FACTORS ASSOCIATED WITH ADHERENCE TO METHADONE TREATMENT AMONG HEROIN USERS ATTENDING A METHADONE ASSISTED TREATMENT PROGRAM AT MUHIMBILI NATIONAL HOSPITAL

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FACTORS ASSOCIATED WITH ADHERENCE TO METHADONE TREATMENT AMONG HEROIN USERS ATTENDING A METHADONE ASSISTED TREATMENT PROGRAM AT MUHIMBILI NATIONAL HOSPITAL

By

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A dissertation Submitted in Partial Fulfillment of the Requirement for the Degree of Master of Science in Clinical Psychology of the Muhimbili University of Health and Allied Sciences

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CERTIFICATION

The undersigned certifies that he has read and hereby recommends for acceptance by Muhimbili University of Health and Allied Sciences, a dissertation titled ***"Factors Associated with Adherence to Methadone Treatment Among Heroin Users Attending a Methadone Assisted Treatment Programme at Muhimbili National Hospital*** "presented in fulfillment of the requirement for the Master of Science Degree in Clinical Psychology of Muhimbili University of Health and Allied Sciences.

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(Co-supervisor)

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Date

DECLARATION

AND

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I, **Adili Kadria Seushi** declare that this **dissertation** is my original work and that it has not been presented and will not be presented to any university for a similar or any other degree award.

Signature _____ **Date** _____

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DEDICATION

This thesis is dedicated to my late parents Kadria H. Seushi (my father) and Maryfreda Raphael (my mother). With their unconditional love, I grew up to be the person I am. I have no words to describe them. They gave me everything good I needed so that I may reach my career goal. They passed away while I was a medical student. I continue to be inspired by their memory.

ABSTRACT

Introduction

Injecting drug use has resulted in major international public health problems. Estimates suggest that there are between 11-21 million individuals who inject drugs worldwide. Methadone Assisted Treatment (MAT) is becoming a more common approach to addressing the health, social, and financial ramifications of addiction. Tanzania now has an estimated 25,000 drug injectors, 40 percent of them infected with H.I.V.

The main question is what factors influence one to adhere to methadone treatment. A number of previous Western studies have found evidence for a number of possible factors that may be associated with methadone treatment adherence such as age, gender, occupation, education, social relationship and support. The current study explores the extent to which these factors may be associated with adherance in a low income country with an IDU evolution and profile remarkably different from many Western countries

Objectives

To identify factors associated with adherence to methadone treatment among IDU attending MAT at MNH

Study Design

This was a retrospective cross sectional study retrieved data from clinical records.

Methods

This study collected data from both male and female clients who were enrolled to the methadone clinic from February 2011 to February 2013. The study analyzed data from 609 client's files. The sample size allowed for comparison between participants who have adhered and those who had not adhered.

A checklist aimed at retrieving information from clinical records (files) was developed. Questions on the checklist match with information found in the files (MAT program

questionnaire) and included sociodemographics, health status (physical and mental) and psychosocial/behavioral characteristics). Data was analyzed using the SPSS version 18

Results

Data from total of 632 files of clients enrolled at MNH MAT clinic was collected. Final analysis included data from 609 participant's files with mean age (SD) of 34.28 years (6.41). The proportion of participants adhering to methadone treatment among IDUs attending MAT clinic at MNH was 75% (460) and 25% (149) did not adhere to the treatment.

Bivariate analysis: There was a significant association between adherence and employment as source of income (p=0.031), results show that participants whose source of income is from employment compared to not employment are 1.5 times more likely to adhere to methadone treatment (OR, 1.50, 95% CI: 1.00-2.23). Hospitalization was another factor that showed a significant association with adherence to methadone treatment (p=0.027). Crudes odds ratio suggest that participants with a low number of hospitalization compared to no hospitalization were 49% less likely to adhere (OR, 0.51, 95% CI: 0.29-0.86) and those who had high number of hospitalization compared to no hospitalization were also less likely to adhere to methadone treatment (OR, 0.50, 95% CI: 0.29-0.87). Furthermore, incarceration showed a significant relationship with adherence (p=0.017) with crudes OR of 1.71 (95% CI: 1.08-2.72). There was also a significant relationship between quality of life and adherence (p=0.028).

Multivariate Analysis: Gender was the only factor that was found to show a significant association with adherence. Male participants compare to female were 0.24 less likely to adhere to treatment (OR, 0.24, 95% CI: 0.07-0.85).

Conclusion and Recommendations

This is the first MAT in sub sahara Africa and this is the first study exploring factors that may be associated with adherence in this cultural context. It is evident from the relatively low drop out rate (25% at two year follow up) that factors that are associated with non adherence are being addressed to a great extent in the MAT programme.

Studies are needed to determine factors that further influence adherence in terms of abstinance and/or reduction of concurrent use of heroin and other drugs of abuse so that more targeted interventions can be added to the current programme.

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LIST OF ABBREVIATIONS

MAT	:	Methadone Assisted Treatment
MNH	:	Muhimbili National Hospital
HIV	:	Human Immunodeficiency Virus
AIDS	:	Acquired Immunodeficiency Syndrome
IDU	:	Intravenous Drug Users
CDC	:	Centers for disease Control and Prevention
NIH	:	National institute of Health
NIDA	:	National Institute on Drug Abuse
MUHAS	:	Muhimbili University of Health and Allied Sciences
IRB	:	Institutional Review Board

CHAPTER ONE

1.1 INTRODUCTION TO THE STUDY

Injecting drug use (IDU) has resulted in major international public health problems. Estimates suggest that there are between 11-21 million individuals who inject drugs worldwide (Mathers et al., 2008) and it takes place in 151 countries (Mathers et al., 2009). Drug abuse is associated with the higher rates of domestic violence and violent crimes (Fenoglio et al., 2003; Nessa et al., 2008)

Epidemiological evidence attributes an increasingly significant role to injecting drug use in driving many national HIV/AIDS epidemics (UNAIDS (2009a). In 2007 it was estimated that 15.9 million (range 11.0-21.2 million) people worldwide inject drugs, mainly heroin and between 20–40% in five countries and over 40% in nine are HIV positive. This amounts to about 3.0 million (range 0·8–6·6 million) people who inject drugs and who might be HIV positive (Mathers et al., 2008).

The dynamics of the spread of HIV infection among IDUs are varied and seem to involve a number of factors (Strathdee et al., 2010). For example a decade ago, HIV was not identified among people who inject drugs in Estonia (Ball et al., 1998) whereas ten years later an estimate suggests that the prevalence of HIV infection had reached 72% in one sample of IDUs in Estonia (EMCDDA, 2007). On the other hand, Australia and New Zealand, with IDU prevalence rates higher than in many other countires where injecting drug use takes place, have maintained very low levels of HIV infection. This difference has been attributed to geographic isolation, as well as the swift introduction of needle and syringe programs when HIV infection was first noted in the 1980s (National Centre in HIV Epidemiology and Clinical Research, Australian National Data Report 2003-2007, 2008).
Thus it appears that the IDU epidemic in interface with HIV varies with countries . So each country needs to explore the problem in context and from many perspectives and design prevention strategies that address the needs of the particular country.

Evolution of heroin use in Tanzania

IDU is a relatively recent phenomenon in this setting. Studies in the seventies and eighties show no evidence of heroin use (Kilonzo & Maselle, 1986; Kilonzo, 1989). However, in 1991 a household community survey in four regions of the country found that 0.2% had already tried cocaine and 0.1 % had tried heroin (Kilonzo, et al., 1992) and lifetime use of these substances was found among students in Dar es Salaam (Kaaya et al.,1992; Kilonzo et al., 1997; Musoke 1997; Flisher et al., 1997; Kazaura et al., 1997). In 2001 a rapid situational analysis showed evidence that IDU was spreading in the large urban areas and needle sharing was practiced in all sites where heroin was injected (Kilonzo et al**.,** 2001) and a study in Dar es Salaam among out of school youth found that out of the 75% of the study sample using heroin, 18.3% were injectors (Muhondwa et al., 2002). Tanzania's vulnerability to drug trafficking due to its geographical position with many direct international air and sea connections had long been a concern (Kilonzo, 1992b) and despite every effort to control the trafficking it has continued to escalate .

From 2003-2010, a series of research studies were conducted in Tanzania among the IDU population and largely focused on gaining a better understanding of the socio cultural and environmental context of IDU, and more specifically the risk factors associated with HIV transmission, both from contaminated syringes and sexual practices. The areas of focus were: identifying the drug taking histories (drug careers) of heroin injecting drug users in Dar es Salaam and their risk behavior for contracting blood borne pathogens (Msami, 2004; McCurdy et al., 2005); identifying the attitude, norms and beliefs as well as behaviors of drug users associated with HIV transmission (Laurent, 2006); assessing HIV prevalence by testing IDU's blood samples (Williams et al., 2009); assessing IDU/HIV prevalence by testing used syringes supplied by injection drug users (McCurdy et al., 2006); HIV prevalence of men who have sex with men in Zanzibar including rates of intravenous drug use (Dahoma et al., 2009); the unique practice amongst Tanzanian female IDUs of flashblood (injecting a syringe full of blood from another IDU who has just injected heroin), thought to stop withdrawal symptoms (McCurdy et al., 2010); identifying injecting drug initiation practices and the places and situations in which injecting drug taking occurs (McCurdy et al., 2005); preliminary results from a HIV

prevention study gave HIV prevalence rates and HIV risk behaviors in IDU (Timpson et al., 2006); and gender differences in IDU risk behaviors (Williams et al., 2006).

There is an estimated 25,000 drug injectors in Tanzania (0.06% of total population of Tanzania) of whom 40% are infected with HIV as cited in Pangaea Global AIDS Foundation, 2010. The above studies presented an alarming picture and in response the first public methadone assisted therapy program in sub-Saharan Africa was established at Muhimbili National Hospital in Dar es Salaam, Tanzania The communities studies gave a good idea of the personal characteristics and living conditions that existed among IDUs in communities in Dar es Salaam.

It is crucial that IDUs enrolled adhere to treatment. The main question is which of the many characteristics or factors described in the community studies are likely to be associated with adherence to methadone treatment in this cultural context.

1.2 LITERATURE REVIEW

1.2.1 Heroin and Health Hazards Heroin and Health Hazards

Opiate (and its derivative heroin) is a product of the seedpod of the naturally occurring Asian poppy plant. These seedpods contain morphine that is an addictive substance (NIDA, 2006b). Users of heroin experience multiple physical and mental side effects. After an injection of heroin, drug users report feelings of intense euphoria, accompanied by a warm flushing of the skin, dry mouth, and heavy extremities. Thereafter, users tend to become drowsy or have an incoherent wakeful event accompanying by mental dysfunction that is a result of depression of the central nervous system (NIDA, 2006b).

Heroin dependence has been associated with serious health conditions that include, but are not limited to the following: (a) fatal overdose (b) spontaneous abortion (c) collapsed veins (d) blood-borne diseases and infections (NIDA, 2006b).

The process of becoming an addict

Addictive drugs tend to over stimulate the reward system of the brain through the release of stimulatory neurotransmitters. Saturation of stimulatory neurotransmitters cause a euphoric sensation that results in a heightened pleasure that the individual will want to repeat; cessation of use of addictive drugs results in a sudden lack of stimulatory neurotransmitters , and this condition tends to provoke compulsive behaviors (Nessa et al., 2008). At this point, the person is considered addicted to the drug. In addition addiction to drugs the effect users' mental status, leading to disinhibition, reduced impulse control, impaired decision making and judgment, which, in turn, can increase the likelihood that individuals will engage in high-risk sexual behavior as a means to obtain drugs. And finally, physiological consequences of drug abuse may alter susceptibility to infection and interact with HIV treatment drugs (Bram et al., 2009).

1.2.2 Methadone

Methadone hydrochloride is a long-acting opioid which acts on the opioid receptors in human brain. It was first synthesized in Germany during the World War II and used as an analgesic (Marsch, 1998). The only available treatment for pain at the time was morphine. Methadone assisted treatment (MAT) was first developed for the treatment of opioid drug dependence in the mid 1960s by Dole & Nyswalder (1965). Methadone helps opiate users to control use. Methadone suppresses opioid withdrawal symptoms for approximately one day (±12 hours). Methadone treatment, unlike heroin use, does not have adverse toxicological effects that limit drug users' functional capacities (CDC, 2000b). It is considered one of the most effective and safe substitution therapies for opiate dependence (Pang et al., 2007).

1.2.3 Effectiveness of MAT

Researchers have long found evidence that methadone maintenance is an effective alternative for opiate dependence treatment (Hall et al., 1998). It has been proven globally to be an effective approach in the control of illegal opioid drug use but also reduces the

risk of HIV infection. Extensive evidence has been established that MAT is associated with (1) retention of a large number of patients in treatment, cessation of drug use and reduction in frequency of drug use (Brands & Brands, 1998; Marsch, 1998, Gowing et al., 2008, Mattick et al., 2009); (2) decrease in HIV infection rate and other parenterally transmitted infections such as Hepatitis B and C among IDUs (Drucker et al., 1998; Loughlin et al., 2004, Gowing et al., 2008), and (3) other social improvements such as reduction in drug related criminal activities, enhances the clients' productivity, increase in employment, family integration, etc. (Marsch., 1998). MAT has also been shown to be highly cost-beneficial (Doran et al., 2003, Godfrey et al., 2004).

One of the main challenge in methadone is treatment adherence (Hall et al., 1998). Studies have shown variation of retention rates among IDUs attending methadone assisted therapy ranging from 32.3% to 80% (Gu, 2012; Simpson et al, 1997; Lin et al., 2013; Reisinger et al, 2009; Long et al 2010). Understanding factors that influence retention allows development of interventions that improve retention in methadone treatment resulting in better outcome.

1.2.4 Adherence and Gender

From the community studies in Dar many gender differences and drug careers have been found in IDU populations in Tanzania. Women are younger, less likely to be married, have less schooling, have resided in Dar for fewer years and are less likely to be living with parents and more likely to consider themselves homeless (Ross et al., 2008). Being male was a risk factor for needle sharing and women were more likely to be homeless and have more sexual partners. Sex for money was the main income for 82% of women compared to only 1% of men (Williams et al., 2006). In the study comparing risk behaviors by gender 24% of men shared needles compared to only 6% of women (Williams et al., 2006) however irrespective of gender if income is less that US$ 46 a month needle sharing is more prevalent. Economics seems to be the primary driver. The implications seem to be that women don't share needles because they don't need to as they can secure money through sex more easily than men.

The facts with regard to gender and IDU and HIV risk found that within the IDU population in Tanzania, the HIV prevalence rate for women injection drug users is twice that for men. In fact studies indicate that half of all female drug users in the Dar es Salaam could be infected with HIV (Williams, et al., 2007, McCurdy et al., 2006: Timpson, et al., 2006). In Zanzibar the HIV prevalence was 18% higher among females (30.7%) compared to males (12%) (Dahoma et al., 2009).

Studies from elsewhere have shown that gender differences are associated with adherance. Agosti et al (1991) found that males were more likely than females to drop out of treatment, and other studies have supported this showing females to be more likely to adhere to treatment as well (Chou et al., 1998; Simpson et al., 1997). However, there are studies that have reported that women were more likely to drop out of treatment (Arfken et al., 2002; Hser et al., 2004; Roberts & Nishimoto, 1996) and in outpatient treatment , men remained in treatment longer than women (McCaul et al.,2001). Mammo et al., (1993) in a study involving 2,697 outpatients and intensive outpatient admissions for the state of New Jersey found that the rate of not completing treatment was significantly higher for females, those who are less educated, those employed in less – skilled occupation and the young. And yet other studies have found that gender has not been related to treatment success or failure (Carroll et al.,1991; Gainey et al., 1993; Melnick et al., 1997; Saum et al., 2001).

1.2.5 Adherence and Age

Research indicates that younger participants of MAT are less likely to successfully adhere to treatment than older clients (Chou et al., 1998; Hser et al., 2004; Saum et al., 2001; Sechrest & Shicor, 2001). Also in Australia an analysis of predictors of treatment adherence for people entering methadone treatment found trends suggesting that younger people tended to leave treatment (Ball et al., (2006). Likewise Sendi et al., (2003) found in a Swiss sample that the risk for termination of treatment increased with younger age. Older patients undergoing methadone treatment have been found to be more persistent in treatment (Magura et al., 1998).

A 33-year follow up study of opiate dependent individuals, found that over time, older abusers had an increase in methadone assisted therapy participation (Hser et al., 2001). However, the same study also found that continued substance use by older adults did

appear to influence several health and quality of life factors: the older individuals who continued using heroin had higher rates of disability and mental health issues, daily alcohol intake, cigarette smoking, other illicit drug use, criminal involvement, and lower rates of employment (Hser, et al., 2001).

In summary older age can predict increased treatment engagement to a greater or less degree. Chan and colleagues (2004) hypothesize that the problems and consequences associated with using substances over a number of years may lead older adults to recognize the importance of getting clean and are thus more likely to engage in treatment than younger adults who have not yet experienced the cumulative effects of years of substance abuse. Thus, older age may lead to better understanding of the importance of treatment and then lead to better treatment engagement. Given the support for age as a predictor of treatment engagement in some studies, age was considered an important covariate to consider in models of treatment engagement.

Another suggestion is that the socio-emotional career of the older substance user is marked by loneliness, stress, and fear of victimization; like many older adults, they prefer to "age in place" by remaining in a familiar socio-environment where they know the rules and what to expect (Levy & Anderson, 2005) and as older adults may perceive themselves powerless to adjust to the social norms and physical demands of the current drug world (Anderson & Levy, 2003). In another study of 24 older adults on methadone maintenance treatment for opiate dependence, a lack of trust was identified as the main obstacle to use and expansion of social supports (Smith & Rosen, 2009). Higgs et al (2010) suggest that heroin use among an older adult population is an area that is lacking in research compared to studies with other substances.

1.2.6 Adherence and Employment Status

Veach et al (2000) identified that those retained in treatment, when compared to those who dropped out, were more likely to be employed and those individuals who use drugs were more likely to report greater difficulty finding stable jobs.

These difficulties were compounded by lower social economic status and educational levels.. Vaillant (1998) found that the severity of addiction is proportionally related to employment status; that is, those with higher severity were less likely to be employed.

Among IDUs in the community in Dar es Salaam, the major source of income for more than three quarters of men was employment compared to a tenth of women. The major source of income for women was trading sex for money (82%) compared to a negligible number of men (William's et al.,2006)

1.2.7 Adherence and Education

According to the National Household Survey on Drug Abuse (one of the main sources of information on the prevalence of illegal drug use in the US population) drug use tends to be associated with low levels of education (SAMHSA, 2003).

In a study of 165 individuals enrolled in a 12 week/ 20 – session outpatient treatment study of Relapse Prevention for the MAT, Sayre et al., (2002) found that those classified as completers - attended all 20 sessions (35%), late dropouts – attended 10 – 19 sessions (15%), or early dropouts – attended less than 10 sessions (50%). Early dropouts were those with less education and late dropouts were those with more years of education.

Among 487 heroin dependent patients involved in treatment for 9 months Siqueland et al., (2002) found that patient with less education stayed in treatment for less time compared with those with higher education.

In a study of 5,827 client records from a state funded alcohol and methadone treatment programs in 4 treatment modalities. Wickizer et al., (1994) reported that completion rates were highest for intensive inpatient alcohol treatment (75%) and lowest for intensive outpatient drug programs (18%); one of the variables most consistently related to treatment completion is education. Clients with more education were more likely to adhere to the program.

However, a study conducted by Magura et al., (1998) examined education as a predictor of engagement in drug treatment and failed to find support for its role among its sample of 1206 admitted patients across six methadone maintenance programs in 15 New York City clinics. This study was conducted with a methadone maintenance sample doing chart reviews, which is similar to the current study.

1.2.8 Adherence and Criminal Background

Terry et al., (2003) reveall that heroin use and drug – related offences are the most common crimes in the criminal justice and affect nearly every community. Drug offenders move in and out of the criminal justice system with some regularity, and it appers that heroin use and crime are inexorably linked. Collins and Allison (1983) found that drug users who were required by court order to seek treatment were retained at the same rate as those who voluntarily committed themselves to treatment. And later Hiller et al., (1985) examined the association between legal pressure and treatment adherence in a national sample of 2,605 clients admitted to 18 long-term residential facilities that participated in the Drug Abuse Treatment Outcome Study (DATOS). They found that those who entered residential treatment with moderate to high pressure from legal authorities adhered less compared to those who entered under low pressure from the legal authorities.

Waldorf et al., (1983) identified that drug crime connection makes maintaining abstinence from heroin use difficult because although no longer using the substance, individual may revert to prior criminal behavior patterns, again hindering the desistance process. In other words individuals who retire from drug use, but maintain some elements of the lifestyle and past criminal behavior patterns may serve as triggers to relapse as these behavior may have become habitual, increasing the difficulty of maintaining adherence.

Mattick and colleagues (2009) did a meta analysis study on the effectiveness of MAT and reported that MAT may reduce criminal activity even though the summary effect estimate is not statistically significant and indicated that the non-significant results for criminal activity reductions may be due to scarce data on a rather uncommon outcome measure of effects of MAT.

And more recent a pilot study in Vietnam reported a significant reduction in HIV-related risk behaviours among patients and in crime activities in the districts where the pilot MAT was implemented; and significant improvement in patient quality of life (Long et al., 2010).

1.2.9 Adherence and Living Arrangement

According to Tuten et al (2003) homeless women presented with greater heroin use, medical problems, psychosocial difficulties than domiciled women and treatment adherence was poorer for homeless women compared to domiciled women. McLellan et al., (1994) did a research to find out whether residential treatment setting has a significant value in a MAT program. It was found that those who receive treatment at residential setting reported to have significantly decrease in heroin use compare to control group. Thus, it apperas that those at residential setting had a higher adherence compared to a control group.

Among IDUs in the community in Dar es Salaam the proportion of women who were single was higher than that of men (95% versus 70%). More men were married or living with a regular partner (13% versus 2%). Almost all men were living in their own house or living with family (94% versus 58%). In contrast, more than a quarter of women considered themselves homeless (73%) compared to less than a fifth of men (14%) (Williams et al., 2006).

1.2.10 Adherence and Social Support

Social support is a factor that is often lacking for individuals with substance use disorders. Broome et al., (2002) found that those patients living with people who are drug or alcohol users had higher rates of dropouts compared the ones who live with non drug or alcohol users. In Griffith et al., (1998) 960 opiod drug users admitted to three publicly funded methadone clinics participating in the DATAR project and it was found that those with poor social support had poor adherence compared to those with good social support.

Another study of 66 patients enrolled in a methadone treatment program revealed that homeless status and low initial perceived social support from family scores were significant predictors of adherence (Westreich et al., 1997). Mc Lellan et al., (1983) found that reductions in heroin use and related AIDS risk behaviors among MAT individuals have been associated with both physiological and psychological factors and that psychosocial support is needed to maximize the effectiveness of MAT.

And Hser (2007) pointed out that older adults who attempt to stop using heroin may have a more difficult time doing so, as the social networks to support recovery have not been established in the earlier life course .

Although the literature has investigated social support and functioning as a variable that is associated with substance use disorders and abstinence, it is often focused on individuals who substance of choice is alcohol. More research is needed to address the relationship among social support and functioning and older individuals with opiate use disorders. Each substance of choice presents a unique clinical picture and subsequent treatment interventions (for example, increased discussion around safe needle use would be appropriate for intravenous heroin users, but less relevant for individuals whose substance of choice was marijuana). Focusing on how social support and functioning is associated with abstinence among individuals with opiate dependence will help to implement effective treatment interventions.

1.2.11 Adherence and HIV/AIDS Status

Estimation of the prevalence of HIV among people who inject drugs is challenging because of the difficulties of selecting representative samples and alternative methods may not be that certain. By comparison, data on the extent of heterosexual spread of HIV within the general population is in many situations easier to obtain, with numerous more readily available sampling options.

Transmission of HIV can be reduced among opiate addicts by making drug treatment available to those that want help. Drug treatment allows for assessment and treatment of psychological problems and may help.

HIV negative status has not been associated with adherence (Sendi et al., 2003). Harris et al. (2006) identified a relative low rate of HIV infection among MAT patients.

They suggested a possible protective effect of methadone maintenance against acquiring HIV infection, because MAT is orally administered and is not injected (which is a primary route for HIV infection among drug users). In a MAT pilot study inVietnam only one new HIV positive case was detected at 6 months (Long, 2010)

Studies in Dar es Salaam using a variety of methods have attempted to estimate the HIV prevalence in the IDU population in Tanzania. Msami (2004) in his sample, of 201 injectors in Kinondoni district, found a seroprevalence of 31.3%, almost four times higher than the national prevalence of the time and it was higher among females (75%) than males (23.1%). Timpson et al., (2006) found a prevalence of positive HIV status of 27% in the males and 58% in the females (Timpson et al., 2006). Self reported HIV infection amongst IDU was found to be 1% in both males and females (Williams et al., 2006). However, in the same sample 31% of women reported having being told they had gonorrhea in the past, 24% Syphilis, 12% genital warts and 7% genital ulcers, whereas only 1% of men reported previous Syphilis, none reported gonorrhea and less than one percent reported genital warts or ulcers. Implications are that these diseases are going undiagnosed and untreated in the male IDU population which could be also be contributing to the HIV risk in this population.

Williams et al., (2009) later looked at HIV prevalence in sexually active IDUs in Dar es Salaam using serology testing after they consented to giving a blood sample. 64% of the females were found to be HIV positive and 28% of the men despite only 5 participants saying they were positive in the pre-test interview.

Dahoma et al., (2009) reported that nearly a third of men who have sex with men felt they either had low or no risk of HIV despite over 80% having inconsistent condom use. Implications seem to be that injection drug users are not aware of HIV related risks nor too concerned about knowing their status. In order to provide educational intervention programs for IDU in terms of lowering HIV risk more knowledge of IDU beliefs and attitudes regarding HIV risk is needed.

1.2.12 Adherence and Mental Health Treatment

Co-morbid mental health and substance use disorders, or dual diagnosis, is another factor that is associated with difficulty in maintaining abstinence. Prevalence of co-morbid mental health issues among individuals with substance use disorders is high.Often a substance use disorder develops from an attempt to self-medicate an underlying mental health problem, creating two illnesses that are often intertwined and difficult to manage (Moos et al., 1993). One study of primarily opioid users found comorbidity of substance use disorders and another mental health issue at 67% (Thomasius et al., 2010).

Agosti et al., (1991) found that depression status was related to treatment completion in women. Maxwell and Shinderman (2002) also showed that patients with psychiatric comorbidity had significantly better adherence and fewer positive urine tests, than patients with only an opiate addiction diagnosis. Skinner et al., (2011) conducted a 12-year follow-up study with 144 opiate-dependent individuals, and found that mental health issues (namely depression) can be a significant factor in continued drug use. Further evidence to support the notion that mental health disorders can influence treatment outcomes is from Freeman et al (2011) study of approximately 345,000 individuals who were mandated to DUI treatment from 2005-2008. Freeman and colleagues found that individuals with a co-occurring Bipolar Disorder diagnosis were less likely to complete treatment than peers without a Bipolar Disorder diagnosis. However, other studies have found that depression is not related to MAT adherence (Williams & Robers, 1991) nor is depression related to attrition among males or females (Alterman et al., 1996)).
Broome et al., (1999) found that adherence is influenced by psychiatric symptoms of clients at intake. Hostility, for example, was associated with a lower likelihood of adherence at 90 days. Depression, however, was associated with higher adherence rates at 90 days.

Sub-diagnostic psychological distress is also highly prevalent among individuals with substance use disorders, as discussed in a study conducted by Ross and colleagues (2005). Looking at 825 current heroin users in Australia, Ross and colleagues identified that 49% reported some level of psychological distress that was significantly higher when compared

with population norms. As co-occurring mental health issues present often in individuals with substance use disorders, consideration of the impact of mental health issues among those individuals being treated for substance use disorders appears imperative to achievement of abstinence and sustained recovery.

In a study of 587 individuals, Khoury et al., (2010) found that high rates of lifetime dependence on various substances was strongly correlated with current PTSD symptoms as well as childhood physical, sexual, and emotional abuse. Identifying and treating trauma and PTSD among individuals with substance use disorders may help in the process of recovery and the achievement of abstinence. Personality disorders are also, by definition, long-standing, and Axis II issues can further complicate achievement and maintenance of abstinence

In Lofwall and colleagues (2005) comparison of older (ages 50-66) and younger (ages 25-36) adults in opioid maintenance programs, mood disorders (Major Depressive Disorder, Bipolar Disorder, and Dysthymic Disorder) were the most common among the older individuals. Further, the adults over age 55 were more likely to have organic brain damage and paranoid psychosis, and to require longer episodes of psychiatric care and medical detox, as compared with the younger adults in this sample.

Overall Mental health issues and substance use have been shown to be correlated, although the relationship with abstinence is not well understood. Some studies suggest that there is no relationship among psychiatric comorbidity and relapse with substance use disorders. Di Sclafani et al., (2007) investigated 471 incarcerated males in a 33-year follow-up study and found that individuals who quit using heroin earlier in life also had a significantly lower level of psychological problems than individuals who continued to use later in life.
Maremmani and colleagues (2008) found similar results in a 6-year longitudinal study of 129 individuals on methadone maintenance, finding that concurrent psychiatric disorders were the strongest negative predictor of relapse, regardless of other clinical and socioeconomic variables.

According to Rao et al., (2004), Psychological problems, in addition to opiate addiction and lack of drug treatment engagement, may continue to put these individuals at risk for contracting and spreading HIV (Rao et al., 2004). Drug treatment provides an opportunity to address psychological problems that may otherwise go untreated. If untreated, psychological problems may affect readiness to modify HIV risk behaviours, a main principle of behaviour change models. Accordingly, enrolling opiate addicts in drug treatment allows for assessment and treatment of psychological problems and may help in the adoption of HIV risk reduction methods.

1.3 STATEMENT OF THE PROBLEM

Methadone assisted therapy aims at reducing heroin withdraw symptoms by replacing heroin with a daily dose of methadone. One of the interventions to reduce the spread of HIV/AIDS among IDUs is the establishment of MAT Clinics. It gives IDUs a real chance of staying off drugs and not sharing needles for injecting.

There is abundant evidence supporting the effectiveness of MAT in reducing behaviours that are known to facilitate the transmission of HIV, such as injection drug use, sharing of injection equipment, and sex work needed to get money for drugs (Gowing et al., 2008). However, for various reasons, some IDUs default from MAT and retention rates can range from 33%-80% (Gu, 2012; Simpson et al., 1997; Lin et al., 2013; Reisinger et al., 2009; Long et al., 2010) at two year follow up. Example, Sayre et al., (2002) when examining 165 individuals enrolled in a 12 week/ 20 – session outpatient treatment reported a 35% dropout from the treatment. The implication of non adherence or drop out from MAT clients is significant.

A number of Western studies (Veach et al., 2000; Agosti et al., 1991; Amodeo et al., 2008) have found an association between methadone treatment adherence and factors such as age, gender, occupation, education, social relationship and support.

However, all of these studies were conducted in the western countries and their results while useful are probably not as applicable to the MAT programme in Dar es Salaam given the remarkable differences in terms of service availability, drug and healthcare policies, and socio-cultural environments.

This study aimed at exploring the association between these factors and adherence to methadone treatment in the first MAT programme in sub-sahara Africa.

1.4 SIGNIFICANCE OF THE STUDY (RATIONALE)

This is the first public methadone assisted programme in mainland Sub sahara Africa and identifying the factors associated with the adherence and factors associated with non adherence of attendess at the methadone treatment program will help professionals develop targeted intervention that increases the effectiveness of MAT and reduce attrition rates. Achieving a sustainable methadone assisted program with high retention rates will impact public health positively.

The findings have a lot of implications for MAT service providers who will be able to identify individuals at higher risk of defaulting treatment at the onset of enrolment.

Preventing dropout can start early in treatment by focusing on important (and modifable) factors that impact attrition. Understanding the factors that impact drug treatment adherence helps determine what specific factors need to be addressed to retain IDUs in treatment and who is most likely to succeed in a given drug treatment program. Tailored programs can increase methodone treatment effectiveness beyond what has been currently achieved through standard therapies.

1.5 OPERATIONAL DEFINITIONS

Dependence (addiction). Dependence (also referred to as addiction) is defined as a set of clinical symptoms that include inability to control use, impairment of functioning, and evidence of physiological effects associated with long term drug use (American Psychiatric Association, 1987).

Drug- The drugs are natural or synthetic substances, medical or not medical, legal or illegal, psychoactive effect and the excessive and/or prolonged consume determine the dependency and tolerance, as well as, diversity biological, psychological, social or spiritual impact (National Cancer Institute, n.d.).

Drug abuse. Drug abuse is defined as the compulsive legal or illegal substance use despite the negative and sometimes dangerous effects

Drug withdrawal. In the moment that a drug user stops using drugs, there is the possibility of withdrawal symptoms. The magnitude of withdrawal symptoms will depend on the length of time the person has used the drug. Frequent symptoms include craving for the drug, restlessness, muscle and bone pain, insomnia, diarrhea and vomiting, cold flashes, and kicking or other involuntary movements NIDA, 2006b).

Adherence: In this study, adherence is operationalized as length of stay in MAT in days, non adherence means absence of 30 days continously after which returning back into programme needs NGO intervention using patient's Case Worker

Tolerance. Tolerance is defined as the necessity to increase gradually the doses of drugs to re-experience the effects that occurred when the drug was first used (NIDA, 2006b).

1.6 CONCEPTUAL FRAMEWORK

There are number of factors that influence medication adherence. The current study has adopt the model developed by Park and Jones (1997) in explaining factors that influence methadone adherence. Park and Jones (1997) argue that for a person to adhere or not to adhere on medication there are number of factors that can contribute. These factors can be personal factors, health system factors and provider factors.

Patient Related Factors

Patients are influenced by type of medication including the dosage and hospitalization in using the particular medication. Living situation is another factor that can contribute, including dependent, living arrangement, quality of life and having close friends who use substances. Demographics also contribute on the adherence of medication. Furthermore, Coexisting illness such as anxiety, depression, chronic illness can contribute on medication adherence. Each of these patient-related factors affects the other, such that the complexity of a medication regimen and the presence of coexisting depression, for example, will certainly affect the patient's perceived need for medication and perceived risk of side effect, in addition to affecting medication adherence in other ways.

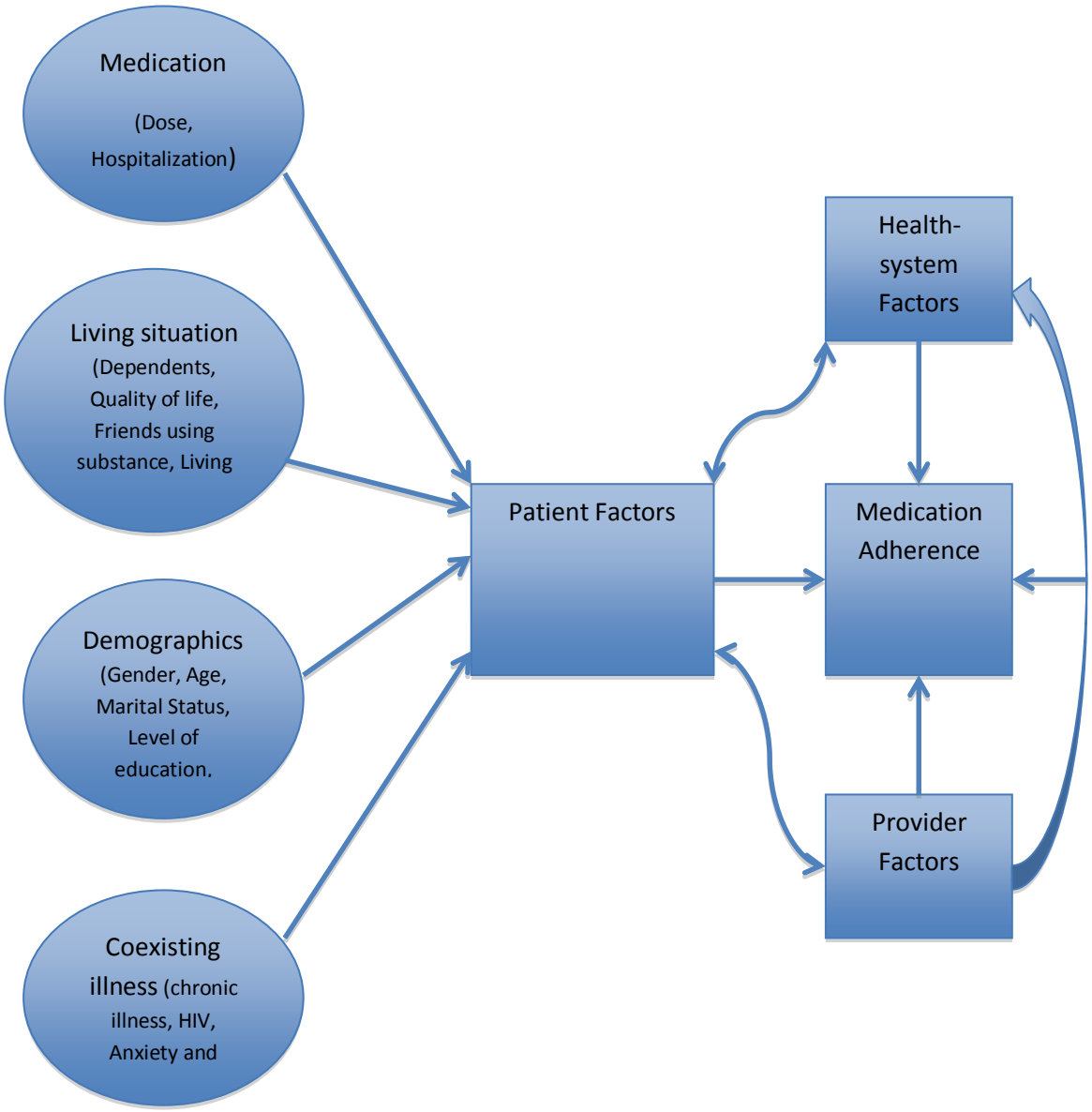
Health-System Factors

In addition to cost (specifically, the effect of cost-sharing and out-of-pocket costs on patient adherence), health-system factors include formularies, prior-authorization requirements and benefit caps, fragmentation of care, and access to care. Each of these factors affects the ease with which patients are able to access their medication and discuss medication-related issues with their providers.

Provider Factors

These include patient-provider trust and satisfaction; time spent discussing medications, and other communication issues. Providers in these cases include not only physicians but also pharmacists, nurses, and physician assistants, who play important roles in the medication use process.

Figure 1: Park and Jones (1997) Medication Adherence Conceptual framework



1.7 OBJECTIVES OF THE STUDY

1.7.1 Broad Objective

To identify factors associated with adherence among IDUs attending the Methadone Assisted Therapy (MAT) at Muhimbili National Hospital (MNH)

1.7.2 Specific Objectives

1. To determine the adherence and not adherence rates of IDUs at MAT
2. To explore social demographic factors associated with adherence to methadone treatment among IDUs.
3. To find an association between psychosocial factors and adherence to methadone treatment among IDUs.
4. To determine associations between medical conditions (HIV/AIDS, number of hospitalizations) and adherence to methadone treatment among IDUs.
5. To determine associations between mental conditions (Anxiety and Depression) and adherence to methadone treatment among IDUs.

1.8 RESEARCH QUESTIONS

1.8.1 Broad research question

- "Do IDUs that attend MAT at MNH adhere to the treatment, what are the factors that facilitate adherence and what factors hinder adherence in this sociocultural context?"

1.8.2 Specific objectives

- “What is the proportion of IDUs adhering to methadone assisted therapy at MNH?
- “Is there any association between social demographic factors and adherence to methadone treatment among IDUs?
- “Is there an association between psychosocial factors and adherence to methadone treatment among IDUs”
- “Does HIV/AIDS status influence adherence to methadone treatment among IDUs”
- “Does mental illness influence adherence to methadone treatment among IDUs”

CHAPTER TWO

2.1 METHODOLOGY

2.1.1 Study Area

This study was conducted at Methadone Assisted Therapy Clinic at Muhimbili National Hospital. The center is under the Department of Psychiatric and Mental Health. The center was established in February 2011 and offers services to IDUs only.

These clients are recruited to the clinic by community outreach workers or more recently by their peers. Prior to recruitment for the methadone assisted treatment clinic, the client is screened for evidence of being heroin dependent and an injector by assessing for the presence of injection marks and venous scars. They are also assessed for their readiness to quit and for evidence of sustained social support in terms of an 'adherence partner' who will be responsible for the care of the client at home and facilitate their attendance at the methadone clinic on a daily basis. At the MAT clinic, the screening procedure for enrolment is done by the assessment nurses, health social workers and the clinician who verifies eligibility for MAT enrolment. For a client to be enrolled for MAT, he/she has to meet DSM IV TR criterion for substance dependence, test positive for heroin during urine drug screening, present with recent venous scaring with/without phlebitis, proof of psychosocial supporter (like sponsor) as well as providing a written informed consent to adhere to treatment plan and regulations.

2.1.2 Study Design

Retrospective cross sectional study retrieved data from clinical records.

2.1.3 Study population

This study collected data from both male and female clients who are enrolled at the methadone clinic from 4th February 2011 to 1st February 2013. A total of 632 files were examined, 23 files of clients who passed away were removed from the study sample. The study analyzed information from 609 clients' files. The sample size allowed comparison between participants who have not adhered and those who have adhered with the treatment.

Inclusion criteria

- Clients enrolled to the clinic between February, 2011 and February 2013

Exclusion Criteria

- All clients who have passed away prior to February 2013

Figure 2: Recruitment of Files

2.1.4 Study Material

In answering the research questions this study used a checklist with a total of three sections aimed at eliciting information from IDUs' files. The the checklist (Appendix 1) matched the MAT Program Questionaire on questions related (focusing) on the research variables. The MAT Program Questionaire is the standard recorded information documented on files for all attendees. It also includes two psychological scales :

(1) The John Hopkins Symptoms checklist with 25 questions was used to capture anxiety and depressive symptoms.

The tool has ten questions for anxiety and fifteen questions for depressive symptoms. The tool has been validated and used among the pregnant women population in Tanzania by Kaaya et al., (2002)

(2) The SF 12 (HRQOL) an instrument to measure health related quality of life and it assesses patients' level of function and their perceived wellbeing was translated to get a Kiswahili version. This scale has also been used among HIV/AIDS patients who were on ARVs attending CTC clinic in Kagera.

First Section: Social Demographic

Participants' demographic details were recorded. The demographic checklist includes questions that recorded participant's age, gender, and marital status, number of children, education level and social economic status questions. Information in this section provided data for objective number two of the study.

Second Section: Health information

The questions focused on the presence or absence of chronic illnesses (including HIV) and mental illness (Anxiety & Depression) and number of hospitalizations. This section aimed at answering objective number four and five of the study.

Third Section: Psychosocial factors

In measuring psychosocial factors associated with adherence to methadone treatment information regarding social relationship, social support and criminal background was collected. This section aimed at answering objective number three of the study.

2.1.5 Data Collection

Data collection commenced after receipt of letter of permission from Muhimbili National Hospital and recruitment of research assistants. Data were collected from the MAT data set to complete the checklist. MAT data set information was obtained from MAT questionere from each client's file. The completion of the MAT questionnaire is a requirement for clients who attend MAT clinic.

2.1.6 Data Management

All secondary data obtained was stored in the principal investigator's office in a secure environment with limited access. A screen capture tool was created and data entry was done through Statistical Package for Social Science (SPSS) version 18.

2.1.7 Analysis Plan

Analysis was done according to the study objectives. The dependent variable was adherence to methadone treatment and was dichotomous (yes or no).

The study looked at 13 factors (predictors) grouped into 3 main groups (demographic factors, psychosocial factors and medical factors). Predictors which are latent variables such as social support and social relationship sum scores were computed and distrubtions assessed to determine the analysis. Predictors which were categorical such as education and gender were not computed further. The following steps were followed after data cleaning:

1. Chi-square test and Odds Ratio were used to determine associations and strength of associations between predictor variables and sexual risk behaviors.
2. In controlling for confounders multiple logistic regression was used. Crude odds ratio, adjusted OR and 95% confidence interval were examined.
3. Descriptive statistic was examined for all predictors (factors)..

Then findings/results from the study are presented in tables, figures, and graphs in relation to the research objectives and variables.

2.1.8. Ethical consideration

Ethical clearance to conduct the study was sought from MUHAS Ethical Review Board. Permission to do the study was obtained from MNH and Psychiatry Head of Department.

CHAPTER THREE

3.1 RESULTS

3.1.1 Univariate Analyses

3.1.1.1 Description of participants

A total of 632 participants' files enrolled at MNH MAT clinic between February 2011 and February 2013. Data was not extracted from files of 23 (3.64%) participants who had passed away prior to February 2013. Final analysis included data from 609 participants' files (figure 1). Male participants were in the majority compared to female participants. They comprised 93.3% (568) of total population. The mean age (SD) was 34.28 years (6.41).

Table 1 below, shows the distribution of the study participants' characteristics (socio-demographic, health status and psychosocial and behavioral). Results of the current study show that with regard to the socio-demographic characteristics a high number of participants reported to be single 480 (78.8%) compared to those who were married 81 (13.3%) and widowed or divorced 44 (7.2%). Regarding level of education, most study participants attending MAT clinic completed primary school education 294 (48.3%) followed by those who had secondary education (161, 26.4%). The majority of participants 462 (75.9%) reported to have no employment, followed by 7.6% who had part time employment. Furthermore, among 609 participants attending MAT clinic 42.7% reported illegal activities to be their source of income. Finding related to their health status shows that 277 (45.5%) have never been hospitalized, 199 (32.7%) had a low number of hospitalization and 133 (22 %) reported a high number of hospitalization. A total of 76 (12.5%) participants reported to have chronic illnesses that impaired their functioning compared to 74.9% who stated not to have a chronic illness. Among 454 participants who were tested for HIV at the clinic, 170 (27.9%) tested positive and 284 (46.6%) tested negative. The serostatus of the remainder of clients was unknown, at least not recorded on file. On the Hopkins Symptom checklist for anxiety and depression 389 (63.9%) reported low scores while 209 (34.3%) scored high on the symptoms.

The majority of the participants scored low on depressive symptoms as compared to those who scored high (73.1% versus 3.8%). Participants' substance use dependence status was also assessed and 98 % met the criteria for dependence only 2 (0.3%) participants did not meet criteria for dependence. Dependence is one of the criteria for enrolment it is not clear how two clients who do not meet the criteria are attending, data collected from baseline data.

Table 1: Descriptive statistic of participants

		TOTAL [1]N = 609 (%)
Gender		
Male		568 (93.3)
Female		41 (6.7)
Marital Status		
Single		480 (78.8)
Married		81 (13.3)
Divorced/Widow		44 (7.2)
Level of Education		
No formal education		37 (6.1)
Primary		294 (48.3)
Secondary (Form 1-4)		161 (26.4)
Above form 4		39 (6.4)
Employment Status		
No Job		462 (75.9)
Full Time		22 (3.6)
Part Time		46 (7.6)
Source of Income		
Employment[2]		
	No	166 (27.3)
	Yes	443 (72.7)
Family/Friends		
	No	264 (43.3)
	Yes	345 (56.7)
Illegal activities		
	No	351 (57.6)
	Yes	258 (42.7)
Dependents for basic needs		
No dependents		277 (45.5)

1-2 Dependants	174 (28.6)
3 or more dependants	157 (25.8)
Hospitalization[2]	
No	275 (45.2)
Low	199 (32.7)
High	134 (22.0)
Chronic illness imparing functioning	
No	456 (74.9)
Yes	76 (12.5)
HIV Status	
Positive	170 (27.9)
Negative	284 (46.6)
Unknown	155 (25.5)
SF-12 Score[2]	
Very Good	29 (4.8)
Good	89 (14.6)
Average	155 (25.5)
Poor	285(46.8)
Living Arrangements	
Partner and Children	68 (11.2)
Children alone	41 (6.7)
Parents	180 (29.6)
Extended Family	34 (5.6)
Friends	31 (5.1)
Alone	68 (11.2)
No stable arrangements	16 (2.6)
Others	83 (13.6)
Living with someone who has a current alcohol problem	
No	470 (77.2)
Yes	51 (8.4)
Living with someone who uses non-prescribed drugs	
No	468(76.8)
Yes	53(8.7)
No. of close friends using drugs	
No	94 (15.4)
Low (1-4)	188 (30.9)
Middle (5-8)	114(18.7)
High (above 5)	213 (35.0)

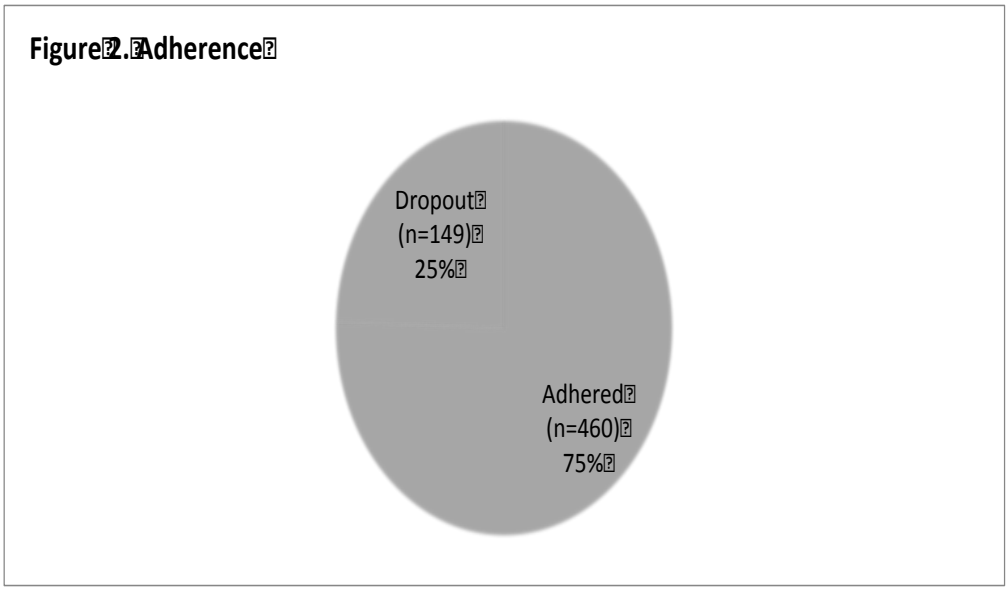
Incarceration[2]	
Never	341 (56.0)
Once	65 (10.6)
More than once	169 (27.8)
Anxiety symptoms	
Low	389 (63.9)
High	209 (34.3)
Depression Symptoms	
Low	445 (73.1)
High	23 (3.8)
[1]All variable totals < 609 are due to missing responses	

The psychosocial factors of participants explored included the quality of life (QOL). Results show that a high proportion (46.8%) of participants were found to have poor quality of life, while 25.5% had average, 14.6% and 4.8% had good and very good quality of life respectively. On criminal background, 341 (56%) have never been in jail, 65 (10.6%) only once and 169 (27.8%) more than once. With regard to living arrangement, a high proportion of participants stay with their parents (29.6%) (See Table 1)

3.1.1.2 Description of methadone treatment adherence

As seen in Figure 1, the proportion of participants who adhered to the methadone treatment among IDUs attending MAT clinic at MNH was 75% (460) and 25% (149) did not adhere to the treatment.

Figure 3: Adherence



3.1.2 Bivariate Analyses

3.1.2.1 Factors associated with methadone treatment adherence

As evident from Table 2 below, there was a significant association between adherence and employment as source of income (p=0.031), observing crudes odds ratio as summarized in Table 3, results shows that participants whose source of income is from employment are 1.5 times more likely to adhere to methadone treatment (OR, 1.50, 95% CI: 1.00-2.23) compared to those who are not employed. The association between adherence and other social demographic factors (age, gender, marital status and level of education) was not significant. Hospitalization was another factor that appears to be significantly associated with adherence to methadone treatment (p=0.027). Crudes odds ratio suggest that participants with a low number of hospitalization compared to no hospitalization are 49% less likely to adhere (OR, 0.51, 95% CI: 0.29-0.86) and those who have a high number of hospitalization compared to no hospitalization were also less likely to adhere to methadone treatment (OR, 0.50, 95% CI: 0.29-0.87). Levels of anxiety, depression or HIV status were not significantly associated with adherence. However, incarceration had a significant relationship with adherence (p=0.017) with crudes OR of 1.71 (95% CI: 1.08-2.72). There was also a significant relationship between quality of life and adherence (p=0.028).

Table 2. Bivariate analysis of predictors of adherence to MAT

		Adherence		TOTAL [1]N = 609 (%)	X^2	P-value
		No n=149 (%)	Yes n= 460 (%)			
Gender					2.30	0.186
Male		143 (25.1)	425 (74.8)	568 (100)		
Female		6 (14.6)	35 (85.4)	41 (100)		
Marital Status					5.10	0.164
Single		121 (25.2)	359 (74.8)	480 (100)		
Married		23 (28.4)	58 (71.6)	81 (100)		
Divorced/Widow		5 (11.4)	39 (88.6)	44 (100)		
Level of Education					4.50	0.213
No formal education		6 (16.2)	31 (83.8)	37 (100)		
Primary		88 (29.9)	206 (70.1)	294 (100)		
Secondary (Form 1-4)		41(25.5)	120 (74.5)	161 (100)		
Above form 4		8 (20.5)	31 (79.5)	39 (100)		
Employment Status					1.032	0.597
No Job		123 (26.6)	339 (73.4)	462 (100)		
Full Time		8 (36.4)	14 (63.6)	22 (100)		
Part Time		12 (26.1)	34 (73.9)	46 (100)		
Source of Income						
Employment					3.94	0.056
	No	50 (30.1)	116 (69.9)	166 (100)		
	Yes	99 (22.3)	344 (77.7)	443 (100)		
Family/Friends						0.183
	No	72 (27.3)	192 (72.7)	264 (100)		
	Yes	77 (22.3)	268 (77.7)	345 (100)		
Illegal activities						0.183
	No	93 (26.5)	258 (73.5)	351 (100)		
	Yes	56 (21.7)	202 (78.3)	258 (100)		
Dependents for basic needs					4.43	0.109
No dependents		76 (27.4)	201 (72.6)	277 (100)		
1-2 Dependants		44 (25.3)	130 (74.7)	174 (100)		
3 or more dependants		29 (18.5)	128 (81.5)	157 (100)		

Hospitalization[2]				7.26	0.027
No	74 (26.9)	201 (73.1)	275 (100)		
Low	54 (27.1)	145 (72.9)	199 (100)		
High	21 (15.7)	113 (84.3)	134 (100)		
Chronic illness imparing functioning				0.461	0.577
No	125 (27.4)	331 (72.6)	456 (100)		
Yes	18 (23.7)	58 (76.3)	76 (100)		
HIV Status				0.01	1.000
Positive	34 (20.0)	136 (80.0)	170 (100)		
Negative	58 (20.4)	226 (79.6)	284 (100)		
Quality of life				9.14	0.028
Very Good	3 (10.3)	26 (89.7)	29 (100)		
Good	20 (22.5)	69 (77.5)	89 (100)		
Average	33 (21.3)	122 (78.7)	155 (100)		
Poor	87(30.5)	198(69.5)	285(100)		
Living Arrangements				5.19	0.636
Partner and Children	24 (35.30)	44 (64.7)	68 (100)		
Children alone	9 (22.)	32 (78)	41 (100)		
Parents	45 (25)	135 (75)	180 (100)		
Family	9 (26.5)	25 (73.5)	34 (100)		
Friends	8 (25.8)	23 (74.2)	31 (100)		
Alone	19 (27.9)	49 (72.1)	68 (100)		
No stable arrangements	2 (12.5)	14 (87.5)	16 (100)		
Others	24 (26.9)	381 (73.1)	83 (100)		
Living with someone who has a current alcohol problem				0.186	0.739
No	125 (26.6)	345 (73.4)	470 (100)		
Yes	15 (29.4)	36 (70.6)	51 (100)		
Living with someone who uses non-prescribed drugs				0.165	0.685
No	127 (27.1)	341 (72.9)			
Yes	13 (24.5)	40 (75.5)			
No. of close friends using drugs				1.16	0.764
No	25 (26.6)	69 (73.4)	94 (100)		

Low (1-4)	49 (26.1)	139 (73.9)	188 (100)		
High (above 90)	47 (22.1)	166 (77.9)	213 (100)		
Life time incarceration[2]				8.15	0.017
Never	92 (27.0)	249 (73.0)	341 (100)		
Once	22 (33.8)	43 (66.2)	65 (100)		
More than once	30 (17.8)	139 (82.2)	169 (100)		
Dependence				1.150	0.358
1-4	1 (50)	1 (50)	2 (100)		
5-7	92 (19.7)	375 (80.3)	467 (100)		
Anxiety symptoms				2.10	0.349
Low	129 (26.1)	366 (73.9)	495 (100)		
Moderate	16 (18.8)	69 (81.2)	85 (100)		
High	4 (22.2)	14 (77.8)	18 (100)		
Depression Symptoms				2.05	0.166
Low	146 (24.6)	447 (75.4)	593 (100)		
High	3 (50)	3 (50)	6 (100)		

[1] All variable totals < 609 are due to missing responses

[2] $p \leq 0.05$

3.1.3 Multivariate Analyses

3.1.3.1 Factor associated with adherence to methadone treatment

All social-demographic, psychosocial and health related factors that had $p<0.25$ were explored in the forward logistic model to determine which factor best predicts the likelihood of adherence to methadone treatment among IDUs at MNH methadone clinic. Gender was the only factor that was found to show a significant association with adherence. Male participants compared to female were 0.24 less likely to adhere to treatment (OR, 0.24, 95% CI: 0.07-0.85). (Table 3)

Table 3. Logistic regression of independent predictors of adherence to MAT among IDUs in Dar es Salaam, Tanzania

	[1]N=609 (%)	Adherence		
		OR (95%CI)	[3]AOR 95% CI	P-Value
Marital Status				
Single	480 (78.8)	1.00	1.00	---
Married	81(13.3) (13.30)	0.85 (0.50-1.44)	0.84 (0.37-1.89)	0.673
Divorced/Widow	44 (7.2)	2.00 (1.01-6.82)	2.26 (0.70-7.31)	0.175
Gender[2]				
Male[2]	568 (93.3)	0.51 (0.21-1.24)	0.24 (0.07-0.85)	0.028
Female	41 (6.7)	1.00	1.00	---
Level of Education				
No formal education	37 (6.1)	1.00	1.00	---
Primary	294 (48.3)	1.33 (0.41-4.29)	0.52 (0.18-1.52)	0.233
Secondary (Form 1-4)	161 (26.4)	0.60 (0.27-1.36)	0.83 (0.27-2.55)	0.741
Above form 4	39 (6.4)	0.76 (0.32-1.77)	0.84 (0.21-3.34)	0.809
Dependents for basic needs				
No dependents	277 (45.5)	0.60 (0.37-0.97) [2]	1.19 (0.53-2.73)	0.670
1-2 Dependants	174 (28.6)	0.67 (0.40-1.14)	1.37 (0.65-3.09)	0.439
3 or more dependants	157 (25.8)	1.00	1.00	---
Hospitalization				
No	275 (45.2)	1.00	1.00	---
Low	199 (32.7)	0.51 (0.29-0.86) [2]	0.90 (0.55-1.50)	0.693
High	134 (22.0)	0.50 (0.29-0.87) [2]	1.62 (0.65-4.02)	0.297
SF-12 Score				
Poor	285 (46.8)	0.26 (0.08-0.89) [2]	0.28 (0.61-1.32)	0.11

Average		155 (25.5)	0.42 (0.12-1.49)	0.41 (0.09-1.94)	0.26
Good		89 (14.6)	0.39 (0.10-1.45)	0.38 (0.08-1.89)	0.24
Very Good		29 (4.8)	1.00	1.00	---
Incarceration					
Never		341 (56.0)	1.00	1.00	---
Once		65 (10.7)	0.72 (0.41-1.27)	1.00 (0.49-2.05)	0.995
More than once		169 (27.8)	1.71 (1.08-2.72) [2]	1.00 (0.54-1.85)	0.995
Source of Income					
Employment					
	No	166 (27.3)	1.00	1.00	---
	Yes	443 (72.7)	1.50 (1.00-2.23) [2]	1.43 (0.82-2.49)	0.20
Family/Friends					
	No	264 (43.3)	1.00	1.00	---
	Yes	345 (56.7)	1.31 (0.90-1.89)	0.94 (0.57-1.57)	0.82
Illegal activities					
	No	351 (57.6)	1.00	1.00	---
	Yes	258 (42.4)	1.30 (0.89-1.90)	1.03 (0.60-1.78)	0.90
Depression					
Low		445 (73.1)	1.00	1.00	---
High		23 (3.8)	2.00 (0.85-4.76)	0.47 (0.17-1.26)	0.13

[1]All variable totals < 609 are due to missing responses

CHAPTER FOUR

4.1 DISCUSSION

This study aimed at identifying individual factors that are associated with treatment adherence among IDUs attending Methadone Assisted Therapy (MAT) at Muhimbili National Hospital (MNH). The findings of the study provide a descriptive distribution of characteristics of clients who attend the clinic and the factors that influence whether they remain in treatment or drop out.

In answering the first research question of the study "What is the proportion of IDUs adhering to methadone assisted therapy at MNH? Clinical effectiveness of methadone is most commonly measured by retention of clients in treatment and by abstaining or reduction in the frequency of concurrent drug use (heroin and /or others) compared to no treatment or treatments that do not include methadone (Gowing et al., 2008, Mattick et al., 2009). Adherence in this study is operationalized as length of attendance at MAT in days, non adherence means absent for 30 days or more continuously after which returning back into programme needs NGO intervention using patient's Case Worker.

Based on this definition the study shows that 75% of MAT clients adhered in that they were retained in MAT at time of study (over a two year period from time of enrolment Feb 2011 to Feb 2013) and 25 % dropped out with that period and prior to completion of treatment .

The retention rate is higher when compared to Liu et al., (2008) reported results from a prospective cohort study in Guizhou province, China which recruited 1003 patients from 8 MAT clinics. In this study, the overall retention rate after 14 months of follow-up was 56.2%. It was found that a higher dose of methadone predicted higher retention.
Also findings from this study are higher that a retention rate of 48.7 % (drop up rate of 51.3%) revealed in a more recent study conducted in China by Gu et al., (2012) among 158 methadone assisted therapy clients. And even higher when compared to a study in Taiwan that reported a retention rate of 32.3% (drop out 67.7%) among 368 IDUs attending a methadone clinic during 18 months follow up (Lin et al., 2013). Barriers to

adherence included: side effects, inconvenience, low dosage, financial difficulties, and lack of access.
The difference in adherence between Tanzania and countries like China could reflect the difference in culture as well as programme related factors.

However an analysis of a 9-month follow-up data from a cohort of 965 patients in a pilot project in Vietnam revealed that the treatment retention rate after 9 months was approximately 90% after one year and 80% after two years (Long et al., 2010) which compares favourably with the findings of this study. Data which is available and important in understanding the factors associated with adherence but not reported in this study include: point in time of drop out (6, 9, 12, months), reasons for drop out, proportion of clients with concurrent drug use (heroin or other drugs) or to what degree they have reduced heroin use (either self-reported or detected by urine testing).

One factor that might have contributed to the success in terms of retention in treatment is the involvement of a family member (adherence sponsor) in the role of the treatment supporter as a requirement for every patient both in Dar es Salaam and Vietnam.
Additionally, both are the pilot programmes conducted with high level of attention and dedicated resources from many sectors of the society.

Among factors that contributed to the higher adherence rate at MAT Clinic at MNH are; Before clients are enrolled to the Methadone program at MNH they have to be screened and make a contract with one of the selected NGOs. The NGO provide follow up of clients as well as support. Clients at Methadone Clinic at Muhimbili, they have to maintain a good attendance, good behavoir. If they misbehave, they are first given a verbal warning, then written warning. If they still misbehave, they are sent back to the NGO where they came from, where they are counseled and they will be sent back the Methadone Clinic. At the clinic, beside having Psychiatrists, Pharmacists , and Nurses, there are also, Clinical Psychologists, Social workers, Occupational Workers who strengthen the services. Clients can participate in individual or group therapy. There is a program whereby clients after showing good manner are being employed to work as gardeners at the MNH campus and get paid

The second research question of the study asks “Is there are any associations between social demographic factors and adherence to methadone treatment among IDUs?” Finding of the current study shows that when adjusted for predictors of methadone treatment adherence, gender was the only social demographic factor that showed a significant association. Male IDUs attending MAT compared to female were 76% less likely to adhere (AOR, 0.24, 95% CI: 0.07-0.85). While there is some support in the literature to support this association it is not very robust. And the fact that males accounted for 93.3% of the sample and females only 6.7% reduces the strength of the association. However, Agosti et al (1991) found that males were more likely than females to drop out of treatment, and other studies have supported this showning females to be more likely to adhere in treatment as well (Chou et al., 1998; Simpson et al., 1997).

However, there are studies that have reported that women were more likely to drop out of treatment (Arfken et al., 2002; Hser et al., 2004; Roberts & Nishimoto, 1996) and in outpatient treatment patients, men remained in treatment longer than women (McCaul et al.,2001). Mammo et al., (1993) in a study involving 2,697 outpatients and intensive outpatient admissions for the state of New Jersey found that the rate of not completing treatment was significantly higher for females, those who are less educated, those employed in less – skilled occupation and the young. And yet other studies have found that gender has not been related to treatment success or failure (Carroll et al.,1991; Gainey et al., 1993; Melnick et al., 1997; Saum et al., 2001).

For non adjusted factors (predictors), there was an interesting finding which suggest that methadone clients who do not have family members who depend on them are less likely to adhere to methadone treatment compared to those who have more than 3 dependents.

Comiskey C.M (2013) in a 3 year national longitudinal study comparing drug treatment outcomes for opioid users with and without children in their custodial care at intake demonstrate that having children in a client's care improves outcomes for heroin use but also suggest the possible use of substitution substances.The association could imply that those who do not have people who depend on them are less likely to be motivated to recover, while those who need to support their family members may feel the need to stay in the program and be able to provide the requred support

In relation to other social demographic factors, findings of the current study are supported by McHugh et al., (2013) who found marital status, education and employment not to be associated with methadone treatment adherence. However, other previous studies (Chou et al., 1998; Hser et al., 2004; Veach et al, 2000; Mammo et al., 1993) do not support the current studies on the identified demographic factors.

HIV prevalence rate of 25% was noted in this study, which is lower than estimated by others.

HIV status for 155 clients was unknown at baseline. It is not clear whether clients did not know or they refused to reveal their status. From the community studies Williams et al., (2009) looked at HIV prevalence in sexually active IDUs in Dar es Salaam using serology testing after they consented to giving a blood sample. 64% of the females were found to be HIV positive and 28% of the men despite only 5 participants saying they were positive in the pre-test interview. In order to provide educational intervention programs for IDU in terms of lowering HIV risk, more knowledge of IDU beliefs and attitudes regarding HIV risk is needed for 6 and 12 months follow up.

The third research question aimed at exploring the association between psychosocial factors including quality of life as determined by scores on the SF 12 (HRQOL) , social support, living arrangements and criminal activities and adherence to methadone treatment. When adjusted, there was no significant association between psychosocial factors and methadone adherence.

Results of the current study show that those who have poor quality of life compared to those who have very good are less likely to adhere and this is consistent with findings from Mc Lellan et al., (1983). Findings from this study do not suggest a relationshp between living arrangemets, social support, criminal activity and adhereance. These findings are not consistent with other studies (Sayre et al., 2002; Tuten et al., 2003; Broome et al., 2002) who found social relationship, living arrangement, social support, quality of life and criminal background to be associated with methadone adhrence.

However, on the bivariate analysis, criminal background suggest that those who have spent more time in jail are more likely to adhere. This is in contrast to Waldorf et al., (1983) who found that those with criminal background are less likely to adhere to treatment. Hiller et al., (1985) examined the association between legal pressure and treatment adherence in a national sample of 2,605 clients admitted to 18 long-term residential facilities that participated in the Drug Abuse Treatment Outcome Study (DATOS). They found that those who entered residential treatment with moderate to high pressure from legal authorities adhered less compared to those who entered under low pressure from the legal authorities.

Mattick and colleagues (2009) meta analysis on the effectiveness of MAT reported that MAT may reduce criminal activity even though the summary effect estimate is not statistically significant and indicated that the non-significant results for criminal activity reductions may be due to scarce data on these two rather uncommon outcome measures of effects of MAT.

A pilot study in Vietnam reported significant reduction in HIV-related risk behaviours among patients and in crime activities in the districts where the pilot MAT was implemented; and significant improvement in patient quality of life (Long et al., 2010).

The fourth research question asks "*Does HIV/AIDS status influence adherence to methadone treatment among IDUs*" Results of this study showed that HIV/AIDS status has no significant relationship with methadone treatment adherence. It is well established that transmission of HIV can be reduced among opiate addicts by making drug treatment available to those that want help. Harris et al., (2006) identified a relative low rate of HIV infection among MAT patients. They suggested a possible protective effect of methadone maintenance against acquiring HIV infection, because MAT is orally administered and is not injected (which is a primary route for HIV infection among drug users).

However evidence to suggest that HIV is associated with adherence is limited. McHugh et al., (2013) did not find an association when examining 50 IDUs living with HIV attending methadone. Sendi et al., (2003) have shown that HIV negative status has not been associated with adherence.

With regard to the number of hospitalization and its relationship to treatment retention, the findings shows that participants with more frequent hospitalizations are less likely to adhere to the treatment compared to those who have not been admitted at the hospital. Studies have shown that older opiate dependent individuals who continued using heroin had higher rates of disability and more frequent hospitilizations (Hser et al., 2001). It would be interesting to note if there is a relationship between freuquency of hospitilizations and age and stage of HIV infection in this study

The last reseach question was to identify whether mental conditions (anxiety and depresion) are associated with methadone treatment adherence. Findings from this showed insignificant association between anxiety or depression and methadone treatment adherence. Results are inconsistent with findings reported by Gonzalez et al., (2011) who found that depressed patients are three-times more likely to be non adherent as non depressed patients. The lack of association in this study could be accounted for in part in that the scores on the John Hopkins depression was not completed in 141 files.

Amodeo et al., (2008) showed association between anxiety and adherence to methadone treatment. The lack of association again could reflect the limitation of the deign. Even though the scores for anxiety were available for all but one client, anxiety (and depression) were recorded during the initial assessment by rotating clinicians at the clients intake assessment, whereas adherance in terms of retention or drop out as it occurred later at 6 or 12 months follow up. Initial anxiety and depressed symptoms may hae resoled by time of ‘drop’out’. To examine these mental condition there is a need for a longitudinal case control design that will allow for a better comparison.

4.2 STUDY LIMITATIONS

There are a number of factors that may have affected the quality of the study. One of the main limitation was the design of the study. The principal investigator relied primarily on the electronic recorded data. The study depended on the information in the patient's files. Secondary data collection may have high rates of missing data as it completely depends on data collected before the study.

For example adherence in the context of MAT services, includes not only attendance and following the treatment regime but also abstinance or reduction in continued use of heroin or other drugs as determined by self report or urine testing. Only data on attendance and drop out were retrieved for analysis which is only one aspect of adherence. Also it should have been possible to correlate point of drop out and lenght of time in the programme. This would have given some important data on pattern of drop out (e.g early in the programme or later- 6, 12, 18, 24 months).

This is the first time for clients have had an opportunity to access treatment and the enrollment procedures are strict. Clients may have felt the need to respond in a social desirable way because of fear of non-enrollment or termination from the program.

In addition the current study did not include data on a number of additional treatment adherence influencing factors. These include program related reasons for drop out, psychological factors like self-efficacy, coping and stress, dose associated with retention, dose and HIV status, satisfaction with the programme, structural issues like distance from the site, unable to leave the city because of daily attendance.

CHAPTER FIVE

5.1 CONCLUSION AND RECOMMENDATION

It is evident from the relativly low drop out rate (25% at two year follow up) that factors that are associated with non adherence are been addressed to a great extent in the MAT programme.

This is the first public MAT in mainland sub sahara Africa and this is the first study exploring factors that may be associated with adherance in this cultural context. There are a number of studies from non African countries which have been identified predictors of adherance to MAT , however while the findings from this study showed some similarity with these studies there was also some disimilarities. And perhaps that is not surprising when one considers the context of the IDU problem in Tanzania. A very rapid evolution of IDU obtained from transient drug trafficking through our ports is remarkabley different than that of other countries. An epidemic of injecting drug use associated with driving the HIV epidemic was not something that was ever predicted.

The study findings indicate that females are more likely to adhere than males. In the context of a study population in which 93.3.% are males and only 6.7 % females this finding needs to be further explored. The profile of the female IDUs is well researched in the community studies conducted in Dar from 2003-2010. Some correlates with the profile of female IDUs from the community studies and those enrolled in the MAT programme may shed some light.

The findings also indicate that the majority of participatnts experience a poor quality of life. Research indicates that recovery from IDU requires individual and structural approaches that are patient-driven meeting quality of life issues (Laudet & White, 2010) and more holistic in nature (De Maeyer et al., 2011). It is recommended that a more holistic approach continue to be strengthened at MAT to improve quality of life of IDUs.

Future studies using follow up case control design are needed to better determine factors that influence adherence and such a design will clarify better risk and protective factors.

Data on the proportion of patients with concurrent drug use (either self-reported or detected by urine testing) at 3, 6 and 9 months was not accessed. Neither was data on dose of methadone and retention, dose methadone and HIV status. These factors have been identified in other countries as associated with adherence. Studies focusing on these issues may provide important data.

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APPENDIX I: CHECKLIST

I. PERSON INFORMATION

1	Sex	i. Male ( )			
		ii. Female ( )			
2	Date of birth	_____			
	Age	_____			
3	Marital status	Single	( )	Widow	( )
		Married	( )	Divorced	( )
		Co habiting	( )		
4	Number of children	_____			

II. EDUCATION

5	Education completed	0. No formal education 1. Primary 1-7 years 2. Form I - IV 3. Form IV and above

III EMPLOYMENT & INCOME

6	Employment status	1. No job. 2. Full time 3. Part time

SOURCE OF INCOME

7	From Employment	
		No
		Yes
8	From Family/Friends	
		No
		Yes
9	From Illegal activities	
		No
		Yes

IV. HEALTH

10	Having ever tested for HIV	0 [ ] No 1 [ ] Yes
11	Results of HIV test	1. [ ] HIV negative negative (not infected) 2. [ ] HIV positive (infected) 3. [ ] Don't know

QUALITY OF LIFE

12	In general, how do you scale status of your health?	1. Excellent 2. Very good 3. Good 4. Average 5. Poor

V. FAMILY AND SOCIAL

13	Living arrangements.	1 [ ]With partner and children 2 [ ] With partner alone 3 [ ] With children alone 4 [ ]With parents 5 [ ]With family 6 [ ] With friends 7 [ ] Alone 8 [ ] Controlled Environment 9 [ ] No stable arrangement 10 [ ]Others
14	Being satisfied with living arrangements	0 [ ] No 1 [ ] Indifferent 2 [ ] Yes
15	Living with someone who has a current alcohol problem	0 [ ] No 1 [ ] Yes
16	Living with someone who uses non-prescribed drugs	0 [ ] No 1 [ ] Yes

17	People you spend most of your free time with	1 [ ] Family 2 [ ] Friends 3 [ ] Alone
18	Being satisfied with the way you spend your free time	0 [ ] No 1 [ ] Indifferent 2 [ ] Yes
19	Number of Close friends using drugs or abusing alcohol	[_____]

VI. RISK BEHAVIORS

CRIMINAL BACKGROUND

20	Have you ever incarcerated in your lifetime?	0 [ ] No 1 [ ] Yes

VII. SUBSTANCE DEPENDENCE

21	MAT Form 8. Score of less than 3	0 [ ] No Dependence
	Score of 3 or more	1 [ ] Has Dependence

VIII. JOHN HOPKINS SYMPTOM CHECKLIST 25

22	Anxiety Sub-Scale: Score [_____]	0 [ ] No Anxiety 1 [ ] Has Anxiety

23 Depression Sub-Scale: Score [_____]

0 [ ] No Depression

1 [ ] Has Depression

X. ADHERENCE TO METHADONE TREATMENT

24 Did the client Adhere to Methadone treatment in 30 days in a role?

0 [ ] N0

1 [ ] Yes