FACTORS ASSOCIATED WITH TUBERCULOSIS TREATMENT OUTCOMES UNDER THE DIRECTLY OBSERVED THERAPY AT THE LA GENERAL HOSPITAL

BY

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THIS DISSERTATION IS SUBMITTED TO THE UNIVERSITY OF GHANA, LEGON IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTER OF PUBLIC HEALTH DEGREE

JULY, 2017
DECLARATION

I, Eunice Twumwaa Adwubi, confirm that this thesis presented for the degree of Masters in Public Health has been composed entirely by myself and that it has not been submitted, in whole or in part, in any previous application for a degree. Except where stated otherwise by reference or acknowledgment, the work presented is entirely my own.

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DEDICATION

This work is dedicated to: Linda Amponsah, my prayer is that this becomes a stepping stone for you to achieve more than I could ever do and to my mum Mary Ama Amponsah, who took me to school, and showered on me so much love. It is dedicated to Kingston Tagoe and Richard Amponsah for believing that I could achieve this.

It is also dedicated to Prof. Augustine Ankomah, Prof. Dorothy Yeboah-Manu, and Dr. Akosua Baddoo, who I have admired from a distance for their work in public health. I truly am grateful for your mentoring, guidance, advice and the many opportunities you gave. Someday, I will look back and realize that we made this world better, thanks to you.
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<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tr>
<td>TB</td>
<td>Tuberculosis</td>
</tr>
<tr>
<td>MDR</td>
<td>Multi Drug Resistance</td>
</tr>
<tr>
<td>XDR</td>
<td>Extensively drug-resistant</td>
</tr>
<tr>
<td>DOT</td>
<td>Directly Observed Therapy</td>
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DEFINITION OF TERMS

Tuberculosis patient: Any person clinically diagnosed with tuberculosis and has experience treatment in a health facility.

Directly Observed Therapy Short-course: WHO recommends strategy that emphasizes the use of most effective standardized, short-course regimen, and of fixed-dose drug combinations under observation to facilitate adherence to TB treatment and to reduce the risk of the development of drug resistance.

Treatment outcomes: End result of tuberculosis treatment

Treatment success: Sum of TB cured cases and those who completed treatment

Treatment completed: A TB patient who completed treatment without clinically diagnosis to prove treatment success of otherwise.

Multidrug resistance TB: Cases that are resistance to at least both isoniazid and rifampicin.

Cured: A pulmonary TB patient with bacteriologically confirmed TB at the beginning of treatment who was smear- or culture-negative in the last month of treatment.

HIV-positive TB patient: Person diagnosed of TB who has a positive result from HIV testing conducted at the time of TB diagnosis or other documented evidence of having being on HIV care.

HIV-negative TB patient: Refers to any clinically diagnosed case of TB who has a negative result from HIV testing conducted at the time of TB diagnosis.
**HIV status unknown TB**  Any clinically diagnosed case of TB who has no result of HIV testing or documented showing his or her enrolment in HIV care.

**Treatment failure:**  A TB patient whose sputum smear or culture diagnoses report is positive at month 5 or later during treatment.

**Defaulted:**  A TB patient who after registration had not collected drugs for 2 consecutive months or more.

**Died:**  A TB patient who dies for any reason during the course of treatment.

**Sputum Smear Microscopy:**  A method of TB diagnosis in which bacteria is observed in sputum samples examined under a microscope.

**Treatment supporter:**  A non-health worker who supervises a TB patients take his or her drugs

**Relapsed:**  A patient who was previously treated for TB and was declared cured or completed and is diagnosed again with TB.

**Adverse outcome**  TB treatment that was unsuccessful due to death, failure or default.
ABSTRACT

Background: Ghana is among the countries in Africa that is burdened with tuberculosis. Despite the tremendous improvement in tuberculosis diagnosis and treatment, patient related factors, healthcare provider factors and community factors have an influence on the desired outcome.

Objective: This research sought to determine the patient, community and healthcare provider factors associated with tuberculosis treatment outcome.

Method: The study adopted a mixed methods approach to collect data from participants at the La General Hospital. For the quantitative methods, total sampling technique was used to sample all tuberculosis patients folders registered under Directly Observed Therapy in 2016. Data extraction tool was designed and used to gather information on patient related factors. For the qualitative research method, purposive sampling technique was applied to select and interview ten tuberculosis patients, five healthcare providers and five community members (known as tuberculosis treatment supporters). Quantitative data was analysed using SPSS version 21 and summarized using frequencies and proportions. Contingency tables were used to test for associations between treatment outcomes and patient, healthcare provider and community factors. Simple and multinomial logistic regression was used to test associations at $p<0.05$. Framework analysis was adopted in analysing the qualitative interview data where emerging themes were identified and discussed in relation to existing theories. The analysis was supported by Nvivo software.

Quantitative Results: The quantitative results showed an association between HIV positive and unsuccessful treatment outcome (p <0.03, CI: 1.78 – 16.15). TB/HIV negative patients had greater odds of getting cured from TB compared with TB/HIV positive patients (OR: 0.001). There was no association between tuberculosis treatment outcome and distance, gender and age.

Qualitative findings: The qualitative study found both positive and negative perceptions of how patient, healthcare provider and community-related factors could influence tuberculosis treatment outcome.

Conclusion: The study concluded that of all the patient related factors examined, co-morbidity in respect of TB/HIV status had a significant association with treatment outcomes in the quantitative study. HIV-positive tuberculosis patients had greater chances of obtaining unsuccessful treatment outcome. However, socio-demographic factors, including age and gender were not associated with treatment outcome. For the qualitative study, the conclusion was that some patient factors and healthcare provider factors could have both positive and negative influence on treatment outcome. For the community-related factors, the study concluded that distance was not associated with treatment outcome when examined in the quantitative study. Besides, other community factors such as stigma and use of alternative treatment could have negative influence on treatment outcome.

Recommendation: The study recommends that health policy makers and practitioners should revise policies toward improving TB/HIV comorbidity treatment outcome in the search for strategies to control and manage tuberculosis.

Keywords: Tuberculosis; Treatment outcomes; HIV
CHAPTER ONE

INTRODUCTION

1.0. Background to the study

There has been a reduction in the number of deaths and incidence of tuberculosis (TB) since 2004. However, the epidemic is still a global threat to lives with increasing tuberculosis comorbidity and multidrug resistance (WHO, 2016). World Health Organization (WHO) reported about 1.8 million deaths resulting from TB, while about 10.4 million new cases of tuberculosis occurred worldwide in 2015 - 56 % men and 10 % children (WHO, 2016). Of these, China, Indonesia, Nigeria, India, Pakistan and South Africa contributed 60 % of the 10.4 million new cases of TB (WHO, 2016). Globally, the disease incidence declined by 1.5 % from 2014 to 2015 (Zumla et al., 2015a). Zumla et al. (2015a), report that despite the reduction, TB remains part of the top ten causes of mortality in the world. India, contributes more than one third of the world’s TB cases and deaths while Africa is severely burdened with TB/HIV co-infection (WHO, 2016).

TB is a communicable disease caused by Bacillus Mycobacterium Tuberculosis (Tipayamongkholgul et al., 2016). Usually, TB affects the lungs - Pulmonary TB, with a few instances of TB affecting other parts of the human body - extra pulmonary TB (Perrin, 2015). The disease is transmitted through airborne particles called droplet nuclei. Infected people release droplet nuclei into the atmosphere through coughing, sneezing and laughing (National Tuberculosis Control Program, 2014). However, not everyone who breathes in droplet nuclei
develops the disease. The bacilli are able to live dormant in the human body for many years and only resurface when the immune system is compromised (Ralph, 2017).

A TB patient can infect people if the condition is not treated (Ralph, 2017). Being exposed to the infection does not imply that an individual will develop the disease. However, it is estimated that out of 2-3 billion infected people, 5-15 % will develop the disease in their lifetime (WHO, 2016). The symptoms of TB include excessive weight loss, severe headache, chest pains, shortness of breath, night sweats and even death (Nliwasa, 2016). The disease poses an economic burden on families of TB patients and the country (Aggarwal et al., 2016).

The global community has made efforts to control TB and promote health. Such efforts include Bacille Calmette-Guerin (BCG) vaccination, introduction of anti-TB drugs, Directly Observed Therapy Strategy (DOTS), End TB strategy among others (Daniel, 2006; Zumla et al., 2015a). The BCG was widely used after the World War I in Europe and Ecuador (Daniel, 2006). The BCG has 60-80 % protective efficacy against TB in children who have not been exposed to TB infection (Roy et al., 2014). Subsequently, isoniazid (INH), rifampin (RIF), ethambutol (EMB) and pyrazinamide (PZA) have been introduced in the treatment of TB (Zumla et al., 2015b).

A self-Administered therapy approach allows patients to follow through medications unsupervised (Mohammadien & El-Baset, 2016). Consequently, patients were not able to follow the treatment resulting in drug resistance, treatment failure and relapse (Mohammadien & El-Baset, 2016). To control the adverse effect of non-adherence, World Health Organization and World Bank expanded the Directly Observed Therapy Strategy (DOTS) Short course in (Centers
for Disease Control and Prevention, 1994). Under the DOTS, health-care providers are responsible for the successful treatment, but not patients (McLaren, Milliken, Meyer & Sharp, 2016).

DOT also termed Stop TB strategy strives on five constituents: political assurance by governments, improved laboratory services, a constant supply of superior drugs, documentation of individual patients’ success and programme development towards set goals, and direct observation by a healthcare worker of each patient swallow tablets (Centres for Disease Control and Prevention, 1994). The WHO used the Stop TB strategy (DOTS) to achieve the Millennium Development Goal (MDG 6c), which was to end and reverse TB incidence from 2000 to 2015 (WHO, 2016).

In the era of Sustainable Development Goals (SDGs), WHO’s End TB Strategy has replaced Stop TB Strategy for the period 2016-2035 (Suthar, Zachariah & Harries, 2016). The SDG target 3.3 aims at ending TB epidemic by 2030 (Suthar et al., 2016). Although MDG6c has been achieved at the global level, some countries suffer increasing incidence and burden of TB (Zumla et al., 2015a). Africa’s population in 2014, was severely burdened by TB as 281 cases were recorded in every 100,000 population, compared to a global average of 133 cases per 100,000 population (Duru et al., 2015). Of the 9.1 million cases of TB and HIV co-infection, 7.1 million came from Africa, implying the severity of TB in Africa (Duru et al., 2015).

In Ghana, TB burden has equally been noticed (Mueller-Using, Feldt, Sarfo & Eberhardt, 2016). The nation adopted WHO’s DOTS in 1994 and obtained nationwide coverage in 2000 (Marfo,
2009). Despite this measure, in 2006, Ghana was ranked the 13th highest in estimated new cases in Africa (Ministry of Health, 2016).

A study conducted at the Accra Regional Hospital reported the proportion of patients who started treatment and were cured or lost to follow up, but not the factors that accounted for the treatment outcome (Afutu et al., 2012). Another study also investigated TB treatment outcomes at Sunyani Regional hospital (Dodor & Afenyadu, 2005) but no such study has been done at the La General hospital. Thus, there is the need to carry out the study at the La General hospital.

1.1. Problem statement

The National Tuberculosis Control Programme (2014) reported that there was an increase in TB cases from 2011 to 2013 in Ghana. The statistics showed that Ashanti Region had the highest number of reported cases (3,041) followed by Greater Accra Region (2,901). Furthermore, up to 2,400 cases in Accra were lost to follow up or defaulted in following up with treatment under DOT (National Tuberculosis Program, 2014). The Greater Accra region recorded 48 % of its target in 2013 (Tuberculosis Control Program, 2014).

The question is: what could possibly be accounting for these rises? One reason could be that although the number of cases reported in health facilities keeps rising, a considerable number is lost to follow-up (Tuberculosis Control Program, 2014). Some researchers attribute it to the fact that patients do not take their drugs while others default (abruptly stopping the medication)
during TB treatment (Dodor & Afenyadu, 2005). A study conducted at the Accra Regional Hospital showed a high defaulter rate and a significantly lower cure rate (Afutu et al., 2012). Thus, out of 84 laboratory confirmed TB cases at the Accra Regional Hospital in 2009, 32 did not start treatment. Among those who started treatment, 43 % was lost to follow up (Afutu et al., 2012). Generally, problems associated with TB treatment outcomes could be discussed under patient factors, healthcare provider factors and community factors (Muture et al., 2011; Finlay et al., 2012 Abdelhadi et al., 2015).

There are known patient factors associated with TB treatment outcomes including: HIV co-infection, ignorance, patients' knowledge of TB, smoking and alcohol abuse (Abdelhadi et al., 2015; Vasankari et al., 2007; Biadglegne et al., 2013; Patra et al., 2014).

Healthcare provider related factors known to be associated with TB treatment outcomes include attitudes of healthcare providers, inadequate counselling, waiting time and delayed laboratory test report (Finlay et al., 2012; Muture et al., 2011; Oladimeji et al., 2013; Ibrahim et al., 2014; Loveday et al., 2014).

Similar to other African countries, the reasons accounting for the problem have been associated with community related factors (Muture et al., 2011). In South Africa (Finlay et al., 2012), Pakistan (Walley et al., 2001), Kenya (Muture et al., 2011), and Nigeria (Oladimeji et al., 2013),
community related factors known to have caused non-adherence to DOT treatment include; stigma, beliefs concerning TB and family support.

Known therapy related factors associated with tuberculosis treatment outcomes include adverse side effects of TB drugs, sputum conversion time and type of infection, whether it is MDR, XDR among others. In Canada (Yee et al., 2003), Europe (Leimane et al., 2005), and Peru (Furin et al., 2001), adverse drug side effect is associated with treatment default and death. A study by Orenstein et al., (2009) reported on adverse side effect and its effect on TB treatment outcomes. The gaps in the literature were somewhat filled in the present study through a mixed method design.

1.2. Justification of the Study

Tuberculosis treatment default contributes to the rising incidence of multiple drug resistance (MDR) in the world (Gandhi et al., 2010). MDR cases take longer time (8 to 12 months) to treat and are relatively costly (Zumla et al., 2015a). It is estimated that 480 people around the globe developed multi-drug resistance in 2014 (WHO, 2016). To reduce the incidence of MDR cases, patients must adhere to treatment. Surprisingly, patients continue to default even under the supervision of health practitioners (Finlay et al., 2012). Afutu et al., (2012), reported the number of TB treatment defaulters at the Accra Regional Hospital in 2009. However, the researchers did not report on the patient, community and healthcare provider factors accounting for the increase in TB treatment defaulting. Indeed, these gaps have to be addressed accordingly. Identifying patient related factors (Finlay et al., 2012), for example, how patients’ lack of understanding of
TB as a disease contributes to defaulter rate in the community will help policy makers and healthcare providers to develop strategies to resolve the problem. Thus, this study will address this gap in the literature since earlier studies have not addressed this issue at the Accra Regional Hospital (Afutu et al., 2012).

Admittedly, reducing TB defaulter rate will save the nation the economic burden involved in MDR management (Gandhi et al., 2016), inform policy and practice, and finally translate into reduction in the rate of tuberculosis default in Ghana. However, this will be difficult to achieve if efforts are not made to identify how healthcare provider factors, such as lack of cordial relationship among them and patients, contribute to TB treatment defaulting at a health facility like the Accra Regional Hospital. This study will help to provide some clues to such factors since few studies that have investigated these factors were conducted outside the shores of Ghana (Finlay et al., 2012; Oladimeji et al., 2013).

Understanding how community factors, for instance, stigma and lack of support contribute to TB treatment defaulting will help to strategically, position the National Tuberculosis Programme (NTP) to address the condition by adopting context specific approaches to treatment. Although earlier studies had assessed the community factors accounting for TB treatment defaulting in other African countries (Muture et al., 2011; Abdelhadi et al., 2015), no study has yet examined these factors at the La General Hospital. Hence, the purpose of this study is to unravel how such factors could be accounting for TB treatment outcomes at this hospital. Generally, the findings
will contribute to how new policy paths could be charted in addressing undesired TB treatment outcomes as well as filling the gaps in the literature.

1.3. General Objectives

To determine the factors associated with tuberculosis treatment outcomes at the La General Hospital.

1.3.1. Specific Objectives

1. To examine patient related factors associated with TB treatment outcomes.

2. To investigate healthcare provider factors associated with TB treatment outcomes.

3. To explore community related factors associated with TB treatment outcomes.

4. To identify the side effect of drugs on TB treatment outcomes.

1.3.2. Research Questions

1. What are the patient related factors associated with TB treatment outcomes?

2. What are the healthcare provider factors associated with TB treatment outcomes?

3. What are the community related factors associated with TB treatment outcomes?

4. How does the side effect of drugs affect TB treatment outcomes?
1.4. Outline of the Dissertation

The dissertation is presented in six chapters. Chapter one presents the introduction to the study where the background, problem statement, justification, general objective, specific objectives and research questions are presented. Section two presents discussion of the literature, theoretical model and conceptual framework guiding the study. Chapter three is where the methods applied to collect data for analysis are presented. Chapter four presents the results of the study after data analysis. Chapter five is where discussion of the results and findings of the study are related to existing literature and theoretical model. Chapter six presents the summary, conclusions and recommendations of the study. Here, limitations to the study and directions for future research are also presented.
CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter presents a review of related studies on the key concepts of the topic under review. There are four sections. Section one presents a review of some studies conducted on TB treatment outcomes and mode of drug administration. While section two presents a review on factors (patients, healthcare providers and community related) associated with TB treatment outcomes, section three discusses the health belief model in light of the study. Section six presents a review on the gaps in the literature and the chapter summary.

2.1 TB treatment outcomes

Different attempts have been made to define TB treatment outcome. In a study on the definition of TB treatment outcome, Sengul et al. (2015), categorized patients as having a successful outcome if they had completed treatment or were cured. Those with poor outcomes had either defaulted, died or had failed treatment. They found that people who were young, had no other disease, were not resistance to drugs, and had attained high education often have successful pulmonary tuberculosis (PTB) treatment outcome (p.821).

2.2 Factors associated with TB treatment outcomes

This section presents factors that are probable to account for TB treatment outcome. These factors are discussed below under three main headings: patient related, healthcare provider related and community related factors.
2.2.1.0 Patient related factors

Narasimhan, Wood, McIntyre and Mathai (2013), found that socio-economic and behavioural factors were shown to increase the vulnerability to infection. For instance, specific groups such as health care workers and indigenous population were also at a greater risk for TB infection and disease. Li et al. (2013), showed that causes of delays to TB treatment included socio-demographic and economic factors, mostly poverty, rural residence, lack of health insurance, lower educational achievement, stigma and poor knowledge of TB.

Chimbindi et al. (2014), compared the satisfaction with HIV and TB services and examined the association between patient satisfaction and patients' socio-demographic characteristics in multivariable regression. From their analysis, they identified five factors underlying the HIV data and the TB data (availability, accommodation, acceptability and communication for HIV and TB patients; and global satisfaction for TB patients only). However, they found that the level of satisfaction did not differ significantly with patients' socio-demographic characteristics. Among the patient factors that are possible to influence TB treatment outcome in this study are: gender, age, educational level, employment status, income, migration, and knowledge of TB. These have been explained below.

2.2.1.1 Gender

It has been argued that the gender of a TB patient could influence their response to treatment (Mukherjee, Saha, Sarkar, & Chowdhury, 2012). Mukherjee et al., (2012), examined the gender variances in the notification rates and treatment outcomes of TB patients listed under the Revised
National Tuberculosis Control Program (RNTCP) in a rural tuberculosis unit (TU) in West Bengal, India. They found that out of 3605 patients, 2498 (69.3%) were males and 1107 (30.3%) were females with a male to female ratio of 2.25:1. They also observed that male patients were more than females in all the unfavourable outcomes like death, failure, and default although none of the differences were statistically significant (p.120).

Most men are assumed to have poor health seeking behaviour since they are likely to report late to health facilities with health problems (Gordon et al., 2013). Males tend to associate persistent coughs and chest pains to smoking, cola consumption and alcohol abuse, hence, making the rate at which TB infection developed into a disease condition higher in men than women (Gordon et al., 2013). However, women may default more due to their frequent use of alternative treatment such as herbs and prayer camps after medical diagnosis (Noora, 2015). Dodor and Afenyadu (2005), found that males defaulted more than females.

2.2.1.2 Age

The age of a patient can help determine the rate of recovery from a health condition (Gutierrez, Kindratt, Pagels, Foster, & Gimpel, 2014). Gutierrez et al., reported that patients within the ages of twenty-four and more are found to default more relative to the other age groups. A study reported that patients 40 years and more were found to complete TB treatment as compared to relatively younger ones (Burton et al., 2011). Ananthakrishnan et al. (2013), concluded that TB patients who are old have poor treatment outcome demanding special attention to this group.
Perez-Velez and Marais (2012), argue that tuberculosis is a main but often unrecognized cause of disease and death among children in regions where the disease is endemic; and service delivery in such areas is hindered by the lack of pragmatic policies to guide diagnosis and management. Marais, Donald, Gie, Schaaf and Beyers (2013), found that age-related range of TB disease reveals the ontogeny of the host immune response towards tuberculosis. They suggested the need to focus on the ontogeny of the immune response in children to provide valuable insights to direct future research regarding tuberculosis prevention, vaccine development and treatment.

2.2.1.5 Income

The income level of patients is expected to have a role to play in the outcome of TB treatment. The fact is that patients travel in the course of the treatment, which means that when they run short of medications, they could discontinue medication until they return to the health facility. Although the treatment is free, there is an indirect cost incurred during treatment (Umar et al., 2012). This means that patients with low income may not be able to afford the cost of feeding and transportation related to treatment. This can cause them to default treatment. In few instances, patients obtain financial support from family and friends.

Dodor and Afenyadu (2005), observed that the income of patients strongly explains why they default from treatment. These researchers explained that TB patients with less income default much more than those with high income. In support of Dodor and Afenyadu’s (2005), findings, Muture et al. (2011), argued that TB patients with low income are more likely to discontinue treatment.
Tanimura, Jaramillo, Weil, Raviglione and Lønnroth (2014), conducted a systematic review of the financial burden of tuberculosis (TB) faced by patients and affected families. They found that income loss often constituted the major financial risk for patients. These researchers suggested that aside ensuring that healthcare services are equitably financed and provided in a manner that reduces direct and indirect costs, there was the need to make sure that TB patients and affected families received appropriate income replacement and other social protection interventions.

2.2.1.6 Patients’ Knowledge of TB

It is believed that patients’ knowledge of TB is essential to ensuring treatment completion. The idea is that when patients are educated on the causes of TB and treatment demands of the disease condition, they are likely to adhere to treatment. Patients’ knowledge of TB may stem from personal contacts with infected people, media and also counselling provided by health providers (Ritchie et al., 2015). However, if the healthcare providers are also deficient in knowledge, they may not be able to educate the patients appropriately. For example, Ritchie et al. (2015), argued that although lay health workers (LHWs) play a crucial role in managing the high TB burden, lack of training is a main obstacle to their role as TB care providers in Malawi.

However, patients who have inadequate knowledge of tuberculosis, its causes and treatment are likely not to adhere to treatment (Muture et al., 2011). Muture et al. (2011), reported from a cross-sectional study that the rate of defaulting is high during initial 2 months - the intensive phase of treatment. These researchers reported that many TB patients discontinued treatment because they were ignorant of the disease and its implications for their health in Nairobi, Kenya. Li et al. (2014), found that only 31.8 % pulmonary TB (PTB) patients had once received TB
health education before their TB diagnosis in China. They revealed that long patient delay and patients’ poor TB knowledge were prime reasons for patient delay.

Westerlund, Tovar, Lönnermark, Montoya and Evans (2015), used a cohort study to characterize tuberculosis-related knowledge and associations with delayed treatment and treatment outcome in peri-urban shanty towns of Peru. They reported that elderly people with low educational level and no previous diagnosis had poor TB related knowledge. They suggested the need for health education to improve tuberculosis prognosis since low tuberculosis-related knowledge independently predicted tuberculosis recurrence.

Soomro, Qadeer and Mørkve (2013), conducted a study with TB patients and health personnel, to examine barriers encountered by TB patients when seeking health care in Rawalpindi, Pakistan. They realized that most patients were well conversant with the idea of taking TB medications under direct supervision and its overall significance. However, they found that limited knowledge of patients was among the main obstacles to TB adherence. Sengul et al. (2015), suggested that knowledge of the factors influencing treatment success would lead to the undertaking of specific processes in the management of PTB, which may aid in decreasing treatment failure.

Tang et al. (2015), evaluated non-adherence to anti-TB treatment among internal migrants with pulmonary TB and threats for non-adherence in Shenzhen, China. They argued that patients with no knowledge of TB treatment or had to travel long distance to get treated were likely to miss one or more doses of medication. Hence, they suggested that policies to improve health
education and healthcare access would be needed to reducing non-compliance to TB treatment among internal migrants.

2.2.1.7 HIV Status, smoking behaviour, alcohol consumption

Treatment outcome can also be influenced by patients' own behaviours and lifestyle choices (Dias et al., 2013). There is the need to be conscious of the effect that smoking and diabetes pandemics may be having on the incidence of TB (Jiménez-Corona et al., 2012). The relationship between TB and HIV has been noted in recent times as it is observed that even as general implementation of the strategy of directly observed treatment short course (DOTS) during the 1990s resulted in improved global control of tuberculosis, its effectiveness has been limited in areas where poverty and infection with the human immunodeficiency virus (HIV) or drug-resistant tuberculosis are prevalent, and the emphasis on a positive sputum smear as the diagnostic criterion actually excludes most children from care (Marais et al., 2010; WHO/HTM/TB, 2011; Perez-Velez, & Marais, 2012).

Naidoo et al. (2013), revealed that significant determinants of non-adherence known to both anti-TB drugs and dual therapy (ART and anti-TB drugs) included poverty, having one or more co-morbid health state, being a high risk for alcohol mis-use and a partner who is HIV positive with an additional predictor for non-adherence to anti-TB drugs been tobacco use. Narasimhan et al. (2013), reported that along with entrenched risk factors for TB (such as human immunodeficiency virus (HIV), malnutrition, and young age), evolving variables such as diabetes, indoor air pollution, alcohol, use of immunosuppressive drugs, and tobacco smoke contributes greatly at both the individual and population level.
Ranzani *et al.* (2016), found that alcohol and drug use was three times more frequent as well as the population attributable fraction for the joint effect of homelessness, alcohol and drug use was almost 20% in homeless patients with pulmonary TB (PTB) in São Paulo State (SPS), Brazil.

### 2.2.2.0 Healthcare provider factors associated with TB treatment outcome

This section presents discussion of healthcare provider factors that could account for TB treatment outcomes. Li *et al.* (2013), found that health facility determinants related with delays in TB care-seeking and diagnosis included limited availability of resources to execute prompt diagnosis, lack of competent health workers and geographical obstacles in China. Among the healthcare provider factors that could influence TB treatment outcome in this study include: appointment and waiting time, delay of laboratory reports, inadequate counselling, and attitude of healthcare providers. These have been discussed below.

#### 2.2.2.1 Appointment and waiting time

The time spent at the health facility is a concern to patients (Lusignani *et al.*, 2013). Given the stigma attached to TB disease, patients will always want to avoid being seen at DOTS centers. When time spent at the health facility is prolonged due to delay in laboratory test result or misplaced patients folder, patients become uncomfortable with the fear of being stigmatized should they be seen at the DOTS centre by other community members. Lusignani *et al.* (2013), reported that living in a suburban area, having a waiting time in the centre (within less than an hour) and the health centre of first contact different from the DOTS centre were factors influencing the system delay in TB diagnosis in Angola.
2.2.2.2 Counselling

TB treatment will be improved if patients are given appropriate counselling by healthcare providers. Thus, aside high educational level, adequate counselling on the disease condition is associated with treatment completion. Muture et al. (2011), report that when healthcare providers offer health education on TB and communicate the need for treatment compliance, patients are more likely to adhere. Finlay et al. (2002), reported that inadequate counselling on TB, impeded treatment completion.

Effective counselling may be dependent on the appropriate use of guidelines by healthcare providers. Mala, Moser, Dinant and Spigt (2014), explored service providers' motives deviating from TB treatment guidelines by interviewing thirty-nine service providers Ethiopia. They found the major explanations for deviation include: inadequate diagnostic modalities, limiting the ability to correctly diagnose TB and providing the precise regimen and vagueness in guideline recommendations.

The attitude of healthcare providers may encourage or discourage TB patients from attending health facilities (Chimbindi et al., 2014). Chimbindi et al. (2014), reported that queues, health worker-patient contact time, staff attitudes, and facility sanitation could influence patient satisfaction. Arguably, people suffering from this medical condition may receive little care from society. Finlay et al. (2012), reported that some health providers are said to be shouting at patients for unacceptable behaviours such as spitting in the open and coughing without covering their mouth with a handkerchief. Patients feel disrespected and unfairly treated by health providers. This explains why some TB patients default (Ananthakrishnan et al., 2013).
Dodor and Afenyadu (2005), point out that a friendly relationship between patients and healthcare providers is a major factor contributing to treatment completion. However, Finlay et al., (2012), sampled 3,165 TB patients from 8 provinces to examine patient-and provider-related threats associated with default from TB treatment in South Africa. They found that major risk factors associated with default among both groups included poor health provider attitude and changing residence during TB treatment. Contrary to this observation, Marfo (2001), found that poor attitudes of health workers and the duration of treatment were least among the factors explaining reasons why patients defaulted.

2.2.3.0 Community factors associated with TB treatment outcome

This section presents community factors that may be accounting for TB treatment outcome. Notably, there is cumulative proof that community-based treatment of MDR TB is a possible and cost-effective substitute to centralized, hospital-based care (Weiss et al., 2014). Weiss et al. (2014), reported that outcomes of community-based MDRTB and XDRTB treatment outcomes seem comparable to overall treatment outcomes. Among the community factors, which may influence TB treatment outcome in this study, are: distance to health facility, availability of alternative treatment, stigma, and family support. These have been espoused below.

2.2.3.1 Distance to the health facility

It could be argued that distance from patients’ home to the health facility is a determinant of treatment outcome (Muture et al., 2011). It is common knowledge that TB patients who are poor cannot afford the cost of transportation to health post through six months of treatment. In addition, the stress of crossing long distance to access health service discourages patients from continuing with treatment. For example, another factor found to have significantly affected default rate was patients traveling away from treatment sites (Muture et al., 2011).
Another key determinant identified was long distance from patient's residence to health facility (Marfo, 2009). Marfo (2009), explained that under the DOTS, patients are required to take medication under the direct observation of health practitioners. However, patients are burdened with having to cross long distance to take medication within short time intervals (daily and weekly). This burden contributes to their discontinuation of treatment.

Finlay et al. (2002), found that changing residence during TB treatment exposed patients to defaults. Without proper referrals, when patients moved from one locality to the other during treatment, it becomes stressful to cross distances from their new locality back to treatment sites for drugs and appointment. Li et al. (2013), argue that policies that take away patients' financial barriers in access to TB care, and incorporation of the informal care sector into TB control in urban and rural sets are fundamental factors in TB control. Soomro et al. (2013), revealed that long distance from health facility was among the main obstacles to TB adherence in Rawalpindi, Pakistan. In view of this, direct observation of patients and consistent home visits by health workers were suggested to decrease the risk of non-adherence.

2.2.3.2 Availability of alternative treatment

The availability of alternative treatment options other than orthodox medicine may influence health treatment outcomes in resource-poor settings (Tiruneh, Galárraga, Genberg, & Wilson, 2016). This is likely to be compounded as there are misconceptions surrounding TB and the fact that patients' perception of the disease may also inform their approach to treatment (Miture et
al., 2011). Some patients think of TB as a spiritual affair and thus default medical treatment to seek spiritual help at prayer camps. While others resort to herbal use, some patients combine all three approaches. Muture et al. (2011), established that the use of herbal medicine as an alternative treatment predisposed patients to defaulting.

Finlay et al. (2002), argued that reliance and use of herbal treatment impeded treatment completion. Li et al. (2013), identified that the practice of seeking care first from Traditional Chinese Medicine (TMC) providers was a risk factor for diagnostic delay in TB care-seeking and diagnosis in China. Chang and Cataldo (2014), reported that decisions about illness disclosure and choices between traditional healers and public or private providers were influenced by TB stigma.

Tiruneh et al. (2016), concluded that complex socio-cultural, economic, and health-system factors prevent optimum patient retention. Therefore, to address the challenges and barriers, these researchers suggested that better tracing, enhanced social support, and regular adherence counselling on stigma and alternative healing options, including interventions aimed at altering clinic routines and improving patient–provider communication should be adopted.

2.2.3.3 Stigma

It could be suggested that apparent stigma and discrimination against TB patients has the potential to influence treatment outcome (Tiruneh et al., 2016). Tomás et al. (2013), observed that while TB screening was often perceived as a socially responsible deed, it could be professed as discriminatory. Tuberculosis as a contagious disease may be stigmatized in the communities
where patients come from indicating the extent to which patients may default treatment. That is, in most communities, stigma is associated with TB (Muture et al., 2011). For instance, while some people perceive the condition as related to witchcraft, others associate it with a curse. In view of this, most people isolate themselves from TB patients. In order to keep friends and beloved, some patients could decide to stop visiting health facilities in order to avoid being seen by community members (Muture et al., 2011). Soomro et al. (2013), reported that social stigma was among the main barriers to TB adherence in Rawalpindi, Pakistan. According to the researcher, stigma from community was reported to be strongly associated with patients defaulting treatment.

Chang and Cataldo (2014), conducted a systematic review of 1,268 studies to examine the effect of TB stigma on knowledge, attitudes and responses to TB and to ascertain similarities and differences across countries. These analysts found that stigma antecedents included negative attitudes and misperceptions regarding the causes of TB and the relationship with the human immunodeficiency virus. They confirmed that there were cultural variations with respect to TB and the potential for stigma as well as difference and similarities in the impact of TB stigma on knowledge, attitudes and responses to TB across countries. Hence, they recommended that cultural differences should be considered in the development of solutions aimed at decreasing stigma and improving treatment compliance.

2.2.3.4 Family support

It is vital to note that family support under DOTS is essential to treatment completion and outcome (Hamusse, Demissie, Teshome, & Lindtjørn, 2014). To improve the successful
outcome of the strategy, patients are requested to bring along a close family relation who serves as a treatment support in the course of medication. The reality is that TB patients are often weak and need financial support and motivation to be able to continue treatment. However, patients who may lack such family support are likely to discontinue treatment to work for money (Burton et al., 2011; Cele, Knight, Webb, Tint, & Dlungwane, 2016).

Using case control and focus group discussions, a study elicited factors contributing to high defaulter rates in the Yendi district of Ghana (Marfo, 2009). Marfo (2009), showed that poor family support and adverse side effects of TB drugs were the main patient-related variables influencing high defaulter rate. This researcher explained that patients discontinued treatment because their families were not financially and socially supportive. Coupled with the lack of family support was the adverse side effect of the drug, including headaches, vomiting, rashes, and discoloured urine. The frustrations of these conditions discouraged patients from continuing with treatment.

On the other hand, a study reported that family members often contributed to meeting the psychosocial needs, and were central in providing economic support to patients challenged with burdensome medical expenditures or who were compelled to leave their jobs due to being on TB treatment in peri-urban Lima, Peru (Paz-Soldán et al., 2013).

2.2.4.0 Adverse side effects

Yee et al. (2003), conducted a study in Canada to investigate the incidence of serious side effects of anti-tuberculosis drugs among active TB patients. The researchers discovered that the
occurrence of serious side effects such as hepatitis and rash was common among females, the elderly, Asian natives and HIV/TB co-infected patients. The authors also reported that side effects resulted in prolonged treatment, hospitalization and even death and thus patients are more likely to default from treatment when they are challenged with drug side effects. According to Mkopi et al. (2013), possible side effects of tuberculosis include vomiting, severe headache, limp pains, rashes, swollen feet and reduced visual capacity. Patients are more likely to abandon treatment when they are not informed of drug side effect and how to manage them (Munro et al., 2007). Munro et al. (2007), explained that some healthcare providers pay no attention to patient’s complaints on drug side effect. For the few healthcare providers who listened to patient’s complaints, they responded derisively, thus influencing patient’s decision to default treatment. The researchers suggested that patients should be provided with adequate knowledge on treatment dynamics prior to and during treatment periods.

2.3 Conceptual Framework

The standard treatment regimen for tuberculosis is six month of medication. Under the DOTS, patients are monitored at a particular health centre through the treatment. Drugs are dispensed to patients with time intervals. Treatment supporters are assigned to patients to motivate and remind them to take their medicines. These measures are put in place to ensure adherence to treatment (WHO, 2010). The conceptual framework in figure 2.1 illustrates the influence of patient, healthcare provider and community factors on TB treatment outcomes. The relationship between the factors has been explained in the literature review section and by health belief model.
2.4 Theoretical Framework - Health belief model

The idea of the health belief model (HBM) is that individual beliefs about and perceptions of a disease contribute greatly to their health behaviours (Jones, Smith & Llewellyn, 2014). Jones et al. (2014), explain that, this theory was advanced in the 1950s by social scientists at the United States Public Health Service in order to comprehend the failure of people to accept disease prevention. This psychological model explains why screening programmes, especially tuberculosis were not successful. The model argues that four main constructs independently or in
combination can be used to explain individual behaviour towards health issues. These concepts include perceived seriousness, perceived susceptibility, perceived benefits and perceived barriers. Upon modification, motivating factors, self-efficacy and cues for action have been added to the constructs (Green & Murphy, 2014). The health belief model will be used to explain the findings of this study under its six main tenets explained below.

First, perceived seriousness refers to an individual's feelings of the severity of contracting a disease and living with the disease untreated (Skinner, Tiro & Champion, 2015). Skinner et al. (2015), indicate that a person's feeling of severity varies with an evaluation of medical consequences and social effect. For instance, flu is perceived by many people as a minor illness that resolves with less effort. However, an asthma patient would perceive flu as a serious condition that needs medical attention (Skinner et al., 2015). With reference to this study, TB patients' knowledge of TB, educational level, and counselling received at the health facility. Thus, an individual highly educated is likely to perceive health threats and take necessary actions on time compared to infected persons who are illiterates.

Second, perceived susceptibility describes an individual's personal perception of the danger of acquiring an illness or disease. There is wide variation in a person's feelings of personal vulnerability to an illness or disease. It is logical that individuals would take actions to prevent the occurrence of diseases that make them vulnerable. The opposite is however true. Thus, individuals are more likely to engage in unhealthy behaviours perceiving they are at no risk of a disease (Green & Murphy, 2014). Hence, one current health status (comobidity), alcohol consumption, smoky behaviour and attitude of healthcare providers inform their perceived susceptibility.
Third, perceived benefits refer to a person's perception of the efficacy of various actions available to lessen the threat of a disease or to a cure disease. Actions people take in a disease condition depend on assessment of both perceived vulnerability and perceived benefit. People would accept the recommended health action if it was perceived as beneficial (Skinner et al., 2015). TB patients are more likely to result to traditional medicines among other alternative treatment for TB available to them, should they perceive those options as effective.

Fourth, perceived barriers denote to a person's feelings of the hitches to accomplishing a suggested health action. There is a wide discrepancy in a person's feelings of obstacles which lead to a cost/benefit analysis. The person assesses the effectiveness of the actions against the perceptions that it may be costly, dangerous, painful, time-consuming, or inconvenient. Thus, the benefits of a new health behaviour should outweigh the consequences of continuing the old behaviour (Skinner et al., 2015). Some of the barriers impeding successful TB treatment outcomes include stigma, attitude of healthcare providers, income, family support, adverse side effect of medication and waiting time.

In addition to the four beliefs, cue to action is the spur needed to initiate the decision-making process to accept a suggested health action. These cues can be from within an individual (chest pains, wheezing) or external (advice from others, illness of family member, newspaper article.). Cues of actions are events, things or people that move an individual to change their behaviour
(Green and Murphy, 2014). Counselling, drug side effect and family support are factors that could cause a TB infected person to adhere to treatment or otherwise.

Finally, self-efficacy depends on the level of an individual's confidence in his or her capacity to effectively perform a behaviour. Self-efficacy is a concept in many behavioural models which relates to whether a person implements a desired behaviour. Thus, if people do perceive that an intervention is beneficial yet they do not see themselves as capable of doing it, chances are that the intervention will not be tried (Green and Murphy, 2014). Therefore, personal beliefs in one's ability to daily take TB medicines for six or more continuous months informs whether the individual will even attempt in the first place to start with TB medication.

2.5 Gaps in the literature

It could be observed from the above analysis that several factors may contribute to TB treatment outcome. However, much of the gaps identified in the analysis have also been espoused in the justification section (refer to 1.2). Of particular interest to this study are the patient factors (Narasimhan et al., 2013); healthcare provider factors (Li et al., 2013; Lusignani et al., 2013); and community factors (Weiss et al., 2014; Paz-Soldán et al., 2013), which have not been examined in relation to the TB-DOTS programme at the selected hospital in the selected metropolis in the Greater Accra Region of Ghana. Thus, conducting this study will help unravel how such factors, if not addressed, could negate the positive gains chalked through the DOTS programme. It is anticipated that the study findings will help come out with possible recommendations, which will be useful in moving forward towards controlling TB in the metropolis in particular and the country at large.
2.6 Chapter summary

The chapter has reviewed existing literature related to the topic under study as well as theoretical framework that explains the concept. The next chapter presents the study methods.
CHAPTER THREE

METHODS

3.0 Introduction
This chapter presents the research methods and strategies that were applied to collect primary data for further analysis in this study. Section one presents the study design while section two describes the study location. Section three presents the sampling strategy used in this study. Details on the study population are described in section four. Section five explains the study variables. Section six indicates the sample size determination for the quantitative part of the study. Section seven presents the data collection technique (data extraction and in-depth interviews). Procedures used in data analysis are presented in section eight while section nine explains the quality control issues, including the pretest / pilot study. Section ten presents how the ethical issues were addressed. Section eleven is the chapter summary.

3.1 Study Design
This study employed mixed methods design using cross sectional approach and in-depth interviews. According to Levis (2006), cross sectional studies are carried out to determine the prevalence of an outcome of interest in a group of people. They are carried out in a short period of time. Cross sectional studies are useful for public health planning and resource allocation (Levin, 2006). Mixed methods research permits the researcher to use both qualitative and quantitative methodological approaches. Thus, in using qualitative and quantitative viewpoints, data collection and analysis, mixed methods provide broad and depth understanding to
phenomenon (Johnson et al., 2007). In this study, both qualitative and quantitative analysis played a parallel role in helping answer the research questions.

According to Johnson and Onwuegbuzie (2004), the goal of mixed methods is to draw from the strengths of qualitative and quantitative methods and decrease their weakness in research. This strategy enhanced triangulation of both methodology and theory (Hussein, 2015). Hussein (2015), defines triangulation as the use of multiple methods, mainly qualitative and quantitative in studying the same phenomenon, for the purpose of increasing study credibility. This implies that triangulation is the combination of two or more methodological approaches, theoretical perspectives, data sources, investigators and analysis methods to study the same phenomenon. However, using both qualitative and quantitative paradigms in the same study has resulted into debate from some researchers arguing that the two paradigms differ epistemologically and ontologically. Nevertheless, both paradigms are designed towards understanding particular subject area of interest and both of them have strengths and weaknesses.

3.2 Study location

The study was carried out at the La General Hospital. La General Hospital is located in the Accra Metropolitan Assembly (AMA) Assembly area in the Greater Accra Region of Ghana. Accra Metropolitan Assembly is divided into six sub-metros namely; Osu Clottey, Kpeshie, Okaikoi, Asheidu Keteke, Ablekuma and Ayawaso (Ghana Districts, 2016). The Hospital is one among the four government hospitals in the Accra metropolis (Ghana Districts, 2016). Although the hospital has no designated laboratory for TB testing it runs routine smear microscopy in the general laboratory. The hospital records an average of about 20 TB diagnosed cases in a month.
The facility also has a DOT centre responsible for dispensing anti-TB drugs, monitoring and recording treatment progress of patients as well as a newly built isolation ward that accommodates severe cases of TB and other medical conditions deemed necessary for isolation.

The location of the La General Hospital is depicted in figure 3.1 below.

Figure 2.2: Geographical location of La General Hospital in Ghana. Source: Google Maps (2017).

3.3 Sampling Strategy

For quantitative data, total sampling technique was applied to select all TB cases in 2016 for document review at the La General Hospital. Total population sampling is a technique where the entire population that meets selection criteria is included in the study (Thompson, 2013). Total population sampling is often used where the number of cases under investigation is relatively small (Thompson, 2013). This technique helped the researcher to review all TB case documents in 2016. The researcher used 2016 cases because most TB patients from previous years were indisposed, especially due to migration and death.
For qualitative data, purposive sampling technique was used to carefully select informants who have in-depth knowledge regarding the research topic. Purposive sampling technique is the thoughtful choice of participants due to the qualities they possess (Etikan, Musa & Alkassim, 2016). Etikan et al., (2016), explained that purposive sampling is used to identify and select information-rich cases for the most proper use of available resources. In this study, sample for qualitative data were selected considering their knowledge and experience in TB treatment.

3.4 Study Population

The study population consists of mainly the TB patients, healthcare workers and TB treatment supporters of the La General Hospital. The TB patients included those registered in 2016 whether on treatment or not. The healthcare workers included nurses, clinic in-charge and drug dispensers at the DOT centre. Treatment supporters consisted of relatives and friends of the TB patients. All together 107 TB case folders were reviewed for quantitative data while five (5) healthcare providers, ten (10) TB patients and ten (10) treatment supporters were interviewed for qualitative data.

3.4.1 Inclusion criteria

Quantitative study:

1. TB patients registered under DOT from January 2016 till December 2016.
2. Referral cases into the facility

Qualitative study:

1. TB patients 18 years and above.
2. TB treatment supporters from patients' communities.

3. Healthcare providers working at the DOT centre.

3.4.2 Exclusion criteria

Quantitative study:

1. All cases registered outside of the year 2016.

Qualitative study:

1. TB patients on admission.

2. Non-TB patients attending the hospital.


4. Healthcare providers not working at the DOT centre.

3.5 Variables

The dependent variable was TB treatment outcomes. Treatment outcome is classified in two different ways in this study. First, it is analysed as a binary outcome with the following categories: successful treatment outcome and unsuccessful treatment outcome. Secondly, TB treatment outcome is considered as a categorical variable with four categories, namely: treatment completed, cured, defaulted and died. Each category of treatment outcome is clearly defined in the list of definitions above. The independent variables were based on both patient factors and healthcare worker factors and community factors as presented below.
3.5.1 Dependent variable

Tuberculosis treatment outcome (completed, cured, defaulted and died).

3.5.2 Independent variables

1. Socio-demographic Characteristics (age, gender, employment status and educational level).

2. Patient factors (income, co-infection, smoking behaviour and alcohol consumption).

3. Healthcare provider factors (TB clinic opening times, waiting time and attitudes of healthcare providers).

4. Community factors (use of alternative treatment, stigma, and family support).

5. Side effect of drugs (headache, rashes, vomiting, impaired hearing and vision).

These were measured to find answers to respond to the research questions so that the objectives of the study could be addressed.

3.6. Data Collection Techniques

The fieldwork took place between May and June, 2017. Two research methodologies (quantitative and qualitative) were applied to collect empirical data for subsequent analysis. These have been explained below.

3.6.1. Data Collection Technique for Quantitative Data (Data extraction)

The data extraction tool was designed in sections taking into account the dependent variable, socio demographic variables (gender and age) of patients and some patient related factors (co-
infection, smoking behaviour and alcohol consumption). Data was extracted from patient hospital folders. Data collected was matched against that reviewed in the DOT register to ensure accuracy. The data extraction tool was structured in five main sections. First section captured general information, including type of document under review, patient ID per the document under review, name of person reviewing data and date the tool was filled. This helped to cross check the hospital documents for any clarification needed.

The second section recorded information on eligibility and treatment outcome. Here, the month and year of patient’s diagnosis and the outcome of their treatment was captured. The third section was on patient related factors (HIV status, comment on smoking and alcohol consumption). Two research assistants were trained to assist with data extraction. The period was between January and December, 2016. This was because it was easy to locate the TB patients who might have been lost to a follow up if the period had been much later. A similar strategy was applied in a previous study by Tupasi et al., (2017), in their quest to explore views of MDR TB patients on interventions to reduce treatment lost to follow up.

3.6.2. Data Collection technique for Qualitative Data: In-depth Interviews

In-depth interviews were conducted with TB patients, healthcare workers and community member (treatment supporters). Different interview guides were used for the three different groups of participants.

3.6. 2.1 In-depth interview with TB Patients

Ten (10) TB patients were interviewed. The focus was to explore how the patient related factors (income, HIV status, smoking behaviour, alcohol consumption and knowledge of TB) influence
TB treatment outcomes. As the patients came to the facility for medication, the researcher purposefully approached them and explained the objectives of the study to them. Upon agreement to participate, a convenient date, time and place for the interview was scheduled. Most interviews took place during late mornings at the patient’s residence while others took place at the hospital premises.

The interviews were conducted in an open and airy setting with the interviewer seated next to, but not directly facing the patient. This was a measure to ensure that the interviewer was protected from contamination. Interviews lasted for an average of 20 minutes. The responses of patients were coded from TBP1 to TBP10. This implies that the views of first patient interviewed bear the code TBP1. These appear in the results and discussion section to represent the views of TB patients. The interview guides used was structured in four sections. The first section presented issues on ethics and consent as well as questions on interviewee’s background. Section two captured questions on patient related factors. Findings on healthcare provider factors and community factors are presented in sections three and four respectively. The last section captured questions on recommendations to improve TB treatment.

3.6.1.2 In-depth Interviews with Healthcare Providers

Five healthcare providers were interviewed at the DOT Centre. Healthcare providers who qualified for interviews were those who work on TB cases. The focus was to explore how the healthcare provider, patient and community factors affect TB treatment outcomes. Consent was sought from healthcare providers interviewed at their convenient times. Interviews took an average of 40 minutes. Interview guide for healthcare providers took the same structure as the
interview guide for TB patients. Responses of healthcare providers were coded from HCP1 to HCP5. Thus, the views of the first healthcare provider interviewed are captured under the code HCP1.

3.6.1.3 In-depth interview with TB Treatment Supporters (Community Members)

In-depth interviews were conducted with five (5) purposively selected TB treatment supporters who are members of the communities within which patients reside. TB treatment supporters are community members who accompany TB patients to the health facility for review and assist them in taking their medication. The focus was to explore how the community related factors (availability of alternative treatment, stigma and family support) and healthcare provider factors influence TB treatment outcomes.

The researcher and community members negotiated convenient time and place for the interviews. It is believed that treatment supporters have experienced the community perception of TB and the lived experiences of patients in the community. Interviews with these community members were done at the residence of the interviewees allowing for interviewees to be relaxed and not to feel intimidated by the presence of healthcare providers at the hospital setting. The researcher together with community members who consented to be interviewed decided on the day the interview should be conducted.

Interviews lasted an average of 20 minutes. Interview guide used for treatment supporters was slightly different from that used for healthcare providers and TB patients. The responses of treatment supporters were coded from TS1 to TS10. This implies that the views of first treatment supporter interviewed bear the code TS1. These appear in the results and discussion section to
represent the views of TB treatment supporters. The interview guide used was structured in four sections. The first section covered questions on interviewer background information, ethics and consent. The second section contained questions on community related factors and the third section, questions on healthcare provider factors. The last section was on recommendations to improve TB treatment.

After interviewers had given consent, a audio recorder was activated to capture the conservation. The recorder was put on pause for a short time in some instances where interviewers had to attend to important call.

3.7 Data Analysis

Two different analytical techniques were used to analyse the quantitative and qualitative data as explained below.

3.7.1 Quantitative Data Analysis

The quantitative part of the research measured the following variables: distance, HIV status, age, gender associated with TB treatment outcome. Statistical analysis was conducted using SPSS version 21. Descriptive statistics was conducted and frequency table was drawn for socio-demographic factors and TB treatment outcome. Distance was calculated with the help of google map application. Patient's place of residence and the hospital was entered in the map to provide distance in kilometers. Moreover, Variance Inflation Factors (VIF) was computed for distance from health facility, HIV status, gender, and age.
**Assumptions:** To detect the presence of multicollinearity between predictors, Variance Inflation Factors (VIFs) were calculated. According to Grégoire (2014), multicollinearity is a condition of very high inter-associations among the independent variables. It is a type of disturbance in the data, and if present in the data the statistical inferences made about the data may not be reliable. High VIFs indicate increased effects of multicollinearity in the model. Variance Inflation Factors greater than 5 are cause for concern, whereas VIFs of 10 should be regarded as the maximum upper limit (Menard, 2011). All variables, which passed the multicollinearity test were fed into a multinomial regression to test their association with the various TB treatment categories.

3.7.2 Qualitative Data Analysis

Framework analysis was used to analyse the qualitative interview data. This method is used, especially in policy implied research (Dixon-Woods, 2011). According to the author, framework analysis is flexible such that it allows for data analysis during data collection process; saving the researcher the time spent waiting for all responses before analysis. The researcher first familiarised herself with transcribed data while recognizing the diversity of respondents‘ demographic characteristics. Emerging themes were identified and data was interpreted. The qualitative analysis was done manually. Codes have been allocated to participants whenever they are quoted in the analysis. For instance, TBP1-TBP10 = means Tuberculosis patient; HCW1-HCW5 = means health care worker; and TS1-TS5 = means treatment supporter.
3.8 Pretest

As part of ensuring quality control and validity and reliability, a pretest of study was done at the Kaneshie Polyclinic; to know what to add or remove from the interview guide and data extraction tool and also the reaction of the respondents.

3.9 Ethical Consideration

Ethical issues involved in the study were addressed by doing the following:

1. A letter of introduction from SPH was sent to the Regional Director of Health Services, Greater Accra Region, to seek permission to use the health facility for the data collection.
2. A similar letter was delivered to the Medical Director of the La General Hospital, who disseminated the information to the health providers for participation in the study.
3. Ethical clearance was granted by the Ethics Review Committee of the Ministry of Health / Ghana Health Service (MOH/GHS) as a requirement to conduct a research on a health facility.
4. The aim of the study was provided to the research participants. A participants’ consent form was designed and used for the participants (see appendices A, B and C).
5. Participants were assured of confidentiality and anonymity of the information provided.

3.9.1 Quality Control

To ensure reliability and validity of the data, a well-designed data extraction tool containing details necessary to achieve the set objectives assisted in obtaining the right information from providers and patients. The research assistants were people who are knowledgeable and were
trained for the data extraction. However, daily checking and monitoring was done to ensure high quality. All interviews were conducted by the principal researcher. This was to ensure that maximum information was collected during the conversation.

3.9.2 Subjects of the Study

The study participants consisted of tuberculosis patients registered in 2016, TB treatment supporters and healthcare providers at the Chest clinic, La General Hospital. Selection was based on participants’ availability and willingness to be involved in the study.

3.9.3 Privacy and Confidentiality

Participants were informed that privacy and confidentiality would be ensured as no names would be mentioned. They were assured that the outcome of the study would be very beneficial to individuals who access the facility as a whole and the national TB programme in Ghana.

3.9.4 Data Storage and Usage

Participants were told that their information would be stored by the principal investigator and used for research purpose only. The data was stored on devices such as goggle drive and personal laptop of the principal investigator. The data would be discarded after a period of five years.
3.9.5 Compensation

The participants were informed that participation in the study would not lead to any harmful effect. Therefore, participation did not attract any compensation.

3.9.6 Risks and Benefits

Participants were informed that the information they provide would help the researcher to understand the factors associated with TB treatment outcomes. The information would be beneficial in the long run as it would arouse the interest of policy makers to pay more attention to national TB programme. Thus, their participation in the study did not involve any risk or cost.

3.9.7 Participation in the Research

Participants were informed that their participation in the study was voluntary and their decision to or not to participate in the study would not influence the nature of the ongoing relationship between healthcare providers and the researcher.

3.10 Chapter summary

The chapter has presented the methods, both quantitative and qualitative research method used in collecting data for the study. The next chapter presents the study results.
CHAPTER FOUR

ANALYSIS OF RESULTS / FINDINGS

4.0 Introduction

This chapter is in two main sections, first is the qualitative followed by the quantitative. The qualitative part presents the findings of the study conducted with TB patients, healthcare providers and TB treatment supporters at La General Hospital. This section is further divided into two main subsections. The first subsection presents socio-demographic of patients, healthcare providers and TB treatment supporters that were interviewed. The second subsection presents emerging themes. The quantitative part is also sub-divided into two parts. The first part presents the descriptive statistics for the data collected from TB patients’ folders. The second part presents the statistical test of association conducted by the researcher.

4.1 Qualitative results

This section presents analysis of the qualitative data. There are two main sub-sections. First sub-section presents socio-demographic characteristics of participants. The second sub-section presents results on patient related factors, healthcare provider factors and community related factors. Table 4.1, presents the study participants.

4.1.1 Socio-demographic characteristics of participants

The socio-demographic characteristics of patients, healthcare providers and treatment supporters are presented below.
Table 4.1: Table of study participants

<table>
<thead>
<tr>
<th>Study Participants</th>
<th>Number sampled</th>
</tr>
</thead>
<tbody>
<tr>
<td>TB Patients</td>
<td>10</td>
</tr>
<tr>
<td>Healthcare workers</td>
<td>5</td>
</tr>
<tr>
<td>Community members</td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td>20</td>
</tr>
</tbody>
</table>

Source: Field work, 2017

Socio-demographic characteristics of TB Patients

Seven out of the ten interviewees were engaged in informal works such as hairdressing, taxi driving, sewing cloths and petty trading. One of the interviewees was a recent graduate from a tertiary institution and unemployed. The rest were orderlies and security personnel employed in the formal sector. One interviewee was not successful with the treatment (relapse case) and was on treatment at the time of interview. TB patients were interviewed on their experience with TB treatment with regards to socio-demographic factors such as age and sex; patient-related factors (smoking behaviour, alcohol consumption, income, knowledge of TB, co-infection); healthcare provider (attitude of health workers, waiting time, counselling); and community-related variables such as the use of alternative treatment, family support and stigma. The breakdown of the patients‘ socio-demographic characteristics is presented in table 4.2.
Table 4.2: Socio-demographic characteristics of TB Patients

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>4</td>
</tr>
<tr>
<td>Female</td>
<td>6</td>
</tr>
<tr>
<td>Occupation</td>
<td></td>
</tr>
<tr>
<td>Formal</td>
<td>2</td>
</tr>
<tr>
<td>Informal</td>
<td>7</td>
</tr>
<tr>
<td>Unemployed</td>
<td>1</td>
</tr>
<tr>
<td>Education level</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>3</td>
</tr>
<tr>
<td>Primary</td>
<td>2</td>
</tr>
<tr>
<td>Secondary</td>
<td>4</td>
</tr>
<tr>
<td>Tertiary</td>
<td>1</td>
</tr>
<tr>
<td>Age</td>
<td></td>
</tr>
<tr>
<td>20-39</td>
<td>5</td>
</tr>
<tr>
<td>40-59</td>
<td>5</td>
</tr>
<tr>
<td>Treatment outcome</td>
<td></td>
</tr>
<tr>
<td>Successful</td>
<td>9</td>
</tr>
<tr>
<td>Non-successful</td>
<td>1</td>
</tr>
</tbody>
</table>

Source: TB Patients Folder, 2017

Socio-demographic characteristics of health care providers

Five healthcare providers at the Chest clinic of La General Hospital were interviewed on their experience of working at the clinic, patients, the health system and community factors associated with TB treatment outcomes. Healthcare workers interviewed had had at least, one year working experience with patients. This may imply that they have adequate information, experience with TB patients at the clinic and have possibly engaged in health education programmes in the
communities. Table 4.3 below summarizes the socio-demographic characteristics of the healthcare providers interviewed.

Table 4.3: Socio-demographic characteristics of health care providers

<table>
<thead>
<tr>
<th>Participant</th>
<th>Sex</th>
<th>Position</th>
<th>Facility Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Female</td>
<td>Nurse – In charge of TB patient</td>
<td>4 years</td>
</tr>
<tr>
<td></td>
<td></td>
<td>treatment</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Female</td>
<td>Community Health Nurse</td>
<td>2 years</td>
</tr>
<tr>
<td>3</td>
<td>Female</td>
<td>Community Health Nurse</td>
<td>2 years</td>
</tr>
<tr>
<td>4</td>
<td>Male</td>
<td>TB Drug Dispenser</td>
<td>8 years</td>
</tr>
<tr>
<td>5</td>
<td>Female</td>
<td>Head of Department</td>
<td>1 year</td>
</tr>
</tbody>
</table>

Source: Field Work, 2017

4.1.1.3 Socio-demographic characteristics of TB treatment supporters

Five (5) treatment supporters were interviewed to collect data on community-related factors such as stigma, family support and use of alternative treatment. Three out of the five were relatives of the TB patients who lived with the patient during the period of treatment and hence, had indirect experience and perception of TB. One of the treatment supporters was a healthcare provider who vouched to be a treatment supporter to a patient who was rejected by his family. Table 4.4 summarizes the socio-demographic characteristics of the treatment supporters interviewed.
Table 4.4: Socio-demographic characteristics of TB treatment supporters

<table>
<thead>
<tr>
<th>Participant</th>
<th>Sex</th>
<th>Relation to TB Patient</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Female</td>
<td>Mother</td>
</tr>
<tr>
<td>2</td>
<td>Male</td>
<td>Brother</td>
</tr>
<tr>
<td>3</td>
<td>Female</td>
<td>Healthcare provider</td>
</tr>
<tr>
<td>4</td>
<td>Male</td>
<td>Healthcare provider</td>
</tr>
<tr>
<td>5</td>
<td>Male</td>
<td>Brother</td>
</tr>
</tbody>
</table>

Source: Field Work, 2017

4.1.2 Patient related factors

In this section, the key themes/sub-themes that emerged from analysis of the qualitative interview data have been presented below. That is to say that the section presents analysis of patient factors, which could influence tuberculosis treatment outcome.

4.1.2.1 Beliefs about TB

Interview participants expressed opinions related to their belief systems and how such beliefs could influence their continued treatment and associated treatment outcome of TB. The Ghanaian society is built on the basis of socio-cultural beliefs and traditions. Each community or locality has its own beliefs, which could influence how members within that community behave and relate to health care interventions and related issues. It was evident that the interview participants had been influenced by these beliefs to the extent that they believed that the weather and environmental factors could be the cause of their conditions. Some of the interviewees lived in fishing communities. To them, since they usually engage in fishing activities during the night and under adverse weather conditions, that is what could have accounted for their condition. In
such a case, they rather build their knowledge of the TB around the explanation that people in this profession or society could provide:

[...] When I started coughing, I didn’t take it seriously because I believe cold weather and bad air on the sea cause people to cough [...] My uncle told me that it is normal for fishermen to cough since they inhale cold air almost all the time [...] (TBP 7).

Patients had been socialized to think that coughing for more than two weeks was not serious. Thus, their perception of TB makes them delay on reporting to the hospital. When asked whether they took medicines as prescribed by the healthcare providers, they admitted to complying with treatment with the exception of few participants who reported to have defaulted along the course:

[...] When I took the medicine for some time, the coughing stopped and I regained my weight [...] The situation was not serious like when it started and I was fine so I stopped [...] (TBP 1).

Moreso, religious beliefs about TB play a significant role in determining compliance with treatment. It emerged from data collection that patients perceived that the TB disease was spiritual necessitating prayers and fasting:
It was not a common cough ooh. […] Hmm, I dreamt that someone breathed on me only to wake up the next morning coughing profusely […] so I came to the prayer camp for spiritual healing […] (TBP 10).

It was revealed that TB Patients were recruited from the screening programs organized at churches and prayer camps by some healthcare providers. Patients who believed that TB was a spiritual disease most often stopped treatment to stay in prayers camps and churches believing God for deliverance.

4.1.2.2 Knowledge of TB

In most of the Ghanaian communities, there is limited access to health information. Thus, until someone is infected by a certain condition, they may not have been exposed to it. This is typical and was not surprising that the participants related to this perception. It was revealed that, how much a person knows of a medical condition guides their behaviour and choices regarding that disease. Patients’ knowledge of the causes, symptoms and treatment options available to addressing the issue of TB informed their perceived seriousness of the disease, adherence to treatment resulting in successful treatment outcome. Upon interaction with TB patients, it emerged that patients had less knowledge of TB prior to their infection. They reported to have learnt about TB at the health facility after diagnosis:
[...] I didn’t know of TB until I was diagnosed [...] I think people in my area also know less of the disease [...] (TBP 2).

Patients accommodated the knowledge that coughing was a condition that occurs during wet seasons when the weather is cold. Thus, they resorted to alternating between cough mixtures and herbal medicine:

[...] When I started coughing I didn’t take it serious [...] I went to buy some medicines from a drugstore and took it [...] (TBP 1).

Patient’s knowledge of what causes TB, which practices to avoid or do to remain uninfected is associated with treatment outcomes. Testimony from a patient when asked about what happened that caused him to return to the facility with TB after being cured throws much light on this argument:

[...]When I finished taking the medicine I was told I was cured, so I thought drinking beer wouldn’t cause any problem [...] Later I began to cough again. I returned to the hospital to take the medicines again [...] (TBP 1).

It was realized that some patients who were earlier cured of TB reported to the health facility with reinfection due to their inadequate knowledge of TB.
4.1.2.3 Past experience

Human response to things and occurrences is often based on their previous encounter with similar phenomena. Patients’ past experience of the symptoms of TB and how they were resolved contributes to their health seeking behaviour and treatment outcome. Some of the interviewed participants reported that their relatives and friends had had TB before and they had observed how serious their condition was. Their perceived vulnerability to the disease made them report to the health facility when they observed similar symptoms:

[...] I got scared when I started coughing [...] I suspected TB because my mother had TB by then [...] I went to the hospital and I was told it was TB [...] I took it serious because I have seen what TB can do [...] (TBP 10).

The analysis revealed that, participants perceived that patient factors could positively or negatively influence tuberculosis treatment outcome.

4.1.2.4 Smoking and alcohol consumption

Interview participants articulated opinions related to smoking and alcohol abuse and how such behaviour could have influence on their treatment outcome. TB is a respiratory infection related to the respiratory tract and lungs. Drinking alcohol damages the human lungs while smoking affects the respiratory tracts, rendering the immune system weak and making people vulnerable
to TB. It was evident that interviewed patients who were engaged in smoking and alcohol consumption did not see how such behaviours influence TB treatment outcome. They expressed how their forefathers and friends smoked and consumed bottles of alcohol yet did not get infected with TB. Thus, they continue to smoke and drink alcohol and later report to the health facility with reinfection:

[…] I do not agree with those who say drinking alcohol and smoking could cause one to get TB, my grandfather used to smoke and drink alcohol a lot and yet never had TB […] I think there is no connection between drinking alcohol, smoking and TB […] (TBP 6).

[…] I think that drinking alcohol has got nothing to do with getting TB or not […] Honestly, I didn’t drink alcohol while taking the medicines but now that I am cured, I take small, small […] (TBP 5).

However, some patients expressed their opinions on how alcohol consumption and smoking could result in unsuccessful treatment:

[…] TB is airborne however, drinking alcohol and smoking heavy could predispose people to getting infected by TB easily […] (TBP 2).

The analysis showed that patients had acquired knowledge of the disease after they had been diagnosed and hence, understood the influence of drinking and smoking on treatment outcome.
4.1.3 Community-related factors

In this section, the key themes/sub-themes that emerged from analysis of the qualitative interview data have been presented. That is to say that, the section presents analysis of community-related factors, which could influence tuberculosis treatment outcome.

4.1.3.1 Family support

In Ghana, individuals in their communities are organised around the extended family system. In such families, members have a pool of relatives to nurture and support them in times of need. Thus, it was not surprising when patients reported to have received support from their family during their treatment. Examples of support patients obtained include financial support, encouragement and service (washing, cooking and cleaning). Family members play the role of treatment supporters such that they assist patients in their treatment. Their work includes reminding patients to take their medicines on time, encouraging and sometimes accompanying patients to the hospital.

[…] It was my aunty and mother who were going to the hospital with me when I was weak. They had to stop working to take care of me […] (TBP 5).

[…] my brother and his wife were really helpful to me. They provided me with food and sometimes money when I needed them […] (TBP 9)
The analysis indicated how patients were supported by their relatives or families in their treatment regime. For instance, they would wake them up every morning to go for their medicines at the health facility.

4.1.3.2 Alternative treatment

In the Ghanaian community, people share their health challenges with their friends, neighbours and relatives to seek ways for resolving them. Thus, there is an adage in the Twi language, that: 

*se wotɔn wo yareɛ a, ena wonya ano aduro*, which translates —you get a better cure by selling your sickness”. In so doing, patients get several treatment options from which they choose which to comply with. To get value for their money and time, patients engage in a cost/benefit analysis of alternative treatment before making the decision to comply with one.

The analysis revealed that compliance with treatment could result when patients see orthodox medication as useful, beneficial and quick at relieving their pain and curing them of TB. From accounts of TB patients, it emerged that they analyse orthodox treatment of TB as beneficial and efficacious in resolving their chronic coughs, fever and unexplained weight loss. When asked if they knew of other forms of treatment aside that given at the hospital, patients mentioned spiritual means and the use of herbal medicines.

[...]I have heard of one prayer camp which is into curing such diseases but I have not tried anything aside what I was given at the hospital [...] After taking the hospital medicine for a few months I saw how the medicine helped me so I did not think of going to that prayer camp [...] (TBP 3).
[...] I tried one herbal mixture recommended by a friend along with the hospital medicines. Hmm for about two weeks my condition was not getting better until I stopped taking the herbal mixture [...] (TBP 10).

It appeared that patients who had earlier resorted to the use of herbal medicines other than the orthodox medication reported with no improvement in their medical condition.

4.1.3.3 Nearness to health facility

In Ghana, cost of transportation is a major expenditure that takes greater part of people income or salaries. The poor nature of roads and traffic condition in urban Ghana makes it stressful for people to move around.

Interviewed participants expressed their opinions regarding how distance to the health facility could influence treatment outcome. Patients reported to have no challenge with the distance they had to cover to get to the health facility for medication as they lived in surrounding suburbs of the health facility. Per the protocol of the National TB control Programme in Ghana, TB patients must be referred to facilities near to their place of residence to enable them cope with their frequent visit to the hospital for medication. Thus this realisation was not surprising. Some patients reported to have walked to take their medicine because the distance from their house to the health facility is short.

[...] most of the times I walk with my husband to the hospital [...] It is not a long distance from my house so I use the walking as exercise [...] (TBP 8).
Some patient who reported to stay far from the health facility did not see the distance as a reason to stop taking their medication.

### 4.1.3.4 Stigma

Honour and respect are values that every Ghanaian expect of his or her fellow. People want to be seen as morally upright and socially acceptable. Having a disease alleged to be as a result of immoral behaviour will mean that the individual will lose the respect and fellowship he or she enjoys in society. TB is an example of diseases highly stigmatized in the communities. The stigma attached to TB could be due to the misconceptions Ghanaians have about it. This is evident in the names to the disease. For instance in the Twi language, TB is known as *nsamanwa* which translates as “ghosts‘ cough”. Thus, TB will undoubtedly kill whoever gets infected.

Interviewed participants expressed their opinions that related to stigma and how it influences treatment outcome. Generally, TB patients and their families did not disclose their relatives TB status to community members. According to the treatment supporters, they did this to protect the respect and dignity of their respective families:

[…] *No one on this compound knew what was wrong with my daughter except her husband and son […] I only told those who asked that it was typhoid. If I told them the truth, they regard our family as unclean and will look down upon me […]* (TS 1).
However, patients who disclosed their TB status to close friends and neighbours were stigmatized, isolated and insulted in their communities. They were sometimes denied access to shared washrooms and toilets provided for people living in compound houses. Treatment supporters found their work difficult yet they were hopeful for successful outcomes.

[…] Yes, I told neighbours of my sons condition, thinking that they would sympathize with me […] I was surprised at their attitude towards me and my family […] they will insult me with my sons condition […] they changed the padlock to the household bathroom so that we cannot bath there and contaminate the place […] (TBP 5).

[…] The nurses will be shouting go back and cover your mouth as if the patient is not a human being. It is embarrassing, even if I was the patient I will not come back again for medicine […] (TS 4).

Hence, it emerged that some healthcare providers despise TB patients, they try not to have any physical contact with them without protective equipment even when they are not coughing. Thus, to avoid the stigma from community and healthcare providers, TB patients stop going to the health facility for their medication. This behaviour explains why some patients default treatment.
4.1.4 Health Provider factors

This section presents analysis of healthcare provider factors, which could influence tuberculosis treatment outcome. The analyses are presented on the basis of the themes that emerged from the interview data.

4.1.4.1 Waiting time

Most Ghanaians put their businesses first to their health probably because of the common saying in the Twi language that “sika ye mogya” which translates as “money is life”. Thus, having money gives you an edge to survive and therefore people have to work at all cost to accumulate wealth. Moreover, traffic condition and unemployment situation in urban Accra demands that people wake up early for work to avoid lateness that could cause them their jobs. TB medicines are taken in the early morning before breakfast. It would not be surprising for patient to skip their medication in order to get to work early and make money.

Generally, patients reported to have spent less time at the DOT centre whenever they went to take their medicines. They were not forced to think of defaulting treatment because much of their time was taken by healthcare providers. They explained that the opportunity given them to schedule times for doctor’s review even motivated them to be committed to treatment. They described how healthcare providers would be ready to serve them as early as 5:00 am GMT before they went to work. When asked about their thought on the time spent at the facility, these highlighted common responses were provided:
I did not spend time at the hospital when I came to take my medication […] Immediately, I got there the workers gave me water and the medicine. So I am able to get to the market early to sell […] (TBP 4).

I felt my time was respected when the nurse asked me to decide what time within the week I could come for review […] so I also listen and follow the instructions they give me concerning my health […] (TBP 2).

When I have to meet the doctor for review, I spent lot of time in queue because the doctors are not many compared to the patients[...] There is always lot of people to see the doctor and no special doctor for TB patients only[...] (TPB 9).

However, patients expressed views on how they spent hours waiting to meet the doctor for review. They reported that this was because there were lots of patients with different medical conditions waiting to meet the doctor as well. Yet this long hours spent at the hospital had not discouraged them from continuing with treatment. They were given the opportunity to choose within a given week which day they would prefer to see the doctor for review. Thus they fix their review dates on days that do not pose any significant loss to them.

4.1.4.2 Cost of treatment

The standard of living in Accra metropolitan area is high. People earn relatively less income and spend more paying bills and supporting family members. For this reason people may not have
enough money to spend on their healthcare. Thus, health interventions that are costly to the individual are likely not to be patronized. For those interventions that come at a cost, patients may first engage in a cost/benefit analysis before choosing which intervention to commit resources to. Patients weigh the efficacy of treatment against the perceptions that it may be expensive. Thus, the returns that TB treatment brings to the patient should outweigh all other forms of cost including financial. Patients’ income becomes a barrier when their lack of money impedes their access to treatment. However, from data collected, it was realised that income level of patients was not a barrier to TB treatment. This is because TB treatment in Ghana is sponsored by the National Tuberculosis Program.

However, patients reported to have spent more of their money on food since the TB medicines increase patients appetite for food. They complained of having to eat much more within short time intervals.

[…] I could not work […] When I take the medicine, it makes me weak and very hungry […] I sleep and eat throughout the day […] (TBP 2).

Consequently, patients who did not have fat incomes and also lack family support were left to defaulting treatment in search of money. Such patients also benefit from processed foods that are distributed at the health facility once a while to patients. Yet they complained of the inadequacy of such food to resolve their hunger issues.
Sometimes I do not go for my medicine instead I went round with my taxi to gather some money to feed myself [...] If I do not do so, the medicine will kill me with hunger [...] (TBP 7).

[...] truly I did not pay for the medicines and laboratory test. Even the X-ray was covered by National Insurance [...] (TBP 3).

Patients admitted that the cost of transportation and the distance from their place of residence to the health facility was not a problem. They also reported to have paid nothing for the TB medicines they took at the hospital.

4.1.4.3 Insufficient finance and logistics

In Ghana, the funds allocated to healthcare provision are inadequate relative to the country’s disease burden. Health facilities have to devise several coping mechanisms to remain in operation. One of which is to unofficially halt the provision of some services. Sometimes, the inadequate funds and logistics are misused. This condition limits the workforce within the health system in providing standard care.

Generally, healthcare providers expressed opinions relating to how they no longer receive financial support from the Regional Health Directorate to support activities such as home visit, outreach programmes and tracking of default cases. Healthcare providers have to bear the cost of transportation to and fro patients’ home. They narrated how they get tired from walking in slums
to track cases lost to follow up. According to them, the hospital vehicle that they often use had broken down and no effort was being made to fix it.

[...] At first we have a car for home visits but now we are either told there no money for petrol or the car has broken down [...] We cannot afford to use our money on home visit [...] We are also tired with walking long distances to slum areas to visit patients [...] (HCP 2).

The analysis revealed that to cope with this situation, healthcare providers at the DOT centre limit the frequency of home visits even though it implies that they may lose out on some patients who might have migrated from their known place of residence. This condition discourages them from tracking patients who default. Providers believe that this contributes to unsuccessful treatment outcomes in some patients.

### 4.1.4.4 Attitude of healthcare providers

The human resource, their attitude and competencies within the health system is imperative to meeting health relative objectives. The workforce in most of the health facilities in Ghana is limited compared with the number of patients they serve. Bearing in mind that individual's beliefs and values influence their attitudes even at work, it is difficult to alter healthcare providers' beliefs about TB disease even if those conceptions are not true.

[...] Some nurses at the ward put on gloves and nose mask when touching TB patients who are not infectious [...] Hmm, I got really annoyed when a patients’ relative was given gloves to wear while washing the patients’ cloth [...] Even a doctor would not allow the patient to sit in his
consulting room but rather the patient stands outside while he the doctor sits in his office and talks with the patient with his door opened […] (HCP1).

From data analysis it appeared that healthcare providers who work outside the DOT Centre often avoid physical contact with TB patients at the hospital. Workers at the TB clinic indicated that doctors and nurses in other departments would refer patients who report of consistent coughing to the clinic without proper diagnosis. They feared contracting the infection if they spent much time interacting with such patients. Despite the training they have received on TB disease, their fear and the stigma attached to TB informed their attitude towards.

4.1.4.5 Co-infection (HIV)

Recently, the link between HIV and TB is clear. People who get HIV also get TB. Both conditions suppress the individual’s immune system and make the person susceptible to all kinds of diseases. It is difficult to tell which of these infections a patient contracted first. HIV and TB are stigmatized in Ghanaian communities. Producing such coughs means that one is expected to die soon. HIV is perceived as a disease from God to punish the promiscuous. Thus, having both conditions could be too much for an individual to live with in a community.

Interview participants articulated views related to HIV TB co-infection and how such condition affect TB treatment outcome. Generally, patients with HIV/TB comorbidity die during treatment.
According to healthcare providers interviewed, they could not explain if it was the HIV that caused patients death since patients’ respond positively to the TB treatment.

\[\ldots\] HIV patients already have weak immune system so when they get infected with TB their condition becomes worse \[\ldots\] they often die before treatment completion \[\ldots\] what we cannot tell is what causes their death, if it’s the TB or the HIV or the depression and stigma from their community \[\ldots\] (HCP 4).

\[\ldots\] the patient was fine; she was taking all medicines for the HIV and TB. \[\ldots\] she had begun to put on weight and the coughing had stopped. \[\ldots\] hmmm, it was only one morning that she passed away suddenly \[\ldots\] (TS 3).

The analysis showed how even treatment supporters confirmed the assertions of healthcare providers when they described how HIV/TB patients could die suddenly after showing signs of recovery.

4.1.4.6 Counselling from healthcare providers

In most of the Ghanaian communities, people have limited knowledge of and misconceptions about diseases. They report to the hospital when their condition is serious and expect to be cured within the shortest possible time in order to return to their jobs. Thus, they are willing to accept the counsel of healthcare providers for cure. This explains to some extent why Ghanaians respect and regard the advice of healthcare providers especially doctors. From the accounts of the
participants, it appeared that their attitude towards treatment and their treatment outcome were influenced by the counsel they received at the hospital.

[…] I felt lazy to go for the medication every day, it was a healthcare provider that encouraged me that I should not be deceived by the improvement I see in my health […] He said I should continue and finish my medication as prescribed by the doctor […] (TBP 5).

Patients recounted the knowledge they had amassed from such counsel and how that inspired them to take their medicines. Patients reported to have learnt the causes of TB and how they should live with their family to avoid the spread of the disease. They were exposed to common drug reactions and how to manage them. They expressed opinions related to how encouragement from healthcare providers helped them to overcome the challenge of waking up early every morning to take medicines. Patients confessed that but for the counsel received from healthcare providers, they would have stopped taking the medicines.

[…] I was told that if I continually miss my medication, the capsules will not be able to cure me of TB and I will have no option left than injections. I was motivated to take the capsules to avoid the worse […] (TBP 7)

Generally, the analysis revealed that while some healthcare provider factors could have a positive influence on treatment outcome, others could have a negative treatment outcome as well.
4.1.5 Adverse drug reaction

Some people can react to certain medications when administered. It is importantly so when it comes to TB drugs or HIV antiretroviral drugs. The unfortunate thing is that in most Ghanaian communities, people do not usually experience adverse reaction or allergy to some medications or food. This becomes evident only when the person takes some medicines:

[...] *A patient had Stephen Johnson’s Syndrome and we had to discontinue treatment [...] She was taken to Korle Bu Teaching hospital for further treatment [...] She returned to continue the medication anyway [...]* (HCP 1).

This was an obvious truth from the analysis when some TB patients recalled having skin rashes on the stomach and back. They mentioned that this condition did not prevent them from taking their medication since nurses provided them with creams that resolved the problem. However, some cases of drug reaction led to the discontinuation of treatment for some months.

4.2 Quantitative results

This section presents the results of the quantitative study analysed from the patients’ folders.

4.2.1 Descriptive Statistics for Data from TB Patients’ Folders

For this part of the study, 107 patient folders were reviewed. Summary statistics were calculated on age of respondents, and frequencies and percentages were calculated for respondents’ gender, HIV status, TB treatment outcome, and place of residence. Majority of the respondents were
males \((n = 72, 67\%)\). Records in TB patients' folders indicated that, most of them tested negative for HIV \((n = 86, 80\%)\), most of them were cured of TB \((n = 47, 44\%)\), and most of them reside in La \((n = 72, 67\%)\). Frequencies and percentages are presented in Table 4.5.
Table 4.5: Frequency Table for Demographic Characteristics of TB Patients

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>35</td>
<td>32.71</td>
</tr>
<tr>
<td>Male</td>
<td>72</td>
<td>67.29</td>
</tr>
<tr>
<td>Missing</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>107</td>
<td>100</td>
</tr>
<tr>
<td><strong>HIV status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative</td>
<td>86</td>
<td>80.37</td>
</tr>
<tr>
<td>Positive</td>
<td>21</td>
<td>19.63</td>
</tr>
<tr>
<td>Missing</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>107</td>
<td>100</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10-29</td>
<td>24</td>
<td>22.43</td>
</tr>
<tr>
<td>30-49</td>
<td>44</td>
<td>41.12</td>
</tr>
<tr>
<td>50-69</td>
<td>31</td>
<td>28.97</td>
</tr>
<tr>
<td>70-89</td>
<td>7</td>
<td>6.54</td>
</tr>
<tr>
<td>90 and above</td>
<td>1</td>
<td>0.94</td>
</tr>
<tr>
<td>Total</td>
<td>107</td>
<td>100</td>
</tr>
<tr>
<td><strong>TB treatment outcome</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Successful category</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Completed</td>
<td>33</td>
<td>30.84</td>
</tr>
<tr>
<td>Cured</td>
<td>47</td>
<td>43.93</td>
</tr>
<tr>
<td>Total</td>
<td>80</td>
<td>74.77</td>
</tr>
<tr>
<td>Not successful category</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Defaulted</td>
<td>14</td>
<td>13.08</td>
</tr>
<tr>
<td>Died</td>
<td>10</td>
<td>9.35</td>
</tr>
<tr>
<td>Lost but found</td>
<td>1</td>
<td>0.93</td>
</tr>
<tr>
<td>On treatment</td>
<td>1</td>
<td>0.93</td>
</tr>
<tr>
<td>Transfer</td>
<td>1</td>
<td>0.93</td>
</tr>
<tr>
<td>Missing</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>27</td>
<td>25.22</td>
</tr>
<tr>
<td><strong>Place of residence</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Burma camp</td>
<td>1</td>
<td>0.93</td>
</tr>
<tr>
<td>La</td>
<td>72</td>
<td>67.29</td>
</tr>
<tr>
<td>Labone</td>
<td>1</td>
<td>0.93</td>
</tr>
<tr>
<td>Nungua</td>
<td>2</td>
<td>1.87</td>
</tr>
<tr>
<td>Nyaniba estate</td>
<td>1</td>
<td>0.93</td>
</tr>
<tr>
<td>Osu</td>
<td>18</td>
<td>16.82</td>
</tr>
<tr>
<td>Pokuase</td>
<td>1</td>
<td>0.93</td>
</tr>
<tr>
<td>Sakumono</td>
<td>1</td>
<td>0.93</td>
</tr>
<tr>
<td>Tema station</td>
<td>1</td>
<td>0.93</td>
</tr>
<tr>
<td>Teshie</td>
<td>6</td>
<td>5.63</td>
</tr>
<tr>
<td>Trade fair</td>
<td>2</td>
<td>1.87</td>
</tr>
<tr>
<td>Weija</td>
<td>1</td>
<td>0.93</td>
</tr>
<tr>
<td>Total</td>
<td>107</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: TB Patients Folder, 2017
4.2.2 Variance Inflation Factors (VIF) for distance from health facility, HIV status, sex, and age

A binary logistic regression was conducted to examine whether distance from health facility, HIV status, sex and age had any significant impact on the odds of obtaining the unsuccessful category of treatment outcome. The reference category for treatment outcome was successful.

All predictors in the regression model have VIFs less than 10. This implies that the independent variables can be used in the logistic regression model without any disturbance in the results to be obtained. Table 4.6 shows results from the test of assumption.

Table 4.6: Variance Inflation Factors (VIF) for distance from health facility, HIV Status, Sex, and Age

<table>
<thead>
<tr>
<th>Variable</th>
<th>VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance from health facility</td>
<td>1.02</td>
</tr>
<tr>
<td>HIV Status</td>
<td>1.13</td>
</tr>
<tr>
<td>Sex</td>
<td>1.15</td>
</tr>
<tr>
<td>Age</td>
<td>1.02</td>
</tr>
</tbody>
</table>

Source: TB Patients Data, 2017

4.2.2.1 Logistic regression results with distance from health facility, HIV status, sex, and age predicting treatment outcome

The overall model was significant \( \chi^2 (4) = 14.68, p<0.005 \), suggesting that distance from health facility, HIV status, sex, and age had a significant effect on the odds of observing the Not Successful (unsuccessful) category of treatment outcome. McFadden’s R-squared was calculated to examine the model’s fit, where values greater than >2 are indicative of models with excellent fit (Louviere, Hensher, & Swait, 2000). The R-squared range values calculated for this model
were 0.13-0.19. The regression coefficient for distance from health facility was not significant, \( B = -0.12, \ OR = 0.89, \ p = .271 \ (p<0.005) \), indicating that distance from health facility (km), did not have a significant effect on the odds of observing the not successful (unsuccessful) category of treatment outcome.

The regression coefficient for HIV Status of TB patient was significant, \( B = 1.68, \ OR = 5.36, \ p <0.003 \), indicating that, compared with HIV negative TB patients, TB patients with HIV positive were 5.36 times more likely to have unsuccessful treatment outcome.

Successful category of treatment outcome would increase by approximately 436%. The regression coefficient for Sex was not significant, \( B = 0.29, \ OR = 1.33, \ p = .602 \ (p>0.05) \), indicating that sex, did not have a significant effect on the odds of observing the Not Successful category of treatment outcome. The regression coefficient for age was not significant, \( B = 0.03, \ OR = 1.03, \ p = .082 \ (p>0.05) \), indicating that age, did not have a significant effect on the odds of observing the incomplete category of treatment outcome. Table 4.7 summarizes the results of the regression model.

**Table 4.7: Logistic Regression Results with distance from health facility, HIV status, sex, and age predicting treatment outcome**

<table>
<thead>
<tr>
<th>Variable</th>
<th>P-value</th>
<th>OR(Adj)</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance from health facility</td>
<td>0.271</td>
<td>0.89</td>
<td>0.72</td>
</tr>
<tr>
<td>HIV Status (Ref: Negative)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>0.003</td>
<td>5.36</td>
<td>1.78</td>
</tr>
<tr>
<td>Sex (Ref:Female)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>0.602</td>
<td>1.33</td>
<td>0.45</td>
</tr>
<tr>
<td>Age</td>
<td>0.082</td>
<td>1.03</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Source: TB Patients Folder, 2017
### 4.2.2.2 Relationship between Sex of patients and TB treatment outcomes

Chi-square test of independence was used to ascertain the relationship between patient's TB treatment outcome and sex (table 4.7). The Chi-square test of independence is a hypothesis test conducted to guide the decision whether to reject the idea that the row and column classifications are independent. Since the p-value was greater than or equal to 0.05, we cannot reject the hypothesis that rows and columns are independent at the 95.0% confidence interval. Therefore, the observed value of patient's TB treatment outcome for a given case may bear no relation to its value for sex of patient.

**Table 4.8: Relationship between Sex of patients and TB treatment outcomes**

<table>
<thead>
<tr>
<th>Sex of Patients</th>
<th>Female</th>
<th>Male</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Died</strong></td>
<td>5 (50.0%)</td>
<td>5 (50.0%)</td>
<td>10</td>
</tr>
<tr>
<td><strong>Completed</strong></td>
<td>9 (27.3%)</td>
<td>24 (72.7%)</td>
<td>33</td>
</tr>
<tr>
<td><strong>Cured</strong></td>
<td>17 (36.2%)</td>
<td>30 (63.8%)</td>
<td>47</td>
</tr>
<tr>
<td><strong>Defaulted</strong></td>
<td>3 (21.4%)</td>
<td>11 (78.6%)</td>
<td>14</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>34 (32.7%)</td>
<td>70 (67.3%)</td>
<td>104</td>
</tr>
</tbody>
</table>

Source: TB Patients Folder, 2017

### 4.2.2.3 Relationship between HIV status of patients and TB treatment outcomes

From the table 4.9 below, majority (n=85, 82%) of the cases analysed were HIV negative while TB/HIV negative patients (n=12, 86%) defaulted. TB/HIV positive patients mostly died during treatment (n=7, 70%) whereas most patients without HIV got cured (n=45, 96%).

**Table 4.9: Relationship between HIV status of patients and TB treatment outcomes**


<table>
<thead>
<tr>
<th>HIV Status</th>
<th>Died</th>
<th>Completed</th>
<th>Cured</th>
<th>Defaulted</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative</td>
<td>3 (30.0%)</td>
<td>25 (75.8%)</td>
<td>45 (95.7%)</td>
<td>12 (85.7%)</td>
<td>85 (81.7%)</td>
</tr>
<tr>
<td>Positive</td>
<td>7 (70.0%)</td>
<td>8 (24.2%)</td>
<td>2 (4.3%)</td>
<td>2 (14.3%)</td>
<td>19 (18.3%)</td>
</tr>
<tr>
<td>Total</td>
<td>10</td>
<td>33</td>
<td>47</td>
<td>14</td>
<td>104</td>
</tr>
</tbody>
</table>

Source: TB Patients Folder, 2017

4.2.2.4 Multinomial logistic regression results with patients characteristics predicting treatment outcome

A standard multinomial logistic regression was used to predict TB treatment outcomes of patients. Four outcomes, died, cured, defaulted, and completed, were represented; died was used as the reference category. Two binary predictor variables, sex and HIV status, were used with males and testing positive as focus groups. Two quantitative variables assessing-distance from patient’s place of residence to TB treatment facility and age of patients were used. High values indicate longer distances and increase in age.

The result of the multinomial logistic analysis shows that the four-predictor model offers a statistically significant prediction of success. Prediction success for the cases was modest, with an overall prediction success rate of 58.7% and correct prediction success rates of 20%, 91.5%, 0.0% 48.5%, for TB patients who died, got cured, defaulted, and completed treatment, respectively.
Table 4.10 shows the regression coefficients, the Wald test, adjusted odds ratio, and the 95% confidence intervals (CI) for odds ratios for each predictor contrasting died with each of the treatment outcomes: completed, cured, and defaulted. The result indicated that only HIV status was statistically significant in each of the categories. For the first treatment category, *completed*, the result indicated that TB patients who are HIV negative are about 7 times more likely to complete treatment. For the second treatment category, *cured*, the result indicated that TB/HIV negative patients are about 64 times more likely to receive cure. For the third treatment outcome, *defaulted*, the result indicated that TB/HIV negative patients are about 13 times more likely to default.

Table 4.10: Multinomial Logistic Regression Results

<table>
<thead>
<tr>
<th>Treatment Outcomes</th>
<th>P-value</th>
<th>OR</th>
<th>95% CI for OR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Lower</td>
</tr>
<tr>
<td><strong>Completed</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>.56</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>.61</td>
<td>.99</td>
<td>.93</td>
</tr>
<tr>
<td>Distance from health facility</td>
<td>.77</td>
<td>1.03</td>
<td>.83</td>
</tr>
<tr>
<td>Sex (Ref: Male)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>.67</td>
<td>.70</td>
<td>.13</td>
</tr>
<tr>
<td>HIV Status (Ref: Positive)</td>
<td>.03</td>
<td>6.54</td>
<td>1.19</td>
</tr>
<tr>
<td><strong>Cured</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>.55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>.06</td>
<td>.95</td>
<td>.89</td>
</tr>
<tr>
<td>Distance from health facility</td>
<td>.69</td>
<td>.95</td>
<td>.76</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>Age</td>
<td>Sex</td>
</tr>
<tr>
<td>--------------------------</td>
<td>--------</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td><strong>Sex (Ref: Male)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>.66</td>
<td>1.49</td>
<td>.26</td>
</tr>
<tr>
<td>HIV Status (Ref: Positive)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative</td>
<td>.00</td>
<td>64.17</td>
<td>7.50</td>
</tr>
<tr>
<td><strong>Defaulted</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>.81</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>.87</td>
<td>1.00</td>
<td>.94</td>
</tr>
<tr>
<td>Distance from health facility</td>
<td>.28</td>
<td>.55</td>
<td>.19</td>
</tr>
<tr>
<td><strong>Sex (Ref: Male)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>.73</td>
<td>.70</td>
<td>.09</td>
</tr>
<tr>
<td>HIV Status (Ref: Positive)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative</td>
<td>.02</td>
<td>12.91</td>
<td>1.51</td>
</tr>
</tbody>
</table>

*Note:* the dependent variable was TB treatment outcome with *died* as reference category. The reference category is: Died. This parameter is set to zero because it is redundant.

**Source:** TB Patients Folder, 2017

### 4.3 Chapter summary

The chapter has presented results and analysis of findings from both the quantitative and qualitative studies conducted at the La General hospital regarding the factors influencing TB treatment outcome. While the quantitative results showed some factors having association and others not having association with treatment outcome, the qualitative findings also showed that, some factors could positively or negatively influence treatment outcome. The subsequent chapter presents the discussion of the empirical findings and how they could be explained by the chosen theory as well as how they relate to existing literature.
CHAPTER FIVE

DISCUSSION OF STUDY FINDINGS

5.0 Introduction

Discussion of findings of the study in relation to existing literature and the health belief model is presented in this chapter. There are six sections. Section one presents a summary of the demographic characteristics of participants. Section two discusses patient related factors. Section three presents healthcare provider factors in relation to existing literature. Section four discusses community related factors while section five presents discussions on adverse drug reactions. The last section presents the chapter summary.

5.1 Socio-demographic characteristics of TB patients

Majority of the TB patient reside in La and Osu, an average of 2.2 km away from La General Hospital. A few patients reside in places as far as 25km away from La General Hospital. Most of the patient respondents were in the age range of 30-49 years (41%). Males constituted 67% of the study participants compared to females (33%). This supports the findings of the study by Mukherjee et al. (2012), where males consisted (69.3%) of the participants. Results from this study indicated no association between age (p=0.82) and sex (p=0.43) on one side and TB treatment outcome on the other. This finding contradicts that of Burton et al. (2011); Ananthakrishnan et al. (2013) and Mukherjee et al. (2012) who found an association between TB treatment outcome and age as well as sex of patients.
5.2 Patient related factors and TB treatment outcomes

This section presents the analysis relating to the patient factors. The key themes/sub-themes have been analysed in the context of existing literature.

5.2.1 Knowledge of TB (Perceived seriousness)

In this study, patients’ knowledge of TB was found to be limited and had some influence on treatment outcome. All participants interviewed reported to have no knowledge of TB prior to their diagnosis. It emerged that patients who had relapsed and were re-infected did so as a result of limited knowledge of TB infection.

This finding can be explained by the Health Belief Model’s (HBM) element called perceived seriousness. This construct holds that, individual’s personal evaluation, beliefs and perceptions are important determinants of their health choices. According to Jones, Smith and Llewellyn (2014), personal judgment of the severity of a disease can explain patients’ behaviour regarding their health. Patients with less or limited knowledge of TB perceived the symptoms of TB as less serious to warrant immediate medical attention. This group of patients was likely to delay medical treatment and have unsuccessful treatment outcome. People who perceive TB as a dangerous condition do so due to the knowledge they have of the disease. Such people would be more proactive in seeking and complying with treatment compared with those who do not regard TB as serious.

This supports Muture et al. (2011), finding that, patients who have inadequate knowledge of tuberculosis, its causes and treatment are likely not to adhere to treatment. The study finding also supported the results of Sengul et al. (2015). These researchers found that limited knowledge of patients was among the core impediments to TB adherence. Sengul et al. (2015), suggested that,
knowledge of the factors influencing treatment success would lead to the implementation of strategies in PTB management, which may help reduce unsuccessful treatment outcome.

However, other studies have reported that, TB patients’ knowledge of the condition does not influence adherence and treatment outcome. For instance, Liam, Lim, Wong and Tang (1999), reported that adherence to treatment and follow-up was not affected by age, sex, educational level, occupation and extent of knowledge of tuberculosis.

5.2.2 Smoking and alcohol consumption (perceived susceptibility)

Analysis of the qualitative study indicated that TB patients who engaged in drinking alcohol and smoking did not see the risk of contracting TB out of that behaviour. It appeared that such patients ended up with relapse. Just a few realized the danger of smoking and drinking alcohol from the counsel of healthcare providers and stopped such an act. This helped them to obtain successful treatment outcome. This finding sits with that of Naidoo et al. (2013), who revealed that, the significant predictors of non-adherence included alcohol misuse, being HIV positive and tobacco use. Conclusions from meta-analyses conducted by Imtiaz et al. (2017), supported the study findings. These authors indicated that, alcohol intake caused 22.02 incident cases and 2.35 deaths in every 100000 TB case in 2014.

This finding could be explained by the HBM’s perceived susceptibility. Perceived susceptibility describes how peoples’ judgment of their chance of contracting a disease influences their health seeking behaviour, which has a bearing on their treatment outcome (Kamran, Ahari, Biria, Malpour & Heydari, 2014). Thus, smokers and alcoholics who perceived susceptibility to a TB often take action to decrease the risk or prevent unsuccessful outcome.
5.2.3 HIV Status (self-efficacy)

Logistic regression estimates indicated that TB/HIV positive patients had 5.36 (CI: 1.78 – 16.15) odds of obtaining unsuccessful outcomes compared with TB/HIV negative patients. TB/HIV negative patients had greater chance of completing treatment and getting cured. Interestingly, results from multinominal logistic regression revealed that, this same group of patients was more likely to default treatment (OR= 12.91, CI: 1.51-110.13). However, TB/HIV patients do not even live to default treatment. This explains why the odds of defaulting treatment are greater for TB/HIV patients compared with TB/HIV negative patients.

Explanations as to why TB/HIV positives obtain unsuccessful outcomes could be derived from the HBM construct called self-efficacy. It is the belief in one’s own self and ability to complete TB treatment with successful outcome. When presented with an option, people assess their individual ability to adopt and maintain a given health behaviour for the benefits that it presents (O'connor, Martin, Weeks & Ong, 2014). Compared with TB/HIV negative patients, TB/HIV positive patients have their immune systems compromised by these two conditions. Their confidence in their body’s ability to recover is low. Thus, they could die prior to or during treatment.

Even though there is a policy direction on TB/HIV integration in Ghana, due to inadequate ‘political will’ from management of Ghana AIDS commission and the National Tuberculosis Control programme, it has descended to lower levels, thereby hindering progress towards the inclusive management of TB/HIV (Amo-Adjei, Kumi-Kyereme, Amo & Awusabo-Asare, 2014).
5.2.4 Cost of treatment (perceived benefit)

TB treatment in Ghana is sponsored by the National Tuberculosis Programme (Amo-Adjei et al., 2014). It is not surprising that the study finding showed that, TB patients spent no money on their medication. This implies that irrespective of whether a patient earns more as income or not, he or she has equal access in terms of financial resources, to TB treatment. Moreover, protocol demands that patients are referred to the nearest health facility for medication (Amo-Adjei, 2016). This reduces cost incurred on transportation and time spent traveling to health a facility and back. This explains why patients reported to have spent less money on transportation to the facility every morning for their medication. Thus, successful treatment outcome is influenced by the cost of TB treatment and not how much one earns in terms of income.

In contrast, Tanimura et al. (2014), found from a systematic review of the financial burden of tuberculosis (TB) faced by patients and affected families that, income loss often constituted the major financial risk for patients. Muture et al.’s (2011), findings are in congruent with that of Tanimura et al. (2014). These authors found that, patients with low income may not be able to afford the cost of feeding and transportation related to treatment, which could cause them to discontinue treatment. A similar situation could arise in the case of TB treatment in Ghana if it was not for free. However, under the current system, it is free and as such, patients did not perceive the cost of treatment and transportation as having any influence on treatment outcome. This finding could be explained by the HBM element of perceived benefit. This principle elucidates that, when people are presented with options to choose from, the result from their cost effectiveness analysis is what determines their choices (O'connor, Martin, Weeks & Ong, 2014).

Realizing the cost effectiveness of treatment at the health facility, TB patients choose to comply with treatment.
5.3 Healthcare provider related factors

This section presents analysis of the findings of the healthcare provider factors and their association with extant literature.

5.3.1 Attitude of healthcare providers (perceived barrier)

People are the centre of the health system (Gamm, Hutchison, Dabney, & Dorsey, 2015). Their attitudes, beliefs and values influence their interaction with patients and their work in general (Bowling, 2014). This study found that attitudes of healthcare providers played a significant role in obtaining successful TB treatment outcome. Some healthcare providers working outside the Chest Department stigmatize and isolate themselves from TB patients due to their fear of contamination. This makes patients uncomfortable when they visit the hospital. Thus, making them discontinue treatment. It was also found that, where healthcare providers developed friendly relationships with patients, the patients tend take their medication as instructed. This implies that, healthcare providers’ fears and perceived susceptibility informs their attitudes, which could help increase success treatment or otherwise.

This finding is consistent with that of other studies (Chimbindi et al., 2014; Ananthakrishnan et al., 2013). These researchers found that, attitude of healthcare providers could encourage or discourage TB patients from attending health facilities. Thus, patients feeling of disrespect and unfair treatment by health providers, explains why they would not show up at the health facility to take medicines. Moreover, attitudes of healthcare providers in relation to TB treatment outcomes could be explained by one of the HBM’s tenets called perceived barrier. This tenet espouse that, difficulties that patients perceive to encounter should they adopt a given treatment option guides their choices and attitude towards the treatment regime (Green & Murphy, 2014). Attitudes of healthcare providers appeared as a barrier to patients’ compliance and treatment
outcome. Thus, to avoid the stigma, isolation and discrimination from healthcare providers, patients would avoid visits to the hospital for medicines.

5.3.2 Counselling by healthcare providers (perceived benefit)

Peoples’ perception of the efficacy of various actions available to lessen the threat of a disease or to a cure for a disease informs their choices. Actions people take in a disease condition depend on assessment of both perceived vulnerability and perceived benefit. People would accept the recommended health action if it was perceived as beneficial (Skinner et al., 2015).

The study observed that, counselling received from healthcare providers helped TB patients to overcome some challenges with compliance to the treatment regimen. Patients learn about the disease and how to manage themselves while on treatment so as to prevent the spread of TB. Counselling served as the trigger to deciding whether to comply with TB treatment regimen or not. Patients who followed the counsel of healthcare providers adopt new behaviours that facilitate treatment success. This supports the assertion that, when healthcare providers offer counselling, patients are more likely to complete treatment successfully (Muture et al., 2011).

5.3.3 Waiting time (perceived benefit)

When patients wait several hours at the hospital, they become frustrated with losing productive time in queues. Some studies (Nezenega & Tafere, 2013; Lusignani et al., 2013), on TB treatment conclude that long time spent at health facilities is a barrier to treatment compliance. For instance, Nezenega and Tafere (2013), established that, patients’ opinions on health care
provider attitude, absence of drugs and long waiting time had a negative influence on patient satisfaction and adherence to TB treatment. However, this study’s findings revealed that, TB patients did not wait for long at the health facility and thus, time spent at the facility was to the advantage of patients. All patients admitted to have reported early to the health facility to avoid being seen by people they know and being late for work. The healthcare providers also ensured that, patients were served on arrival. This is because the medicine is to be taken early in the morning before breakfast. Relating it to the HBM, when patients perceived benefit outweighs their fears and barriers, they tend to adhere to treatment for successful outcomes. This could be the reason why 75% of TB patients obtained successful outcomes.

5.3.4 Insufficient finance and logistics (perceived barrier)

TB medication in Ghana is sponsored by the Global Fund to Fight AIDS, TB and malaria yet there is inadequate political will for the fight against these diseases (Amo-Adjei et al., 2014). This is evident in the implementation of operational policies and allocation of resources. The study revealed that, healthcare providers’ responsibilities to patients and the community are limited by insufficient funds and logistic supply. Healthcare providers have to cater for their transportation cost to patients’ homes for follow up. Relating to the health belief model, providers are constrained in the delivery of TB service by limited resources. This situation could be considered as a perceived barrier to successful outcome. Thus, patients who have defaulted are most often not tracked to be put back on treatment. This assertion supports the findings of Dimitrova et al. (2006), that, in the health care system, inadequate funding was the primary reason for low screening coverage.
5.4 Community related factors

This section presents the discussion of findings on the community related factors in relation to literature and how they could be explained by the health belief model.

5.4.1 Stigma (perceived barrier)

TB is one of the diseases that is highly stigmatized and surrounded by misconceptions in the Ghanaian society (Thompson, 2015). Analysis indicated that patients would do everything possible to avoid the stigma attached to the disease, including having to stop taking their medication to avoid being seen by known faces in their community. TB patients perceived stigma as a great impediment to treatment success. Some healthcare providers outside the chest department also stigmatized TB patients. This supports the findings of Soomro et al. (2013), that social stigma was one main hurdle to TB adherence in Rawalpindi, Pakistan. According to these researchers, stigma from community influences patients to default treatment. Findings on stigma could be explained by HBM's perceived barrier. This implies that patients will forgo treatments to avoid embarrassments and isolation. Recognizing the shame and despise from their community, TB patients may avoid going for medicines/medication.

5.4.2 Family support (perceived benefit)

Drawing from the Ghanaian cultural context, people rely heavily on the extended family system for social support (Awumbila, Teye, & Yaro, 2016). Owing to this cultural context, the findings indicated that, most TB patients received social support from family members. These supports are in the form of monies, services and encouragement. Family support is explained by cue to
action related to the health belief model. Cues to action are the triggers of behaviour change. They could be events, people or things that motivated TB patients to overcome barriers, complete medication and get cure (Jones et al., 2014). If a patient is motivated and can perceive the benefits associated with a given treatment, there is a higher probability that, behaviour change will occur. Counselling and family support are cues to action that influence the level of adherence and treatment outcome.

This explains why Marfo (2001), reported that, poor family support was one of the main variables influencing high defaulter rate. This researcher explained that, patients discontinued treatment because their families were not financially and socially supportive. This finding corresponds with a study in peri-urban Lima, Peru, which revealed that family members contributed to meeting the psychosocial and economic needs of TB patients confronted with burdensome medical expenses (Paz-Soldán et al., 2013).

5.4.3 Alternative treatment (perceived benefit)

The study observed that TB patients knew and may have used alternative treatment. However, they abandon those alternatives for orthodox treatment. This is because their perceived benefits regarding the choice of orthodox treatment is what motivates them to continue with treatment. Such benefits include free treatment, nearness to patients’ residence and opportunity to schedule review dates. In line with the health belief model, patients perceive that medicine given them at the health facility is efficacious and therefore, there is no need to use herbal or spiritual remedies (Jones et al., 2014). Healthcare providers‘ advice patients against the use of alternative treatment since it could worsen their medical condition and increase their chances of defaulting
and treatment failure. This supports the argument raised by Muture et al. (2011), who conducted a case-control study in Nairobi, Kenya and found that, the use of herbal medicine was a predictor for defaulting treatment.

5.4.4 Nearness to health facility (perceived benefit)

The lack of geographical access to health facilities is one main reason for patients’ failure to fully comply with tuberculosis treatments. Findings from quantitative analysis indicated no association between distance and treatment outcome (p= 0.271; CI: 0.72 – 1.10). This assertion however, contradicts that of Marfo (2001); and Soomro et al. (2013). These authors revealed that long distance from health facility was among the major reasons for default. This implies that treatment outcome is affected by how close or far a patient lives from the health facility. However, qualitative findings showed that nearness to health facility serves as a benefit to patients. Short distance to a health facility could influence patients to comply with treatment, which could lead to successful treatment. Thus, TB patients perceived short distance to a health facility as a benefit and reason for complying with treatment. This finding sits well with the analogy of perceived benefit in the HBM (Green & Murphy, 2014). Hence, patients find it advantageous to receive treatment close to their residence where they will not incur much cost on transportation.

5.5 Adverse drug reaction (perceived benefit)

When patients suddenly developed negative reaction to medication, they begin to doubt the efficacy of these medicines and may stop taking those medicines. Mkopi et al. (2013), cited
examples of TB drug side effect as vomiting, severe headache, limp pains, rashes, swollen feet and reduced visual capacity. According to Yee *et al.* (2003), these reactions serve as barriers to treatment completion and could cause hospitalization, default, death and prolonged treatment. Unlike the findings of Yee *et al.* (2003), this study found that TB patients continued with treatment despite drug reactions. Although drug reaction could be a perceived barrier, the knowledge and remedies obtained from healthcare providers influenced patients’ decision to continue with treatment. It is only in severe conditions that patients are asked to stop the medication for drug sensitivity test and further medical examination. Moreover, this finding could be explained by the HBM specifically, perceived benefit (Green & Murphy, 2014). Thus, patients engaged comprehensive care where all challenges include drug reaction is catered for. Addressing drug reactions serves as a motivation for patients to continue treatment.

5.6 Chapter Summary

The chapter has analysed the findings of the study and related them to existing literature and the theoretical perspective of health belief model. It has demonstrated that, while some of the patient related factors, healthcare provider factors and community factors are associated with unsuccessful treatment outcomes, distance, age and gender were not significantly associated with unsuccessful outcome in the quantitative findings. However, the qualitative findings showed both positive and negative perceptions of factors that could influence treatment outcome.
CHAPTER SIX

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

6.0 Introduction

The study summary, conclusions and recommendations are presented in this chapter. The chapter is divided into five sections. Section one presents the summary of the study. Section two presents the conclusions of the study. Section three presents the contribution to knowledge/recommendations. Section four presents the limitations. Section five presents the suggestions for future research.

6.1 Summary of the Study

This section presents the summary of the study. The study sought to determine the factors associated with TB treatment outcomes at the La General Hospital. This was achieved by determining factor associated with TB treatment outcomes among patients, healthcare providers and the community members (TB treatment supporters) using a mixed methods approach to collect data between May and June, 2017. The data was analysed using appropriate statistical techniques, including SPSS version 21 and framework analysis. The key finding was that patient, healthcare provider and community factors, could influence TB treatment outcome either positively or negatively. The conclusions drawn on the basis of the specific objectives have been presented below.
6.2 Conclusions of the Study

The study’s conclusions are compared with conclusions from previous studies and presented under the specific objectives as stated in chapter one of the write-up.

6.2.1 Patient related factors

Generally, the study concludes that, patient related factors such as age and gender were not associated with TB treatment outcomes. However, smoking, limited knowledge of TB, alcohol consumption and HIV positive status could influence unsuccessful outcomes. Similar evidence exist that, despite public health efforts, patients who are hospitalized with TB are frequently admitted through emergency care settings, have a high risk for in-hospital mortality, and incur substantial hospital charges (Hansel, Merriman, Haponik, & Diette, 2004). Hansel et al. (2004), suggest that, to improve TB health outcomes, more vigorous clinical management and prevention strategies should especially target older patients and those with comorbid medical conditions. Having HIV as comorbidity among TB patients increased the odds of obtaining incomplete TB treatment and could influence successful outcomes. Similarly, a study in Spain, found that, the outcome of tuberculosis treatment was much worse in HIV-positive patients, where drug use and presence of neoplastic disease substantially affected mortality (Ruiz-Navarro et al., 2005).

6.2.2 Healthcare provider related factors

The study also concludes that healthcare provider factors, such as attitude of healthcare providers and insufficient funds and logistics could influence unsuccessful outcome(s). Counselling, however, could influence TB treatment successful outcome. Similar to the findings of this study,
a study conducted in Ho, Ghana observed that, treatment outcome was considerably better in the national tuberculosis programme (NTP) than in the semi-private clinic (Lönnroth, Thuong, Lambregts, Quy, & Diwan, 2003). Lönnroth et al. (2003:165), argued that, the difference is not likely to be due to differences in patient characteristics or in provider knowledge. These researchers attributed the issue to the different financial incentives for the providers in the two settings; and ways of paying for services by patients as the possible reasons for the observed difference in the quality of case management and treatment outcome.

Moreover, other attitudes of healthcare providers working at the DOT centres have been reported, for instance, a study in Thailand, explored the relationship between decentralization and a national disease control programme understanding the views and attitudes of staff working in a national TB control programme on the process of change and their involvement in that change (Newell, Collins, Baral, Omar, & Pande, 2005). Newell et al. (2005:212), noted that, among the important problems identified included: confused lines of authority, difficulties of integrated supervision, poor career paths and promotion possibilities, unclear performance management, lack of priority to be given to health and TB control, lack of local accountability, lack of capacity and the risk to the drug supply.

### 6.2.3 Community related factors

Additionally, it is concluded that nearness to health facility and availability of orthodox treatment of TB in communities could influence positive treatment outcome. However, Stigma could influence unsuccessful outcomes. Similar to this conclusion, a study found that, after adjusting for patient factors, having severe medication side-effect and travel time to clinic
increased treatment default (Jittimanee, Madigan, Jittimanee, & Nontasood, 2007). Jittimanee et al. (2007), reported that, the patient factor of being paid on a daily basis was also significantly associated with treatment default. A study in Ethiopia, which utilised both quantitative (cohort study) and qualitative (focus group discussion and an in-depth interviews) methods reported that, the complementary results obtained from the quantitative and qualitative components of the study indicated that, the TB club approach had a significant impact on improving patients‘ compliance with anti-TB treatment and in building positive attitudes and practices in the community regarding TB (Demissie, Getahun, & Lindtjørn, 2003).

6.3 Recommendations / Contribution to Knowledge

Every research attempts to fill gaps in literature. Therefore, this section presents the contributions made by the present thesis with regards to knowledge, education and public health practice.

6.3.1 Contribution to Policy and Practice

By WHO definition, Ghana achieved 100% DOTS coverage in 2000 (GHS, 2017). The Ghana Health Service, report shows that, Ghana is in the maintenance phase of DOTS expansion (GHS, 2017). One important observation made in this study was the effect that HIV status could have on TB treatment outcome. Given that having HIV increased the odds of incomplete TB treatment, there is the need for greater emphasis on collaboration between National HIV and TB control programmes. Greater collaboration will help provide a more holistic care to patients receiving TB treatment so that constraints arising from HIV could be addressed concurrently.
Logistics for health workers with regards to the provision of TB treatment must be given greater consideration as the lack of it appears to lower staff morale and satisfaction.

6.3.2 Contribution to Theory

The use of multiple approaches (that is, triangulation of methods) in the present study implies that, different sets of theories may apply to a given social phenomenon. The theory applied in this study was the health belief model (Green & Murphy, 2014). An important tenet of the theory is that individuals who perceive the severity of the disease and their susceptibility are more likely to change behavior into healthy lifestyles. The study indicated that TB/HIV co-morbid patients were more likely to have incomplete TB treatment outcome. Having HIV puts TB patients at risk for major complications and diseases. Yet, people with HIV tended to have high odds of incomplete treatment for TB. This is explained by the quantitative findings, which revealed that, TB/HIV co-morbid patients were more likely to die during treatment. This is an interesting observation given that the health belief model had predicted the contrary.

Govender and Schlebusch (2012), for example, reported that HIV patients exhibit high levels of depression and suicidal ideations underpinned by high sense of hopelessness. These analysts argued that, the general sense of hopelessness might ostensibly explain why the HIV comorbid TB patients might have lost hope in treatment and hence, leading to defaulting and incomplete treatment. Moreover, patients receiving TB treatment might have lost interest in the benefits of the treatment given that they had to deal with HIV too. Although the health belief model appears to partly explain the observations of the study, there remain more gaps in theory to explain the
observation precisely. Further research into theories, which combine psychological process leading to hopelessness in HIV/TB comorbid patients, might help explain the phenomenon. This study has therefore, contributed to understanding the health belief model, which was applied to a study of TB treatment outcome at the La General hospital. The study suggests the need for a combination of other theories to explain why TB patients who had HIV comorbidity were at increased risk for incomplete treatment and subsequently, died. Accordingly, the study recommends that, the key elements (patient, healthcare provider and community factors) within the context of Ghana could be extended to the HBM.

6.3.3 Contribution to Methodology

The present study employed mixed methods approach (both quantitative and qualitative). This helped to provide a holistic understanding of the phenomenon under study. The in-depth interviews allowed the understanding of individual level factors both from the views of patients, health care providers and community members (treatment supporters). Quantitative approaches also helped to test observations seen at the interview levels. The demerit of using a single approach was compensated for with the use of a mixed methods approach. This implies that, the mixed methods approach is very useful in the study of a socially sensitive topic such as TB treatment outcomes. Therefore, the findings of this study are based on methodological triangulation as described by earlier researchers (Hussein, 2015).

Hussein (2015), defines triangulation as the use of multiple methods, mainly qualitative and quantitative in studying the same phenomenon, for the purpose of increasing study credibility. This implies that, triangulation is the combination of two or more methodological approaches,
theoretical perspectives, data sources, investigators and analysis methods to study the same phenomenon. However, using both qualitative and quantitative paradigms in the same study has resulted into debate from some researchers arguing that the two paradigms differ epistemologically and ontologically (Hussein, 2015). Nevertheless, both paradigms are designed towards understanding particular subject area of interest and both of them have strengths and weaknesses.

6.4 Recommendations

Based on the overall findings and conclusions, the following recommendations have been made to influence public health policy and practice.

There is the need to address the gap in logistics at the policy making stage. This is particularly, important given that inadequate logistics could lead to low staff performance and poor morale of health workforce who are key partners in TB treatment.

There is the need to enhance the collaboration between the Ghana AIDS Commission and the National Tuberculosis Programme to develop policies that would help improve the health of HIV TB comorbid patients.

6.5 Limitations to the Study

The study had certain limitations. With regards to sample size, they study focused on only the patients, their treatment supporters and health providers at the La General Hospital in the Greater Accra Region of Ghana. This makes it difficult to generalize the findings to patients' population
in the whole country. There was a challenge calculating distance from patients’ house to the health facility because of difficulty in locating exactly where patients lived on google map.

6.6 Future Research

Future researchers should seek to address the challenges faced by the researcher, including the following. Future studies should recruit more patients from different regions in Ghana so as to enhance the generalization of the findings. Future studies can examine policies that could improve treatment outcomes for HIV-TB comorbidity patients.
Reference


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infection in children: systematic review and meta-analysis. *Bmj, 349*, g4643. [http://doi.org/10.1136/bmj.g4643](http://doi.org/10.1136/bmj.g4643)


residents; results from a cohort study, Peru. *Journal of Infection*, 71(3), 347-357. doi.org/10.1016/j.jinf.2015.05.010.


APPENDICES

Appendix A: Consent form for tuberculosis patients

School of Public Health

College of Health Sciences

University of Ghana

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<th>Title:</th>
<th>Factors associated with tuberculosis treatment outcomes under the Directly Observed Therapy at La General Hospital.</th>
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<td>Adwubi Eunice Twumwaa</td>
</tr>
<tr>
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<td>School of Public Health, College of Health Sciences, University of Ghana</td>
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General information about the research

The study seeks to determine the factors associated with tuberculosis outcomes among patients registered under the DOT system in the La General Hospital. Respondents consisting of all TB patients aged 10 years or more and registered from January, 2016 to December, 2016, will be selected from the DOT register. Respondents will be asked to respond to questions on tuberculosis treatment outcomes.
Possible risk and discomfort

The research will pose no risk to the respondent. However, there is possible discomfort associated with time. Some questions may prove embarrassing yet they are important to achieve study objectives.

Permission

You have been selected to participate in this study. The objective of the study is to determine factors associated with tuberculosis outcome. Your consent is therefore required. However, you can refuse to or withdraw from participating from the study at any time without fear of stigmatization or harm.

Confidentiality

All information you provide in this study will be kept confidential. Numbers will be assigned to questionnaire not names. Thus you are assured of anonymity.

Benefits with participating

This study seeks to find out factors associated with tuberculosis outcome. Although there will no direct benefit for participating, the findings are expected to inform sound policy decisions and programs aimed at improving TB outcomes under the DOT.

Undertaken

I have read and understand the above information. I am satisfied and therefore consent to participant in this study

……………………………………..…………………………………………………………
Code of participant  Date and signature of participant

……………………..  ………………………………………………

Name of researcher/research assistant  Date and signature of researcher/assistant

In case of any concern you can contact the Ethics Administrator, Ms. Hannah Frimpong, GHS/ERC on 024-599-7061
Appendix B: Consent form for healthcare providers

School of Public Health

College of Health Sciences

University of Ghana

Title: Factors associated with tuberculosis treatment outcomes under the Directly Observed Therapy at La General Hospital.

Principal investigator: Adwubi Eunice Twumwaa

Affiliated institution: School of Public Health, College of Health Sciences, University of Ghana

Address: School of Public Health, University of Ghana, Legon, Ghana.

E-mail address: etadwubi@st.ug.edu.gh

Tel. No: 0267019531

General information about the research

The study seeks to determine the factors associated with tuberculosis outcomes among patients registered under the DOT system in the La General Hospital. Respondents consisting of all TB patients aged 10 years or more and registered from January, 2016 to December, 2016, will be selected from the DOT register. Respondents will be asked to respond to questions on tuberculosis treatment outcomes.

Possible risk and discomfort
The research will pose no risk on participants. However there may be discomfort with having your views recorded. You are assured that data collected including voice recordings will be kept under password protection on the principal researcher’s laptop. Data will be destroyed after the study is done.

Permission

You have been selected to participate in this study. The objective of the study is to determine factors associated with tuberculosis outcome. Your consent is therefore required. However, you can refuse to or withdraw from participating from the study at any time without fear of stigmatization or harm.

Confidentiality

All information you provide in this study will be kept confidential. Thus you are assured of anonymity.

Benefits with participating

This study seeks to find out factors associated with tuberculosis outcome. Although there will no direct benefit for participating, the findings are expected to inform sound policy decisions and programs aimed at improving TB outcomes under the DOT.

Undertaken

I have read and understand the above information. I am satisfied and therefore consent to participant in this study

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University of Ghana  http://ugspace.ug.edu.gh
Code of participant                  Date and signature of participant

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Name of researcher/research assistant  Date and signature of researcher/assistant

In case of any concern you can contact the Ethics Administrator, Ms. Hannah Frimpong, GHS/ERC on 024-599-7061
Appendix C: Consent form for community members (treatment supporters)

School of Public Health

College of Health Sciences

University of Ghana

Title: Factors associated with tuberculosis treatment outcomes under the Directly Observed Therapy at La General Hospital.

Principal investigator: Adwubi Eunice Twumwaa

Affiliated institution: School of Public Health, College of Health Sciences, University of Ghana

Address: School of Public Health, University of Ghana, Legon, Ghana.

E-mail address: etadwubi@st.ug.edu.gh

Tel. No: 0267019531

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Possible risk and discomfort

The research will pose no risk on participants. However there may be discomfort with having your views recorded. You are assured that data collected including voice recordings will be kept under password protection on the principal researcher’s laptop. Data will be destroyed after the study is done.

Permission

You have been selected to participate in this study. The objective of the study is to determine factors associated with tuberculosis outcome. Your consent is therefore required. However, you can refuse to or withdraw from participating from the study at any time without fear of stigmatization or harm.

Confidentiality

All information you provide in this study will be kept confidential. Thus you are assured of anonymity.

Benefits with participating

This study seeks to find out factors associated with tuberculosis outcome. Although there will no direct benefit for participating, the findings are expected to inform sound policy decisions and programs aimed at improving TB outcomes under the DOT.

Undertaken

I have read and understand the above information. I am satisfied and therefore consent to participant in this study
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Code of participant                                                  Date and signature of participant

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Name of researcher/research assistant                                 Date and signature of researcher/assistant

In case of any concern you can contact the Ethics Administrator, Ms. Hannah Frimpong,
GHS/ERC on 024-599-7061
Appendix D: Data Extraction Tool

School of Public Health

College of Health Sciences

University of Ghana

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<td>Hospital Folder</td>
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<tr>
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<td>DOT treatment folder</td>
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<tr>
<td>ELIGIBILITY</td>
<td></td>
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<tr>
<td>------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Month and year of diagnosis</td>
<td></td>
</tr>
<tr>
<td>Date treatment started</td>
<td></td>
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<tr>
<td>Period on treatment</td>
<td></td>
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<tr>
<td>Current treatment status</td>
<td></td>
</tr>
<tr>
<td>□ Still under treatment</td>
<td></td>
</tr>
<tr>
<td>□ Cured</td>
<td></td>
</tr>
<tr>
<td>□ Default</td>
<td></td>
</tr>
<tr>
<td>□ Treatment failed</td>
<td></td>
</tr>
<tr>
<td>□ Not evaluated (referred)</td>
<td></td>
</tr>
<tr>
<td>□ Dead</td>
<td></td>
</tr>
<tr>
<td>Treatment supporter</td>
<td></td>
</tr>
<tr>
<td>□ Yes</td>
<td></td>
</tr>
<tr>
<td>□ No</td>
<td></td>
</tr>
</tbody>
</table>

| PATIENT RELATED FACTORS                         |
| HIV status | □ Positive  
|           | □ Negative  
|           | □ Not known |
| Comments on smoking | ---------------------------------------------  
|           | □ Not known |
| Comments on alcohol use | ---------------------------------------------  
|           | □ Not known |
| Last laboratory test result |  
| Follow-up month |  

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Next appointment date
Appendix E: Semi-Structured Interview Guide for Tuberculosis Patients

School of Public Health

College of Health Sciences

University of Ghana

Introduction

This interview will seek your perspective of the factors that influence TB treatment outcome. The outcome will help improve service delivery at the facility and the country as a whole. You are at liberty to stop answering any questions or withdraw altogether. This action may not affect your right to healthcare at the facility. However, I would be grateful if you could complete the interview. Your confidentiality, anonymity is assured as your name will not be used in the report.

Patient related factors

Questions will be followed by prompts to elicit information from participants on the following sub-themes.

1. Income

Could you please explain to me how income can influence treatment outcomes?

Would you say that the rich get cure of TB and the poor do not? Please explain your view on this.

2. Smoking behavior
Could you please share your opinion on the perception that patients who smoke while taking anti-TB drugs will not get cured?

Would you be able to explain to me how smoking can influence TB treatment outcomes?

3. Alcohol consumption

Would you explain to me how you believe alcohol could interfere with the potency of drugs to cure TB?

Would you please explain your thoughts on whether alcohol is good or not while taking treatment for TB?

4. HIV status

Would you be able to discuss with me the idea that anyone who has both HIV infection and TB could have adverse treatment outcomes?

Could you explain how HIV infection may influence TB or its treatment outcome?

5. Patient’s knowledge of TB

Would you be able to indicate to me if you would have had a different treatment outcome if you knew about TB at the early stages of your treatment?

Could you explain to me how your prior knowledge of TB could have affected your attitude towards treatment?

Assuming that you knew of TB before treatment, what would you have done differently during your treatment?
Adverse side effect

Would you please explain your thoughts on how drug side effect may influence treatment outcomes
Appendix F: Semi-Structured Interview Guide for Healthcare providers

School of Public Health

College of Health Sciences

University of Ghana

Introduction

This interview will seek your perspective of the factors that influence TB treatment outcome. The outcome will help improve service delivery at the facility and the country as a whole. You are at liberty to stop answering any questions or withdraw altogether. This action may not affect your right to healthcare at the facility. However, I would be grateful if you could complete the interview. Your confidentiality, anonymity is assured as your name will not be used in the report.

Healthcare provider factors

Questions will be followed by prompts to elicit information from participants on the following sub-themes.

1. Appointment times

Could you please comment to me on the view that patient treatment outcomes are influenced by TB clinic opening times?

Would you be able to explain the extent to which you assume that appointments and waiting times influence TB treatment outcomes?

2. Attitude of healthcare providers
To what extent would you support the opinion that patient’s treatment outcome to some extent depends on the attitudes of healthcare providers?

Would you be able to explain how TB patients relate to healthcare providers during treatment?

3. *Adverse side effect of Anti TB drugs*

Would you please comment on the view that adverse side effects resulting from TB drugs affect treatment outcomes?
Appendix G: Semi-Structured Interview Guide for TB Treatment Supporters (Community Members)

School of Public Health

College of Health Sciences

University of Ghana

Introduction

This interview will seek your perspective of the factors that influence TB treatment outcome. The outcome will help improve service delivery at the facility and the country as a whole. You are at liberty to stop answering any questions or withdraw altogether. This action may not affect your right to healthcare at the facility. However, I would be grateful if you could complete the interview. Your confidentiality, anonymity is assured as your name will not be used in the report.

Community related factors

Questions will be followed by prompts to elicit information from participants on the following sub-themes.

1. Stigma

Would you be able to indicate to me how people perceive TB patients in your community?

Would you be able to describe to me how community stigma of TB patients influences TB treatment?
2. *Family support*

Would you describe to me how families in the community support members with TB to take their drugs?

How do the following support systems: physical aid, financial support and sympathy, influence TB treatment outcome of patients in the community?

3. *Availability and use of alternative treatment*

Would you be able to discuss with me any other forms of TB treatment in the community?

Would you be able to explain whether people use these means to treat TB?