

UNIVERSITY OF CAPE COAST

**MANAGEMENT OF TUBERCULOSIS AND HIV IN SELECTED
HEALTH FACILITIES IN GHANA**

PRINCE JUSTIN ANKU

2016

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University of Cape Coast

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HEALTH FACILITIES IN GHANA

BY

PRINCE JUSTIN ANKU

Thesis submitted to the Department of Population and Health of the Faculty of Social Sciences, College of Humanities and Legal Studies, University of Cape Coast, in partial fulfilment of the requirements for the award of Master of Philosophy degree in Population and Health.

NOVEMBER 2016

DECLARATION

Candidate's Declaration

I hereby declare that this thesis is the result of my own original research and that no part of it has been presented for another degree in this university or elsewhere.

Candidate's Signature:..... Date:.....

Name: Prince Justin Anku

Supervisors' Declaration

We hereby declare that the preparation and presentation of the thesis were supervised in accordance with the guidelines on supervision of thesis laid down by the University of Cape Coast.

Principal Supervisor's Signature:..... Date:.....

Name: Prof. Akwasi Kumi-Kyereme

Co-Supervisor's Signature: Date:.....

Name: Dr. David Teye Doku

ABSTRACT

Tuberculosis (TB) and Human Immunodeficiency Virus (HIV) are the two leading causes of death from infectious diseases globally. The World Health Organization has recommended integration of TB-HIV services in the management of the syndemic. However, scaling up of integrated TB-HIV services remain sub-optimal in Ghana, despite a nationally accepted collaborative policy. This study, therefore explored issues surrounding TB-HIV services integration towards effective management of the syndemic. The study drew evidence from 31 service providers and 30 co-infected patients from 12 health facilities across four regions of Ghana. Using Normalization Process Theory as a framework, qualitative analysis was done with the assistance of NVivo 10. The findings of the study revealed a unanimous endorsement of a full integration model of service delivery. Service providers suggested intensified case finding, health education, and the use of mobile phone technology as additional strategies for TB-HIV management. The study also identified lack of commitment from programme managers, inadequate infrastructure, inadequate staff, Directly Observed Treatment (DOT) strategy, and funding constraints as key barriers to integration of services. Experiences of co-infected patients with regard to treatment access include inconsistencies in therapy administration, separate clinic appointment dates for TB and HIV, late diagnosis and prolonged TB treatment due to drug resistance. The conclusion drawn is that, co-infected patients and health care providers at the point of care are open to integration, but this will require commitment from all stakeholders, especially programme leaders at the national level so as to derive the full benefits associated with service integration.

KEY WORDS

Co-infected patients

HIV

Integration

Management

Normalization Process Theory (NPT)

Tuberculosis

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DEDICATION

In memory of my sister; Linda Constancia Anku and my grandmother Aurelia

Dansua Adzayawo

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LIST OF ABBREVIATIONS

AIDS	Acquired Immuno Deficiency Syndrome
ANC	Antenatal Care
ART	Anti-Retroviral Therapy
CAMELIA	Cambodian Early versus Late Introduction of Antiretroviral
CBI	Community Based Intervention
CCC	Comprehensive Care Centre
CD4	Cluster of Differential 4
CHW	Community Health Workers
CI	Contextual Integration
CPT	Co-trimoxazole Preventive Therapy
CT	Counselling and Testing
DOTS	Directly Observed Treatment Short-course
DR-TB	Drug Resistance Tuberculosis
EBSCO	Elton Bryson Stephens, Sr. Company
ERC	Ethical Review Committte
GAC	Ghana AIDS Commission
GFATM	Global Fund to Fight AIDS, TB and Malaria
GHS	Ghana Health Services
GoG	Government of Ghana
HIV	Human Immunodeficiency Virus
IPT	Isoniazid Preventive Therapy
IRB	Institutional Review Board
IRIS	Immune Reconstitution Inflammatory Syndrome
IW	Interactional Workability

MDGs	Millennium Development Goals
MDR-TB	Multi Drug Resistant Tuberculosis
MEDLINE	Medical Literature Analysis and Retrieval System Online
MoH	Ministry of Health
NACP	National AIDS Control Programme
NGOs	Non-Governmental Organizations
NPM	Normalization Process Model
NPT	Normalization Process Theory
NTP	National Tuberculosis control Programme
PHC	Primary Health Care
PICT	Provider-initiated HIV Counselling and Testing
PLHIV	People Living with HIV and AIDS
QHP	Quality Health Partners
RI	Relational Integration
SAPIT	Starting Antiretroviral Therapy at Three Points in Tuberculosis
SMS	Short Message Service
SSW	Skill Set Workability
TB	Tuberculosis
UCC	University of Cape Coast
UN	United Nations
UNAIDS	Joint United Nations Programme on HIV/AIDS
USAID	United States Agency for International Development
WHA	World Health Assembly
WHO	World Health Organization
XDR-TB	Extensively Drug-Resistant Tuberculosis

CHAPTER ONE

INTRODUCTION

Background to the Study

Tuberculosis (TB) continues to be one of the world's deadliest communicable diseases. Together with human immunodeficiency virus (HIV), they are the two leading causes of death from infectious diseases (WHO, 2014a). Globally, it is estimated that 35 million people were living with HIV at the end of 2012 (Joint United Nations Programme on HIV/AIDS, 2013), out of which 8.6 million people developed tuberculosis (TB) with a vast number of cases recorded in sub-Saharan Africa (WHO, 2013a). In the following year (2013), 9 million people developed TB and 1.5 million died, out of which an estimated 360 000 were HIV-positive (WHO, 2014a). TB continues to be the leading cause of mortality and ill-health among people living with HIV, especially in developing countries (Stop TB partnership, 2010; Wong et al., 2012; Ford et al., 2015a).

There is an overwhelming evidence that point to the fact that there is a synergistic relationship between Tuberculosis and HIV/AIDS with increase mortality among co-infected patients (Lawn & Churchyard, 2009; Abdool Karim, Churchyard, Abdool Karim, & Lawn, 2009; Harries et al., 2010; Khan et al., 2010; Lawn, Wood, De Cock, Kranzer, Lewis, & Churchyard, 2010; Kwan & Ernst, 2011; Lawn et al., 2011a; Zulma et al., 2012; Dheda, Barry, & Maartens, 2015) making the two diseases the deadliest human syndemic today. Despite this overwhelming body of evidence on the TB-HIV syndemic, there is also some documented evidence of knowledge gap regarding both diseases

with knowledge about TB being lower. People are still harbouring several misconceptions about the disease (Wynne, Jhangri, Richter, Alibhai, Rubaale, & Kipp, 2012; Grut, Sanudi, Braathen, Jurgens, & Eide, 2015), suggesting that there is too much focus on HIV alone to the neglect of other infectious diseases like TB (Grut et al., 2015). This knowledge gap between TB and HIV/AIDS can however be addressed through integrated health education programmes at all levels (Wynne et al., 2012). Even though extensive evidences exist about the synergistic relationship between Tuberculosis and HIV, programmes at the global, national, and local levels are often undertaken vertically with little or no coordination (Friedland, Harries, & Coetzee, 2007).

Africa is confronted with the worst TB epidemic today largely as a result of the high prevalence of HIV and AIDS as well as weak health care system (Chaisson & Martinson, 2008). The continent accounted for one quarter of the global burden of TB and the highest rates of cases and mortality relative to population (An average of 280 incident cases per 100 000, more than twice the global average of 126). An estimated 1.1 million (13 percent) of the 9 million people who were infected with Tuberculosis in 2013 were also HIV-positive. The African continent accounts for an estimated 4 out of every 5 HIV-positive TB cases and TB deaths among people who were HIV-positive. Thus, the continent accounts for the highest rates of TB-HIV co-infection (WHO, 2014a).

The risk of developing TBs is high among people infected with HIV, especially during the initial stages of HIV infection (Loveday & Zweigenthal, 2011). TB is a single most frequent opportunistic infection for HIV and responsible for morbidity and mortality among persons living with HIV

(PLHIV), with a significant proportion of all HIV related mortality attributed to TB (WHO, 2009a; Sileshi, Deyessa, Girma, Melese, & Suarez, 2013). There is therefore the need for timely and comprehensive interventions to address this situation in order to reduce the incidence of TB, especially among PLHIV (Loveday & Zweigenthal, 2011; Owiti et al., 2015).

The emergence of HIV witnessed a rapid rise in its prevalence in sub-Saharan Africa, which was followed by a significant rise in the incidence of tuberculosis in the region (Getahun, Gunneberg, Granich, & Nunn, 2010). In sub-Saharan Africa where HIV prevalence is high, mortality rate of HIV related TB cases is 20 times higher than other regions of the world. There is therefore the urgent need for collaborating efforts between individuals and the various stakeholders that are responsible for TB and HIV management and control programmes (UNAIDS, 2012). In order to deal with the continuous crises of TB mortality among PLHIV, the WHO in 2008 approved a strategy known as “the three Is” (intensified case-finding, isoniazid prophylaxis therapy, and infection control) (WHO, 2008). However, there were issues with how to successfully implement the various strategies that have been endorsed to manage the TB-HIV syndemic.

The World Health Organization in 2004 and then again in 2012 in an attempt to deal with the double burden of TB/HIV proposed closer integration of tuberculosis and HIV programmes at least at the facility level (WHO, 2004; 2012a). Evident however, suggest that there is no consensus regarding the form (partial or full) of integration and at what levels services are expected to be integrated (Legido-Quigley et al., 2013). A number of models of TB-HIV

service integration (linkage, collaboration, full integration) have been suggested as ways to manage TB and HIV (WHO, 2012a).

The first level of integration known as linkage is mainly concerned about referral of patients during service delivery and care. In this model, a patient who entered through the TB service is expected to be referred for HIV counselling, testing and care if tested positive. On the other hand, if a patient entered through HIV service, he/she is expected to be referred for screening, diagnosis and treatment for TB if found positive. The second level of service integration is collaboration and it is concerned with partial integration of services. In this model, a person who entered via the TB service will also be tested for HIV and then referred for HIV care if positive. Similarly, when a patient entered through HIV service, the patient will also be screened for TB and then referred for treatment and care if positive. The final model of integration is known as full integration and is concerned with a “one-stop-shop” approach where both TB and HIV services are provided in a single facility (WHO, 2004; 2012a). However, the appropriateness of the various models in terms of affordability, effectiveness and efficiency with regards to a given setting has not been adequately established (Uyei, Coetzee, Macinko, & Guttmacher, 2011).

TB management in Ghana can be traced back to the pre-independence era when the then colonial government saw the urgent need to fight the disease as a result of the threat it poses to the larger society due to its highly contagious nature (GHS, 2015). In 1994, the National TB Control Programme (NTP) was established to take charge of TB management in the country which also saw the adoption of the WHO-approved Directly Observed Treatment,

Short - course (DOTS) as a management strategy. This strategy revolved around five pillars; (government) political commitment, diagnosis by sputum smear microscopy, standardized supervised treatment regime, uninterrupted drug supply and recording, and reporting system (Ogden, Walt, & Lush, 2003). Based on the WHO's definition, Ghana has achieved 100 percent DOTS coverage back in the year 2000 and currently in the maintenance stage of DOTS expansion. The "DOTS" strategy has for a long time been the recommended strategy and it is largely regarded as one of the most effective interventions in the global fight against tuberculosis (UN, 2011).

Ghana has also implemented the Stop TB Strategy of the WHO which has six underlying strategies to help drive towards the achievement of the 2015 TB related MDGs (GHS, 2015). The six components of the strategy include pursuing high-quality Directly Observed Treatment Short-course (DOTS) expansion and enhancement, address TB/HIV, Multi-Drug Resistance Tuberculosis (MDR-TB) and other challenges, contribute to health system strengthening, engage all care providers, empower people with TB as well as communities, and enable and promote research (WHO, Stop TB Partnership, 2006). More recently, the World Health Organization (WHO) launched "The End TB Strategy" with an overall goal to end the global TB epidemic by the year 2035. This strategy has well defined indicators (35% reduction in number of TB deaths compared with 2015 by 2020, 75% by 2025, 90% by 2030, and 95% by 2035; 20% [$<85/100,000$] reduction in TB incidence rate compared with 2015 by 2020, 50% [$<55/100,000$] by 2025, 80% [$<20/100,000$] by 2030, and 90% [$<10/100,000$] by 2035; Zero TB-affected families facing catastrophic cost due to TB by 2020, Zero by 2025, Zero by 2030, and Zero by

2035) to guide and serve as a benchmark for assessment at the various stages (WHO, 2014b). The strategy also has guiding principles as well as pillars and components to guide individual countries as well as the global community to successfully implement and achieve the targets which will ultimately lead to a world free of TB. The NTP in Ghana is on the verge of implementing the new “End TB Strategy”. However, with the evidence of the newly conducted prevalence survey, the NTP has recognized the need to develop effective mechanisms on how to reach, detect and treat missed TB cases if they are to achieve the objectives of the 2015-2020 strategic component of the “End TB Strategy” (WHO Regional Office for Africa, 2015).

In 1987, the National AIDS Control Programme (NACP) was established in Ghana to take charge of control and management of HIV in the country (GHS, 2013). Currently, the management of HIV/AIDS in Ghana is under two state supported institutions; the Ghana AIDS Commission (GAC) which is a supra-ministerial and multi-sectorial body established by Act 613, 2002 of parliament, under the chairmanship of the President of the Republic of Ghana and National AIDS Control Programme (NACP). The Ghana AIDS Commission is mandated to provide support, guidance and leadership in the fight against HIV and AIDS epidemic while the NACP serves as an implementing agency, and coordinated by the Ghana Health Service (Ghana AIDS Commission, 2013). The Anti-Retroviral Therapy (ART) was introduced in 2003 on a pilot basis and later rolled out as a full treatment regimen for HIV.

The ART and the general HIV care in Ghana started with a highly centralized approach with treatment only limited to teaching hospitals in the

country. However, both ART and general HIV care has since been decentralized from the teaching hospitals to the various district hospitals nationwide. Presently, there are about 1057 TB treatment centres and 160 ART clinics nationwide (NTP, 2009; GHS, 2012). In Ghana, vertical programmes such as TB and HIV control programmes has for some time now, largely depended on funding from international organizations such as WHO, United States Agency for International Development (USAID), Stop TB and other Non-governmental Organizations (NGOs). In the last decade, for instance, the Global Fund to fight AIDS, TB and Malaria (GFATM) has even made available much funding for the management of TB and HIV than the Government of Ghana (Amo-Adjei, 2014; WHO, 2015a).

Before 2007, TB and HIV management were largely vertical with referral services the only form of integration. This has resulted in a high cost for treatment of patients as well as other inconveniences since a number of visits will have to be made in order to obtain the required treatment and care especially among co-infected patients. Consequently, there were missed cases, higher losses to follow-up, high case fatality rate, as well as delays in initiation of ART (WHO, 2013a). In 2007, the Ghana Health Service in collaboration with NACP and NTP developed guidelines for clinical management of TB-HIV co-infection in Ghana which is supposed to be a reference tool for all healthcare providers in clinical settings to effectively manage patients and help fight the TB-HIV syndemic in Ghana using service integration as a strategy (GHS, 2007). TB-HIV service integration, which has been adopted to effectively manage the syndemic in Ghana, is expected to have taken place in all healthcare facilities by 2015 (GHS, USAID-Ghana, QHP, 2007).

Statement of the Problem

TB and HIV have long been acknowledged as a public health challenge in Ghana with both diseases accounting for about 7% of all adult deaths (GHS & MoH, 2010). In 2007, the Ghana Health Service came out with a guideline for the clinical management of TB and HIV co-infection in Ghana. This document acknowledged the complex relationship between TB and HIV and calls for collaboration between National HIV/AIDS Control Programme (NACP) and the National Tuberculosis control Programme (NTP) to effectively manage the TB/HIV syndemic (GHS, 2007; GHS, USAID-Ghana, QHP, 2007).

There has been an increase with regards to percentage of TB patients with known HIV status over the years. However, global progressed in coverage slowed between 2012 and 2013 with Ghana (relatively high TB/HIV burden country) reporting less than 75 percent coverage after previously having reported more than 75 percent (WHO, 2014a). There exist a significant disparity in the management of TB and HIV in Ghana with co-infected patients been worst affected. According to WHO, 73 percent of notified TB patients in Ghana know their HIV status with 21 percent tested HIV-positive. Whereas 74 percent of notified HIV-positive TB patients are started on Co-trimoxazole Preventive Therapy (CPT), only 42 percent of notified HIV-positive TB patients started on ART (WHO, 2014a). Weak political commitments as well as unsatisfactory coordination between TB/HIV programmes among other things have been noted as challenges that account for the relatively inefficient management of TB and HIV in Ghana due to failure to adequately integrate TB-HIV services (Amo-Adjei, 2013; NTP, 2013).

The World Health Assembly (WHA) adopted WHO's "Global strategy and targets for tuberculosis prevention, care and control after 2015" on 19th May, 2014 at the 67th Assembly. This post-2015 strategy known as "The End TB strategy" is an ambitious strategy with an overall goal to end the global TB epidemic by 2035 with well defined targets (WHO, 2014b). In order for the world to achieve this goal of ending the TB epidemic by 2035, resource limited countries such as Ghana need to adopt appropriate strategies that will ensure access to high-quality tuberculosis care and prevention (especially among HIV-positive patients) while at the same time addressing the social determinants of TB and ensure closer collaboration between NACP and NTP (Lonnroth, et al., 2010; Getahun & Varma, 2015). However, it appears largely that the current management strategies in place, especially in resource limited countries like Ghana are not effective enough to accelerate the decline in TB incidence towards elimination by 2035 (Amo-Adjei, Kumi-Kyereme, Amo, & Awusabo-Asare, 2014; WHO, 2014a).

In Ghana, the current management strategy for HIV and TB is service integration. Thus, NTP and NACP are expected to integrate TB and HIV prevention, care (counselling, diagnosis, and treatment) and support activities. This integration is expected to take place in 60 districts by 2008 and all districts by 2015 (GHS, USAID-Ghana, QHP, 2007). As part of the health system response to strengthening TB-HIV collaboration and integration, it is expected that NTP and NACP will jointly plan and implement TB and HIV activities at all levels, resulting in a "one-stop-shop" approach. It is also expected that specific funding for either TB or HIV will be used for TB/HIV activities so as to ensure effective management of the TB-HIV syndemic

(GHS, USAID-Ghana, QHP, 2007). However, there is no consensus about the specific model of integration. Consequently, different models of integration (linkage, collaboration, full integration) have been instituted across various healthcare facilities in Ghana, with no consensus on what model best fit the Ghanaian context (Ansa, Walley, Siddiqi, & Xiaolin, 2014).

Despite an extensive body of knowledge on HIV-TB service integration elsewhere, relatively few studies exist in Ghana on integration of TB-HIV services. These studies include (Ansa, Walley, Siddiqi, & Wei, 2012; Amo-Adjei, Kumi-Kyereme, Amo, & Awusabo-Asare, 2014; Ansa et al., 2014). However, these studies failed to incorporate the perspective of co-infected patients regarding TB-HIV service integration. For instance, Ansa et al. (2012) only tried to assess the impact of TB-HIV service integration on the outcome of TB treatment. Amo-Adjei and his colleagues on the other hand acknowledged their failure to include the perspective of co-infected patients as a major limitation and entreat future studies to explore TB-HIV service integration from the perspective of patients (Amo-Adjei, Kumi-Kyereme, Amo, & Awusabo-Asare, 2014). Ansa et al. (2014) only compared the impact of increasing levels of TB-HIV integration on service delivery.

TB-HIV service integration is expected to result in effective management of the syndemic (GHS, USAID-Ghana, QHP, 2007; WHO, 2012a). However, it appears largely that the current interventions are not working as expected. Evidence from recently conducted national prevalence survey brought to light that the prevalence of TB in Ghana is actually three times higher than what was estimated by WHO due to the high number of missed TB cases among other things. Consequently, the NTP has

acknowledged the need to develop an effective and efficient mechanism to reach out, detect and treat all missed TB cases in order to set out Ghana on the move towards achieving the objectives of the 2015-2020 strategic component of “The End TB Strategy” (WHO Regional Office for Africa, 2015). It is against these backdrops that the study sought to explore issues surrounding TB-HIV service integration towards effective management of TB and HIV in Ghana.

Objectives of the Study

The general objective of the study was to explore issues surrounding TB-HIV service integration towards effective management of TB and HIV in Ghana. The specific objectives of the study are to:

1. Explore views of co-infected patients on TB-HIV service integration.
2. Explore views of healthcare providers on innovative ways to manage TB and HIV in Ghana.
3. Assess the preferred model of TB-HIV service integration from the perspective of service providers.
4. Examine the barriers to TB-HIV service integration from the perspective of service providers.
5. Examine the experiences of TB-HIV co-infected patients with regard to access to treatment.

Research Questions

1. How do co-infected patients view TB-HIV service integration?
2. How can TB and HIV be effectively managed in Ghana using innovative means?

3. What is the preferred model of TB-HIV service integration from the perspective of service providers and why?
4. What are the barriers to TB-HIV service integration and how do these barriers hinder service delivery?
5. What are the experiences of TB-HIV co-infected patients with regard to access to treatment and services?

Significance of the Study

The study sought to explore issues surrounding TB-HIV service integration towards effective management of TB and HIV in Ghana. Therefore, the findings will inform policy makers, healthcare providers and other stakeholders about the state of TB and HIV management in Ghana. It will also help policy and decision makers in the formulation and adoption of appropriate policies and strategies to effectively manage TB and HIV and strengthen service integration in Ghana.

The WHO organization has recently launched its ambitious project of ending the global epidemic of TB by 2035. It is critical for resource limited countries such as Ghana, where TB and HIV remained a greater public health concern to explore ways to effectively manage both diseases. Even though the WHO's project is geared towards the elimination of TB, we cannot ignore HIV due to the synergistic relationship that exists between both infections. The study will provide vital evidence on the management of TB-HIV in Ghana which will inform policies and strategies towards effective management of the syndemic. Effective management of TB and HIV in Ghana will go a long way to helping WHO in its quest to having a world with zero TB infection by the year 2035.

In light of the synergistic relationship that exists between TB and HIV, coupled with the dwindling health care financing of the control programmes in Ghana which often rely on donors, service integration has been suggested as the best option to manage the TB-HIV syndemic. It is therefore prudent to examine barriers as well as benefits of TB-HIV service integration. The outcome will inform policies and interventions on how to effectively manage both diseases in the midst of the prevailing challenges.

The study will also add to the existing body of knowledge on the management of TB and HIV. Even though, issues of TB and HIV have been extensively documented in the literature, most studies looked at either of the two diseases exclusively without establishing a link between both diseases. In recent times, however, studies were able to look at both diseases concurrently, especially after integration of health care services was suggested as the way forward for developing countries. Nevertheless, studies on TB and HIV service integration in Ghana are limited. This study will therefore add to the existing debate on the viability of TB-HIV service integration in Ghana and the preferred model of integration towards effective management of both diseases. Also, most researchers that study TB-HIV service integration only examine it from the perspective of healthcare providers without incorporating views of co-infected patients. Therefore, the study will attempt to partially fill the gap in the literature by incorporating the perspective of TB-HIV co-infected patients.

Limitations of the Study

Even though the findings of this study provided meaningful insight into issues surrounding TB-HIV service integration from the perspectives of

both service providers and patients, there are a number of inherent limitations in the study. Firstly, this study was conducted in few facilities; 12 healthcare facilities across four regions of Ghana. With the limited number of facilities used in this study, there is the need for nationwide study which will provide a more accurate depiction of the situation.

There is also a limit to which results of this study can be generalized due to the qualitative methods of inquiry that was employed in this study. There is therefore the need for methodological triangulation which is completely missing in this study. The study made use of only qualitative data collected through interviewing of the respondents and the results were not compared with treatment outcomes for TB and HIV in the various facilities that were selected for the study.

Despite the above limitations of the study, the results of the study provide meaningful insight into TB-HIV service integration in the selected facilities. With a strong theoretical base for this study, results can be transferred across similar settings as a way of validating (Nicholls, 2011).

Definition of Terms

A number of epidemiological terms have been used in this study and this section provides definitions for the terms used.

Co-infection: A person who is infected with more than one disease causing organisms at the same time and both organisms complements each other to cause more harm. In this case, the term is used to refer to a person who is infected with both TB and HIV.

GeneXpert: It is a new and more advanced molecular test for TB, which is used for TB diagnosis by identifying the presence of the bacteria, and at the same time test for the resistance of the strain to drug Rifampicin.

Integration: It refers to the coordinated provision of TB-HIV services and includes several models, ranging from locating TB and HIV services in one facility, to a one-stop-shop model that offers a complete package of TB-HIV services delivered by one health care team at the same facility and at the same time.

Morbidity: It refers to disease and illness of a person or in a given population. In this case, it is used to refer to TB and HIV illness and disease.

Mortality: It refers to deaths that occur within a population. In this case, it is used to refer to deaths as a result of TB and HIV infections.

Regimen: A set of plans or lay down procedure that guides the management and access to treatment for TB and HIV

Syndemic: Two or more infections, which interact synergistically thereby contributing to the excess burden of disease in a given population.

Organization of the study

This thesis is organized into five chapters. The Chapter One puts the study into perspective through the background to the study. It provides an extensive explanation of the synergistic relationship between tuberculosis and HIV as well as issues relating to integration of TB-HIV services. It further explained the global and local situations of TB and HIV based on available

documented evidence from the literature. The chapter also includes Statement of the Problem, Objectives of the Study, Research Questions and Significance of the Study.

In chapter Two, a systematic review of relevant related literature was carried out. The review was mainly based on peer reviewed articles which are relevant and related to the study. However, some grey literature such as reports and conference proceedings were considered where appropriate. This chapter also involved review of some relevant theories and a theoretical framework was developed to guide the study.

The third chapter was devoted to the methodology which included research philosophy and the study design. The study design was exploratory, which was purely qualitative in nature and employed exploratory approach to research. It also included the study area, sources and types of data, sampling technique, sample size, instrument for data collection, pre-testing, data collection procedure, data processing and analysis, and ethical consideration.

Chapter Four dealt with results and discussion of major findings. Qualitative content analysis was carried out and the findings were presented under major themes and categories that emerged from the analysis. The result was discussed in relations to empirical literature. The theoretical/conceptual framework that was developed for the study was also vital in the analysis and the discussion.

The final chapter was concerned with the summary of the major findings, conclusion and recommendations of the study. The chapter also suggested areas for further studies.

CHAPTER TWO

LITERATURE REVIEW

Introduction

In this chapter, a systematic review of existing literature which is related and relevant to the study was carried out. It consists of empirical evidence in the field of TB-HIV management. The chapter also reviewed some existing theories of infectious disease management and health service delivery, which helped in the development of the conceptual framework for the study. Literature was obtained by searching electronic bibliographic databases including PubMed, BioMed Central, EBSCO host, Google scholar, and MEDLINE. Specific journals, including; Lancet, New England Journal of Medicine, Lancet Infectious Disease, and Social Science and Medicine were also searched for literature. Author tracking was also done for articles that have been published on TB-HIV management by some specific authors. The selection criterion was limited to studies on TB-HIV management that were published in English within the last decade (2006-2016). In order to conduct a comprehensive systematic review, I did not exclude studies based on their designs or absence of outcome measurement. Thus, both quantitative and qualitative studies were considered for the review.

After gaining access to the various electronic bibliographic databases such as EBSCOHOST using UCC license, the researcher used the terms “TB” and “HIV” (and their synonyms; Tuberculosis and Human Immunodeficiency Virus) and (“service integration,” “TB-HIV co-infection” “effective management” and other terms depicting integration and management). The

search for literature yielded a total of 1089 papers including reports. The titles of 845 non-duplicated materials were screened for inclusion. Out of that, 622 full text and abstracts were further assessed for eligibility bearing in mind the time of publication as an inclusion criterion (2006 - 2016). Finally, 102 papers (peer-reviewed articles and reports) fulfilled the eligibility criteria and were included in the review.

Overview of the TB-HIV Syndemic

Globally, it is estimated that 1.2 million (12%) of the 9.6 million people who developed TB were also HIV-positive, with the African region accounting for 74% of these cases. Mortality due to TB-HIV co-infection was highest at 570, 000 in 2004 but decreased to 390, 000 in 2014 (WHO, 2015b). Global estimate also indicates that 51% of notified TB patients know their HIV status in 2014 which is a small increase from 49% at the end of 2013 (WHO, 2015b).

Management of TB and HIV

Even though international guidelines exist for management of TB and HIV (WHO, 2012a; Lonroth, et al., 2015), evidence suggest that in both high and low-incidence countries, the quality of TB care is below standard regardless of whether private or public facilities provided the care or services (Sotgiu, et al., 2011; Migliori, et al., 2012; Sreeramareddy, Qin, Satyanarayana, Subbaraman, & Pai, 2014; Das, et al., 2015). Evidence from India revealed that the quality of care for TB patients is suboptimal especially in private health care facilities (Satyanarayana, et al., 2015). Late and incorrect diagnosis, inappropriate design for treatment regimen as well as infection

prevention and control are the major areas where suboptimal management has been identified (Sreeramareddy, et al., 2014; Das, et al., 2015).

The best time to initiate anti-retroviral therapy (ART) among patients co-infected with tuberculosis remained uncertain (Uthman, Okwundu, Gbenga, Volmink, Dowdy, & Nachega, 2015). There were some studies that looked at HIV testing and when to start ART in order to prevent TB among PLHIV. Evidence suggests that the use of anti-retroviral therapy (ART) significantly reduces the risk of TB among HIV-positive patients who are put on treatment (Lawn, Myer, Edwards, Bekker, & Wood, 2009; Lawn, Wood, De Cock, Kranzer, Lewis, & Churchyard, 2010; Harries et al., 2010; Lawn et al., 2011a). However, efforts to control TB at the community level are not yielding the expected result in Sub-Saharan Africa because most patients with HIV are diagnosed late and often start ART with low CD4 counts (Lawn, Harries, Anglaret, Myer, & Wood, 2008). It has been reported that immunodeficiency due to HIV cannot fully restore immunity of patients even if ART is successful. Therefore, late initiation of ART is associated with suboptimal outcome and worsens the health conditions as well as treatment outcome for patients (Luz et al., 2015).

A number of studies (mostly conducted in Southern Africa) also pointed out that intensified case finding ensures an early start to TB treatment which reduces HIV related TB morbidity and mortality and at the same time contributes to infection control at the community level as well as healthcare facilities (Bock, Jensen, Miller, & Nardell, 2007; De Cock, Gilks, Lo, & Guerma, 2009; Granich, Gilks, Dye, De Cock, & Williams, 2009; WHO, 2009b). The extra benefits of Isoniazid Preventive Therapy (IPT) in

combination with ART in co-infected patients have been reported to have reduced morbidity and mortality among patients, including those with CD4 counts greater than 500 cells per μL (Rangaka et al., 2014).

It was also evident in some studies (mostly randomized control trials) that, for people who are newly diagnosed with HIV and are accessing health care, TB screening with Mycobacterium culture has a high outcome, with culture-positive TB in 5-25% of otherwise unselected patients (Day, Charalambous, Fielding, Hayes, Churchyard, & Grant, 2006; Ayles, et al., 2009). Both studies concluded that undiagnosed TB among people is a threat to the control of the disease and recommended the need for a more rigorous approach to tackling transmission of the disease. One other study pointed out that the nosocomial infection of tuberculosis accounted for an appreciable but generally unrecognized proportion of the total risk of TB infection (Bock, Jensen, Miller, & Nardell, 2007).

Studies available have also documented suboptimal initiation of ART among patients after tuberculosis therapy has been initiated. These studies suggest that early initiation of ART in co-infected patients receiving TB therapy improve the uptake and continuation of ART (Lawn, Campbell, Kaplan, Little, Morrow, & Wood, 2011b; Lawn et al., 2011c; Pepper, Marais, Wilkinson, Bhaijee, De Azevedo, & Meintjes, 2011; Van Lettow et al., 2011). Evidence from Malawi pointed out that the rates of ART increase with the shortening timing of ART after TB diagnosis. In this study, the authors evaluated changes in rates of ART initiation after an initiative to improve timing of ART after TB diagnosis. They found a significant, but far from

optimal (at 24% after 3 months of tuberculosis therapy initiation) increase in the rate of ART initiation (Van Lettow et al., 2011).

There has been a large debate on when to start ART, especially among patients co-infected with TB with one group advocating for early initiation and the other group advocating for delay initiation. The group, which advocates for delayed initiation is concerned about the toxic effect of combined drugs, non-adherence to the treatment regime due to the increased pill burden, and risk of developing immune reconstruction inflammatory syndrome. However, in a study in which the authors carried out a systematic review and meta-analysis, it was evident that the risk of developing immune reconstitution inflammatory syndrome (IRIS) during ART is largely associated with CD4 counts at the initiation of ART. The study concluded that the risk of IRIS is higher among patients with CD4 counts less than 50 cells per μL at the start of ART. Therefore, initiation of ART among HIV patients co-infected with TB who are already on TB treatment increases the risk of IRIS particularly when the CD4 count is less than 50 cells per μL (Muller, Wandel, Colebunders, Attia, Furrer, & Egger, 2010).

Evidence suggests that early initiation of ART in HIV patients, especially severely immune-compromised patients who are co-infected with TB is very critical in ensuring survival and better treatment outcomes for both infections (Naidoo, Baxter, & Abdool Karim, 2013a). Some recent studies have also documented support for early initiation of ART as their findings revealed that early initiation of ART reduces morbidity from TB and other bacterial diseases (The TEMPRANO ANRS 12136 Study Group, 2015; The INSIGHT START Study Group, 2015). This is where TB-HIV service

integration is very vital to ensure adequate timing of treatment initiation for co-infected patients as proper monitoring and evaluation of the health conditions of the patients is assured in an integrated system.

In a study known as “The Starting Antiretroviral Therapy at Three Points in Tuberculosis” (SAPIT) trial, it became evident that introducing ART at the time of tuberculosis therapy significantly increases survival among co-infected patients with CD4 counts less than 500 per cubic millimetre which reinforce TB-HIV service integration (Abdool Karim et al., 2010). Similarly, a retrospective cohort study conducted in Madrid found an increase in survival among TB-HIV co-infected patients when ART was initiated within two months after tuberculosis treatment was initiated (Veloso et al., 2009). With the emergence of new evidences of TB-HIV syndemic, the World Health Organization came out with a revise edition of recommended guidelines for management of TB-HIV with the use of ART. The World Health Organization (WHO) recommended that ART should be initiated as early as possible within the first eight weeks after tuberculosis therapy has been initiated (WHO, 2010a).

The Cambodian Early versus Late Introduction of Antiretroviral (CAMELIA) trial where the authors investigated whether early initiation of ART (two weeks after starting TB therapy) could reduce mortality among patients with severe immunodeficiency as compared to late initiation of ART (eight weeks after initiating TB therapy), it became evident that early initiation of ART after the start of tuberculosis treatment significantly increased survival among TB-HIV co-infected patients with CD4 counts of 200 per cubic millimetre or lesser (Blanc et al., 2011).

In recent years, the issue of Extensively Drug-Resistant Tuberculosis (XDR-TB) has gained more attention globally because of the difficulties involved in the treatment process and it has been considered the most resistant form of TB (Kliiman & Altraja, 2009; WHO, 2013a). XDR-TB as a result of poor treatment outcome is often characterized by high mortality levels among patients and it is seen as a major threat in the fight against tuberculosis (Dhedha et al., 2010). Just like general TB infection, studies point to a synergistic relationship between XDR-TB and HIV infection with a high mortality rate (Gandhi et al., 2010; O'Donnell, Padayatchi, Kvasnovsky, Werner, Master, & Horsburgh, 2013). Treatment and management of XDR-TB –HIV is complex and involves strict treatment regime which comes with likely drug interaction and adverse reactions to the drugs among patients (Shean et al., 2013).

A retrospective study carried out in South Africa revealed poor outcomes for patients with XDR tuberculosis irrespective of their HIV status. The study further pointed out that a significant proportion of XDR-TB patients with failed treatments are often discharged from hospitals, even though they present a positive sputum culture and this will likely result in transmission of the disease to the wider community (Pietersen et al., 2014). The study recommends a more effective drug regimen for a better treatment outcome. However, it is important to note that adherence to the treatment regime is vital for both TB and HIV outcomes (Kulkarni, Akarte, Mankeshwar, Bhawalker, & Kulkarni, 2013). It is evident that suboptimal adherence to treatment promotes the development of antiretroviral drug resistance on treatment and consequent unsuccessful treatment outcome (O'Connor et al., 2013; Kulkarni, Akarte, Mankeshwar, Bhawalker, & Kulkarni, 2013).

A study conducted in South Africa revealed a disparity in adherence to treatment regimen for HIV and TB with adherence to ART considerably higher than TB medication. The study recommended that short-course treatment for drug-resistant TB which will require that patients take relatively lesser number of pills may improve adherence and better treatment outcomes in XDR-TB/HIV patients (O'Donnell, Wolf, Werner, Horsburgh, & Padayatchi, 2014). Knowledge, attitudes and beliefs of patients have been documented as influencing adherence to ART and TB medications (Munro, Lewin, Smith, Engel, Fretheim, & Volmink, 2007; Olowookere, Fatiregun, & Adewole, 2012). It was evident in a study conducted to find out about predictors of TB medication and ART non-adherence that factors such as poverty, multiple morbid conditions, alcohol abuse, and partner being HIV positive among others influence non-adherence to treatment regimen. Thus the study recommended a comprehensive management programme that will address poverty, alcohol abuse, psycho-social counselling as key to successful TB management with or without HIV (Naidoo, Peltzer, Louw, Matseke, Mchunu, & Tutshana, 2013b). A qualitative evidence points out that barriers such as financial difficulties, inadequate communication with health care providers, pill burden and its side effects are responsible for non-adherence to treatment regime among TB-HIV co-infected patients. The study suggested that in addition to medical care, less financial support and provision of food will go a long way to facilitating adherence. The study further identified provision of counselling, especially for patients who start ART in the early stages of TB treatment (Gebremariam, Bjune, & Frich, 2010).

In a cluster-randomised trial conducted in Rio de Janeiro, Brazil to assess the effect of IPT on rate of TB and mortality among HIV infected patients, it was evident that the use of IPT significantly reduces incidence of TB and mortality. As such, the study recommended scaling up of IPT among HIV-positive patients, especially in settings of moderate TB incidence (Durovni et al., 2013). It is clear that management of TB and HIV require a comprehensive strategy that will ensure effective management of the syndemic and a better treatment outcome, especially for co-infected patients.

Linkage between TB-HIV Management

Successful management of TB and HIV will require linkage between the management processes of both diseases since TB remain a major cause of admission among HIV-positive patients (Ford et al., 2015a). Even though the WHO's recommended Directly Observed Treatment (DOT), short course is regarded as highly effective in TB control, evidence tends to suggest that it does not provide the optimum outcome in patients with HIV-associated TB and has also proved not to be effective at population level in places with high prevalence of HIV (Lawn & Churchyard, 2009). A more rigorous approach which will require comprehensive interventions are therefore needed to address the burden of TB among persons living with HIV and also in settings where HIV prevalence is high (Harries et al., 2010; Lawn, Meintjes, McIlleron, Harries, & Wood, 2013).

The WHO has long acknowledged the urgent need to establish a link between TB and HIV policies and programmes (WHO, 2004). At the end of 2011, it is estimated that approximately 1.3 million lives have been saved as a result of interventions put forward by WHO's interim policy on collaborative

TB-HIV programmes and activities (WHO, 2012b). However, in all regions of the world, late diagnosis as well as late initiation of treatment regimen has been reported as a major cause of high morbidity and mortality among persons living with HIV (IeDEA and ART Cohort Collaboration, 2014; Siedner, Ng, Bassett, Katz, Bangsberg, & Tsai, 2015; Ford, Mills, & Egger, 2015b). HIV morbidity is poorly understood, especially in resource-limited settings where diagnostic procedure is far from optimum and as such missed opportunities and limited understanding of the disease exist (Ford et al., 2015a). In places such as Zambia, where scaling up of HIV testing for patients with TB has been documented to be successful, missed opportunities for HIV patients to be enrolled on ART still exist. Also, referrals for co-infected patients to access care for both TB and HIV still poses a major challenge as a result of poor linkage or integration of TB-HIV services (Miyano, Muvuma, Ishikawa, Hiroyoshi, Msiska, & Syakantu, 2013).

Evidence from high-income countries suggests that the role of non-AIDS-related diseases to mortality is on the rise among people living with HIV (Weber et al., 2013; Smith et al., 2014). However, in sub-Saharan Africa, TB and bacterial infections are the leading causes of mortality and morbidity among people living with HIV (Wong et al., 2012; Anglaret et al., 2012). WHO recommends that immediate initiation of effective TB treatment regimen should be the priority in TB-HIV co-infected patients reporting for treatment (WHO, 2010b). ART has also been found to be of immense benefit not only for HIV patients, but also for TB patients co-infected with HIV. In a study conducted to examine the impact of ART on mortality among TB-HIV co-infected patients, it was evident that initiating ART before or at some point

during TB treatment significantly decreases the risk of mortality during TB treatment. The study recommended that nationwide programmes should ensure the expansion of ART coverage so as to effectively manage the TB-HIV syndemic (Odone, Amadasi, White, Cohen, Grant, & Houben, 2014).

In recent years, one important issue regarding the global fight against TB has been the challenges posed by MDR-TB (Zulma, Raviglione, Hafner, & Reyn von, 2013). A study conducted in South Africa pointed to an association between MDR – TB and HIV infection with co-infected patients at a high risk of developing MDR-TB, which is a major challenge for TB control programmes in countries with high HIV prevalence (Wells et al., 2007). The study concluded that institutional outbreaks, devastated public health programs, and a complex clinical management issues may be responsible for the convergence of MDR-TB and HIV infection epidemics. Similarly, some recent studies showed evidence of high proportion of MDR-TB among HIV-positive patients, which demonstrated a synergistic relationship between both epidemics with increasing prevalence (Walls et al., 2015; Heysell et al., 2016).

A systematic review conducted to assess treatment outcomes among MDR-TB patients co-infected with HIV found no substantial difference in success rate between MDR-TB patients co-infected with HIV and MDR-TB patients in general. Nevertheless, it was evident that mortality rate was higher among adult co-infected patients, which emphasizes the need for early detection and better treatment regime (Isaakidis, Casas, Das, Tseretopoulou, Ntzani, & Ford, 2015). Evidence suggests that when ART is initiated early among co-infected patients during treatment for MDR-TB it may result in better treatment outcome and decrease mortality rate (Arentz et al., 2012).

However, even though significant progress has been made in scaling up ART in settings with high HIV prevalence like sub-Saharan Africa, late initiation of ART due to late diagnosis still remain a challenge (Siedner, Ng, Bassett, Katz, Bangsberg, & Tsai, 2015).

A retrospective cohort study conducted in South Africa revealed that response to treatment of MDR-TB did not differ with HIV infection in places with access to ART. The study, however, concluded that early initiation of ART at the primary care level could reduce mortality among HIV-infected patients with low CD4 (Mohr et al., 2015). Evidence from The Netherlands revealed that successful treatment of MDR-TB can be achieved through close collaboration among all stakeholders involved in the management of TB. However, the study identified HIV as one major risk factor that accounts for unsuccessful treatment outcomes among patients (van Altena et al., 2015). According to Satti and his colleagues, treatment of drug resistant TB is very challenging, especially among patients co-infected with HIV. The study reported that in order to effectively manage DR-TB among patients co-infected with HIV, there must first be a successful management of their HIV, including an ART regimen (Satti, McLaughlin, & Seung, 2013). Starting ART in HIV infected adults with a CD4 counts greater than 500 cells per cubic millimetre is associated with better treatment outcomes as compared to starting therapy in patients after the CD4+ counts had dropped to 350 cells per cubic millimetre or lesser (Lundgren et al., 2015).

Integration of TB-HIV Services

Available literature point to a growing consensus that early case detection and early initiation of the TB treatment regimen are very vital in the

fight to reducing mortality associated with TB and also reduce the spread of TB among HIV- positive patients (WHO, 2011; Bassett et al., 2012; WHO, 2013b). Vertical programmes which include separate healthcare facilities for TB and HIV may lead to ineffective management of both diseases, mainly as a result of poor case detection and delay in starting treatment regimes (Zachariah et al., 2011). Voss De Lima and his colleagues in a study in which they assessed the outcomes of TB and HIV care linkage, found that a significant proportion of patients failed to have a linkage care for TB and HIV despite efforts to strengthen referrals of HIV patients who are newly diagnosed with TB at the healthcare facility. The study, therefore, recommends TB-HIV service integration at least at primary care level (Voss De Lima et al., 2013).

Even though integration has been suggested as one of the effective ways to manage TB and HIV especially in resource limited settings, evident tend to suggest that most TB clinics refers co-infected patients to different clinics to access ART which often leads to loss to follow-up, self-transfer, delays in starting ART and increase mortality (Lawn et al., 2011b; Legido-Quigley et al., 2013; Wilkinson, Skordis-Worrall, Ajose, & Ford, 2015). A retrospective cohort study conducted in Tanzania revealed that integrating TB-HIV services along with a complete electronic data collection process significantly increased diagnosis of TB among PLHIV. The study, therefore, supports a move away from vertical programs to integrated service/care, especially, in rural settings of sub-Saharan Africa (Haraka et al., 2015).

In 2004 and again in 2012, WHO recommended TB-HIV service integration as the way forward to better management of TB and HIV/AIDS,

especially in low- and middle-income settings of the world (WHO, 2004; 2012). However, evidence suggests that there is no consensus regarding the form (partial or full) of integration and at what levels services are expected to be integrated (Legido-Quigley et al., 2013). A number of models of TB-HIV service integration have been suggested as ways to manage TB and HIV. However, the appropriateness of the various models in terms of affordability, effectiveness and efficiency with regards to a given setting has not been adequately established (Uyei, Coetzee, Macinko, & Guttmacher, 2011). However, evidence suggests that integrating TB and HIV services whereby co-infected patients can have treatment for both infections at the same time is associated with decrease mortality among patients (Abdool Karim et al., 2011). Effective management of TB and HIV through service integration will not only help reduce mortality among HIV patients but also help in the fight against TB as integration will help reduce relapse among TB patients who are co-infected with HIV (Khan, Minion, Al-Motairi, Benedetti, Harries, & Menzies, 2012).

There is documented evidence from Zambia which revealed that after TB services have been integrated with home-based care for PLHIV, it has resulted in a substantial decrease in treatment default rate among patients which ultimately led to better treatment outcome (Miti, Mfungwe, Reijer, & Maher, 2003). In a study conducted in Cape Town, South Africa, where the authors investigated the impact of full TB-HIV service integration, it became evident that complete TB-HIV service integration is viable and has resulted in a significant increase in uptake of ART and at the same time ensuring early initiation of ART (Kerschberger et al., 2012). This study, therefore,

recommended scaling up of complete/full TB-HIV service integration, especially in settings with a high prevalence of TB and HIV syndemic. Similar support for complete TB-HIV service integration has been documented in Kenya and Malawi, where integration was found to have increased uptake of ART and also adherence to TB treatment regimen (Huerga, Spillane, Guerrero, Odongo, & Varaine, 2010; Phiri et al., 2011).

In another study conducted recently in rural Kenya to explore the impact of TB and HIV service integration, it became evident that integration of TB and HIV service improve uptake and reduce delay in initiating CPT and ART in rural healthcare facilities (Owiti et al., 2015). The study, therefore, recommended increase efforts to integrate TB and HIV services as a way to effectively manage the TB-HIV syndemic. Contrary to the above study, Patel and his colleagues in their study examined why people delayed ART found that in spite of full integration of TB – HIV services, significant proportion of patients delayed initiation of ART (Patel, Nana, Yotebieng, Tabala, Behets, & Van Rie, 2014). The study, therefore, advocated for pragmatic approaches to ensure that patients are enrolled on ART as early as possible especially those at risk of delaying ART. However, this study is just one of the very few studies that reported integration to be non-beneficial.

Aside service integration, decentralization of TB-HIV service integration has also been suggested as a way to effectively manage the TB-HIV syndemic. However, evidence points to mixed results. In South Africa, Peters and his colleagues assessed the implementation of collaborative TB-HIV services at a hospital-based antenatal care (ANC) service unit. They found that identification of HIV-positive women and TB suspects were

satisfactory. However, the implementation of ART, CPT, IPT and other TB – HIV integrated services were found to be suboptimal (Peters, Heunis, Kigozi, Osoba, & Van Der Walt, 2015). In a primary healthcare setting in Kinshasa, Democratic Republic of Congo, where TB and HIV services have been integrated as a way to effectively manage the syndemic, a study conducted by Van Rie and his colleagues also found mixed results. Even though TB-HIV service integration at the primary health care level (nurse-centred) has resulted in early initiation of ART and decrease mortality among TB patients, mortality among patients with severe immune-suppression was still high, emphasizing the limit of TB-HIV management at the primary health care level (Van Rie et al., 2014). In a prospective cohort study of HIV infected children aged 3-18 years, starting TB treatment regimen in primary health care (PHC) clinics in Kinshasa, Democratic Republic of Congo, it was evident that nurse-cantered paediatric TB-HIV service integration at PHC level is actually feasible and is associated with improved treatment outcomes such as higher ART uptake, reduced mortality and clinical improvement of patients (Patel, Yotebleng, Behets, Vanden Driessche, Nana, & Van Rie, 2013).

Contrary to the extensive evidence that point to TB-HIV service integration being associated with better management and treatment outcomes for TB and HIV, a study by Kaplan et al., (2014) found that TB-HIV service integration at a primary health care facility in Cape Town is not associated with improvement in TB treatment outcome. This study also revealed that provision of ART and TB services in an integrated health care facility does not result in decrease TB death and default rates among patients.

It is however worth considering that the success or otherwise of TB-HIV service integration to ensure effective management of the syndemic depends largely on service providers and the level of coordination between service providers responsible for TB and HIV (Kumwenda et al., 2011). Njosing and his colleagues noted that, for TB-HIV service integration to be successful and sustained, there must be proper planning, scaling up of the human resource as a way of strengthening the health care system, development of infrastructure, and ensure continuous medicines for treatment of patients (Njosing, Edin, San Sebastian, & Hurtig, 2011).

Benefits of TB-HIV Service Integration

Vertical programmes where TB and HIV are managed separately have been regarded as ineffective way of managing the syndemic due to the synergistic relationship that exist between the two diseases (Zachariah et al., 2011; Haraka et al., 2015). Consequently, integration of TB-HIV services have been recommended to address the challenges presented by vertical programmes and help to better manage the syndemic (WHO, 2012a). A number of countries, especially middle and low income countries where TB and HIV remain a greater public health concern have taken up TB-HIV service integration as the way forward from the time it has been recommended by WHO in 2004 (Legido-Quigley et al., 2013). In a study conducted in South Africa, it became evident that there is the need for TB-HIV service integration as it was revealed in this study that co-infected patients delayed or failed entirely to get enrolled on ART when they are referred from a separate TB clinic (Lawn et al., 2011b).

TB-HIV service integration has also been found to have significantly improved treatment outcomes for both diseases and also ensure early initiation and adherence to ART (Hermans et al., 2012). This study endorses the full integration of TB-HIV services, especially in settings where HIV and TB prevalence remain high. However, a study conducted in Ghana, where the authors evaluated different delivery models (total segregation to full integration), it was revealed that increasing levels of integration may improve screening for HIV but not necessarily the uptake of CPT or ART (Ansa et al., 2014). Similarly, a study conducted in South Africa recently in which the authors evaluated whether TB-HIV service integration has a better ART uptake, it was evident that integration of TB-HIV care in Free State has not resulted in improvement in ART uptake. The study found a significant proportion of patients with unknown HIV status and CD4+ count result. It was also evident that only a small proportion of patients were started on ART. The study, however, speculated that the failure of TB-HIV service integration to improve ART uptake in Free State may be as a result of failure to ensure full integration of TB-HIV service as well as absence of monitoring and evaluation of the integration process at the healthcare facilities (Ledibane, Motlhanke, Rose, Kruger, Ledibane, & Claassens, 2015).

Integration of TB-HIV service (counselling, diagnosis, social support, and patients tracing) especially in middle- and low-income settings like sub-Saharan Africa, where the syndemic of TB-HIV remain a greater public challenge in the face of dwindling finances will ensure that the limited available funds are managed properly which will ultimately lead to effective and efficient management of both diseases (Kerschberger et al., 2012).

Evidence suggests that provider-initiated HIV counselling and testing (PICT) in TB clinics has a positive impact on HIV testing among TB patients by increasing the proportion of TB patients with known HIV status, hence the need to integrate of TB-HIV services (Harries et al., 2008). The provider-initiated counselling and testing in an integrated health care facility has been found to be beneficial as it provides a quick way of testing for HIV among TB patients and also ensure the early linkage of HIV services to TB patients who are in need of such services (Harries et al., 2006). A study by Tribble et al. (2011) found that vertical programs where TB and HIV services are rendered separately is associated with missed opportunity for TB patients to test for HIV, emphasizing the urgent need for TB-HIV service integration at least at diagnostic level.

At the time that TB-HIV service integration was suggested as the way forward in managing TB and HIV, especially in resource limited settings, there was no recommendation on the exact model of integration. As such, different models of integration exist across various settings (Legido-Quigley et al., 2013). However, a comparative study into various models of integration revealed that treatment outcomes for patients were better when they access care for TB and HIV from the same service provider. The study, therefore, recommends that efforts of integration should be towards single service provider (one stop service) for both diseases (Schulz, Draper, & Naidoo, 2013). In a study conducted in South Africa to evaluate treatment outcome for TB among TB-HIV co-infected patients, it was evident that integration of TB-HIV services coupled with decentralization are feasible and associated with the favourable treatment outcome especially when patients are carefully

chosen for down-referrals. The study noted that the challenges associated with integration and decentralization should be addressed and the concept should be expanded as it will result in better management of the TB-HIV syndemic (Jacobson, Moll, Friedland, & Sheboi, 2015).

Integration of TB and HIV service delivery has been found to be beneficial, especially in resource limited settings (Uyei, Coetzee, Macinko, & Guttmacher, 2011; Owiti et al., 2015). Evidence from Guatemala revealed that TB-HIV service integration significantly improved starting of TB treatment regimen among patients (23% before integration as against 94% after integration) and decreased mortality (72% before integration as against 27% after integration). Also, TB-HIV co-infected patients were more likely to access ART in integrated service than in vertical programs (72% after integration as against 22% before integration) (Ikeda et al., 2014).

In Uganda, TB-HIV service integration has led to a moderate proportion of patients completing the TB treatment regimen (62% before integration as against 68% after integration) and a reduced mortality or treatment default (33% before integration as against 25% after integration). Also, more TB-HIV co-infected patients were initiated on ART at the time of TB treatment (94% after integration as against 78% before integration) (Hermans et al., 2012). Similar successes of TB-HIV service integration has been recorded in South Africa. It was evident that TB-HIV service integration has resulted in improvement in delay among patients before initiation of ART as the time decreased from 147 days to 75 days after integration of TB-HIV services (Kerschberger et al., 2012). TB-HIV service integration has led to improvement in treatment outcomes for both epidemics (Uyei et al., 2011).

Integration of ART into other services such as TB has been found to be associated with significant improvement in ART coverage. At the same time, decentralization of ART into primary health facilities and local communities is usually associated with improved adherence to treatment (Suthar, Rutherford, Horvath, Doherty, & Negussies, 2014).

Systematic review of studies revealed that there is documented evidence of the cost-effectiveness of TB-HIV service integration across various settings of the world (Hyle, Naidoo, Su, El-Sadr, & Freedberg, 2014). In India, TB-HIV service integration where HIV testing was incorporated into the TB clinic was found to be cost-effective as compared to vertical programmes with selective screening (Ulher et al., 2010).

Barriers to TB-HIV Integration

Even though studies have extensively documented evidence of benefits associated with TB-HIV service integration, some studies also reported barriers or challenges to TB-HIV service integration, especially in sub-Saharan Africa. These studies reported operational challenges, including the potential for stigmatization against integrated facilities, fear of nosocomial transmission of TB in HIV patients, management of drug-drug interaction, and funding constraints as barriers to TB-HIV service integration (McIlleron, Meintjes, Burman, & Maartens, 2007; Gandhi et al., 2009). Nansera, Bajunirwe, Kabakyenga, Asimwe, and Mayanja-Kizza (2010) identified among other things; inadequate staffs (TB and HIV service providers), lack of capacity to effectively diagnose TB and HIV, inadequate knowledge and skills among health care workers to provide integrated care as major barriers to TB-HIV service integration in rural settings.

In a study conducted by Harris and his colleagues in Zambia on TB-HIV service integration, it was evident that integrating TB and HIV services in urban primary care centres is feasible and will lead to better management of TB-HIV syndemic. However, the study also acknowledged inadequate staff, limited capacity of ART clinics to take on TB treatments, and community misconceptions regarding TB and HIV as major barriers to TB-HIV service integration. The study, therefore recommended that barriers to TB-HIV service integration need to be addressed to ensure integration because of its associated benefits, especially in resource limited settings such as sub-Saharan Africa (Harries et al., 2008). Another study also reported that, lack of commitment on the part of national and local leadership, fear of losing professional autonomy on the part of specialists, and disagreement about resource allocation as major challenges or hindrances towards TB-HIV service integration (Daftary, 2012).

Even though integration of TB-HIV services are recommended due to the clinical synergistic relationship between the two epidemics, some people are of the view that allowing patients to access care and treatment for both diseases at the same facility may expose HIV patients to nosocomial infection, including TB (Dong et al., 2007). According to Amo-Adjei (2013), inadequate coordination between NTP and NACP, weak monitoring and evaluation, competition for funding and attention, poor public-private partnership are some of the barriers to effective control of TB in Ghana. In sub-Saharan Africa and other resource limited countries, where most health care facilities are confronted with inadequate infection control protocols, resulting in nosocomial infection, TB-HIV service integration remain a challenge (Gandhi

et al., 2006). In South Africa, Nansera et al, (2010) identified inadequate health staffs with special interest in TB and HIV care, especially in the rural settings as a major barrier hindering TB-HIV service integration. In Ghana, Amo-Adjei et al., (2014) have reported lack of commitment on the part of programme managers, especially at the national level to adequately integrate TB and HIV services as a major barrier in implementing this strategy. Therefore, Successful TB-HIV service integration will require commitment from all stakeholders to addressing the barriers, without which integration cannot be appropriately implemented.

Innovative Approaches to TB-HIV Management and the Way Forward

As a result of the public health threat that TB and HIV pose, especially in resource poor settings, several attempts have been made to address the burden of the syndemic. Aside integration of services widely recommended by WHO, some countries have also adopted other approaches to deal with the syndemic. One of such approaches is Community Based Interventions (CBI). In a systematic review conducted on CBI for prevention and treatment of TB, it was evident that this strategy significantly improves prevention and management of TB. Thus, the use of Community Health Workers (CHW) to deliver TB treatment significantly improves access and utilization while at the same time ensuring capacity building, and better data/information management regarding patients (Arshad, Salam, Lassi, Das, Naqvi, & Bhutta, 2014). Similarly, a study conducted by Corbett et al. (2010) where the authors compared two active case-finding (mobile van and door-to-door enquiry of chronic cough) strategies for community-based management of TB, it was evident that both methods are effective in managing the TB epidemic at the

community level. However, the mobile van method was revealed to be significantly more efficient as compared to door-to-door enquiry for finding patients with formerly undiagnosed smear-positive TB.

There are also documented evidence that supports integrating smaller units of CHW in the area of TB and HIV services through establishing supportive structures and adequate supervisions (Uwimana, Zarowsky, Hausler, & Jackson, 2012; Uwimana, Zarowsky, Hausler, Swanevelder, Tabana, & Jackson, 2013). However, both studies acknowledged that obstacles such as inconsistent supply of commodities such as test kits need to be addressed to ensure increase uptake of HIV counselling and testing towards successful community-based interventions in TB-HIV management. WHO has endorsed home-based care and integrated TB-HIV management, especially for co-infected patients (WHO, 2012a). Implementing integrated home-based care for TB and HIV will require training of CHW and also improve collaboration between the community and health facility as well as strengthening of referral system (Howard & El-Sadr, 2010). Amo-Adjei and Awusabo-Asare (2013) noted that social interventions such as enablers' package, community participation in treatment and public-private partnership are important strategies towards better management of TB in Ghana.

The mobile phone is gradually emerging as an indispensable tool in the management of chronic diseases such as HIV/AIDS (Lester & Karanja, 2008). In a systematic review of studies on text messaging intervention to improve health or health related outcomes, it was evident that the use of mobile text messaging improved adherence to medication and treatment scheduled appointments between HIV patients and service providers, emphasizing the

feasibility of employing this strategy in the management of other chronic diseases that need long term management (Mbuagbaw, Mursleen, Lytvyn, Smieja, Dolovich, & Thabane, 2015). Similarly, Finitis, Pellowski and Johnson (2014) found that mobile text messaging can be useful in ART adherence among patients as it serves as a constant reminder. However, decrease frequency in text messages was associated with decrease adherence. The study, therefore, recommends the need for future research that will compare various design and intervention in order to establish how best to optimize efficacy. Even though evidence remained scanty in relation to mobile text message impacting positively on TB management, available evidence shows a possibility. A systematic review conducted by Nglazi, Bekker, Wood, Hussey and Wiysonge (2013) revealed that there is not enough high-quality data on the effectiveness of text messaging interventions for enhancing adherence to TB treatment. However, the study acknowledged the potential of mobile text messaging to improve patients' adherence to therapy.

In a cluster-randomised trial to evaluate the effectiveness of mobile text messaging and medication monitors to improve adherence to medication among TB patients, it became evident that whereas reminders from medication monitors significantly improved adherence with medication among TB patients, text messaging on the other hand does not improve adherence to medication (Liu et al., 2015). However, the possibility of mobile phone text messaging to enhance the quality and delivery of health care (ART and TB care), such as diagnosis, adherence to treatment, and data collection has been adequately documented (Free et al., 2013; Denking, Grenier, Stratis, Akkihal, & Pant-Pai, 2013). In a qualitative study conducted to understand

perceptions, attitudes and feasibility of Short Message Service (SMS) to improve TB treatment and adherence, it was revealed that the overall perception of patients regarding this intervention is positive. Consequently, mobile text messaging intervention is regarded as an efficient approach to improve adherence by way of simple reminders to patients (Albino, et al., 2014).

Furin, Akugizibwe, Ditiu, Gay, Palmero and Zaidi (2015) noted that in order to drive the world towards elimination of TB, existing strategies for halting the spread of TB has to be prioritised, implemented and scaled up especially in low and middle – income countries. These existing strategies include; active/intensified case finding, rapid diagnosis, post – exposure treatment, and early initiation of optimal treatment regime for all forms of TB (Theron et al., 2015; Yuen et al., 2015). A simple strategy for diagnosis based on symptoms if done correctly has the potential to yield significant results for diagnosis and referrals (van't Hoog et al., 2012). On the other hand, sputum-based diagnostic strategy has been found to miss a significant number of cases of TB, especially among those with active form of TB and HIV (Swindells et al., 2013). In effect, efforts have been intensified, especially in resource limited countries with regard to provision of point-of-care tests for the measure of HIV viral load, but this cannot be said about TB (Ritchie et al., 2014).

Resource-limited countries, especially in the sub-Saharan Africa region where TB and HIV remain a major public health concern will continue to require both technical and financial assistance in their quest to overcome the challenges pose by comprehensive TB service (Furin et al., 2015). Whereas

most of these challenges have been successfully overcome in many settings with regards to the provision of general HIV care, TB care and control among PLHIV still pose a greater challenge (Gupta et al., 2014). It is therefore imperative for policy makers and service providers understand and appreciate the reasons behind this disparity in the management of the syndemic even though integration has been proposed and implemented across a wide range of settings. Evidence suggests that high quality TB control strategies coupled with effective ART have been able to save many lives from being lost. It is now important to ensure that such quality services and treatment regimes are available to all persons living with HIV so as to ensure that people do not die of a syndemic which has received so much financial commitment and attention globally over the years (Furin et al., 2015).

Summary and Conclusion of the Systematic Review

The review revealed that even though there are international policies regarding management of TB and HIV, there is no consensus on the best time to start ART among TB patients co-infected with HIV. However, most studies have advocated for early initiation of treatment for both infections as early initiation of treatment has been found to be associated with better treatment outcome. MDR-TB and XDR-TB have received close research attention in recent years as the results of the difficulties involved in their management. Just like general TB infection, studies have revealed a synergistic relationship between MDR-TB, XDR-TB and HIV. Successful integration of TB-HIV services has been reported to be associated with better treatment outcome. However, studies have also reported some obstacles to TB-HIV service integration. These obstacles include; potential for stigmatization against

integrated facilities, fear of nosocomial transmission of TB to HIV patients, management of drug-drug interaction, and funding constraints.

Aside integration of TB-HIV services, some other innovative approaches have been reported to have been implemented across various settings. Some of these approaches include; Community Based Interventions (CBI), use of mobile phone technology to improve adherence to treatment regimen, and active/intensified case finding among other strategies. This review provides evidence to suggest that researchers and policy makers need to direct efforts toward studies on the integration of TB-HIV and treatment outcome while innovative strategies need to be assessed for viability and appropriateness in order to better manage the syndemic. There is also the need to further explore barrier to TB-HIV integration in sub-Saharan Africa and how to overcome these barriers.

Theoretical Issues

There is evidence in support of the important role theories play in the assessment of new interventions in health care delivery (Morden et al., 2015). Several theories have been used in either adopted or adapted format over the years to explain the implementation of interventions or innovations in the context of health care. In health care policy implementation, one of the theories that had gained attention in recent times is the Normalization Process Theory (NPT). However, other theories have also been used extensively by some researchers in assessing health care delivery. Some of these include; contingency theory, chaos theory, complexity theory, and four-factor theory.

Complexity Theory

Complexity theory is concerned with functioning and changes within a given system, beginning from the assumption that the field of healthcare delivery has become increasingly complex (Kernick, 2004; Kannampallil, Schauer, Cohen, & Patel, 2011). It is critical to observe, assess and improve systems or institutions as a whole rather than dividing it into individual components. Some researchers are of the view that complexity theory is not entirely a theory, but a group of concepts, heuristics and analytical tools that are related (Manson, 2001; Kannampallil, Schauer, Cohen, & Patel, 2011)

According to Manson (2001) complexity theory can be divided into two aspects; mathematical complexity and aggregate complexity. The mathematical complexity is derived from chaos theory and its corresponding mathematics. Aggregate complexity on the other hand is concerned with the relationships among various elements within a system, resulting in a complex behaviour (Manson, 2001). The mathematical complexity is regarded as quantitative while the aggregate complexity is viewed as a qualitative component of the theory (Kernick, 2004). Both mathematical and aggregate complexities have the potentials to provide meaningful insight into how healthcare system works in terms of implementations of new interventions (Litaker, Tomolo, Liberatore, Strange, & Aron, 2006). Complexity theory views hospitals and health institution organized around a specific disease (in this case, TB and HIV management) as “complex adaptive systems”. This complex adaptive system is a group of individual agents (specialized health workers in the field of TB and HIV management) whose actions are interconnected (Plsek & Greenhalgh, 2001).

The various units or components of a complex system continuously interact to achieve the desired result. These interactions among the various units are even more critical than the discrete actions of individual components (Sweeney & Griffiths, 2002). This is where TB-HIV service integration is very critical in the management of both diseases. As a result of the synergistic relationship between HIV and TB the WHO recommended TB-HIV service integration. This requires that HIV and TB healthcare and service providers interact to provide the best possible care for patients especially co-infected patients. Thus, the interaction between NACP and NTP is even more critical than the discrete actions of either of them. One suggestion of the complexity theory is that a comprehensive plan with distinctive objectives for units within the health care system rarely improves patients' care in a complex healthcare system. Thus the focus should be on the system (health care system) as a whole with a unique goal (in this case, effective management of TB and HIV) (Plsek & Wilson, 2001). Since units within a complex system are interconnected, a small influence in one part of the system may have a large effect on another unit. For instance, an effective management of TB and HIV will involve service integration (counselling, screening, diagnosis, referrals, treatment and management of both infections) into a system which will help reduce the burden of both diseases among the larger society. The theory thus emphasises that we need not to focus on a single unit of the system such as diagnosis, but all the other aspects involve in the treatment regimen.

The complexity theory offers an opportunity to understand how a complex system like healthcare operates and the need for individual units to interact in order to produce the desired result (effective management of TB

and HIV). Despite the theory offering a comprehensive theoretical base for studying new interventions and innovations in management and organization, it has received some critiques just like any other theory. In the view of Stacey (2000) complexity need to be applied authentically and not as a loose metaphor which seems to be the case among researchers that use the theory to study management and organizations. Thus, in order to understand the complexity in management, we need to conceptualize organizations as a dynamic and non-linear entity (Stacey, 2000).

Contingency Theory

Contingency theory posits that there is no one best way of doing things since the decision on how to organize will have to depend on the environment of the organization. The most appropriate design for an organization is the one that fits with the existing situation (Donaldson, 2001). The contingency theory sees the success or otherwise of an organization as being dependent on the fit that exist within the structure of the organization, the strategy and the size (Cakir, 2012; Grotsch, Blome, & Schleper, 2013). Once there is a high level of fit within the organization, it will translate into high performance. A cornerstone of the contingency theory is that in order to have a high-performing organization, structure must fit with critical contingencies like uncertainty, strategy, and size (Luo & Donaldson, 2013). When there is fit, it will help the organization to achieve its goals, including high performance. Therefore, the focus of organizational design is to identify misfits (in this case vertical management of TB and HIV) and modifying them into fits (integration of TB-HIV services). Misfits happen when the existing structural level does not match the structural level, which fits the contingency level.

Klass and Donaldson identified two types of misfits; under-fit and over-fit (Klass & Donaldson, 2009). Under-fit occurs when the actual structure is smaller than the structural level that is ideal for the contingency level. Over-fit on the other hand is when the structural level is bigger than the ideal structure for the contingency variable (Klass & Donaldson, 2009). Existing misfits within an organization's structure and its contingencies (strategy and size) will result in less performance. For instance, management of TB and HIV in Ghana was initially done through vertical programs. However, in the face of contingencies such as the synergistic relationship between both diseases (Harries et al., 2010), and the dwindling health financing in Ghana which rely mainly on donors (Amo-Adjei, 2014), integration of TB-HIV has been endorsed as the best way to manage the TB-HIV syndemic (WHO, 2012a). Thus, integration is regarded as the best way to manage TB and HIV in resource limited countries in the face of the prevailing contingencies.

Even though contingency theory offers a major framework for the study of organizational design and performance, its major challenge has been the critique that the theory is static and fails to acknowledge organizational changes and adaptation over time (Donaldson, 2001). When the theory was used by Amo-Adjei and his colleagues to study TB-HIV service integration, they concluded that institutional structures are not static as posit by the theory (Amo-Adjei et al., 2014), highlighting its limitation in relation to the study. The authors, however, acknowledged that the theory provides an important theoretical insight into the integration of disease control programmes.

Normalization Process Theory

Normalization process theory (NPT) is a set of interrelated sociological tools which are put together to help understand and provide explanation to social processes by which innovative or modified practices of idea, implementation and organizing work are carried out in healthcare and other settings (May et al., 2009). The NPT was developed between the year 2000 - 2009 to address the observed complexity involved in implementation and integration of new ways of health care delivery (treatment) within the healthcare system. Before the development of the NPT, other theories that were used to study health care interventions were seen as complex and often not practicable to use in real-world situations (Cook, O'Donnel, Dinnen, Coyne, Ruzek, & Schnurr, 2012), hence the development of NPT to help solve such complexities. The theory provides a simplified approach to assessing the use of evidence in health care interventions (Finch & May, 2009). It is an improvement on previous theories and draws extensively from existing empirical evidences, and offers a more dynamic and comprehensive assessment of key issues that are involved in the overall processes, from innovation to incorporating new interventions in everyday care.

The main tenet of the NPT is on collective, coordinated, and cooperative social activities to understand the agents (in this case healthcare providers for TB and HIV as well as TB-HIV co-infected patients) within the implementation process (May, 2013). The implementation processes are operationally through four related mechanisms; *coherence*, *cognitive participation*, *collective actions*, and *reflexive monitoring*.

The first aspect, that is coherence (sense making of TB-HIV service integration) deals with the agents involved (in this case, TB-HIV service providers) working together to achieve a common goal (in this case effective management of the syndemic). All actors are expected to work coherently based on specific guidelines so as to achieve the desired result. Agents individually and collectively will have to acknowledge that the integration of TB-HIV services is new, appropriate and will help them to manage TB-HIV cases effectively.

The second aspect which deals with “cognitive participation” (or how an intervention might fit into existing ways of service delivery) is concerned with defining and organizing actors to perform their new roles within a given institution. In this case, roles are spelled out clearly for both TB and HIV service providers. For instance, in a linkage model of service delivery, when a client is diagnosed with HIV, the NACP official is expected to refer the client to the NTP officials to test for TB. Thus, the various actors identified and agreed on their individual and collective roles in the new intervention.

The third aspect which is termed “collective action” is concerned with the enactment of the new intervention. This is where the roles, task and processes that are identified at the “cognitive participation” stage are put into action. Thus, individual and collective actions that are needed to ensure that the new intervention fits into the existing system so as to achieve the desired result. “Collective Action” is also referred to as the Normalization Process Model (NPM) and is made up of four sub-components; Contextual Integration (CI), Relational Integration (RI), Skill Set Workability (SSW) and Interactional Workability (IW) (May, 2006). The CI construct refers to the

immediate circumstances in which healthcare professionals and patients encounter one another in which treatment processes are operationalized. RI construct is concerned with the network of relations in which clinical meetings between healthcare professionals and patients are made, and by which knowledge and practice regarding treatment is defined and operationalized. It involves two aspects; accountability and confidence. SSW refers to the healthcare labour force (medical and paramedical) division of labour within a given health care facility. It also involves the mechanisms through which knowledge and practices about a complex intervention are disseminated. It is characterized by two dimensions; allocation and performance. IW construct is concerned with the capacity of a facility to understand and accept the allocation control and resources, including infrastructure to implement a complex intervention (in this case TB-HIV service integration for patients). It involves two dimensions; execution and realization (May, 2006).

The final stage, which is “reflexive monitoring” is concerned with defining and organizing the knowledge upon which appraisal is based. This process includes appraisal of the benefits of the new intervention at both individual and collective levels. Thus, it is the ongoing individual and collective assessment of the value of the new intervention or healthcare delivery, be it for TB-HIV co-infected patients or their own professional practice. Evidence from the literature suggest that periodic appraisals are very important since it will help bring to attention problems and challenges that need to be addressed in order to sustain the new intervention and also recognize the worth or otherwise of an intervention (May et al., 2009).

Extensive review of literature revealed that NPT has been employed in a number of health intervention studies and has proven to provide high-quality explanatory power for why new interventions have been successful or otherwise (Gunn et al., 2010; Bamford, Heaven, May, & Moynihan, 2012; Hooker, Small, Humphreys, Hegarty, & Taft, 2015; Morden et al., 2015). It is upon this basis as well as its relevance that the study adapted the NPT to help explore issues regarding TB-HIV service integration. Figure 1 is the diagrammatic illustration of NPT according to Morden et al, (2015).

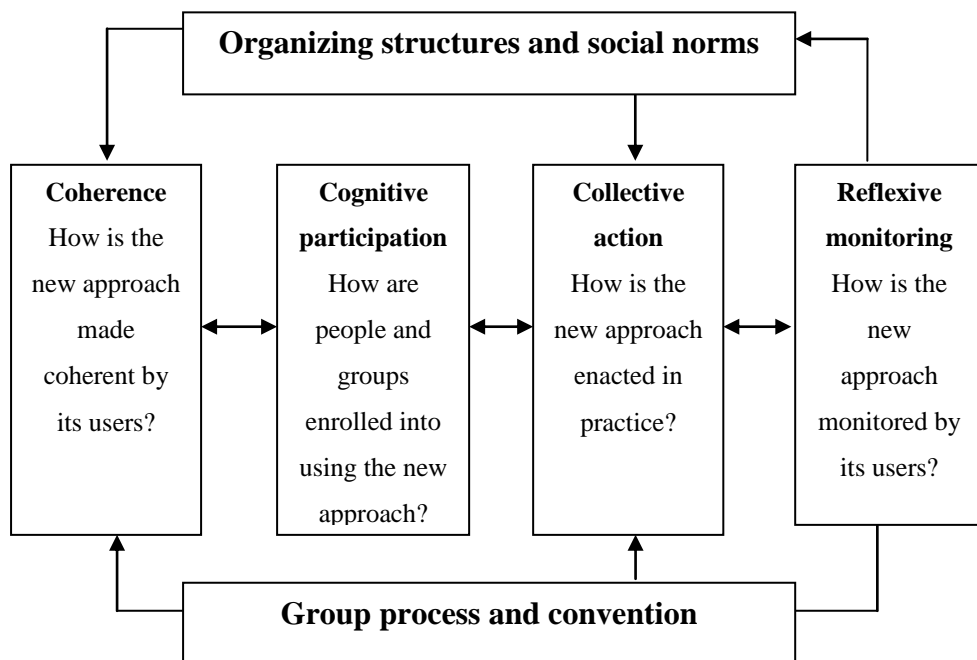


Figure 1: Normalization Process Theory (NPT)

Source: Morden et al., (2015).

The NPT has been adapted as a conceptual/theoretical framework for the study after an extensive review of theories related to health care delivery. This was informed by its relative advantage over other theories as far as the focus of this study is concerned. The theory has a starting point of understanding innovation within a given context. The decision to employ NPT

as a framework for this study meant that issues surrounding TB-HIV service integration can be explored extensively by using the various constructs of the theory.

In summary, NPT provides an excellent theoretical framework for the study as it was vital in the data analysis and the discussion of the results. The various constructs of the theory served as important tools in exploring, analysing, and understanding the issues surrounding TB-HIV service integration as well as the general management of the syndemic in the selected health facilities.

Figure 1 is a conceptual framework based on NPT by Morden et al. (2015). However, after an extensive literature review, the researcher decided to adapt the model by extension to provide a clearer picture of what constitute the various constructs within the model. A systematic review conducted by McEvoy and his colleagues on qualitative studies that used NPT as a conceptual framework, revealed that even though the theory offers a valuable framework to study interventions in healthcare, some researchers do not explicitly demonstrate what goes into the various constructs (McEvoy, Ballini, Maltoni, O'Donnell, & Mair, 2014). It has therefore become necessary for the researcher in this study to adapt the framework to better fit the study by explaining what constitute the various construct in relation to this particular study. Assessment of an intervention in healthcare has to produce a result. Therefore, I introduced an outcome construct “*S,*F” to depict success or failure. The adapted version of the NPT conceptual framework is presented diagrammatically in figure 2:

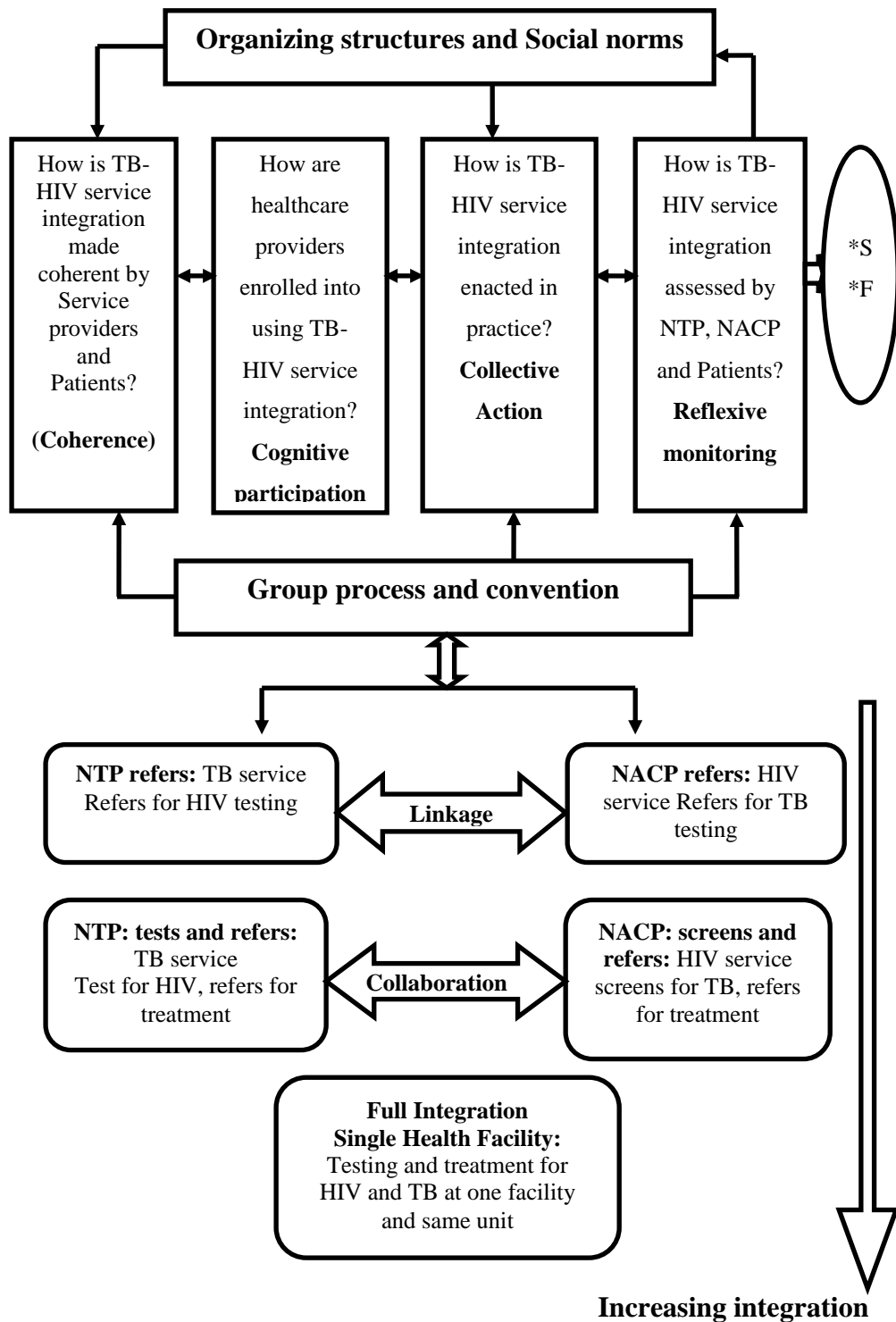


Figure 2: Normalization Process Theory (NPT)

Source: Adapted from Morden, et al., (2015).

CHAPTER THREE

RESEARCH METHODS

Introduction

This study sought to explore issues surrounding TB-HIV service integration towards effective management of the syndemic. This chapter is concerned with the various research methods and techniques that were employed in data collection as well as subsequent processing and analysis of the data. The chapter among other things includes; research philosophy, research design, study area, sources and types of data, sampling procedure, sample size and data collection instruments. Other issues that were also considered in this chapter includes; pre-testing, data collection procedures, data processing and analysis, ethical consideration and chapter summary

Research Philosophy

There are two dominant research philosophies in social sciences research; positivism and interpretivism. According to positivists, social phenomena and occurrences are often complex but could be overcome by reductionism which places emphasis on accurate measurements that will result in objectivity and reproducibility. As such, positivist researchers often use quantitative analysis, confirmatory analysis, deductions, and laboratory experiments as their methods of inquiry. However, due to the qualitative research method that was employed in this study, the focus has been on interpretivist paradigm.

Interpretivist Philosophy

The interpretivism research philosophy/paradigm emerged mainly as a critique of positivism. Qualitative research encompasses a wide range of research conventions, but often regarded as a shift from an “old paradigm” which is positivism to a “new paradigm” in research which include; interpretivist, critical, constructionist, feminist, and post-modern paradigms (Lincoln, Lynham, & Guba, 2011). Interpretivism is concerned with the centrality of meaning and understanding of the social world. Those who hold this paradigm are of the view that there is no universal truth. Thus, reality is socially constructed (Myers, 2009). Interpretivism can be looked at from three distinctive points of views; ontological, epistemological, and methodological (Iivari, 2007). Interpretivist researchers from the ontological point of view argue that there are multiple realities. As such, we cannot talk about objectivity and universally accepted reality. For radical interpretivists, there exists no reality outside of our social construction. There is no objective or universal truth, but rather contrasting views held by different people. Thus, people may share conflicting truths at the same time, but that does not necessarily make it objective.

From the perspective of epistemology, interpretivism is concern about the subjective theory of knowledge. There is no objective reality in our social world. Realities are constructed by social actors through social interactions and are subjective, multiple and context-dependent (Carson, Gilmore, Perry, & Gronhaug, 2001). Researchers are part of the study and as such cannot be separated from the study participants. The researcher and the study participants or objects of investigation are linked in such a way that meanings

that we ascribed to social phenomenon are central to how we understand ourselves and others through interaction (Black, 2006).

From a methodological perspective, interpretivism is concerned with qualitative methods which are vital in understanding how participants view a given social phenomenon (Myers, 2009). The use of qualitative methods helps to avoid researchers imposing meaning upon their research participants. A number of approaches such as participant observation, ethnography, and phenomenology are often used by interpretivist researchers. They also employed methods such as in-depth interview, focus group discussion, photography, and documentary analysis in their studies (Iivari, 2007).

The interpretivist paradigm assumes that social reality is created largely in the human consciousness as a creation of the mind. Based on this ideology, interpretivists disagree with the positivist paradigm by conceiving that knowledge or what constitute reality is subjective and natural. There is also the postulation that individuals are proactive in the creation of their own realities. Interpretivists are of the view that human beings participate freely in the creation and construction of social reality. This paradigm assumes ideographic position about science and therefore posits that epistemological ideas should not be informed by universal principles. As such, reality does not exist. What exist are individual interpretations about the social world and these interpretations are unique to the individual. Therefore, science should be based on subjectivity and what is unique to an individual in his/her creation and interpretation of the social world (O'Connor, Netting, & Thomas, 2008). Interpretivist researchers and scholars have relativist or subjective view of the social world. The methods of inquiry often employed by interpretivist

researchers include; exploratory analysis, field experiments, ideographic experiment, induction, and qualitative analysis (Ogilvy, 2006).

The two dominant paradigms; positivism and interpretivism in social science research have their respective advantages and disadvantages based on their unique viewpoints about our social world. Researchers adopt and align their studies with either of the two or both paradigms based on their methods of inquiry. In line with the qualitative method of inquiry adopted in this study, interpretivist paradigm is thus considered appropriate. Therefore, the various aspects of this work, especially the data collection and analysis are aligned with interpretivism paradigm due to the qualitative approach to inquiry that was adopted in this study.

Study Design

There are three dominant qualitative research designs in the social sciences. These are; grounded theory design, ethnographic design, and narrative research design. This study adopted a grounded theory research design and followed the “process approach” which is largely exploratory (Creswell, 2012). A grounded theory design involves a systematic, qualitative procedure that is used to generate a theory that explains, at a broad conceptual level, a process, an action, or an interaction about a phenomenon of interest (Creswell, 2012). However, the focus of this study is not to generate a theory, but to apply NPT to explore the issues surrounding TB-HIV service integration. A process approach in grounded theory research involves the researcher trying to gain meaningful insight of the sequence of actions among people and events regarding a substantive topic (Corbin & Strauss, 2008). TB-HIV management is a process that involves sequence of interactions between co-infected patients

and service providers. In line with the above and the qualitative method of inquiry that was employed in this study, grounded theory involving the process approach was adopted because the study sought to explore issues, including practices and experiences of health care providers and co-infected patients regarding TB-HIV service integration.

Study Area

The study was carried out in four regions of Ghana (Western, Central, Eastern, and Volta) among service providers as well as co-infected patients in the selected health care facilities. The four regions were specifically chosen because of the relatively high burden of TB-HIV in their catchment areas and their influences in policy implementation. In the Western region, facilities were selected from Takoradi, Kwesimintsim, and Essikadu. From the Central region, facilities were selected from the Cape Coast Metropolis. With regard to the Eastern region, which has the highest prevalence of HIV and also served as the first region to start ART in HIV management, facilities were selected from Koforidua which is the regional capital, and Agormanya which has the highest prevalence of HIV in Ghana. In the Volta region, facilities were selected from Ho, Kpando and Hohoe. In each of the four regions, at least a single facility was selected from the regional capital. Figure 3 is the map of the study area, showing the various study sites.

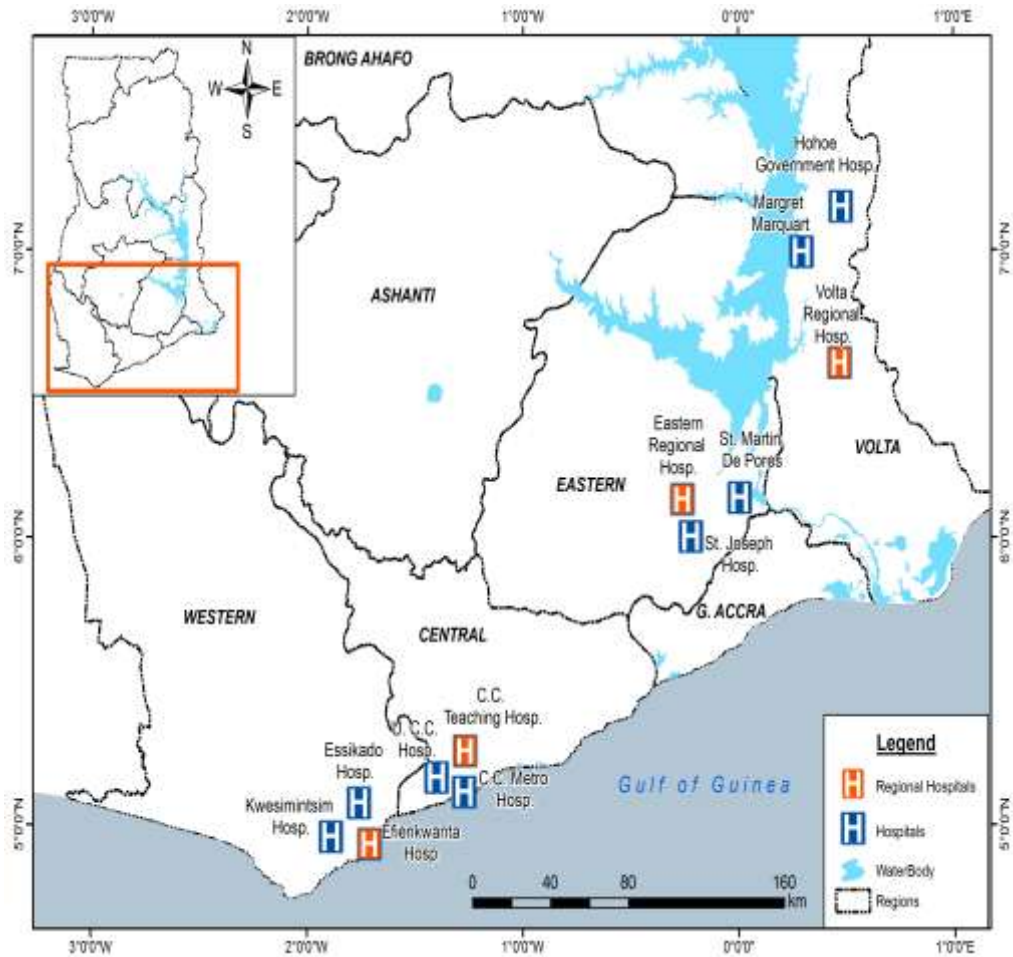


Figure 3: Map of the Study Area

Source: Department of Geography and Regional Planning, GIS unit, UCC (2016).

Sample Size

The study considered views from a total of 61 respondents; 31 service providers and 30 TB-HIV co-infected patients at various stages of treatment from the selected healthcare facilities in the four selected regions in Ghana. Informed by the principles of saturation in qualitative data collection, the sample size was not determined before the study, but evolved during the data collection (DiCicco-Bloom & Crabtree, 2006). In line with qualitative approach adopted for the study, a sample size of 61 was deemed appropriate

for the study. According to Morse (2015) there is no specific sample size for a qualitative study, but the sample may be informed by the kind of analysis the researcher intends to conduct in the study. However, a sample size of approximately 30 to 50 is considered appropriate and adequate for a good grounded theory research which will require both categorical and thematic analysis (Morse, 2015). The sample size that was employed in this study provided a dataset that was large enough to allow for a more rigorous analysis. It has been argued that qualitative inquiry can obtain an in-depth understanding of issues from a comparatively fewer respondents using the right methods (DiCicco-Bloom & Crabtree, 2006). According to Nicholls (2011) the relatively larger sample sizes employed in quantitative studies are geared toward generalizability of the results. However, the focus of qualitative study is not to generalize the results and so generalizability is not a relevant principle in qualitative studies. Qualitative research focuses on human experiences and is therefore more concerned with transferability as a way of validating findings (Nicholls, 2011).

Sampling Procedures

Purposive sampling was used to select participants with professional involvement in managing TB and HIV at the facility level in each of the selected regions. The rationale for employing purposive sampling in this study is based on the assumption that certain categories of people are critical for the study as they may have an important perspective on the phenomenon of interest (Mason, 2002; Robinson, 2014). Empirical evidence from the literature suggests that it is important to involve healthcare professionals to make inputs into interventions and also appraise new interventions, without

which interventions may fail (Bamford, Heaven, May, & Moynihan, 2012). However, this study also included views from co-infected patients as they are the direct beneficiaries of any interventions in health care delivery.

Respondents were drawn from selected health care facilities and are service providers under NTP and NACP in the four selected regions of the country. Respondents with long working experience with TB and HIV management as well as those who have been at the forefront of issues relating to TB-HIV service integration at the facility level were recruited for the study (see Robinson, 2014). Informed by maximum variation principle in purposive sampling (Patton, 2002), individual healthcare personnel occupying a range of roles (counselling, diagnosis, treatment, care, prescription, and dispensing of medicine) in TB-HIV management at the selected health care facilities were considered for the study.

The data collection took place in four regions (Eastern, Central, Western and Volta) of Ghana. Three health care facilities providing TB and HIV services were selected from each region. In each of the four selected regions, the regional hospital or a teaching hospital which is the highest point of referral was purposively selected and then the other two facilities were randomly selected. However, in the Eastern region which has the highest prevalence of HIV and TB, St. Martin de Porres Catholic Hospital at Agormanya was purposively selected in addition to the Eastern Regional Hospital due to its role in policy implementation in the TB-HIV management in Ghana. St. Martin de Porres Catholic Hospital was the facility where ART use was first piloted in Ghana and currently has one of the highest TB-HIV client-base in the country. In each of the three selected healthcare facilities in

each region, four respondents (1 NACP service provider, 1 NTP service provider and 2 co-infected patients) were selected. However, in facilities with full integration of TB-HIV services where a medical officer is in charge of both TB and HIV management, that medical officer was selected in addition to the institutional TB and HIV coordinators. Therefore, the total number of service providers interviewed summed up to 31 respondents.

With regards to co-infected patients, a total of 30 respondents were drawn from the selected health facilities across the four selected regions of Ghana. Two co-infected patients from each of the selected facilities were sampled. However, in some facilities (Cape Coast Teaching Hospital, Comprehensive Care Centre at the Effia Nkwanta Regional Hospital, and St. Martin de Porres Catholic Hospital at Agormanya) with large numbers of TB-HIV co-infected patients, the number of respondents interviewed was increased to 4 per facility. The respondents were TB-HIV co-infected patients at different stages of treatment and across various models of care; separation, linkage, collaboration and full integration.

Data Collection Methods

In order to dig deep into the issues, the study employed qualitative approach to collect empirical data and capture reality as experienced by the respondents (service providers and co-infected patients in the selected health care facilities) through their narratives of experiences, views and understanding of issues regarding TB-HIV service integration in their respective facilities in particular and Ghana as whole. Qualitative studies are largely descriptive and involve the collection and analysis of data that are concerned with meanings, beliefs, attitudes and experiences rather than

quantitative approach that requires numerical counts from which statistical inferences are carried out (Punch, 2005). Also, qualitative methods are considered appropriate when applying a theory to formulate a policy or an intervention as well as evaluating the success or otherwise of an intervention (May et al., 2010; O'Cathain, Thomas, Drabble, Rudolph, & Hewison, 2013). Since the focus of the study is to explore issues regarding TB-HIV service integration using normalization process theory (NPT), qualitative approach is thus considered appropriate for the study.

In the view of Ong and his colleagues, qualitative methods that are aligned with theories are appropriate and effective tools for accessing and responding to how healthcare professionals adopt an intervention in a given context (Ong et al., 2014). Since TB-HIV service integration is an intervention to ensure effective management of TB and HIV, qualitative approach is deemed appropriate to explore issues surrounding this intervention. The decision to incorporate the views of service providers in this study was informed by evidence from Malawi which indicated that the success or otherwise of patients benefiting from TB-HIV service integration depends largely on service providers (Kumwenda et al., 2011). However, patients' perspective was also included in order to help partially address the gap in knowledge since the few available studies conducted in Ghana did not include the perspective of patients. Therefore, data was drawn from a total of 61 respondents (31 service providers and 30 co-infected patients) from the selected facilities for the study. This method allowed for a comprehensive dataset to be obtained for the study. The distribution of the respondents by region and facility is presented in Table 1.

Table 1

Distribution of the respondents by region and facility

Facility by Region	No. of Service Providers	No. of Co-infected Patients.	Total
Eastern Region			
Eastern Reg. Hosp.	2	2	4
St. Joseph Hospital	3	2	5
St. Martin de Porres Hosp.	3	4	7
Central Region			
Cape Coast Teaching Hosp.	3	4	7
UCC Hospital, Cape Coast	2	2	4
Cape Coast Metro Hospital	2	2	4
Western Region			
Effia Nkwanta Reg. Hosp.	3	4	7
Essikadu Hospital, Sekondi	2	2	4
Kwesimintsim Hosp.	3	2	5
Volta Region			
Volta Reg. Hospital, Ho	3	2	5
M. Marquart Cath. Hosp.	2	2	4
Hohoe Government Hosp.	3	2	5
Total	31	30	61

Source: Fieldwork, 2016

Data Collection Instruments

Data were collected by in-depth interviewing of the selected respondents using interview guides. This enabled the respondents the freedom to address as many issues as possible regarding TB and HIV management in their respective health care facilities and Ghana in general. The instruments

were designed such that, the study participants would be able to share experiences about the phenomenon of interest, thereby depicting accurate reality as experienced by them (Wolgemuth et al., 2015; McIntosh & Morse, 2015).

Guided by the objectives of the study, two different interview guides (one for the service providers and one for co-infected patients) were used in the data collection. The first interview guide that was used to elicit views and experiences of service providers was structured into four main sections. The first section was concerned with background information on respondents. The background information among other things includes; sex, age, programme affiliation, qualification, working experience, and current position. The second section was concerned with questions that bordered on the benefits and barriers to TB-HIV service integration. Section three was concerned with questions that explored the views of service providers about the various models of TB-HIV service integration and their preferred model of integration. The fourth section is made up of questions that helped to explore views of service providers on some innovative ways to manage TB and HIV in Ghana.

The second interview guide which was used to collect data on co-infected patients consists of 4 main sections. The first section or section 'A' includes information on socio-demographic characteristics of the respondents. It included; age, sex, marital status, educational level, occupation, number of years living with both infections, and the number of years of accessing treatment for both infections. The section 'B' consists of questions that bordered on experiences and benefits of accessing treatment in the various

models. The section 'C' involved questions that elicit views on the challenges faced by co-infected patients in accessing care in the various models of integration. The last section which is section 'D' was concerned with discussions on patients' general view about TB-HIV service integration and whether they endorse it or not and how improvements can be made with regards to services rendered to them.

Pre-testing of Instruments

The semi-structured interview guide which was used for the data collection has been pre-tested in December, 2015 at the Catholic Hospital, Anfoega, after ethical approval was obtained from Ghana Health Service ethical review board. In the pre-testing of the instrument, three TB-HIV service providers and three co-infected patients were recruited. The Catholic hospital was specifically chosen for the pre-testing because it is one of the major healthcare facilities in the North Dayi Municipality where TB and HIV services were expected to be integrated. The health care facility also has similar characteristics in terms of institutional structure and service delivery to those that were included in the study. The pre-testing was done to correct errors and shortcomings that have been embedded in the instruments. Pre-testing of research instrument before going to the field was very critical as it helped to determine whether the questions were adequate enough to help achieve the objectives of the study. It also afforded the researcher the opportunity to see whether the questions are clear and the language used was appropriate to motivate participants to respond to the questions (Adams, Khan, Raeside, & White, 2007).

The interviews conducted during the pre-testing were transcribed verbatim. The transcripts were read through several times to allow for themes and categories to be generated. The results from the pre-test showed that the instruments have the potential to elicit vital data for the study. However, it was realized that the issues were entirely on TB-HIV management and do not include AIDS. As a result, appropriate adjustments were made in consultation with study supervisors to ensure that the instrument has the utmost potential to address the research questions and ultimately achieve the objectives of the study.

Data Collection Procedures

After a successful pre-testing and adjustment to the instruments in consultation with my supervisors, data collection was carried out in the selected health care facilities in the four selected regions between January to March, 2016. At each of the facilities, the TB or HIV coordinator looked through the register to identify co-infected patients at the various stages of treatment and they were contacted by phone. The purpose of the study was explained to them and their consent was sought. The first three or four patients who agreed to participate were recruited. In-depth interviews were conducted to obtain the experiences and views of the selected service providers as well as co-infected patients who were included in the study. The interviews were based on one-on-one interaction between the interviewer and each of the respondents. According to Creswell (2012), one-one-one interviews are useful when the phenomenon of interest is sensitive and it also offers the opportunity for respondents to ask questions and provide detailed information even beyond what the question demands. It also affords the interviewer the chance to probe

issues into details and sort clarifications to responses given by the respondents (Creswell, 2012).

The respondents were encouraged to give detailed narratives of their experiences regarding TB-HIV service integration. The respondents were accorded the freedom to express themselves in one-on-one interaction with the interviewer. The interviews were tape-recorded with each participant's consent while adhering to strict ethical issues that guide the conduct of research (Nordstrom, 2015). On the average, each interview lasted for 51 minutes. As a measure of ensuring reliability, after each interview process, the recorded audio was played back to the respondent to further agree on the issues and also make clarifications to some of the issues that could not come out clearly. The interviewer took written notes of all the clarifications that were made by the respondents.

Data Processing and Analysis

Data collected through tape-recorded interviews were transcribed verbatim to capture the exact responses from the research participants. After transcription and cleansing of the data, qualitative coding was then carried out. The coding process followed both deductive and inductive approaches to qualitative analysis, using inter-rater coding technique. I and my academic mentor independently coded the data at two levels. At the first level, where we followed inductive coding approach, the transcripts were read through several times and a number of themes and sub-themes were explored. We reviewed the codes obtained by each other. Subsequently, related themes and sub-themes were merged into the various categories. At the second level, we followed deducted coding approach where themes and categories that fell

under the key constructs of the Normalization Process Theory (NPT) that made up the theoretical framework for the study were adequately explored (Bernard & Ryan, 2010).

The analysis was done with the assistance of QSR NVivo 10 computer software for qualitative data analysis. The transcripts were read through several times while taking notes of key issues. Finally, themes and categories were developed using the “nodes” function of the software. The issues that made up the themes and categories were further analysed for commonalities, variations and disagreements (Morse, 2015). This was done by checking for some key words in the data that relate to specific themes and matching them against the context in which they were used with the help of the “Queries” functions of the software. The final topics that emerged from the analysis formed the bases for discussion of the results. The NPT, which was used in the building of the conceptual framework, also guided the analysis and discussion.

Ethical Considerations

A prior, free and informed consents were obtained from the various respondents before the interviews. An information sheet that includes a description of the nature of the study, duration of the study, potential risk, benefits and anticipated cost were made available to the participants to read and make a decision on whether to participate or not. In order to ensure confidentiality and anonymity, names of the study participants were not included in the demographic data and the researcher tried as much as possible not to use anything that will identify or link a specific respondent to a specific interview. Thus, the researcher maximized the protection of respondents’ identities while at the same time maintaining the worth and integrity of the

data (Saunders, Kitzinger, & Kitzinger, 2015). The respondents were adequately informed about their voluntary participation in the interview and were reminded that they were not obliged to respond to all the questions and can withdraw from the interview at any stage without a penalty. The audio-recorded interviews as well as the transcribed data were protected using *Folder Lock* computer software. The hard copy of the transcribed data was hidden from sight and access to it was restricted as much as possible. The data obtained from the respondents were solely used for academic purposes.

Ethical clearance was obtained from the Ghana Health Service (GHS) Ethical Review Committee (ERC) (approval ID number: GHS-ERC: 15/10/15) and the University of Cape Coast Institutional Review Board (IRB) (approval ID number: UCCIRB/CHLS/2015/10) before the field work. Permission was also sought from the various regional health directorates and the selected health facilities before the data collection. At the facility level, introductory letter from the Department of Population and Health, UCC and copies of ethical clearance notes were presented to the various authorities.

The design and writing of this thesis was in accordance with the various ethical standards regarding research. I thereby declared that I do not have any conflict of interest.

CHAPTER FOUR

RESULTS AND DISCUSSION

Introduction

This chapter deals with the results that were obtained from the analysis of the field data. The results of the study are presented based on the specific objectives of the study. The results were subsequently discussed and compared with existing empirical literature in the field of TB and HIV.

Socio-demographic Characteristics of the Respondents

A total of 61 in-depth interviews were conducted across four regions (Eastern, Central, Western and Volta) of Ghana. The respondents were made up of 31 service providers and 30 TB-HIV co-infected patients.

TB-HIV co-infected Patients

A total of 30 TB-HIV co-infected patients were drawn from the selected health facilities across four regions of Ghana. The respondents were patients at various stages of treatment for TB and HIV in the selected healthcare facilities across the various models of care; separate, linkage, collaboration and full integration. Twenty of the respondents have received less than one year of ART, with just one of them receiving more than five years of ART. With regards to the TB treatment, 21 respondents have received four to six months (continuation phase) of anti-TB treatment while only 5 respondents have received one to three months (intensive phase) of TB treatment. The summary of the background characteristics of the co-infected patients is presented in Table 2.

Table 2

Background Characteristics of the TB-HIV Co-infected patients

Background characteristic	Frequency	Percentage (%)
Co-infected patients		
Sex		
Male	10	33.3
Female	20	66.7
Age		
20-29	7	23.3
30-39	7	23.3
40-49	9	30.0
50-59	6	20.0
>59	1	3.3
Level of Education		
No Education	3	10.0
Primary	8	26.7
JHS	16	53.3
SHS	3	10.0
Religion		
Christianity	27	90.0
Islam	3	10.0
ART received		
< 1 year	20	66.7
1-2 years	4	13.3
4-5 years	1	3.3
>5 years	1	3.3

Table 2 continued

Anti-TB received		
1-3 months	5	16.7
4-6 months	21	70.0
>6 months	4	13.3

Source: Fieldwork, 2016

However, four respondents have gone beyond the six months TB treatment regimen due to either treatment failure or development of drug resistance. The respondents were made up of 67 percent females (20) and 33 percent males (10), between the ages of 23 to 60 years. The educational level of the respondents ranges from no education, which made up 10 percent (3) to Senior High School, which also made up 10 percent (3) of the respondents. None of the respondents had attained tertiary education. Twenty-six out of the thirty respondents indicated to have been employed in the informal sector, but had to stop working when their health conditions got worse. Fourteen of the respondents were traders, three were farmers, six of them reported being unemployed, and the remaining seven were involved in various informal jobs.

All the respondents were receiving treatment for both TB and HIV at their respective health facilities, with 67 percent (20) of them received less than a year of ART and only 3 percent (1) of them have received more than five years of ART. Seventeen percent (5) of the respondents were at the early stages (1-3 months) of anti TB medication whiles 70 percent (21) were on the verge of completing treatment (4-6 months) for TB. However, 13 percent (4) of the respondent have gone beyond the standard 6 months anti-TB therapy.

Service Providers

A total of 31 service providers were interviewed in the selected health facilities across the four selected regions in Ghana. The respondents were between the ages of 26 and 59 years with varied levels of experiences in TB and HIV management. All the respondents have at least three years of working experience in management of TB and or HIV with the most experienced service provider having 30 years of experience in TB and HIV management. Seventy seven percent of the respondents have between one to nine years of experience in TB and HIV management. The respondents occupied a wide range of positions in the management of TB and HIV in the selected facilities across the four selected regions in Ghana. They were made up of 36 percent Institutional TB Coordinators, 32 percent Institutional HIV coordinators, 16 percent Medical Officers, 3 percent Pharmacist, 10 percent Nurse/Counsellor, and 3 percent Laboratory Technician. The respondents were drawn from various health facilities including; Teaching Hospital, Regional Hospitals, Metropolitan Hospitals, Sub-Metro Hospitals, Municipal Hospitals, District Hospitals and Sub-District Hospitals across four regions of Ghana with various models of TB-HIV service integration (separate, linkage, collaboration, and full integration) under practice. The respondents were affiliated to either the National AIDS Control Programme (NACP) or National TB Control Programme (NTP) or both programmes in the case of facilities which are practicing full integration model. The summary of the background characteristics of the respondents is presented in Table 3.

Table 3

Background Characteristics of the Service Providers

Background characteristic	Frequency	Percentage (%)
Service Providers		
Sex		
Male	14	45.2
Female	17	54.8
Age		
20-29 years	7	22.6
30-39 years	11	35.4
40-49 years	6	19.4
50-59 years	7	22.6
Programme Affiliation		
NTP	12	38.7
NACP	13	41.9
NTP/NACP	6	19.4
Position		
TB Coordinator	11	35.5
HIV Coordinator	10	32.3
Medical Officer	5	16.1
Pharmacist	1	3.2
Counsellor/Nurse	3	9.7
Lab. Technician	1	3.2
Years of Work Experience		
1-9 years	24	77.4
10-19 years	4	12.9
20-29 years	2	6.5
30-39 years	1	3.2

Table 3 continued.

Facility		
Teaching Hosp.	3	9.7
Regional Hosp.	6	19.3
Metro/Municipal Hosp.	9	29.0
District Hosp.	3	9.7
Sub-Dist./Metro Hosp.	10	32.3

Source: Fieldwork, 2016

Views of co-infected Patients on TB-HIV Service Integration

The respondents endorsed the full integration of TB-HIV services as the most preferred model of care. Reduced financial burden and easy access to care for both infections were frequently mentioned as the reasons for their preference for full integration of services. Patients receiving care in a fully integrated system acknowledged that such a model of care is very beneficial as it provides them with the opportunity to receive comprehensive care for both infections in a convenient manner. Respondents who were receiving care in other models of care; separate, linkage, and collaborative systems also gave their preference for full integration.

The respondents (co-infected patients) unanimously endorsed the full integration of TB-HIV services where services for both infections are provided in the same facility, under the same roof thereby resulting in a “one-stop-shop” approach. One of the major reasons for their endorsement for full integration has to do with stigma and discrimination which most of them have to deal with on each visit to their respective health facilities for treatment and care. Aside stigma and discrimination, patients also acknowledged that full

integration of services will enable NACP and NTP officials at the point of care to work closely to enhance quality of care and also spare them the extra financial commitment that they have to fulfil in order to access care for both infections through multiple visits to the health facility every month. Co-infected patients see full integration of services as a mean to protect them from stigma and discrimination. This was what one of the respondents got to say concerning TB-HIV services:

“The one-stop-shop approach will be better. Far better! I will like that one so much [smile]. I will be much more comfortable with that... That will eliminate all the inconveniences I face in accessing treatment. It is not easy going there (facility where the patient is receiving ART) and then 3 or 4 days later, come here also for treatment. I spend so much money taking car from home to the hospital each time I’m coming for medication and already I don’t have money since I’ve stopped working for some time now due to my condition. If the workers [service providers] for both TB and HIV work together to take care of me, I think I will like it. I think I will prefer that one since I will just have to walk through once and then I get treatment for both infections” (27 year old co-infected patient, have been on ART for 8 months and been on anti-TB medication for 3 months, accessing care in the separate delivery model).

Similar sentiments were shared among the respondents across the various healthcare facilities in the various Districts. To buttress the above, another respondent shared similar view as:

... Because, I don't want to be moving "up-and-down" the various units for treatment. Having treatment at the same facility and under the same roof for the two [both infections] and on the same date will be comfortable for me. That will also give me the opportunity to discuss with them [service providers] about my condition regarding both infections and it will also give them the chance to discuss and agree on what to do for me. Yes! ... you know when we move in and out of the place [care centre] like that, people get to see us and gossip about us (37 year old co-infected patient, on the verge of completing TB treatment, have been on ART for 2 years).

With regards to respondents' general impression about the treatment and care currently being received at the various facilities, there was a mixed result. It was evident that whereas patients who are receiving care in fully integrated systems are satisfied with services rendered to them, others who are receiving care in either separate, linkage or collaborative systems share the view that there is more room for improvement. However, patients receiving care in these systems feel powerless to make requests for changes in the model of services even though they prefer full integration of services.

"It is ok. I think the service providers are trying their best... As for me, however and wherever they ask me to go, I shall go because I'm the one who is sick and require treatment. But I think if both services are provided in the same place whereby anytime I come to the hospital, they can treat me ones and the two sets of medicines are given to me, I will go home and use them. I think that will be a lot better" (46 years old co-infected patient).

The overwhelming endorsement of full integration of services among the respondents highlighted the perceived relative advantage of this model over the others. There is a substantial evidence elsewhere that suggest that integration of TB-HIV services are viable and has a positive effect on the management of TB and HIV as it has led to better treatment outcomes among patients (Huerga et al., 2010; Phiri et al., 2011; Uyei et al., 2011; Kerschberger et al., 2012; Hermans, et al., 2012; Patel, et al., 2013; Legido-Quigley et al., 2013; Ikeda et al., 2014; Owiti et al., 2015; Jacobson et al., 2015). With the ever increasing evidence in support of service integration, program managers at the national level need to show more commitment towards integration of services by addressing the remaining barriers to service integration.

One of the major reasons for which co-infected patients gave their preference for full integration of services is reduction and possible elimination of stigma and discrimination, which has been a major obstacle in the fight against TB and HIV in Ghana (Dodor & Kelly, 2010). In the context of the Normalization Process Theory (NPT), organizing structures and social norms which is one of the construct of the theory directly influence how new intervention (TB-HIV service integration, in this case) is made coherent by its users and at the same time directly influence how the new intervention is enacted in practice (Figure 2). Therefore, full integration of services if implemented very well will positively impact on TB-HIV management since it will help overcome stigma and discrimination (Ikeda et al., 2014). TB-HIV service integration is also cost effective (Ulher et al., 2010; Hyle et al., 2014). This is very important in the management of the syndemic, especially in resource limited settings like Ghana (Legido-Quigley et al., 2013).

With the endorsement of full integration of services by the direct beneficiaries of the services, efforts need to be intensified towards ensuring that all facilities providing TB and HIV services in the country are fully integrated. The call for full integration is even stronger in this study as patients receiving care in full integrated systems gave positive feedbacks about their experiences with the services rendered to them. Most of the patients mentioned convenience, easy access to treatment and protection of privacy as some of the benefits that they are currently deriving from accessing care in an integrated system. These factors are critical in treatment regimen and will go a long way to ensuring adherence to treatment (Munro et al., 2007; Dodor & Kelly, 2010). In addition, the result revealed theoretical evidence of *coherence*, which is critical in adoption of an innovation (Figure 2).

Views of Providers on Innovative Ways to Manage TB and HIV

Some important innovative ways to TB-HIV management identified from the data analysis include; intensified case finding, health education, and the use of mobile phone technology in TB-HIV management.

Intensified Case Finding

It also emanated from the data analysis that, respondents see “intensified case finding” strategy as a major intervention that has the potential to address the problem of missed TB case. Under this strategy, all units at the facility are expected to engage in screening for TB once they suspect someone to be suffering from the disease. Screening tool in a form of a questionnaire is made available to each unit in the facility to screen for TB. The respondents regard this strategy as a way of getting all staffs of the facility

involved in TB case detection and as such limit as much as possible the number of patients that might pass through the facility with TB without being detected. Respondents frequently mentioned poor case finding at the facility level as a major contributing factor to the high missed TB cases that we have in Ghana.

With a routine protocol that requires that all TB clients are also screened for HIV and vice versa before treatment commences, respondents see this strategy not to be only vital for the TB case detection but also diagnosis and treatment of HIV as well. Currently, intensify case finding is underway in most of the major healthcare facilities across the country. The respondents express the need for such strategies to be scaled up to include all health care facilities in the country. The following excerpt reflects the views shared by the respondents:

“In our facility now, if you go to almost all the units we have a questionnaire there for screening of patients. If you come and you cough, we screen you for TB and if you are eligible, we send you to the lab to do sputum test. We are doing a screening for almost all our clients. Even if the client coughs for less than two weeks and we have strong reason to suspect TB, the client has to go to the lab. So we’ve started doing the screening at every unit so that we can make the early detection and then treat them as early as possible” (28 year old TB coordinator with 3 years working experience).

Again, some respondents are of the view that this (intensified case finding) strategy need not to be limited to the healthcare facilities but also be extended to Pharmacies and licensed chemical shops. According to the

respondents, most patients often go to the chemist shops and pharmacies to get medicines for severe cough which may be early signs of TB. Training of attendants on the use of the screening tools at such medical outlets will help in early detection of clients who might resort to pharmacies and chemical shops for remedies to severe cough.

“The larger Pharmacies and Chemists Shops in town should be educated about TB and provided with screening tools so that when they suspect somebody of TB, they can quickly refer the person to the nearest health care facility for diagnosis and treatment. They can also keep a cough register. When a client comes twice or thrice with the same cough and the medicines sold to them are not working, they can send them to us to test for TB” (28 year old TB coordinator, working with the NTP for 3 years).

The Intensified case finding strategy is currently underway in some major facilities across the country. In the context of the normalization process theory, it is necessary that service providers accept that intensified case finding strategy is appropriate and will aid significantly in the management of the syndemic. In facilities where this strategy had been implemented, the respondents acknowledged its appropriateness and effectiveness. This is the first step towards successful implementation of an innovation in health care delivery. There was also evidence of coherence, cognitive participation and collective action (Figure 2) with regards to facilities that have implemented this intervention. The respondents indicated that, there were no difficulties in using the screening tools and also getting other staffs of the various

units/departments of the hospitals to adopt intensified case finding in their everyday service delivery and practices.

Studies conducted in South Africa revealed that intensified case finding provides opportunity for early initiation of TB treatment which is associated with significant reduction in HIV related TB morbidity and mortality and at the same time contributes to infection control at the health care facilities and the community at large (De Cock et al., 2009; Granich et al., 2009; WHO, 2009). Evidence suggests that, intensified case finding strategy is feasible and also associated with high case detection if appropriate mechanisms are employed in the diagnostic procedure (Balcha et al., 2014).

The existing TB-HIV management protocol, that requires that all TB cases are screened for HIV and vice versa need to be strictly followed (Durovni et al., 2013; Yuen et al., 2015). This will ensure that intensified case finding for TB will also result in HIV diagnosis and treatment for both infections in the case of co-infected patients (Furin et al., 2015). In Zambia, where scaling up of HIV testing for patients with TB has been reported to be successful, missed opportunities for HIV patients to be enrolled on ART was observed (Miyano et al., 2013). It is therefore imperative to ensure that cases are not only found, but also enrolled on a treatment regimen as early as possible (Yuen et al., 2015).

In all regions of the world, late diagnosis as well as late initiation of treatment regimen has been reported as a major cause of high morbidity and mortality among persons living with HIV (IeDEA and ART Cohort Collaboration, 2014; Siedner et al., 2015; Ford, Mills, & Egger, 2015b). WHO recommends that immediate initiation of effective TB treatment regimen

should be the priority in TB-HIV co-infected patients reporting for treatment (WHO, 2010b). There is a growing consensus that early case detection and early initiation of treatment for TB are very crucial in the effort to reduce mortality associated with TB and also reduce the spread of TB among HIV-positive patients (WHO, 2011; Bassett et al., 2012; WHO, 2013b). Early case detection of TB and HIV can be achieved through intensified case finding but efforts will have to be made to ensure that all cases that are detected are put on treatment as early as possible (Yuen et al., 2015). Again, this will call for proper integration of services so that co-infected patients can receive comprehensive care (Voss De Lima et al., 2013; Schulz, Draper, & Naidoo, 2013).

Health Education

Health education also emerged from the data analysis as a major strategy that has the potential to positively impact on TB and HIV management in Ghana. The respondents are of the view that unlike knowledge regarding HIV, which is very high, knowledge on TB leaves much to be desired. According to the respondents, community outreach programmes by the TB units of the various facilities has a higher potentials to reach the masses and help eliminate the problem of patients suffering from TB for several months without reporting to a healthcare facility for treatment due to ignorance. However, respondents express concerns about the inadequacy of funds to regularly embark on community outreach programmes to sensitize people about TB. Notwithstanding this, the respondents see community education as a key intervention in the management of TB. In the views of most of the respondents, it is almost impossible to embark on “intensified case finding” at

the community level. Therefore, the programmes have to rely on education, sensitization and behaviour change communication which can be achieved through community outreach programmes. This view was shared by most of the respondents across the various facilities. This is what one of the respondents had to say:

“I think we need to intensify our sensitization programmes. We need to regularly carry out education to the public on TB. Once the awareness level is high and anybody present signs and symptoms of TB, the person will immediately know what to do or others around him can advise the person on what to do. People out there in the various communities need to know a lot more about TB and must be alert to spot out a suspected TB person if they see one. This can be achieved through mass education programmes and community outreach which we sometimes do here in this hospital. I think we only need to intensify it” (26 year old Disease Control Officer /TB coordinator who have been working with the NTP for 3 years).

Health education which will encompass community outreach programmes is vital in the fight against TB since it has the potential to increase knowledge about the syndemic and also address misconceptions about TB (WHO, 2014b). This will go a long way in the fight against TB and HIV in Ghana as it will help patients to seek early treatment upon realization of symptoms (Amo-Adjei & Awusabo-Asare, 2013). Cost effective interventions such as health education will go a long way to helping WHO in its quest to end TB by 2035 (WHO, 2014b). This intervention, even though not new, has the potential to address the knowledge gap between both

infections at the community level. Elsewhere, the knowledge gap between TB and HIV have been documented, with knowledge regarding TB significantly lower than HIV and people still having several misconceptions about the disease (Wynne et al., 2012; Grut et al., 2015). Therefore, health education on TB and HIV through community outreach programmes is crucial in the fight against the syndemic.

Use of Mobile Phone Technology in TB-HIV Management

The use of mobile phone technology also emerged from the interviews as a key strategy that can be employed to address treatment interruption and default among TB and HIV clients who are receiving treatment. The nature of TB and HIV therapy is such that clients are required to take the medication regularly over a minimum of six months in the case of TB and lifetime with regards to HIV. Taking treatment or therapy over a long period of time may pose challenges to patients with regard to adherence to the treatment regimen. There is therefore the need to ensure that clients who are in treatment do not default or interrupt the treatment regimen in order to achieve better treatment outcome. With the ever increasing number of people with access to mobile phones in Ghana, it was evident that the respondents are of the view that this technology can be employed in our efforts towards effective management of TB and HIV in Ghana since treatment default has been identified as a major challenge in treatment regimen. One of the respondents noted:

“I think alarms can be activated on phones for patients who have phones so that it will serve as a reminder a day before their clinic day and also on the clinic day. It can also be put on the phones of the treatment supporters to remind the clients. Some of them, [patients] it

is not their fault because they have other things to do and may forget their appointment dates” (HIV coordinator, Male, 33 years of age).

It also became evident in this study that technology is an indispensable tool in the management of disease and can be employed in TB-HIV management to address treatment default and loss to follow-up. Treatment default remains a major obstacle in the management of TB and HIV due to long duration of the therapy regimen. The mobile phone is gradually emerging as an essential tool in the management of chronic diseases such as HIV/AIDS (Lester & Karanja, 2008). However, a systematic review carried out by Nglazi et al., (2013) revealed that there is not enough high-quality data on the effectiveness of text messaging interventions for enhancing adherence to TB treatment. The study, however, acknowledged the potential of mobile text messaging to improve patients' adherence to therapy.

In a more recent systematic review conducted on studies about use of mobile phones to improve health related outcomes, it was evident that the use of mobile text messaging significantly improves adherence to medication and treatment scheduled appointments between HIV patients and service providers, emphasizing the feasibility of employing this strategy in the management of other chronic diseases that need long term management like TB (Mbuagbaw et al., 2015). A qualitative study conducted to ascertain the feasibility of short message service to improve adherence to TB treatment regimen, it was revealed that the overall perception of patients regarding this innovation is positive. The study, therefore regards mobile text messaging intervention as an important approach that can be adopted by way of simple reminders to patients (Albino et al., 2014). The feasibility and effectiveness of

mobile phone intervention to improve maternal mortality in Ghana have been documented (Velez, Okyere, Kanter, & Suzanne, 2014; Amoah, Anto, Osei, Pieteron, & Alessandro, 2016). With this evidence, it is not out of place to suggest that the same intervention can be employed in TB-HIV management in Ghana to improve adherence to the treatment regimen and ultimately achieve a better treatment outcome.

Preferred Model of TB-HIV Service Integration

All the service providers interviewed in this study gave their preference for TB-HIV full integration model which will result in “one-stop-shop” approach. The respondents frequently mentioned that the synergistic relationship between TB and HIV provide a strong case for TB-HIV services to be fully integrated as it will provide the perfect opportunity for effective and comprehensive care for co-infected patients. The respondents also regard full integration of services as an opportunity to pool resources together in the midst of the dwindling finances. Service providers at the various points of care were willing to fully integrate services, but felt powerless to resolve the issue of clients using separate healthcare facilities for TB and HIV services. The following excerpt from one respondent echoed the views express by the service providers:

“The best approach is the full integration of TB-HIV services where the client will feel comfortable and assured that even with the dual infections, he/she can receive the needed services at the same facility or unit at a go without any stigma and discrimination and of course at a lesser cost. This is because if a client with dual infection is compelled to receive treatment at different facilities, the cost of transportation

moving between two facilities becomes a burden. Then also, there is too much time wasting since the client will have to be moving up and down. So, once we integrate services, we are able to reduce financial costs incurred by clients and also reduce time spent in access [to] treatment” (57 year old Medical Officer, Regional HIV coordinator and who have been in HIV and TB management for 26 years).

Despite the unanimous support for full integration resulting in “one-stop-shop” approach, two respondents even though endorsed full integration are of the view that, it will still not adequately solve the problem. According to them, apart from TB and HIV services being fully integrated at the unit level, they preferred HIV services to also be integrated into the mainstream services where HIV patients can walk into any consulting room and sees any medical officer on duty and will still receive adequate care. They are of the view that such an approach will ensure that all health workers at the facility will be actively involved in TB and HIV management and not only leave the provision of such services to clinicians who are assigned to the TB and HIV units. This is what one of them got to say when asked about the various models of TB-HIV service integration:

“Personally, I believe that we should have an integrated approach to TB and HIV [management] whereby every clinician in the country should be able to attend to TB and HIV clients from beginning to the end and be part of the team So I think the integrated approach will make it in such a way that everybody [every medical officer] is trained on comprehensive management of both infections... so that we don’t see TB and HIV management as sideline issues that are at a corner of

the hospital where unless you are attached to the unit, you don't have anything to do with TB and HIV [management]... Here, we are trying to make it a broader spectrum and we hope to continue to integrate it in order to get all clinicians and staffs involved in the management [of TB and HIV]" (Medical Officer In-Charge – Public Health Unit, Institutional TB-HIV coordinator for the past 8 years).

Contrary to the findings of Amo-Adjei et al. (2014), who reported some level of reluctance on the part of programme managers to endorse integration of TB-HIV service, this study revealed overwhelming support for full integration of services. It should however be noted that whereas Amo-Adjei and his colleagues limited their study to programme managers, this study was conducted among service providers at the point of care in the selected facilities and co-infected patients currently receiving treatment. With the ever increasing evidence in support of full integration of services coupled with its acceptance among service providers at the point of care (Miti et al., 2003; Kerschberger et al., 2012; Owiti et al., 2015), programmes managers at the national level need to show more commitment towards integration of services by addressing the remaining barriers to service integration (Amo-Adjei et al., 2014).

Barriers to TB-HIV Service Integration

A number of barriers emerged from the data analysis as hindering efforts to integrate TB-HIV services. The key barriers identified include; lack of commitment from programme managers and hospital authorities,

inadequate infrastructure, inadequate staff and DOT strategy in TB management, and issues relating to funding.

Lack of Commitment from Programme Managers and Hospital Authorities

Lack of commitment from NTP and NACP programme managers and hospital authorities emerged as a major barrier to TB-HIV service integration. In places where there is little or no collaboration between the TB and Counselling and Testing (CT) units, the respondents are of the view that their efforts are not yielding the desired result. According to them, even though patients could access treatment and care for both TB and HIV at the same facility, the two units are far apart from each other. This often poses challenges to both service providers and clients. The hospital authorities are however, not willing to commit resources towards integration of services. It was evident that in such cases, service providers are not able to effectively collaborate with each other to deliver the best possible care to patients. Aside diagnostic services where service providers at the TB units test their clients for HIV and those at the CT units also screen their clients for TB, there is no much collaboration when it comes to treatment and data management. The lack of effective collaboration beyond diagnosis poses significant challenges to both service providers and co-infected patients. This is what one of the respondents got to say when asked to comment on the possibility of full integration at the facility:

“Yes, it is possible! But our managers and hospital authorities always complain there is no money. It is very possible to do it because it is being done at other facilities. I had the opportunity to work at the 37 Military Hospital and other health facilities before... both TB and HIV

services are provided at the Public Health Unit... Here, the two units are far from each other and sometimes when you send patients to the other unit, they don't go and only turn around and go home" (31 year old service provider, working as TB coordinator for 5 years).

Policy document by the Ghana Health Service entreats all health facilities to integrate TB and HIV services by the end of 2015 (GHS, USAID-Ghana, QHP, 2007). However, scaling up of TB-HIV service integration in most of the facility is far from optimum. The respondents bemoan lack of commitment on part of the programme managers and hospital authorities as a major obstacle to the integration of services. This lack of commitment on part of programme managers has also been documented in Ghana by Amo-Adjei, et al., (2014).

In most sub-Saharan Africa countries where there are evidences of inadequate infection protocol, people are objecting to TB-HIV integration out of fear of nosocomial infection (Dong et al., 2007; Gandhi et al., 2009). Amo-Adjei (2013), noted inadequate coordination between NTP and NACP officials among other factors as barriers to effective TB control in Ghana. This undesirable situation has now reinforced the issue of full integration of TB and HIV services in order to ensure effective management of the TB-HIV syndemic. There is therefore the need to bring together managers from both programme to realize the need for service integration so as to show more commitment towards it.

Infrastructure

Infrastructure was also found to be one of the major barriers to TB-HIV service integration. Whereas service providers at the point of care view TB-HIV service integration as a way to maximize already scarce resources and ensure better management of TB and HIV, especially for co-infected patients, lack of infrastructure remains a major obstacle to integration of services. In most of the facilities where there is some level of collaboration between the CT unit (HIV unit) and the chest clinic/ TB unit, respondents are of the view that their efforts to collaborate very well is often hampered by the physical distance between the two units. Since the time that there was an urgent call for integration of services at the facility level, most facilities were faced with the challenge of synchronizing the activities of the two units.

TB service providers often complain about the state of the various TB units. Service providers are of the view that since most of the units were not specifically built for TB services, adequate provision were not made to ensure enough ventilation in order to protect service providers against possible infection. Aside possible infection to service providers due to the infrastructure, privacy and confidentiality were also raised as issues that hinder service integration in most of the facilities. The lack of appropriate infrastructure to provide TB-HIV services were expressed by almost all service providers delivering services in separate, linkage and collaborative systems.

“Inadequate infrastructure is our major problem in this facility. Housing these two units [TB and HIV units] at one place will help the system to improve. This is very necessary and for effective service

delivery, but as it stands now, we have the HIV unit as part of the Public Health Unit and the TB Unit is separated... Therefore, I think the most pressing need is the [provision of] TB-HIV unit which will be large enough to house both units to provide comprehensive care” (Institutional HIV coordinator, 39 years old with 8 years working experience as a coordinator).

The respondents emphasized the need to provide either of the two services (TB or HIV), taking into account the other due to the synergistic relationship that exist between the two infections. The respondents are of the view that TB and HIV services need to be fully integrated in order to deliver the best possible care to the patients. HIV clients need to be constantly screen for TB and not just the mandatory screening of the patients before treatment is ensured. In order to effectively do that, TB and HIV services need to be fully integrated where the two units will work closely to ensure effective management of the two infections especially with regards to co-infected patients. However, as it is the case in most of the facilities, TB and HIV units are not together and it is becoming a lot more difficult to follow the right protocol in the management of the syndemic. This is what one of the respondents got to say regarding the provision of HIV services taking into account TB:

“It is very important for us to consider TB when we are providing services for persons with HIV even if they don’t show any sign of TB. You know, TB and HIV are related and so if we are just treating a patient for HIV without screening for TB, we may be doing our best, but the patient may not be responding to the treatment because of the

TB... After the TB treatment, because the HIV is still there, the client may not recover fully and the TB might come back.... We are supposed to be working more closely with the TB unit, but we are not able to do so because the distance between the two units. I think integration was not considered when setting up the units” (29 year old Institutional coordinator with 4 years working experience).

Stigma within the health sector and the general public remain a major challenge in the fight against TB and HIV in Ghana (Dodor & Kelly, 2010). With stigma an important factor, any effort in the management of TB and HIV (two infectious diseases which carry stigma) must take into consideration protection of patients against stigma. Institutional challenges relating to lack of infrastructure in implementing TB-HIV collaborative services have been documented in other studies (Okot-Chono, Mugisha, Adatu, Madraa, Dlodlo, & Fujiwara, 2009; Njozing et al., 2011). Within the framework of Normalization Process Theory, it was evident that *organizing structures and social norms* are preventing TB-HIV service integration from achieving coherence and cognitive participation at most of the facilities. These two steps are critical in the successful implementation of any new intervention (Figure 2). Therefore, integration of TB-HIV services will have to be done in such a way that appropriate infrastructure are put in place so that issues relating to stigma and nosocomial infections are addressed to allow for integration of services.

With the elimination of stigma and the right infrastructure in place, TB-HIV integrated service will be made coherent by users (both service providers and patients) and there will be cognitive participation on the part of

service providers. In this study, both service providers and patients have given their preference for full integration (coherence), which is an important step towards adopting an intervention. However, it is important to note that in most of the facilities where full integration has not been implemented, the current infrastructure will make it very difficult for such a model of care to be put in place. Efforts will have to be intensified in order to provide modern infrastructure that will allow for full integration of TB-HIV services.

Inadequate Staff and DOT Strategy in TB Management

Despite the overwhelming willingness of service providers at the point of care to fully integrate TB and HIV services, they often feel powerless to resolving the problems of patients having to use separate facilities for TB and HIV services. One of the major issues that emerged from the data analysis with regards to barriers to TB-HIV service integration is the limited staffs that are involved in TB and HIV management. In both units (CT and TB units), the respondents emphasized shortage of staffs and workload as they are expected to provide both TB and HIV counselling services, diagnosis, data management, follow-up on patients, engages in community outreach programmes, and the general management of syndemic. As a result, the few service providers at the various facilities are expected to perform a wide range of duties which could ultimately result in inefficiency. Respondents also express concerns about the transfer of staffs from one Unit or facility to the other as it will require time for new staffs to be trained in the protocols for managing TB and HIV. As a result, some of the respondents suggested that TB and HIV management should involve all hospital staffs and not just limited to the staffs of the two units or the public health department.

With the increase in clientele base of the units, service providers are of the view that staff strength needs to be increased so that there will be division of labour which will ultimately lead to efficiency. Even the few facilities where services are fully integrated, respondents indicate inadequate staff, especially with regards to Medical officers. The respondents are of the view that inadequacy of staff, especially designated Doctors has potentially negative consequences on the management of the syndemic. The following quote by one of the respondents highlight the problem:

“Currently, our most pressing need with regards to TB-HIV service delivery is lack of clinicians [Medical Doctors]. We need at least one clinician who will be dedicated solely to TB and HIV services and will be available at all times to respond to the needs of our patients... Sometimes when our patients come around, they urgently need to see the Doctor but sometimes, it takes a long time for them to be attended to. We sometimes even have to reschedule a date for them to come and see the doctor. That is not the best.... This is our main problem currently in this facility. There is the need for our patients to regularly see the doctors for other conditions” (Institutional HIV coordinator/nurse, 29 years old with 4 years working experience).

The DOT strategy was also seen as an obstacle to patients receiving care in the integrated system. Even though service providers acknowledged the importance of co-infected patients receiving care for both TB and HIV at the same facility, they are sometimes left powerless to resolve the situation where patients have to use separate facilities for TB and HIV care. Under the DOT strategy, patients are required to receive treatment and care at facilities

that are closer to their communities. TB services are available in nearly all health facilities in Ghana but HIV services are still limited to major health facilities across the country. Therefore, if service providers have to strictly go by the DOT strategy, patients will have to use any facility that is closer to their place of residence for the TB treatment and then another facility for HIV services where it is not available in the facility providing the TB services. The following excerpt is a view shared by one of the medical officers interviewed:

I think here, the key thing is that TB is supposed to be DOT [Directly-Observed Treatment] so the clients are supposed to take their TB drugs as close to their homes as possible. Yet, the HIV medicines are not available at the facilities in the smaller communities. So what it means is that we have people here who have to receive their TB drugs in a small community somewhere, but still have to come to us for the HIV services. So it makes it such that it is difficult to have a one-stop-shop for them [co-infected patients]... Anybody outside our catchment area will have to take TB somewhere and then come to us for HIV treatment... The best would have been that they come to one place they get their HIV drugs and their TB drugs and then they go away” (49 year old Medical Officer/Institutional TB-HIV coordinator with 10 years working experience).

This finding is consistent with the finding of a study conducted in South Africa, where the authors identified inadequate health staffs with special interest in TB and HIV care, especially in the rural settings as a major barrier hindering TB-HIV service integration (Nansera et al., 2010). DOT strategy has been regarded as one of the most effective interventions in the global fight

against TB as it has helped to address treatment default and non-compliance (WHO, Stop TB Partnership, 2006). The DOT strategy requires that patients receive treatment at facilities that are closer to them as much as possible. The challenge here is that with the co-infected patients, ART are not available in every facility across the country. Whereas it will be easier for the patients to receive care for TB even at a health centre within the community, ART are not available in such facilities. In this case, integration of services becomes difficult and so patients are not able to receive comprehensive care for both infections. While there is the need for patients to receive care at facilities that are closer to them as much as possible under DOTS (Voss De Lima et al., 2013), efforts should also be made to decentralize ART to primary health facilities (Patel et al., 2013). Evidence suggests that decentralization of ART to include primary health facilities and local communities is associated with improved adherence to treatment (Suthar et al., 2014). With scaling up of ART to include primary facilities, co-infected patients can easily access treatment for both infections at facilities closer to their communities. However, issues relating to stigma will have to be adequately addressed through proper planning and provision of appropriate infrastructure (Njosing et al., 2011).

Funding

Funding issues also emerged from the data analysis as having effects on the activities of the two control programmes as well as serving as a barrier to integration of services. Whereas the respondents acknowledged the tremendous contribution made by donor agencies, especially Global Fund, they expressed concerns about the ever-dwindling of the funds in recent times. In recent times, some donor agencies like the Global Fund resort to giving out

funds for joint activities of Tuberculosis and HIV control with malaria being added in some instances. Such initiatives by the international organizations have reinforced the need to integrate services, especially at the facility level which will result in resource pooling. However, with the dwindling of funds in recent times and donors being specific with regards to how to use the funds, most facilities are not able to adequately integrate services. The issue here is that, in order to adequately integrate services, there is the need to invest in suitable infrastructure which will enhance collaboration between the two units. The two control programmes rely heavily on donor funding, but the donors often do not provide funds for infrastructure. This is what a 33 year old institutional HIV coordinator got to say:

“The issue is that, the programmes [NACP and NTP] rely heavily on donor funding to carry out their activities such as contact tracing, community outreach programmes and other activities. Now that the funding is no longer coming regularly, we are increasingly facing so many challenges... Another issue is infrastructure; where we can provide both TB-HIV services. This will require money, but the funds are no longer coming and even if they come, the donors are specific and often they are not concerned about funding for infrastructure. The hospital authorities are also reluctant in this regard”.

With the ever dwindling funds from the donor organizations for the running of the programmes, the respondents fear that donors might entirely pull out of making funds available for management and control of TB and HIV in Ghana. They highlighted that, several years of effort and hard work to ensure that TB and HIV prevalence in Ghana are put under check could go

down the drain if alternative arrangements are not put in place in time to guard against such occurrence. As such, respondents are of the view that public health activities for each year should be adequately covered by the Government of Ghana (GoG) through the Ministry of Health (MoH), so that funds can be made available for the programmes. Aside that, some respondents are of the view that individual institutions that are involved in TB and HIV management should also independently seek funds from other private organizations and institutions in order to fund their activities. According to the respondents, such a move will not only increase the funding base of the programmes, but also ensure continuity of the programmes in the event that the main donors pulled out in terms of supporting the programmes. The following quote highlights the sentiments shared by most of the respondents:

“My concern is that with regards to TB-HIV management in Ghana, even though a lot of efforts have been put into it, if we are not careful, things may get out of hand again. The programmes; NACP and NTP are too much donor-dependent and if we don’t take time, things might go wrong... We can easily collaborate with the telecommunication service providers like MTN and Vodafone so that the public is made to freely donate to the programme through texting or something like that to mobilize funds for the programme. So far, we rely heavily on “Global Fund” for our activities... So if we do that and the government also supports a little, with addition to what we get from the donors, we will be able to have more than enough to run the activities of the programmes. More importantly, if the donor support ends, the programme can still continue. The donors can decide to pull out in the

future. What then do we do?" (HIV coordinator, 33, has been working with the NACP at the facility for 5 years).

Respondents highlighted the dwindling nature of funds that are currently made available for activities of the two programmes. Funding constraints for TB and HIV control activities in Ghana due to over reliance on donors have been documented (Adjei, Nazzar, Seddoh, Blok, & Plummer, 2011; Amo-Adjei, 2013). The volatile nature of disease-specific funding due to priority setting and changing politics on the part of the donors makes overreliance on such funds a time bomb (Jenniskens et al., 2012). With this volatility in funding well documented, there is the need for countries such as Ghana to take appropriate steps towards finding alternative means of funding TB-HIV activities so as to secure the future of the programmes against possible withdrawal of current donor supports.

Health care financing in Ghana has largely been the responsibility of the Government of Ghana. However, a significant proportion of funds come from international donor institutions, especially for vertical programmes regarding specific diseases such as TB, HIV and Malaria. In the last decade, for instance, the Global Fund to fight AIDS, TB and Malaria (GFATM) has even made available much funding for the management of TB and HIV than the Government of Ghana (Amo-Adjei, 2014; WHO, 2015a). The dwindling funds from the donor organizations coincided with Ghana's attainment of lower middle income status. With the current situation where donors are increasingly reducing funds for the programmes, it is very important that the government and various health institutions will have to show more

commitment by looking at alternative means to fund activities of TB and HIV control programmes.

Experiences of co-infected patients with regard to access to treatment

It emerged from the data analysis that, the respondents have both positive and negative experiences with regards to access to treatment and care. Whereas co-infected patients have benefited from management protocol which requires that all patients who tested positive to either of the two infections are tested for the other, leading to TB-HIV diagnosis and treatment, respondents also had some bad experiences. Some of these bad experiences include; inconsistencies in therapy administration, separate clinic appointment dates for TB and HIV, late TB diagnosis and prolonged TB treatment due to drug resistance.

Treatment for TB Symptoms leads to TB-HIV Diagnosis and Treatment

It was evident from the analysis that most of the respondents could not tell when exactly they got infected with either HIV or TB. However, most of them reported having persistent coughs with occasional blood stains (major symptom of TB) but did not seek treatment until their conditions deteriorated. It was evident that the respondents do not suspect TB even though the signs and symptoms were present. In such cases, patients only reported to the health facility with complaints of cough before they are requested to produce sputum for TB testing. As a protocol in most health facilities providing TB and HIV services, patients diagnosed with TB is also required to receive counselling and testing for HIV. Therefore, patients' quest to seek treatment for persistent

cough often leads to TB and HIV diagnosis and treatment. The following quote by one of the TB-HIV co-infected patients highlight the above situation:

“... as for the HIV I don't really know. The sickness that brought me to this hospital was Tuberculosis. Even that one I don't really know. I have been coughing continuously for a very long time, so I came to the hospital and I received treatment with some medicines to take home. But when I went home, the cough persisted and even became worse. So one day I went to the Regional Hospital where the doctor asked me to go and have a chest X-ray. It was then that I was told that I had TB. I was then asked to go to CDC [Communicable Diseases Centre], and when I got there, they asked me about where I live. After that I was given a letter to come to this hospital for treatment. When I came, that was when I met the guy [Disease Control Officer] here and he told me that I need to go to the lab here for some blood tests before I begin the treatment. After I provided the blood sample, I was later informed that I had HIV too... I was then told not to worry and that, I can receive treatment for that one too here” (52 year old male co-infected patient, have been on HIV treatment for two years and anti-TB medication for seven months).

The diagnostic process of most of the respondents followed a similar pattern where persistent cough and significant loss in weight have led to seeking treatment primarily for the cough before being diagnosed with TB and HIV. However, few of the respondents indicated having been diagnosed earlier with HIV and have been on ART for a period of time before experiencing severe cough which has led to the diagnosis of TB. It is however

important to note that in two of such cases, the respondents indicated having interrupted ART for various reasons, before the onset of severe cough (TB) that lasted for a long time.

“I started the HIV treatment about 5 years ago, but it got to a point that anytime I take the drugs, I don’t feel fine; I feel so dizzy and weak. So I stopped! I stopped taking the drugs for 3 years but I felt sick and I was coughing badly so I came to the hospital for treatment... I started coughing since last year April [10 months preceding the interview]. After I delivered my baby somewhere last year, I complain of cough to the doctor and he gave me some cough syrup. But after using it, I still did not get better. The cough persisted and even got worse. So I came again before I was sent to the lab to produce sputum for testing. That was when I was told I have TB... That was when they got to know that I have not been coming for my HIV drugs. But I was told that if I stop, my health will deteriorate so I have resumed the treatment now” (25 year old co-infected patient, currently receiving treatment for both TB and HIV).

Patients only seek treatment for the severe cough when it has become unbearable as a result of the immunodeficiency brought about by the HIV infection. This is consistent with a study conducted by Ford et al., (2015a) in which they noted that TB patients often do not seek early treatment until their health deteriorate considerably resulting in TB being a major cause of admission among HIV positive patients. Delay and late diagnosis of TB due to patients not seeking early treatment for symptoms of TB has been adequately documented (Sreeramareddy et al., 2014; Ford, Mills, & Egger, 2015b).

Whereas the best time to introduce ART among TB-HIV co-infected patients remain uncertain (Uthman et al., 2015), it is however important to introduce treatment and care for both infections as early as possible (Luz et al., 2015).

In Ghana, as a protocol for TB and HIV management, all TB patients are required to be screened for HIV and vice versa (GHS, 2007). With this protocol in operation across all major healthcare facilities in the country, undiagnosed TB-HIV co-morbid clients who seek treatment for severe cough will end up being diagnosed and treated for both infections. There is therefore the need to adhere to the treatment protocol and also intensified case finding in TB management, which will not only result in the diagnosis of TB but also HIV in the case of co-infected patients.

Inconsistencies in Therapy Administration

Whereas co-infected patients who were receiving treatment and care in full integrated facilities did not mention any negative experiences directly related to the treatment and care they are currently receiving, those receiving care in other models (separate, linkage and collaboration systems) shared some negative experiences. It emerged from the data analysis that a major negative experience of co-infected patients receiving treatment was inconsistencies in therapy administration often emanating from delayed diagnosis of TB among HIV positive patients.

Most of the respondents mentioned being taken to the healthcare facility at a very bad state after several weeks of severe cough with blood stains in the case of some patients. Thus, TB among HIV positive clients are often diagnosed late due to conflicting instructions as TB and HIV services are not fully integrated and patients using two separate facilities for treatment and

care. In some instances, co-infected patients had to suspend ART for sometimes in order to allow for two weeks of anti-TB medication before resuming ART. In most cases, patients do not understand the dynamics of the treatments and as such do not know exactly what to do at the various stages of the treatment. The following excerpts illustrate an experience of one of the respondents [TB-HIV co-infected patient] who share similar experience with many others:

“... I usually go to [name withheld for ethical reason – a private facility about 3km from the District Hospital] for my HIV drugs. After some time, I started coughing and fell sick. When I reported to them at the St. Patrick Hospital, they were not able to actually tell [me] what was wrong with me until I came here [District Hospital] before they told me I was suffering from TB after I did some lab tests and X-rays. But when I started the TB treatment here [District Hospital] in addition to the HIV drugs, I started having problems... I reported here before they [service providers] told me to stop taking the HIV drugs and take only the TB drugs for now.... I did not also realized that I needed to come for medication again until this morning when I came here that they told me I should have reported last week. I did not understand the whole thing and now I’ve run out of the TB drugs. It is not my fault, because I don’t know” (59 year old male co-infected patient, living with HIV and has been on treatment for three years, one month into TB medication, receiving care in separate health facilities).

Another patient has this to say regarding experiences with accessing treatment for both TB and HIV in a collaborative system:

“I was given some medicines in a red sachet 10 months ago. I didn’t know it was a TB drug. I took it for 2 months and I didn’t come again. It was at the last clinic visit that I complain to the Doctor about cough before he said I should come here [TB unit]. It was then that I was told that I supposed to have continued with the treatment after the first two months. I didn’t know that I was supposed to continue” (50 year old co-infected patient, being on ART for three months now and have now resumed TB treatment in a collaborative system).

On the other hand, it was evident that patients who are receiving care and treatment in a fully integrated system are much comfortable with the services currently provided by the care givers. They are of the view that accessing treatment in an integrated system is very beneficial to them. The respondents frequently mentioned easy access to treatment for both infections and convenience in receiving treatment as some of the benefits derived from receiving care in a fully integrated system of care. All the respondents indicated that they have a regular supply of medication for both TB and HIV and feel motivated to continue the treatment regimen as they have seen significant improvement in their conditions so far. This is what one of the respondents had to say:

“Yes, it has afforded me the opportunity to get well again. Initially, I could hardly walk or talk to anybody but now the drugs have made me gain some strength. Since I’m able to get treatment for both the TB and HIV here, I like it so much because I don’t have to travel to another place [facility] in order to do so... Yes, I do get medicines anytime I come on my usual monthly clinic visit. There was no time that my

medicine got finished and I come to the hospital and was not able to get my medication. I always got access to medicine anytime I come... Yes! Since I'm getting better I want to continue to take the medicines so that I will even get better. I want to regain good health so that I can get something [work] to do and take care of myself.” (23 year old co-infected patient, have been on HIV treatment for a year now, and three months into TB treatment).

In India, Kapoor and his colleagues noted a complex pathway followed by TB patients before finally being put on anti-TB medication and in some cases, patients visited different facility rather than the facility that first diagnosed them with TB (Kapoor, Raman, Sachdeva, & Satyanarayana, 2012). In many resource-limited countries, HIV morbidity is poorly understood and as a result, missed opportunities exist due to poor diagnosis procedure (Ford et al., 2015a). In cases where TB-HIV co-infected patients have to use different facilities for care, the protocol for management is likely to be compromised either as a result of patients not providing adequate information to the service providers or service providers at the latter facility not linking up with the first facility for patient records before treatment is initiated (Voss De Lima et al., 2013; Wilkinson, Skordis-Worrall, Ajose, & Ford, 2015).

In Zambia, Miyano et al., (2013) observed that referrals for TB-HIV co-infected patients to access treatment and care for both infections still poses a major challenge due to poor linkage or integration of TB-HIV services. In cases where patients decide to self-transfer during ART without notice to service providers at the facilities where they are receiving treatment, there is the likelihood of inconsistency in therapy administration, especially when the

patient is newly diagnosed with TB (Wilkinson et al., 2015). This is where proper service integration is very important so that co-infected patients can receive quality and comprehensive care for both infections based on the existing treatment protocols (Haraka et al., 2015). Zachariah, et al., (2011) noted that vertical programmes which also include the use of separate healthcare facilities for TB and HIV management often result in ineffective management of both infections due mainly to poor case detection and delay in enrolling patients on the treatment regimen.

Evidence suggests that service integration will not only reduce mortality associated with TB, but also help fight TB among HIV-positive patients (Khan et al., 2012). It is however important to note that the success or otherwise of service integration in providing comprehensive care for patients, especially co-infected patients will depend partly on service providers and the level of coordination that exist between service providers responsible for TB and HIV management (Kumwenda et al., 2011). Patients need to be educated more on the dynamics of TB and HIV infections and the need to stick to one health care facility for all other health care services and not just for ART in case of HIV-positive clients. This will ensure that even if TB is later diagnosed in the course of ART, appropriate therapy can be delivered to the patient in an integrated system (Lessells, Swaminathan, & Godfrey-Fauseett, 2015).

From a theoretical perspective (see Figure 2), it was evident that coherence (sense making of TB-HIV service integration) was present among the service providers as they acknowledged the potentials of service integration to have a positive impact on the management of TB and HIV. However, there was less evidence of cognitive participation (or how TB-HIV

service integration fit into the existing ways of service delivery) as the existing infrastructure in most of the facilities could not allow for appropriate service integration. Aside the facilities where there is full integration of service, in other models of service delivery; separate, linkage and collaboration, it was evident that collective action regarding integration was poor. The inconsistencies in therapy administration, which emerged from the analysis is a manifestation that the group process and conventions in separate, linkage and collaborative models of care failed to provide comprehensive care for TB-HIV co-infected patients due to how services are delivered. Efforts should therefore be made to ensure that services are fully integrated.

Separate Clinic Appointment Dates for TB and HIV

The treatment regimen for TB and HIV take a longer duration compared to other infectious diseases, with HIV treatment being a lifelong regimen. It is therefore very crucial to ensure that patients feel comfortable in accessing care and treatment. It emerged from the data analysis that two different appointment dates were given to TB-HIV co-infected patients to access treatment and medication for TB and HIV. This issue was observed across all models (separation, linkage, collaboration and full integration) of integration. It was evident that individual patients were given a specific date to report for their HIV drugs and then a different date to report for their anti-TB drugs. Thus, for co-infected patients who are on treatment for both TB and HIV, a minimum of two visits have to be made each month in order to access care for both infections.

In the midst of the difficult financial situations that most TB-HIV patients found themselves, the respondents accentuated that such a service

delivery strategy exerts enormous pressure on the already limited finances. Patients are of the view that if service providers at the point of care (healthcare facilities) can work more closely so that a single appointment date can be given where care and medication for both infections can be accessed each month will be more beneficial. The following quote represents a concern raised by one of the respondents. This concern was shared by almost all the co-infected patients interviewed:

“My little problem is that I have different clinic days to come for the drugs. The sister at the down there [HIV unit] gave me a different date and those here [TB unit] also gave me a different date. You know [coughing] transportation is an issue and I have to come here twice every month to take the drugs” (46 year old co-infected patient, receiving care in a collaborative system, has been on ART for 3 months and anti-TB drugs for a little over a month).

To buttress this theme, another respondent who shares dissatisfaction with having to cope with two different appointment dates for TB and HIV services have this to say:

“It is good that I can access both the TB and HIV treatment here in this hospital... But my issue is that since I have resumed treatment for both the TB and the HIV, I have two different dates; one for the TB treatment and the other for the HIV treatment. If both of them can be put together for me, it will be of a great benefit to me. That means I will be able to save some money, which I would have used for transport. Already, I don't have enough money and I'm struggling with

finances” (50 year old male co-infected patient, have been on ART for 3 months and anti-TB medication for 3 months).

This challenging experience of having to deal with two separate appointment dates in order to access treatment for both infections was expressed by patients across all models of care. Even in fully integrated systems, patients are faced with the issue of having to come to the same facility at least twice in every month for treatment. Using the NPT framework, this finding demonstrates that, even in fully integrated systems which may have achieved coherence, cognitive participation and collective action have not been fully achieved due to lapses in the group process and conventions. This is evidence that the group process and conventions have not been adequately synced with management protocols under service integration (Figure 2). Since TB-HIV service integration is patient-centred and concerned with better management of the syndemic, measures should be put in place to ensure that with just a single visit in a month, co-infected patients can access both TB and HIV medication on the same clinic day. Again, this is where service providers under the two programmes need to collaborate more in order to ensure comprehensive care (Kumwenda et al., 2011).

In a study conducted in South Africa across various models of integration, it was evident that treatment outcomes were better when TB-HIV care and services were accessed from the same service provider and on a single visit each month (Schulz et al., 2013). It is therefore important for service providers to work more closely to ensure that co-infected patients who are receiving care in integrated system are given one clinical appointment date

for both services as it will go a long way to ensure adherence to the treatment regimen.

Late TB Diagnosis and Prolonged TB Treatment due to Drug Resistance

It was evident that diagnosis of TB, especially among HIV-positive clients was far from optimal. Service providers rely mainly on sputum microscopy and chest X-ray to diagnose TB. However, there appears to be a challenge; whereas sputum microscopy is available at nearly all healthcare facilities (hospitals) providing TB and HIV services, X-ray services along with other advance means of diagnosis such as GeneXpert are only limited to major healthcare facilities across the country. With the limitations of sputum microscopy well documented, service providers at the various facilities compliment it with chest X-ray in order to help find cases that might otherwise be missed by sputum microscopy. Smaller healthcare facilities providing TB and HIV services have to rely on nearest major health facility (Teaching, Regional or Municipal hospitals) for X-ray. In most cases, patients are referred to such facilities for chest X-ray. It however appears that some clients often do not go for the X-ray partly due to inconveniences brought about as a result of distance or financial commitments. This has often left both service providers and patients in a difficult situation and TB is only diagnosed at an advanced stage of the disease when patients become severely sick and weak. In HIV positive patients, this situation could lead to some devastating consequences. Below is an experience shared by one of the respondents:

“... For the treatment for HIV, when I was on the drugs, I felt very ok. I became well within a short time. I usually take the medication for 30 days. As for [the] TB, I have been coughing for so long but I did not

give any special attention to it ... I later suffered from severe cough again, this time I occasionally produced sputum with blood stain ... When I reported to them at [name withheld for ethical reasons – a relatively smaller Private facility] they were not able to actually tell [me] what was wrong with me until I came here [the Municipal Hospital] before they told me I was suffering from TB after I did some lab tests and X-rays” (59 year old male co-infected patient, receiving care in separate facilities).

The issue of treatment failure and MDR-TB among HIV-positive clients also emerged from the data analysis. The current treatment regimen that is available and being practice in Ghana require that TB patients go through a treatment regimen that is supposed to last for a period of six month; two months intensive phase and four months continuation phase. However, in cases where treatment have failed or patient develop resistant to any of the drug components, the patient is expected to go beyond the six months regimen and in some cases daily injection is recommended in addition to the daily pills. It was evident from the data analysis that some TB-HIV co-infected patients experienced treatment failure with regards to TB and in some cases developed resistance to the TB drugs. In such cases, patients were required to continue with the TB medication in addition to daily injection for an extended period. The following quote from one of the respondents highlights this situation:

“This is the second time I have to be on TB medication. At first, I was put on 6 months treatment and after completing the 6 months treatment, the final lab showed that it was negative but I was still coughing a little bit. So from time to time, I do report to the doctor and

I was given medicines to take home and be taking ... The cough still persisted and I didn't know what to do. It got to a point that the cough became severe again and I had to come back to the hospital for treatment. So it was then that I was put on the TB treatment again. So currently I am back on the TB treatment. It is about a month now since I started and this time I am taking injections every day in addition to the pills” (52 year old co-infected patient, have being on ART for two years, and anti-TB medication for a month, after initial six months of treatment).

This study revealed that the diagnosis of TB, especially among HIV-positive client is far from optimum even though there is a well-established protocol, which requires that all HIV-positive patients are screened for TB and vice versa. Most facilities heavily rely on sputum microscopy for diagnosis. However, the limitations of sputum microscopy in TB diagnosis in terms of its inability to effectively diagnose patients, especially those already infected with HIV have been documented (Getahun, Harrington, O'Brien, & Nunn, 2007).

With over reliance on sputum smear which is a relatively inefficient way of diagnosing TB among HIV patients, there is a greater chance of missed TB cases among HIV-positive clients (Balcha et al., 2014). There is therefore the need to move away from sputum smear to more advance means of diagnosis such as GeneXpert which is more effective in diagnosing TB, including the resistant strains (Boehme et al., 2011). The challenge here however is that, advance means of diagnosis such as Chest X-Ray and GeneXpert are only limited to major healthcare facilities due to the cost involved in securing such equipment. GeneXpert for instance is only available

currently in the Regional and Teaching Hospitals among the facilities visited. Service providers in the various facilities must therefore show more commitment and forge closer collaboration so that patients who need such services can still access them even if it is not available in their facilities.

This study has also pointed out evidence of MDR-TB among HIV patients who are currently on treatment. This finding concurs with the findings from a study conducted in Cambodia which reported evidence of a high proportion of MDR-TB among HIV-positive patients (Walls et al., 2015). There is therefore a growing evidence to suggest a synergistic relationship between MDR-TB and HIV. MDR-TB poses a greater challenge to the global fight against TB due to the complex nature of the treatment (Zulma et al., 2013; Heysell et al., 2016). However, a systematic review conducted to ascertain treatment outcomes for MDR-TB found no significant difference in the success rate of treatment between MDR-TB patients co-infected with HIV and MDR-TB patients in general, even though there was higher mortality rate among co-infected patients (Isaakidis et al., 2015).

Evidence points to high rates of MDR-TB, interruption of treatment regimen and high mortality among HIV-positive patients (Heysell et al., 2016). In spite of this, successful treatment of MDR-TB can be achieved through close collaboration among all stakeholders involved in TB management, but HIV is a major risk factor that contributes to unsuccessful treatment among patients (van Altena et al., 2015). There is therefore the need to also pay closer attention to ART among co-infected patients receiving treatment for MDR-TB as it has the potential to ensure a successful treatment outcome especially when initiated early (Mohr et al., 2015). Again, this is

where the full integration of TB-HIV services are critical so that the co-infected patients can receive quality and comprehensive care leading to effective management of the syndemic.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

This chapter presents the summary of the results of the study, the conclusions drawn based on the findings and recommendations. It also provides suggested areas for further studies in the field of TB-HIV management.

Summary of the Study

The main objective of the study was to explore issues surrounding TB-HIV services integration towards effective management of TB and HIV in Ghana. Specifically, the study was undertaken to:

1. Explore the views of co-infected patients about TB-HIV service integration.
2. Explore the views of healthcare providers on innovative ways to manage TB and HIV in Ghana.
3. Assess the preferred model of TB-HIV service integration from the perspective of service providers.
4. Examine the barriers to TB-HIV service integration from the perspective of service providers.
5. Examine the experiences of TB-HIV co-infected patients with regard to access to treatment.

Employing a qualitative approach to research, a total of 61 respondents (30 co-infected patients and 31 service providers) were interviewed in 12 different health facilities across four regions of Ghana. The analysis was done

with the assistance of QSR NVivo 10 computer software for qualitative data analysis and followed both deductive and deductive coding approaches. The results were based on the themes and categories that emerged from the data analysis.

Summary of the Major Findings

This section provides a summary of the study based on the major findings that were obtained from the study.

All the respondents (both co-infected patients and service providers) unanimously endorsed fully integrated model of TB-HIV service delivery. The co-infected patients frequently mentioned; reduced financial burden, easy access to treatment for both infections and protection against stigma as reasons for their preference for full integration of TB-HIV services. With regard to the service providers, they are of the view that the synergistic relationship between TB and HIV is enough reason to fully integrate services in order to provide comprehensive care for co-infected patients.

Service providers suggested intensified case finding, health education which will encompass community outreach programmes, and the use of mobile phone technology to add to the existing strategies in the management of TB and HIV in Ghana.

The key barriers to integration of services that have been identified include lack of commitment from programme managers and hospital authorities, inadequate infrastructure, inadequate staff and DOT strategy in TB management, and issues relating to funding.

The experiences of the co-infected patients were found to be both positive and negative. Whereas patients have benefited from management

protocol which provided opportunity to diagnose both infections, they also shared a number of bad experiences. Some of these bad experiences include; inconsistencies in therapy administration, separate clinic appointment dates for TB and HIV, late TB diagnosis and prolonged TB treatment due to drug resistance.

Conclusions

Based on the major findings of the study, the following conclusions have been made:

Various models of TB-HIV services exist across the country. However, most of the facilities have not fully integrated TB-HIV services. The respondents view full integration model as viable, appropriate and will ultimately result in better management of the syndemic and access to treatment and care.

Programme managers, especially at the national level and some hospital authorities have not shown enough commitment to ensuring that TB-HIV services are fully integrated. Co-infected patients and service providers at the point of care are however open to integration of TB and HIV services.

There are a number of barriers to TB-HIV service integration, which were examined in this study. TB-HIV service integration cannot be effectively implemented without addressing these barriers.

TB-HIV services as well as the general management of the syndemic in most of the selected facilities are far from optimal as evident in the negative experiences shared by most of the co-infected patients. However, there is a unique example of a full integration model in one of the study sites. Patients

accessing care in this facility highlighted positive experiences with regards to treatment and care.

Recommendations

Based on the findings and conclusions of the study, the following recommendations are made;

1. The GAC, GHS and other stakeholders have to sensitize programme managers for both TB and HIV (NTP and NACP), especially at the national level on the need to show more commitment towards integrating (preferably full integration model) TB-HIV services in order to help patients obtain the full benefits associated with it.
2. The GHS and NTP must ensure that, strategies such as intensified case finding and community outreach which are currently in operation in some facilities need to be scaled up to include all major health care facilities across the country. Efforts should also be made to improve upon diagnosis through the use of GeneXpert.
3. The GHS in collaboration with the NACP and NTP should put in the necessary resources towards building the capacity of DOT centres to also provide ART. This will provide opportunity for co-infected patients to access treatment for both infections as closer to their communities as possible.
4. Efforts should be made by all stakeholders, including GoG through MoH, the NACP, the NTP, hospital authorities, and donor organizations to address key barriers such as infrastructure and inadequate staff so that services can be integrated. The DOTS strategy

should also be reviewed with regards to co-infected patients to enable them access treatment for both infections at the same facility.

5. The Ministry of Health and NTP need to continue and if possible, intensify their education and advocacy on TB with emphasis on the fact that TB is curable and the need for people to seek early treatment.
6. Funding constraints for both programmes needs to be addressed. The GoG should show more commitment to the management and control of TB and HIV by making some funds available specifically for the two programmes. As it is now, the two programmes are over reliant on the dwindling donor funds. As a result, their activities, including efforts to integrate services are often hampered when the funds are not made available by the donors.

Suggestions for Further Research

1. This study has added qualitative evidence to the viability and appropriateness of TB-HIV service integration. There is therefore the need now to conduct a systematic review and meta analysis of studies that looked at treatment outcomes after service integration, especially in resource limited settings in order to establish the robustness of the evidence in support of service integration.
2. Studies should also be conducted to compare TB-HIV management (case finding, counselling, diagnosis, treatment initiation, adherence to treatment regimen) with treatment outcomes across the various models to ascertain the most effective model of integration for the Ghanaian setting.

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APPENDICES

APPENDIX A

**UNIVERSITY OF CAPE COAST
COLLEGE OF HUMANITIES AND LEGAL STUDIES
FACULTY OF SOCIAL SCIENCES
DEPARTMENT OF POPULATION AND HEALTH**

CONSENT FORM FOR SERVICE PROVIDERS

I am Prince Justin Anku an M.Phil student at the department of Population and Health, University of Cape Coast. As part of my academic work, I am conducting an exploratory study on **“Management of TB and HIV & AIDS in Selected Health Facilities in Ghana”**. In line with the study, I will like to interview you for some information concerning your experiences regarding TB-HIV services. Your participation in this interview is paramount to the success of the study. The information you will provide in this interview will be tape-recorded and later transcribed to be used for the analysis but you are assured of total confidentiality and anonymity. In effect, your name will not be included. The results of the study will be shared with participating health facilities. There is however no direct financial benefit for you for participating in the study. The study has no external or internal funding. You reserve the right not to respond to any question that you consider confidential and you are at liberty to back out of the interview at any point without any penalty. The interview process will take approximately 20 – 35 minutes. I therefore crave for your indulgence and co-operation in this interview by signing below if you

have read this information or it has been read to you and you agree to participate in this interview.

Thank you in advance.

.....

Respondent

.....

Facilitator

Date:

For any further clarifications you can please contact the following people

Prof. Akwasi Kumi-Kyereme

Dr. Joshua Amo-Adjei

Dept. of Pop. and Health, UCC

Dept. of Pop. and Health, UCC

Mobile: 0244255234

Mobile: 0504142130

E-mail: kumikyereme@yahoo.com

E-mail: joshua.amo-adjei@ucc.edu.gh

APPENDIX B

UNIVERSITY OF CAPE COAST

COLLEGE OF HUMANITIES AND LEGAL STUDIES

FACULTY OF SOCIAL SCIENCES

DEPARTMENT OF POPULATION AND HEALTH

CONSENT FORM FOR PATIENTS

I am Prince Justin Anku an M.Phil student at the department of Population and Health, University of Cape Coast. As part of my academic work, I am conducting an exploratory study on **“Management of TB and HIV & AIDS in Selected Health Facilities in Ghana”**. In line with the study objectives, I will like to interview you for some information concerning your experiences regarding TB-HIV services usage. Your participation in this interview is vital to the success of the study. The information you will provide in this interview will be tape-recorded and later transcribed to be used for the analysis but you are assured of total confidentiality and anonymity. In effect, your name will not be included. The results of the study will be shared with participating health facilities which may be used to improve upon the services rendered to you. There is however no direct financial benefit for you for participating in the study. The study has no external or internal funding. You reserve the right not to respond to any question that you consider confidential and you are at liberty to back out of the interview at any point without any penalty. The interview process will take approximately 20 – 35 minutes. I therefore crave for your indulgence and co-operation in this interview by signing below if you

have read this information or it has been read to you and you agree to participate in this interview.

.....

Respondent's signature

.....

Facilitator's

Date:

For any further clarifications you can please contact the following people

Prof. Akwasi Kumi-Kyereme

Dr. Joshua Amo-Adjei

Dept. of Pop and Health, UCC

Dept. of Pop. and Health, UCC

Mobile: 0244255234

Mobile: 0504142130

E-mail: kumikyereme@yahoo.com

E-mail: joshua.amo-adjei@ucc.edu.gh

APPENDIX C

UNIVERSITY OF CAPE COAST
COLLEGE OF HUMANITIES AND LEGAL STUDIES
FACULTY OF SOCIAL SCIENCES
DEPARTMENT OF POPULATION AND HEALTH

INFORMATION SHEET

Title of the study: Management of Tuberculosis and HIV in Selected Health Facilities in Ghana.

Introduction: I am Prince Justin Anku, an MPhil student of the Department of Population and Health, University of Cape Coast.

Address: Department of Population and Health. Faculty of Social Sciences, University of Cape Coast. PMB. University Post Office.
UCC – Cape Coast

Telephone: 0248419846 / 0500003459

E-mail: valjustin@gmail.com

Nature of research: As part of my academic work, I am conducting an exploratory research on “Management of Tuberculosis and HIV & AIDS in Selected Health Facilities in Ghana. This study is entirely an academic work and seeks to explore issues surrounding TB-HIV service integration towards effective management of TB and HIV in Ghana. In line with the methods for the study, I will like to interview you for some information concerning your views and experiences regarding TB-HIV integrated services.

Participant involvement

Duration: I will like to seek your views and experiences regarding issues surrounding TB-HIV service integration. The interview process will take approximately 20 – 35 minutes.

Potential Risk: Some of the questions may evoke emotions since you may be required to recall some experiences.

Benefits: The results of the study will be shared with participating health facilities. There is however no direct financial benefit for you for participating in the study.

Cost: The interview process will cost you approximately 20-35 minutes of your time.

Compensation: There is no financial or material compensation to be given to you as participant in the study.

Confidentiality: Since the study adopts a qualitative approach to research and the interview process will follow “one-on-one” approach, your identity will be known to the interviewer which is also the Principal Investigator. The information you will provide in this interview will be tape-recorded and later transcribed to be used for the analysis but you are assured of total confidentiality and anonymity. In effect, your name will not be included and there will be no traceable link with the data to you.

Voluntary participation/withdrawal: Your participation in this interview is entirely voluntary and you can withdraw from the interview at any stage of the interviewing process without any penalty. You reserve the right not to respond to any question that you consider

confidential. I however crave for your indulgence and co-operation in this interview.

Outcome and Feedback: The results of the study will be shared with all participating institutions. The audio-recorded interviews as well as the transcribed data will be protected using *Folder Lock* computer software. The hard copies of the transcribed data will be hidden from sight and access to it will be restricted as much as possible. The transcribed data as well as the entire data set will be destroyed as soon as the study is completed.

Funding: The study is entirely an academic work and has no internal or external funding. All expenses regarding the conduct of the study will be beard by the student who is the Principal Investigator.

For any further clarifications you can please contact the following people

Hannah Frimpong

GHS-ERC Administrator

Office Tel: +233 302681109

Mobile: 0243235225

Prof. Akwasi Kumi Kyereme

Dept of Pop. and Health, UCC

Mobile: 0244255234

E-mail: kumikyereme@yahoo.com

APPENDIX D

UNIVERSITY OF CAPE COAST
COLLEGE OF HUMANITIES AND LEGAL STUDIES
FACULTY OF SOCIAL SCIENCES
DEPARTMENT OF POPULATION AND HEALTH

In-Depth Interview Guide for Service Providers

A. BACKGROUND INFORMATION

1. Sex
2. Age.....
3. Type of facility: 1= Regional hospital 2= District Hospital 3=
Polyclinic 4= Clinic 5= Other [specify].....
4. Programme affiliation.....
5. Current Position.....
6. How many years all together have you being working as []
7. Have you ever had any in-service training, seminar or workshop on
TB-HIV management? **Probe:**
 - When was the last time?
 - What were the issues covered?
 - Was the training relevant? How relevant?

B. Barriers to TB-HIV service integration

8. I will like you to tell me about how you carry out service for
persons with TB taking into account HIV in this facility.
9. What are the guidelines for delivering services for TB-HIV co-
infected patients?

- Probe: Specific roles by NACP and NTP official/facility coordinators and other service providers
- What do you think about the nature of the working relationship between the two units? (**Ask in relation to the team members in case of full integration**)

Probe: Are you satisfied? Please give reasons

10. What can you say about the relevance/importance of providing TB services taking into account HIV?

- Probe but don't list! eg: Early initiation of treatment for both infections, adherence to treatment, reduced loss to follow up. etc

11. Can you please tell me about the current most pressing need of this facility with regards to TB-HIV integrated service delivery?

- Why is it the most pressing need?

12. What are some of the barriers to providing TB services taking into account HIV in this facility? Probe but don't list! eg: Inadequate staff, limited capacity (infrastructure) of the facility to provide integrated service, nosocomial infection, funding, conflict between NACP and NTP officials.

13. How do these barriers affect or hinder service delivery?

14. How can these barriers be overcome?

C: Preferred Model of Integration

15. Can you please tell me about how TB and HIV services are delivered in this facility or in the country?

16. Why this approach of service delivery?

17. What is your general assessment of TB and HIV service delivery in this facility

- What are some of the benefits associated with how you provide TB and HIV services? **(Both services providers and co-infected patients)**
- Can you tell me about some of the challenges you faced under the way you provide TB and HIV services?
- Do you think your clients (patients) are comfortable accessing care under your service delivery approach? - **Probe** for reasons if not given.

18. In your opinion, do you think the current mode of service delivery in this facility is effective enough to help you achieve the desired outcome of effective management of TB-HIV syndemic?

19. If you are put in authority, how would you want TB and HIV & AIDS services delivered in this facility or country?

- (Try tease out linkage, collaboration and full integration)
[Probe: viability, appropriateness and perceived benefits]

20. What is your preferred model of integration?

- Reasons for the preferred model of integration.

D: Innovative ways to manage TB and HIV in Ghana

21. Results of the recently conducted National TB Prevalence Survey showed that the prevalence of TB is 3 times what was estimated by WHO due to high number of missed TB cases. What in your view are some of the factors that account for this situation?

22. In your opinion, how can we reach, detect and treat all missed cases? Probe for:
- National level interventions
 - Community level interventions
 - Facility level interventions
23. Treatment default has been identified as a major challenge in the fight against TB and HIV in Ghana. In your view, how can we ensure that patients who are on treatment do not default?
24. There exist a significant disparity in the management of TB and HIV in Ghana with co-infected patients been worst affected even though service integration is expected to address that. In your view, what can be done to ensure comprehensive care for co-infected patients?
25. Do you have anything else to say generally about TB and HIV management in Ghana?

Thanks for your time and cooperation!

APPENDIX E

In-Depth Interview guide for co-infected patients

A. BACKGROUND INFORMATION

1. Sex
2. Age.....
3. Highest Level of Education attained.....
4. Religion.....
5. Occupation.....
6. Marital status
7. How long have you been living with HIV?
8. How long have you been living with TB?
9. How long have you been on HIV treatment?
10. How long have you been on TB treatment?

B. Benefits and experiences of patients regarding treatment and care

11. Can you please tell me how you access treatment and care for both infections?
 - Probe for experiences from diagnosis to treatment
12. Do you think accessing care in this manner is of any benefit to you?
 - Probe but don't list! Eg: Easy access, reduced financial burden, convenience
13. What is your opinion about how you access TB and HIV & AIDS services in this facility?
 - Probe for regular supply of medication
 - Motivation to continue/complete the treatment regimen
 - Reminder for next clinic day or visit

C. Challenges faced in accessing treatment

14. What challenges do you face when accessing treatment in this facility?
15. How can these challenges be overcome?
16. Do you think you have enough support from service providers to access treatment for TB and HIV? If not, what are the challenges you face from service providers in terms of accessing treatment?

D. General views about TB-HIV service integration

17. Before initiation of treatment regime, were you given adequate counselling about the nature of the treatment and what you are supposed to do during the treatment regime?
18. What is your view about the mode of service delivery at the facility where you are currently accessing treatment?
19. If patient is accessing treatment in linkage or collaborative system, ask about view on full integration system [*Where services for both infections are provided in the same facility, under the same roof “one-stop-shop”*].
20. If given the opportunity and freedom, how would you like to access treatment for both TB and HIV & AIDS? Probe for reasons?
21. What is your general impression about the treatment and care you are currently receiving in this facility?
 - Are you satisfied with the services? Why.....
 - If you are to request for any changes to the service delivery process, what would it be?
22. Do you have anything else to say about access to treatment and care for TB and HIV & AIDS? **Thanks for your time and cooperation.**

APPENDIX F

GHANA HEALTH SERVICE ETHICS REVIEW COMMITTEE

In case of reply the number and date of this Letter should be quoted.

*My Ref. :GHS-ERC: 3
Your Ref. No.*



Research & Development Division
Ghana Health Service
P. O. Box MB 190
Accra
Tel: +233-302-681109
Fax + 233-302-685424
Email: Hannah.Frimpong@ghsmail.org

11th December, 2015

Prince Justin Anku
University of Cape Coast
Department of Population Health
Cape Coast

ETHICS APPROVAL - ID NO: GHS-ERC: 15 /10/15

The Ghana Health Service Ethics Review Committee has reviewed and given approval for the implementation of your Study Protocol titled:

“Management of Tuberculosis and HIV & AIDS in Selected Health Facilities in Ghana”

This approval requires that you submit yearly review of the protocol to the Committee and a final full review to the Ethics Review Committee (ERC) on completion of the study. The ERC may observe or cause to be observed procedures and records of the study during and after implementation.

Please note that any modification without ERC approval is rendered invalid.


You are also required to report all serious adverse events related to this study to the ERC within three days verbally and seven days in writing.

You are requested to submit a final report on the study to assure the ERC that the project was implemented as per approved protocol. You are also to inform the ERC and your sponsor before any publication of the research findings.

Please note that this approval is given for a period of 12 months, beginning December 11th, 2015 to December 10th, 2016.

However, you are required to request for renewal of your study if it lasts for more than 12 months.

Please always quote the protocol identification number in all future correspondence in relation to this approved protocol

SIGNED.....
PROFESSOR MOSES AIKINS
(GHS-ERC VICE-CHAIRPERSON)

Cc: The Director, Research & Development Division, Ghana Health Service, Accra

APPENDIX G

UNIVERSITY OF CAPE COAST
INSTITUTIONAL REVIEW BOARD SECRETARIAT

TEL: 03321-33172/3 / 0207385653/ 0244207814

C/O Directorate of Research, Innovation and Consultancy

E-MAIL: irb@ucc.edu.gh

OUR REF: UCC/IRB/A/02

YOUR REF:



9TH MAY, 2016

Mr. Prince Justin Anku
Department of Population and Health
University Cape Coast

Dear Mr. Anku,

ETHICAL CLEARANCE -ID NO: (UCCIRB/ CHLS/2015/10)

The University of Cape Coast Institutional Review Board (UCCIRB) has granted **Provisional Approval** for implementation of your research protocol titled: **"Management of Tuberculosis and HIV&AIDS In Selected Health Facilities in Ghana"**

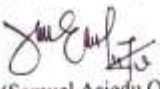
This approval requires that you submit periodic review of the protocol to the Board and a final full review to the UCCIRB on completion of the research. The UCCIRB may observe or cause to be observed procedures and records of the research during and after implementation.

Please note that any modification of the project must be submitted to the UCCIRB for review and approval before its implementation.

You are also required to report all serious adverse events related to this study to the UCCIRB within seven days verbally and fourteen days in writing.

Always quote the protocol identification number in all future correspondence with us in relation to this protocol.

Yours faithfully,


for (Samuel Asiedu Owusu)
ADMINISTRATOR

cc: The Chairman, UCCIRB

ADMINISTRATOR
INSTITUTIONAL REVIEW BOARD
UNIVERSITY OF CAPE COAST
Date: 05-05-16