UNIVERSITY OF MALAWI

COLLEGE OF MEDICINE

RESEARCH PROJECT REPORT

ACCESSIBILITY OF ANTI- RETROVIRAL THERAPY TO HIV- INFECTED INMATES IN MALAWI PRISONS

A CROSS- SECTIONAL STUDY OF CHICHIRI PRISON IN BLANTYRE, MALAWI

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ABSTRACT

Background: HIV/AIDS is an important cause of morbidity and mortality both globally and in Malawi. In an attempt to combat the epidemic; there has been a scale up of ART coverage both globally and in Malawi, but little is known if there has also been a scale up of ART coverage in Malawi prisons. According to a number of studies conducted it has been shown that there is a high prevalence of HIV in prisons compared to the general population. According to a study done in 2006 in Malawi there was a low coverage of ART in prisons compared to the general population. There have not been any recent studies on accessibility of ART in Malawi prisons compared to the general population; therefore, this study was aimed at bridging that gap in knowledge.

Objective: To compare accessibility to Antiretroviral Therapy (ART) by HIV- infected inmates at Chichiri prison in Blantyre with access to Antiretroviral Therapy in the general population of Malawi in 2015.

Methods: This was a cross- sectional study conducted at Chichiri prison in Blantyre district which was chosen conveniently. All HIV- infected inmates on ART will be included in the study. The sample size for qualitative data was 27. Both qualitative and quantitative methods were used in this study. Qualitative data were collected from inmates using interviewer-administered semi- structured questionnaires; and from Key Informants using Key Informant Interviews. Secondary quantitative data were collected from the Malawi Prison Services Headquarters HIV/AIDS Department. Qualitative data were analysed using thematic content analysis and quantitative data using proportions at 95% Confidence Interval.

Results: 27 participants (22 HIV infected inmates and 5 Key Informants) were enrolled in the study. Of the 22 HIV infected inmates, 21 were males and 1 was female. The age range of the inmates was 23- 70. Chichiri prison has 350 HIV infected inmates and of these 340 (97%) are on ART. By second quarter of 2015, the proportion of inmates on ART in Malawi prisons was 58% (1,332 out of 2,293 HIV infected inmates) compared to the 57% (568,470 out of 1 million) of people in the general population of Malawi. Most participants were in WHO stage 3 on ART initiation and adherence for all participants was more than 95%. All participants admitted that HTC services and ARVs are available at the prison's ART clinic. However, these were some of the factors affecting accessibility to ART: (1) Congestion and lack of privacy (2) Sharing of ARVs and dose adherence (3) Poor nutrition (4) Stigma and discrimination (5) Service provision. From key Informant interviews, these were some of the factors affecting service provision (1) Routine and incarceration (2) Change in drug administration (3) Limited ART services.

Discussion:

This study showed that there was no difference in coverage of ART in Malawi prisons and the general population of Malawi; and that there was a considerable improvement in accessibility to ART in Chichiri prison although there were many factors affecting ART accessibility in prisons which could be improved.

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LIST OF ABBREVIATIONS

AIDS:	Acquired Immunodeficiency Syndrome
ART:	Antiretroviral Therapy
ARV	Antiretroviral
CAG	Community ART Group
CPT:	Co-trimoxazole preventive therapy
COMREC:	College of Medicine Research and Ethics Committee
KIIs:	Key informant interviews
HIV:	Human immunodeficiency virus
HTC:	HIV testing and counselling
ITNs:	Insecticide-treated nets
PMTCT:	Prevention from Mother to Child Transmission
PwP:	Prevention with Positives
QECH:	Queen Elizabeth Central Hospital
STIs:	Sexually Transmitted Infections
TB:	Tuberculosis
WHO	World Health Organisation

INTRODUCTION AND LITERATURE REVIEW

Human immunodeficiency virus, tuberculosis and sexually transmitted infections are important causes of morbidity and mortality in Sub- Saharan Africa. Majority of studies have shown that prisoners bear a disproportionate burden of infections.(1)

Since the start of the HIV epidemic in the early 1980's to 2013, 78 million people, globally, had been infected and 39 million people had died of HIV- related illnesses. By end 2014, 36.9 million people were living with HIV globally; of which 25.8 million (70%) came from Sub- Saharan Africa. Globally 15.8 million people living with HIV in June 2015 were on ART (42.8% of people living with HIV globally), an increase from 7.5 million out of 34.4 million (21.8%) in 2010; representing a 21% increase in ART coverage between 2010 and 2015. In Sub- Saharan Africa, 10.7 million (41% of people living with HIV in Sub- Saharan Africa) people were on ART by end- 2014.(2, 3)

In Malawi, the prevalence rate of HIV was 10.8% in 2012(3). By the end of the second quarter of 2015 about 1 million people were living with HIV in Malawi and of these 568,470 (57% of people living with HIV in Malawi) were on ART (4), an increase from 250,000 out of 920,000 (27%) in 2010(5); representing a 30% increase in ART coverage between 2010 and 2015.

HIV prevalence has been reported to be 2- to 3- fold times higher in prisoners than in the general population in Sub- Saharan Africa.(1) For example, in South Africa HIV prevalence in prisons was 41.6% compared to 10.8% prevalence in the general population in 2007.(6) Even though there has been a scale up of ART coverage globally and in Malawi, it is not known if there has also been a scale up of ART in vulnerable groups like prison inmates. The last known study that looked at access to ART in Malawi prisons was done in 2007, and it showed that 0.13% of the total population of people on ART, in Malawi, were prisoners. Due to their confinement, prison inmates had limited access to CD4- cell counting facilities and this resulted in late initiation of ART in prisons in 2006.(7)

Prisoners being a vulnerable group are at high risk of HIV transmission.(8) Some of the factors that make them a vulnerable group are: poor living conditions like congestion; poor quality and low quantity of food that causes them to exchange sexual intercourse for space to sleep, food and blankets.(9) The prison environments have also been associated with high frequencies of unhealthy behaviour like unprotected and multiple- partner homosexual activity that expose inmates to HIV infection Homosexuality poses an 18 times risk of HIV transmission than penile- vaginal sexual intercourse.(10) There is high prevalence of sexually transmitted infections in prisons.(11) Some of these STIs can increase the risk of HIV acquisition three- fold or more.(12)

Treatment and prevention of HIV/AIDS has public health and human rights implication. According to WHO, "all prisoners have the right to receive health care, including preventive measures, equivalent to that available in the community without discrimination, in particular with respect to their legal status or nationality. The general principles adopted by national AIDS programmes should apply equally to prisoners and to the community." (WHO

guidelines on HIV infection and AIDS in prison, 1993). The Universal Declaration of Human Rights (1948) and the Constitution of Malawi (1994) also state that prisoners have a fundamental right to life and the enjoyment of the highest standard of health just like members of the general population.(13,14)

There has not been much study about access of ART in Malawi prisons. A known retrospective cohort study that was done on ART access in prisons was in 2007(7) and it only gave the percentage of inmates on ART out of the whole population (0.13%). This does not take into account the fact that the prevalence of HIV in prisons and the general population are different and that the prisons have a smaller population than the general population. Therefore; the figure 0.13% does not give a clear picture concerning ART accessibility in prisons compared to the general population. Since it was a quantitative study, there was no qualitative component to find out what factors affect accessibility to ART in prisons.

This study was a cross- sectional study aimed at comparing the accessibility of ART in prisons with accessibility of ART in the general population by comparing the proportion of HIV-infected inmates on ART out of all inmates eligible for ART with the proportion of the general population on ART out of all the people eligible for ART in the general population. This was combined with qualitative study to determine factors that affect access to ART in prisons, availability of ARVs in prison's ART clinic, availability of HTC services in prison and how ART services are provided at prison's ART clinic.

JUSTIFICATION

HIV is one of the most important causes of morbidity and mortality in Sub- Saharan Africa.(1). Due to ART scale up in Malawi, prevalence of HIV has been reduced from 14% in 2003 to 10.8% in 2010.(8,5). There was no known information if there has been a scale up of ART coverage in Malawi prisons. Therefore, the aim of this study was to assess accessibility of ART in prisons.

The findings of this study might be used in improving ART accessibility by inmates since the study also identified factors that affect accessibility of ART.

STUDY OBJECTIVES

General objective

- To compare accessibility to Antiretroviral Therapy (ART) by HIV- infected inmates at Chichiri prison in Blantyre with access to Antiretroviral Therapy in the general population of Malawi in 2015.

Specific objectives

- To determine the availability of ARVs in prison ART clinic
- To determine how confinement and routine affect access to ART
- To determine availability of ART services including HTC services, CD4-cell counting/ viral load test and counseling services in the prison ART clinic
- To compare proportion of prisoners on ART with proportion of people on ART in the general population

METHODOLOGY

Study type and design

To address the study objectives, this study was a cross- sectional study which combined qualitative and quantitative methods of data collection and analysis. A cross- sectional study was used because the study is comparing two groups, prison and general population, at a specific point in time, the year 2015.

Study place

The study was conducted at Chichiri prison in Blantyre, Malawi. Chichiri prison is one of the four maximum prisons in Malawi with a capacity of 800 inmates. As of June 2015, the total population at Chichiri prison was approximately 2000 inmates. Of these, about 350 are HIV infected and 340 are on ART.

Study population

The study population was 350 HIV infected inmates of all ages and both sexes at Chichiri prison in Blantyre, Malawi in 2015.

Sample population

Inclusion criteria: HIV infected inmates on ART at Chichiri prison in Blantyre, Malawi.

Exclusion criteria: all HIV- infected inmates on ART in segregated cells or who have high risk for harm to themselves or interviewers, or HIV- infected inmates on ART not willing to consent.

Selection criteria: convenience sampling, purposive sampling.

Study period

The study period was from 9 November 2015 to 11 January 2016. Data were collected for a period of 4 days; from 16 November to 18 November 2015 primary data from Chichiri prison (from inmates and service providers at the ART clinic) and on 24 November 2015 from prison headquarters in Zomba.

Sample size

The sample size was 27 and was selected purposively. Of these; 22 were HIV infected inmates on ART in Chichiri prison, 4 service providers at Chichiri prison ART clinic and 1 participant from the office of HIV/AIDS program in prisons at the prison headquarters in Zomba.

Data collection

Since the days allocated for data collection by the prison authorities to investigators were days not scheduled for refill or for review; the peer educators informed the inmates of the study and inmates came at freewill to the clinic to participate in the study.

Data were collected by the investigators from inmates using interviewer- administered semi-structured questionnaires. These questionnaires were used to collect data on: demographic distribution, availability of ART, availability of HTC services, socio- economic and cultural factors affecting ART access and service provision and how it affects attendance to the ART clinic. This was supplemented by data from the participants' master cards which included: when they started ART, WHO stage at ART initiation, and previous month pill count and adherence.

Key informant interviews (KIIs) were conducted by investigators to understand the general overview of the system at the ART clinic and how services are provided. The key informants included 4 service providers at Chichiri prison ART clinic and 1officer from HIV/AIDS program in prisons at the prison headquarters in Zomba.

Quantitative data were collected from the Malawi prison headquarters and it included: population of inmates in Malawi, number of inmates who are HIV infected in Malawi prisons and number of inmates who are on ART in Malawi prisons.

Data management and analysis (Table 8)

Quantitative Analysis

All quantitative data were analysed at 95% Confidence Interval. Demographic data are reported as frequency and percent (categorical data), and mode, mean and range (continuous data). These data were entered in Microsoft Excel 2007 (Microsoft Corporation 2006, WA. USA) and were analysed using Epi Info 7.1.4.0 (Centers for Disease Control and Prevention 2014, GA. USA). Data for comparison of ART coverage in Prisons and in Malawi were reported using proportions and were analysed using Stata 12 (StataCorp, College Station, TX).

Qualitative Analysis

Qualitative data were analysed using thematic content analysis. Data were typed in Microsoft Word 2007(Microsoft Corporation 2006, W.A, USA), investigators familiarised themselves with the data, then codebooks were created in Microsoft Word 2007 (Microsoft Corporation 2006, W.A, USA). Themes were then derived and eventually summarized into findings.

Ethical considerations

HIV/AIDS is an issue that is associated with stigma and discrimination. Therefore data collection in this study took place at the Prison's ART clinic where the potential participants go at their freewill. Being in prison also deprives inmates of their autonomy, as such a written informed consent was given to all participants so that they make their own decision to participate in the study.

For confidentiality, identification numbers and not names were used throughout the study. To ensure scientific validity and ethical consideration, approval from COMREC was sought. In order to access Chichiri prison, approval from the Malawi Prisons Services was sought.

RESULTS

QUANTITATIVE RESULTS

CHARACTERISTICS OF STUDY PARTICIPANTS

Chichiri prison has a total population of about 2000 inmates and of these 340 (338 males and 2 females) are HIV infected, representing 17% of the total population of inmates. Out of the 340 HIV infected inmates, about 330 are on ART. A total of 22 inmates were enrolled in the study; 21males representing 95.5% (95%CI: 77.2%, 99.9%) and 1 female representing 4.5% (95%CI: 0.1%, 22.8%) (Table 1).

Table 1: Gender distribution of participants

Gender	Frequency	Percentage	95%Confidence Interval
Female	1	4.5%	(0.1%, 22.8%)
Males	21	95.5%	(77.2%, 99.9%)
Total	22	100.0%	

The age range of participants was 23 to 70 years, the mean age was 34.4 years and the mode age group was 25 to 29 years (Figure 1).

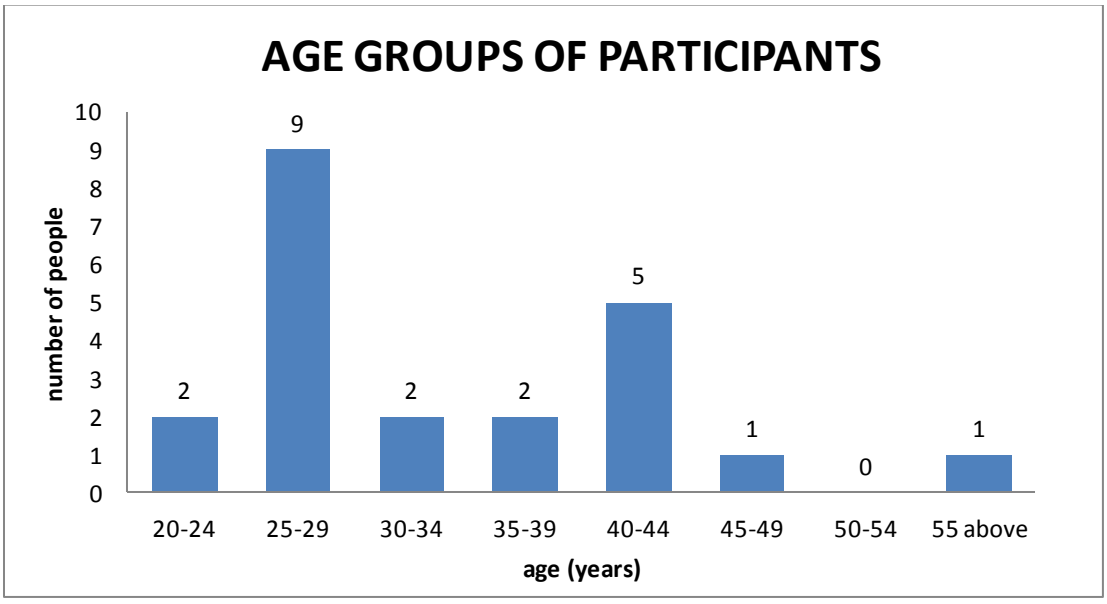

Figure 1: Age groups of participants

Majority of the participants 59.1% (95%CI: 36.4%, 79.3%) were reportedly married at time of imprisonment, while 18.2% (95%CI: 5.2%, 40.3%) were divorced, 13.6% (95%CI: 2.9%, 34.9%) were widowed and 9.1% (95%CI: 1.1%, 29.2%) were single (Table 2).

Table 2: Marital status of participants

Marital status	Frequency	Percent	95% Confidence Interval
Divorced	4	18.2%	(5.2%, 40.3%)
Married	13	59.1%	(36.4%, 79.3%)
Single	2	9.1%	(1.1%, 29.2%)
Widowed	3	13.6%	(2.9%, 34.9%)
Total	22	100.0%	

Half of the participants (11 out of 22) were self- employed before imprisonment and 81.8% (9 out of 11) of these had small scale businesses. 41% of the participants were employed by others as drivers, guards, housemaid and mechanics and 9% of the participants were unemployed (Table 3, Table 9).

Table 3: Occupation of participants before incarceration

Occupation	Frequency
Employed	9
Self employed	11
Unemployed	2

The mean period of stay in prison for the participants was 23.5 months and the mode was11 months. Most of the participants (15 out of 22) had not stayed in prison for more than 20 months (Figure 2).

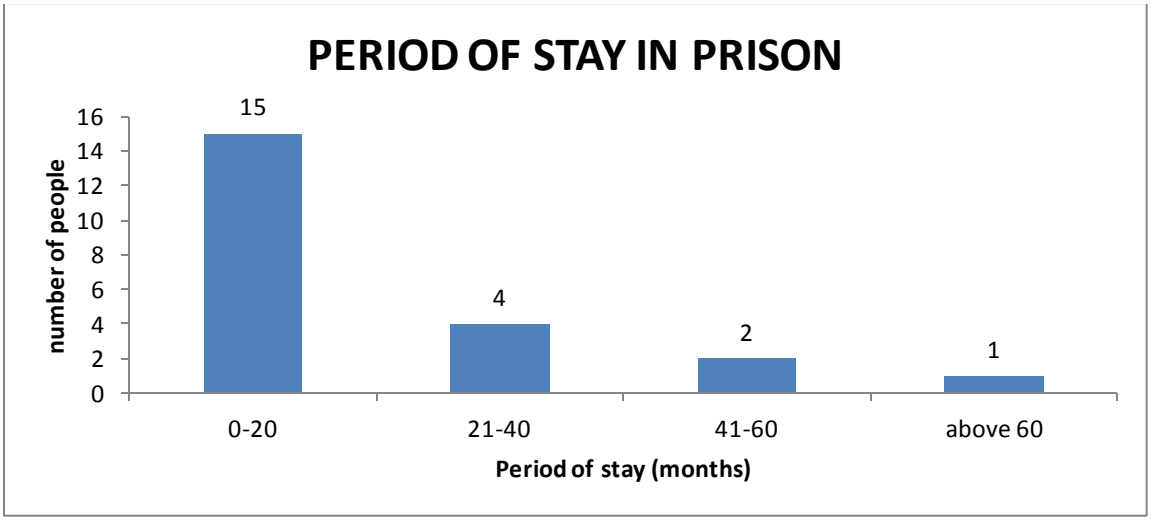

Figure 2: showing participants' period of stay in prison

AVAILABILITY OF ARVS AND HTC SERVICES

All participants said that HTC services are available in the prison. Most of the participants (13 of the 22, representing 59.1%) were tested for HIV in the prison's HTC centre. Most of the participants (12 out of 13) who were tested in prison were initiated on ART in the same

month or year and 1 was initiated on ART in the following year. Only 1 person who was tested at home was initiated on ART in the prison. All of the participants were on 5A regimen of ART and all participants reported that there was no time the clinic had no ARVs.

Most of the participants were in late stage during initiation. The most common WHO stage at ART initiation of the participants was stage 3, representing 59.1% (95%CI: 36.7%, 79.3%) and it was mostly due to severe weight loss (>10% of presumed or measured body weight), chronic diarrhoea and TB. 32% were in WHO stage 1, 9% were in WHO stage 2 and none was in WHO stage 4 during initiation (Table 4). Few participants had their CD4- cell count done. Of the 22 participants, 7 (31.8%) had their CD4- cell count done.

Table 4: WHO clinical stage of participants at initiation of ART

WHO Stage at ART clinic	Frequency	Percentage	95% Confidence Interval
1	7	31.8%	(13.9%, 54.9%)
2	2	9.1%	(1.1%, 29.2%)
3	13	59.1%	(36.4%, 79.3%)
Total	22	100.0%	

PROPORTIONS OF PEOPLE ON ART IN THE GENERAL POPULATION AND PRISONS

There are approximately 1,000,000 people living with HIV in the general population of Malawi, 56.8% (95%CI: 56.7%, 56.9%) of these are on ART[1]. In Malawi prisons approximately 2293 inmates are living with HIV and 58.1% (95%CI: 56.1%, 60.1%) of these are on ART.

	Number of people living with HIV	Number of people on ART	Prevalence of people on ART	95% Confidence Interval	P- value
General population of Malawi	1,000,000	568470	56.8%	(56.7%, 56.9%)	0.230
Malawi prisons	2293	1332	58.1%	(56.1%, 60.1%)	

Table 2: Proportions of people on ART in Malawi and in Malawi prisons

[1] Data sourced from: Ministry of Health. Malawi Integrated HIV Program Report April- June 2015. Government of Malawi; 2015 Jun p. 1

QUALITATIVE RESULTS

SOCIO- ECONOMIC AND CULTURAL FACTORS AFFECTING ART ACCESS

After analysing the text of the interview, we observed four factors that help explain socio-economic and cultural factors that affect ART access in Chichiri prison.

Congestion and lack of privacy

On average 19 out of 22 (86.4%) participants sleep in cells with 150 inmates which are meant for 50 to 60 inmates. The cells are congested so that inmates sleep in a sitting position called *"shamba"*. Out of the remaining 3 participants; 1 sleeps in a cell of 14 meant for juveniles because he is currently a student, 1 sleeps in a cell of 54 inmates and the other one is the female participant and sleeps in a cell of 17 although the number is not fixed since most women are on remand.

Majority of the participants, 15 out of the 22 (68.18%) (both genders), have all the people in their cells knowing that they are on ART. All participants take ARVs in the cell using water easily accessed from a tap in the cell.

Although few participants keep and take ARVs on their own, a majority of the participants, 17 (all men) out of the 22 (77.27%), belong to groups of 18 to 20 which is used for collection of ARVs at the clinic. Most members of these groups belong to one cell, *cell 5*, which is meant for people who are physically ill. Most of the people in this cell are HIV- infected which makes it easy for other inmates to know that they are HIV- infected and probably on ART.

Few group members (1 to 3) go on a monthly interval to the clinic to collect bottles of ARVs for all group members. The collected ARV bottles are stored in one carton by a group leader in the cell. During the evening, mostly between 6 to 8pm the group lines up to take their ARVs in the cell (Box 1).

> "The clinic staff lack discipline, after we ask them to collect ARVs for us at the clinic, they come to the female cells and announce our names in front of everyone so that we collect the ARVs from them."
>
> "During the time of taking drugs in the evening, the leader lines us up and everyone in the cell knows that it is time to take ARVs."

Box 1: Participants' comments on lack of privacy in prisons

Sharing of ARVs and dose adherence

Based on records from ART master cards it was found that adherence to ART for the previous month was more than 95% for all participants and that most participants had a pill count of 0 for the previous month and only 6 out of 22 had pill counts of 1 to 4 due to early collection of drugs. However, after interviewing the participants, 2 out of 22 participants forgot to take their drugs 1 to 2 times in the previous month. 4 out of the 22 participants had days when they did not take ARVs for other reasons and out of the 4 participants, 1 did not take ARVs because of delay from prayers and 3 because of hunger due to insufficient food.

Some of the participants (4 out of the 22) admitted to have ever shared ARVs with others. Some of the instances when ARVs were shared were when an inmate is just coming in or when someone delayed to go for ARV refill.

Poor nutrition

The inmates have one meal per day which they receive at 7 in the morning. Most of the participants divide the meal into two or three for them to eat before taking ARVs in the evening. Sometimes this food gets spoiled because of poor storage. One participant said that some people on ART exchange sex for food so that they have enough food to take with ARVs to avoid some of the side effects. These insufficient meals discourage some participants to take their daily doses.

Stigma and discrimination

Even though 2 participants did not know what other people say about them being on ART and 4 of the participants said were encouraged by other inmates that are not on ART to take their drugs, the majority of the participants (16 out of 22) stated that other inmates say negative comments about them. Some of the negative comments that other inmates said were: people on ART are wasting government resources, they are useless and are already dead, and that the people were careless to have contracted HIV (Box 2).

"Some people say that we are moving corpses and we are wasting government resources"
"With the insufficient food in prison, some people say it is because the government is buying ARVs for us instead of buying food for the inmates"
"People laugh at me and say that I was careless to have contracted HIV"

Box 2: Participants' opinions on stigma and discrimination from fellow inmates

SERVICE PROVISION

Participants' opinions about ART clinic service

After analysing the text from the interview, most of the participants had mixed opinions about the services provided at the ART clinic (Box 3). From the analysis, two main themes were generated.

Good service provision

Some of the participants explained that some of the reasons why the services are good are: good follow- up of patients after testing and ART initiation, friendly service providers at the ART clinic and because there is a wide range of services provided to the inmates at the clinic like weight measurement, medication dispensation and counselling.

Poor service provision

Some of the participants said the services are poor sometimes because of lack of privacy in distribution of ARVs especially in the female ward where a staff member from the ART

clinic goes to their cells to call out names of clients on ART who later line up to collect the ARVs in front of everyone. Another reason was that service providers sometimes delay in attending to clients so that some are sent back to their cells unattended. Participants also said that sometimes there is delay in referring patients to QECH for other reasons like side effects or other ailments. Participants also said that they sometimes receive harsh treatment from some service providers and that there is favouritism in distribution of *chiponde* (Peanut- based Ready- to- use Therapeutic Food).

> "They are good sometimes, but sometimes when we are sick they don't attend to us in time, they even send us back without receiving help."
> "They are poor. They treat us as if we are not humans. We understand we are being punished but this is not part of it."
>
> "Relevant drugs are given and their weight measured but they are not given supplementary food like *chiponde* and it is a concern because the food given is not enough"

Box 3: Participants' opinions on services at the ART clinic

Effects of service provision on participants' attitude to attending ART clinic

After interviewing the participants, it was found that most of the participants have a negative attitude towards attending the clinic because of the way they are treated, however, they still go to the clinic because they have no choice since this is the only ART clinic available (Box 4). On the other hand, some of the participants have a positive attitude towards attending the clinic because of the good services provided. However, the attitude of few others is not affected by service provision.

> "We are just prisoners, there is nothing we can do we have no choice but to still go to the clinic no matter how we are treated"
>
> "It affects me so that each time I have a problem I hesitate to go to the clinic to seek help"

Box 4: participants' opinions on effects of ART service provision on attendance to the clinic

FROM KEY INFORMANT INTERVIEWS

The clinic has 4 permanent staff members; 1 Clinical Officer, 1 Nurse, 1 Medical Assistant and 1 Patient attendant. It also has 3 temporary staff from Médecins Sans Frontiéres. The staff members are assisted by 7 Peer Educators who are inmates in the prison.

The other Key Informant was from the HIV/AIDS department at Malawi Prison Services Headquarters in Zomba.

By the end of June 2015, the total population of inmates in Malawi prisons was 13784, of these 2293 were HIV infected; of which 1332 were on ART.

FACTORS AFFECTING SERVICE PROVISION

After interviewing the service providers at Chichiri Prison ART clinic and from an officer from prisons HIV/AIDS program, the following were the factors affecting service provision.

Routine and incarceration

The inmates start their day at around 7 in the morning to receive their meals and do manual labour, and then they are locked up in their cells at 3 in the afternoon. This gives the service providers limited time to see their clients, as such some go back to their cells unattended.

During the rainy days the inmates are not released from their cells until the rains stop and this means that the service providers cannot attend to their patients as scheduled.

Change in drug administration system

Since the start of the ART clinic, all the inmates who were on ART were going to collect their drugs at the clinic where they could also have a routine check up. With a few members of staff they have, some prisoners could go back without being attended to. About 6 months ago, the system was changed to what is known as Community ART Group (CAG) which consists of 18 to 20 members of inmates on ART and 1 to 3 group members go on a monthly interval to the clinic to collect bottles of ARVs for all group members. The collected ARV bottles are stored in one carton by a group leader in the cell and during the evening, mostly between 6 to 8pm, the group lines up to take their ARVs in their cell. The other remaining inmates in the groups are reviewed every 3 months.

The introduction of this system has reduced workload to the service providers as they can distribute ARVs to many people at once.

Limited ART services

Despite the clinic offering more than one ART regimen (2A, 5A and 6A) with a majority of the patients on 5A (318 out of 340 inmates on ART); the clinic lacks most basic services of an ART clinic. For instance, they do not have a lab to help them with CD4- cell counting, as such; they send their samples to Dream laboratory in Blantyre. Like many ART centres in Malawi the clinic does not have equipment for viral load testing. For preventive services the clinic only offers CPT and does not offer PMTCT and does not provide condoms to the clients.

NUTRITION OF INMATES ON ART

Due to insufficient funds for meals in prisons, there is no special consideration for inmates on ART as they receive one meal per day as other inmates. However, whenever supplementary food (*chiponde*) is available, it is given to HIV infected inmates who have severe weight loss and once they recover they cease receiving the supplementation. The inmates do not understand this because they expect that all HIV infected inmates should receive *chiponde* and they think it is unfair to them and they usually complain.

CRITERIA FOR CELL ALLOCATION

In consideration to inmates who are physically ill, the prison made provision of one cell (cell 5) which is less congested. The cell ended up being occupied mostly with HIV infected inmates. Despite the prison's good intentions for the physically ill, it ended up being a discriminatory factor since most people in the cell are HIV infected.

DISCUSSION

The establishment of ART clinics in Malawi prisons can be considered as a great step towards achieving the UNAIDS goal of ending the AIDS epidemic by the year 2030 and one of the strategies for achieving this goal is to increase the coverage of ART globally.(2) However, the availability of ARVs is not enough; there are other factors that affect accessibility of ART such as socio- economic and cultural factors, service provision and other supporting services.

In order to be initiated on ART there is need to know one's HIV status. At Chichiri prison, it was found that HTC services are available, and all the participants displayed knowledge of the existence of this service, including those who were tested at home, before incarceration. Most inmates got informed about this service by the peer educators who are also inmates but assist at the HTC and ART clinics. Some were informed on arrival at the prison. The availability of the HTC service and the knowledge of its existence by the inmates is a positive factor towards the improvement of ART services in prison. This could mean most inmates get tested and know their HIV status, therefore having the opportunity to start ART on time if eligible, and if not to be properly followed up in the pre-ART program. Timely initiation on ART greatly improves the outcomes of the ART.(15)

The inmates admitted that there were no times the clinic had no ARVS; this ensures that there is consistency in the reception of ARVS and it also helps the inmates not to miss doses. The diversity of regimens offered at the clinic helps the people who are not on 5A to easily access their regimens in prison.

The change in distribution of ARVS at the prison's ART clinic for the past 6 months; from individual collection to collection in groups (CAG system) has come with its advantages and disadvantages both to service providers and inmates on ART. The service providers have a reduced burden of attending to many patients per schedule, taking into consideration that there are few staff members attending to many inmates. The service providers are also able to distribute ARVs to many people (18 to 20) at once. The process of reviewing the patients is relatively shorter than before since the patients (remaining members of the group) only come for review on a 3 month interval and they already have their ARVs since their ARVs are already collected by the other members of the group. Therefore, this means that even if the inmates are sent back without being reviewed, they still have their ARVs in the cell and their daily doses are not affected.

These ART groups may also act as peer support groups for inmates by encouraging each other to continue taking their medications and helping each other in necessary skills to take care of themselves. The groups may also assist in promoting adherence to ART by the inmates since the group members take their ARVS together in the cell, however, this might not mean that everyone is taking their ARVS since the cell is dark and there might be pill dumping and the group leaders cannot manage to monitor if everyone has taken their medication. ART groups on the other hand may also contribute to lack of privacy; and stigma and discrimination in the cells as the people line up to collect their daily doses every evening,

eventually the other people might know that they are on ART. In turn, this might discourage other inmates from going to get tested for HIV or it might discourage those that are HIV infected to start on ART. Another disadvantage might be lack of security of the ARVs since they are kept in one carton in the cell, which can be accessible to other inmates. This might also endanger the lives of other inmates who might want to abuse the ARVs like overdosing or smoking.(16)

A key aspect to obtaining the greatest benefits from ART is full adherence to the therapy. Due to multiplication and mutation rate of HIV, very high levels of adherence to ART schedules are necessary to avoid viral resistance.(17) According to the 2014 guidelines on Management of HIV in Malawi, 95% dose adherence is defined as missing 0- 3 tablets with an average of 8 week interval.(18) The prison environment can be challenging with regards to maintaining adherence of ART. This is consistent with the findings of a study that was done in Namibia prison which among other factors found that insufficient access to food, lack of privacy and stigma were the factors that discouraged the inmates to achieving a 100% adherence(16). Our study found that adherence to ART was more than 95% for all the participants from the master cards compared to 91% of the people in the general population of Malawi who have a 95% dose adherence.(4) However, after interviewing the participants, it was found that some participants had missed doses for other reasons. This raised some questions as to how it is possible to have adherence of more than 95% yet some doses were missed. A possible explanation to this difference could be pill dumping. Even though the inmates who belong to ART groups line up in the cell when it is time to take ARVs in the evening it is not a guarantee that everyone will take the drugs because the cells are dark and their leaders cannot manage to monitor if everyone is taking their drugs. The other reason for missing doses was sharing of ARVs with other inmates either newcomers or those who do not belong to ART groups and delayed to go for refill. However, it is not every time the shared ARVs are eventually replaced and for the newcomers it means that they will still have missed doses after returning the ARVs. Therefore, the findings from our study with regards to dose adherence might not completely be contrary to the findings in other studies which showed that dose adherence is poor in prisons.(16)

Prison conditions should not be an additional punishment. The prison sentence is a sanction; it holds an individual accountable for their actions and protects the society. It deprives someone of their liberty and impacts on certain other rights such as freedom of movement which are inevitable consequences of imprisonment.(19) However, in reality prison living conditions are generally poor and they do not even meet the most basic of standards and it is even worse when one is HIV positive.

Living with HIV behind bars is a double tragedy due to lack of privacy because of congestion and stigma and discrimination. Currently Chichiri prison has exceeded its capacity with 200%(20) and the inmates are locked up for long periods (17 hours) in congested cells. This congestion and confinement means that the inmates lack autonomy because they have no control over who knows their HIV status. Congestion may also contribute to transmission of communicable diseases like TB (1) and this is a disadvantage to inmates especially those that are HIV infected.

Prisons lack necessary nutrition to cater for the inmates yet those on ART are supposed to have a balanced diet. Currently inmates receive one meal per day which is not enough and it is a disadvantage to inmates, especially to those on ART who are supposed to have balanced diets and are required to take ARVs with food.(21) With the increase in the number of inmates over the years, the situation might worsen if other measures will not be employed. These insufficient meals sometimes make inmates not to take their ARVs for fear of exacerbating side effects like numbness and dizziness; and this concurs with a study done in Rwanda which showed that lack of food is a barrier to people seeking ART in resource- poor settings.(22) Unbalanced diets can cause malnutrition which may lead to immunosuppression thereby worsening the already immunocompromised state of HIV infected patients even though they are taking ART.(21)

Since the establishment of standalone ART clinics in the four central prisons (Chichiri, Zomba, Maula, and Mzimba prisons) of Malawi was relatively later than most ART clinics in the country, it is expected that not all services required to be provided by such centres could be in place in these prison ART clinics. According to WHO and Malawi HIV/AIDS guidelines an ART centre should be able to provide the following services as basics: HTC services; preventive measures such as condoms, Prevention with Positives (PwP), CPT, ITNs; and PMTCT; should also have the means to regularly, as recommended, check the CD4- cell counts and viral load measures of the clients.(23,18)

As part of the preventive measures CPT, PwP, and condoms are required to be provided to reduce easy transmission of the virus and prevent most opportunistic infections. However, at Chichiri prison ART clinic not all these are available. The inmates can access CPT and counselling services as part of PwP.

CPT is corrected together with the ARVs. And they are counselled during their review every 3 months. The CPT improves their quality of life by reducing the number of infections they are susceptible to. Counselling is aimed at making them have a better understanding of the infection thereby equipping them with the knowledge of how to best take care of themselves and lower transmission rates by avoiding risky behaviours such as skipping medications and having unprotected sex.

According to the KIIs, it was found that the HIV/AIDs department for the Malawi prisons is yet to put in place a policy concerning PMTCT. This is one of the key components in fighting HIV/AIDs. As a country, Malawi is doing a great job with the introduction of option B+. However this might not be the priority in the Malawi prisons and understandably so because the population of female inmates is very low, which means that the population of the female inmates with HIV is even lower. Another factor to consider is that most women are on remand; as such they do not spend much time in prisons. Even the convicts have relatively shorter sentences than the male inmates. Therefore it is very rare for a female inmate who is HIV positive to be pregnant, therefore requiring PMTCT, in the prisons. However having the policy in place would be beneficial in the rare cases since proper use of this service can reduce the transmission of HIV from mother to child to below 5% (24) and every life counts.

The provision of condoms would be very controversial in Malawi prisons. Despite this preventive measure being a requirement by WHO, in prisons male inmates and female inmates are separated, this would mean the condoms will be used for sex between same sex parties and homosexuality is illegal in Malawi as stated in the Penal Code of Malawi(Section 154). However the argument is that as part of the fight against HIV/AIDs prostitutes in Malawi are encouraged to use condoms and are provided with condoms using friendly services even though prostitution is also illegal in Malawi.(25) Another factor to consider is that unprotected sexual intercourse between men (penile-anal) poses an 18- times risk for HIV transmission than penile-vaginal sex, and HIV prevalence in prisons is 3 times higher than the general population(10,1), therefore the inmates are subjected to very high risk of contracting the HIV virus. Continual re- infection with HIV to inmates on ART may cause increase in viral load and would counteract with the effectiveness of ART. In addition, high prevalence of HIV in prisons is a public health concern because most of these people will be re-integrated into the general population at some point thereby putting the whole population at risk too.

Very few ART clinic centres have the equipment to check viral load in the general population, therefore it is no surprise that all the prison ART clinic centres do not have this too. The viral load is checked at 6 months and then every 2 years. Therefore due to the limited resources and the comparatively fewer number of inmates on ART than the general population, it can be arranged for this service to be obtained at a larger and more established centre rather than completely ignoring it. The viral load helps in assessment of ART success or failure; which would help service providers to take the right actions in managing the inmates just like it is for the members of the general population on ART.

Out of the 22 inmates who participated, 7 had their CD4 cell counts checked on initiation of ART. Despite the absence of the equipment for checking CD4 cell count at the prison clinic, there is an arrangement between the prison and a non government lab, dream laboratory in Blantyre, which enables the prison clinic staff to use this service for free. This is a great development and a step towards achieving equality in the care of inmates and general population on ART. This arrangement will help in timely initiation of ART. Unfortunately our study did not explore further on the presence of similar arrangements for other prison ART clinics and other laboratories, governmental or non-governmental.

In general, most inmates had mixed thoughts about the services provided at the clinic and how they are provided. Whilst more than half admitted to liking the services for different reasons like good follow-up, friendly clinic staff and a range of services, some participants also added negative aspects. Some of the complaints from the inmates included delay in referral to larger health facilities like QECH; neglecting other illnesses not directly linked to HIV/AIDs; favouritism by the clinic staff, in the distribution of *chiponde*, for example. However according to the KIIs this is due to lack of understanding by the inmates on the criteria for the distribution of the *chiponde*. This highly nutritious food is meant to be given to those with severe weight loss but due to budget constraints sometimes it is not enough even for those meeting the criteria. This misunderstanding might not be limited to the

supplementary food distribution area only. The inmates might probably also think the ART clinic staff is not being friendly simply because they are professional.

Unfortunately the opinions of the inmates affect their attitude and health seeking behaviour from the clinic. Even though most admitted they still go because they do not have a choice, this might still affect the time concept of the health seeking behaviour. The inmates might hesitate going to the clinic until the problem is worse, hence affecting the outcome of treatment and quality of life.(15)

Another reason for poor service provision might be understaffing of the ART clinic which might lead to delay in attending to patients as evidenced by the inmates' complaints of sometimes being sent back unattended. The key informants also said that there are only 4 permanent staff members at the clinic attending to all inmates and prison staff members.

By the end of June 2015, it was estimated that about 1 million people were living with HIV in Malawi and of these 880,000 were eligible for ART. Of these 568, 470 were alive and on ART, representing 57% of those infected with HIV in the general population of Malawi.(4) After interviewing key informants it was learnt that an estimate of 2,293 inmates were living with HIV in Malawi prisons by the end of June 2015 and out of these 1332 were on ART, representing 58% of those living with HIV in Malawi prisons. However, the number of inmates eligible for ART in Malawi prisons is not known. By the end of June 2015 the estimated number of people living with HIV in Chichiri prison was 350 and of these 340 were on ART, representing 97% of those living with HIV in Chichiri prison.

Although the percentage of people on ART is higher in prisons than the general population this cannot be interpreted as the prisons having equal or better ART coverage than the general population of Malawi. As evidenced in Chichiri prison, where 97% of those who have HIV are on ART and most of them started ART on diagnosis if not in the same month, most prison inmates are already eligible for ART initiation at the time of diagnosis or soon after. This can be due to the poor nutrition and living conditions which also affect their health and so they progress into advanced WHO stages relatively quicker than those with HIV in the general population; another reason could be delayed testing. In the second quarter of 2015, most patients (61%)were initiated on ART with WHO stage 1 or 2 (4) in the general population. From the results it is shown that most participants started ART with WHO stage 3 (59%) which also concurs with a study done in 2007 which showed that most inmates (93%) started ART in WHO clinical stage 3 or 4.(7) This indicates that the percentage of HIV-infected inmates on ART in Malawi prisons should be higher than the current 58% since most of them are already eligible for ART.

As of December 2006 a total of 81,821 patients had been started on ART in Malawi and of these, 103 (0.13%) were inmates(7), this might suggest that there has been a scale up in ART coverage in prisons by 2015 since out of the 568, 470 who are on ART in Malawi, 1332 (0.23%) are inmates. However, due to lack of data on HIV/AIDS and ART in prisons, for instance, the number of inmates who were HIV infected in 2006 is not known, therefore, it is hard to conclude that there has also been a scale up of ART coverage in prisons since proper proportions cannot be derived. Due to the scale up of ART in Malawi, for example 30% scale up between 2010 and 2015, there has been a significant reduction in prevalence of HIV, for instance from 14% in 2003 to 10.6% in 2010.(8) However it is not known if there has also been a significant reduction in HIV prevalence in prisons due to the scale up.

CONCLUSIONS

There has been a considerable improvement in accessibility of ART in Chichiri prison compared to the general population of Malawi. This study found that there was no difference in coverage of ARVs between people living with HIV in the general population of Malawi and in Malawi prisons. Most ART services were accessible at Chichiri prison; however, there are a lot of factors affecting ART access in prisons which are different from the general population such as: lack of privacy, stigma and discrimination due to congestion and poor nutrition; and these factors need to be considered. Other factors that need to be considered are factors that affect ART outcome in prisons, such as: late presentation, limited ART resources and risky sexual behavior.

LIMITATIONS

The limitations of this study were: firstly, the use of one prison, Chichiri prison, which did not represent the situation in all prisons in Malawi and it only reflected on central prisons and not middle- size and small prisons, therefore, the results cannot be generalized to all prisons. Secondly, missing data (prevalence of HIV in prisons, number of inmates on ART in the past years and the current number of inmates eligible for ART) from prison headquarters' database, which would have helped to assess if there has been a scale up on ART coverage in prisons. Thirdly, there was lack of privacy during interviews with inmates since the interviews were conducted in an open space (although wardens were far) which would have led to inmates not being free to answer some questions as they could; it was hard to balance between privacy and security of interviewers. Lastly, investigators failed to do observation of service provision as planned since there were no patients scheduled for clinic during the days allocated for data collection.

RECOMMENDATIONS

Although the Malawi Prisons Services has done a lot with regards to ART coverage in prisons, there is need to offer the full package of ART as recommended by WHO and Malawi ART guidelines. There is also need to improve living conditions in prisons; by expanding living spaces and improving nutrition. For the ART clinics, there is need to increase staff members and also establishing ART clinics in the other prisons. To achieve these, the Ministry of Home affairs and internal security, might also strive to incorporate NGOs and other stakeholders to help in providing necessary resources. A sustainable way of generating income by the inmates would also help apart from just relying on the government and NGOs.

There is also need for more research concerning HIV/AIDS in prisons which might later help in setting policies and necessary interventions concerning HIV/AIDS in prisons.

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APPENDICES

APPENDIX 1

METHODOLOGY

Table 8: Data analysis plan used in this study

Specific objectives	Methods	Analysis
• To determine the availability of ARVs in prison ART clinic	• Quantitative: semi – structured interview of inmates	• Quantitative: Analysed as frequency and percent. Data were entered in Microsoft Excel 2007 (Microsoft Corporation 2006, WA. USA) and Epi info 7.1.4.0 (Centers for Disease Control and Prevention 2014, GA. USA) was used to analyze the data by generating frequency tables and percentages.
• To determine how socio-cultural factors affect access to ART	• Qualitative: semi-structured interview to inmates	• Qualitative: Thematic content analysis: data entered in Microsoft Word 2007 (Microsoft Corporation 2006, WA. USA) familiarisation, extraction of codes from text, grouping and categorizing into similar concepts.
• To determine availability of HTC services in the prison	• Quantitative: semi structures interview to inmates	• Quantitative: Analysed as frequency and percent. Data were entered in Microsoft Excel 2007 (Microsoft Corporation 2006, WA. USA) and Epi info 7.1.4.0 (Centers for Disease Control and Prevention 2014, GA. USA) was used to analyze the data by generating frequency tables and percentages.
• To assess how services are provided at the prison ART clinic	• Qualitative: semi-structured interviews to inmates and key informant interviews to service providers.	• Qualitative: Thematic content analysis: data entered in Microsoft Word 2007 (Microsoft Corporation 2006, WA. USA) familiarisation, extraction of codes from text, grouping and categorizing into similar concepts.
• To compare	• Quantitative:	• Data were analysed using

proportion of prisoners on ART with proportion of people on ART in the general population	secondary data collection from the HIV/AIDS Department at Malawi Prisons Headquarters in Zomba and from the HIV/AIDS Program Report 2015.	proportions at 95% Confidence Interval. • Data were entered in Stata 12 (StataCorp, College Station, TX) and proportions were calculated.

APPENDIX 2

RESULTS

Table 9: Occupation of participants at time of incarceration

OCCUPATION	Frequency	Percent	95%Confidence Interval
Business	9	40.9%	(20.7%, 63.7%)
Cleaner	1	4.6%	(0.1%, 22.8%)
Delivery man	1	4.6%	(0.1%, 22.8%)
Driver	2	9.1%	(1.1%, 29.2%)
Farmer	2	9.1%	(1.1%, 29.2%)
Guard	1	4.6%	(0.1%, 22.8%)
Housemaid	1	4.6%	(0.1%, 22.8%)
Mechanic	1	4.6%	(0.1%, 22.8%)
Metre reader	1	4.6%	(0.1%, 22.8%)
Supplier	1	4.6%	(0.1%, 22.8%)
Unemployed	2	9.1%	(1.1%, 29.2%)
Total	22	100.0%	