

https://dspace.org/

Uptake of case management intervention for continuity of HIV treatment among released inmates in South Africa

Ndini, Pretty

2020
https://hdl.handle.net/10539/31725

Downloaded from a DSpace repository. https://dspace.org/

UPTAKE OF CASE MANAGEMENT INTERVENTION FOR CONTINUITY OF HIV TREATMENT AMONG RELEASED INMATES IN SOUTH AFRICA

Pretty Ndini

Student number: 1498359



A research report submitted to the Faculty of Science,
University of Witwatersrand, Johannesburg, in fulfilment of the requirements for the of Master of Science in the field of Epidemiology and Biostatistics.

Johannesburg, October 2020

DECLARATION

I, Pretty Ndini, declare that this research report is my own, unaided work. It is being submitted for the Degree of MSc Epidemiology at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at any other University.



(Signature of the candidate)

8th day of October 2020 in Johannesburg

DEDICATION

This research report is dedicated to my mother Asa Sithole, who has been my pillar of strength throughout this journey. The report is also dedicated to my best friend Nozipho Sibiya who pushed me when I wanted to give up. Thank you for always being my alarm, proofreading my work, and being my cheerleader.

ACKNOWLEDGEMENTS

I wish to thank my supervisors for agreeing to supervise me. A special thanks to Dr. Tonderai Mabuto for his countless hours of guidance, support, constructive criticism, encouragement, reading my work, and most importantly for his patience throughout this journey. To Dr. Ntombizodwa Ndlovu, thank you for the support, efforts you have made ensuring that I finish this report and for your patience all this time. Thank you both for not giving up on me. Lastly, I would also like to thank the Aurum Institute for allowing me to use their data and the assistance provided the entire time.

SUPERVISORS:

Dr. Tonderai Mabuto (The Aurum Institute)

Dr. Ntombizodwa Ndlovu (University of Witwatersrand, School of Public Health)

TABLE OF CONTENTS

DECLARATION i

DEDICATION ii

ACKNOWLEDGEMENTS iii

DEFINITION OF TERMS viii

LIST OF TABLES ix

LIST OF FIGURES x

LIST OF ABBREVIATIONS xi

ABSTRACT xii

CHAPTER 1: INTRODUCTION 1

1.1 BACKGROUND 1

1.2 PROBLEM STATEMENT 4

1.3 STUDY JUSTIFICATION 5

1.4 AIM 5

1.5 OBJECTIVES 6

1.6 LITERATURE REVIEW 6

1.6.1 Continuation of ART after release 6

1.6.2 Barriers and facilitators for the continuation of ART after release 8

1.6.3 Overview of case management interventions 9

1.6.4 Conceptual framework for this study 13

CHAPTER 2: METHODOLOGY 20
2.1 PRIMARY STUDY 20
2.1.1. Description of the primary study 20
2.1.2. Study setting 22
2.1.3. Data collection for primary study 22
2.2. SECONDARY DATA ANALYSIS 23
2.2.1. Study design 23
2.2.2. Study population 23
2.2.3. Sample size calculations 24
2.2.4. Data collection and data management 24
2.2.5. Study outcomes 24
2.2.6. Statistical analysis 25
2.2.7. Ethical considerations 27
CHAPTER 3: RESULTS 28
3.1 Study participants 28
3.2 Factors associated with uptake of case management support 30
3.3 Linkage-to-care outcomes 32
CHAPTER 4: DISCUSSION 34
4.1. Main findings 34
4.4. Strengths and limitations 37
4.3. Conclusion 38

4.4. Recommendations 39

REFERENCES 40

APPENDIX I- PLAGIARISM DECLARATION 47

APPENDIX II- PRIMARY STUDY ETHICS CERTIFICATE 48

APPENDIX III- ETHICS CERTIFICATE FOR CURRENT STUDY 49

APPENDIX III- TURNITIN REPORT 50

DEFINITION OF TERMS

Linkage-to-care was defined as completing registration for or receiving HIV-specific care at any medical facility after they are released from prison.

Uptake of case management was defined as attending at least one case management session after release from correctional centre.

Awaiting trial detainees are incarcerated persons who are waiting for a judicial sentence or conviction on the crime for which they are accused.

Offenders are persons who have received a judicial determination of the punishment to be served after conviction.

Inmates refers to both offenders and awaiting trial detainees.

LIST OF TABLES

Table 1.1: Summary of studies on linkage-to-care outcomes post-release……11

Table 1.2: Description of factors assessed for associations with uptake of case management…….……..……...15

Table 2.1: Characteristics of study sites…….20

Table 3.1: Participant characteristics at baseline: by uptake of case management support……27

Table 3.2: Analysis of factors associated with uptake of case management support…….29

Table 3.3: Adjusted analysis of association between linkage-to-care and uptake of case management…….....31

LIST OF FIGURES

Figure 1.1: Conceptual framework of socio-ecological factors influencing uptake of case management support……14

Figure 3.1: Linkage into care outcomes among inmates who used the case management intervention and those who did not……...31

LIST OF ABBREVIATIONS

AIDS	Acquired Immunodeficiency Syndrome
ARVs	Antiretroviral Drugs
ART	Antiretroviral Therapy
ATD	Awaiting Trial Detainees
DCS	Department of Correctional Services
FSW	Female Sex Workers
HIV	Human Immunodeficiency Virus
MSM	Men who have Sex with Men
NSP	National Strategic Plan on HIV, STIs and TB
PWIDs	People Who Inject Drugs
STIs	Sexually Transmitted Illnesses
TB	Tuberculosis
WHO	World Health Organisation
USA	United States of America
CDC	Centres for Disease Control and Prevention
ARTAS	Antiretroviral Treatment and Access to Services
CI	Confidence Interval
OR	Odds Ratio
IQR	Interquartile Range
HR	Hazard Ratio

ABSTRACT

Background: Globally, South Africa has one of the highest inmate rates and one of the largest Human Immunodeficiency Virus (HIV) epidemics. Over the years, there have been improvements in accessibility to HIV treatment for incarcerated inmates within correctional facilities in South Africa, with many inmates initiating antiretroviral therapy (ART) and achieving virologic suppression. However, there are no effective referral systems to facilitate linkage to ART clinics in the general community after release from correctional centres. In this study, we sought to evaluate the uptake of an individualised case management intervention designed to facilitate post-release linkage to HIV care services among inmates released on ART.

Methods: This is a secondary data analysis of a prospective cohort of released HIV-positive inmates enrolled in the I-Thuba Linkage-to-Care study conducted in Gauteng Province of South Africa. Briefly, 192 participants who were assigned to receive case management support as an intervention to facilitate linkage-to-care and released from January 2016 to March 2017 were included in this analysis. After excluding participants who died and those re-incarcerated, we remained with a sample size of 188 participants in the final analysis. We assessed factors associated with uptake of case management support (i.e. attending at least one of the three available case management sessions) using univariable and multivariable logistic regression methods. Further, using the simple logistic regression, we assessed the association between uptake of case management support and 90-day linkage to HIV care after release from the correctional centre.

Results: Of the 188 participants assigned to receive case management support, 71% (n = 133) attended at least one case management session, either in-person or telephonically. Uptake of case management was associated with being released on parole and disclosure of HIV status. In this study, participants who had completed their sentences (non-parolees) were less likely to utilise case

management support than inmates who were released under supervision (Adjusted Odds Ratio (AOR) = 0.24, 95% Confidence Interval (CI): 0.11 - 0.52). Also, participants who reported having disclosed their HIV status were more likely to attend case management sessions than those who did not disclose their HIV status (AOR = 5.06, 95% CI: 2.16 - 11.84). Utilization of the case management support was associated with improved linkage-to-care compared to non-utilization of the case management intervention (AOR = 5.62; 95% CI: 2.25 - 14.03).

Conclusion: Our study findings suggest that case management can be successfully implemented in the South African setting and may reduce ART disruption in the period immediately following release. Further research is required to identify methods to increase the reach of case management support to individuals who have completed their sentences and are not required to remain in contact with the corrections system after release. In addition, there is value in strengthening pre-release programmes to provide disclosure counselling as this may influence how individuals engage with HIV care support services after release.

CHAPTER 1: INTRODUCTION

1.1 BACKGROUND

Globally, South Africa is amongst the countries with the highest inmate rates (rates refer to the number of people per population). Approximately 360,000 individuals (360,000 is the prison population in terms of the number of inmates who pass through the system. 118,000 is the number of people required to be in prison but due to overcrowding there are more inmates than the bed capacity) each year are incarcerated (pass through the system) across the 218 correctional facilities in the country (1). The welfare of incarcerated individuals in these correctional centres is managed by the National Department of Correctional Services (DCS), which is organised into six administrative regions across the country: Gauteng; Kwa-Zulu Natal; Eastern Cape; Western Cape; Free state and Northern Cape; and Limpopo, Mpumalanga and North West. The inmate population is broadly categorised into awaiting trial detainees (ATDs) and offenders. ATDs are incarcerated persons who are waiting for a judicial sentence or conviction on the crime for which they are accused, and offenders are persons who have received a judicial determination of the punishment to be served after conviction. Collectively, both ATDs and offenders are referred to as inmates (1).

One of the major challenges within correctional settings globally is the high prevalence of HIV, which is significantly greater than in the general population (2–7). In this regard, the World Health Organisation (WHO) classifies inmates as one of the key populations for the HIV epidemic together with other high-risk groups such as, female sex workers (FSW), men who have sex with men (MSM), people who inject drugs (PWIDs), and transgender people (8). Essentially, key populations are critical to global and national efforts of ending the HIV epidemic as a public health threat by the year 2030. In Southern African correctional facilities, HIV prevalence in various correctional

facilities ranges from 7.2% – 34.9% compared to 4.7% - 18.9% in different general populations (4,9–11). The high HIV prevalence in Southern African correctional facilities is as a result of varies factors such as high-risk sexual activity, poor food and nutrition and drug dependence (10). High risk sexual activities (non-consensual) is driven by overcrowding challenges which limits proper supervision and inmates have little autonomy to protect themselves (10,12). The unplanned nature of the sexual encounters limits the opportunity for negotiation of HIV prevention interventions, such as the use of condoms and pre-exposure prophylaxis. Moreover, the overcrowding of correctional facilities and the limited access to food or services also exacerbate the prevalence of both coerced sex and imbalanced power in sexual relationships. Blood-borne exposure to HIV may also contribute to the disproportionately high prevalence in correctional facilities, occurring through tattooing practices, sharing razor blades for grooming, 'blood-brother' rituals (making incisions and mixing blood), and sharing needles for injecting drug use (10).

In the past decade, DCS has responded to the HIV epidemic in correctional settings by increasing the availability and accessibility to antiretroviral therapy (ART) in correctional centres (1). ART effectively reduces Acquired Immunodeficiency Syndrome (AIDS)-related illness and AIDS-associated deaths and reduces the risk of HIV transmission (13). The expansion of ART programmes in correctional centres has been facilitated by the increase in the number of DCS nurses trained to initiate and manage patients on ART, localisation of the initiation of ART within correctional facilities instead of outside hospitals, implementation of test and treat guidelines for all persons living with HIV and the strengthening of ART delivery through partnerships between DCS and non-governmental organisations. Following HIV diagnosis, inmates in South African correctional settings, who are mostly men, are likely to initiate ART. From 2015 to 2016, a total of 199,750 inmates voluntarily tested for HIV, among those who tested HIV positive, 98% of them were reported to have been initiated on ART (14). In addition, the latest data from DCS 2018-2019 has

shown that among inmates who have tested positive, 99% (27 335/27 751) are on ART (15) and more than 90% achieve virologic suppression within the first six months of treatment (14).

Notwithstanding the successes of ART programmes within correctional centres, inmates on ART need to continue taking their medication after release to reduce AIDS-related morbidity, mortality, and onward HIV transmission. This is particularly important in South Africa, where there is a high movement of inmates from correctional centres back into the community mostly as a result of DCS strategies to manage the problem of overcrowding in most correctional centres across the country (16). In March 2017, DCS correctional facilities across the country were operating at 136% of their official capacity (population of 161,054 vs. approved bed space for 118,136) (1). Over the years, DCS has used parole as one of its strategies to manage overcrowding. Parole is the conditional release of some offenders back into the community before the expiration of their sentence. In 2017, about 51,785 persons were completing their sentences under parole supervision in the general community (1).

Once inmates are released from correctional centres, they face several challenges which often result in discontinuation of ART, as evidenced by increased HIV viral load counts in the period immediately following release (5,17). Most inmates have to navigate several barriers such as unstable housing, economic dependency, substance abuse, disclosure of HIV status, internalised and enacted stigma with regards to HIV and ex-inmate status, and other general issues affecting re-integration back into their families and community (18,19). This leads to delays in linkage to community health facilities for HIV care (referred to as post-release linkage), as reported in most studies that have mainly been conducted in the United States of America (USA). In these studies, the proportion of inmates who successfully continue with HIV care after release ranges from 28 – 73% in the absence of interventions (7,19–25), and from 38% - 96% when inmates are supported in the

post-release period (20,21). Hence the development of comprehensive discharge plans is essential to ensure treatment continuation and successful family and community reintegration of ex-inmates (16).

1.2 PROBLEM STATEMENT

South Africa has a dual burden of bearing the brunt of the HIV epidemic and having one of the highest global incarceration rates. However, there is limited understanding of post-release linkage outcomes for inmates released on ART, and there are no effective referral systems to facilitate linkage of released inmates to ART clinics in the general community. After release, ex-inmates are rarely followed-up to assess or assist with entry into a community ART clinic, they are only provided with a referral letter by a DCS nurse, and they are issued with a 30- to 60-day ART continuation supply (22). These approaches are inadequate for ensuring the continuation of HIV treatment among inmates released from correctional facilities. The lack of post-release systems to support the transition from corrections to community HIV care erodes the impressive HIV care outcomes observed while inmates are within correctional settings.

The antiretroviral drugs (ARVs) used for first-line HIV treatment have a low barrier to resistance, and HIV drug resistance is an immediate concern with interruptions in ART (22). Once in the community, not only is the health of the released individual at risk, but sexual partners are potentially at risk of infection with drug-resistant HIV in the period immediately following release, which is typically characterized by high sexual activities (23). The period after release is also characterized by various social barriers such as drug abuse, unstable housing, poverty and stigma. Continuity of HIV treatment post-release will help to preserve the continuation of first-line ART and reduce the risk of transmitted drug-resistant HIV. Therefore, interventions to facilitate the transition from corrections to community HIV care, are urgently required.

1.3 STUDY JUSTIFICATION

The current five-year National Strategic Plan (NSP) on HIV, Sexually Transmitted Illnesses (STIs) and Tuberculosis (TB) in South Africa, outlines the need for interventions to reach key populations (such as inmates in correctional settings) with customized and targeted interventions to improve initial and sustained engagement in HIV care (24). Without exploring potential interventions to bridge this gap, South Africa is likely to fall short of its goals to retain 90% of patients on treatment, and reduce the number of new HIV infections from 231,000 in 2017 to 100,000 per year by 2022 (24). This study evaluates the uptake of an individualised case management – a potentially transformative intervention with reported success in bridging the gaps of post-release linkage to HIV care in developed countries (22, 24, 25). This and other similar research are required to support evidence-informed interventions for key populations such as inmates who are critical to the control of the HIV epidemic in South Africa. In summarising the available literature, there are major gaps in maintaining released inmates on HIV treatment. Case management interventions offer a potential solution to bridge this gap. Among other priorities, more understanding is required on the acceptability and utilisation of case management services among released inmates in South Africa. Such information will contribute evidence to guide the country's strategic plan on interventions for inmates without 'leaving them behind'.

1.4 AIM

The overall goal of this study is to evaluate the utilisation of case management support by inmates released on ART from six correctional facilities located in the Gauteng Province of South Africa, between January 2016 and March 2017.

1.5 OBJECTIVES

1. To describe the baseline demographic and clinical characteristics of inmates assigned to receive case management support.
2. To determine factors associated with the uptake of case management support among inmates assigned to receive case management support.
3. To determine the association between uptake of case management support and self-reported linkage to HIV care within 90 days of corrections release.

1.6 LITERATURE REVIEW

1.6.1 Continuation of ART after release

There is a paucity of research from developing countries with high incarceration rates, describing the proportion of inmates living with HIV who continue with ART after release, and the factors associated with linkage-to-care outcomes. One of the few studies conducted in South Africa reported the proportion of former inmates who continued HIV care at the same off-site clinic where they had received healthcare services during incarceration. In this study, among 34 released inmates, 23 (68%) visited the clinic at least once within 12 months after release (27). However, in the current era of HIV programmes in South Africa, most inmates receive HIV treatment from on-site correctional centre pharmacies and upon release they access care from community clinics, which are usually in different geographical areas from where the correctional centre is located.

One of the first studies to explore post-release linkage-to-care in the current ART era and in a high HIV burden setting was conducted in South Africa from May 2014 to March 2017. The primary aims of that study (hereafter referred to as the I-Thuba Study), were to estimate linkage to ART following release, and to evaluate factors associated with successful linkage-to-care. In this study, post-release linkage-to-care was defined as completing registration for or receiving HIV-specific care at any

medical facility within 90 days after release. Overall, the study findings point towards poor post-release linkage outcomes. During follow-up, 227 of the 351 (65%) inmates released on HIV treatment self-reported that they had visited a medical facility for HIV care within the first 90 days of release from the correctional centre. Of the 227 who self-reported going to a medical facility, 121 (53%) were verified through paper and electronic clinic records to have gone to the clinic, which translates to an overall of 35% (121/351) verified 90-day post-release linkage across all inmates released on HIV treatment.

Most of the available evidence on post-release linkage outcomes is from developed countries, particularly from the USA, where most correctional service authorities have established programmes to assist with the linkage of released inmates to community resources, including community clinics for treatment continuation. Despite the USA having a lower HIV prevalence and being well-resourced to support released inmates, findings from studies conducted in this setting also suggest gaps in post-release linkage outcomes (28). Without additional support interventions, 28% - 73% of the released inmates in the USA continue treatment within the first 12 months following release (7). In the absence of interventions to facilitate timeous linkage to community clinics, the disruptions in ART lead to the reversal of gains in virologic suppression, which may have been achieved prior to release (29,30). Upsurges in HIV viral load after initial suppression (i.e., virologic rebound), increases the chances of AIDS-related illnesses and AIDS-related deaths if ART is not resumed timeously. Moreover, inconsistent ART use may also lead to the development of ART drug resistance (31), which has similar consequences of virologic rebound and a gradual weakening of the immune system. Further, the effects of ART disruption also pose challenges to the re-integration of released inmates back into their families or the general community. For example, inmates who are ill may not be able to contribute to the economic needs of the household, and they may pose an

additional burden on their families if they require additional care and support with general daily tasks.

1.6.2 Barriers and facilitators for the continuation of ART after release

The period from release from a correctional facility to re-integrating back into the community, including finding clinics to continue with ART, is usually challenging for most released inmates. This highly vulnerable period is marked with multiple challenges related to instability of where to stay, depression, stigma, diminished social support, illicit drug use, unemployment, and care navigation (19). These risk factors for disengagement from HIV care are also reported from routine HIV programmes in the general community. One study in San Francisco found an almost two-fold risk of virologic failure among persons with unstable housing compared to those with stable housing (32). In another qualitative study, the use of illicit drugs was a risk factor for ART interruption due to reincarceration and lower prioritization of engaging in HIV care (33). In another USA-based study among 30 released inmates living with HIV, positive social support was identified as a facilitator for treatment continuation among released inmates (34). In this study, participants who had access to strong family support structures were less likely to relapse to illicit drug use and more likely to remain engaged in HIV care, compared to those who lacked similar support.

Sustained ART care post release is key to the effective management of HIV treatment and maintain the treatment gains achieved during incarceration. However, sustained ART care for the inmate population is difficult due to the challenges faced after release from correctional facilities. Few studies have assessed factors that contribute to sustained ART care post release. One systematic view study reported that sustained ART after release was associated with the provision of disease management education during incarceration and case management (35,36). Another study on retention into care in the general community found that initiating on ART early was associated with

retention in care, which is something that lacks in most inmates (37). Similar results were found by (38) where people who were started on ART early were 0.43 less likely to be lost to follow up (AHR= 0.43, 95% CI: 0.24 – 0.76). Another study conducted in the US found that availability of appointment reminders (RR= 1.13; 95% CI: 1.03 – 1.24) and stigma support services (RR= 1.11; 95% CI: 1.04 – 1.19) were associated with retention in care (39). Utilization of social support was also found to increase retention in care (40).

In the I-Thuba Study conducted among ex-inmates in South Africa, several key barriers, and facilitators to the continuation of ART, were identified among 36 participants who participated in in-depth interviews. At the individual level, economic insecurity and substance abuse were identified as the main barriers. At the interpersonal level, participants who had support from their social networks had more favorable care engagement outcomes. However, in some cases, people within social networks discouraged desirable healthcare-seeking behavior, and instead promoted habits of substance abuse, which outweighed the value of going to the clinics. At the clinic level, experiences with unsatisfactory clinic waiting times, enacted stigma from healthcare workers, and difficulties in navigating the community healthcare system (compared to the DCS healthcare system), were cited as barriers to continuing with HIV medication.

1.6.3 Overview of case management interventions

Studies have extensively explored the effectiveness of case management extensively for supporting released inmates to continue with HIV treatment in the general community. Broadly, case management involves organizing and coordinating activities and other support activities which optimize the well-being of a person (41). In the context of HIV care; a case manager or case worker works collaboratively with their client to assess, plan, implement, coordinate, monitor and evaluate the options and services required to meet the client's HIV care and treatment needs (42).

Several studies in developed settings have explored case management interventions to facilitate the continuation of treatment after release (Table 1.1), albeit mixed results on the effectiveness of such interventions. In one randomized controlled trial of 270 HIV-positive inmates transitioning from San Francisco county jail, participants assigned to receive case management support were 1.95 times (95% CI: 1.11-3.46) more likely to enter into care within 30 days of release compared to those who received standard of care services (43). Similarly, in another USA-based study, participants who received support from a case manager had a two-fold increase in the chances of linking to care, compared to those who did not receive case management support (OR = 1.99; 95% CI: 1.12-3.55) (23). Furthermore, case management was also reported as an effective linkage-to-care intervention in a study conducted in Australia (26). In this study, 53% of participants receiving case management utilized healthcare services post-release compared to 41% of participants in the standard of care group (26).

Despite careful planning, high implementation fidelity, and overall acceptability, findings on the effectiveness of case management of transition outcomes from corrections to community HIV care services have been mixed. In some studies, case management support was found to be ineffective in improving linkage-to-care outcomes (44–46). In a USA-based study, Wohl et al. (45) found that provision of case management compared to standard of care was neither associated with medication adherence nor utilization of social and health services after release from correctional centres (65.1% inmates in the case management arm versus 54.4% in standard of care ($p > 0.5$). In another randomized controlled trial of 405 HIV-positive inmates released from Texas and North Carolina, no differences were observed between participants in the case management intervention and those receiving standard of care; about 60% of participants achieved viral suppression in the intervention arm and 61% in the standard of care (44). These studies highlight the importance of continued

research on the role of case management in promoting positive transition outcomes after correctional facility release.

Table 1.1: Summary of studies on linkage-to-care outcomes post-release

Author, year	Country	Intervention	Comparison group	Duration of intervention	% linking into care post-release
Loeliger et al., 2018 (36)	Connecticut	Transitional case management	No comparison group	30 days before planned release and continued for up to 60 days post-release	21.1% linked into care within 14 days of release and 34.0% linked into care within 30 days post-release.
Ammon et al., 2018 (47)	Dallas	Discharge planning which included a case manager	No comparison group	Pre- and post-release	34% linked to care within 90 days of release.
Booker et al., 2012 (48)	USA	Case management	No comparison group	Participants received case management services in jail and post-release	79% linked to care within 30 days of release.
Wohl et al., 2011 (45)	North Carolina	Case management or pre-release discharge planning	Standard of care participants received HIV outreach services (referrals to community clinics and social services) for 3-6 months prior release only. The outreach services were provided by nurses.	3 months before release and continuing 6 months after release	65.1% of the inmates assigned to the case management intervention linked into care within 4 weeks of release compared to 54.5% assigned to the standard of care arm.
Kinner et al., 2016 (26)	Queensland	Case management	Participants assigned standard of care received usual care which does not include transitional support provided by the prison.	6 weeks before release and 6 months after release	53% of the participants receiving the case management support were able to utilize health services post-release compared to 41% receiving the standard of care.
Myers et al., 2018 (43)	San Francisco	Navigation enhanced case management	Standard of care participants received discharge planning (one-on-one counselling and other social services) and case management for 90 days post-release	12 months post-release	Inmates in the case management arm were 2.15 (95% CI: 1.23 - 3.75) more likely to link into care within 30 days of release compared to those in the standard case management

In South Africa, case management has been applied effectively outside of correctional facility settings. Several studies have shown the effectiveness of case management-based interventions in promoting initial and sustained engagement in HIV care for persons diagnosed with HIV in the general population. In one study conducted to evaluate the effectiveness of three interventions to accelerate linkage-to-care from community-based HIV testing sites in rural and urban South Africa, case management was identified as the only effective intervention in increasing the proportion of the people who went to the clinic for HIV care compared with standard of care (Hazard ratio = 1.1; 95% CI: 0.84-1.3) (49). Similarly, in another USA-based study, participants who received support from a case manager had a two-fold increase in the chances of linking to care, compared to those who did not receive case management support (OR = 1.99; 95% CI: 1.12-3.55) (23). However, in South Africa, there is a dearth of evidence on the application of case management approaches to key populations such as ex-inmates.

1.6.4 Conceptual framework for this study

The socio-ecological framework of (50), was used as a framework to organise individual and contextual-level factors with the potential to influence uptake of case management. This framework is widely applied to studies that seek to understand healthcare-seeking behaviour among various target populations. According to the framework, individuals exist within a broader environmental and social ecosystem that shapes their health behaviours. The framework points to the interactive characteristics of individuals and environments that underlie health outcomes (51). The social-ecological framework divides the influence of healthcare-seeking behaviour into levels that account for individual factors, interpersonal factors, clinic factors, community factors, and policy factors.

- Individual-level factors relate to an individual's various traits and identities, which include attitude, perceptions of physical health, health self-efficacy, personal beliefs, general chronic

illness care, outcome expectancies, and resources such as time and money to access available services.

- At the interpersonal level, relationships and the social networks that an individual participates in may mediate the perceptions of values and/or costs for accessing available services.
- At the institutional/clinic level, the accessibility of health services, and how they are delivered is essential to how individuals assess the costs of engaging in the service. For example, health services that require long waits, or that enacts stigma, increases the costs of care engagement, which may outweigh the value placed on using the services.
- At the community level, individual decision making may be influenced by the community structures and norms that are often important in determining how the individual as a community member behaves and the customs they uphold.
- Lastly, policies that are instituted at a national and local level constitute the broadest level of the socio-ecological model. Policies play a critical role in how health care services are delivered, and more notably, in the level of access of healthcare services to marginalized population groups, such as ex-inmates.

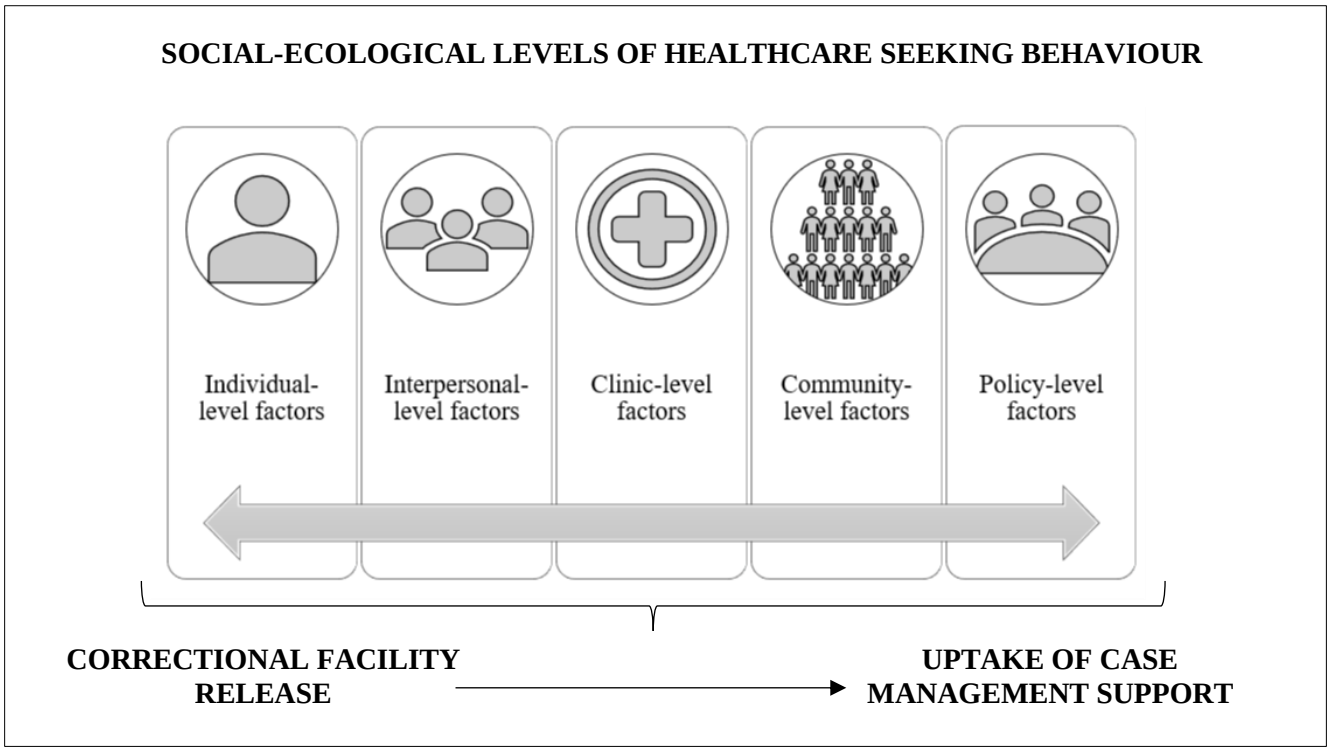


Figure 1.1: Conceptual framework of socio-ecological factors influencing uptake of case management support (50).

In this study, the socio-ecological framework and existing literature were used to guide the selection of variables. In Table 1.2 below, we outline the rationale for the selection of factors that were included in our analyses to investigate the determinants of uptake of case management support.

Table 1.2: Description of factors assessed for association with uptake of case management

FACTORS	CATEGORIZATION	RATIONALE
Individual-level factors		
Age (in years)	18-29 30-40 ≥40	The association between age and linkage-to-care is reported across several studies. In most studies, younger age is associated with poor linkage-to-care outcomes (5,52).
Sex	Male Female	The participant's sex is a commonly reported risk factor for utilization of health services and may be associated with uptake of case management (53).
Country of birth	South African Non-South African	Participants from countries outside of South Africa may experience raised barriers such as the lack of self-efficacy in navigating the health system, or fear of clinic-enacted discrimination based on nationality (54).
Level of Education	Primary school and below Secondary school and above	The association between education and the use of healthcare services has been widely documented. A low level of education is associated with lower self-esteem to navigate the health system (55).
Geographical area released to	Gauteng Province Outside Gauteng Province	Participants released outside of Gauteng were disadvantaged with respect to access to the case managers because communication was only telephonic. They might have not received the full support needed to facilitate their use of healthcare services.
Participation in pre-release programs (These programmes included anger management, life skills, preparatory programmes on sexual offence, substance abuse, restorative justice, HIV/TB peer education. Participation in the programmes differed. There are programmes that are compulsory to inmates depending on their charge/sentence. Other programmes were recommended or voluntarily.	Did not participate Participated in at least one program	Participants attending prerelease programs might have gained knowledge and skills in making healthy choices about uptake of healthcare services post-release (56).

FACTORS	CATEGORIZATION	RATIONALE
Similar programmes are available in all the correctional facilities, however the provision of those programmes may differ by facility.) This was measured by asking participants about their participation in the programmes offered by the facility. Participant participation in the programmes was either determined by social workers or it was voluntarily.		
Prior incarceration	Yes No	Several studies have assessed the association between incarceration and poor health outcomes. History of incarceration has been found to be associated with chronic health problems (57). Incarceration is extremely disruptive and makes it difficult to maintain stable access to healthcare services such as case management. The stigma attached to those with history of incarceration makes them less desirable which may in turn affect access to healthcare services (57).
Incarceration duration (The time was determined by the inmate's date of release. For example, other inmates were enrolled into the study a day before release and others a month or more before date of release).	≤ 6 months 6-12 months ≥ 12 months	Participants spending more time incarcerated may have had enough time to engage with healthcare workers within DCS and might be well equipped to navigate clinics on their own.
Release conditions	Parolee Non-parolee	The association between parole and health care utilization is reported across several studies. In most studies being released on parole is associated with uptake of healthcare services (5).
Perceived health status at enrolment (This was measured by asking participants about their current health status).	Healthy Not healthy	Participants who feel healthy are likely not to see the need for continuing with care (58,59).

FACTORS	CATEGORIZATION	RATIONALE
ART duration (days) at enrolment	≤ 6months 6-12 months ≥ 12 months	Participants that have been on ART for longer may find it easy to navigate the health system because of an understanding of how the medication works and may have developed confidence in the health system. Majority of the participants are initiated on ART in DCS. Navigating the health system is a new thing for them and for most of them they develop the confidence to continue taking medication outside because of the prison experiences.
Interpersonal factors		
Relationship status	Not in a relationship In a relationship	Research has shown that social ties influence multiple health outcomes, including health behaviors. Strong support from family or friends is associated with better health (60). Social ties are likely to influence health behavior. Individual's with the highest level of involvement in social relationships are more likely to engage in the health system (60).
Person staying with at time of release	Partner Family Alone	Like social relationships, having a stable place to stay after release plays a role in successful reintegration which can result to linkage to clinics (60).
Regular contact with social networks during incarceration (This was measured by asking participants if they were keeping contact with people outside DCS either through visits, writing letters or telephone).	Yes No	Regular contact is comparable to social support, and participants with regular contact may have strong social supporting networks, which is linked to better health outcomes.
Duration period between enrolment and release	<30 days >30days	Participants with greater contact time with study staff may have created better rapport or trusting relationships (61,62). The time was determined by the inmate's date of release. For example, other inmates were enrolled into the study a day before release and others a month or more before date of release.

FACTORS	CATEGORIZATION	RATIONALE
Ever disclosed HIV status	Yes No	Studies have shown an association between disclosure and uptake of HIV services. Individuals who have disclosed their HIV status tend to use healthcare services more than those who have not (63).
Institutional factors		
Release center	Kgosi Mampuru Baviaanspoort Modderbee	Services offered (pre-release programs) or received from the three facilities may differ. Access and use of those services within these facilities may determine perceptions of healthcare system outside DCS. These are pre-release services which include ART services, included anger management, life skills, preparatory programmes on sexual offence, substance abuse, restorative justice, HIV/TB peer education.
Site of HIV diagnosis	Correctional Centre Outside Correctional Centre (During this period of incarceration).	An association between being diagnosed with HIV within a correctional facility and linkage-to-care is reported in many studies (64). Inmates who were diagnosed within correctional centers are more likely to continue utilizing healthcare services post-release.
Site of ART initiation	Correctional Centre Outside Correctional Centre	Previous studies have reported an association between initiating ART within a correctional facility and uptake of healthcare services (29,36). The studies have shown an association between initiating ART during incarceration and engaging in care post release (5).

CHAPTER 2: METHODOLOGY

2.1 PRIMARY STUDY

2.1.1. Description of the primary study

The primary study was a prospective cohort study of ex-inmates who were followed up as part of the I-Thuba Linkage-to-Care Study (hereafter referred to as the I-Thuba Study) conducted in Gauteng Province of South Africa, between January 2016 and March 2017. Convenience sampling was used to recruit participants in the study. From this cohort, we selected participants who were assigned to receive case management support as an intervention to facilitate linkage-to-care. All participants were assigned to receive the case management intervention as it was the only intervention available to them. The intervention was available to all participants in the study, the only difference is that it was their decision to choose to use or not to use it.

Participants in the I-Thuba Study were followed up for 90 days from the time of release with the aim of facilitating linkage to HIV care following release. Inmates were eligible to participate in the I-Thuba Study if they: were receiving ART at one of the study sites, were ≥18 years old, capable of providing informed consent, knew or anticipated release within the study period to allow for at least 90 days of follow-up, and willing to provide telephonic or residential contact details to facilitate follow up activities. All inmates who were eligible and willing to participate in the study, completed written informed consent prior to enrolment. Information on baseline characteristics was obtained following enrolment. All participants were enrolled in the correctional centres, prior to release.

A case management intervention was piloted for 18 months and involved up to three individual case management sessions between the trained case manager and study participants. Case management sessions were discontinued after the earliest of the following having occurred: three sessions conducted, 90 days had passed since enrolment, the participant requested stopping, or the participant

had successfully completed a clinic visit to receive ART. Sessions were based on the modified strengths-based counselling principles adapted from the United States Centres for Disease Control and Prevention (CDC) antiretroviral treatment and access to services (ARTAS) counselling approach (21). Strengths-based case management focuses on nurturing participant strengths to achieve personal health efficacy and problem-solving. Briefly, the process involves identification of strengths in specific life domains (i.e. life skills, health, and relationships), goal setting based on the strengths, and guidance from the case manager to engage community resources and informal networks in achieving the goals. Our case management intervention incorporated case transitional, navigation, with discharge planning and with pre-release discharge planning.

Case managers had formal training as either social workers or auxiliary social workers and received two days of didactic and practical training in strengths-based case management. After a participant was enrolled in the case management intervention, a research assistant contacted a case manager via email and cell phone to inform them of the assigned participant. Subsequently, the case manager planned to meet the participant prior to their release to commence building rapport with the client. Following release, the case manager and the participant arranged times and locations for counselling sessions – either telephonic or in-person. The case managers travelled within a radius of 100km from Parktown in Johannesburg (Gauteng). Participants living out of this radius who were willing to meet the case managers, were compensated financially for transport costs up to R100, and often met at halfway locations. During these sessions, the case managers guided participants to identify goals and to develop plans to reach those goals based on the internal and external resources available to the participant. Research assistants, independent of the case management intervention, separately followed up on participants at 30, 60, or 90 days to ascertain if they had gone to a health facility to continue with HIV treatment. Participant follow up was conducted telephonically or in-person.

2.1.2. Study setting

The primary study was conducted in the Gauteng province of South Africa. Three DCS management regions in the province were purposively selected in consultation with the DCS from the eight management areas that constitute the Gauteng DCS region. The selected management areas were Modderbee, Kgosi Mampuru II, and Baviaanspoort. Six out of the seven corrections facilities in these three management areas, were conveniently selected as study sites to provide a balance of large, medium, and small inmate populations. Three of the correctional facilities were in Tshwane Metropolitan City, and the remaining three were in Ekurhuleni Metropolitan City. All participating facilities had on-going on-site routine ART programs available to all inmates meeting South African national eligibility criteria at the time of the study enrolment. The characteristics of the study sites are listed in Table 2.1.

Table 2.1: Characteristics of study sites

Management Area	Name of Correctional Centre	Sentence type	Population by sex
Kgosi Mampuru II (Tshwane District)	Kgosi Mampuru II	Sentenced [1]long-term offenders and awaiting trial detainees	Females and males
	Atteridgeville	Sentenced [2]short-term offenders	Males
Baviaanspoort (Tshwane District)	Baviaanspoort	Sentenced long-term offenders	Males
Modderbee (Ekurhuleni District)	Modderbee	Sentenced long-term offenders and awaiting trial detainees	Males
	Nigel	Sentenced short-term offenders	Males
	Devon	[3]Pre-release offenders	Males

[1]Long-term offenders - Inmates sentenced for a period greater than 36 months
[2]Short-term offenders - Inmates sentenced for a period of 6 to 36 months
[3]Pre-release offenders – inmates within 12 months of release transferred to this facility to serve their remaining months of sentence

2.1.3. Data collection for primary study

Following release, case managers documented the sessions conducted with participants on standardised care session summary forms. These forms captured information on when the session was conducted, the mode of contact (in-person or telephonic), the care session number, and the objectives of the session. The measurement of the primary outcome of this study (uptake of case management support) is based on information collected from these care session summary forms, which were subsequently captured onto an electronic database. The ascertainment of linkage-to-care was based on information collected by other field workers who used standardised follow-up questionnaires at three follow-up time points – 30, 60, and 90 days after release. Field workers traced participants both telephonically, and in-person to ascertain information on participant clinic visits for HIV treatment. This information was collected on paper forms and subsequently captured onto an electronic database.

2.2. SECONDARY DATA ANALYSIS

2.2.1. Study design

Data used in this study are from the prospective cohort of inmates enrolled in the I-Thuba study (intervention phase) with a sample of 188 participants. This current study is therefore a secondary analysis of data from a prospective cohort study.

2.2.2. Study population

We included all participants from the I-Thuba study who were enrolled during the case management intervention phase of the study and were released from the correctional centre during the study follow up period. Participants were inmates on ART, released from the participating correctional centres, aged 18 years and above, and included both men and women. We excluded inmates who were re-incarcerated and those who died during the follow up period.

2.2.3. Sample size calculations

For our study, we assumed that about 65% of the inmates would use the case management intervention. This assumption compares favourably with other studies on uptake of case management services among this population that have demonstrated uptake rates of between 56% - 83% (26). Therefore, we calculated the sample size needed for an estimate of 65% and allowing for a 10% variation on either side, powered at 80%. Based on these assumptions, a minimum sample size of 184 participants was required. Our secondary dataset was sufficient to meet the minimum sample size for this analysis.

2.2.4. Data collection and data management

For this study, we obtained three sets of de-identified datasets from the main I-Thuba study containing data on: participant baseline characteristics, number of case management sessions attended, and 90-day linkage-to-care outcomes. The three datasets were merged for the purposes of this analysis. Data cleaning of the secondary dataset was done through validation checks for key variables, date checks, consistency checks, recoding and identification of duplicates. Assessment for missing data was also performed and we decided that no imputation was necessary due to minimal missing data. Continuous variables were tested for normality using normal plots (histogram) and normality tests (Shapiro-Wilk test) (65).

2.2.5. Study outcomes

The primary outcome for this study was the uptake of case management, which was divided into two categories (uptake/ no uptake). Uptake of case management was defined as a participant having attended at least one case management session within 90 days of release (a participant could attend up to a maximum of three sessions). We defined uptake based on sessions conducted after release. We did not consider pre-release sessions in this definition because at times this happened concurrently at

the time of enrolment as a requirement for the case managers, compared with post-release sessions that relied on participant's willingness to engage with the case manager. Case management is a collaborative patient-provider relationship. Both client and case manager could initiate contact. Uptake of case management was also regarded as a health care intervention/service in this study. Uptake of case management was documented by case managers using a paper-based care session summary form and later captured onto an electronic database.

The secondary outcome for this study was linkage-to-care after release, which was divided into two categories (entered care/did not enter care). Linkage-to-care was defined as completing registration for or receiving HIV-specific care at any medical facility within 90-days of correctional facility release. Linkage-to-care was considered verified if paper, electronic, or national laboratory system records indicated an HIV related clinic visit or HIV-related laboratory testing submitted from a clinic.

2.2.6. Statistical analysis

Analyses were performed on baseline and follow up from the participants who were enrolled in the case management intervention of the I-Thuba study and released between January 2016 and March 2017. Our primary outcome was uptake of case management, which was defined as having attended at least one case management session within the 90 days of release. The primary outcome was categorised into uptake of case management and no uptake of case management.

Continuous variables such as age, duration on ART, incarceration duration and duration period between enrolment and release were also categorized. Frequencies and proportions for categorical variables and medians with interquartile ranges (IQR) (66) for continuous variables, were used to describe the sociodemographic and clinical characteristics of the participants. Logistic regression

(66) methods were used to evaluate factors associated with uptake of case management. This approach was deemed appropriate, given that the primary outcome was based on the cumulative proportion utilising case management over a 90-day period. The time to utilising case management was not considered an essential indicator for intervention performance, hence no time-to-event analyses were performed.

Univariable analyses were performed to assess for associations between uptake of case management and each independent variable or generated interaction terms. Results for univariable analyses are presented as odds ratio (OR) with Wald confidence intervals (CI) (66). Variables with $p < 0.20$ (66) in the univariable analyses were fitted to the multivariable logistic regression model with *a priori* variables age and sex included. Thereafter, multivariable logistic regression was performed using the manual backward elimination selection method (66). Using this method, variables that were least significant from the multivariable logistic regression (i.e. with high Wald p-values) were individually removed and assessed for their contribution to the model using the likelihood ratio test at 5% significance level (66). Variables that significantly contributed to the final model (i.e. likelihood ratio test p-value < 0.05) were retained in the final model.

Prior to fitting the final multivariable model, variables were tested for correlation using Spearman's rank correlation coefficient to identify correlated pairs at $r > 0.5$ (61). Thereafter, the final multivariable logistic regression was fitted using all the significant variables from the multivariable manual backward elimination method. The measures of association between the assessed variables and uptake of case management were reported using adjusted odds ratios and their associated 95% confidence intervals (CI). The robustness of the model was assessed using the Pearson Chi-square goodness of fit test (66).

Analyses were conducted to examine an association between uptake of case management and self-reported entry into care within 90 days of release. Simple logistic regression was used to examine for this association. To exclude the possibility that the association between linkage into care and case management was due to confounding, we controlled our analysis for various potential confounders. Potential confounders were assessed using the Mantel Haenszel test (67). All variables that appeared to be potential confounders from the test were included in the multiple logistic regression, to control for confounding. Variables were thought to be potential confounders if they were significantly associated with uptake of case management and the outcome of entry into care. Age and sex were included *a priori* as potential confounders because they are known to be important predictors of healthcare utilization (5,53). All analyses were done using Stata Statistical Software (Release 14. College Station, TX: StataCorp LP).

2.2.7. Ethical considerations

Ethical clearance for the I-Thuba Linkage Study (M120492) (Appendix II) and this study (M180840) (Appendix III) were obtained from the University of the Witwatersrand Ethics Committee. Permission to use data was obtained from the Aurum Institute. To protect participant confidentiality, no patient identifiers were provided in the dataset used for analysis.

CHAPTER 3: RESULTS

3.1 Study participants

We included all 188 participants who were assigned to receive case management support during the intervention period between January 2016 and March 2017. The participant's baseline characteristics are shown in Table 3.1.

Most of the participants were male (n = 164; 87.2%), born in South Africa (n = 168; 89.4%), with a median age of 34 years (IQR 29 – 38 years). More than half of the inmates had previously been incarcerated (n = 103; 54.8%), and the majority were released on parole to complete their sentences in the community. Nearly two-thirds (n = 118; 62.7%) of the participants had received their first HIV diagnosis during incarceration, and 80% were initiated on ART within the correctional centre. The median time on ART was 126 days (IQR 34 – 1049 days), and the median time spent in a correctional facility after ART initiation was 640.5 days (IQR 163.5 - 1393.5 days). Nearly 80% (n = 150) of the participants reported having disclosed their status during their incarceration period and post-release. Of the 188 participants assigned to receive case management support, 133 (70.7%) attended at least one case management session; of these, more than half (55.6%) had their first session conducted telephonically. It took participants a median of 26 days (IQR 10 – 51 days) to attend the first case management session.

Table 3.1: Participant characteristics at baseline: by uptake of case management support

Variable		Uptake (N = 133) n, %	No uptake (N = 55) n, %	Total N = 188
Age (in years)	Median (IQR)	34 (29 -38)	32 (28 -39)	34 (29 -38)
	18 - 29	32 (65.3)	17 (34.7)	49
	30 - 40	73 (73.7)	26 (26.3)	99
	≥ 40	28 (70.0)	12 (30.0)	40
Sex	Male	115 (70.1)	49 (29.8)	164
	Female	18 (75.0)	6 (25.0)	24
Relationship status	Single	18 (66.7)	9 (33.3)	27
	In a relationship	115 (71.4)	46 (28.6)	161
Level of Education	Primary school and below	35 (74.5)	12 (25.5)	47
	Secondary school and above	98 (69.5)	43 (30.5)	141
Country of birth	South African	124 (73.8)	44 (26.2)	168
	Non-South African	9 (45.0)	11 (55.0)	20
Person staying with at time of release	Partner	23 (67.7)	11 (32.4)	34
	Family	96 (71.6)	38 (28.4)	134
	Alone	14 (70.0)	6 (30.0)	20
Regular contact with social networks during incarceration	Yes	115 (71.9)	45 (28.1)	160
	No	18 (64.3)	10 (35.7)	28
Geographical area released to	Gauteng	98 (73.1)	36 (26.9)	134
	Outside Gauteng	35 (64.8)	19 (35.2)	54
Participation in pre-release programs	Did not participate	32 (60.4)	21 (39.6)	53
	Participated in at least one program	101 (74.8)	34 (25.2)	135
Duration period between enrolment and release	Median (IQR)	17 (7-33)	18 (6-42)	17 (6-35)
	< 30 days	93 (71.5)	37 (28.5)	130
	>30days	40 (68.9)	18 (31.0)	58
Release center	Kgosi Mampuru	54 (66.7)	27 (33.3)	81
	Baviaanspoort	39 (90.7)	4 (9.3)	43
	Modderbee	40 (62.5)	24 (37.5)	64
Prior incarceration	Yes	70 (67.9)	33 (32.0)	103
	No	63 (74.1)	22 (25.9)	85

Variable		Uptake (N = 133) n, %	No uptake (N = 55) n, %	Total N = 188
Incarceration duration	Median (IQR)	352 (177 - 1298)	341 (142 - 1103)	349 (150 - 1264)
	≤ 6 months	35 (63.6)	20 (36.4)	55
	6 - 12 months	34 (79.1)	9 (20.9)	43
	≥ 12 months	64 (71.1)	26 (28.9)	90
Release conditions	Parole	86 (85.2)	15 (14.9)	101
	Non-parolee	47 (54.0)	40 (45.9)	87
Perceived health status at enrolment	Healthy	120 (70.2)	51 (29.8)	171
	Not healthy	13 (76.5)	4 (23.5)	17
Site of HIV diagnosis	Correctional Centre	80 (67.8)	38 (32.2)	118
	Outside Correctional Centre	53 (75.7)	17 (24.3)	70
Site of ART initiation	Correctional Centre	111 (74.0)	39 (26.0)	150
	Outside Correctional Centre	22 (57.9)	16 (42.1)	38
ART duration (months) at enrolment	Median (IQR)	199 (46 - 1096)	61 (30 - 838)	126 (34 - 1049)
	≤ 6months	65 (65.7)	34 (34.3)	99
	6 -12 months	15 (88.2)	2 (11.8)	17
	≥ 12 months	53 (73.6)	19 (26.4)	72
Ever disclosed HIV status	Yes	116 (77.3)	34 (22.7)	150
	No	17 (44.7)	21 (55.3)	38

3.2 Factors associated with uptake of case management support

From the univariable analysis, factors associated with the uptake of case management were country of birth, participation in pre-release programmes, the correctional centre from which participant was released, release conditions, site of ART initiation, ART duration at the time of enrolment and ever disclosing HIV status (Table 3.2).

At multivariable level, only the release conditions (parolee or non-parolee) and ever disclosing HIV status, remained associated with uptake of case management support. Participants who had

completed their sentences and released without conditions, were less likely (AOR = 0.24, 95% CI: 0.11 - 0.52) to attend any case management sessions compared with those who were released on parole and were still under the custody of DCS officials. Participants who ever disclosed their HIV status were more likely to utilise the case management support, compared with participants who reported that they had not self-disclosed their HIV status (AOR = 5.06, 95% CI: 2.16 - 11.84). The overall results from the Pearson Chi-square goodness of fit showed that the fitted model was stable (p = 0.47).

Table 3.2: Analysis of factors associated with uptake of case management support

Variables		Unadjusted OR (95% CI)	Wald p-value	Adjusted OR (95% CI)	LR p-value
Age, years	18 - 29	Ref	0.56	Ref	0.78
	30 - 40	1.49 (0.71 - 3.12)		1.19 (0.49 - 2.89)	
	≥ 40	1.24 (0.51 - 3.04)		0.84 (0.27 - 2.54)	
Sex	Male	Ref	0.62	Ref	0.85
	Female	1.28 (0.48 - 3.41)		0.89 (0.27 - 2.87)	
Relationship status	In a relationship	Ref	0.62	-	-
	Single	0.80		-	-
Level of Education	Primary school and below	Ref	0.51	-	-
	Secondary school and above	0.78 (0.37 - 1.65)		-	-
Country of birth	South African	Ref	0.01	-	-
	Non-South African	0.29 (0.11 - 0.75)		-	-
Person staying with at time of release	Partner	Ref	0.89	-	-
	Family	1.21 (0.54 - 2.71)		-	-
	Alone	1.12 (0.34 - 3.69)		-	-
Regular contact with social networks during incarceration	No	Ref	0.42	-	-
	Yes	1.41 (0.60 - 3.30)		-	-
Geographical area released to	Gauteng	Ref	0.26	-	-
	Outside Gauteng	0.68 (0.34 - 1.33)		-	-
Participation in pre-release programs	Did not participate	Ref	0.05	-	-
	Participated in at least one program	1.94 (0.99 - 3.82)		-	-

Variables		Unadjusted OR (95% CI)	Wald p-value	Adjusted OR (95% CI)	LR p-value
Duration period between enrolment and release	< 30 days	Ref	0.72	-	-
	> 30days	0.88 (0.45 - 1.74)		-	-
Release center	Kgosi Mampuru	Ref	0.001	-	-
	Baviaanspoort	4.88 (1.58 - 15.06)		-	-
	Modderbee	0.83 (0.42 - 1.65)		-	-
Prior incarceration	No	Ref	0.35	-	-
	Yes	0.74 (0.39 - 1.40)		-	-
Incarceration duration	≤ 6 months	Ref	0.24	-	-
	6 - 12 months	2.15 (0.86 - 5.40)		-	
	≥ 12 months	1.41 (0.69 - 2.87)		-	
Release status	Parole	Ref	0.0001	Ref	0.0002
	Non-parolee	0.23 (0.11 - 0.49)		0.24 (0.11 - 0.52)	
Perceived health status at enrolment	Healthy	Ref	0.57	-	-
	Not healthy	1.38 (0.42 - 4.43		-	-
Site of HIV diagnosis	Correctional Centre	Ref	0.24	-	-
	Outside Correctional Centre	1.48 (0.75 - 2.89)		-	-
Site of ART initiation	Correctional Centre	Ref	0.05	-	-
	Outside Correctional Centre	0.48 (0.23 - 1.01)		-	
ART duration (days) at enrolment	≤ 6 months	Ref	0.10	-	-
	6 - 12 months	3.92 (0.84 - 18.16)		-	
	≥ 12 months	1.46 (0.74 - 2.85)		-	
Ever disclosed HIV status	No	Ref	0.0001	Ref	0.0002
	Yes	4.21 (2.00 - 8.87)		5.06 (2.16 - 11.84)	

Ref= Reference group, LR= Overall likelihood ratio p-value

3.3 Linkage-to-care outcomes

Among the 188 participants, 90 (47.9%) linked to care within 90 days of release. Of those who self-reported linkage-to-care, 81(90%) had attended at least one case management session (Figure 3.1). Findings from the unadjusted logistic regression analyses showed that participants who attended at least one case management session were 7.96 (95% CI: 3.59 - 17.62) times more likely to link into

care within 90 days of release, compared with inmates who did not attend any case management session. In analyses adjusting for potential confounders (Table 3.3), (sex, age, status of HIV disclosure, release status and release centre) , attending at least one case management sessions remained associated with better linkage-to-care outcomes, although the measure of association was lower (AOR = 5.62; 95% CI: 2.25 - 14.03; P = 0.0001).

Table 3.3: Adjusted analysis of association between linkage-to-care and uptake of case management

Linkage-to-care		Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Uptake of case management	No	Ref	Ref
	Yes	7.96 (3.59 - 17.62)	5.62 (2.25 - 14.03)

*Adjusted for age, sex, release center, release status, disclosure.

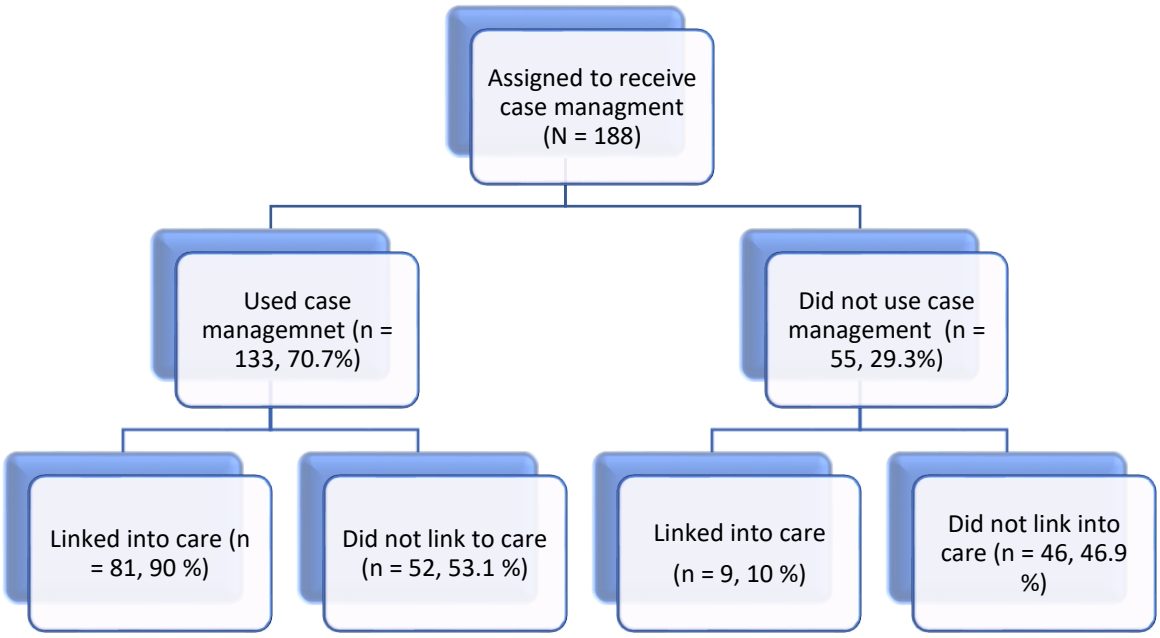


Figure 3.1: Linkage-to-care outcomes among study participants

CHAPTER 4: DISCUSSION

4.1. Main findings

Identifying strategies to promote retention on HIV treatment is essential to ensure that individual and public health benefits of ART are optimised. The current standard of care approaches to link ex-inmates released on ART are inadequate to promote retention in HIV care. This underscores the need to pilot and evaluate pragmatic interventions to bridge this gap. In this study, we aimed to assess factors associated with uptake of case management among released HIV-positive inmates and the linkage-to-care outcomes by uptake on the case management.

We identified two factors at different socio-ecological levels that were associated with the uptake of case management support. Participants who were released on parole (individual-level) and those who voluntarily disclosed their HIV status within their social networks (interpersonal-level), were more likely to use the case management services. However, we also expected other individual-level factors such as age, education, and gender to be associated with uptake of the case management intervention because they are recognized as important factors in research. Even so, our study not finding associations between uptake of case management and these variables is also consistent with some studies on linkage to care post release among this population. For example, one study conducted in French Guiana found that initiating and being on ART during incarceration were the main predictors of uptake of HIV care post release (68) . Also, a systematic review by Yanes-Lane et al (69) showed mixed results regarding the role of age on uptake of healthcare services post release. In contrast other studies did find gender disparities in health outcomes, where women were reported to be less likely to engage in care nor achieve a viral suppression (70). Also having a less than high school education found to be a key barrier in not utilizing healthcare services. With regards to linkage-to-care,

participants who utilised of case management support were more likely to link to a community clinic for continuation of HIV care and treatment.

At baseline, most participants (62.8%) had received their initial HIV diagnosis and started ART within a correctional centre. This highlights the significant strides made by DCS in increasing accessibility to ART within correctional centres, and the importance of correctional services in providing ART services to men who have been shown to exhibit poor HIV care-seeking behaviour in the general population (1). Notably, over half of the inmates had been previously incarcerated and most participants were released on parole to finish serving their sentence in the community. This supports the importance of additional research to explore interventions that can improve post-release linkage-to-care outcomes.

Parolees were more likely to engage with the case management services than inmates who were released without conditions (non-parolees). This is consistent with other studies that have shown positive associations between being released on parole and healthcare utilization (71). In one study, 23.0% of parolees (95% CI: 20.1%- 26.1%) compared to 17.8% of non-parolees (95% CI: 15.6%-20.3%) successfully linked to health services after release (5). In another study, parolees were 1.3 (95% CI: 1.1-1.6) times more likely to collect their medication within 30 days of release and 1.5 (95% CI: 1.4-1.7) times as likely to collect their medication again at 60 days post-release than those who completed their sentence (5,72). It is plausible that inmates released on parole are more likely to have stable housing (one of the conditions for parole), a factor that is associated with improved utilisation of available healthcare services for this population (73). In addition, community follow-up of parolees is relatively easier in comparison to those released without conditions, who have no obligation to update their contact details and are highly mobile. Therefore, case managers may have had better chances of successfully contacting parolees compared to non-parolees.

Participants who disclosed their HIV status to other people within their social network exhibited higher utilisation of the case management support within 90 days of release than those who had not disclosed. Notably, the proportion of participants who had disclosed their status was high (80%), and comparable to the findings of another study conducted in Ethiopia Central prison where 83.3% of inmates had self-reported disclosure of their HIV status (74). Evidence from studies and HIV programmes in the general population strongly suggests that disclosure is a facilitator for uptake of healthcare and social services, both for HIV and other chronic conditions (75,76). Similarly, non-disclosure decreases access and utilization of healthcare services (63,77,78).

In this study, disclosure of HIV status may have improved utilisation of case management support in several ways. Firstly, most participants relied on cell phones of their next of kin for communication with case managers. Participants who had disclosed their HIV status would have been more likely to provide case managers with these contact details, and free to inform their next of kin on the importance of the calls by the case managers. Similarly, case managers also conducted home visits, and participants who had disclosed their status may have been more likely to have less reservations and honour their home visit appointments compared to those who had not disclosed. Thirdly, participants who did not get support after disclosing their status would have been more likely to rely on case managers for support. Lastly, after having disclosed their HIV status, some participants were encouraged by their family members to utilise the case management intervention as evidence of rebuilding life.

Less than half of the participants assigned to case management, self-reported visiting a community clinic for HIV care within the first 90 days of release. Although very low, the linkage-to-care outcomes observed in our study (47.9%) are within the range of 38% to 96% that has been reported

in other studies conducted among ex-inmates assigned to receive post-release support for linking released inmates to community healthcare services (20,21,36,47,48,79). Notably, participants who utilised case management support were more likely to complete the HIV clinic visit, compared to those who did not meet with a case manager.

Our linkage-to-care findings are similar to those from a randomized controlled trial of 270 HIV-positive inmates transitioning from San Francisco county jail (43). Participants who were assigned to receive case management support were 1.95 (95%, CI: 1.11-3.46) times more likely to be linked into care within 30 days of release compared to those who received the standard transition service (43). Case management has also been shown to improve treatment continuation outcomes in other studies conducted in the USA and Australia (23,26) . Despite careful planning, high implementation fidelity, and overall acceptability; the effect of case management of transition outcomes from corrections to community HIV care services has been mixed. Other studies also using counselling and case management have not achieved a difference between control and intervention arms (44,46). Even with optimal care navigation and strengths-based counselling, competing attention for immediate needs of housing, food, economic security, mental health care, and substance use challenges may greatly exceed the goals of seeking HIV care. Therefore, while utilization of case management support showed improvements in linkage-to-care outcomes, additional complementary interventions are required to further reduce the attrition from HIV care after release.

4.2 Strengths and limitations

A key strength of our study was evaluating the novel application of case management support to one of the first prospective cohorts (to our knowledge) of ex-inmates released on HIV treatment in South Africa. Further, the prospective follow-up of participants for a period of 90 days post-release, was

essential to quantifying the challenges of accessing HIV care for this population, in the short-term period following release.

Our study also had several limitations. Follow-up of incarcerated individuals after release was challenging for the primary I-Thuba study, and failure to determine outcomes for all participants is a short-coming. Those who could not be traced (24.5%) were more likely to lack a fixed address and not have regular contact with family members. It is plausible that this population was less likely to have engaged in care following release, although this cannot be verified. Among those participants who were contacted, most reported clinic attendance which could be due to the social desirability bias, a phenomenon reported in prior linkage-to-care studies (52,59,64). This can be resolved through validation of self-reported data by checking participants medical records at the clinics or comparing self-reported responses with other data collection tools such as laboratory reports. The use of convenience sampling and the possibility of selection bias the primary study, limits the generalizability of our findings. However, the feasibility of other sampling approaches, such as random sampling, is limited by the high movement of inmates across different sections of the correctional centre and poor communication of release dates, which limit the accuracy of sampling frames and selection procedures. Lastly, we did not collect any qualitative data to explore the reasons for the observed utilization patterns for case management support. Such information is essential for quality improvement and intervention scale-up.

4.3. Conclusion

Overall, utilization of the case management intervention was high, which suggests that the intervention can be successfully implemented in the South African setting and may reduce ART disruption in the period immediately following release. Our study findings also highlight the existence of barriers to achieving optimal continuation of ART among released inmates. The failure

to continue on ART is likely to be costly for the inmates and their sexual partners. Our findings highlight the need for further operational research to identify effective strategies to retaining patients on ART as they transition from correctional centres to the general community.

4.4. Recommendations

Based on our findings and identified study limitations, we recommend further areas for research.

Additional qualitative research is required to explore barriers and facilitators to engagement in HIV care support interventions by inmates released on ART. Such qualitative studies should also explore the influence of clinic, community, and policy-level factors that were not explored in our study, and which are unlikely to be adequately addressed in quantitative studies. Additional research in other rural DCS management areas, is also required to provide further insights into how case management interventions may need to be adapted for such settings. Innovative follow up methods are required to increase the reach of case management support to individuals who have completed their sentences and are not required to remain in contact with the corrections system after release. Also, there is need for new approaches, such as national unique identifiers or biometrics to improve tracking the transition of patients from corrections to community care and across clinics in the community.

In addition, there is value in strengthening pre-release programmes to provide disclosure counselling as this may influence how individuals engage with HIV care support services after release. More research is also required in other DCS regions outside of Gauteng, and the cost-effectiveness of similar approaches should be evaluated to guide policy makers. Furthermore, we also recommend mixed-methods research studies, which may provide more insights into the contextual factors influencing uptake of case management interventions.

REFERENCES

1. Department of Correctional Services. Department of Correctional Services: Annual report 2016/2017 financial year [Internet]. [cited 2019 Mar 21]. Available from: http://www.dcs.gov.za/wp-content/uploads/2017/12/DCS-AR-2016_17-.pdf

2. Golin CE, Knight K, Carda-Auten J, Gould M, Groves J, White BL, et al. Individuals motivated to participate in adherence, care and treatment (imPACT): Development of a multi-component intervention to help HIV-infected recently incarcerated individuals link and adhere to HIV care. BMC Public Health. 2016;16(935):1–16.

3. Golrokhi R, Farrhoudi B, Taj Leila, Pahlaviani FG, Mazaheri-Tehrani E, Cossarizza A, et al. HIV Prevalence and correlations in prisons in different regions of the world: A review article. TOAIDJ. 2018;12:81–92.

4. Chimphambano C, Komolafe I, Muula A. Prevalence of HIV, HepBsAg and Hep C antibodies among inmates in Chichiri prison,Blantyre, Malawi. MALAWI MED J. 2007;19(107):107–10.

5. Baillargeon J, Giordano T, Harzke AJ, Spaulding AC, Wu H, Grady J, et al. Predictors of reincarceration and disease progression among released HIV-infected inmates. AIDS Patient Care STDS. 2010;24(6):389–94.

6. Westergaard RP, Spaulding AC, Flanigan TP. HIV among persons incarcerated in the USA: A review of evolving concepts in testing, treatment, and linkage to community care. Curr Opin Infect Dis. 2013;26(1):10–6.

7. Iroh PA, Mayo H, Nijhawan AE. The HIV care cascade before, during and after incarceration: A systematic review and data synthesis. AM J Public Health. 2015;105(7):5–16.

8. World Health Organization. Consolidated guidelines on HIV prevention, diagnosis, treatment and care for key populations. [Internet]. 2014 [cited 2019 Jun 17]. Available from: https://apps.who.int/iris/bitstream/handle/10665/128048/9789241507431_eng.pdf;jsessionid=1EC4B5CEF4C8914F48D5BC288308ACA8?sequence=1

9. Southern African Development Community. Assessment report on HIV and AIDS, Tuberculosis, Hepatitis B and C, and other Sexually Transmitted Infections in prison settings in the SADC. [Internet]. 2009 [cited 2019 Apr 14]. Available from: https://www.sadc.int/files/6314/1171/8815/Assessment_Report_on_HIV_and_AIDSTuberculosis_Hepatitis_B_and_C_andother_Sexually_Transmitted_Infectionsin_Prison_Settings_in_the_SADC.pdf

10. United Nations Office on Drugs and Crime, Joint United Nations Programme on HIV and AIDS, World Bank. HIV and prisons in sub-Saharan Africa: opportunities for action. [Internet]. 2007 [cited 2019 Apr 14]. Available from: http://data.unaids.org/pub/report/2007/hiv_prison_paper_en.pdf

11. Henostroza G, Topp SM, Hatwiinda S, Maggard KR, Phiri W, Harris JB, et al. The high burden of Tuberculosis (TB) and Human Immunodeficiency Virus (HIV) in a large Zambian prison: A public health alert. PLoS ONE. 2013;8(8):1–7.

12. Torriente A, Tadion A, Hsu L. Opening the door to zero new HIV infections in closed settings. Health Hum Rights. 2016;18(1):157–68.

13. World Health Organization, Joint United Nations Programme on HIV and AIDS, United Nations Office on Drugs and Crime. Effectiveness of interventions to manage HIV in prisons – HIV care, treatment and support (Evidence for action technical papers). [Internet]. 2007 [cited 2017 Sep 23]. Available from: https://www.who.int/hiv/idu/Prisons_HIV%20treatment.pdf

14. Department of Correctional Services. Department of Correctional Services: Annual report 2015/2016 financial year. [Internet]. 2016 [cited 2017 Jul 22]. Available from: http://www.dcs.gov.za/wp-content/uploads/2016/08/DCS-Annual-Report-2015-16.pd

15. Department of Correctional Services. Department of Correctional Services Annual Report: 2018/2019 financial year.

16. Department of Health. Guidelines for the management of Tuberculosis, Human Immunodeficiency Virus and Sexually-Transmitted Infections in correctional centres 2013. [Internet]. 2013 [cited 2019 Feb 10]. Available from: http://www.section27.org.za/wp-content/uploads/2013/05/Guidelines-for-the-management-of-Tuberculosis-Human-Immunodeficiency-Virus-and-Sexually-Transmitted-Infections-in-Correctional-Centres-2013.pdf

17. Teixeira PA, Jordan AO, Zaller N, Shah D, Venters H. Health outcomes for HIV-infected persons released from the New York city jail system with a transitional care-coordination plan. AM J Public Health. 2015;105(2):351–7.

18. Miloy M, Marshall B, Montaner J, Wood E. Housing status and the health of people living with HIV/AIDS. Curr HIV/AIDS Rep. 2012;9(4):364–74.

19. Shubert G. Mass incarceration, housing instability and HIV/AIDS: Research findings and policy recommendations. [Internet]. 2013 [cited 2019 Feb 2]. Available from: http://nmac.org/wp-content/uploads/2013/02/Incarceration-Report-FINAL_2-6-13.pdf

20. MacGowan RJ, Lifshay J, Mizuno Y, Johnson WD, McCormick L, Zack B. Positive Transitions (POST): Evaluation of an HIV prevention intervention for HIV positive persons releasing from correctional facilities. AIDS Behav. 2015;19:1061–9.

21. Gardner LI, Metsch LR, Anderson-Mahoney P, Loughlin AM, del Rio C, Strathdee S, et al. Efficacy of a brief case management intervention to link recently diagnosed HIV-infected persons to care. AIDS. 2005;19:423–31.

22. Venter WF, Kaiser B, Pillay Y, Conradie F, Gomez GB, Clayden P, et al. Cutting the cost of South African antiretroviral therapy using newer, safer drugs. SAMJ. 2016;21(107):28–30.

23. Arriola KR, Braithwaite RL, Holmes NE, Fortenberry RM. Post-release case management services and health-seeking behavior among HIV-infected ex-offenders. J Health Care Poor Underserved. 2007;18:665–74.

24. South African National Aids Council, Department of Health. Let our actions count: South Africa's National Strategic Plan for HIV, TB and STIs 2017-2022. [Internet]. [cited 2019 Feb 10]. Available from: https://sanac.org.za//wp-content/uploads/2017/06/NSP_FullDocument_FINAL.pdf

25. Brennan-Ing, Seidel L, Rodgers L, Ernst J, Wirth D, Tietz D, et al. The impact of comprehensive case management on HIV client outcomes. PLoS ONE. 2016;11(2):1–12.

26. Kinner SA, Alati R, Longo M, Spittal MJ, Boyle FM, Williams GM, et al. Low-intensity case management increases contact with primary care in recently released prisoners: a single blinded, multisite, randomised controlled trial. J Epidemiol Community Health. 2016;70:638–88.

27. Davies NE, Karstaedt AS. Antiretroviral outcomes in South African prisoners: A retrospective cohort analysis. PLoS ONE. 2016;7(3):1–6.

28. Spaulding AC, Messina LC, Kim BL, Chung K, Lincoln T, Teixeira PA, et al. Planning for success predicts virus suppressed: Results of a non-controlled, observational study of factors associated with viral suppression among HIV-positive persons following jail release. AIDS Behav. 2013;17:203–11.

29. Haley DF, Golin CE, Farel CE, Wohl DA, Scheyett AM, Garrett JJ, et al. Multilevel challenges to engagement in HIV care after prison release: a theory informed qualitative study comparing prisoners' perspectives before and after community reentry. BMC Public Health. 2014;14(1253):1–15.

30. Parienti J-J, Das-Douglas M, Massari V, Guzman D, Deeks SG, Verdon R, et al. Not all missed doses are the same: Sustained NNRTI treatment interruptions predict HIV rebound at low-to-moderate adherence levels. PLoS ONE. 2008;3(7):1–5.

31. Jiamsakul A, Kerr SJ, Ng OT, Lee MP, Chaiwarith R, Yunihastuti E, et al. Effects of unplanned treatment interruptions on HIV treatment failure– results from TAHOD. Trop Med Int Health. 2016;21(5):662–74.

32. Clemenzi-Allen, Geng E, Christopoulos K, Hammer H, Buchbinder S, Havlir D, et al. Degree of housing instability shows independent "Dose-Response" with virologic suppression rates among people living with Human Immunodeficiency Virus. [Internet]. San Francisco: Open Forum Infectious Diseases; 2018 [cited 2019 Jul 14] p. 1–3. Available from: Downloaded from https://academic.oup.com/ofid/article-abstract/5/3/ofy035/4934745 by guest on 14 July 2019

33. Swan H. Different patterns of drug use and barriers to continuous HIV care post-incarceration. J Drug Issues. 2015;45(1):38–52.

34. Rozanova J, Brown S-E, Bhushan A, Marcus R, Altice FL. Effect of social relationships on antiretroviral medication adherence for people living with HIV and substance use disorders and transitioning from prison. Health and Justice. 2015;3(18):1–13.

35. Althoff AL, Zlenev A, Meyer JP, Fu J, Brown S-E, Vagenas P, et al. Correlates of retention in HIV care after release from jail: Results from a multi-site study. AIDS Behav. 2013;17(02):156–70.

36. Loeliger KB, Meyer JP, Desai MM, Ciarleglio MM, Gallagher C, Altice FL. Retention in HIV care during the 3 years following release from incarceration: A cohort study. PLoS Med. 2018;15(10):1–28.

37. Bulsara SM, Wainberg ML, Newton-John TR. Predictors of adult retention in HIV care: A systematic review. AIDS Behav. 2018;22(3):752–64.

38. Janssen S, Wieten RW, Stolp S, Cremers AL, Rossatanga EG, Klipstein-Grobusch K, et al. Factors associated with retention to care in an HIV clinic in Gabon, Central Africa. PLoS ONE. 2015;10(10):1–14.

39. Oliver CD, Rebeiro PF, Shepherd BE, Keruly J, Mayer KH, Mathews WC, et al. Clinic-level factors associated with retention in care among people living with Human Immunodeficiency Virus in a multisite US cohort, 2010–2016. 2019;

40. Waldrop-Valverde D, Guo Y, Ownby RL, Rodriquez A, Jones DL. Risk and protective factors for retention in HIV care. AIDS Behav. 2014;18(8):1483–91.

41. Cook CL. Case management for linkage. In: Encyclopedia of AIDS [Internet]. New York: Springer; 2017. Available from: https://link.springer.com/referenceworkentry/10.1007%2F978-1-4614-9610-6_453-1

42. Commission for Case Manager Certification. Definition and philosophy of case management. [Internet]. [cited 2019 May 5]. Available from: https://ccmcertification.org/about-ccmc/about-case-management/definition-and-philosophy-case-management

43. Myers JJ, Dufour M-S, Koester KA, Morewitz M, Packard R, Klien KM, et al. The effect of patient navigation on the likelihood of engagement in clinical care for HIV-infected individuals leaving jail. AM J Public Health. 2018;108(3):385–92.

44. Wohl DA, Golin CE, Knight K, Gould M, Carda-Auten J, Groves JS, et al. A randomized controlled trial of an intervention to maintain suppression of HIV viremia following prison release: The imPACT trial. J Acquir Immune Defic Syndr. 2017;75(1):81–90.

45. Wohl DA, Scheyett A, Golin CE, White B, Matuszewski J, Bowling M, et al. Intensive case management before and after prison release is no more effective than comprehensive pre-release discharge planning in linking HIV-infected prisoners to care: A randomized trial. AIDS Behav. 2011;15(2):356–64.

46. Reznick OG, McCartney K, Gregorich S, Zack B, Feaster DJ. An ecosystem-based Intervention to reduce HIV transmission risk and increase medication adherence among prisoners being released to the community. J Correct Health Care. 2013;19(3):178–93.

47. Ammon B, Iroh P, Tiruneh Y, Li X, Montague BT, Rich JD, et al. HIV care after jail: Low rates of engagement in a vulnerable population. J Urban Health. 2018;95:488–98.

48. Booker CA, Flygare CT, Solomon L, Ball SW, Pustell MR, Bazerman LB, et al. Linkage to HIV care for jail detainees: Findings from detention to the first 30 days after release. AIDS Behav. 2013;17:128–36.

49. Hoffmann CJ, Mabuto T, Ginindza S, Fielding KL, Kubeka G, Dowdy DW, et al. Strategies to accelerate HIV care and antiretroviral therapy initiation after HIV dagnosis: A randomized trial. J Acquir Immune Defic Syndr. 2017;75:540–7.

50. McLeroy KR, Bibeau D, Steckler A, Glanz K. An Ecological Perspective on health promotion programs. Health Educ Q. 1988;15(4):351–77.

51. Golden SD, Earp J-A. Social ecological approaches to individuals and their contexts: Twenty years of health education & behavior health promotion interventions. Health Educ Behav. 2012;39(3):364–72.

52. Govindasamy D, Ford N, Kranzer K. Risk factors, barriers and facilitators for linkage to antiretroviral therapy care: A systematic review. AIDS. 2012;26:2059–67.

53. Ha JH, Van Lith LM, Mallalieu EC, Chidassicua J, Pinho MD, Devos P, et al. Gendered relationship between HIV stigma and HIV testing among men and women in Mozambique: a crosssectional study to inform a stigma reduction and male-targeted HIV testing intervention. BMJ Open. 2019;9:1–10.

54. Ross J, Cunningham CO, Hanna DB. HIV outcomes among migrants from low- and middle-income countries living in high-income countries: A review of recent evidence. Curr Opin Infect Dis. 2018;31(1):25–32.

55. Hahn RA, Truman BJ. Education improves public health and promotes health equity. Int J Health Serv. 2015;45(4):657–78.

56. South A, Wringe A, Kumogola Y, Isingo R, Manyalla R, Cawley C, et al. Do accurate HIV and antiretroviral therapy knowledge, and previous testing experiences increase the uptake of HIV voluntary counselling and testing? Results from a cohort study in rural Tanzania. BMC Public Health. 2013;13(802):1–12.

57. Massoglia M, Pridemore WA. Incarceration and health. Annu Rev Sociol. 2015;41:291–310.

58. Krakau I. Perception of health and use of health care services in a Swedish primary care district. A ten year's perspective. Scand J Prim Health Care. 1991;9(2):103–8.

59. Croxford S, Yin Z, Burns F, Copas A, Town K, Desai S, et al. Linkage to HIV care following diagnosis in the WHO European region: A systematic review and meta-analysis, 2006-2017. PLoS ONE. 2017;13(2):1–18.

60. Umberson D, Montez JK. Social relationships and health: A flashpoint for health policy. J Health Soc Behav. 2010;51:54–66.

61. Chipidza FE, Wallwork RS, Stern TA. Impact of the doctor-patient relationship. Prim Care Companion CNS Disord. 17(5).

62. Bracken N, Hilliard C, McCuller WJ, Harawa NT. Facilitators of HIV medical care engagement among former prisoners. AIDS Educ Prev. 2015;27(6):566–83.

63. Spangler SA, Onono M, Bukusi EA, Cohen CR, Turan JM. HIV-positive status disclosure and use of essential PMTCT and maternal health services in rural Kenya. J Acquir Immune Defic Syndr. 2014;67:235–42.

64. Yehia BR, Stewart L, Momplaisir F, Mody A, Holtzman CW, Jacobs LM, et al. Barriers and facilitators to patient retention in HIV care. BMC Infect Dis. 2015;15(246):1–10.

65. Chatfield C. Problem solving a statistician's guide. 2nd ed. United Kingdom: Chapman & Hall; 1995.

66. Hosmer DW, Lemeshow S. Applied logistic regression. 2nd ed. New York: Wiley; 2000.

67. Boston Univesity school of Medicine. The Cochran-Mantel-Haenszel method. [Internet]. [cited 2019 Nov 8]. Available from: http://sphweb.bumc.bu.edu/otlt/mph-modules/bs/bs704-ep713_confounding-em/BS704-EP713_Confounding-EM7.html.

68. Huber F, Vandentorren S, Merceron A, Bonifay T, Pastre A, Lucarelli A, et al. Returning to care after incarceration with HIV: The French Guianese experience. BMC Public Health. 2020;20(754):1–9.

69. Yanes-Lane M, Dussault C, Linthwaite B, Cox J, Klein MB, Sebastiani G, et al. Using the barriers and facilitators to linkage to HIV care to inform hepatitis C virus (HCV) linkage to care strategies for people released from prison: Findings from a systematic review. J Viral Hepat. 2020;27:205–20.

70. Erickson M, Shannon K, Sernick A, Pick N, Ranville F, Martin RE, et al. Women, incarceration and HIV: A systematic review of HIV treatment access, continuity of care and health outcomes across incarceration trajectories. AIDS. 2019;33(1):101–11.

71. Mallik-Kane K, Paddock E, Jannetta J. Health care after incarceration: How do formely incarcerated men choose where and when to access physical and behavioural health services? [Internet]. 2018 [cited 2019 Sep 14]. Available from: https://www.urban.org/sites/default/files/publication/96386/health_care_after_incarceration.pdf

72. Baillargeon J, Giordano TP, Rich JD, Wu ZH, Wells K, Pollock BH, et al. Accessing Antiretroviral Therapy following release from prison. JAMA. 2009;301(8):848–57.

73. Zelenev A, Marcus R, Kopelev A, Cruzado-Quinones J, Spaulding A, Desabrais M, et al. Patterns of homelessness and implications for HIV health after release from jail. AIDS Behav. 2013;17(2):181–94.

74. Getaneh M, Reta MM, Assefa D, Yohannis Z, Demilew D. Two-third of inmates were depressed among HIV positive prisoners at central prison (Kaliti), Addis Ababa, Ethiopia. BMC Res Notes. 2019;12(170):1–6.

75. King R, Katuntu D, Lifshay J, Packel L, Batamwita R, Nakayiwa S, et al. Processes and outcomes of HIV serostatus disclosure to sexual partners among people living with HIV in Uganda. AIDS Behav. 2008;12:232–43.

76. Vanlandingham M, Im-Em W, Yokota F. Access to treatment and care associated with HIV infection among members of AIDS support groups in Thailand. AIDS Care. 2006;18(7):637–46.

77. Muessig KE, Rosen DL, Farel CE, White BL, Filene EJ, Wohl DA. Inside these fences is our own little world: Prison-based HIV testing and HIV-related stigma among incarcerated men and women. AIDS Educ Prev. 2016;28(2):103–16.

78. Loutfy M, Johnson M, Walmsley S, Samarina A, Vasquez P, Hao-Lan H, et al. The association between HIV disclosure status and perceived barriers to care faced by women living with HIV in Latin America, China, Central/Eastern Europe, and Western Europe/Canada. AIDS Patient Care STDS. 2016;30(9):435–44.

79. Montague BT, Rosen DL, Sammartino C, Costa M, Gutman R, Solomon L, et al. Systematic assessment of linkage to care for persons with HIV released from corrections facilities using existing datasets. AIDS Patient Care STDS. 2016;30(2):84–90.

APPENDIX I- PLAGIARISM DECLARATION

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG | FACULTY OF HEALTH SCIENCES



PLAGIARISM DECLARATION TO BE SIGNED BY ALL HIGHER DEGREE STUDENTS

SENATE PLAGIARISM POLICY: APPENDIX ONE

I PRETTY NDINI (Student number: 1498359) am a student registered for the degree of Msc epidemiology in the academic year 2020

I hereby declare the following:

- I am aware that plagiarism (the use of someone else's work without their permission and/or without acknowledging the original source) is wrong.
- I confirm that the work submitted for assessment for the above degree is my own unaided work except where I have explicitly indicated otherwise.
- I have followed the required conventions in referencing the thoughts and ideas of others.
- I understand that the University of the Witwatersrand may take disciplinary action against me if there is a belief that this is not my own unaided work or that I have failed to acknowledge the source of the ideas or words in my writing.

Signature: [signature] Date: 31/03/2020

26/04/2015
1

APPENDIX II- PRIMARY STUDY ETHICS CERTIFICATE

R14/49 «Tit init name»

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M120492

NAME: (Principal Investigator)	Dr Salome Charalambous and Dr Chris Hoffmann
DEPARTMENT:	Aurum Institute The Aurum Institute (Private)
PROJECT TITLE:	TB and HIV Treatment Continuity Among Offenders and Awaiting Trial Detainees after Parole Release Correctional Centres in Gauteng, South Africa: Programme Immplementation and Evaluation - Post-Release Linkage Into Care
DATE CONSIDERED:	31/03/2017 (Initial Approval 27/03/2017)
DECISION:	Approved unconditionally
CONDITIONS:	Annual Recertification (2017) Valid for the Period 15 May 2017 - 15 May 2018
SUPERVISOR:	Dr Violet Chihota
APPROVED BY:	Professor P. Cleaton-Jones, Chairperson, HREC (Medical)
DATE OF APPROVAL:	24/05/2017

This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Research Office Secretary 3rd floor, Philip Tobias Building, Parktown, University of the Witwatersrand. I/We fully understand the conditions under which I am/we are authorised to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated, from the research protocol as approved, I/we undertake to resubmit to the Committee. **I agree to submit a yearly progress report**. The date for annual re-certification will be one year after the date of convened meeting where the study was initially reviewed. in this case, the study was initially review in April and will therefore be due in the month of April each year. Unreported changes to the application may invalidate the clearance given by the HREC (Medical).

Principal Investigator Signature Date

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

APPENDIX III- ETHICS CERTIFICATE FOR CURRENT STUDY

UNIVERSITY OF THE WITWATERSRAND JOHANNESBURG

R14/49 Miss Pretty Ndini

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M180840

NAME: (Principal Investigator)	Miss Pretty Ndini
DEPARTMENT:	Public Health
PROJECT TITLE:	Uptake of case management intervention for continuity of HIV treatement among released inmates in South Africa
DATE CONSIDERED:	31/08/2018
DECISION:	Approved Unconditionally
CONDITIONS:	
SUPERVISOR:	Mr Tonderai Mabuto and Mrs Zodwa Ndlovu
APPROVED BY:	Doctor CB Penny, Chairperson, HREC (Medical)
DATE OF APPROVAL:	22/10/2018

This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.

DECLARATION OF INVESTIGATORS

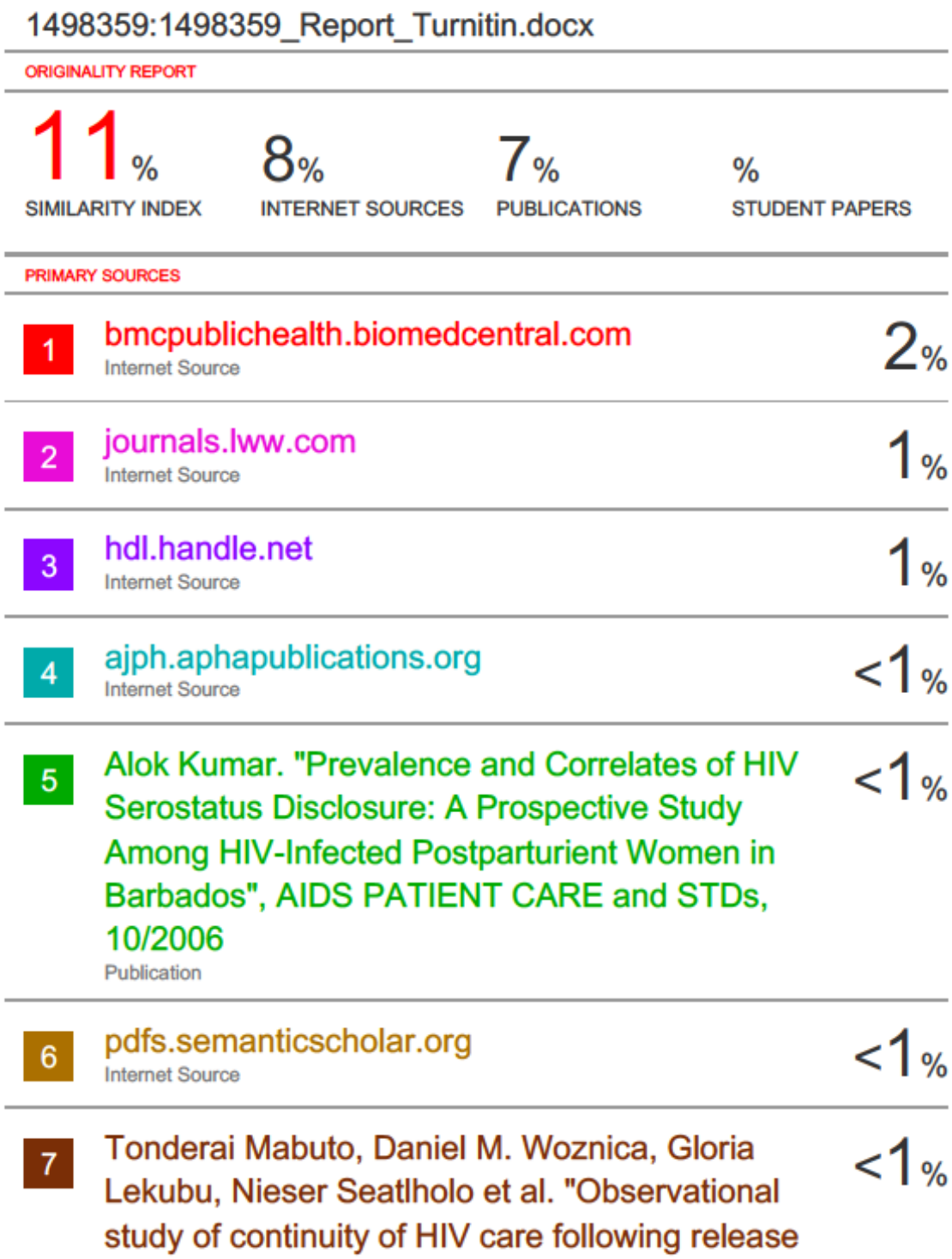
To be completed in duplicate and **ONE COPY** returned to the Research Office Secretary on the Third Floor, Faculty of Health Sciences, Phillip Tobias Building, 29 Princess of Wales Terrace, Parktown, 2193. University of the Witwatersrand. I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated, from the research protocol as approved, I/we undertake to resubmit the application to the Committee. **I agree to submit a yearly progress report**. The date for annual re-certification will be one year after the date of convened meeting where the study was initially reviewed. In this case, the study was initially reviewed in August and will therefore be due in the month of August each year. Unreported changes to the application may invalidate the clearance given by the HREC (Medical).

Principal Investigator Signature

Date

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

APPENDIX III- TURNITIN REPORT



1498359:1498359_Report_Turnitin.docx

ORIGINALITY REPORT

11%	8%	7%	%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	bmcpublichealth.biomedcentral.com Internet Source	2%
2	journals.lww.com Internet Source	1%
3	hdl.handle.net Internet Source	1%
4	ajph.aphapublications.org Internet Source	<1%
5	Alok Kumar. "Prevalence and Correlates of HIV Serostatus Disclosure: A Prospective Study Among HIV-Infected Postparturient Women in Barbados", AIDS PATIENT CARE and STDs, 10/2006 Publication	<1%
6	pdfs.semanticscholar.org Internet Source	<1%
7	Tonderai Mabuto, Daniel M. Woznica, Gloria Lekubu, Nieser Seatlholo et al. "Observational study of continuity of HIV care following release	<1%