed that 52% of IDUs reported sharing injecting equipment while 78% reported sharing both injecting equipment and other injecting paraphernalia in the previous four weeks. The study further showed that IDUs discriminately share injecting equipment with a median of two others in the previous four weeks. Overall levels of sharing of injecting equipment showed by the study were

reasonably consistent across the various sub groups (geography, gender, age, injecting career, main drug of use) investigated (Taylor et al., 2004).

There is a growing evidence of differences between women and men who inject drugs in terms of level of HIV risk practices. One study conducted among IDUs in the city of Sydney in 1994 found that female were more likely to report sharing needles, injected heroin more times, more likely to have shared with someone they later found out was HIV positive and more likely to engage in prostitution than males (Dwyer et al., 1994).

Research has found that IDU in developing countries do share injecting equipment to large extent. In Bangkok, 55% of IDUs reported sharing equipment on monthly basis. Thirty percent of IDUs in Rio de Janeiro reported this behaviour, and about 53% in Santos shared equipment on at least a monthly basis. Researchers in India have also found evidence of extensive needle sharing among IDUs. Samples of injecting drug users from Manipur and Nagaland report regular sharing of equipment in 89-96% of cases. Equipment sharing is also prevalent in Yunnan province, China, with 100% of sample of 282 IDUs reporting sharing (Riehman, 1996).

There is evidence that IDUs do clean their equipment, however, many use inappropriate techniques. The WHO Multi-City report found that of those who shared equipment, in all three cities (Rio, Santos and Bangkok) over 60% (of the 95% who reported cleaning)

used rinsing in cold water most frequently, which is not an effective means of killing HIV. However, researchers in Manipur, India found that 62% of IDUs never cleaned their equipment, and the majority of those who clean primarily used tap water, which is an ineffective method. Bleach, which does disinfect injecting equipment, was not available as a household item in India, and so is not routinely used promoted as cleaning method.

In a study carried out in Ho Chi Minh City, Vietnam, the reported levels of needle sharing was low and decreases significantly from 20% in 1995 to 12% in 1998 for sample of IDUs on the streets, following successful implementation of intervention programmes (Hien NT, 2001).

In a study conducted in Dar es Salaam in 2000 among 144 injecting drug users, 53.5% said they shared injecting needles while 63.2% and 26.3% said they injected alone and in the company of others, respectively. However, the study could not explore further on other aspects of sharing such as number of people shared with, sources of injecting equipment which are known to be associated with HIV infection (Muhondwa, 2002).

Report on a rapid situational assessment for drug demand reduction in Tanzania revealed existence of needle sharing among IDUs found in Dar es Salaam, Mwanza, Arusha and Zanzibar (Kilonzo et al., 2002). The study revealed that sharing of needles/syringes was

commonly reported as a risk factor for contracting HIV. Moreover, the habit of neither changing the needles nor cleaning them for fearing of loosing the few remaining drops of the drugs in washing was found to be a potential risk factor to HIV infection. Drug paraphernalia were also not cleaned before administration of the drug and when cleaned proper procedures were not adhered to thus the possibility of contamination was high. In addition, the needles and syringes that could be contaminated were often picked from hospital damps or from the street.

The study further pointed out that injecting drug use was as a source of concern in the face of high HIV and hepatitis C infection levels. Specifically, given the high sero-prevalence of HIV/AIDS particularly amongst adolescents and young people, an emerging injecting drug use epidemics as well as the sexual behaviour among drug users suggest a high potential of escalation of HIV/AIDS epidemic.

However, the levels of sharing could not be established. The risk of sharing needles was reported to be a function of availability of financial resources. The report further pointed another reason to be the difficulty of the addict in assessing inherent risk to HIV infection. Despite the fact that the study shows the existence of potential risk injecting practices among the IDUs, the level of sharing or safe injecting could not be established.

2.6 Factors that facilitate HIV transmission among IDUs

One factor associated with rapid transmission of HIV among IDUs is the presence of a mechanism for "efficient mixing" where IDUs have access to other injecting equipment (Des Jarlais et al., 1992). In parts of South-east Asia, sharing occurs in drug injecting shops, where IDUs pay a "professional injector" to inject them with the shop equipment that is shared among many IDUs who attend each day. Other common injecting sites at which equipment is often shared include semi-public venues such as private dwellings, parks and other open spaces, graveyards and under bridges (Stimson et al., 1996). Prisons are also locations for efficient mixing in some areas, including Bankok (Des Jarlais et al., 1992). The venues for efficient mixing are similar to what are termed "shooting galleries" in the United States, which are typically located in basement apartments, abandoned buildings or in run down apartment or hotel rooms where IDUs rent, share and borrow needles. Researchers have found significant association between exposure to HIV and use of shooting galleries. Further researches have shown that in shooting gallery users were more likely to rent, share and borrow needles and less likely to always use bleach and water to clean needles (Reihman, 1996).

Possessing, using and selling injectable drugs is against the law in most places; many countries outlaw the purchase, sale and possession of needles and syringes without a prescription. These policies simply increase the price of drugs and make it more difficult for drug users to obtain and use safe, clean injecting equipment. Drug users are therefore

often very vulnerable to HIV from sharing needles and syringes as well as from unprotected sex (James, 1993).

The risk of HIV transmission among IDUs who share equipment is lower when equipment is cleaned or disinfected properly. One study in Yunnan province found that some IDUs sterilized their equipment through boiling it, and this was negatively associated with HIV infection (Reihman, 1996). However, very little is published concerning the safety of needles used by IDUs in Tanzania.

Researchers in Vietnam have shown that HIV infection among IDUs in Ho Chi Minh City is associated with injecting by drug dealer, injecting on the street and sharing the drug pots (Hien, 2001).

Wood E. et al have showed requiring help injecting as a risk factor for HIV infection among IDUs in Vancouver in 2003. They found the variables that were independently associated with requiring help injecting were borrowing a used syringe, frequent cocaine injection and female gender. The most common reasons for requiring help injecting were having no viable veins, jugular injection or "jugging" anxiousness or being drug sick and not knowing how to inject (Wood et al., 2003).

The utilization of a pre-used needles/syringes in the preparation of drug solute for more than one injector is another, and perhaps more common way in which needles/syringes can be shared indirectly. Taylor et al (2004) showed that injecting drug users were injecting together in a group of two or more. They found out that it was common to prepare drug in one batch for all participants; that being the most efficient way to divide drug s bought with pooled resources. The researchers found that pre-used needles/syringes were used to draw up preparation water; inserted into shared filters; used to measure drug solution; and then squirted solution back onto a spoon for injection by another IDU. Although the use of needles/syringes does not come into direct contact with another IDU in such circumstances, it potentially could contaminate any or all of the other injecting paraphernalia or drug solution (Taylor et al., 2004).

Type of drug injected contributes to HIV risk. Many studies in the United States do show stronger association between the frequency of cocaine injection and HIV infection compared to heroin injection Several studies have found a higher HIV seroprevalence rate among cocaine injectors than heroin injectors, even when controlling for other behaviour factors. This is explained by the physiological effects of a drug that influence the pattern of use, where those who inject cocaine tend to do so more often with increased likelihood of sharing with other, compared to heroin injectors. In addition, poly drug use, not being in current treatment, and level of heroin use has been seen to be associated with HIV infection among IDUs in Sydney (Reihman, 1996).

Most studies of risk factors for HIV among injecting drug users found that length of injecting is positively related to seropositivity, meaning that new IDUs are at less risk of HIV transmission than experienced IDUs. The explanations for this are that either new drug users share injection equipment less often, or they share equipment primarily with the new users, who are less likely to be infected with HIV. However, some studies in developed countries have found that new IDUs practice risky injecting behavior, including sharing needles and syringes, more often than IDUs who have been injecting long time (Reihman, 1996).

The term new injector has different meanings, depending on the length of time the practice of injecting has been prevalent in a certain country. For instance, the practice of injecting has been prevalent in some developed countries since the 1960s, with some IDU reporting injecting careers of up to 20 years (Des Jarleus et al., 1992). In these countries, drug users who have been injecting only 5 years would be considered "new". However, in countries such as Myanmar, the practice of injecting has only been increasing since the late 1980s. In countries such as this, all injectors can be considered as "new" injectors.

Another study done in Rio de Janeiro found that IDUs who have been injecting drugs for more than 5 years were significantly more likely to be HIV positive. Reserchers in Argentina also fund that length of time of drug use was significantly associated with



HIV serostatus. Duration of drug injecting for more than 5 years was also related to HIV seropositivity among a group of IDUs studied in Malaysia (Reihman, 1996).

Frequency of injecting also has been seen to be associated with HIV risk. One study of IDUs in Peurto Rico found that injecting four times a day was associated with HIV seropositivity. Another study done in Rio de Janeiro found that IDUs who inject four or more times a week were significantly more likely to be HIV positive (Reihman, 1996).

2.7 Levels of HIV infection among injecting drug users in developing countries

The increase in drug injecting associated with HIV has been reported. In 1992 only 80 countries reported injecting drug use with 52 reporting HIV infection among IDUs. In 1999, 134 countries reported injecting drug use with 114 countries reporting concurrent HIV transmission among IDUs (CDC 2003, Ball et al., 1999).

Countries differ in the timing of the introduction of HIV into the drug using population and levels of HIV infection in this population. In some countries where injecting drug use is found, such as Hong Kong, Nepal and Singapore, HIV seroprevalence is virtually nonexistent, while in other areas, such as Brazil, Thailand, Manipur and Yunnan Province in China, levels of HIV infection in IDUs are reported to be stabilized at 50% or higher in some cases (Des Jarlius et al., 1992).

A study conducted in Vietnam in 2003 involving 309 participants, indicated HIV prevalence among new initiates (IDUs who have been injecting for less than two years) was 25.6% compared to 48.9% among established injectors, pointing that the new initiates were marginally less likely to share syringes and needles (Go et al., 2004). In Viet Nam in 2000, HIV prevalence among IDUs was around 65% (UNODC, 2004).

Injecting drug users in several towns in Asia have prevalence rates above 60%. The highest rates have been found in Ruili in Yunnan Province at 82% in 1991, the state of Manipur India at 73% in 1992 and several towns in Myanmar, including Yangon (74%), Mandalay (84%) and Mythyina (91%) (Riehman, 1996).

In Sub-Saharan Africa, a study conducted in Lagos in 2000 revealed that more than 20% of approximately 400 street users of heroin and cocaine were injecting. The HIV prevalence of 11% among the IDUs in Lagos was higher than the national average of 5.4% in the same year (UNODC, 2004).

An ongoing World Health Organization study in Nairobi City that involved 156 IDUs revealed that, the HIV seroprevalence in this group was 36.3% (53/146). The prevalence rates were higher for female IDUs with the HIV seropositivity of 80% (12/15) (Odek-Ogunde et al., 2004).

In Tanzania, a study done in Dar es Salaam but confined to those high-density areas where the crime rate is high, commercial sex is common and HIV a major problem indicates that 18.3% of all 924 drug users interviewed reported injecting drugs (Muhondwa et al., 2002). However, the extent of HIV infection in this group was not determined.

The Tanzania National Multilateral AIDS Control Strategy has identified IDUs as a target group among the most vulnerable groups in the country. Nevertheless, no population-based study of HIV prevalence among IDUs has been attempted.

There is evidence that HIV epidemics associated with IDU can be prevented, slowed, stopped and even reversed provided thorough understanding of IDU and HIV infection of local situation is known (Ball et al., 1998).

CHAPTER 3: METHODOLOGY

3.1 Study area

The study was conducted in Kinondoni Municipality, which is among the three Municipalities that makes up the city of Dar es Salaam. Kinondoni Municipality lies to the North of both Ilala and Temeke Municipalities. Its border to the East and North-East is the Indian Ocean. It shares the border with Bagamoyo District to the North, Kibaha to the West and Kisarawe District to the south-west. The Municipality comprises 27 wards.

The size of Kinondoni Municipality is 531Km^2 covering both rural and urban areas. Its population is 1,083,913 of which 547,081 and 536,832 are males and females, respectively with urban population of 1,027,225 (94%) and a growth rate of 4.3% per annum. Average population density per km^2 is 2,825 persons and the dominating religions are Moslem and Christianity according to 2002 Population and Housing Census.

The municipality is faced with rapid impact of urbanization where competition for jobs is high, criminality, prostitution, drug abuse and illegal business is rampant. Income of majority is generated by marginal jobs and many live in poor housing conditions.

The rapid growth of urbanization is attributed by informal sector with little income generation, which led to serious economic hardship to many urban dwellers. Furthermore, the rapid growth urbanization is accompanied by social dislocation and

disintegration of traditional family ties thus predisposes youth to experience stress and difficulties in adaptation.

The site was selected due to its large urban population, which is the largest of all other Municipalities and Districts in Tanzania.

3.2 Study population

The study population involved 201 injecting drug users from IDUs gathering places mapped in densely populated areas found in Kinondoni Municipality in Dar es Salaam City. The wards included were Msasani, Manzese, Kinondoni and Ubungo. The IDUs were identified purposively using a snowballing method, whereby the first injecting drug user was identified with the help of an ex-drug user and after being interviewed he was asked to provide leads to other members of the IDUs population in Kinondoni Manicipality.

3.3 Study design

A cross sectional study was undertaken that involved individuals who were injecting drugs as their mode of drug use in Kinondoni Municipality.

3.4 Sample size estimation

The sample size was calculated using the single proportion formula as follows:

$$n = \frac{4p(100 - p)}{\varepsilon^2}$$

Where, n = sample size

p = proportion of IDUs who are HIV seropositive (Nigeria) = 11%

ε = margin of error = 5%

Hence, $$n = \frac{4 \times 11 (100-11)}{5^2}$$

$$= 156.6$$

The proportion of IDUs who are HIV seropositive is estimated by UNODC (2004) to be about 11% in Nigeria. As this is the only estimate available for sub Sahara Africa at the time the study was been conducted it was used as an estimate for Kinondoni area. This gave a minimum sample size of 157 people, however in this study, a sample size of 201 IDUs was taken.

3.5 Recruiting research assistants

One woman and two men were hired as research assistants; one man who was a former drug user assisted in recruiting respondents to participate into the study and the remaining two assisted in data collection. The research assistants were trained in all

aspects of the research protocol including questionnaire administration. Age between 18 and 30 years, experience in conducting drug related researches and willingness to work for long hours were criteria for selecting the research assistants.

3.6 Recruiting volunteers

Snowballing method was employed, whereby the first volunteer was obtained from the hidden and elusive population with the assistance of a research assistant who was a former injecting drug user.

The respondents were provided with transport allowance and a soft drink during the interview in recognition of their time and effort. The respondents were provided with an allowance of Ths 2000/= upon completion of the interview and HIV testing.

3.7 Eligibility of the volunteers

Participants to the study included only those self-reported injecting drug users in the 48 hours before being interviewed and those who signed the informed consent form. The form introduces participant to the study, it states its objective, study procedure, time to be taken, expected benefits and burden to the participant. Other information provided in the form include the freedom of participants to proceed or quit the study at any time and at his/her will, allowances to participant, confidentiality and places where participant can ask questions or seek help in case he/she receives any harm through his participation in the study. The designed informed consent form is annexed (Appendix C).

3.8 Procedure and results of pilot testing

A pilot testing was conducted on 23rd May, 2004. With a snowballing recruitment, 10 self-identified IDUs were interviewed with a structured questionnaire then they were counseled for HIV testing. They were given their results on the same day during post testing session except one who did not like to know his serostatus. Two out of the 10 tested were HIV seropositive.

3.9 Data collection procedure

Data collection was done using structured interviews with selected injecting drug users. Potential candidates were screened by researchers as to their eligibility for participation in the study. Respondents were given a brief description of what the study entailed which emphasized the confidential and voluntary aspects of the study. A consent form was read by the interviewer at the beginning of the interview and those candidates that were interested and eligible for participation signed at the end of the form. Signing a written consent form signified consent. The interviewer then administered the questionnaire immediately. The interviews were conducted in Kiswahili and each took about 25 to 30 minutes. The principal investigator while assisted by two trained research assistants conducted the interviews. The principal investigator supervised the assistants closely to ensure that procedures and schedules were strictly adhered to. At the end of each day of data collection, the research team reviewed the forms for completeness and consistency.

The interviews took place in a quiet, confidential rented office. The office was located in the neighbourhoods of the mapped areas where it was convenient for the respondents. The office was first located in Manzese ward, and then shifted to Msasani ward and then to Ubungo ward before it was moved to Kinondoni ward. The office was placed in all these locations because it was assumed that those areas were occupied by a good number of IDUs.

3.10 Research instrument for data collection

A standard interviewer-administered 5-page questionnaire of 52 questions was used. It focused on demographic characteristics, social development of injecting drug use, current injecting drug use behaviour and health status of a respondent. The designed questionnaire is annexed (Appendix A).

3.11 HIV testing

3.11.1 Sample collection

After completion of the interview, a signed informed consent form for HIV testing was obtained from those interested respondents. The designed informed consent form is annexed (Appendix E). HIV pretest counseling was then provided, followed by collection of blood specimens.

Blood specimens were collected into special containers. The containers were labeled with a unique study code that corresponded to the code on the completed questionnaire.

No personal identifiers were placed on either the questionnaire or the container. On the same day the containers were safely taken for testing at the laboratory located at Muhimbili National Hospital, HIV Testing Centre of the Department of Psychiatry.

3.11.2 Laboratory testing

Collected blood specimens were tested for HIV-1 or HIV-2 antibodies with rapid agglutination test for antibodies to HIV (Capillus HIV-1/HIV-2, Trinity Biotec, Ireland). Reactive samples were further tested with lateral flow rapid test for HIV (Determine HIV-1/2 Rapid Test, Abbot Laboratory, USA). Specimens that reacted in both antibody tests were considered HIV positive while those non-reactive specimens were taken to be HIV negative.

3.11.3 Dissemination of results

One day after the specimens were collected participants were provided with results of their HIV test by the same trained person who counseled them to undergo the HIV test.

All respondents determined to have a need to stop their drug abuse behaviour were directed to a newly established methadone treatment unit at the Department of Psychiatry at the Muhimbili National Hospital. In addition, those HIV seropositive respondents were advised to visit WAMATA, Better Living Centre (Magomeni SDA Dispensary) and other similar NGO Centres where they could receive appropriate care.

3.12 Data management and analysis

The principal investigator while assisted by two research assistants, collected data from the respondents. The data and information collected was recorded in a form designed; and later entered into a software programme, "Epi Info 2002" for processing. The data entry and processing was carried out by the principal investigator.

3.13 Ethical issues

The permit to carry out the study was obtained from both the Directorate of Research and Publications of Muhimbili University College of Health Sciences and from the Kinondoni Municipal Council.

The volunteers were informed about the objectives of the study and their part in it. They were informed that their participation was voluntary and that they were free to quit the study at any time. They could choose not to answer any question and that the information provided would be treated as confidential. In addition, they were assured of anonymity by ensuring that no names of participants would appear on the questionnaire.

Benefits to the volunteers were explained; these included the good preventive interventions they would receive following application of the findings. Likewise, the questions posed to volunteers would make them aware of the risks they would face if they become HIV infected.

Informed consents were obtained prior to both data collection and to voluntary HIV testing. The two types of informed consent forms are annexed (Appendices C and E).

3.14 Study constraints, biases and limitations

Limitations of the study include possible recall bias: participants were asked to recollect many events over a long period of time, which may have influenced the accuracy of their responses.

There was a methodological limitation by depending on self-reports for information about injecting practices where a respondent may perceive an incentive to underreport risk behavior.

Sample units were selected from convenience areas for easily availability of the IDUs. This method could be a source of bias as it reduces the likelihood that the sample will represent a good cross section from a study population.

The sampling method employed limits generalization of results, as it could have likely excluded people who were not well integrated into the study population.

3.15 Definitions of terms

Drug Injecting Practices

These are individual behaviour usually carried out during injecting drug use. They include drug use characteristics and drug injecting behaviours.

Drug use characteristics

These are drug related characteristics exhibited by drug users. They include type of drug used, frequency of drug use, duration of drug use and, age of drug use initiation.

Drug injecting behaviours

These are behaviours exhibited by drug user when injecting drugs. They include sharing of drug or injecting equipment (needle/syringe) or paraphernalia, self or assisted injecting, injecting alone or in a company, injecting place, sourcing of injecting equipment and disposal of injecting equipment.

HIV Seropositivity

This is a state of being infected with HIV as indicated by a positive HIV test.

Injecting drug use (IDU)

This is a mode of drug use whereby a user introduces a drug into his/her body directly into the blood stream mainly intravenously or intramuscularly using a needle or syringe filled with the drug.

Injecting Drug Users (IDUs)

These are individuals who use drugs by administering it through injecting drug use.

Sharing

This is multiperson use of drug injecting equipment among injecting drug users. It involves borrowing and lending of injecting equipment.

CHAPTER 4: RESULTS

4.1 Study population social characteristics

4.1.1 Age and Sex

The study involved 201 active injecting drug users from Kinondoni Municipality. Among them 169 (84.1%) were males, and 32 (15.9%) were females. The respondents were aged between 18 and 48 years. The mean age of the respondents was 29.4 years. (Standard deviation = 5.1 and the median 29 years). There was a statistical difference (p=0.02) between mean age for males (29.8) and females (27.5). The majority of the subjects (49.3%) were in the age group 20-29 and the least (2%) were in the age group 10-19 as indicated in Table 1. The greater proportion of males (47.3%) was found in the age group 30-39, while the greater proportion of female (65.6%) was in the age group 20-29.

Table 1: Distribution of the respondents by age group and sex

Age group (years)	Male	Female	Total
	Number (%)	Number (%)	Number (%)
10-19	4 (2.4)	0	4 (2)
20-29	78 (46.2)	21 (65.6)	99 (49.3)
30-39	80 (47.3)	10 (31.2)	90 (44.8)
40-49	7 (4.1)	1 (3.1)	8 (4.0)
Total	**169 (100.0)**	**32 (100.0)**	**201 (100.0)**

4.1.2 Marital status

Of all the respondents, 6% were either married or cohabiting, while the rest, were either single, separated, divorced, or widowed as revealed in Table 2. Among the married and cohabiting respondents, 16.7% were in a current relationship with partners who were injecting drugs and 16.7% had partners who were using drugs in other different ways. The remaining respondents (66.7%) had partners who did not use any drug. About three quarters (73.6%) of the respondents were single. Both males (76.9%) and females (59.4%) were in the highest proportions in the single status category.

4.1.3 Education level

As shown in Table 2, a large proportion of the respondents (47.3%) had attained only primary education and only 2% had reached tertiary level of education. Among the institutions at tertiary level of education reached by the respondents include Dar es Salaam Institute of Technology (DIT), Dar es Salaam School of Accountancy, Leeds University and the National Institute of Water. Of all the respondents, 27.9% were primary school dropouts while 7.9% were secondary school dropouts. The highest level of education attained by male respondents is tertiary level (2.4%) compared to secondary level by females (3.1%).

Table 2: Distribution of the respondents by marital status, education levels, occupation and sex

Social status	Male	Female	Total
	Number (%)	Number (%)	Number (%)
Marital status			
Single	130 (76.9)	19 (59.4)	149 (73.6)
Married	6 (3.6)	1 (3.1)	7 (3.5)
Cohabiting	3 (1.8)	2 (6.2)	5 (2.5)
Separated/Divorced	28 (16.6)	10 (31.2)	38 (18.9)
Widowed	2 (1.2)	0 (0)	2 (1.0)
Total	**169 (100.0)**	**32 (100.0)**	**201 (100.0)**
Education			
None	6 (3.6)	3 (9.4)	9 (4.5)
Primary			
Std. 1-6	45 (26.6)	11 (34.4)	56 (27.9)
Std. 7	84 (29.7)	11 (34.4)	95 (47.3)
Secondary			
Form 1-3	11 (6.5)	4 (12.4)	15 (7.4)
Form 4	16 (9.4)	2 (6.3)	18 (8.9)
Form 5	1 (0.6)	0 (0)	1 (0.5)
Form 6	2 (1.2)	1 (3.1)	3 (1.5)
Tertiary	4 (2.4)	0 (0)	4 (2.0)
Total	**169 (100.0)**	**32 (100.0)**	**121 (100.0)**
Occupation			
Legal			
Porter	57 (33.7)	0 (0)	57 (28.4)
Petty Trader	53 (31.3)	18 (56.3)	71 (35.3)
Commuter bus tout	33 (19.5)	0 (0)	33 (16.4)
Bus conductor	11 (6.5)	0 (0)	11 (5.5)
Employed	2 (1.2)	0 (0)	2 (1.0)
House girl	0 (0)	1 (3.1)	1 (0.5)
Others	13 (7.7)	2 (6.3)	15 (7.4)
Not working	0	11 (34.4)	11 (5.5)
Total	**169 (100.0)**	**32 (100.0)**	**201 (100.0)**
Illegal			
Pick pocketing	89(52.7)	0 (0)	89 (44.3)
Begging	12 (7.1)	3 (9.4)	15 (7.5)
Drug peddling	3 (1.7)	0 (0)	3 (1.5)
Commercial sex	0 (0)	27 (84.3)	27 (13.4)
Drug injector	1 (0.6)	0 (0)	1 (0.5)
Not involved	64 (37.9)	2 (6.3)	66 (32.8)
Total	**169 (100.0)**	**32 (100.0)**	**201 (100.0)**

4.1.4 Occupation

Most of the respondents (35.3%) reported that they were carrying out petty trade as their main legal activity as indicated in Table 2. Other major jobs mentioned were porter (28.4%) and commuter bus tout (16.4%). Only 1.0% of the respondents reported having some form of formal employment. Other reported that they had jobs, which include bus conductor (5.5%), housekeeping, driver, motor-vehicle mechanics, electrical technician, accountant, fishery, computer technician, hair plating and house building. Most of the males (33.7%) said that they were porters while most females (56.3%) were petty traders. Eleven (34.4%) females said they were not working at all unlike males who all declared that they were working. In addition, 67.2% respondents admitted to be involved in different illegal activities. Majority of them (44.3%) said they were active in pick pocketing. Other reported illegal occupations include drug peddling, commercial sex, injecting drugs to other IDUs and begging. Most males (52.7%) mentioned pick pocketing as their illegal occupation they undertake while most female (84.3%) admitted they were commercial sex workers.

4.1.5 Daily income

Most of the participants (63.7%) said they were earning more than Tshs 6,000/= per day as indicated in Table 3. Only 1.5% reported getting daily income up to Tshs 2,000/=. The highest proportion of males and females were earning more than 6,000/= per day. However, a larger proportion of females (68.8%) reported getting more than 6,000/= per day than that of males (62.7%) which is getting the same amount.

Table 3. Distribution of the respondents by income, living arrangements and sex

Social status	Male	Female	Total
	Number (%)	Number (%)	Number (%)
Income/day (TSh):			
≤2,000	1 (0.6)	2 (6.2)	3 (1.5)
>2,000-4,000	23 (13.6)	4 (12.5)	27 (13.4)
>4,000-6,000	39 (23.1)	4 (12.5)	43 (21.4)
>6,000	106 (62.7)	22(68.8)	128 (63.7)
Total	**169 (100)**	**32 (100)**	**201 (100)**
Living arrangement:			
Residing place:			
Rent room	25 (14.8)	16 (50.0)	41 (20.4)
Family house	126 (74.6)	8 (25.0)	134 (66.6)
Ghetto	7 (4.0)	4 (12.5)	11 (5.5)
Street	5 (3.0)	1 (3.1)	6 (3.0)
Friend's room	6 (3.6)	3 (9.4)	9 (4.5)
Total	**169 (100.0)**	**32 (100.0)**	**201 (100.0)**
Living with:			
Wife/husband	4 (2.4)	2 (6.2)	6 (3.0)
Friends	23 (13.6)	17 (53.1)	40 (19.9)
Alone	7 (4.1)	3 (9.4)	10 (5.0)
Parents	92 (54.4)	5 (15.6)	97 (48.3)
Other relatives	38 (22.5)	3 (9.4)	41 (20.4)
Others	5 (3.0)	2 (6.3)	7 (3.4)
Total	**169 (100.0)**	**32 (100.0)**	**201 (100.0)**
Persons per room:			
1	52 (30.8)	5 (15.6)	57 (28.4)
2	62 (36.7)	13 (40.6)	75 (37.3)
3	38 (22.5)	8 (25.0)	46 (22.9)
≥4	12 (7.2)	5 (15.5)	17 (8.5)
On street	5 (3.0)	1 (3.1)	6 (3)
Total	**169 (100.0)**	**32 (100.0)**	**201 (100.0)**
Residence duration (years):			
<10	56 (33.1)	26 (81.2)	82 (40.8)
10-19	12 (7.1)	0 (0)	12 (6.0)
20-29	44 (26.0)	3 (9.4)	47 (23.4)
≥30	57 (33.7)	3 (9.4)	60 (29.9)
Total	**169 (100.0)**	**32 (100.0)**	**201 (100.0)**

4.1.6 Living arrangements

The majority of the respondents (66.6%) lived in their family house; only a small number (3%) were living on the streets. Other areas of abode reported by the respondents include rented room (20.4%), ghetto (5.5%) and sharing a friend's room (4.5%). Males (74.6%) reside most in family houses while female (50.0%) in rent room. Most of the respondents (48.3%) reported living with their parents. The remaining of the respondents were living with other relatives (20.4%), their friends (19.9%), alone (5%), and with their wives/husbands (3%). Most males (54.4%) of were living with their parents while most females (53.1%) were living with their friends.

Of all the respondents, 37% were living in a room of two people. Only 28% of the participants reported living alone in a room while 22.9% said they were living in a room of 3 people. Both males (36.7%) and females (40.6%) reported living most in rooms of two people. Only 3% said they were living on the street.

The majority of the respondents (40.8%) reported living in current residing area for not more than ten years. Minority (6%) had lived between ten and nineteen years. Slightly more than one quarter (29.9%) of the respondents said that they had lived for thirty years or more.

4.2 Drug Use

4.2.1 Drugs injected

Respondents reported to have ever injected four different types of drugs, which are heroin white, heroin brown, cocaine and diazepam (Valium®) (Table 4). All participants had injected heroin white and over half (56.2%) had injected heroin brown. Only 2% and 0.5% of the respondents had injected cocaine and diazepam, respectively.

4.2.2 Drug most commonly injected

The most commonly injected drug declared by each respondent, regardless whether is a male or a female was heroin white (Table 4). In addition, all respondents reported to have injected heroin white in the last 48 hours before the interview.

4.2.3 Age of injection initiation

The overall mean age of initiation of injecting drug use was 25.5 years, while the median was 25 years. The mean age of injection initiation in males and females was 25.7 and 24.3 years, respectively. The median on set age of injection was slightly lower in females (23 years) than in males (25 years).

4.2.4 Time from first drug use to first injection

The respondents reported wide range of time periods from first drug use to first injection (Table 4). The mean was 6.7 years, while the median and mode was 6 and 2 years, respectively. The table shows that majority (47.3%) of respondents were in less than 5

year category, followed by 34.8% in 5-10 years category and the least (17.9%) in the category of more than 10 years.

Table 4. Distribution of injecting drug use characteristics among the respondents by sex

Drug use	Male (n=169)	Female (n=32)	Total (n=201)
	Number (%)	Number (%)	Number (%)
Types of drugs ever injected:			
Heroin (white)	169 (100)	32 (100)	201 (100)
Heroin (brown)	97 (56.2)	16 (50)	113 (56.2)
Cocaine	3 (1.8)	1 (3.1)	4 (2.0)
Valium	1 (0.6)	0 (0)	1 (0.5)
Most commonly injected drug:			
Heroin white	169 (100)	32 (100)	201 (100)
Age of injection initiation:			
<20	25 (14.8)	8 (25)	33 (16.4)
20-29	110 (65.1)	19 (59.4)	129 (64.2)
≥30	34 (20.1)	5 (15.6)	39 (19.4)
Time from 1st drug use to 1st injection:			
<5	76 (45.0)	19 (59.4)	95 (47.3)
5-10	58 (34.3)	12 (37.5)	70 (34.8)
>10	35 (20.7)	1 (3.1)	36 (17.9)
Injection frequency:			
1-2	16 (9.5)	6 (18.7)	22 (11.0)
3	124 (73.4)	23 (71.9)	147 (73.1)
4-5	29 (17.2)	3 (9.3)	32 (15.9)
Mean injection frequency	3.1	2.9	3.1
Injection duration:			
≤5	131 (77.5)	26 (81.2)	157 (78.1)
5-10	33 (19.5)	4 (12.5)	37 (18.4)
>10	5 (3.0)	2 (6.2)	7 (3.5)

4.2.5 Frequency of injection

All respondents reported to be injecting drug daily within the preceding four weeks; 11% once or twice a day, 73% three times a day and 15.9% four to five times a day. A larger proportion of both males (73.4%) and females (71.9%) were injecting three times a day. The overall observed mean of injections per day was 3.0, while for male and female was 3.1 and 2.9, respectively.

4.2.6 Injection duration

Injecting drug use in the study population ranged from below one year to 14 years, with the mean injection duration of 3.9 years, while for males and females were 4.1 and 3.3 years, respectively. The mode of injection duration was 4 years, while for males and females were 4 and 1 year, respectively.

Table 4 shows the highest proportion (78.1%) of respondents had injected for less than five years. The lowest proportions (3.5%) of the respondents had injected for more than ten years. Similarly, the highest proportions of males (77.5%) and females (81.2%) had injected for less than 5 years, while the lowest proportions of males (3.0) and females (6.2) had injected for more than ten years.

4.2.7 First substances of abuse used

Four types of substances of abuse including combination preparations (cocktails) were reported as having been used by respondent as their first substance of abuse (Table 5).

Majority (56.2%) of the respondents mentioned cigarette as their first substance to use, followed by cannabis (34.8%), alcohol (8%) and combination preparations (1.0%). Most males (59.8%) said their first substance of abuse to use was cigarette while most female used either cigarette (37.5%) or cannabis (37.5%). Among the cocktails used include cigarette and heroin; cigarettes, cannabis and heroin, and cannabis and heroin.

Table 5. Distribution of first substance of abuse used by the respondents by sex

Substance	Male	Female	Total
	Number (%)	Number (%)	Number (%)
Cigarette	101 (59.8)	12 (37.5)	113 (56.2)
Cannabis	58 (34.3)	12 (37.5)	70 (34.8)
Alcohol	9 (5.3)	7 (21.9)	16 (8.0)
Cocktails	1 (0.6)	1 (3.1)	2 (1.0)
Total	**169 (100.0)**	**32 (100.0)**	**201 (100.0)**

4.2.8 Sequence of drug use modes

Almost all the respondents (99.5%) had applied sequentially more than one mode of use while using illegal drugs. Table 6 shows that only 0.5% of the respondents said that they started using illegal drugs by injecting. The majority (74.1%) reported to have started with smoking mode of use and end up with injecting. The proportions of males in each sequence of drug use modes are almost the same as for females. Most males (74.6%) and females (71.95) reported to have started smoking and directly ending in injecting.

Table 6. Distribution of sequence of drug use modes reported by the respondents by sex

Substance	Male	Female	Total
	Number (%)	Number (%)	Number (%)
Smoking-Inhaling/Sniffing-injecting	41 (24.3)	9 (28.1)	50 (24.9)
Smoking-Injecting	126 (74.6)	23 (71.9)	149 (74.1)
Sniffing/Inhaling-Injecting	1 (0.6)	0 (0)	1 (0.5)
Injecting	1(0.6)	0 (0)	1 (0.5)
Total	**169 (100.0)**	**32 (100.0)**	**201 (100.0)**

4.2.9 Reasons for shifting from one drug to another (shift in the pattern of drug administration)

As shown on Table 7 different reasons for shifting from one drug to another were provided by the respondents. These included the following: to increase the drug effect, enticement by colleagues, declining in income and family violence. Other reasons given included the fact that the opted drug was acting very fast, imitation and anger. The majority (78.6%) of the respondents stated that they shifted to other drugs in order to increase the drug effect, followed by 19.4% who pointed to enticement by their colleagues, while 1.5% and 1% attributed it to income loss and family violence, respectively. The majority (82.2%) of males and females (59.4%) reported that they shifted from one drug to another in order to increase the drug effect.

4.2.10 Reasons for starting injecting

Various reasons for starting injecting were reported by respondents (Table 7) including the fact that the drug stays longer in the body (73.1%), the drug acts faster (37.8%),

previous drug lost its effect (24.9%), drug can be easily be prepared and administered (23.4%), imitation (5%), drug can be economically used (4.5%), drugs are easily available (with low price) (3.0%) and the injecting mode increases "happiness" following usage (3.0%). The majority of both males (74.6%) and females (65.6%) attributed injection initiation to the fact that through injecting, a drug stays in the body for a longer time.

Table 7. Distribution of reasons viewed by the respondents for shifting from one drug to another and for injection initiation by sex

Reasons	Male (n=169)	Female (n=32)	Total (n=201)
	Number (%)	Number (%)	Number (%)
Reasons for shifting from one drug to another:			
Increasing drug effect	139 (82.2)	19 (59.4)	158 (78.6)
Peer pressure/ enticement	25 (14.8)	14 (43.8)	39 (19.4)
Income loss	3 (1.8)	0 (0)	3 (1.5)
Family violence	2 (1.0)	0 (0)	2 (1.0)
Others	3 (0.2)	0 (0)	3 (1.5)
Reasons for injection initiation:			
Drug easy to be used	43 (25.4)	4 (12.5)	47 (23.4)
Drug stays long in the body	126 (74.6)	21 (65.6)	147 (73.1)
Drug easily available	5 (3.0)	1 (3.1)	6 (3.0)
Drug acts fast	66 (39.1)	10 (31.3)	76 (37.8)
Imitation	8 (4.7)	2 (6.3)	10 (5.0)
Previous drug lost effect	47 (27.8)	3 (9.4)	50 (24.9)
Economical on use	9 (5.3)	0(0)	9 (4.5)
Increase "happiness"	5 (3.0)	1 (3.1)	6 (3.0)

The majority of both males (74.6%) and females (65.6%) attributed injection initiation to the fact that through injecting, a drug stays in the body for a long time.

4.3 Injecting behaviours

4.3.1 Injecting with used needles/syringes

A considerable proportion (40.3%) of respondents reported injecting with used needles in the preceeding 6 months. Almost the same proportion of males (40.2%) and females (40.6%) reported injecting with used needles/syringe.

Table 8. Distribution of injecting behaviours among the respondents by sex

Behaviour	Male (n=169)	Female (n=32)	Total (n=201)
	Number (%)	Number (%)	Number (%)
Injecting with used needles/syringes	68 (40.2)	13 (40.6)	81 (40.3)
Injection administration:			
Self injecting	120 (71.0)	21 (65.6)	141 (70.1)
Assisted injecting	49 (29.0)	11 (34.4)	60 (29.9)
Used water that was contaminated by IDUs' needles/syringes	132 (78.1)	23 (71.9)	155 (77.1)
Injecting place:			
Personal room	95(56.2)	25 (78.1)	120 (59.2)
Hidden areas	16 (3.6)	1 (3.1)	17 (8.5)
Places of abode (maskani/vijiweni)	14 (8.3)	1 (3.1)	15 (7.5)
Cemetery	8 (4.7)	3 (9.4)	11 (5.5)
Other places	36 (21.3)	2 (6.25)	38 (18.9)
Main source of needles/syringes:			
Buying from colleague	14 (8.3)	2 (6.2)	16 (8.0)
Buying from shop/pharmacy	155 (91.7)	30 (93.8)	185 (92.0)
Disposal of needles/syringes:			
Keeping for future use	62 (36.7)	15 (46.9)	77 (38.3)
Throwing at any place	57 (33.7)	11 (34.4)	68 (33.8)
Throwing at a place beyond reach	50 (29.6)	6 (18.8)	56 (27.9)

4.3.2 Injecting with used injecting equipment

The respondents reported several pieces of injecting equipment required for preparation of drug for injection. The list of injecting equipment includes filters (0.5%), cotton

swabs (0.5%), acidifier (locally known as ndimu ya mchina) (9.5%), metal bottle caps (4.5%) and spoons (4%) as cookers. None of the respondents reported injecting using used injecting equipment.

4.3.3 Administration of injection

Table 8 indicates that 70.1% of the respondents practiced regular self-injection while the rest (29.9%) preferred to entrust the administration of their injection to a fellow IDU. The request to be injected by another arose either because the vein they proposed to use posed great challenge to the self-injector or because they do not know how to inject. The majority of both males (71.8%) and females (65.6%) reported self-injecting.

4.3.4 Preparation of drug with water contaminated with IDUs' needles/syringes

As seen in Table 8, about three quarters (77.1%) of the respondents reported using or sharing water that was contaminated with needles/syringes of other IDUs in preparing (mixing and liquefying) drug for injection. Similar proportions of males (78.1%) and females (71.9%) reported sharing water previously contaminated by fellow drug users when cleaning their needles/syringes.

4.3.5 Injecting places

As shown in table 8, a large percentage (59.2%) of the respondents reported doing the injecting of drugs in their rooms (Table 8) Outdoor places mentioned by the respondents included hidden places (8.5%), places of adobe (Maskani/Vijiweni) (7.5%) and cemetry

(5.5%). Other places identified by the respondents were toilets, ghettoes, under bridges, bush, coast beaches, under trees and abandoned buildings. Both males (56.2%) and females (78.1%) reported often times taking drugs in their rooms. However, there was a statistical difference ($p<0.05$) between females and males that were taking drugs in their rooms.

4.3.6 Source of needles/syringes

Table 8 shows that the majority (92%) of the respondents stated that their main source of needles/syringes was shops or pharmacies. The remaining (8%) reported buying from their colleagues. The proportion of males (91.7%) buying needles/syringes from pharmacy was similar to that of females (93.8%).

4.3.7 Disposal of needles/syringes

Three distinct ways were reported for disposal or storage of needles/syringes (Table 8). The largest proportion (38.3%) of the respondents said they were keeping the equipment for future use, 33.8% said they were throwing them at any place, while the remaining (27.9%) claimed that they were throwing them at a point which could not be reached such as in pit latrines. In general the distribution of males and females reported the way they dispose/store the needles/syringes were fairly similar; 36.7% males and 46.9% females reported be keeping the equipment for future use, 33.7% males and 34.4 females throw at any place, while 29% males and 18.8% females throw at points that can not be reached.

Table 9. Distribution of injecting behaviours among the respondents who share needles/syringes by sex

Behaviour	Male (n=68)	Female (n=13)	Total (n=81)
	Number (%)	Number (%)	Number (%)
Cleaning syringe/needle used by IDUs:			
Yes	64 (94.1)	13 (100)	77 (95.1)
No	4 (5.9)	0	4 (4.9)
Items used for cleaning syringes/needles			
Cold water	60 (88.2)	12 (92.3)	72 (88.9)
Warm water	3 (4.4)	1 (7.7)	4 (4.9)
Spirit	1 (1.5)	0	1 (1.2)
Not cleaned	4 (5.9)	0	4 (4.9)
Number of people with whom IDUs had shared needles/syringes:			
1	30 (44.1)	10 (76.9)	40 (49.4)
2-5	35 (51.5)	2 (15.4)	37 (45.7)
6-10	2 (2.9)	1 (7.7)	3 (3.7)
>10	1(1.5)	0	1 (1.2)

4.4 HIV seroprevalence among study population

4.4.1 HIV seroprevalence among study population

Overall HIV seroprevalence among 201 participants at the time of interview was 31.3% as noted in Table 10. Females had a higher HIV seroprevalence of 75% than males who had a seroprevalence of 23.1%. (OR = 10, 95% CI: 4.2, 24.0). A statistical significant difference between male and female HIV seroprevalence was found ($\chi^2 = 33.7$, $p<0.01$).

Table 10: Distribution of HIV status of the respondents by sex

Sex	HIV-positive (%)	HIV-negative (%)	Total (%)
Male	39 (23.1)	130 (76.9)	169 (100)
Female	24 (75)	8 (25)	32 (100)
Total	**63 (31.3)**	**138 (68.7)**	**201(100)**

4.4.2 Selected sociodemographic characteristics and HIV seroprevalence among the study population.

Seroprevalence of HIV infection among the study population was compared to selected sociodemographic characteristics with respect to sex, age, marital status, education, occupation, and income (Table 11).

4.4.2.1 Sex

With respect to sex, females had an overwhelming HIV seroprovalence of 75% compared to prevalence of 23.1% found in males.

Table 11. Distribution of selected sociodemographic characteristics and HIV seroprevalence among the respondents by sex

Social status	Male		Female	
	Number tested	Number HIV-positive (%)	Number tested	Number HIV-positive (%)
Total	169	39 (23.1)	32	24 (75)
Age (years)				
<20	4	0	0	0
20-29	78	16(20.5)	21	15(71.4)
30-39	81	20 (24.7)	10	8 (80.0)
≥40	6	3 (50)	1	1 (100)
Marital status				
Married and cohabiting	9	1(11.1)	3	3 (100)
Single	130	29 (22.3)	19	14 (73.7)
Separated, widowed	30	9 (30.0)	10	7 (70)
Education				
None	6	1 (16.7)	3	3 (100)
Primary	129	30 (23.3)	22	17 (77.3)
Secondary	30	5 (16.7)	7	4 (57.1)
Tertiary	4	3 (75)	0	0
Occupation				
Petty trader	53	9 (17)	18	14 (77.8)
Porter	57	12 (21.1)	0	0
Bus commuter	33	10 (30.3)	0	0
Others	26	8 (3.1)	3	2 (66.7)
Not working	0	0	11	8 (72.7)
Illegal occupation				
Pick-pocketing	89	21 (23.6)	0	0
Commercial sex	0	0	27	20 (74.1)
Others	16	4 (25)	3	2 (66.7)
Not involved	64	14 (21.9)	2	2 (100)
Income/day (TShs.)				
<2000	1	1 (100)	2	2 (100)
>2000-6000	62	12 (19.4)	8	6 (75)
>6000	106	26 (24.5)	22	16 (72.7)

4.4.2.2 Age

The HIV seroprevalence in both males and females was high among old adults compared to young adults. For example, the prevalence for males who were 40 years or above was 50% compared to 24.7% and 20.5% for those aged between 30-39 years and 20-29 years, respectively.

4.4.2.3 Marital status

In males, high HIV prevalence of 30% was noted among widowed or separated respondents, followed by those who were single (22.3%) while the lowest prevalence of 11.1% was seen among married or cohabiting respondents. In contrast, high prevalence of 100% was seen among married and cohabiting females, followed by those with single marital status (73.7%) while the lowest prevalence (70%) was observed among separated or widowed.

4.4.2.4 Education

In females, high HIV seroprevalence (100%) was seen among those who did not receive any formal education followed by those with only primary education (77.3%) and secondary education (57.1%).

HIV prevalence was high (75%) for males with tertiary level of education compared to 23.3% and 16.7 of those who attained only primary education and secondary education, respectively and 16.7% of those who did not attend any formal education.

4.4.2.5 Occupation

HIV prevalence in males was high (30.3%) among commuter bus tout compared to 21% among the porters, 17% among the petty traders and 3.1% among other participants with different types of occupations including builders, electrical technicians, artists, fishermen, drivers, accountants and vehicle mechanic.

HIV prevalence in females was high, 77.8% among those petty traders compared to 72.7% and 66.7% among those without and those carrying out other activities (like housekeeping, hair plating), respectively.

4.4.2.6 Illegal occupation

In females, HIV prevalence was substantially higher among commercial sex workers (74.1%) than those who were involved in begging (66.7%) (Table 11).

In males, HIV prevalence was almost the same among the respondents with different illegal occupations. The HIV prevalence among those involved in pick-poketing was 23.6% and those involved with other illegal pursuits like begging or injecting was 25%.

4.4.2.7 Daily Income

Prevalence of HIV infection among males who are low income earners (those who receive less than 2,000/= per day) was remarkably high (100%) compared with 24.5 % and 19.4% for those who earn more than 6,000/= and between 2,000 and 6,000/= per day, respectively.

High prevalence (100%) was found among those females earning less than 2,000/= per day followed by those who earn between 2,000/= and 6000/= per day with a HIV prevalence of 75%, and those earn more than 6,000/= per day with a prevalence of 72.7%.

4.4.3 Drug injecting practices and HIV seroprevalence among the study population

HIV seroprevalence among the study group was compared to drug injecting practices with respect to duration of drug use, injection duration, type of drug used, shared needles/syringes, sharing water for injection, number of people shared needles/syringes, time to first injection and injection frequency (Table 12).

4.4.3.1 Duration of drug use

The HIV prevalence among males respondents who had used drugs for less than 5 years was 18.2%, while for those who had used for 5 up to 10 years and more than 10 years, the prevalence was 20.3% and 26.3%, respectively.

Females who had used drugs between 5 and 10 years had higher HIV prevalence of 85.7% than the remaining who had used drugs for more than 10 years and less than 5 years who had the prevalence of 83.3% and 58.3%, respectively.

4.4.3.2 Injection duration

The HIV prevalence for both males and females injected for less than 5 years was 20.6% and 73.1%, respectively. For those males and females injected between 5 and 10 years the prevalence was 27.3% and 75%, respectively, while the prevalence for those injected for more than 10 years was as high as 60% and 100%, respectively.

4.4.3.3 Type of drugs used

In males the HIV prevalence was lower (16%) among those who had ever used only heroin white than the prevalence among those who had ever used more than one type of drug: heroine white & heroin brown (25.8%), heroin white & cocaine (66.7%), heroin white & valium (100%). Similarly in females, those who had ever used only one type of drug, the prevalence was lower (60%) than those reported to had ever used more than one type of drug: heroin white & heroin brown (87.5%) and heroin white & cocaine (100%).

Table12: Distribution of drug injecting practices and HIV seroprevalence among the respondents by sex

Characteristics	Male		Female	
	Number tested	HIV-positive (%)	Number tested	HIV-positive (%)
Total	169	39 (23.1)	32	24 (75)
Duration of drug use:				
<5	22	4 (18.2)	12	7 (58.3)
5-10	64	13 (20.3)	14	12 (85.7)
>10	83	22 (26.3)	6	5 (83.3)
Injection duration (yrs):				
<5	131	27 (20.6)	26	19 (73.1)
5-10	33	9 (27.3)	4	3 (75)
>10	5	3 (60.0)	2	2 (100)
Types of drugs ever injected:				
Heroin white	68	11 (16.2)	15	9 (60)
Heroin white & brown	97	25 (25.8)	16	14 (87.5)
Heroin white &Cocaine	3	2 (66.7)	1	1 (100)
Heroin white &Valium	1	1 (100)	0	0
Shared needles:				
No	101	21 (20.8)	19	12 (63.2)
Yes	68	18 (26.5)	13	12 (92.3)
Shared water for injection:				
No	37	8 (21.6)	9	6 (66.7)
Yes	132	31 (23.5)	23	18 (78.3)
No of people shared needles/syringes:				
1	30	7 (23.3)	10	9 (90)
2-5	35	9 (25.7)	2	2 (100)
6-10	2	1 (50)	1	1 (100)
>10	1	1 (100)	0	0
Time to first injection (yrs):				
<5	76	15 (19.7)	18	14 (73.7)
5-10	58	16 (27.6)	12	9 (75)
>10	35	8 (22.9)	1	1 (100)
Injection frequency/day:				
1-2	16	2 (12.5)	6	4 (66.7)
3	124	29 (23.4)	23	17 (73.9)
4-5	29	8 (27.6)	3	3 (100)

4.4.3.4 Shared needles/syringes

HIV prevalence was higher among both males (23.6%) and females (78.3%) who reported to be sharing needles than the prevalence among those males (21%) and females (66%) who did not. However, the difference was not statistically significant (χ^2 =2.0, p=0.15).

4.4.3.5 Shared water for injection

HIV prevalence was higher among both males (23.5%) and females (78.3%) who reported to be sharing water for injection than the prevalence of those males and females who did not share water for injection whose prevalence was 21.6% and 66.7%, respectively. However, these findings failed to establish statistical significant difference (χ^2 = 0.02, p=0.88).

4.4.3.6 Number of people shared needle/syringes

In males, those who reported to be sharing needles/syringes with only a person, the observed prevalence was 23.3% and those who shared with more than 10 people the prevalence was 100%. The HIV prevalence among those who shared needles/syringes with people between 2 and 5 and those shared with people between 6 and 10, the HIV prevalence was 25% and 50%, respectively. Similarly, in females, those who reported sharing needles/syringes with only a person the HIV prevalence was 90%, while those shared with people between 2 and 5 and those shared with people between 6 and 10 the prevalence was 100% in each.

4.4.3.7 Time to first injection

The prevalence among those males who had spent 5 years from first drug use to first injection was considerable low (19.7%). For those who spent between 5 and 10 years and those who spent more than 10 years the prevalence was as high as 27% and 22%, respectively.

Females who spent less than 5 years from first drug use to first injection had the lowest HIV prevalence (73.7%) among all females. Those spent between 5 and 10 years and those spent more than 10 years from first drug use to first injection the prevalence was as high as 75% and 100%, respectively.

4.4.3.8 Injection frequency

HIV prevalence in males was high (27.6%) among those who injected for 4 up to 5 times a day compared to 23.4% and 12.5% for those injected thrice and those injected either once or twice a day, respectively.

Likewise, HIV prevalence was high among females injected for 4 up to 5 times a day with a prevalence of 100% compared to 73.9% and 66.7% for those injected thrice and those injected either once or twice a day, respectively.

CHAPTER 5. DISCUSSION

5.1 Demographic characteristics of the study group

The demographic characteristics of the study group are generally comparable to those reported in other countries by Riehman (1996). As it was in other developing countries like Malaysia and Thailand the majority (84.1%) of the respondents were men in their twenties and significantly older than their female counterparts. Few of the IDUs (6%) are married or cohabiting while many of them (66.7%) are married or cohabiting with non-drug users reflecting the potential route of spreading the HIV into the general population if the IDUs are infected.

Like in many other African countries south of Sahara, most of the respondents have low level of education with 47.3% up to primary school and therefore able to read and write mainly Swahili. In addition, up to one third of the respondents were school dropouts at different levels of their training. This shows that IDUs were predisposed to drug use behaviour probably due to their low education levels. As it has been reported in Pakistan (Agha et al., 2003) the majority (93.5%) of the respondents are employed in the informal sector as unskilled workers many (67.2%) of whom depend on illegal income generating activities to support their lives.

The fact that there was a "professional injector" among the respondents raises an alarming signal to the possibility of the availability of shooting galleries, which are widely known to be associated with the spread of HIV. In these galleries, IDUs pay a

person (professional injector) to inject them with the injecting equipment that is shared among many IDUs who attend each day and hence poses a potential risk for HIV infection.

IDUs appear to obtain enough money to sustain their habit as most (68.8%) of them earn up to more than 6,000/= per day.

This study shows that more than half of the respondents reported to have been residing in their current places for more than 10 years suggesting that they are relatively immobile and hence with minimal risk for HIV transmission. This is contrary to Riehman's (1996) findings that characterize IDUs as people who travel extensively without carrying their injecting equipment both abroad and in their own countries, and inject drugs in these other areas.

Almost half (56.2%) are living with their parents, suggesting that the drug taking behaviour could have been contributed by poor parenting. The nature of parents' work in the urban areas, especially in Dar es Salaam is such that they do not get enough time to spend with their children.

5.2 Drug Use

The most commonly injected drug among this group is heroin white. This proves its wide spread and presence of drug trafficking in the country. Heroin white might be greatly consumed because its preparation prior to injecting is simple which does not require long complicated procedures and many injecting equipment other than water compared to other injectable drugs.

The mean age (25.5 years) of injection initiation of the respondents is higher than the age reported elsewhere. Crosier and Dorman in 1991 reported that the mean age of injection initiation in London and Ireland was 19 and 18 years, respectively. This probably shows that children below 18 years are under parental control after which they depend on themselves and thus get easily hooked in injecting behaviors.

With respect to time from first drug use to first injection, the results shows that the majority (47.3%) of the respondents were in the less than 5 year category, followed by 34.8% in 5-10 year category and the least (17.9%) in the category of more than 10 years. This trend probably shows that the number of drug injectors increases with decrease in time period from first drug use to first injection probably pointing to an expansion of injecting drug using population i.e. many more people are being initiated into injecting mode as noted that the highest proportion (78%) of the respondents had injected for less than five years.

Numerous studies have shown that IDUs who have been injecting drugs for more than 5 years were significantly more likely to be HIV positive (Friedman et al., 1989a; Riehman, 1996; WHO 1994). In this study group, the highest proportion (78.1%) of the respondents have injected for not more than 5 years raising concern on the future possibility of HIV spread among IDUs if immediate appropriate measures would not be taken. At the same time the presence of about 21.9 % of those injected for more than 5 years (established injectors with all HIV risk behaviours) shows the presence of high HIV risk.

The mean drug injection frequency per day exhibited by the respondents was 3.1. This is contrary to previous studies, which indicated that injecting four times or more a day is usually associated with HIV seropositivity (Rhodes et al., 1999). However, measures should be taken to promote harm reduction strategies and to discourage drug use behaviour in order to reduce the chances of raising the injecting frequency and consequently minimizing the risk of HIV infection.

A high proportion (74.1%) of the respondents started with smoking as a mode of drug use and ended up with injecting. About half (56.2%) of all the respondents used cigarette as their first substance of abuse. These results clearly indicate that smoking is an important stage at which interventions against drug injecting behaviour must focus. This is in line with Riehman's suggestions (Riehman, 1996) who emphasized that drug

control programmes need to be tailored to specific type of drug users in different stage of their drug careers.

Less than half (43.8%) of the respondents used cannabis or concoctions of various illicit drugs as their first substance of abuse. This shows that the prohibited drugs are easily available in the area that the IDUs are found and with time drug use can spread to the general population because these areas are heavily populated. There is therefore a need for immediate drug control measures to minimize the influx of drugs.

The fact that more than three quarters of the respondents reported to have shifted from one drug to another in order to increase effect of drug raises concern about the increasing number of drug addicts in the Municipality.

Most (73.1%) of the IDUs preferred the injecting mode because they said that it acts fast and remains in the body for a long time. This means that these drug users are always under the influence of drug, which at any moment could predispose them to HIV risk behaviours.

5.3 Injecting behaviour

Although 92% of the respondents buy needles/syringes from pharmacies, a considerable proportion (40.3%) admitted to inject with used needles in the previous 6 months with 45.7% of them sharing with two to five people. Furthermore, 77.1% of all respondents while preparing drugs admitted to have used water that was contaminated with other

IDUs needles/syringes. This indicates that drug use in this population is a group phenomenon and sharing of needles/syringes or water is unacceptably high and therefore indicates the existence of potential risk of transmission of infections such as HIV among IDUs.

To their credit, almost all (95.1%) of IDUs who shared needles/syringes attempted to clean them before use, however, proper disinfection techniques were not followed. Because of the observed high level of inefficient cleaning, there is a need for adopting harm reduction approach that will encourage use of new injecting equipment or supplying of cleaning materials such as bleaching agents or provision of education on ways on how to minimize HIV transmission among IDUs.

The findings shows that introduction of harm reduction approach could easily be followed by the IDUs as most (95.1%) of them were trying to clean the used needles/syringes before use and the great proportion (92%) was trying to obtain the new injecting equipment (from pharmacy).

A considerable proportion (29.9%) of the respondents preferred to entrust the administration of their injection to fellow IDUs. As shown by Wood et al (2004) this practice poses great risk for HIV infection among IDUs. In addition 40.8% of the respondents reported to be injecting in hidden areas, places of abode (vijiweni/maskani) or in cemetery, which are places reported to be strongly associated with high rate of

transmission of HIV (Stimson et al., 1996). Perhaps they have to hide from their parents and for fearing of being caught by good abiding citizen.

The study revealed that the largest proportion (38.3%) of the respondents was keeping their needles/syringes for future use, 33.8% said they were throwing them at any place, while the remaining (27.9%) claimed that they were throwing them to a point that could not be reached such as in pit latrines. The utilization of pre-used needles/syringes is a common way in which needles/syringes can be shared indirectly and therefore poses potential risk for HIV infection as reported by Taylor et al (2004). The haphazard throwing away of syringes/needles might cause great harm to society. The HIV infected injecting equipment disposed of in this way might be picked by children for play and in so doing lead them to be infected with HIV.

5.4 HIV seroprevalence

The overall HIV prevalence in the study group was 31.3% (females: 75% and males: 23.1%). This is more than twice of the country general population HIV prevalence of 12% (National AIDS Control Progaramme, 2002). One major reason for this high prevalence is probably the presence of drug injecting behaviour, which is known to be associated with HIV infection. It again appears to be a result of unsafe injecting which involve unhealthy environment in which the injecting takes place, the storage of needles/syringes, the sharing of needles/syringes and the ineffective sterilization.

This HIV seroprevalence is higher than the expected seroprevalence in urban areas among the most vulnerable population in Tanzania, which is said to be 24.4% according UNAIDS, US Census Bureau (2002). This probably indicates that the IDU population has not received much attention as far as the group specific control measures against HIV are concerned. This high HIV prevalence among IDUs indicates the substantial need of specific interventions that are tailored to this group.

Similar findings have been revealed by an ongoing study conducted among drug users in Nairobi City, where the HIV prevalence among IDUs was 36.3% (53/146), with higher HIV seropositivity of 80 % (12/5) among females than in males (Odek-Ogunde et al., 2004).

5.5 A comparison of HIV prevalence with selected demographic characteristics and drug injecting practices.

An overwhelming HIV seroprevalence of 75% was observed in females as compared to that of 23.1% found in males. This great difference may be due to the fact that a large proportion (84.3%) of females were also involved in high HIV risk commercial sex work. Other reasons that could explain this magnitude include biological and anatomical predisposition of females.

On the other hand, the results provide support for the fact that women who inject drugs may be at greater risk of HIV infection through both their drug taking and their sexual practices.

HIV seroprevalence in both males and females was high among older adults compared to younger adults. For example, the prevalence for males who were 40 years or above was 50% compared to 24.7% and 20.5% for those aged between 30-39 years and 20-29 years, respectively. This could be explained by the fact that those old IDUs (established injectors) have been injecting for a longer period than the young adults who are new initiates who are less likely to share needles/syringes. This compares well with what Go et al (2004) reported.

HIV prevalence appears to relate well with age, injection duration, sharing of needles/syringe, using water contaminated by IDUs needles/syringes, the number of people sharing needles/syringes and injection frequencies. However, due to sample size limitation, association between HIV prevalence and the said variables could not be statistically established.

5.6 Limitation of the study

Due to non-probabilistic nature of the study sample, it is difficult to generalize the results to other injecting drug use population. Moreover, the study design fails to establish association between the HIV risk drug injecting practices and HIV prevalence.

Inspite of this methodological limitation, the results offer a unique snapshot of the current situation of IDUs in Kinondoni Municipality. Moreover, the study methodology has shown that IDUs can be accessed best and cooperate well through a snowballing method and therefore indicate that the method can also be employed in clinical programmes.

6. CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

This study has shown that IDUs in Kinondoni Municipality posses various demographic characteristics that put themselves at risk of HIV infection and that can spread the HIV into the general population. These characteristics include low level of education, being 30 years of age or older, marrying non-drug users and being involved in illegal occupations such as prostitution or injecting others with drugs.

Highly addictive drugs such as heroin and cannabis are easily available in the Kinondoni Municipality. The study, therefore, underlines the need for intensifying drug control efforts in Kinondoni and in the country at large and for initiation of appropriate interventions a gainst i njecting d rug u se in which smoking will be a stage of focus as shown in the study.

The study has highlighted multiple drug injecting practices of which IDUs put themselves at risk of HIV infection. High levels of HIV risk injecting behaviours such as sharing of needles/syrnges are prevalent among IDUs. Drug use related HIV risk behaviours such as frequency of injection, and injection duration do exist among IDUs. The s tudy t herefore, u nderlines t he need for development of appropriate interventions that will involve harm reduction approaches and that will also discourage drug use behaviour.

HIV seropositivity among IDUs population is substantially high and thus indicating the high possibility of explosive HIV epidemics in the Municipality. The study, therefore, underscores the urgent need of HIV prevention campaigns that will specifically target the IDUs population.

6.2 Recommendations

The study recommends the following:

- Full understanding of causal factors for HIV infection among IDUs e.g. association with crime or drinking or smoking or IDU needs to be well established that will enable development of appropriate strategies to be employed in HIV interventions among IDUs such as methadone treatment, information and education campaigns.

- There is a need to explore the reasons underlying the risks practices among IDUs and an understanding of these factors needs to be incorporated into HIV risk-reduction and drug harm reduction policies and programmes.

- Harm reduction policy should be formulated that will stipulate clearly appropriate strategies that will reduces the risks of HIV infection among IDUs and to the general population.

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