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HEALTHCARE CHALLENGES IN THE IMPLEMENTATION OF TB INFECTION PREVENTION AND CONTROL AT HARARE CENTRAL PRISON, ZIMBABWE, 2019-2020

BY

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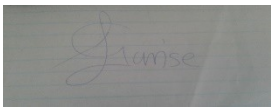
Abstract

Worldwide, overcrowding in prisons has led to communicable diseases like Tuberculosis (TB). Zimbabwe is no exception to the problem, with Harare Central Prison (HCP) – one of the largest prisons in Zimbabwe with more 1500 inmates, having serious challenges of TB among inmates. Healthcare workers and Prison Officers face the challenges in the implementation of Tuberculosis Infection Prevention and Control (TBIPC) at the institution. This study assessed the healthcare challenges curtailing the implementation of TBIPC guidelines of the World Health Organization by healthcare workers at Harare Central Prison. An analytical cross-sectional study on 69 purposively selected informants from among prison officers and nurses was conducted based on a semi-structured questionnaire. Further, the study interviewed key informants from among senior management to identify possible recourse on the issues raised by the informants. Findings from senior management were analyzed based on grounded theory. Epi Info 7.2 was used to analyze the data. The questionnaire assessed availability of materials for TBIPC such as face masks and respiratory ventilators, availability of national guidelines, training on TBIPC as well as administrative challenges hindering TBIPC. The mean age was 39±9 years (IQR=22—55 years). Overall, 40 (58%) of the respondents reported having inadequate materials for TBPIC at the prison. All respondents confirmed that they had access to TBIPC guidelines but complained that the TBIPC guidelines were not clear to them particularly on issues that relate to policy clarity for their practice of TBIPC. Twenty-eight (40.6%) claimed that they had not received training on TBIPC. Fifty-five (79.7%) reported having administrative challenges inclusive of accessing materials for TBPIC when they needed them. Senior management reiterated that trainings on TBIPC are needed but the lack of staff hinders the pace of training. The senior management confirmed the to clarify the policy on TBIPC during the training. Furthermore, the senior management encouraged the health care workers to lobby for installation of better TBIPC equipment at the prison. In conclusion, the gaps identified in this study are important for policymaking. Efforts to improve the availability of TBIPC guidelines; TBIPC training, clarity of policies on TBIPC and addressing the administrative constraints are urgently needed.

Key Words: Tuberculosis; Key informants; Prisons; Healthcare workers; Tuberculosis Infection Prevention and Control

Declaration

I declare that this dissertation is my original work except where sources have been cited and acknowledged. The work has never been submitted, nor will it ever be submitted to another university for the award of a degree.

Loice Garise  **10 June 2021**

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Abbreviations

AIDS	Acquired Immuno-Deficiency Syndrome
ECDC	European Centre for Disease Prevention and Control
HIV	Human Immunodeficiency Virus
HW	Health Workers
ICRC	International Committee of the Red Cross
MHCC	Ministry of Health and Child Care
NGO	Non-Governmental Organizations
IPC	Infection Prevention and Control
PITC	Provider Initiated Counselling and testing
PE	Peer Educator
TB	Tuberculosis
TBIC	Tuberculosis Infection Control
TBIPC	Tuberculosis Infection Prevention and Control
WHO	World Health Organization
ZPCS	Zimbabwe Prisons and Correctional Service

Definition of Terms

Infection Prevention and Control: these are activities that are carried out in a bid to limit the spread of diseases and illnesses, (WHO Infection Prevention and Control Guidelines, 2010). If prevention does fail hen there is need to contain the infection such that it does not spread from one prisoner to the other or to the prison officers.

Infection prevention and control practices: this is the use of different techniques that are put in place so as to prevent infection and to prevent spread of infections (WHO, 2010).

Prison: is defined as a place or institution of confinement, especially of long term confinement for those who have been convicted of serious crimes or otherwise considered undesired undesirable by the government.

Prison Officers: according to oxford dictionary, 2010 is defined as people who work at the prisons making sure there is maximum security of the prisoners through keeping them safe and preventing them from escapes.

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CHAPTER 1 INTRODUCTION

1.1 Introduction

Worldwide, communicable diseases are common in prisons than in the general population due to overcrowding (Turnbull & Reid, 2017). Adherence to implementation guidelines for TB Infection, Prevention and Control espoused by the World Health Organization is therefore imperative to protect inmates, prison workers and the community. Zimbabwe is no exception to the problem of overcrowding. Harare Central Prison in Harare, located east of Harare city Centre, the prison often holds up to 2,000 inmates or more, increasing the risk of infectious diseases. A contextual analysis focusing on the situational analysis, knowledge, access and practices towards the implementation of TB Infection control guidelines at Harare Central Prison to mitigate the TB situation at the prison.

Harare Central prison suffers from a high mortality rate, a prevalence of communicable diseases, shortages of food, clothing, and medicine. There is need to engage all stakeholders relevant to help in the prevention and spread of infections especially to the vulnerable group like prisoners. Joseph (2006) also agrees with this statement in the sense that infections have become the major health concern. This implies all stakeholders (prisoners, community, staff, and the government) should be involved in infection control in prisons.

Harare Central Prison got some donations which were health associated in the fight against infection from European Centre for Disease Prevention and Control (ECDC). Sixty-one thousand nine hundred and thirty-two prisoners benefited from the

organization, the major problem they wanted to solve was overcrowding in prisons and improvement of infrastructure of which they could not meet. Despite this, basic medical care and shelter for prisoners is provided.

The President of Zimbabwe pardoned 2,000 inmates in May 2016 in an attempt to reduce overcrowding. Overcrowding at Harare Central Prison has led to more cases of skin conditions, upper respiratory tract infections, tuberculosis and diarrhea. There is need to investigate on how the healthcare system is implementing TB infection prevention and control strategies for both inmates and prison officers.

According to Bick (2016), Infection Control Practitioners must implement knowledge in order to protect the health of inmates, correctional employees and the community. Predisposing factors that leads to the transmission of TB are delayed case detection, poor contact detection, inadequate treatment of infectious cases, high turnover of prisoners, and poor implementation of TB infection control (IC) measures, rationed access to soap, water, and clean laundry, insufficient infection control expertise and overcrowding amongst others (Mohle-Boetani , Miguelino & Dewsnup, 2002).

Due to the structure of the old colonial buildings and infrastructure the prison walls are considered as the reservoirs of Mycobacterium Tuberculosis. Transmission of TB also occurs through the prison environment which is not well ventilated, visitors, the prisoners themselves and prison officers. The abrupt transfer of inmates from one location to another further complicates the diagnosis of infection, interruption of transmission, recognition of an outbreak, performance of a contact investigation and eradication of disease.

Incarceration of inmates leads to high burden of illness especially TB. This is worsened by the policy or guidelines of correctional administrators and correctional health practitioners which they follow for example the time the inmates are released from their cells in the morning which is the unlock time and the lock-up times which will lead to less out-door life for inmates. This will therefore lead to increased risk of one getting infected with Tuberculosis hence there is need to exercise standard infection control measures to the vulnerable group (prisoners). Public policy makers should also put in mind the vulnerable population in prisons to have flexible and favorable conditions for inmates as this will enable healthcare works and prison officers to exercise international standards which will enable standard operations in the Zimbabwe Prisons and Correctional service.

Inmates returning to their home communities should have proper medication, health education on infectious conditions, life skills as this will help them in the community in which they live. This means that if well treated, screened and given proper health education on prevention of infectious conditions it means there would be no re-infection of conditions like tuberculosis and diarrhoeal conditions or skin conditions. Inmates are beacons of public health opportunity so there is need to do more researches on the vulnerable group.

Public health issues are of great concern in the prison environment as this helps in the prevention point of view of inmates and prison workers as this helps in the reduction of morbidity and mortality and transmission of diseases as these are highly prevalent in inmate populations as evidenced by other studies. Some of the conditions that are prevalent in prisons include tuberculosis, viral hepatitis, Human immune virus and

sexually transmitted disease. Hence this study is mainly hammering on the challenges faced by healthcare workers in the management of TBIPC contribute greatly to the global burden of TB disease in prisons as evidenced by CDC (2006). Joseph Bick (2006) also emphasized that TB is a major public health concern in correctional facilities throughout the world and Incarcerated populations are at disproportionately high risk for developing TB infection and disease compared to the general populations.

Tuberculosis is an infection of poverty and crowding, so it is no surprise that inmates have high rates of TB infection hence there is need to practice Tuberculosis prevention and Control in incarcerated units. HIV infection accelerates the development of active tuberculosis, HIV and viral hepatitis, sexually transmitted diseases and skin conditions. There is need to impact inmates with knowledge about tuberculosis in prisons as this helps in the screening, prevention treatment and infection control in prisons. This is of great advantage to the general population because inmates after serving their sentence they return back to the community.

The Zimbabwe Prisons and Correctional Service needs to have proper strategies in the management of inmates and officers in the management of infectious diseases in prisons as this is of great value to the nation at large. This is of great importance because every inmate who leaves a correctional facility with untreated sexually transmitted disease, viral hepatitis, HIV, or tuberculosis might be a source of transmission in the community hence there is need of public health attention. This means every inmate who is treated for communicable disease behind bars reduces the risk to the public health.

1.2 Background of the study

Ministry of Health and Child Care, Zimbabwe in line with the World Health Organisation (WHO) 2013 launched the standard precautions on National Infection Prevention and Control Guidelines to strengthen infection control practices in health care facilities nationwide and this includes prisons. Prisons usually lack adequate information technology, clinical information sharing facilities and the different jurisdictions responsible for care of the prisoners is often poor (Bick, 2017)

Tuberculosis (TB) is a communicable disease that is a major cause of ill health, one of the top 10 causes of death worldwide and the leading cause of death from a single infectious agent (ranking above HIV/AIDS). The bacillus Mycobacterium Tuberculosis, which is spread when people who are sick with TB expel bacteria into the air; for example, by coughing, causes it. Typically, TB affects the lungs (pulmonary TB) but can also affect other sites (extra-pulmonary TB). About a quarter of the world's population is infected with M. tuberculosis and thus at risk of developing TB disease.

Globally, reliable information on the prevalence and incidence of tuberculosis within correctional facilities such as prisons and other types of detention centers is limited. The contribution of tuberculosis rates in prisons to the transmission rates of new Mycobacterium tuberculosis infections in the general population is unclear (Levy, Reyes & Coninx 1997). This is worsened by the dilapidated colonial structures, overcrowding, lack of sanitation and ventilation and inadequate medicines and nutrition.

Generally, prisons TB cases have dropped with 1 or 2 cases diagnosed over a month in most prisons (Prisons Statistics, 2017) Harare Central Prison incidence rate is 4,1% (2019) compared to 3% in 2018 for the same period. During the period May, June, July

2019 zero new cases were recorded for new cases but as for August, Sept and October 4 new cases were recorded making a total number of 19 inmates diagnosed of TB during the period January 219 to October 2019 which means TB cases are starting to increase at Harare Central Prison Hospital (HCPH). In late 2008 there was cholera outbreak at Harare's Central Prison and an average of four to five deaths to prisoners died in a day (Prison Statistics, 2016).

The cholera outbreak was due to poor sanitation conditions in the prison thus exposing the vulnerable group to diarrheal conditions especially cholera. Throughout the prison system, prisoners were rendered acutely vulnerable to disease because of the lack of food, and they increasingly contracted malnutrition related diseases like pellagra, they died of starvation and lowered immunity that predisposes the inmates to infectious conditions hence the Infection Prevention and Control team should implement strategies that protect the healthcare workers, officers and inmates. Tuberculosis (Parliamentary Report, 2011), despite being a curable disease, continues to be a major public health threat.

The World Health Organization (WHO 2018) estimated that 1.5 million people died of the disease in 2013. In the 2014 Global Tuberculosis Report, WHO noted that of the estimated nine million cases of TB in 2013, only 64% was notified as newly diagnosed, leaving a remaining three million people who were left not diagnosed or diagnosed but not reported. Clearly, improved diagnosis of TB is urgently needed. Worldwide prison statistics have shown that there is a rise in new TB cases each year and some cases or statistics are unrecorded.

In European prisons, the prevalence of TB is estimated to be up to 17 times higher than in the general population. Other studies have shown that TB appears to reflect a regional trend with high rates of prison-based TB reported in South Africa (41%), Cote d'Ivoire (27.5%) (Dolan, 2007) and Zimbabwe (50%) (Alexander, 2009) among others. WHO has launched a strategy to Stop TB by 2035 to help fight the continued challenges towards TB?

The World Health Organization (WHO 2013) estimates that there are 10 million new cases of tuberculosis (TB) reported worldwide each year, and 1.7 million people die from the disease. Incidences of TB in sub-Saharan Africa (SSA) remains very high at over 300 new cases of TB per 100 000 population in 2007. TB incidence rate in Zambian prisons is 5 285 cases per 100 000 inmates per year which is 10 times more than that of the outside population. An article entitled Death and disease in Zimbabwe's prisons describes the terrible conditions faced by prisoners in Sub Saharan Africa which are overcrowding, poor nutrition, poor sanitation, HIV infection and poor health care are obvious causes for the escalating death toll in Zimbabwe's prisons.

Tuberculosis is a public health problem and has numerous challenges especially in the Low Medium income countries were 80% of the global TB resides. A study based on longitudinal TB data from 26 countries in Eastern Europe and Central Asia concluded that the rate of growth of prison populations was the most important determinant of differences in the TB infection rates in these countries.

1.3 Statement of the problem

A preliminary review of the TB surveillance system for Harare Central Prison has indicated that for the past year there has been a decrease in TB cases amongst inmates

(3%) and during the first and second quarter of 2019 TB cases were on the rise during the third quarter there were no cases of TB recorded. The researchers worry is that during the beginning of the third quarter of 2019 there has been an increase in TB cases at the institution hence proposing to an investigation. This leads to 4.1% incidence rate of TB for the period of January 2019 to October 2019 as compared to 2018. This clearly indicates that there has been a rise of TB cases at Harare Central Prison, Harare Central Prison has a total population of 2000 inmates, 445 prison officers and 72 healthcare workers.

1.4 Objectives

1.4.1 Broad Objective

To investigate on the healthcare challenges in the implementation of TB Infection Prevention and Control measures at Harare Central Prison as from January 2019 to March 2020

1.4.2 Specific objectives:

i. To conduct a situational analysis on the environmental structure and practices on TBIPC at Harare Central Prison as from January 2019 to March 2020
ii. To assess the health care workers and officers' knowledge on TBIPC at Harare Central Prison as from January 2019 to March 2020
iii. To analyze the environmental factors which includes the administrative and managerial factors implemented by health workers and officers in the implementation of TBIPC as from January 2019 to March 2020

1.5 Research Questions

i. Why are TB cases on the rise at Harare Central Prison as from January 2019 to March 2020?

ii. What factors do contribute to challenges faced by health care workers in the fight against TB infection control at Harare Central Prison as from January 2019 to March 2020?

1.6 Justification of the Study

Global Tuberculosis Report according to WHO (2013) noted that of the estimated nine million cases of TB, only 64% were notified as newly diagnosed, leaving a remaining three million people who were left not diagnosed or diagnosed but not reported. This also applies to urgent attention needed at Harare Central Prison incidence rate on TB, which is 4.1% (2019), compared to 3 % in 2018 for the same period. During the period May, June, July 2019 zero cases were recorded for new cases but as for August, Sept and October 4 new cases were recorded making a total number of 19 inmates diagnosed of TB during the period January 219 to October 2019, which means TB cases are starting to increase at Harare Central Prison Hospital (HCPH). Policies and guidelines on TB Infection prevention and control should also be implemented at the site.

1.7 Delimitation of the Study

The study was carried out at Harare Central Prison. The study participants were health workers and prison officers at the site. Inmates were excluded from the study as this is a vulnerable group. Prisoners were the targeted population where research questions and

most of the research information was to be obtained from but because it is a vulnerable group and because of security reasons that protects inmates, prison officers and health care workers were recruited in the study.

1.8 Limitations of the Study

Permission for authorization to carry out this study took a lot of time because there are a lot of hierarchy and security screening procedure that was followed by the prison officials for the researcher to be cleared.

CHAPTER 2 LITERATURE REVIEW

2.1 Tuberculosis: definitions and concepts

Tuberculosis (TB) is a disease caused by germs that are spread from person to person through the air. It usually affects the lungs, but it can also affect other parts of the body, such as the brain, the kidneys, or the spine. A person with TB can die if they do not get treatment (Centers for Disease Control and Prevention [CDC], 2000). Tuberculosis is a chronic infectious and communicable granulomatous disease caused by mycobacterium tuberculosis (Reza, 2009).

If the immune system of the host fails to eliminate the infection, the bacilli proliferate inside alveolar macrophages then the infected macrophages produce cytokines and chemokines that attract other phagocytic cells thus leading to one having TB. According to Morrison, Pai & Hopewell (2008) people who are in close contact with an individual

who has an infectious form of tuberculosis are at increased risk of acquiring the infection.

2.1.1 Transmission of Tuberculosis

Tuberculosis is spread via airborne transmission and is passed from person to person through airborne particles called droplet nuclei. An individual with tuberculosis coughs, sneezes, shouts, speaks, or sings the tubercle bacilli located within these droplet nuclei, are expelled into the air and if one who does not have the condition breaths in this tubercle bacilli one is infected with tuberculosis. The droplet nucleus forms after the droplet is expelled into the air and can remains suspended, and infectious, in the air

for hours or days and may be dispersed by air currents or ventilation systems which are bad like in the overcrowded areas. Infection may occur in a susceptible host and if inhaled the tubercle bacilli will then reach the alveoli of the lungs. TB transmission depends on the infectiousness of the person with TB, the environment in which exposure occurs and the duration of exposure. Infectiousness of a person with TB is inferred from microscopic examination of sputum. TB transmission from persons who are smear positive through the laboratory examination of the sputum his condition is worsened by t and the likelihood of transmission after exposure to an infectious person is increased.

2.1.2 Prevention and Control of TB in Correctional Facilities

Transmission of TB in incarcerated units or prisons throughout the world signifies a need for improvement in TB control efforts focused on correctional populations, correctional environment and structures and hence also worsens the condition if one has the tubercle bacilli. Prisons and incarcerated institutes are very good setting of primary

source of health information, intervention, and promotion so correctional facilities have a unique opportunity and responsibility to address TB issues which consists of the infection control, prevention, treatment, care and support of individuals with the condition.

The prevention and control of tuberculosis in correctional facilities requires the implementation of a tuberculosis control program which ensures prompt disease detection, isolation, management, treatment and care modalities which suit international guidelines and discharge planning for infectious inmates. Health promotion activities which are effective include assigned personnel responsible for the program who is the Tuberculosis Infection Control Focal Person. Also included is the TB control plan, periodic facility-specific TB risk assessments, continuing staff and inmate education and collaborations with public health and community partners and mainstreaming with other organisations like the Non-Governmental Organisations (NGOs) and any other organisations that may be beneficial to the ZPCS like collaborating with other public health officers, and other community partners.

2.1.3 Screening

According to CDC (2006) there is need for early suspicion of TB if the following signs and symptoms should be looked into which are productive cough for the past two weeks, night sweats, chest pains, loss of appetite and weight loss. If one presents with these symptoms there is need to do what is called early screening, isolation, collection of sputum for examination at the laboratory, diagnosis, and treatment of persons with these symptoms and if possible contacts should be traced and investigations be done.

Early screening of TB disease remains the most effective means of preventing TB transmission especially in prisons so there is need to health educate the healthcare workers and the prison staff on the importance of early screening. The dangers that are associated with inmates with undiagnosed TB condition can expose other inmates correctional staff and this also means that when released they also can infect persons living in surrounding communities or the community where they would be staying after release from prison. The primary goal to screen tuberculosis in a correctional facility is to detect TB disease and prevent transmission and thus also helping in the isolation of the infected. This also helps in the benefit of TB treatment and thus helping the patient for quicker recuperation.

CDC (2006) guidelines recommend that at facilities risk is determined by TB transmission risk within that facility. The number of TB cases that had occurred in the facility in the previous year; also take not of substantial numbers of inmates with TB risk factors for example having HIV and TB. At the same time, significant numbers of inmates from areas of the world with high TB rates and also note if the employees of the facility are not otherwise at risk for TB. If it means that the facility does not meet these criteria should be categorized as a non-minimal TB risk facility.

The risk of having Tuberculosis should be assessed at least quarterly and should be with the help from the national health department which is Ministry of Health and Child Care. This is important if the prison staff and healthcare workers are impacted with knowledge from workshops and trainings on TB. There is need to engage what is called the multipronged approach to TB screening which is mainly based on the context and inmate characteristics, TB history, symptom review, diagnostic testing, gene expert and

chest radiograph. There is an excellent point to note especially in prisons that all correctional facilities regardless of TB risk level they should obtain a TB history and conduct a symptom screening of all newly incarcerated inmates on intake.

Health education programs about tuberculosis information to inmates can play an important role to create awareness about TBIPC preventive measure and influence the people to perform TB preventive activities. WHO, (2009) policy on TB infection control in health-care facilities, prisons and households for example covering the mouth or moving away a reasonable distance away from people. Patients with low immunity due to HIV are more likely to acquire tuberculosis in an area with high tuberculosis prevalence (Ngowi, Mfinanga, Bruun, & Morkve, 2008).

2.2 Theoretical Framework

The Health Belief Model (HBM) and literature review, evidence demonstrates that socio demographicsocio-demographic factors including sex, age, and education can influence TB Infection, preventive and control behaviours. Thwin and Chapman (2009) agrees to the fact that age is related to TBIPC meaning to say the younger ag group is likely to develop TB and older age had good TB preventive behaviours. The behavioural preventive behaviour focuses on the general health promoting activities which includes living in good ventilated houses, avoidance of overcrowding, avoidance of close contact with TB patients, good nutrition and better personal health habits with regard to spitting and coughing (Reza, 2009).

The Health Belief Model (HBM) originated in 1950s as a systematic method to explain and predict preventive health behavior on health conditions. It focuses mainly on two aspects which are health behavior which is threat perception and behavioral evaluation.

In terms of TB Infection, prevention, threat perception includes two components susceptibility to have the condition TB and anticipated severity of the consequences of having the condition (TB).

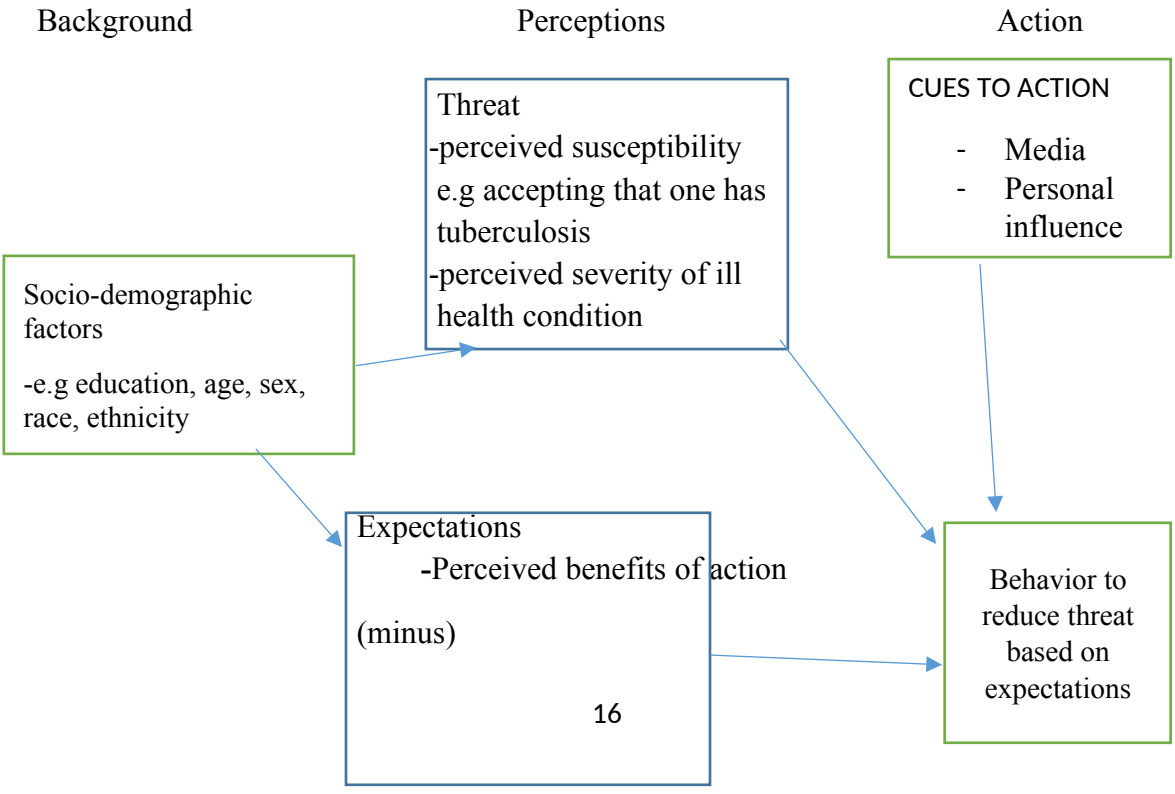
The HBM includes four concepts which are perceived susceptibility, perceived severity, perceived benefits, and perceived barriers. Application in the TB infection Prevention and Control states that perceived susceptibility of tuberculosis disease may influence the person to perform TB preventive activities. Personal belief is also very influential as postulated by Hashmi, Javed, Tahir and Jamil (2016) who found that most of participants (63%) believed that everyone can be infected by tuberculosis. Meanwhile 67.9% of them believed that tuberculosis is a serious threat and stated that TB is very dangerous. In another study in India, Sharma, Malhotra, Taneja, Saha, & Ingle (2007) found that (89.2%) perceived it to be an infectious disease and anyone can get TB.

Perceived severity to tuberculosis infection, prevention and control if not practised can lead to death or severe consequences. Karim (2010) conducted a study on community perceptions of tuberculosis, found out that TB was a deadly disease, and could affect anyone. Gilani and Khurram (2012) found that 73% of respondents perceived TB as a communicable disease and more than 33% of respondents considered that TB affects education, occupation, getting married, and having children. Sikwese (2012) also found that TB is a dangerous disease while some participants associated TB with HIV. Findings by Haasnoot (2010) also showed that 67% of the Maasai population perceived that TB is a dangerous disease.

Perceived barriers of TBIPC includes accessing TB testing, treatment services, treatment cost, health service centre far away from the resident, lack of transportation

overcrowding in prison and poor nutrition amongst others. TB control requires early diagnosis and treatment facilities, good administrative, managerial and environmental factors not excluding respiratory hygiene. Brouwler (2014) according to his Mozambique study in the TBIPC strategies in prisons he also agrees with this statement. Ohnmar, Win, Nyunt, & Lwin (2012) found that most commonly reported barriers to consulting a medical doctor and difficulty in taking time off from work.

Stigma and discrimination also play a great role in the perceived barriers to TBIPC. TBIPC in prisons also affects inmates because some do not disclose their disease and delay seeking health care for the fear of being stigmatized (Qureshi, Morkve, & Mustafa, 2008). Screening of inmates and initiating them early on treatment also helps in the TBIPC in prisons. Hochbaum (1958) as cited in Glanz et al., (1999) demonstrated with considerable precision that a particular action to screen for a disease was associated strongly with the two interacting variables of perceived susceptibility and perceived benefits.



-Perceived barriers to action
-Perceived self-efficacy to
perform action

Figure 2.1: Health Belief Model (adapted from Rosenstock, Strecher, and Becker, 1988)

The health Belief Model is described as having the following components in detail perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action and self-efficacy. Perceived Susceptibility is the individual's assessment of their risk of getting the condition (TB) and how likely one think may have this problem.

Perceived severity means how serious a problem one believes his/her issue is. This is an individual's assessment of the seriousness of the condition, and its potential consequences, which are related to being sick and death.

Perceived Benefits is an individual's assessment of the positive consequences of adopting the behavior that helps in the reduction of having the condition (TB). This is where health education, trainings, reading pamphlets, listening to the radio about issues on TBIPC .This will help the individual to reduce behavioral risks that may lead one in contracting TB.

Perceived barriers refers an individual's assessment of the influences that facilitate or discourage adoption of the promoted behavior. For example, being incarcerated and having limited resources may predispose one to having TB of which this includes having enough resources, overcrowding, having a good environment, having enough trainings to both the healthcare workers and the prison officers and amongst all having a balanced

diet. Perceived barriers also include what are called the potential negative aspects of doing this recommended behavior especially when one is in a limited resource setting (prison).

Cues to Action refers to triggers to change one from having the condition (TB). An individual's perception of the levels of susceptibility and seriousness provide the force to act. Benefits (minus barriers) provide the path of action. This means that for the strategies on TBIPC to work it may require some cues to action for the desired behavior to occur like reducing overcrowding in prisons, providing a normal balanced diet, reducing smoking of tobacco in prisons and facilitation of having prison cells that suit the international standards. Health educations and trainings of both staff has also a great impact in promoting a range of behavior changes that health in the challenges faced by healthcare workers in the management of TBIPC in prison.

Self-efficacy is one's conviction that one can successfully execute the behavior required to produce the outcomes and this can be through health motivation, trainings, workshops, enough resources and the value for health.

2.3 The Health Belief Model concept, definitions and application in TB Infection Prevention and Control at Harare Central Prison.

The table below clearly shows in brief the Health Belief Model concepts which are perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action and self- efficacy. The table shows clearly HBM definitions and its application.

Table 2.1: Concepts, Definitions and Application in TB Prevention and Control

Concept	Definition	Application
Perceived Susceptibility	One's opinion of chances of getting a condition	Define population(s) at risk, risk levels; personalize risk based on a person's features or behavior; heighten perceived susceptibility if too low.
Perceived Severity	One's opinion of how serious a condition and its consequences are	Specify consequences of the risk and the condition
Perceived Benefits	One's belief in the efficacy of the advised action to reduce risk or seriousness of impact	Define action to take; how, where, when; clarify the positive effects to be expected.
Perceived Barriers	One's opinion of the tangible and psychological costs of the advised action	Identify and reduce barriers through reassurance, incentives, assistance.
Cues to Action	Strategies to activate "readiness"	Provide how-to information, promote awareness, reminders.
Self-Efficacy	Confidence in one's ability to take action	Provide training, guidance in performing action.

2.4 Summary

The review was centered on Literature in prisons and constructs for the health belief model were used to guide the review of the available literature. The same constructs were also used in the guide of data collection and analysis. Literature reviewed included studies on socio-demographic factors, socio-cultural factors, health related factors as well as perceived susceptibility to TB infection prevention and control in prisons.

CHAPTER 3 METHODOLOGY

3.1 Introduction

This chapter addresses the research methodology, research design, data collection methods and procedures, sampling methods and ways of analysing the data collected.

iii.2 Study Design

An analytic cross sectional study was carried out to review the current health care workers and officers' duties, working conditions and the completed questionnaires from the key health workers' informants. Some of the variables to be measured on the records include the environment, administrative activities, management activities, respiratory hygiene, hand washing sites, smoking tobacco, water and sanitation methods in prisons and this also includes simplicity, acceptability and usefulness of TB infection prevention and control at the institution. The individuals to be interviewed, some of the variables to be measured include designation, number of completed years in service and skills of implementing the infection prevention and control of TB in the prison environment.

iii.3 Study Setting

The study was carried out at Harare Central Prison. The prison was established in the 20th century, and is operated by the Zimbabwe Prisons and Correctional Service (ZPCS). A 1973 study found that 97% of admitted inmates were black Africans, and 50.6% were younger than 28. Harare Central Prison is a medium security prison and houses men only. It is located east of Harare City Center. The prison houses a maximum of 2, 000 inmates, each cell should have one inmate but currently it holds three or more inmates. The prison environment is over populated thus exposing the prison population at risk of

infectious diseases hence there is need for the implementation of TB Infection, Prevention and Control strategies to inmates, prison officers, healthcare workers and the community at large. Harare Central Prison in Harare, Zimbabwe is no exception to the problem of overcrowding. Pardonement to 2,000 inmates was done by the President of Zimbabwe in May 2016 in an attempt to reduce overcrowding.

Harare Central Prison (HCP) has a two-ward hospital, one ward serves as a Tuberculosis Unit with 13 beds and a Multi-Disease Ward with also 13 beds. The hospital also includes an opportunistic department, a dental unit and an out-patient department. The prison suffers from a high mortality rate, a prevalence of communicable diseases, shortages of food, clothing, and medicine. Moving toward the 21st century, infections have become the major health concern (Joseph, 2006).

A contextual analysis focusing on the situational analysis, knowledge, access and practices towards the implementation of TB Infection control guidelines at Harare Central Prison to mitigate the TB situation at the prison.

3.4 Study Population

Total study sample was 84 of which 69 participants (health care workers and prison officers) were randomly selected from Harare Central prison and comprise of the following key informants. Prison Medical Officer 1, Matron 2, Sister In Charge 3, Registered General Nurse 27, TB Focal Person 1, EHT 1, and Prison Officers 34.

3.5 Sample size and sampling procedure

Sample size has been calculated using the formula

$$n = N/ (1 + Ne^2)$$

where n = sample size

N = Study population

e = margin of error (0.05)

A sample size of 69 health care workers and prison officers was used.

There were 5 key informants from the health care workers and the prison officers. Key informants includes the 1 Prison Medical Doctor, 1 Matron, 1 Sister in Charge, 1 Infection, Prevention and Control Focal Person and the Officer in Charge.

Sampling procedure included the Convenient sampling was done to the healthcare workers and Prison Officers on duty during the time of the study. This led to random sampling to 35 health care workers and 34 prison officers (69 study participants).

Inclusion /Exclusion Criteria included Healthcare workers and Prison Officers with more than 2 years working at Harare Central Prison were included in the study. Healthcare workers and Prison Officers with less than 2 years working at Harare Central Prison were excluded from the study.

3.6 Data Collection Instruments:

The use of interviewer administered questionnaires for healthcare workers and prison officers on duty at Harare Central Prison.

3.6.1 Validity and Reliability

Treece & Treece (2000) define validity as the ability of the instrument to answer the

research problem which in this case was to identify the effects of TB amongst prisoners, healthcare workers and prison officers. In this study the researcher compared data from

healthcare workers and prison officers in an effort to improve validity. The researcher divided each group into subgroups according to age, work experience on TBIPC, knowledge levels of the groups, environmental assessment, administrative and managerial assessments and then compared the subgroups. Interviewer administered questionnaires and document analysis was used to obtain data in an effort to improve validity.

3.7 Pre-testing of Instruments

The data collection tools was pre-tested at Harare Remand Prison and adjustments were made as necessary.

3.8 Data collection procedure

The use of interviewer administered questionnaires for healthcare workers and prison officers on duty at Harare Central Prison was used by the researcher.

3.9 Analysis and organisation of data

Data from the questionnaires was entered into an excel sheet which was then imported into EPI Info 7 for quantitative data analysis. Tables extracted from EPI Info 7 were used for presentation of data. Qualitative data for content documented information and responses from interviewees (Healthcare workers and Prison Officers) was analysed manually.

3.10 Ethical Considerations:

Permission to carry out the study was sought and obtained from the Zimbabwe Prisons and Correctional Service Headquarters Research Board, The Director of Health Services Harare City and academic platforms.

All interviewees were provided with an informed written consent form which they signed if they agreed to be part of the study and they were assured of confidentiality. The informed consent were written in English and Shona so that the participants will understand clearly the questions. Participants would be told that there are no monetary benefits for participating in the study. Participants were also told that participation was voluntary and they could withdraw from the study at any time during the study. Ethical approval was sought and obtained from Africa University Research Ethics Committee (AUREC).

3.11 Summary

Materials and methods for conducting the study were highlighted in this chapter. These included the study design, sampling techniques, data collection procedures and analysis. The research methodology used for this study was a mixed methodology which was mainly qualitative with quantitative embedded. The pragmatic paradigm was chosen to guide the research since it allows triangulation of methods. Analytic cross-sectional study was used to find the challenges faced by healthcare workers and prison officers in the implementation of TBIPC strategies at Harare Central Prison. A sample size of 69 study participants was chosen by the researcher so as to help identify the challenges in infection control on TB in prisons. Convenient sampling method was used to obtain the 69 study participants that included the healthcare workers and prison officers. Data was collected using the interviewer administered questionnaires and data was analyzed using both quantitative and qualitative methods. Ethical issues were observed before and during data was collection.

CHAPTER 4 DATA PRESENTATION, ANAYSIS AND INTEPRETATION

4.1 Introduction

In order to find out the challenges faced by healthcare workers and prison officers in the implementation of TBIPC at Harare Central Prison data was collected through interviewer administered questionnaires and documentary analysis. This method was used to improve validity of the results. The results were presented in tables obtained from Epi info 7 which also helped in the statistical presentation of data. EPI Info 7 was used for quantitative data analysis. Qualitative data was analysed manually for content documented information and responses from interviewees (Healthcare workers and Prison Officers).

4.2 Data Analysis

4.2.1 Demographic characteristics of healthcare workers and prison officers

A total of 69 healthcare officers and Prison Officers (30F, 39M) participated in the study. These were categorised as 38yrs (01M) Prison Medical Officer, 42-45yrs (02F), Sister In Charge 38-43yrs (02F, 01M), Registered General Nurse 28-45yrs (20F,07M), TB Focal Person 36yrs (01M), EHT 43yrs (01M), Prison Officer 25-55yrs (28M,06F). All these respondents worked at Harare Central Prison during the time of study. This information is shown in Table 4.1 below

Table 4.1: Demographic Characteristics of Respondents

Variable	Category	Age / age range	Frequency (n=69)	Number of years on TBIPC
Sex	Female	25-45	30	
	Male	25-55	39	
Designations	Prison Medical Doctor	38	01	5
	Matron	42-45	02	16
	Sister In Charge	38-43	03	17
	Registered General Nurse	28-45	27	8-15
	TB focal person	36	01	10
	EHT	43	01	7
	Prison Officer	25-55	34	9-15

Table 4.2 Age Distribution of Respondents

	N	Minimum	Maximum	Mean	Std. Deviation
Age	69	25	55	38.25	8.958

Variables included in the study include healthcare workers and prison officers. Age had a mean of 38.25 and a standard deviation of 8.958. The total number of 69 respondents had a minimum age of 25 and a maximum age of 55 showing a young workforce.

4.2.2 Environmental assessment on TB infection control for vulnerable groups according to the ZNASP 111 2015-2020

Table 4.3 below shows the situational analysis on the environmental structure and practices of healthcare workers and officers at Harare Central Prison on TB infection prevention and control as from January 2019 to March 2020.

Table 4.3: Situational Analysis on Environmental Structure and Healthcare Worker Practices

Variable		**Frequency (n=69)**	**Percentage (%)**
Availability of materials for TBIPC	No	29	42
	Yes	40	58
Are ventilation system available at the site and open space	No	38	55.1
	Yes	31	44.9
Policy on TBIPC Clear to staff	No	00	00
	Yes	69	100

The results show that 29 (42%) of the respondents believe that they do not have adequate resources such as face masks and respiratory ventilators for use at the institution as compared to the 40 (58%) that indicated that there was the availability of resources to use in the help to fight Tuberculosis in prisons. However, the same respondents (100%) all confirmed that the existence of a national policy/ guidelines in the prevention of TBIPC whilst there was no departmental work policy in prisons to fight tuberculosis.

4.2.3 Healthcare workers and prison officer's knowledge on TBIPC

Table 4.4 shows healthcare workers and officers' knowledge on TB infection prevention and control at Harare Central Prison as from January 2019 to March 2020.

Table 4.4 Healthcare Worker and Prison Officer Knowledge on TBIPC

Variable		Frequency	Percentage
Officers have adequate knowledge on TBPIC			
	YES	48	69.6
	NO	21	30.4

The table below indicates the number of health workers and prison officers during the time of the study and is designated according to profession. Prison Officers make the majority of the respondents 35 (50.7%), followed by RGN 27 (39.1%) with a distant third of sister in charge 3 (4.3%).

Table 4.5 Healthcare Worker and Prison Officer Knowledge on TBIPC

Variable	Frequency	Percentage
Doctor	1	1.4
Environmental Health Technician	1	1.4
Infection Prevention and control	1	1.4
Matron	1	1.4
Prison officer	35	50.7
Registered General Nurse	27	39.1
Sister in Charge	3	4.3

Trainings have been provided to the respondents with 41 of them (59.4%) confirming to

receiving the training while 28 (40.6%) claimed not to have received the training. This shows that there is need to expose most of the staff members at the institution to more meetings, trainings and workshops to enable them to be knowledgeable about TBIPC.

4.2.4 Administrative and managerial factors on TBIPC

Table 4.6 shows the administrative and managerial challenges on TB infection prevention and control at Harare Central Prison as from January 2019 to March 2020.

	Frequency (N=69)	Percentage (%)	Cumulative percentage (%)
No	14	20.3	20.3
Yes	55	79.7	100.0
Total	69	100	

The administrative and managerial challenges faced by the respondents shows that 55 (79.7%) had problems in accessing resources like gloves, face masks while 14 (20.3%) believe that they don't have any challenges in accessing resources. Availing the resources would reduce exposure to the infections.

4.3 Challenges faced by healthcare workers in the implementation of TBIPC at Harare Central Prison.

The above results indicate the challenges faced by healthcare workers and Prison Officers at Harare Central Prison during the time of the study and this included shortage of resources, colonial structures that do not suit international standards in the fight against TB in prison, lack of knowledge and trainings on TBIPC in prison and lastly the unavailability of an organisational policy or guidelines in the fight against TBIPC in

incarcerated populations. Administrative and managerial issues also play a major role in the challenges faced by healthcare workers and Prison officers in TBPIC in prisons and this is highly marked by the unlock and lock up times of inmates for example and overcrowding at the institution.

4.4 Dissemination of results:

Findings were presented to the Research and Development Board Zimbabwe Prisons and Correctional Service, AUREC, Director of Health Services Harare City and academic platforms.

CHAPTER 5 DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter is a summary of the major findings and gaps from the findings on the challenges faced by healthcare workers and Prison officers in the implementation of TBIPC strategies in prisons in line with the study objectives. Reference was made to any concurrence with or deviation from previous studies in public health practice. Recommendations from the findings will also be given in this chapter.

5.2 Discussion

5.2.1 Situational analysis on the environmental structure and practices of healthcare workers and officers

Respondents indicated that the respiratory protection at the site was not available at all times at the facility and this includes face masks and open space areas and some indicated that there were not enough ventilation systems at the site. According to Health Belief Model, the particular course of action taken depends upon beliefs regarding the effectiveness of the various available actions in reducing the disease threat, termed the perceived benefits of taking health action. Glanz (1999) also agrees with the same statement that TB patients perceived benefit from covering the mouth and nose are beneficial to the fight of TBIPC in prisons.

Thwin and Chapman (2009) found that 91.8% of their study population perceived benefit from covering the mouth and nose if someone who had TB coughed or sneezed beside them. This study finding confirmed that there was a relationship between perceived benefit and TB preventive behaviors, thus the finding supports the hypothesis.

This concurs with the behavioural preventive behaviour focuses on the general health promoting activities which includes living in good ventilated houses, avoidance of overcrowding, avoidance of close contact with TB patients, good nutrition and better personal health habits with regard to spitting and coughing (Reza, 2009). All respondents indicated that there was the availability of a national policy/ guidelines in the prevention of TBIPC whereas all respondents also indicated that there wasn't the availability of a policy for the vulnerable group (inmates) at the site so they were using the national policy. WHO (2009) policy on TB infection control in health-care facilities, prisons and households for example covering the mouth or moving away a reasonable distance away from people. This means that there is need to include a departmental policy considering the TBIPC in prisons.

In correctional facilities tuberculosis can be reduced through consistent and effective use of environmental controls and thus including general and local exhaust ventilation and this means that rooms should be well ventilated but in ZPCS there are still colonial structures, poor air cleaning methods and lack of resources. These environmental controls are well detailed in published guidelines for the prevention of TB in healthcare settings and for environmental infection control in healthcare facilities and can be used to educate healthcare workers and prison officers and constitutional policies and procedures in correctional settings that suit international standards.

There is need to enable flexible unlock and lock up time for the inmates indoors and out-doors so that they will be able to breath uncontaminated air with tuberculosis and in the developed world their prisons are supplied with an exhaust system that removes contaminated air and replaces it with uncontaminated air. This can also be improved by

well ventilated rooms hence in our prison colonial structures are still in place. According to CDC (2006) air within a correctional facility should flow to minimize exposure of other inmates that do not have the disease and this can only be in place when the structures permit outdoor air supply.

General ventilation that exhausts air directly to the outside is the most protective ventilation design and should preferentially be used in areas likely to contain infectious aerosols, (CDC, 2006).

In Correctional facilities environmental controls will fail if they are not appropriately operated and maintained and this means that the facilities should work together with ventilation engineers and infection control personnel so as to ensure the proper design and ongoing maintenance of environmental controls. Correctional facilities should schedule routine preventive maintenance which covers all components of the ventilation system which includes air-cleaning devices and they should also verify that environmental controls and they should operate as designed.

Respiratory protection in all correctional facilities should be developed, implemented, and maintain respiratory protection programs in the service. This should also include the respiratory protection fit for testing and training of all correctional employees who may potentially have contact with infectious or potentially infectious inmates. Healthcare workers and prison officers who work together with infectious patients should be given respiratory protection to wear and also health in proper disposal and care of such. N95 respirators, which were recommended by National Institute for Occupational Health and Safety, for example should be given to the healthcare workers, prison officers and also

the inmates so that there is adequate protection to everyone and this should also apply to confirmed TB inmates or probable cases.

5.2.2 Knowledge level of healthcare workers and prison officers

Knowledge level for the respondents ranged from poor, good and very good of which on the outcome of these results it indicated that healthcare workers' knowledge on TBIPC was very good and for the Prison officers it was good. Workshops and trainings done in the year 2019 none of the respondents attended the trainings. There is need to consider healthcare workers, prison officers and also inmates in the trainings and workshops on TBIPC as TB can affect anyone so everyone should be knowledgeable about the condition. Karim (2010) also conducted a study on Community perceptions of tuberculosis and found out that TB was a deadly disease and could affect anyone.

Tuberculosis preventive behavior was higher in those who had higher education. This means that education can modify health behaviors and influence the initiation of preventive behaviors in TBIPC The results of this study were consistent with the previous studies and supported the hypothesis that Socio-demographic factors, particularly educational attainment, trainings and workshops are believed to have an effect on behaviors (Glanz 1999). Thwin and Chapman (2009) also indicated that the more educated persons had higher consciousness in preventing TB. This study also confirmed that education had a significant relationship with TB preventive behaviors.

According to Health Belief Model, knowledge is a structural modifying factor that is related with preventive behaviors. This means that it increases the individuals understanding and it can motivate to take decision for change behaviors from negative to positive aspects in TBIPC. Good levels of knowledge on TB also help to make decisions

for appropriate preventive action in infection control measures on TB. According to Thwin and Chapman (2009) he also indicated that good TB knowledge affected the respondents for good preventive behaviors.

5.2.3 Administrative and managerial factors on TBIPC

Some respondents indicated that they had knowledge on the presumptive cases. The other respondents also indicated that they do not understand much on the triage system on TB presumptive cases so there is need to hold trainings and workshops on TBIPC. Inmates fear stigmatisation and discrimination even bullying from other inmates so there is need to do some trainings and workshops to the prison community as this will sensitize them and help in the TBIPC in prisons. TBIPC in prisons also affects inmates because some do not disclose their disease and delay seeking health care for the fear of being stigmatized (Qureshi, Morven, & Mustafa, 2008). Though they had no idea on the triage system respondents indicated that there is the availability of isolation rooms for presumed or confirmed cases.

Healthcare workers and Prison officers indicated that there was the availability of drugs for TB and this also goes in agreement with the CDCD statement which says a person with TB can die if they do not get treatment (CDC, 2012). Timeliness for lockup and unlock of prisoners and a normal diet was being given to inmates though some patients with low immunity due to conditions like Diabetes Mellitus and HIV were more likely to acquire tuberculosis in an area with high tuberculosis prevalence (Ngowi, Mfinanga, Bruun, & Morkve, 2008). Perceived barrier of TBIPC also indicates that accessing TB testing, treatment services, treatment cost, health service centre far away from the

resident, lack of transportation overcrowding in prison and poor nutrition amongst others.

Respondent's results indicated that none of them attended any workshop or training on TB in the year 2019. This needs to be addressed so that everyone gets knowledge on TBIPC. All respondents indicated that there was the availability of a laboratory and the testing kits for TB in prisons.

5.2.4 Challenges faced by healthcare workers in the implementation of TBIPC at Harare Central Prison

Though some respondents indicated that there was enough space for triage of TB suspected cases or presumptive cases some indicated it as a challenge as the prison environment is overcrowded. Morrison, Pai and Hopewell (2008) also indicated that people who are in close contact with an individual who has an infectious form of tuberculosis are at increased risk of acquiring the infection. Environmental factors also included smoking tobacco of inmates in cells was also a challenge in TB control at the site.

All respondents indicated that there was the availability of the national policy or guidelines on TBIPC and none of the respondents indicated that there was the availability of a departmental or institutional policy on TBIPC. All respondents indicated that there were aware of respiratory hygiene that is through health education from healthcare workers at the institution. Challenges were also noted on the administrative and managerial factors that is for example there was no training or

workshop done to neither the healthcare workers nor the prison officers at the site during the year 2019.

5.2.5 Other factors contributing to challenges faced by healthcare workers and prison officers implementing TBIPC

Immunosuppressive conditions like Diabetes Mellitus and HIV coinfection were the most potent immunosuppressive risk factor for developing active TB disease in prisons. TB also accelerates HIV progression through increased systemic immune activation. Coinfection leads to increases in the rate of disease progression and mortality among patients especially the vulnerable group (inmates).

Malnutrition also increases the risk of one having TB as TB disease can itself lead to malnourishment because of decreased appetite and changes in metabolic processes. Healthcare workers (HCWs) and Prison Officers are at increased risk of exposure to TB as they spent most of their time at the work environment than outdoor. Smoking tobacco is also another risk factor for TB infection and control especially in the prison environment in comparison with non-smokers.

The researcher also noted that all persons receiving treatment for TB disease should undergo clinical monitoring at least monthly to screen for nausea, vomiting, abdominal pain, jaundice, or discolored urine. Inmates on treatment should also be educated about potential adverse effects of the drug(s) and the need to promptly discontinue treatment and seek medical evaluation if adverse effects occur because it has been noted that some inmates will discontinue taking drugs hence leading to defaulting of treatment and thus also leading to Multi-Drug-Resistant TB.

Issues of treatment of TB is also a critical component of TB containment, both in

Correctional facilities and in the larger community. If one is put on medication there is need to provide a stress free environment, have a good supporting system, good nutrition so as to enable one to finish treatment. CDC (2006) also goes on to say an untreated person with tuberculosis is estimated to infect about 10–15 persons per year. Effective anti-TB treatment markedly reduces infectivity so there is need to provide good nutrition, a welcoming environment and give health education on the importance of taking the tuberculosis drugs effectively as this is said to reduce tuberculosis infectivity.

Directly Observed Therapy is the best method to monitor drug adherence in incarcerated units as this helps in the reduction of infection and thereby reducing the risk of relapse and prevents the development of drug resistance and is the preferred treatment strategy for all persons with TB disease. In incarcerated units it's easy to monitor inmates on Directly Observed Therapy as they are all under one unit.

5.3 Limitations to the study

The study participants were health workers and prison officers at the site. Inmates were excluded from the study as this is a vulnerable group. Prisoners were the targeted population where research questions and most of the research information was to be obtained from but because it is a vulnerable group and because of security reasons that protects inmates, prison officers and health care workers were recruited in the study.

Permission for authorization to carry out this study took a lot of time because there are a lot of hierarchy and security screening procedure that was followed by the prison officials for the researcher to be cleared.

5.4 Study conclusions

The discussion and interpretation of the results indicated that most respondents who participated were males and a few were females, their age was between 25 years and 55 years of age. Lack of training and an institutional policy also contributed to the lack of knowledge to the respondents regarding tuberculosis and this showed through the result assessment. Tuberculosis is considered as one problem that threaten a public health in the world and especially in developing countries not forgetting the prisons where there are limited resources. The researcher also found out that there is limited studies or researches done on TBIPC in prisons hence there is need for more researches of this kind in prisons as this helps in the treatment, prevention and control and also not forgetting infection control in prisons.

The detection and screening process of TB cases in prisons is very important in eliminating the prevalence rate of this disease amongst a society and also this leads to the effectiveness of the use of tuberculosis treatment, prevention, and care and infection control strategies. In the prison environment the healthcare workers and prison officers have a crucial role in giving the appropriate care for tuberculosis patients and also direct contact with patients. They also help in the infection control of these infectious conditions.

This means that in the departmental policy or guidelines they should both be included in the treatment and care of both parties (Prison Officers and Healthcare workers. This means that there is need to improve the healthcare workers and prison officers working conditions and hence improves the awareness regarding detection of TB cases in prisons

hence leading to control and decrease the risk of spread this disease (tuberculosis) in prisons.

Screening for TB (to diagnose latent TB infection) and prophylactic therapy remain the most important tools to reduce the risk of progression to TB disease among high risk individuals for example people who are in close contacts with someone who has active TB, HIV infected individuals, health care workers, Prison Officers and inmates. Immunosuppressive conditions like Diabetes Mellitus, Malnutrition and HIV coinfection are the most important and potent risk factor for TB infection and control in prisons. Interventions such as early HIV counselling and screening for TB patients and early diagnosis and initiation of antiretroviral therapy (ART) to co-infected individuals have all been shown to be effective in preventing TB disease.

Good-quality data for HIV and tuberculosis in prisons in sub-Saharan Africa are rare and policies guiding service implementation are often missing thus making the TBIPC difficult especially in prison set ups. Workshops and trainings are also lacking to healthcare workers and Prison Officers so that they get equipped with recent knowledge on the TBIPC in prisons hence leading to challenges in the implementation of TBIPC strategies for the vulnerable groups. There is also need of a constitutional policy (ZPCS) that protects the vulnerable group (prisoners).

Health promotion training, improved health care and availability of TB drugs also helps in the decrease of TB in prisons. The study clearly shows that increased focus on improved health care and training of prisoners and staff on cigarette smoking in prisons to be banned will also help in the management of TB in prisons as this helps in the reduction of the droplet infection as the prison environment is always overcrowded.

5.5 Implications to practice

The ongoing, systematic collection, analysis, interpretation and dissemination of data regarding a health-related events like TBIPC in public health action to reduce morbidity and mortality and to improve health especially in the prison environment.

Public health surveillance system on programs like TB can be used for taking immediate public health action, planning and evaluating programs, and formulating research hypotheses especially for the vulnerable groups.

Public health issues concern health for all and that proper health care is applies to all human beings and that the conditions of health care in prisons as this also affects the general public that is the community. This involved the environmental health officers, clinicians, laboratory staff and those who have responsibility for public health matters have the right of access to prisons and can oblige the prison authorities to take necessary steps to ensure proper health standards.

Study results identified that knowledge, work experience and perceptional factors are related to TB preventive behaviors. Healthcare workers have indicated that they have better knowledge on the prevention of TB. This also means that the healthcare workers and prison officers according to the findings needs some training and workshops so as to help in the easy management of TBIPC in prisons. They can develop TB prevention programs to provide education about TBIPC and preventive health behaviors among TB patients and the prison environment. TBIPC guidelines and an institutional policy is also of importance in the management of TBIPC in prisons as this will help benefit the healthcare workers and the prison officers to increase their knowledge and improve the perception on TB.

5.6 Recommendations

- Need to formulate a departmental policy specifically for the ZPCS so as to help in the implementation of TBIPC policies in prisons.
- The administrative and managerial board at the site should set up workshops and trainings in collaboration with TBIPC knowledge to both healthcare workers and Prison Officers. This will help in the identification of patients with TB, cough etiquette and respiratory hygiene and use of protective clothing.
- If possible stop smoking tobacco in prisons as this worsens the rate of TB infection in prisons.
- Health education talks must be intensified in prisons so that prisoners and officers are able to reduce the transmission of TB infection in prisons.
- Prison administrators should lobby for construction of better modern prisons that support both health and security issues.
- Researchers, healthcare workers and prison officers can apply the study results for further research to develop model of preventive health behaviors and TBIPC programs to increase knowledge, perception and TB preventive behaviors among TB in prisons.
- The study limitation also indicated that due to high security reasons that hinder much time for authorization to start a research and the protection of inmates in investigating such cases there is need to engage more external researchers in the researches done in incarcerated places as this will also help in the improvement

of the management of the staff and inmates in prisons national as this will be able to suit international standards.

5.7 Dissemination of results and any action taken in response to the findings

Dissemination of results was done after the study. The study results were presented to ZPCS Harare Central Prison staff in a meeting. The results were also included in the report which was shared with ZPCS Research Board and will also be shared with AUREC.

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Appendices

Annex A: Consent Letter in English

Harare Central Prison

An investigation on the healthcare challenges in the implementation of TB infection, Prevention and Control at Harare Central Prison as from January 2019 to December 2019

Part 1: Informed Consent

My name is Loice Garise. I am a Master of Public Health student with Africa University. I am carrying out a study on the factors associated with infection prevention and control practices at Harare Central Prison.

The findings from this study will help to influence decision making in treatment, infection prevention and control. There are no direct benefits to you from participating in the study but your participation will contribute towards improving infection prevention and control strategies in prisons. Your responses shall be kept confidential.

Thank you.

I agree to participate in the study_____ (Yes/No)

Appendix B. Tsamba ine mibvunzo mururimi rwe Shona

Bepa remivhunzo kuvachengeti vemajeri nevezveutano pa Harare Central Prison

Zita rangu ndinonzi Loice Garise. Ndiri mudzidzi pa Africa University ndiri mugore rangu rechitatu. Ndiri kuitawo chidzidzi maererano nechirwere chechikosoro chinosheedzwa kunzi TB kuti utachiona hwacho kuti chinodzivirirwa sei mujeri re Harare Central Prison.

Zvatinowana muchidzidzo umu zvinozobetsera pakurapa chirwere ichi. Hapana zvamunowana sezvo muchatibetsera muchidzidzi ichi pane zvinenge zvingediwa nemufundi ingava mari kana zvimwe zvamungafungire asi zvamuchatipa pamivhunzo zvichabetsera kudzivirira TB mumajeri. Zvatichataurirana mubepa rino zvichachengetedzwa hapana pakati penyu neni nevekuchikoro kwandinodzidza.hakuna mumwe achawanazve umbowo uhwu.

Maita basa nenguva yenyu. Munobvumidzwa kubuda muchidzidzo chino pamunenge mafungira kuti ndipo pamagumira.

Ndinobvumirana nezvirikudiwa pachidzidzo chino…….(hongu/kwete)

Appendix 2: Questionnaire

Section A: Demographic variables

Demographic Data

1 .Age [ ]

2. Sex Male [ ] Female [ ]

3. Marital Status Single [ ] Married [ ] Divorced [ ] Widowed [ ]

5. Qualification RGN [ ] EHT [ ] Prison Officer [ ] Other, specify……

6. For how long have you been working at Harare Central Prison? [ ] years

Work Experience

7. How long have you been employed by the Ministry of Justice [ ] (indicate in the box given)

8. How long have you been working closely with the inmates [ ] (indicate in the box given)

Position held, indicate with yes or no in the box provided in ink the rank and position held after the box, e.g. Prison Officer 11, receptionist, Chief Prison Officer, Matron Etc.

General Duty Officer [ ]

Health worker [ ]

Others specify……..

How long have you been in the position mentioned above? [ ]

Knowledge on TB Infection, Prevention and Control

9. Do you have TBIPC guidelines at the institution? .....

a. Do you know of any two objectives in the TBIPC [ ]

10a. Have you received any training in TBIPC? Yes [ ] No [ ]

b. If yes, specify the type of training received

1. Workshop done on TBIPC [ ]

2. TBIPC training [ ]

3. Or any notifiable disease training [ ] if any indicate

11a. Have you ever heard about TBIPC? Yes [ ] No [ ]

12. What are the steps that best describe the steps followed in investigating a TB case in prison?

……

……

…….

13. Please explain the TB screening tool

……

……

……

14. How many forms are filled for TB investigations?

1 [ ] 2[ ] 3 [ ] 4 [ ]

15. What TB records should be submitted to the Region/Prisons or ZPCS Headquarters?

……

……

……..

16. What are the timelines for submitting the above records?

……

……

Checklist for TBIPC programme

17. Do you have the required resources for TBIPC in prisons?

18a. Do you hold health center meetings to discuss TBIPC information? Yes [ ] No [ ]

b. If yes, how many meetings have you held in the past year? .....

c. Availability of minutes Yes [ ] No [ ] (Physically check for the minutes)

19a.How many cases have you detected in the past year.....

b. How were these cases detected?

Gene expert [ ] Sputum for AAFBs [ ]

c. Who does contact tracing? EHT [ ] RGN [ ] Prison Officers [ ]

d. Number of cases contacts traced in 2018….....

e. Number of cases detected from contact tracing……

20a. Have you completed any TB notification form in the past year? Yes [ ] No [ ]

b. How do you rate the TBIPC system?

Simple Yes [ ] No [ ]

Complicated Yes [ ] No [ ]

Sophisticated Yes [ ] No [ ]

c. How long does it take to fill in the TB notification form?

d. Would you require more training on TBIPC? Yes [ ] No [ ]

e. Which specific area would you like to be trained on.....

21a. Did your health center manage to submit TB weekly and monthly returns in the past year?

Yes [ ] No [ ]

b. If yes, how consistent is the reporting.....? (Review records for evidence)

22. What proportion of the TB cases have been notified?

23a. did you collect any sputum specimen from suspected cases of TB?

b. If yes, how many sputum specimens were collected?

24. How many of these specimens were send to the laboratory within 3 days (72 hrs.)

25. What proportions of the results were received within 28 days? .....

26. How do you screen new inmates for TB in prisons?

Appendix 3

Interviewer guide for key informants [Prison Medical Doctor, Matron, Infection Control Focal Person, EHT, Officer in Charge]

Designation……Years in Service……..

1. Can you explain what TBIPC strategies are?

……

……

……

2. Do you think the TBIPC system is achieving its objectives, please explain

……

……

……

……

3. Have you ever received training in TBIPC?

……

……..

4. As an institution which resources did you receive for TBIPC in 2018- 2019?

……

……

……

…….

5. Have you conducted any training for health workers on TBIPC at the institution in the last one year? If yes how many were trained?

6. Why are TB cases increasing at Harare Central Prison? ……

7. What are the challenges in contact tracing TB cases at the prison?

……

……

……

……..8. What do you recommend so that the ZPCS to improve its TBIPC system?

……

……

……

……

……

……..

THE STUDY POPULATION (HEALTHCARE WORKERS AND PRISON OFFICERS)

Tick the appropriate response

When did you learn about TB infection Prevention and Control?

1. I heard about infection prevention and control at recruitment	
2. I was trained about infection prevention and control at recruitment	
3. I was oriented on infection control when I started work in prisons	
4. I went for a basic training on infection prevention offered by the Ministry of Health and Child Care	
5. Never heard of the above	

ENVIRONMENT

	Always	At times	Never
1. I follow clear agreed upon and available cleaning routine			
2. I encourage prisoners to wash their hands after using the toilet/before feeds			

3. when I am on duty I make prisoners spent most of the time out-doors			
4. I also ensure they are accommodate d according to set out guidelines to avoid overcrowding			
5. Before moving sick patients, the clinic staff are told of the orders to move them			
6. I make sure that vans are disinfected before moving prisoners			

When a prisoner is brought with any of the diseases mentioned below, what action do you take?

Disease	isolate	Do not isolate	Refer to the clinic
Chicken pox			
Athletes foot			

Body lice			
Sexually transmitted disease and HIV			
Mumps			
Bloody diarrhea with/without vomiting			
Red eye (conjunctivitis)			
Fever			
Jaundice			

When a prisoner is brought with cough, what action do you take?

	Do nothing	Refer to the clinic
Do you exclude tuberculosis (TB) according to the guidelines		
Do you refer the prisoner to the clinic for PITC		

Thank you for participating in the study

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AFRICA UNIVERSITY
(A United Methodist-Related Institution)
INVESTING IN AFRICA'S FUTURE

AFRICA UNIVERSITY RESEARCH ETHICS COMMITTEE (AUREC)

P.O. Box 1320 Mutare, Zimbabwe, Off Nyanga Road, Old Mutare Tel (+263-20) 60075/60026/60611 Fax (+263 20) 61785 website: www.africau.edu

Ref: AU1318/19

31 January, 2020

Loice Garise
C/O CHANS
Africa University
Box 1320
Mutare

RE: **HEALTHCARE CHALLENGES IN THE IMPLEMENTATION OF TUBERCULOSIS INFECTION, PREVENTION AND CONTROL AT HARARE CENTRAL HOSPITAL**

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

AFRICA UNIVERSITY
RESEARCH ETHICS COMMITTEE (AUREC)
31 JAN 2020
APPROVED
P.O. BOX 1320 MUTARE, ZIMBABWE

The approval is based on the following.

a) Research proposal
b) Questionnaires
c) Informed consent form

- **APPROVAL NUMBER** AUREC1318/19

This number should be used on all correspondences, consent forms, and appropriate documents.

- **AUREC MEETING DATE** NA
- **APPROVAL DATE** January 31, 2020
- **EXPIRATION DATE** January 31, 2021
- **TYPE OF MEETING** Expedited

After the expiration date this research may only continue upon renewal. For purposes of renewal, a progress report on a standard AUREC form should be submitted a month before expiration date.

- **SERIOUS ADVERSE EVENTS** All serious problems having to do with subject safety must be reported to AUREC within 3 working days on standard AUREC form.
- **MODIFICATIONS** Prior AUREC approval is required before implementing any changes in the proposal (including changes in the consent documents)
- **TERMINATION OF STUDY** Upon termination of the study a report has to be submitted to AUREC.

Yours Faithfully

MARY CHINZOU – A/AUREC ADMINISTRATOR
FOR CHAIRPERSON, AFRICA UNIVERSITY RESEARCH ETHICS COMMITTEE