DEPARTMENT OF SOCIAL AND BEHAVIOURAL SCIENCES

SCHOOL OF PUBLIC HEALTH

COLLEGE OF HEALTH SCIENCES

GENDER DYNAMICS AND ADHERENCE TO TUBERCULOSIS TREATMENT IN THE GREATER ACCRA REGION

HANNAH BENEDICTA TAYLOR-ABDULAI

(10191778)

THIS THESIS IS SUBMITTED TO THE UNIVERSITY OF GHANA, LEGON IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF DOCTOR OF PHILOSOPHY (PhD) DEGREE IN PUBLIC HEALTH

MARCH, 2015

DECLARATION

I hereby declare that except for references, which have been duly acknowledged, this thesis is the result of my own research carried out under the supervision of the undersigned, and that, it has never been presented anywhere in part or in whole, for the award of any degree. I am absolutely liable for any shortcoming that might be detected in this work.

CANDIDATE

…… ……

Hannah Benedicta Taylor-Abdulai Date

(10191778)

SUPERVISORS

…….. ……

Prof. Philip Baba Adongo Date

(Principal Supervisor)

…… ……

Dr. Patricia Akweongo Date

(Supervisor)

ACKNOWLEDGEMENTS

I would like to extend my deepest appreciation to Professor Philip Baba Adongo my principal supervisor and Head, Department of Social and Behavioural Sciences, School of Public Health, University of Ghana, Legon for this great opportunity and tutelage. To Dr. Patricia Akweongo of Department of Epidemiology, School of Public Health, College of Health Sciences, University of Ghana, Legon for her detailed critique and very useful suggestions.

Special thanks go to the Institute of Infectious Diseases of Poverty (IIDP) for their generosity in sponsoring my PhD and its entire staff for their support.

My sincerest gratitude goes to all those who have in one way or another contributed and supported this work especially Dr. Samson Olusino Bamiwuye of Obafemi Awolowo University, Victoria Sharon Lisa Mumuni, Beatrice Nyarkwah Sekyere, Eric Koka, Elizabeth Awini, Philip Tabong and all students, staff and faculty of School of Public Health.

I am particularly thankful to all the TB coordinators that I worked with for over six months, uncle Ato and Mrs. Dorothy Agudey of Ghana Health Services (GHS), Dr. Frank Bonsu - Programme Manager and Mr. Felix Afutu - Monitoring & Evaluation Officer (M&E) of National TB Control Programme. My appreciation goes to all the TB coordinators and TB patients who participated in the study.

Finally, I wish to express my everlasting love to all members of my family, especially my husband and children, whom I have had to sacrifice for the entire period that I have been pursuing my PhD.

DEDICATIONS

This thesis is dedicated to the most important men who have made imprints in my life: Major John Kojo Taylor and Musah Abdulai, my beloved father and understanding husband respectively.

ABSTRACT

Tuberculosis (TB) infection is a global disease, however, its menace is felt more in the developing countries, with the marginalized, the poor and other hard-to-reach people facing the greatest barriers to diagnosis, treatment and cure. In relation to gender, TB is the third leading cause of death for women worldwide. Studies on TB and gender have indicated that women experience different risk factors, social and economic consequences and barriers to treatment as compared to men. Gender, as a variable has been found from both medical and social research to influence the epidemiology of TB in various ways. The main aim of the study was to assess the gender dynamics and adherence to TB treatment. The study was descriptive design and used both qualitative and quantitative methodology. The study involved 310 patients (112 female and 198 males) who were receiving treatment at the time of the study and in-depth interviews with 24 TB respondents made up of 12 males (6 TB/HIV co-infected and 6 HIV negative) and 12 females (6 TB/HIV co-infected and 6 HIV negative) and key informants made up of 6 TB coordinators selected from the six facilities where the study took place. Of the 42.3% respondents who did not adhere to the TB treatment regimen, 33% were female and 39.5% males. TB and HIV co-infected among the respondents involved in the survey was 11.9%.

Findings from the study indicated that among the factors used to assess adherence, females were more adherent than their male counterparts (demographic/socioeconomic factors (OR 2.83 CI 95%, 1.44 - 5.58, p>0.003), service/provider-related factors (OR 1.85 CI 95%, 1.05 - 3.23), p>0.032), gender-based factors (OR 1.71 (1.04 - 2.83), p>0.035), community-related factors OR 1.55 CI 95%, 0.94 - 2.55, p>0.087), patient-related factors (OR 2.36 (CI 95%, 1.38 - 4.03, p>0.002). Individual variables that produced significant results were age (40 - 49 p<0.012, 50 – 59 p<0.000 and 60+ p<0.05) marital status (married p<0.014,

widowed p<0.000, divorced/separated p<0.015), income, earning between Gh ₵ 200 and 399 p<0.000 and Gh ₵ 400, p<0.002. Those who reported getting money for treatment was not difficult were less likely to be non-adherent (p<0.002).

Findings from the in-depth interviews corroborated the quantitative findings. Males were more likely to ever-miss medication and key among the factors were inadequate education on the disease, distance to the health facilities, lack of social support, difficulty in getting money for treatment which translated in missing appointments schedules and number of years patients had lived in their community. On the other hand, factors promoting adherence were education by Health Care Workers (HCWs) about disease condition, age and income. The in-depth interview revealed that, stigma associated with the disease was the main reason why females especially adhered to the treatment regimen in order to be rid of the infection.

This study has implication for disease control in terms of better understanding the gender dynamics of the different barriers to TB health care and improving adherence and treatment outcome. The study has provided data on the magnitude of risk factors for non-adherence based on gender, which will be useful in estimating the impact of Directly Observed Treatment Short Course (DOTS) strategy over time, as well as for developing appropriate strategies to inform the National Tuberculosis Control Programme (NTP) in Ghana.

TABLE OF CONTENT

CONTENTS **PAGE**

CHAPTER SEVEN

LIST OF TABLES

Table **Page**

LIST OF FIGURES

Figure **Page**

LIST OF ACRONYMS

AFB	acid-fast bacilli
AIDS	Acquired Immune Deficiency Syndrome
ART	Antiretroviral therapy
BCG	BacilleCalmette-Guérin
CDR	Case Detection Rate
CPT	Co-trimoxazole Preventive Therapy
DOT	Directly Observed Therapy
DOTS	Directly Observed Treatment Short Course
EPTB	Extra pulmonary Tuberculosis
MDRTB	Multidrug-Resistant TB
NTP	National Tuberculosis Control Programme
HBM	Health Belief Model
GHS	Ghana Health Service
GAR	Greater Accra Region
HIV	Human Immunodeficiency Virus
HCW	Health Care Worker
LTBI	Latent TB Infection
TB	Tuberculosis
TST	Tuberculin Skin Test
WHO	World Health Organisation

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background of the study

The current estimates provided by the WHO Global Tuberculosis report 2014 are that 9.0 million people developed TB and 1.5 million died from the disease, 360,000 of whom were HIV-positive in 2013. However, it stated that TB is slowly declining each year and an estimated 37 million lives were saved between 2000 and 2013 through effective diagnosis and treatment (WHO, 2014). The WHO, 2014 report shows that majority of the TB cases and mortality occur among men, however, the burden of disease among women is also high (WHO, 2014). According to the 2013 report, in 2012, there were an estimated 2.9 million cases and 410,000 TB mortality among women, as well as an estimated 530,000 cases and 74,000 deaths among children (WHO, 2013).

Southeast Asia and the Western pacific contributed 58% of the World's TB cases in 2012. Among the South-East Asia regions, India and China have the highest proportion of cases (26% and 12%) of the global total TB cases respectively (WHO, 2013). Africa is reported to have had approximately one quarter of the World's cases, and the highest rates of cases and deaths relative to population – 255 incidence cases per 100,000 on average, more than twice the global average of 122 (WHO, 2013). In Africa, countries with the highest incidence are South Africa and Swaziland, recording the highest incidence of the global rate per capita - about 1 new case for every 100 people each year. The WHO, 2013 data indicated that an estimated 11% to 13% of incident cases were HIV-positive; African accounted for approximately 80% of these cases (WHO, 2013).

Epidemiologically, most TB infections occur in the developing world, with the marginalized, the poor and hard-to-reach people facing the greatest barriers to diagnosis, treatment and cure. These data have been found in the various reports produced yearly by WHO Global tuberculosis reports.

In relation to gender, TB is the third leading cause of death for women worldwide (WHO, 2004). Studies on TB and gender have indicated that women experience different risk factors, social and economic consequences and barriers to treatment than men (Allotey & Gyapong, 2008; Somma et al., 2005; Karim et al., 2003). Whereas men are more likely to have latent TB, women are more likely to develop active disease (WHO, 2004). In developing countries TB remains the third leading cause of death among women of reproductive age (15–44 years), disproportionately affecting pregnant women and the poor (WHO, 2009).

Gender, as a variable has been found from both medical and social research to influence the epidemiology of TB in various ways. Notable among such influences is the differences in social and economic roles that lead to differential exposure to TB, while differential health status, especially in low income countries, may lead to altered progression rates to TB disease (Weis et al., 2008; Karim et al., 2007; Atre et al., 2004; Needham et al., 2001; Thorson & Diwan, 2001). Needham et al., (2001) study found that the rate of progression from latent TB to TB disease is equal or greater in women during reproductive years while at older ages the rate of progression is higher in men. This has been found to be due to the high risk lifestyle of men such as socialization leading to excessive smoking and drinking, and working in more hazardous environment on one hand, and biological on the other (Rhines, 2013; Allotey & Gyapong, 2008; Karim et al., 2007; Thorson & Diwan, 2001; Needham et al., 2001). In some societies women are expected to have less access to health

care (primary and TB-specific), which may lead to delays in detection and treatment of TB (Weis et al., 2008; Karim et al., 2007; Thorson & Diwan, 2001). Socio-economic and cultural differences may have an effect on gender-specific treatment adherence and thus on treatment outcomes. HIV and AIDS in sub Saharan Africa is most prevalent among the female population, which may affect gender-specific prevalence of TB infection and disease, which happens to be an important opportunistic infection (Karim et al., 2007; Atre et al., 2004; Needham et al., 2001).

Research indicates that TB affects mainly women in their economically and reproductively active years, causing a substantial burden on children and families as compared to men (Atre et al., 2004; Needham et al., 2001; Thorson & Diwan, 2001). In the words of Carol Nawina Nyirenda, a TB and HIV advocate, "As *women we usually carry the dual burden of being infected and at the same time caring for their infected and affected family members and loved ones"* – this is the reality of the situation" (Women and TB: www.action.org, page 3).

According to WHO, diagnosis and treatment of TB have not also been equal across gender (WHO, 2003a). Fewer women are diagnosed with the disease, and stigma falls more heavily on them. The current treatment regimen - Direct Observed Therapy (DOT) as the standard of care for TB has also been seen to be stigmatizing since community members would get to know of the type of ailment one is suffering from, therefore the tendency that some might not adhere to the treatment regimen as a result of stigma or other factors (Dhingra & Khan, 2009; Balasubramanian et al., 2004).

The nature of TB treatment regimen equally presents an adherence challenge, as a patient is put on treatment for between six to eight months depending on the severity of the illness. Studies by Daniel et al., (2006); Kaona et al., (2004) have identified patient knowledge of regimen and attitudes toward TB treatment (including perceived benefits of treatment and perceived ability to overcome barriers to treatment) to be positively associated with better adherence to TB treatment. They also identified patient-provider relationship and of the health care setting as factors that contribute to adherence (Daniel et al., 2006; Kaona et al., 2004).

Adherence to treatment regimens that demand long-term therapies such as TB has been described by WHO as a multidimensional phenomenon determined by the relationship among several factors notably; social and economic factors, health/provider-related factors, patient-related factors, (WHO, 2003b). A study conducted in Ghana by Dodor & Afenyadu, (2005), examined the factors associated with TB treatment default and completion at the Effia-Nkwanta Regional hospital. Findings from the study indicated that default from treatment was significantly associated with income per month, ability to afford supplementary drugs, availability of social support and problems relating to others while on treatment. They also found that a cordial relationship between patients and health staff was the main motivating factor for completion of treatment, whilst financial difficulty was the main reason for defaulting from treatment (Dodor & Afenyadu, 2005).

This study assessed the gender dynamics by delving into factors that contribute to adherence or otherwise to TB treatment regimen in the Greater Accra region of Ghana.

1.2 Statement of the Problem

There is evidence that gender influence access to health care and therefore vulnerability to severe diseases such as TB (Khan et al., 2012; Allotey & Gyapong, 2008; Weiss et al., 2008; Karim et al., 2007; Atre et al., 2004; WHO, 2003a; Needham et al., 2001; Thorson & Diwan, 2001; Johansson et al., 2000; Hudelson, 1996). These pieces of empirical evidence are presented in different types of studies conducted predominantly in Southeast Asia, where there is high prevalence of TB with different socio-economic and cultural settings (Weiss et al., 2008; Karim et al., 2007; Thorson & Diwan, 2001; Borgdorff et al., 2000). In these studies, the proportion of males in the sample ranged from 70% to 75%. The studies were mainly quantitative and retrospective and therefore offer little explanation as to why there were higher proportions of males infected with TB or why high proportions of males seek care for TB and why women are in disadvantaged position in terms of factors associated with adherence and default.

Studies that have attempted to look at gender issues have limited themselves to comparing the sexes (male and female) in terms of prevalence. In addition, these studies used quantitative methods (Thorson & Diwan, 2001; Borgdorff et al., 2000). Weiss et al., (2008) admit that gender over the period has not received adequate attention in TB. Although all reporting countries have maintained sex-disaggregated data since 1997, many do not use it enough for research or action. Over the past decade, however, recognition of that gap has motivated some researchers to argue for attention to prioritise gender in TB control programmes (Allotey & Gyapong, 2008).

There is empirical evidence to suggest that women and men often face different barriers to accessing care due to socio-cultural and economic reasons (Khan et al., 2012; Allotey & Gyapong, 2008; Weis et al., 2008; Karim et al., 2007; Atre et al., 2004; WHO, 2003a;

Needham et al., 2001; Thorson & Diwan, 2001; Johansson et al., 2000; Hudelson, 1996). Evidence indicates that accessing and completing TB diagnosis and treatment are influenced by the interaction of factors such as demographic, socioeconomic, patient-related and health/provider-related factors, which are all affected by gender (WHO, 2003a; WHO 2003b). Other studies have also identified gendered institutional norms and processes that may also influence how women and men are treated by the health care system and access leading to their vulnerability in the form of inability to understand instructions and stigma (Dodor et al., 2008; Weiss et al., 2006). It is therefore timely to investigate the challenges related to gender and TB since adherence to treatment of TB is crucial in TB control programmes. On the other hand, non-adherence to treatment regimens is detrimental to national programmes since it leads to multi-drug resistance and therefore increases the cost and duration of treatment.

1.3 Research Questions

The study provided answers to the following research questions:

1. To what extent do demographic and socioeconomic factors affect TB treatment adherence among female and male TB patients.
2. What community and patient-related factors affect TB treatment adherence among male and female TB patients?
3. To what extent do provider and service related factors affect TB treatment adherence among male and female TB patients?
4. What are the effects of concomitant TB and HIV treatment on TB treatment adherence among co-infected male and female patients?

1.4 Study Objectives

1.4.1 General objective

The general objective of the study was to assess gender-based factors that influence adherence to TB treatment regimen.

1.4.2 Specific Objectives

The specific objectives were to:

1. Determine the demographic and socioeconomic factors that affect treatment adherence among female and male TB patients.
2. Assess patient and community related-factors that affect TB treatment adherence among male and female TB patients;
3. Assess the effect of provider and service related factors on TB treatment on TB treatment adherence and
4. Examine the effects of concomitant TB and HIV treatment on TB treatment adherence

1.5 Significance of the Study

The WHO acknowledged the fact that TB is a global health challenge and a symptom of global poverty as a result of the unequal distribution of resources in the world. It is important to note that 70% of the world's poor are female (www.ilo.org/gender) and that these poor women face the challenge of seeking health care and hence limiting them from going through a successful TB treatment regimen (Onifade et al., 2010).

Studies on TB in Ghana have overly focused on biomedical issues; delay in diagnosis and treatment and stigma related issues (Dodor et al., 2008; Dodor & Afenyandu, 2005; NTP, 2004 and NTP, 2006; Addo et al., 2006) without having to look at other equally pertinent issues that confront the TB control programme with regards to gender issues in the

treatment, completion rates and its associated challenges, thus leaving a research gap that needs to be explored and hence this study. This study is necessitated by a research paradigm shift, which sought to emphasise a gendered approach in the TB control programme.

Gender analyses in TB will provide an exploration of the dynamics of susceptibility and provide multiple potential points of intervention for disease control at a vital level of the TB control programme. Albeit, this study sought to do a trajectory of the gender dynamics of TB in relation to the factors that affect adherence to TB treatment regimen in the Greater Accra region of Ghana.

This study is important at a time when most researchers have called for further studies of this nature to be conducted to inform National Tuberculosis Control Programmes and other infectious diseases especially of poverty by using a gendered lens in identifying factors that aid adherence or serve as barriers to adherence.

1.6 Organisation of the thesis

The thesis is organized in seven chapters; chapter one deals with the introductory section, which, comprises; introduction, statement of the problem, objectives of the study, research questions, significance of the study and conclusion.

Chapter two presents an overview of both the global and national TB control programmes as initiated by the World Health Organisation (WHO). It is a review of the Global and national TB Control Programmes, diagnosing of TB in Ghana. The chapter contains the trend in the development of global TB control activities and examines the effects the HIV/AIDS epidemic has on TB incidence and mortality. The limitations of the DOTS strategy for TB control, particularly the neglect of the social milieu in which TB patients

access TB services, are highlighted, and the importance of understanding the stigma attached to TB to help improve case finding and treatment adherence is emphasised.

Chapter three is a review of the literature on TB from the history and epidemiology of TB, medical features, to diagnosis and treatment. It contains a review of literature on gender and TB, gender related influencing factors, stigma and TB, TB and HIV & AIDS, adherence to TB treatment, and the framework for the study.

Chapter four is a description of the study design and explains how the research was carried out. It outlines the principles of both quantitative and qualitative methodologies, and explains and justifies the data collection methods used. It also provides information on data collection and analysis, and ethical and practical issues that arose during the research process. The chapter ends by discussing how validity and reliability of the findings of the study were assessed.

Chapter five is a presentation of the results of the findings in three sections. The first section presents the descriptive data in the form of frequencies and percentages in tables and interjects with qualitative data, the second section presents bivariate data using Pearson chi-square and Fisher's exact test, and qualitative description of interviews with TB co-infected patients to understand the experiences of how they navigate both the initial stage of being diagnosed with TB and the treatment phase and the final section presents multivariate data using multi logistic regression.

Chapter six discusses the main findings of the study. It is a presentation of the general nature of factors that affect adherence from a gendered perspective and discusses gender and TB/HIV co-infection and treatment adherence. Finally, the chapter discusses strengths, strengths and limitations of the study.

Chapter seven is the concluding part of the study and looks at the summary, conclusions drawn from the study and means of improving adherence to TB treatment regimen in Ghana and outlines possible future research gaps.

1.7 Conclusion

This chapter presents the burden of TB globally. It provides enough evidence of the gaps that exist and highlights why the study should be conducted, the problem statement; the research questions for the study and objectives and finally presents how the study was organised.

CHAPTER TWO

2.0 OVERVIEW OF THE TB CONTROL PROGRAMME IN GHANA

2.1 Introduction

This chapter is a description of the events following the introduction of the current treatment regimen for tuberculosis (TB) and reviews the global TB control programme and concludes with the activities of the Ghana National Tuberculosis Control Programme (NTP).

2.2 Global TB Control Programme

TB has been known to man as far back as the mediaeval period. However, prominence was given the disease in 1991 when the World Health Assembly (WHA) resolution recognised TB as a public health problem and developed global efforts to control it (WHA, 1993). The goals for TB control were detection of 70% of new smear positive cases, and cure of 85% of such cases, by the year 2000 (WHA, 1993).

According to WHA, these goals would lead to reduction in the incidence rate of TB by 11% per year and in the TB mortality rate by 12% per year. In 1994, a new strategy the Directly Observed Treatment Short Course (DOTS) was developed for the management and treatment of TB (WHA, 1993). The DOTS strategy has five key components; political commitment, case detection mainly through passive case finding, standardized short-course chemotherapy to at least all confirmed sputum smear-positive cases, ensuring patient adherence to treatment, and adequate drug supply, and a monitoring system for programme supervision and evaluation (WHO, 1994). The DOTS strategy has been widely accepted and has been implemented in many countries. The various National TB Control Programmes worldwide have attained remarkable achievements in TB control. Notable

among the achievements is the number of patients treated under DOTS, which has exceeded 20 million by 2004 (WHO, 2006). Since the introduction of the DOTS, 16 million TB patients had been cured. The universal cure rate among new smear-positive TB cases reached 83% by 2003, and in 2004 the case detection rate was 53% (WHO, 2005). In spite of the successes chalked by DOTS, case management was noted to be woefully inadequate and needed an efficient health system and an organisation, which fits with specific country contexts (Macq et al., 2003; Mahendradhata et al., 2003).

The WHO designed the STOP TB strategy, which covered between 2001 and 2005. This strategy defined the efforts for TB control and, by the end of 2003, over three-quarters of the world's population lived in countries that had officially adopted DOTS (WHO, 2006). In 2006, WHO initiated the new Stop TB Strategy; the core of this strategy is the enhancement of the already existing DOTS, the TB control approach introduced by WHO in 1994. Since then, the number of patients who have been treated under DOTS-based services has been increased. The new Stop TB Strategy builds on the major progress in global TB control in the past decade. The new Stop TB Strategy addresses the key challenges of TB and HIV and MDR-TB, responds to access, equity and quality constraints, and adopts evidence-based innovations in engaging with private health-care providers, empowering patients and communities and helping to strengthen health systems and promoting research (WHO, 2006).

This strategy is to be implemented over the next 10 years as indicated in the Global Plan to Stop TB, 2006 – 2015, with many NTPs adapting it to suit their peculiar circumstance. The Global Plan is a complete assessment of the action and resources needed to implement the Stop TB Strategy and to achieve the following targets: Millennium Development Goal (MDG) 6, Target 8: Halt and begin to reverse the incidence of TB by 2015, detect at least

70% of new sputum smear-positive TB cases and cure at least 85% of these cases, and by 2015, reduce TB prevalence and death rates by 50% relative to 1990 (WHO, 2006).

2.3 Tuberculosis (TB) Control Programme in Ghana

Activities of TB control in Ghana date back to pre-independence. In July 1954, the Ghana Society for the Prevention of Tuberculosis was established to support and supplement government's efforts at combating the disease. In the early 1960's, the Government of Ghana sponsored nurses to be trained in Israel in the area of TB Management (www.ghanahealthservice.org). During the same period, Mobile X-Ray Vans were used to facilitate detection and management of TB cases. History has it that Dr. Moses Adibo, former Director of Medical Services was the founder and establishment of the National Tuberculosis Control Programme (NTP) between July 1965 and April 1968, when he was working at Winneba Government Hospital (www.ghanahealthservice.org).

In 1994 Ghana launched its NTP, based on the WHO's DOTS strategy, and set the same World Health Organisation (WHO) global target which aimed at detecting 70% of people with infectious TB and successfully curing 85% of those detected by 2008 (NTP, 2006). Ghana is among the countries in which the DOTS strategy has been implemented and it has TB coverage of over 80.6% of the population (WHO, 2010).

The NTP has developed two strategies for the expansion of DOTS; inclusion of private practitioners in TB control, which has been described as "Public-Private-Mix DOTS" (PPM-DOTS) and expansion of the TB programme to the community, also known as "Community-based DOTS" (CB-DOTS) (NTP, 2006). According to the NTP, the PPM-DOTS started on a pilot basis in the two largest metropolitans of the country namely Accra

and Kumasi in 2003. It was expanded to other parts of the country, including Shama Ahanta East Metropolitan (SAEM) district in 2008. Currently, the CB-DOTS incorporates all the recommendations of the WHO and is in consonance with the Ghana's national policy on Community-Based Health Planning and Service (CHPS), which seeks to improve access and expand coverage of health services in the country (NTP, 2006). Under the NTP structure, TB treatment centres are located in all regional, district and mission hospitals throughout the country. TB diagnosis and treatment are provided free of charge with some form of enablers to TB patients. However, according to NTP, (2006), patients who need supplementary drugs, for example blood tonics, analgesics and cough mixtures must pay for them.

The WHO Global TB report released in 2011 indicates that Ghana is among a few African countries that have met the World Health Assembly target of 70% TB case detection and 85% treatment success target. TB incidence and prevalence have reduced almost by 50%, a clear indication that Ghana is likely to achieve the Millennium Development Goal (MDG) target for TB control (WHO, 2011).

The NTP has started the implementation of the new Stop TB Strategy of WHO comprising six strategies to achieve the 2015 TB related Millennium Development goals as follows; firstly to pursue high-quality DOTS expansion and enhancement which include: Political commitment with increased and sustained financing, case detection through quality-assured bacteriology, Standardized treatment, with supervision and patient support, an effective drug supply and management system and monitoring and evaluation system, and impact measurement. The second strategy is to address TB/HIV, MDRTB and other challenges. Among the second strategy are the implementation of collaborative TB/HIV activities, prevention and controlling MDRTB, addressing prisoners, refugees and other

high-risk groups and situations. The third strategy includes; contribute to health system strengthening, actively participate in efforts to improve system-wide policy, human resources, financing, management, service delivery, and information systems, sharing innovations that strengthen systems, including the Practical Approach to Lung Health (PAL) and to adapt innovations from other fields. The fourth strategy is based on engaging all care providers through; Public–Public and Public–Private mix (PPM) approaches and International Standards for Tuberculosis Care (ISTC). The fifth strategy is to empower people with TB, and communities through advocacy, communication and social mobilization, community participation in TB care and Patients' Charter for Tuberculosis Care. The final strategy is to enable and promote research, develop programme-based operational research and research to develop new diagnostics, drugs and vaccines (NTP, 2012).

2.3.1 Incidence of TB and HIV in Ghana

The WHO estimates 44,041 new cases of all forms of TB in Ghana corresponding to a TB incidence rate of 211 per 100,000 inhabitants of whom 19,285 are smear positive cases (WHO, 2013). This upsurge of TB as noted by Addo et al., (2000) earlier than this publication is attributed to factors such as HIV and AIDS, poverty, population growth, overcrowding, malnutrition, stress, drugs and alcohol abuse, consumption of contaminated meat and milk and MDRTB.

In 1989 there was an estimated 14% of TB cases attributable to HIV, however, an estimated figure by the Ghana Health Service 2010 report shows that by 2009, as high as 59% of the estimated TB cases were attributed to the HIV epidemic. As a result, all TB patients are considered as possible HIV suspects and will have to go through HIV screening (GHS, 2010). The study found that the prevalence of HIV in TB patients to be between the range of 25% and 30%. Again, autopsies conducted in Accra found the

proportion of TB deaths increased from 3.2% in 1987 and 1988, which was the beginning of the HIV epidemic, to 5.1% in 1997 and 1998 (Adjei et al., 2005; Hesse & Neequaye, 2003; Gyasi et al., 2000).

Currently, there is a policy on integration of TB and HIV collaboration in Ghana. Among the key challenges is that TB and HIV co-infection are found to be high in Ghana making these co-infections cause of high morbidity and mortality among HIV and AIDS patients (GHS, 2007). The purpose of the policy is to delineate the roles and responsibilities of all stakeholders at every level of the provision of health, and to provide guidance on which collaborative TB and HIV activities are to be implemented in the country. This national approach is consistent with current WHO recommendations on the need for collaboration in addressing TB and HIV (GHS, 2007).

According to the 2013 Global TB Report, Ghana has an estimated 86 smear positive pulmonary TB cases per 100,000 population and 106 of all types of TB cases per 100,000 population per year. This translates into 26,000 TB cases annually with a national population of about 24 million. This notwithstanding, only about 15,800 was reported in Ghana in 2013, for which 50% were smear positive cases. Several reasons have been attributed to the current gap as reported in NTP training manual of January, 2012 and the policy document on the implementation of the collaborative efforts (NTP, 2012; NTP, 2011; GHS, 2007). These have been attributed to the fact that many people with TB do not report to health facilities, those who report to the health facilities are not diagnosed as having TB (missed diagnosis), that not all diagnosed cases at the health facilities are captured by the disease surveillance system and finally contact tracing and investigation are not routinely conducted (NTP, 2012; NTP, 2011; GHS, 2007).

2.3.2 National treatment outcomes

There have been tremendous improvements in the treatment outcomes of the TB control programme record nationwide as captured in various reports (NTP, 2011; GHS, 2007). The treatments success has improved from a rate of 72.4% in 2005 to 87.0% in 2009. Consequently, the adverse outcomes reduced from 27.6% in 2005 to 13.0% in 2009. Table 2.1 shows the trend of national treatment outcome of TB in the country.

Table 2.1: Trend of National treatment success rate

Treatment outcomes	2005	2006	2007	2008	2009
Treatment success (%)	72.4	74.5	84.6	85.4	87.0
Adverse outcomes (%)	27.6	25.5	15.4	14.6	13.0

Source: NTP 2012

From Table 2.1, the implication is that the NTP is making improvements in treatment outcomes while reducing the adverse outcome. From a high adverse outcome of 27.6% in 2005 to 13% in four years is a feat to be celebrated by the NTP, whilst treatment success has also been increased from 72.4% in 2005 to 87.0% in 2009, the figure has exceeded the global target set by the WHO.

2.3.3 Objectives of Ghana National Tuberculosis Control Programme (NTP)

The NTP has two main objectives:

1. To reduce the transmission of infection until it no longer poses a threat to public health.
2. To prevent the development of drug resistance

The above objectives relate more to adherence. If practical efforts are made to ensuring that patients who have been diagnosed with TB adhere to the treatment regimen, obviously these objectives will be met in the stipulated period.

2.3.4 Mission of Ghana National Tuberculosis Control Programme (NTP)

According to the NTP, its mission is to ensure that overall targets are met and these are:

1. Ensure that every TB patient has access to TB Treatment and care.
2. Stop transmission of TB
3. Protect vulnerable populations from TB
4. Reduce the social and economic toll that TB exerts on individuals, families, communities and the nation

2.3.5 Staff strength of NTP

The NTP has an ambitious goal of providing universal access to care for all TB patients and to achieve 100% case detection. These they are implementing through the six stop TB strategies. From 4% in 2002, the NTP has trained 7% of 42,000 public service providers in at least one TB component by 2008. According to the NTP, the current number of staff is woefully inadequate looking at the enormous task of having to increase case detection from as low as 50% to 70%. Considering the inadequate staff, the few trained to ensure quality of care and programme implementation leave due to transfers thereby creating training gap for new personnel. This situation might, if not handled properly, affect the quality of care and compromise adherence.

The following targets have been set for the NTP

1. To accelerate on-going efforts to reduce TB prevalence rate from 172 per 100,000 population in 2005 to 100 per 100,000 population by 2015.
2. To reduce TB case fatality rate from 9% in 2006 to 5% by 2015
3. To increase treatment success rate from 84% in 2007 to 90% in 2015
4. To increase case detection rate to at least 70% in 2015

2.3.6 TB diagnosis and treatment in Ghana

TB is diagnosed among patients self-reporting to the Out-Patient-Department (OPD) of healthcare facilities in the country. Individuals who present with a cough lasting two weeks or more first have to be screened by the use of TB screening questionnaire to be sure of the level of exposure before undergoing sputum smear microscopy and chest X-rays. Those found to have TB are then referred to the treatment centres where they are registered and put on anti-TB treatment. There are two phases of the treatment; intensive and continuation (NTP, 2012).

In the 'intensive phase' of treatment which last for the first two months, patients who live in communities far away from the treatment centre are supplied with their drugs and then referred to a health facility near their place of residence for daily 'direct observation of treatment' (DOT). Patients living near the treatment centres are expected to attend clinic every morning for DOT. About 90% of patients are managed daily on this ambulatory basis for the entire intensive phase of two months (NTP, 2012). However, patients who are severely ill or have other medical complications that will not permit ambulatory treatment are admitted to the hospital for treatment (NTP, 2012).

The 'continuation phase' of treatment spans four months; this period is unsupervised and requires all patients to report to the treatment centre once a week or on other arrangements depending on the patient. During the following month's visit the progress is reviewed, counseling offered and supplies replenished. However, this phase could be prolonged to eight or nine months instead of six months if patients do not adhere to the treatment or default, relapse or there is treatment failure. The treatment regimens used throughout the country are those recommended by the WHO (NTP, 2012; WHO, 2003).

The treatment regimens as stated in the WHO TB Treatment Manual 2003, Stop TB kit 2004 and NTP training manual, 2012 comprise:

Category I: This applies to all new cases with sputum smear-positive PTB or smear negative PTB and extra pulmonary tuberculosis (EPTB). These categories of patients are given a 6 month regimen consisting of two months of daily-supervised rifampicin, isoniazid, pyrazinamide, and ethambutol followed by four months of isoniazid and rifampicin. However, Extra-pulmonary tuberculosis (EPTB) patients are put on treatment for up to nine months depending on the location of the infection (NTP, 2012).

Category II: Previously-treated TB patients such as relapse; treatment failure and treatment after default cases are given an 8-month regimen consisting of three months of daily supervised rifampicin, isoniazid, pyrazinamide and ethambutol, supplemented by streptomycin during the first two months, followed by five months of daily rifampicin, isoniazid and ethambutol (NTP, 2012).

Category III: Children less than 12 years are given a 6-months regimen, consisting of two months of isoniazid, rifampicin and ethambutol and four months of isoniazid and rifampicin. Table 2.2 shows the recommended regimen for the various treatment categories.

Table 2.2 Recommended regimens for TB treatment category

TB treatment category	TB patient	TB treatment regimen	
		Initial phase	Continuation phase
		Daily (28 doses/month)	Daily (28 doses/month)
New	All new cases (including new smear-positive; new smear negative PTB, concomitant HIV extra-PTB)	2 (HRZE) = 56 doses of HRZE	4 (HR) =112 doses of HR
Previously treatment	Previously treatment sputum smear-positive PTB: relapse treatment after interruption treatment failure	2S (HRZE/1(HRZE) =84 doses of HRZE + 56 doses of S	5 HRE =140 doses of HRE

Source: NTP, 2012

2.3.7 TB drugs and codes

In Ghana, these drugs with their corresponding codes are used in the treatment of TB. Each drug has it code which, allows for short forms to be used instead of writing the names of the drugs in full (NTP, 2012). These drugs with their accompanying codes are further combined in what is termed as Fixed Dose Combination (FDC) formulations for easy administration and subsequent intake by the patient. By virtue of the fact that they are combinations of drugs, they come in huge 'blister packs especially during the continuation phase. As a result some find it very difficulty to swallow which poses adherence challenge.

DRUG	**CODE**
Isoniazid	H
Rifampicin	R
Pyrazinamide	Z
Streptomycin	S
Ethambutol	E

Source: NTP, 2012

For the purpose of TB treatment these drugs come in fixed combination formula.

CODE	DRUG
HR	Isoniazid + Rifampicin
HRZ	Isoniazid + Rifampicin + Pyrazinamide
HRZE	Isoniazid + Rifampicin + Pyrazinamide + Ethambutol

Source: NTP, 2012

2.3.8 TB Treatment Regimen

In Ghana, the NTP has chosen a few regimens in order to standardize treatment. Table 2.2 presents the recommended treatment regimen for TB treatment categories. The prescribed doses are based on three weight categories in adults;

Weight	Dosage
30 – 39 kg	two tablets
40 – 54 kg	three tablets
55 kg and above	four tablets

Source: NTP, 2012

Patients weighing between 30 and 39 kilogrammes take 2 tablets, those weighing between 40 and 54 kilogrammes take 3 tablets and finally, those weighing 55 kilogrammes or more take 4 tablets daily continuously for between 6 and 9 months. This therefore calls for adherence challenges in view of the fact that even if patients feel well they still need to continue and complete the course.

2.8 Conclusion

This chapter traces the effect of stakeholders working in the area of TB from the global perspective and links it to national efforts at curbing the debilitating effect of TB at both the international and national levels.

CHAPTER THREE

3.0 LITERATURE REVIEW

3.1 Introduction

This chapter reviews literature on the history and epidemiology of tuberculosis (TB), clinical manifestations, diagnosis and treatment of TB. It further explores issues of gender and TB, by relating gender, issues to factors affecting treatment adherence, TB and HIV and concludes by examining in detail the theoretical frameworks applicable to the study.

3.2 History of TB

TB is an airborne disease caused by the bacterium *Mycobacterium tuberculosis (M. tuberculosis). M. tuberculosis* and seven very closely related mycobacterial species (*M. bovis, M. africanum, M. microti, M. caprae, M. pinnipedii, M. canetti and M. mungi)* together comprise what is known as the *M. tuberculosis* complex. Most, but not all, of these species have been found to cause disease in humans. *M. tuberculosis* organisms are also called *tubercle bacilli* (CDC, 2000).

The history of the origins and global spread of TB have changed over the years as new archeological discoveries are made and molecular technologies evolve (Davis, 2000). According to Davies, (2000) studies have enabled scientists to hypothesize that *M. tuberculosis* evolved from the closely related *mycobacterium, M. bovis*, possibly coexisting with the domestication of cattle by humans almost 15,000–20,000 years ago. Prior to discovering the cause of TB, it was known through the ages by many names. Consumption, psthisis, scrofula, Pott's disease, King of Diseases and the white death (or white plague) are some examples (Davies, 2000).

Studies identified TB in mummies from Egypt as far back as 5,400 years (Daniel, 1997 & Davies, 2000). Skeletal remains show TB spread throughout Europe and the Middle East during the Stone Age (Ryan, 1993; Daniel, 1997). Other skeletal remains suggest that TB reached the Americas with the early migrants through the Bering Strait and remained a major health menace throughout the pre-colonial period (Daniel, 2000). Daniel, (2000) writes on the effect of TB in Europe and North America during the 18th and 19th centuries in which TB claimed a substantial number of lives in those continents and earned the title "Captain Among these Men of Death" (Daniel, 2006).

In his write-up Daniel, (2000) opined that the menace of the disease declined when researchers such as Théophile Laennec understood the pathogenesis of TB and began working towards finding remedies at the beginning of the 19th century. He further advanced by the demonstration of the transmissibility of *M. tuberculosis* infection by Jean-Antoine Villemin in 1865 and the identification of the *tubercle bacillus* as the etiologic agent by Robert Koch in 1882.

According to Daniel, (2000), Laennec's work was possible in large part because of his enormous experience with autopsies of persons dying of TB at the Hôpital Necker in Paris. By Laennec's era, TB had heaved across Europe in an epidemic tsunami. Death rates in London, Stockholm, and Hamburg approached between 800–1000 and 100,000 per year at that time. Robert Koch one of the pioneering scientists to unravel the cause of TB was awarded the Nobel Prize in the early 20th century. The excerpt of Robert Koch presentation on TB on the Nobel Prize website has been captured here as:

> *"If the importance of a disease for mankind is measured by the number of fatalities it causes, then tuberculosis must be considered much more important than those most feared infectious diseases, plague, cholera and the like. One in seven of all human beings dies from tuberculosis. If one only considers the productive middle-age groups, tuberculosis carries away one-third, and often more."* (www.nobelprize.org Robert Koch, 12 December 1905)

Koch's lecture, during his Nobel Prize award was considered by many to be the most important in medical history. It was so innovative, inspirational and thorough that it set the stage for the scientific procedures of the twentieth century. During his presentation he vividly described how he had invented a new staining method and demonstrated it for the audience using guinea pigs which were infected with TB material from the lungs of infected apes, the brains and lungs of humans who had died from blood-borne TB, the cheesy masses in lungs of chronically infected patients and the abdominal cavities of cattle infected with TB. He proved beyond all reasonable doubt hat TB is caused by a germ (Koch, 1905).

Koch's work, which, he highlighted in his lectures during the Nobel award, brought a revolution in medical science even though in modern day science people still perceive TB to be caused by witchcraft (Koch, 1905). In Koch's work, the causes of the great scourges could no longer be assigned to witchcraft, ghosts, God's will or any superstition in the western world. Instead they were to be found in germs, microscopic creatures that reproduced in the body and spread from person to person.

Clemens von Pirquet developed the tuberculin skin test in 1907 and 3 years later used it to demonstrate latent TB infection in asymptomatic children. In the late 19th century and early 20th century sanatoria were developed for the treatment of patients with TB (Daniel, 2000). The rest provided in the sanatoria was supplemented with pulmonary collapse procedures designed to rest infected parts of the lungs and to close cavities (Daniel, 2000).

Public health measures to control the spread of TB emerged following the discovery of its bacterial cause (Daniel, 2000). The most important breakthrough in the history of TB is by Albert Calmette and Camille Guérin who developed BCG (Bacille Calmette-Guérin) in

1921 at the Pasteur Institute of Lille, Paris. The development of BCG has protected many a children who hitherto might contract TB and die (Daniel, 2000).

The high mortality associated with TB was reflected in art, social policy, and science (Barnes, 1995). Although the wasting pallor caused by TB became romanticized briefly during the mid-19th century novelists, researchers observed that the disease was otherwise overwhelmingly perceived to be caused by poverty, uncleanliness, or immorality (Dickens, 1986 and Brontë, 1946 cited in Daniel, 2000 and Ott, 1996).

As far back as 1952, Dubos and Dubos, (1952) noted that even in ancient times, written records and even death records may have downplayed the existence of TB, suggesting negative social stigma. Notable advances in understanding the patho-physiology and clinical manifestations of TB occurred during the 17th, 18th, and early 19th centuries (Ayvazian, 1993). By linking the disease to its social context, scientists and political leaders advocated for social reform with mechanisms such as better nutrition, improved sanitation, and better housing to reduce the disease (Ayvazian, 1993).

Other scientists have made significant contributions towards diagnosis, treatment and control of TB, notable among them are; Jorgen Lehmann who discovered para-amino salicylic acid (PAS) in 1943 and Gerhard Domagk who found thiosemicarbazone to be efficacious during wartime Germany and, by the end of 1945 produced the first therapeutic agents with efficacy in the treatment of TB. Albert Schatz, Elizabeth Bugie, and Selman Waksman reported the insolation of streptomycin, the first antibiotic and first bactericidal agent effective against *M. tuberculo*sis (C. von Pirquet cited in Daniel, 2000).

Subsequently, the introduction of the first antibiotics to treat TB also enhanced the assumption of physicians' expertise and authority in ameliorating this major public health menace. Isoniazid was the first oral mycobactericidal drug in 1952 and rifampicin in 1957. The discovery of the first oral mycobactericidal drug created room for effective public

health measures to become possible. Treatment was increasingly expanded to include those with latent TB infections. The history of TB control entered a new chapter. Curative measures were put in place and became the goal sought for every afflicted person in the world by the WHO (WHO, 1974; Ryan, (1992) cited in Daniel, 2000). In 1974, the WHO Expert Committee on Tuberculosis issued its Ninth Report, a document that provided policy guidelines for TB control for the next two decades (WHO, 1974). Over the successive decades, despite declining TB mortality rates in industrialized nations, TB continued unabated throughout most of the world in spite of improved treatment regimen. Further, the emergence of the HIV epidemic and of Multidrug-Resistant Tuberculosis (MDRTB) constituted a cause for serious global concern. Concurrent with the calls from the medical community for new social and behavioral interventions was a call in the social sciences for a better understanding of the potential impact of such interventions and to develop new intervention strategies through coordinated, theory-driven research (IOM, 2000; WHO, 2013).

3.3 Epidemiology of TB

The epidemiology of TB has an unequal global distribution as noted in the history of the disease. The WHO Global TB 2013 report provides current epidemiological data on TB which indicate that an estimated 1.1 million (13%) of the 8.6 million people who developed TB in 2012 were HIV-positive. About 75% of these cases were in the African Region. All over the world in 2012, an approximately 450,000 people developed Multi-drug Resistance tuberculosis (MDRTB) and there were an estimated 170,000 mortality from MDRTB. Most TB cases and deaths occur among men, but TB remains among the top three killers of women worldwide (WHO, 2013; WHO, 2003). There were a projected 410,000 TB deaths among women in 2012, including 160 000 among HIV-positive

women. Half of the HIV-positive people who died from TB in 2012 were women (WHO, 2013). Among the estimated 8.6 million new TB cases worldwide in 2012, 2.9 million were women (WHO, 2013). Again, the report indicates that there were an estimated 530,000 TB cases among children less than 15 years of age and 74,000 TB deaths among HIV-negative children of the same age group in 2012 representing 6% and 8% of the global totals, respectively. The bulk of cases worldwide in 2012 were in the South-East Asia, which represent 29%; African represents 27% and Western Pacific represent 19%. India and China alone represented 26% and 12% of total cases, respectively. The TB incidence rate at country level is 1000 or more cases per 100,000 people in South Africa and Swaziland, and less than 10 per 100,000 population in the Americas and other Western Europe countries such as Japan, Australia and New Zealand. The five countries with the largest number of incident cases in 2012 were India which recorded between 2.0 million and 2.4 million, China recorded between 0.9 million and 1.1 million, South Africa recorded between 0.4 million and 0.6 million, Indonesia had between 0.4 million and 0.5 million and Pakistan reported 0.3 million and 0.5 million. In 2012, 6.1 million cases of TB were notified to national TB programmes (NTPs). Of these, 5.7 million were people newly diagnosed in 2012 and 0.4 million were previously diagnosed TB patients whose treatment regimen was changed. The report further noted that notifications of TB cases have stabilised globally. In 2012 about 66% (approximately 5.7 million) of the estimated 8.6 million people who developed TB were notified as newly diagnosed cases (WHO, 2013).

Most of the High Burden Countries have rates of between 150 and 300 cases per 100,000 population. High Burden Countries with markedly lower rates are Brazil and China, while rates are above 500 per 100,000 population in Mozambique, South Africa and Zimbabwe. Other countries in the top ten worldwide in terms of incidence rates are mostly in Africa.

In South Africa and Swaziland, the best estimate is that at least 1 in every 100 people (1000 or more per 100,000 population) develops TB each year.

3.3.1 Mode of transmission of TB

M. tuberculosis is carried in airborne particles, called droplet nuclei, of 1–5 microns in diameter.

Infectious droplet nuclei are generated when a person with pulmonary or laryngeal tuberculosis (TB) disease coughs, sneezes, shouts, or sings (Nicas et al., 2005). Depending on the environment, these tiny particles can remain suspended in the air for several hours. *M. tuberculosis* is transmitted through the air, not by surface contact (Nicas et al., 2005). Transmission occurs when a person inhales droplet nuclei containing *M. tuberculosis*, and the droplet nuclei cross the mouth or nasal passages, upper respiratory tract, and bronchi to reach the alveoli of the lungs. Any active droplet may transmit the disease since the infectious dose of TB is very low - the inhalation of fewer than 10 bacteria may cause an infection (Nicas et al., 2005).

Infection occurs when a person inhales droplet nuclei containing tubercle bacilli that reach the alveoli of the lungs. These tubercle bacilli are ingested by alveolar macrophages; the majority of these bacilli are destroyed or inhibited (Nicas et al., 2005). A small number may multiply intracellular and are released when the macrophages die. If alive, these bacilli may spread by way of lymphatic channels or through the bloodstream to more distant tissues and organs including areas of the body in which TB disease is most likely to develop: regional lymph nodes, apex of the lung, kidneys, brain, and bone also known as Extra-pulmonary TB (ETB). This process activates the immune system for a systemic response (Nicas et al., 2005).

3.3.2 Clinical manifestation of TB

As has been noted earlier in this chapter, TB infection in humans is a communicable disease caused by *M. tuberculosis*. Although it can affect any part of the body, generally only active pulmonary and laryngeal TB pose a risk of transmission from one person to another (WHO, 2001; CDC, 2000). Like influenza, *M. tuberculosis* is transmitted when a susceptible individual inhales air containing droplet nuclei carrying the tubercle bacilli (WHO, 2001; CDC, 2000). Once inhaled, the droplet nuclei eventually reach the lungs and repeatedly spread throughout the body. In most cases, a competent immune system limits the multiplication of the tubercle bacilli, although some bacilli remain dormant but viable, rendering a condition known as latent TB infection (LTBI) which, according to the WHO, (2001) an estimated one third of the world's population has LTBI (WHO, 2001 and CDC, 2000).

A person with LTBI has an estimated 10% lifetime risk of developing active TB disease. However, certain persons, including children under 5 years of age, persons who have a weakened immune system due to conditions such as malnutrition, HIV and AIDS, diabetes, or certain cancers, and those recently infected with *M. tuberculosis* have a much greater risk of developing active TB. HIV is the strongest known risk factor for developing active TB disease. Studies suggest that being infected with HIV puts people at a 7% to 10% per year risk of developing active TB (WHO, 2001; CDC, 2000).

3.3.3 Latent TB Infection

Persons with LTBI do not feel sick and do not have any symptoms. They are infected with *M. tuberculosis*, but do not have TB disease. The only sign of TB infection is a

positive reaction to the tuberculin skin test or TB blood test. Persons with LTBI are not infectious and cannot spread TB infection to others (CDC, 2000).

Overall, without treatment, about 5% to 10% of persons with LTBI will develop TB disease at some time in their lives. About half of those people who develop TB will do so within the first two years of infection (CDC, 2000). For persons whose immune systems are weak, especially those with HIV infection, the risk of developing TB disease is considerably higher than for persons with normal immune systems (CDC, 2000). Of special concern, are persons infected by someone with extensively drug-resistant TB (XDR TB), who later develops TB disease. These persons will have XDR TB, not regular TB disease (CDC, 2000). Extensively drug-resistant tuberculosis (XDR TB) is a moderately unusual type of multidrug-resistant tuberculosis (MDRTB). It is noted to be resistant to almost all TB drugs, in addition to the two best first-line drugs: isoniazid and rifampin. Extensively drug-resistant TB is also resistant to the efficacious second-line medications: fluoroquinolones and at least one of three injectable drugs (i.e., amikacin, kanamycin, or capreomycin) (CDC, 2015).

3.3.4 Risk of LTBI Progressing to TB Disease

Anyone who has LTBI can develop TB disease, but some people are at higher risk than others. HIV infection is the greatest risk factor for the development of TB disease in persons with LTBI, due to a weakened immune system (NTP, 2012). The risk of developing TB disease is 7% to 10% each year for persons who are infected with both *M. tuberculosis* and HIV infected persons who are not receiving highly active treatment for HIV; it is 10% over a lifetime for persons infected only with M. tuberculosis (NTP, 2012).

Children under 5 years of age are at risk in progressing from LTBI to TB disease because their immune system is not fully developed to combat such infections (NTP, 2012).

3.3.5 Active TB

A patient with *M. tuberculosis* complex identified from a clinical specimen, either by culture or by newer method such as molecular line probe assay or a patient with *M. tuberculosis* complex identified with one or more initial sputum specimen positive for acid-fast bacilli (AFB) is deemed to have active TB (NTP, 2012). In some people, TB bacteria overcome the defenses of the immune system and begin to multiply, resulting in the progression from latent TB infection to TB disease. Some people develop TB disease soon after infection, while others develop TB disease later when their immune system becomes weak (CDC, 2000).

3.3.6 Symptoms of TB

The general symptoms of TB disease include ((NTP, 2012 and CDC, 2000):

- Unexplained weight loss
- Loss of appetite
- Night sweats
- Fever
- Fatigue
- Chills

The symptoms of TB of the lungs include

- Coughing for 2 weeks or longer
- Hemoptysis (coughing up blood)
- Chest pain

Other symptoms depend on the part of the body that is affected. Persons with TB disease are considered infectious and may spread TB bacteria to others. If TB disease is suspected, persons should be referred for a complete medical evaluation. Once a person is diagnosed with TB disease, therapy is given to treat it. TB infection is a serious condition, which can lead to death if not treated early and properly (NTP, 2012; CDC, 2000).

3.3.7 Pulmonary and Extra-pulmonary TB

TB disease most commonly affects the lungs; this is referred to as pulmonary TB. Patients with pulmonary TB usually have a cough and an abnormal chest radiograph, and may be infectious. Although the majority of TB cases are pulmonary, TB can occur in almost any parts of the body, which is known as extra-pulmonary tuberculosis (NTP, 2012). Extra-pulmonary TB disease occurs in places other than the lungs, including the larynx, the lymph nodes, the pleura, the brain, the kidneys, or the bones and joints (NTP, 2012). In HIV-infected persons, pulmonary TB often accompanies extra-pulmonary TB illness. According to NTP, (2012) persons with extra-pulmonary TB disease usually are not infectious unless they have any of the following conditions:

1. Pulmonary TB disease in addition to extra-pulmonary disease;
2. Extra-pulmonary TB disease located in the oral cavity or the larynx; or
3. Extra-pulmonary TB disease that includes an open abscess or lesion in which the concentration of organisms is high, especially if drainage from the abscess or lesion is extensive, or if drainage fluid is aerosolized. Persons with TB pleural effusions may have underlying pulmonary TB that is masked on chest radiograph because the effusion fluid compresses the lung. These patients should be

considered infectious until pulmonary TB disease is excluded ((NTP, 2012 and CDC, 2000).

Other types of extra-pulmonary TB are Glandular TB, Bone and joint TB, TB meningitis, Abdominal TB, Laryngeal TB and Genitourinary TB (NTP, 2012).

Conclusion

The section has reviewed literature on the history and epidemiology on TB with respect to the causative agent, the mode of transmission and the various types.

3.4 Gender Theories and Health Outcomes

This section looks at the theoretical underpinnings of gender and how they relate to health in general and TB in particular. Health is affected by micro and macro-level influences including social structures and institutions, which shape the expectations of women and men, and the way their lives are organised (Oliffe, 2012; Johnson et al., 2009). To understand health practices and illness experiences it is increasingly recognised that accounting for gender is vital (Johnson et al., 2009; Courtenay, 2000).

There is a distinction between what gender and sex mean, though both are often used interchangeably. The following provides a WHO definition of both:

> *"Gender refers to the economic, social and cultural attributes and opportunities associated with being male or female at a particular point in time"*
> *(WHO, 2001 page 43).*

> *"Sex refers to the biological characteristics that define humans as female or male"*
> *(WHO, 2001 page 43).*

Sex and gender are not interchangeable words. Whereas sex is defined as biologically and physiologically, gender is socially constructed. Gender roles are socially constructed and usually framed as an extension of biologically determined social functions. Male and

female are sex categories, while masculine and feminine are gender categories (Bottorff et al., 2011). However, for the purpose of the study male and female are used as social construct.

There are biological differences between men and women that lead to differential health outcomes. In men's health literature, hegemonic masculinity has been associated with risk taking behaviours that compromise health and illness outcomes (Schofield et al., 2000). Conceptualization of masculinities has also been used to examine a range of issues as men's depression (Emslie et al., 2006) prostate cancer, (Halpin et al., 2009). Men's diet behaviours and food choices (Oliffe et al., 2010), tobacco use patterns (Bottorff et al., 2006) as well as help-seeking behaviours (Mahalik et al., 2007) have also been associated with masculinities. As compared to the uptake of masculinities in men's health research, Lyons, (2009) points to the dearth of research that assesses how femininities influence health experiences despite decades of work examining women's health issues. Researchers who have examined femininity in relation to women's health practices have tended to treat femininity as a uniform concept (Rolfe et al., 2009). Although there have been interesting growth in accounting for gender influences in health research, the concept of masculinity and femininity for the most part have been separated despite the social constructionist premise that gender is relational as has been indicated earlier in the section. A socially constructed term referring to roles, responsibilities, behaviours and attributes with a given society considers appropriate for males and females. Health inequalities between females and males are likely to reflect the interplay of biological sex differences and societal gender differences (Connell, 2009; Bird & Rieker, 2008; Denton et al., 2004). This shows that, one cannot delineate gender from sex because ones biological position affects the gender roles given a particular socio-cultural setting.

The biological differences between men and women lead to differential health outcomes. There is difference in perinatal mortality among males and females. These differences are noted to be fairly stable across societies but a wide gap exists in developing countries where there is high perinatal and infant mortality (Connell, 2009; Bird & Rieker, 2008; Kawachi et al., 1999). These differences between females and males in health status and provision of appropriate health services are results of historical gender inequalities (Connell, 2009; Bird & Rieker, 2008; Kawachi et al., 1999). In Kawachi et al., (1999) study, it was found that societies with high gender inequality are unhealthy for both genders. For example, in the US and other countries, women earn significantly less money than men for similar work. In Vietnam, comparatively, more men than women smoke, as female smoking is traditionally considered inappropriate (Kawachi et al., 1999).

With regards to health, gender differences in society can influence both females and males in terms of: exposure to risk factors, access to and understanding information about disease management, prevention and control, subjective experience of illness and its social significance, attitude towards the maintenance of one's own health and that of other family members, patterns of service use and perceptions of quality of care (Bird & Rieker, 2008; Annadale & Hunt, 2000). Annadale & Hunt, (2000) study focused on the impact of how risk and protective factors are different for females and males because of the environment (society) they find themselves and how the society is organised. Strebel et al., (2006) in applying the risk and protective factors posited that marriage is associated with improved health for women and men, but the benefits seem to be higher for men. To them married men live longer than single men and widowed men's life expectancy is significantly shortened following the loss of their partners (Strebel et al., 2006). In contrast, marriage seems to protect women's health by increasing financial stability (Strebel et al., 2006).

However, married women are more vulnerable than married men to negative outcomes of dysfunctional relationships including intimate partner violence (IPV) (Strebel et al., 2006).

Davidson et al., (2006) advanced the subject of biology and environment, by dilating on sex as the biological and gender as a social construct. They posited that gender as a social construct, is multifaceted comprising environmental, biological, physical, and hormonal attributes and that gender should be looked at both conceptual and methodological levels. At the conceptual level, Davidson et al., (2006) argued that gender and health should be examined and the different patterns found should be used to determine the likelihood of causality. At the methodological level, the authors opined that in using gender as determinant, it should be employed to unravel the causal possibilities at play in predicting health outcomes. Again, they posited that gender as a determinant of health elucidate complex role that is likely to play in health outcomes, and indeed, gender plays major role in health outcomes – comparatively more women than men fall sick, however, more men compared to women die from their illness (Bird & Rieker, 2008). Hence, there are variations in life expectancy in many countries for which, males are at a disadvantage (Bird & Rieker, 2008; Walsh et al., 1995; Verbrugge, 1985).

Other feminist scholars have also made significant contributions in conceptualizing gender relations as a set of relationships to address critique of static and binary constructions of gender (female and male) and to re-establish gender as social construct and relational (multi-faceted). They have also advanced the understandings of the complex multiplicity within and across genders by integrating analysis of other social relationships such as class, ethnicity and racialization and their impact at various stages of human endeavours to distinguish the effects that such relations underlie gender dynamics (Greaves, 2012; Annadale & Riska, 2009).

In reviewing literature on gender and health, two scholars, whose works have made significant in-roads in gender and health were used: Raewyn Connell and Chloe E. Bird & Patricia P. Rieker. These are the most influential voices in theorizing gender relations. Connell's work on gender and power aroused lots of attention, particularly men's health research. Connell, (1987) championed the theory that masculinities and femininities play out at a societal level, and how these diverse and multiple forms, fashioned by the structural influences lead to men's dominance over women. She also acknowledged the fact that there exists gender hierarchy and conceptualized what she termed hegemonic masculinity as an idealized masculinity that subordinates other masculinity and femininity (Connell, 1987; Connell & Messerschmidt, 2005). In her work on gender and power, Connell advanced that gender and power constitute a social structural theory based on existing philosophical writings of sexual inequality and gender and power imbalance, the sexual division of labor, the sexual division of power, and the structure of cathexis. Both the sexual division of labour and the sexual division of power had been identified from previous research as two fundamental structures that partially explain gender relations. Connell developed the third structure, which she named "structure of cathexis", to address the affective constituent of relationships. These three overlapping but distinct structures serve to explain the cultural bound gender roles assumed by men and women. Connell stressed that none of the three structures is or can be independent from the others. Connell also noted that these three structures (the structure of labor, the structure of power, and the structure of cathexis) exist at two different levels: the societal and the institutional (Connell, 1987). The highest level in which the three social structures are embedded is the societal level. The three structures are rooted in society through numerous abstract, historically rooted in culture, and sociopolitical forces that consistently segregate power and ascribe social norms on the basis of gender-determined roles. As society slowly

changes, these structures remain largely intact at the societal level over a long period of time. According to Connell and cited by Wingood & DiClemente, (2000) the three social structures are also manifested at a lower and the institutional levels. They identified social institutions as schools, work sites/industries, families, relationships, religious institutions, the medical system, and the media. The three structures (sexual division of labour, sexual division of power and structure of cathexis) are maintained within institutions through social mechanisms through unequal pay for comparable work, discriminatory practices at school and work, the imbalance of control within relationships and at work sites, and the stereotypical and/or degrading images of women in the media. The presence of these and other social mechanisms constrain women's daily lifestyle practices by producing gender-based inequities in women's economic potential, women's control of resources, and gender-based expectations of women's role in society (Wingood & DiClemente, 2000).

Wingood & DiClemente, (2000) used Connell's theory to explain gender-based inequities and disparities in relation to public health and psychological perspective. They advanced that gender-based inequalities in expectations generate the exposures, or acquired risks, and the risk factors that adversely influence women's health. Further, they explained that the public health field examines risks factors that are associated with an increased probability that a disease will later develop. These acquired risks are also called exposures. To them, exposures could be economic, physical, or social in nature (Wingood & DiClemente, 2000).

Connell, (2000) in her work conceptualizes gender relations as being part of the dynamic social life performed through daily interactions and practices, whereby individual actions collectively constitute and recreate prevailing understandings and enactments of masculinities and femininities but not in a uniform way. She describes four interconnected structures of gender relations: production relations – which is reflected in sexual divisions

of labour, power relations evident in the positioning of men as the dominant class in societal discourses and in the exercise of imperial powers, emotional relations that include the influence of hegemonic patterns and relationships in a variety of contexts (e.g. households, workplace) and symbolic representations of gender in society (Connell, 2000; Connell, 2009).

The psychosocial domain identifies risk factors (i.e., knowledge, attitudes, beliefs, and skills) that are associated with engaging in behaviors (risk-taking behaviors) that can increase the risk of disease (Wingood & DiClemente, 2000). They identified other risk factors as socioeconomic, behavioral, or personal in nature and explained that these factors operate at the interpersonal and individual levels (Wingood & DiClemente, 2000).

Bird & Rieker, (2008) have also written extensively about gender and health. In their recent book *"Gender and Health: The effect of constraint choices and social policies"*, they developed an innovative perspective to examine the complex antecedents of health differences between men and women and illuminate the ways in which men's and women's opportunities can in turn affect their choices. They drew on the prevailing public health understanding of health disparities, which emphasises the role of personal choices and health behaviours in enhancing or diminishing an individual's ability to live a long and healthy life. They argued that men's and women's opportunities and choices are to a certain extent constrained by decisions and actions taken by families, employers, communities and governmental policies. In effect, these choices may lead to the observed patterns of gender-based health differences by creating, maintaining or exacerbating underlying biological differences to health. Unlike Connell, Bird & Rieker, (2008) opined that individuals' decisions and even their allocation of resources reflect individual choices and preferences.

Another dimension on gender theory of the work of Bird & Rieker, (2008), is the investigation of the impact of gender as a constrained choice. They opined that, researchers should ask the following questions: *"Whose responsibility is health? Are protective measures, preventative behaviours, and the costs and consequences of poor health practice the province of individuals, families, the workplace, communities, states or some combination of these?" (p. 214).* To Bird & Rieker, (2008) viewing gender as a constrained choice therefore involves addressing the health restrictions that occur at many levels (individual, family, community, society) and acknowledging that healthy "choices" are limited by these overarching and intersecting constraints. These roles were delved into in trying to answer pertinent questions such as "do men's and women's different roles within the household influence how decisions are made, for example who within the household will seek health services and when they will seek them and the different responsibilities men and women play within the household that make them more or less susceptible to health problems?" during the qualitative aspect of the study.

As has already been alluded to, gender is a particularly complex social determinant of health because it interacts, and is closely identified, with biologic dimensions of vulnerability. Research efforts to understand 'what gender does' to health are particularly challenging for several reasons. Key among these is that sex and gender are frequently interchangeably used in the epidemiologic and medical literature as if they are synonyms. While a growing number of health studies claim to include an analysis of gender, they use the terms sex and gender interchangeably, and go no further than including sex/gender as one bivariate category in their analysis as already alluded to in the previous section.

Many societies have expectations as to how women and men should act in terms of roles and responsibilities within the social milieu. Indeed, there are variances in the

opportunities and resources available to women and men, and in their ability to make decisions and exercise their rights for which health seeking and care is an integral part of these rights (GHS, 2009). Gender roles and unequal gender relations interrelate with other social and economic variables, invariably leading to different and inequitable forms of exposure to health risk, and in differential access to and utilization of health information, care and services (GHS, 2009).

Although the health sector in Ghana has over the past decades made considerable progress in improving the health status of Ghanaians, it has become evident that all people living in Ghana have not shared these improvements. According to the Health Sector Gender Policy document Ghanaians continue to suffer the burden of infectious diseases, poor reproductive health, malnutrition and non-communicable diseases, which affect their quality of life and life expectancy (GHS, 2009).

Gender roles can be described as social norms, or rules and standards that dictate different interests, responsibilities, opportunities, limitations, and behaviors for men and women (Wood & Eagly, 2010). Gender roles structure the various "parts" that individuals play throughout their lives, impacting aspects of daily life from choice of clothing to occupation. Informally, by virtue of living in a social world, individuals learn the appropriate or expected behaviour for their gender. While individuals can accept or resist traditional gender roles in their own presentation of self, gender roles are a powerful means of social organization that impact many aspects of society (Wood & Eagly, 2010). For this reason, individuals inevitably internalize conventional and stereotypic gender roles, irrespective of their particular chosen gender, and develop their sense of gender in the face of strong messaging about the correct gender role for their perceived body (Wood & Eagly, 2010). Gender roles shape and constrain individuals' experiences; men and women are treated differently and have diverse life trajectories as a result of their ascribed

role and the degree to which they conform (Wood & Eagly, 2010). The theory of gender and power has been used to examine patient-related factors, service/health provider and socio-economic factors that affect adherence to TB treatment regimen.

In summary, gender plays a crucial role as a determinant of health hence, the disparities we continue to observe in health seeking behaviours and treatment outcomes. The study went beyond the dichotomous 'gender' – 'female/male' to look at factors affecting adherence and how they impart on treatment regimens.

3.4.1 Gender and TB

As noted in the foregoing, gender is an important determinant of health. This is so because it is a powerful social determinant of health that interacts with other variables such as age, family structure, income, education, social support, and with many of the behavioural factors (Doyal, 2002).

Uplekar et al., (2001) have noted that sex-specific incidence and prevalence data are the starting point for the analysis of sex and gender differences in the occurrence of any disease, and TB is no exception. Data on case notifications of sputum-positive TB show that 70% more males than females have active TB (Uplekar et al., 2001). The observed male excess in notifications may be attributed to fewer women in the population with active TB, but it could be that fewer women with TB present themselves for treatment, or that, among those women with TB who visit a clinic, fewer are identified as smear positive (Borgdorff et al., 2000; Rhines, 2013).

Research suggests that prior to adolescence there is little difference between men and women in terms of their TB infection rates (Long, 2000). From about age 15 onwards,

however, when both biological and social changes associated with adolescence differentiate the sexes more markedly, men begin to overtake women in their rates of infection (Long, 2000). There is a propensity for men to progress from infection to disease, as they grow older (Long, 2000). Men are typically more widely exposed to other people with infectious TB, as a consequence of their greater social interaction outside the home. Other behavioural differences noted between men and women that may contribute to higher risk for infection among men and progression from infection to active TB from a weakened immune system include smoking, alcoholism, migration and in some cases, imprisonment. Studies have attributed the lower infection rates in women to less social interaction outside the home, something that is characteristic of adolescent females in many societies (Long, 2000; Fair et al., 1997).

In spite of the lower risk of infection among women, a number of studies have shown that the rate of progression from infection to disease is significantly higher for women of reproductive age than for men of the same age (Needham et al., 2001; Karim et al., 2007). There is also some evidence to suggest that after adolescence until the ages of between 25 and 30 years, women with TB have a higher case fatality ratio than men in the same age group with TB (Connolly & Nunn, 1996; Holmes et al., 1998). A prospective cohort study by Dolin, (1998) in Bangladesh, for example, reported that women aged between 10 and 44 years of age had a 130% higher risk of progressing from infection to clinical disease than men in the same age group. Some questions remain about the validity of these findings since more cases detected during child-bearing years may be a reflection of better detection rather than higher rates, as women attend clinics more frequently for pre and postnatal care, and for health care needs of their young children (Long, 2000).

Connolly & Nunn, (1996) have confirmed that TB is the leading infectious cause of death in women worldwide. To them the disease will greatly affect population growth, the HIV epidemic, increasing poverty and rising levels of drug resistance will inevitably increase the burden of this disease in women. Dolin, (1998) on the other hand indicates that the reasons for the higher rates of progression from infection to disease and higher mortality in women are unclear. He concludes that sex differences and physiological changes occurring in pregnancy are unlikely to be the only factors. To Dolin, (1998) there is a possible that gender inequalities governing various risk factors, such as poor nutrition, may make women at this stage of life more vulnerable to progression from infection to active pulmonary TB.

Needham et al., (2001) and Karim et al., (2007) studies emphasized higher costs of TB treatment for women than for men. The studies found that women take longer to seek care (patient delay) due to stigma and social exclusion, heavier workloads, prioritization of other family members over their own well being, lack of independence, inaccessibility to financial resources and powerlessness in decision-making (Needham et al., 2001; Karim et al., (2007).

Again, women experience longer provider, diagnostic and treatment delays because they are engaged in more activities that need to be replaced in the household, while girls replace these activities more than boys. In addition, women have higher direct costs than men, because they often need somebody to accompany them, they are less mobile, have less financial resources and they experience greater loss of income probably because of more lost work days (Needham et al., 2001; Karim et al., 2007).

Differences in treatment adherence and socio-cultural barriers to help seeking have also been proposed as possible explanations for the gender difference (Dolin, 1998). Gendered differences in help-seeking behaviour mean that women typically delay seeking care and

hence treatment, thereby increasing their risk of TB mortality (Needham et al., 2001; Karim et al., 2007). Gender differentials in social and economic roles and activities may lead to differential exposure to TB bacilli; the general health and nutritional status of TB-infected persons affects their rate of progression to disease (Needham et al., 2001; Karim et al., 2007). In areas where women's health is worse than men's especially in terms of nutrition and human immunodeficiency virus status, women's risk of disease may be increased.

Gender differences also exist in rates of adherence with treatment; according to Hudelson, (1996), the fear and stigma associated with TB seems to have a greater impact on women than on men, often placing them in an economically or socially precarious position. The health and welfare of children is closely linked to that of their mothers, therefore, TB in women can have serious repercussions for families and households (Hudelson, (1996). This review has pointed out to the many gaps that exist in our knowledge and understanding of gender difference in TB and TB control. The question is how do we call for increased efforts to identify and address gender differences in the control of TB? The study is timely enough to answer this question – which sought to find the factors that account for the gender differences.

3.4.2 Gender, social and economic barriers to access TB care

Numerous studies have focused on how gender imbalances within the family and in society at large can influence gender differences in access to healthcare and help-seeking behaviour (Gosoniu et al., 2008; Weiss et al., 2008; Eastwood et al., 2004; Fochsen et al., 2006; Hamid Salim et al., 2004; Sanou et al., 2004; Thorson & Johnson, 2004). All the studies that looked at socio-cultural and economic barriers found that women face higher socio-cultural and financial barriers to access TB care, given their subordinate position in

relation to men (Weiss et al., 2008; Gosoniu et al., 2008; Fochsen et al., 2006; Eastwood et al., 2004; Hamid Salim et al., 2004; Sanou et al., 2004; Thorson & Johnson, 2004).

Among the financial barriers were the cost of travel and treatment; these can have a more limiting effect for women, due to their financial dependence, lower income and lack of control over the family resources (Gosoniu et al., 2008; Weiss et al., 2008; Fochsen et al., 2006; Eastwood et al., 2004; Hamid Salim et al., 2004; Sanou et al., 2004; Thorson & Johnson, 2004). A study in India about gender differences in the costs of TB care found that women spent significantly more money for care seeking than men (Balasubramanian et al., 2004). Contrary to the findings in India, a study in Zambia concluded that, although men spent more money in accessing TB care than women, it was still more affordable for them when taken in the context of their ability to pay and the great disparities in the median individual income between men and women (Aspler et al., 2010).

Other studies based on qualitative methodology have revealed that men were more frequently focused on financial concerns and the effects of TB on the family economy, such as interference with livelihood activities, the loss of wages, financial difficulties, reduced capacity for work, poor job performance, and the consequences of long absence from work (Weiss et al., 2008; Weiss et al., 2006).

Yamasaki-Nakagawa, (2001), earlier found that men were significantly more likely to visit the government medical establishment first if they knew that TB treatment was free than if they did not know, while women did visit other facilities available in their communities before finally using government facilities. This notwithstanding does not necessarily mean that financial barriers are more important for men than for women, but could indicate that women face other types of socio-cultural barriers that limit their access to TB care, in addition to the financial ones. Johansson & Winkvist, (2002) for example, highlight the particular social and economic effects of TB confronted by women who are heads of

household. Studies have reported that men were more concerned about the financial and work related consequences of the TB stigma, such as losing their job, reduced income and the effects that this would have on the family financial resources all of which could also lead to loss of social status within the family and the community (Somma et al., 2008; Atre et al., 2004; Johansson et al., 2000).

A multi-country study conducted in India, Bangladesh, Malawi and Colombia by Somma et al., (2008) found financial and work-related issues to be associated with the stigma of TB among men at all the sites in the study.

Other studies showed that traditional gender roles that grant men a higher status as the 'breadwinner' or the 'head or pillar of the family', cause women to be perceived as less important. Women's health is therefore not prioritised and they may receive less support (including financial support) for their healthcare, compared to other family members in varying social-cultural settings (Jaggarrajamma et al., 2008; Zhang et al., 2007; Thorson & Johansson, 2004; Xu et al., 2004; Johansson et al., 2000)

Studies have found that time constraints related to the heavy workload of women, their domestic social responsibilities and their role as care-takers may also restrict their access to healthcare (Karim et al., 2007; Weiss et al., 2006; Sanou et al., 2004; Thorson & Johansson, 2004). Again, lack of independence on the part of women may reduce decision-making power and restricted mobility thus leading to limitations for seeking healthcare (Karim et al., 2007; Weiss et al., 2006; Sanou et al., 2004; Thorson & Johansson, 2004). This is illustrated by the fact that women often need to ask permission from their husbands or elders and/or be accompanied by a family member, in order to visit a healthcare provider (Gosoniu et al., 2008; Weiss et al., 2008; Balasubramanian et al., 2004; Eastwood & Hill, 2004; Hamid Salim et al., 2004).

Knowledge about TB can also have an influence in help-seeking behavior. Studies have found a significant association between knowledge of TB and both health care actions and care seeking in hospitals and government medical establishments, which ultimately leads to treatment adherence (Hoa et al., 2003; Yamasaki-Nakagawa et al., 2001; Thorson et al., 2000). On the contrary other studies found no gender differences in knowledge about TB, however, studies conducted in Vietnam and China found a significant association between male and increased knowledge about TB (Wang et al., 2008; Thorson & Johansson, 2004; Hoa et al., 2003; Johansson et al., 2000; Thorson et al., 2000). In The Gambia, the lack of knowledge about TB was perceived as worse among women, who were thought to have stronger traditional beliefs (Eastwood & Hill, 2004). The two studies in Vietnam also found differences between men and women regarding the sources of information about TB. While men had more access to TB information through media, such as TV, radio, newspapers and loudspeakers, women had more access through relatives and friends (Hoa et al., 2003; Thorson et al., 2000).

Furthermore, people who received TB information through friends and relatives had lower knowledge scores than those who received it through TV, radio or loudspeakers, an indication of communication breakdown and likely distortion of the facts and lack of clarity on the part of the communicators (Hoa et al., 2003; Thorson et al., 2000).

3.4.3 Gender and TB related stigma

Goffman defined stigma as "the situation of the individual who is disqualified from full social acceptance". According to WHO, (2001a)

> *"Illness-related stigma refers here to social disqualification from full social acceptance by virtue of the identification of a person with TB, ignoring other aspects of this person's identity that might otherwise motivate compassion and support" (WHO, 2001a page 30).*

Social stigma may be experienced in two forms; overt social exclusion (enacted stigma) or anticipation of it (felt stigma) (Scambler, 1998). Fear of the patient about other behaviour towards him/her and a sense of inferiority due to TB is designated perceived stigma and actually being discriminated or being actually avoided by the people who hitherto were friendly before they contracted the TB is designated enacted stigma (Scambler, 1998).

TB is noted to be a highly stigmatised disease irrespective of one's gender. However, females bear heavy burden of stigma as they might not get husbands if they are not yet married or might in some situations be divorced or abandoned by their partners if they are married. Again, in some communities, female TB patients may be avoided by peers and family members (Dodor, 2009; Dhingra & Khan, 2009).

In a study conducted by Dhingra & Khan, (2009), there was a high level of stigma observed at society level with 60% of the patients hiding their TB disease from friends and neighbours. Stigma was observed more among middle and upper middle class when compared to lower middle class and lower class. In using gender as a variable against stigma, it was observed that stigma was more among females than in males (Dhingra & Khan, 2009).

As alluded to earlier, stigma in TB patients is usually of two types; – firstly, a fear of the patient about other's behaviour towards him/her and a sense of inferiority due to development of TB designated as perceived stigma; and secondly, due to actual discrimination or being actually avoided by the people since the patient has TB also designate as enacted stigma Dhingra & Khan, (2009). A patient often tries to hide his/her disease from others due to stigma resulting in further delay in diagnosis and treatment and thus increase chances of transmission to healthy community. Again, Dhingra & Khan,

(2009) study reveals that there is perceived and enacted stigma among tuberculosis patients and indicated that among both male and female TB patients enrolled under Revised National TB Control Programme, perceived stigma was more than enacted stigma in the context of personal, family, community and work place interactions. One third of the TB patients in the study indicated that they were reluctant to attend social functions due to their illness and about 10% to 25% of the patients experienced negative reactions from their family members. Problems related to marriage prospects were expressed by 63% of unmarried patients from the study. Uplekar et al., (1999) also reported that parents of young women did not want to reveal their daughters' illness or did not want to send them to Directly Observed Treatment Short Course (DOTS) due to difficulties that may arise in getting husbands. Fear of infection had been identified as the main reason for the stigmatization attitudes and behaviour of both health professionals and community members towards those with TB because of the contagious nature of TB infections (Uplekar et al., 1999).

Dodor et al., (2008) found that the activities of health professionals could be a basis for stigmatization of patients with TB in the society. Dhingra & Khan, (2009) noted that the use of isolation wards by most hospitals, and the observation that some doctors and nurses use mask and gloves when dealing with TB patients may lead to stigmatization of TB in the eyes of the community members. Besides, the humiliating attitudes put up by health professionals and open avoidance of TB patients whilst being taken care of could send wrong signals to community members that TB is a shameful disease (Dhingra & Khan, 2009).

It is also a widely held view that TB stigma contributes to delays in TB diagnosis and negatively impacts treatment adherence. Some qualitative studies report that community

members without TB, individuals with TB, and health-care providers who treat TB perceive TB stigma to be a barrier to prompt diagnosis of the disease (Liefooghe et al., 1997; Jaramillo, 1998). Indeed, at-risk individuals report that fear of TB stigma and the social and economic impact of stigma affects their willingness to undergo TB screening and to seek medical care after the onset of symptoms associated with TB (Coreil et al., 2004; Watkins & Plant, 2004).

Several studies suggest that health-care providers and at-risk community members perceive TB stigma to have a more substantial impact on women's health-care-seeking behavior than on men's (Coreil et al., 2004; Watkins & Plant, 2004). On the other hand, other studies found that although women in south India felt TB stigma more strongly than men, they were more likely to access health services than men would (Balasubramanian et al., 2004; Thorson & Johansson, 2004; Johansson et al., 2000; Johansson et al., 1999; Hudelson, 1996).

Studies indicate that individuals with TB and their health-care providers also identify TB stigma as a cause of defaulting in treatment. Even after the start of treatment, because of concern about being identified as having TB and suffering the consequences of TB stigma may lead individuals to drop out of treatment programs (Naidoo et al., 2009; Suri et al., 2007; Edginton et al., 2002; Jackson & Yuan, 1997; Sumartojo, 1993).

TB stigma has also been raised as a potential barrier to home and work-based direct observation therapy, given that the presence of TB nurses might mark a person as infected (Ngamvithayapong et al., 1998; Dick & Schoeman, 1996). These studies tend to suggest that at-risk communities and infected individuals perceive that TB stigma causes diagnostic delay and can lead to treatment non-adherence (Ngamvithayapong et al., 1998; Dick & Schoeman, 1996).

Many studies have produced varied results on the role of stigma to treatment adherence of ailments with high levels of stigmatization among patients and non-patients alike. In a bid to quantify the contribution of TB stigma to diagnostic delay and treatment adherence, however, have produced mixed results (Maamari, 2008; Woith & Larson, 2008; Cambanis et al., 2007; Kiwuwa et al., 2005; Godfrey-Faussett et al., 2002; Meulemans et al., 2002). Kiwuwa et al., (2005) found that predictors of delays of more than two weeks included daily alcohol use and subsistence farming, but not perceived TB stigma. Studies in Zambia and Syria revealed that TB stigma was not a predictor of significant delay between the onset of symptoms and seeking health care (Godfrey-Faussett et al., 2002; Maamari, 2008). Contrary to the Zambia and Syria study, a study conducted in Cameroon by Cambanis et al., (2007) found that perceived TB stigma was a significant predictor of delays of more than four weeks. However, Woith & Larson, (2008) found that, among Russians with active pulmonary TB, stigma associated with TB was actually a predictor of treatment adherence. In contrast, TB stigma was found to be the most common motivation cited by HIV-infected Tanzanian patients who did not complete TB treatment regimen (Munseri et al., 2008). Meulemans et al., (2002) also perceived TB stigma to be associated with non-adherence among Pakistani patients on DOT.

Several studies have found women to have had more experiences and greater fear of social isolation, rejection, abuse, harassment, humiliation, conflict with spouses and family members, abandonment, divorce and difficulty in finding marriage partners related to TB (Rintiswati et al., 2009; Somma et al., 2008; Weiss et al., 2008; Weiss et al., 2006; Atre et al., 2004; Balasubramanian et al., 2004; Edginton et al., 2002; Johansson & Winkvist, 2002; Long et al., 2001; Johansson et al., 2000; Thorson et al., 2000). Some studies related this to a particular interest among women in keeping their TB diagnosis a secret,

and feeling secluded and embarrassed about discussing their illness with family and friends (Rintiswati et al., 2009; Gosoniu et al., 2008; Balasubramanian, et al., 2004; Hamid Salim et al., 2004; Thorson & Johansson, 2004; Johansson et al., 2002; Thorson et al., 2000). There were interesting exceptions to this type TB-related stigma for women found in most studies. Concerns about the effects of TB-related stigma in marital status and marriage prospects were not completely absent among men (Kamel et al., 2003). In China, Zhang et al., (2007) study found that unmarried young men were worried that contracting TB would make it difficult for them to find marriage partners, while unmarried women felt that they would still be able to find marriage partners, although their parents might receive fewer betrothal gifts than expectation, probably, TB may have reduced the value place on females with TB. This finding is not surprising considering the fact that there are more males than females in China. In Thailand, higher TB stigma was significantly associated with an increase in patient delay among men, and a decrease in patient delay among women. Pungrassami et al., (2011) study indicated that women seek care more quickly in order to minimize the social consequences of the disease. Studies that explored the links between TB-related stigma and discrimination with other forms of stigma and with social norms, particularly those related to gender roles have been conducted in various settings and have yielded interesting outcomes (Ganapathy et al., 2008; Weiss et al., 2008; Weiss et al., 2006; Atre et al., 2004; Eastwood & Hill, 2004; Edginton et al., 2002). The outcomes of these research findings were that women faced stigma and discrimination more than men do. On the other hand, the following were often associated more often to men; poverty, dirtiness, prostitution, 'free' sex practices 'promoted' by contraceptive use, breaking cultural norms regarding sexual behavior and smoking and drinking alcohol, whereas the perceived association of TB and sexual practices was stronger for women in some contexts and was sometimes explained through local beliefs about HIV and AIDS

(Ganapathy et al., 2008; Weiss et al., 2008; Weiss et al., 2006; Eastwood & Hill 2004; Edginton et al., 2002; Atre et al., 2004).

Beliefs in non-medical causes of TB may also have an influence in stigma and discourage help seeking in medical healthcare facilities, with important differences between women and men. While Promtussananon & Peltzer, (2005) found these non-medical beliefs to be more present among men than among women in South Africa, Atre et al., (2004) reported that in India more women identified supernatural causes of TB, compared to men. In some contexts, traditional beliefs about the causes of TB are closely related to gender roles. Weiss et al., (2006) in their study on gender and TB found that TB in women was thought to be associated with cooking smoke exposure, overwork, childbearing and taking care of other TB patients. In Vietnam, men were thought to be more affected by two 'types' of TB that are caused by hard work and by germs, whereas women were thought to be more affected by a 'type' of TB that is caused by too much worrying (Long et al., 1999). As in other milieu, some people also believed that TB could be hereditary (Zhang et al., 2007; Atre et al., 2004; Long et al., 1999).

Contrary to the previous studies that found significant association between gender and stigma, TB studies conducted in Ecuador and the Democratic Republic of Congo found no evidence of gender differences regarding perceptions, attitudes and stigma related to TB (Armijos et al., 2008; Bennstam et al., 2004).

3.5 TB and HIV

The deadly impact of Human Immune-deficiency Virus (HIV) and TB co-infection cannot be overstated. HIV is the most known risk factor for the conversion of latent TB into active TB (Walia, 2002; WHO, 2007). In turn, TB is a leading cause of death for people with HIV. As HIV infection progresses, the immune system becomes less able to prevent

the growth and local spread of opportunistic infections, including TB (WHO, 2007). Treating both diseases, existing in one patient presents serious adherence challenges since both diseases involve the combination of more than one drug (WHO, 2007). HIV treatment is for life; this means that, an HIV infected person has to be put on ART as long as he or she lives. This is because HIV has no cure whereas TB is curable over a period of maximum of nine months. An HIV positive patient has his or her body immune system broken down, as a result becomes susceptible to a variety of opportunistic infections for which TB is noted to be the greatest (WHO, 2007). Indisputably, TB is the most significant opportunistic infection complicating HIV infection in developing countries, and may happen at any stage in the course of immunodeficiency (WHO, 2009; WHO, 2013). The enormity of HIV infection is known to be greatest in sub-Saharan Africa, where as many as a third of all patients with active tuberculosis are HIV infected (Walia, 2002; WHO, 2013).

According to WHO, TB accounts for about 13% of Acquired immune deficiency syndrome (AIDS) deaths worldwide. When someone is infected with TB, the likelihood of him or her becoming sick with the disease is increased many times if he or she is also HIV positive. Co-infected people with both HIV and latent TB are 800 times more likely to develop TB compared to HIV negative people (WHO, 2007).

Various studies have pointed out difference experiences with respect to TB and HIV treatment experiences. Daftary, (2011) study on TB and HIV co-infection highlighted the effects of the dual diseases and how it exposes patients to a double and unequal form of social stigma. In her study, Daftary, (2011) posited how patients with TB and HIV co-infection experience stigma which are bound by social, structural and gendered inequalities, more especially female patients and how they mediate their decisions to disclose, access and adhere to medical care. With respect to adherence, Rocha et al.,

(2003) study found that 32.9% of HIV and TB patients were non-adherent to treatment and that 22.9% had an unfavorable outcome. Non-adherence was found to be the only predictor of an unfavorable outcome and adherence was independently associated with Intravenous drug use, treatment complications and use of methadone.

Dean et al., (2002) study conducted to assess the risks and benefits of administering Highly Active Antiretroviral Therapy (HAART) during the treatment of TB and HIV co-infected patients showed that there was a significant decrease in viral load and AIDS defining illness in those who were initiated on ART, and a reduction in mortality. Again, there was a significant association between the occurrences of adverse effects and use of ART.

A study conducted in Malawi by Makombe et al., (2007) to compare 6 month and 12 month cohort treatment outcomes among TB and HIV positive patients and HIV positive non TB patients on treatment with ART, showed that those patients with TB had a significantly lower default rate. This was attributed to the fact that these patients had time to stabilize and prepare for their ART since they started ART only in the continuation phase of TB treatment. Again, an indication that adherence might be a challenge for those in the intensive phase of the TB treatment.

Again, Daniel & Alausa, (2006) study conducted to compare the treatment outcomes of TB and HIV positive and TB and HIV negative patients indicated that default rate of 17% was not significantly related to HIV status, although more HIV positive than HIV negative patients defaulted from treatment. In a study conducted by Rowe et al., (2005) in South Africa, revealed that more than half of HIV patients initiated on TB preventive treatment interrupted it, citing fear of stigmatization, lack of money for food and transport, competition between western and traditional medicine, unwillingness to take medications

in the absence of symptoms and disclosure of HIV status. For those who adhered, reasons cited were the belief that TB is curable, social and family support, a supportive clinic environment positively influencing adherence (Rowe et al., 2005).

There are several important associations between epidemics of HIV and TB, as it is obvious that TB is harder to diagnose in HIV positive people, and TB progresses faster in HIV-infected patients (WHO, 2007). At the same time, TB in HIV positive people is more likely to be fatal if undiagnosed or left untreated. Furthermore, TB occurs earlier in the course of HIV infection than other opportunistic infections (WHO, 2007). Finally, TB is the only major AIDS-related opportunistic infection that poses a risk to HIV negative people (WHO, 2007). The prevalence of HIV among TB cases in Ghana is 13.0% (NTP, 2012).

3.6 Adherence to medical treatment

As far back as ca.460 BC – ca.370 BC, Hippocrates of Kos warned physicians to be weary of patient on treatment. As quoted in Jay et al., (1984) in the words of Hippocrates of Kos (ca.460 BC – ca.370 BC) that: *"(The physician) should keep aware of the fact that patients often lie when they state that they have taken certain medicines"* (Jay et al., 1984).

This indicates that the problem of adherence to treatment regimens has been with us since the introduction of modern therapeutic. Litt & Cuskey, (1980) also noted that adherence has become very important in research and international health issues considering the repercussions of its effects on the individual, the community, state and globally.

The use of "adherence" to connote one's behaviour in taking drugs stems from the old fashion clinician centered term as "compliance" which according to Lerner, (1997) was used between the 1950s and 1960s, during that era researchers were using terms such as

"uncooperative" and "non-compliant" to describe patients who did not follow physicians' treatment instructions. In the 1970s, social scientists began laying emphasize on the importance of a patient's right to be actively involved in treatment decisions as well as the negative implications of the term "compliance" itself. Social scientists recommended the term "adherence" to better acknowledge the patient role in TB care and treatment (Ogden et al., 1999; Sumartojo, 1993; Donovan & Blake, 1992).

The WHO tried to delineate the concepts chronic and acute diseases since both encompass different regimen of treatment (WHO, 2003b). In coming up with a difference between the concepts of acute as opposed to chronic, WHO, (2003b) describes the concepts further by using the terms "communicable (infectious) and non-communicable diseases since both need different types of care. They identified chronic conditions, such as human immunodeficiency virus (HIV), acquired immunodeficiency syndrome (AIDS) and TB as infectious in origin and postulate that they will need the same kind of care as many other chronic non-communicable diseases such as hypertension, diabetes and depression (WHO, 2003b).

The issue of an acceptable definition of adherence has been a bone of contention among medical practitioners with regards to the parameters that actually make up the definition. In the earlier times adherence had been focused on the intake of medication, and hence the extent to which a patient followed health practitioner's instructions on how to take prescribed drugs. This was critiqued extensively because it saw the patient as passive in the process. However, in a WHO, (2001) adherence committee meeting, they noted that the conventional 'medical' emphasis in defining adherence had a myopic view without cognizance of other pertinent health-related behaviours such as exercising, dieting and check-up appointments that is beyond the prescribed physical medications that have been given to the patient.

Informed by the work of Haynes, (1979) and Rand, (1990), WHO developed an all embracing definition of adherence as:

> *"The extent to which a person's behaviour …taking medication, following a diet and or executing lifestyle changes, corresponds with agreed recommendations from a health care provider" (WHO, 2003b page 9).*

The definition was seen as all-encompassing one that took into consideration the aspects of health-related behaviours which hitherto was not included. In this study, prominence is on TB treatment adherence, therefore the use of the definition by Urquhart, (1996), which has been defined in terms of TB control as:

> *"The extent to which the patient's history of therapeutic drug-taking coincides with the prescribed treatment (Urquhart, 1996 page 8).*

3.6.1 Adherence versus compliance

The WHO perspective on adherence sought to distinguish between adherence and compliance. With regards to adherence, the patient is in agreement with the recommendations by the Health Care Worker (HCW), whilst the latter is provider initiated (WHO, 2003). Contrary to perspective on adherence, Cramer et al., (2008) posited a different dimension, opting to use the term compliance as a primary term and adherence as the synonym. This was supported by Feinstein, (1990) who had earlier indicated that the term adherence was too sticky for his liking, hence, preferred compliance. This study opted for the term adherence and defined it the same way as Urquhart, (1996) did.

According to Haynes, (2001) adherence among patients suffering chronic diseases averages only 50%. The degree and impact of poor adherence in resource poor countries is much higher given the scarcity of health resources and inequities in access to health care. In the developing countries such as China, the Gambia and the Seychelles, studies found that less than half of patients adhered strictly to treatment regimens; 43%, 27% and 26%,

respectively, of patients with hypertension adhere to their anti-hypertensive medication regimen (Bovet et al., 2002, van der Sande, 2001; van der Sande, 2000). Studies conducted among patients with depression revealed that between 40% and 70% adhere to antidepressant therapies *(*Demyttenaere, 1998*).* In Australia, only 43% of the patients with asthma take their medication as prescribed all the time and only 28% use prescribed preventive medication (Reid et al., 2000). In the treatment of HIV and AIDS, adherence to antiretroviral agents varies between 37% and 83% depending on the drug under study (Stein, 2000; Markowitz & Winawer, 1999) and the demographic characteristics of patient populations (Laine et al., 2000). These exemplify tremendous challenge to health control programmes where success is determined primarily by adherence to long-term therapies.

3.6.2 TB and adherence

Persons diagnosed with TB are required to complete the agreed recommended treatment regimen for a period of six to nine months depending on the location of the infection. Various studies have been conducted in the area of TB treatment adherence to be able to understand and consequently improve the cure rate and control the disease (WHO, 2003; Meulemans et al., 2002). Whereas some researchers have concentrated on how to measure adherence (Byakika et al., 2005; Farmer, 1999), others have looked at the outcome-based adherence indicators (Bernatas et al., 2003; Chan-Yeung et al., 2002); some have also researched into the determinants of adherence (Culqui et al., 2012; Tandon et al., 2002).

According to Tandon et al., (2002) TB is made worse by poor adherence to and frequent interruption of treatment. Treatment of TB requires strict discipline in order to fully eradicate it. There are so many factors that influence the cure rate and one of them is adherence. Although persons who do not complete TB treatment are much more likely to develop MDRTB disease than those who do, poor adherence to TB is common. Indeed,

poor adherence is a challenge to effective treatment for a multitude of diseases and conditions. Data have not shown that demographic characteristics are consistently associated with adherence; however, circumstances like homelessness, active substance use, lack of social support, and untreated mental illness put patients on TB treatment at increased risk for non-adherence (Sumartojo, 1993; Barhoorn & Adriaanse, 1992; Demissie & Kabede, 1994).

Treatment adherence is a critical determinant of any successful TB control. Studies on MDR-TB treatment regimen have attributed this to poor adherence resulting in both treatment failure and development of resistance to TB medicines. In a study by Chan-Yeung et al., (2002) women who were diagnosed and began treatment for TB were more likely to adhere to treatment for a full course. Bernatas et al., (2003) study corroborated Chan-Yeung et al., (2002) study that women are more likely to have a positive treatment outcome than men would.

Uplekar et al., (1999) have suggested that the myriad of problems as a result of socio-cultural and economic barriers women face prior to treatment act to filter out those who would potentially default from treatment. However, Balasubramanian et al., (2004) noted that the higher utilisation of clinics by women in some settings counters the argument that greater motivation arises from overcoming barriers.

Adherence is an important factor to increase the cure rate in TB patients. Patient adherence remains one of the main obstacles that need to be overcome by a TB control programme globally. On the other hand, Burman et al., (1997) opined that non-adherence might also prolong and lead to expensive therapy that is less likely to be successful than the treatment

of drug susceptibility TB. Adhering with DOT, according to Meulemans et al., (2002), is problematic for many patients.

3.6.3 Calculating Adherence

Researchers who have tried to measure adherence have realised that there is no gold standard by which adherence can be quantified (Farmer, 1999). Urquhart, (1996) has posited two distinct ways of measuring adherence – these are process-oriented and outcome-oriented. The former uses the intermediate variables such as appointment keeping, pill counts, recall, to measure adherence, whilst the latter uses treatment outcomes such as cure rate as an indicator of success or failure (Urquhart, 1996). The study used the process-oriented method and the recall to measure adherence among patients on the continuation phase.

This study has reviewed three measurement tools in measuring adherence. These are:

I. **Two- day self report recall**

Patients are asked how they took their medicines in the last two days. The two-day recall has the advantage of a short time-span, which means that memory of medicine intake is likely to be good (Urquhart, 1996). However patients may feel ashamed to report specific instances of non-adherence that occurred in the 48 hours prior to visiting the health facility, especially if they have to specify on the chart exactly when they failed to take a pill and then to explain why (Byakika et al., 2005; Urquhart, 1996).

II. **One-month self-report recall**

TB patients on DOT are asked to indicate their adherence rate over the past month.

By estimating the number of pills missed over a one-month period, patients are confronted less with each specific non-adherent event. The two–day self report and one-month visual

analogue recall methods have been found by Byakika et al., (2005) to be valid instruments for estimating adherence in a recent study in Uganda.

III. Pharmacy pill count.

The pill-count is defined as the most 'objective' of the three approaches, measuring the actual number of pills left over since the previous refill Grymonpre et al., (1998). However, patients who fear the possible repercussions of revealing to the dispensing pharmacist that they have not achieved optimal adherence, may present fewer pills to the pharmacist than were actually left over Grymonpre et al., (1998). All three methods are likely to overestimate adherence.

For the purposes of the study, a combination of the Two-day self report recall and the one-month self report were adopted, non-adherence is captured as respondents who missed their medication for five consecutive days and adherence captured as those who religiously took the medication and made 100% of adherence. Questions pertaining to the recall of missed doses were captured in the questionnaire and the interview guide.

In summary, measurement of adherence provides useful information that outcome monitoring alone cannot provide, but it remains only an estimate of a patient's actual behaviour.

3.6.4 Gender and adherence

Adhering to treatment enhances favourable TB treatment outcomes, all things being equal. On the other hand, non-adherence to treatment enhances TB transmission and aids in the development of drug resistance, resulting in serious fatality to the individual patient, the community in which the patient resides and ultimately to the state. As has been noted in the literature on medical adherence, it could be a process and outcome (Urquhart, 1996). Also adherence is multi-dimensional, which entails lots of factors such as demographic,

socio-cultural and economic, provider/service related and patient related. These factors affect gender in several ways. Whilst males may be affected socio-economically, females may be affected socio-culturally. Several studies have revealed the effect of gender on adherence – notable among them are Chan-Yeung et al., (2002) whose study indicated that women who are diagnosed and begin treatment for TB are more likely to adhere to treatment for a full course than men are and more likely to have positive treatment outcome.

Gender disparities in treatment adherence are believed to be a reflection of the commitment of that section of women who have been able to circumvent difficulties in seeking health care and receiving a diagnosis (Bernatas et al., 2003). Uplekar et al., (1999) have hinted that the antagonistic socio-cultural and socioeconomic barriers women face preceding treatment act to sieve out those who would possibly default from treatment. Nevertheless, the higher use of clinics by women in some settings counters the argument that greater motivation arises from overcoming barriers (Balasubramanian et al., 2004).

Stigma has been noted to act as a motivator in some circumstances and most often causes problems for treatment adherence (Morankar & Weiss, 2003). Since DOTS is based on observing patients taking their medicines either in health centres or at home improves treatment adherence and outcome. DOT, however, can make it difficult to conceal one's illness from the community. Morankar & Weiss, (2003) reported that for 70% of women in Maharashtra, India, who took TB medicines in the presence of a health-care practitioner did not feel comfortable and felt it was not acceptable. If they must take their medicines under direct observation, these women preferred to do so under the supervision of a female nurse. These findings support those of an earlier study, by Balasubramanian et al., (2004), which also indicate that women are less likely to accept DOT than men because of

concerns about social stigma and that failure to receive DOT accounted for most of the treatment failures.

As noted earlier stigma is deemed as a likely reason for non-adherence or default among females, males on the other hand have been reported to be non-adherent or defaulted based on economic reasons. Most economic reasons were loss of income and inability to work (Balasubramanian et al., 2004).

According to the results of a study in Mumbai, India, women who defaulted from treatment did so because of household responsibilities, and because they wished to keep their condition secret (Nair et al., 1997). Among the primary reasons given for dropping out of treatment in Vietnam, listed by males are a lack of understanding of the importance of continuous and prolonged treatment and concern about the adverse economic impact of TB care and treatment on their household finances (Johansson et al., 1999). Women also had to weigh perceived benefits and social and economic costs, invariably, the benefits far outweighed the economic cost. However, they cited concerns about interactions with health-care providers and social stigma as the main reasons for their default (Johansson et al., 1999).

In spite of the gender differences in factors of adherence, not all factors that influence adherence to treatment exhibit such pronounced gender predisposition; some factors affect both men and women equally. Getahun & Aragaw, (2001) identified clinical improvement as the most common reason for treatment discontinuation in their community-based study in Ethiopia, followed by the distance of the treatment facility. Again, family and social supports were found to be a critical element in promoting treatment adherence.

3.7 Theoretical Framework (Health Belief Model - HBM)

It is important to draw on existing health related theoretical frameworks in explaining the study. One such theoretical framework or model that has been extensively used to explain cause and effect and which readily fitted into the thesis is the Health Belief Model (HBM). HBM was originally developed as a systematic method to explain and predict health behaviours. HBM was used by focusing on the attitudes and beliefs of individuals. It was first developed in the 1950s by social psychologists Hochbaum, Rosenstock and Kegels who worked in the American Public Health Services (Redding et al., 2000; Conner & Norman, 1996).

The proponents of the HBM conducted important studies in the 1950s and 1960s meant to analytically explain preventive health behaviour in the area of tuberculosis (TB) – that is, the free TB health screening programme at that time. The HBM posits that health behaviour change is based on a rational appraisal of the balance between the barriers to and benefits of action (Redding et al., 2000). According to the model, the perceived seriousness of, and susceptibility to a disease influence individual's perceived threat of the disease. Variables such as demographic and socio-psychological have been identified to influence both perceived susceptibility and perceived seriousness, and the perceived benefits and perceived barriers to action (WHO, 2003b; Redding et al., 2000). The study used the demographic variables in ascertaining the barriers or otherwise of patients' perceived susceptibility to barriers to actions. Perceived threat was identified to influence cues to action, which can be internal (e.g. symptom perception) or external (WHO, 2003b; Redding, 2000). These variables were used to test, to find out if indeed they affect adherence to TB treatment regimen in the study.

3.7.1 Variables of the Health Belief Model (HBM)

The HBM consists of variables that look at perceived susceptibility, severity, benefits and barriers. The HBM is based on the assumption that a person will take a health-related action if that person according to Champion, (1984) feels that a negative health condition can be avoided, has a positive expectation that by taking a recommended action, he or she will avoid a negative health condition (developing multiple drug resistance or dying) and believes that he or she can successfully take a recommended health action (can take treatment comfortably and with confidence leading to successful treatment). HBM comprises four constructs that represent the perceived threat and benefits:

a. Perceived susceptibility to illness;
b. Perceived severity of the consequences of such illness;
c. Perceived barriers and benefits to enacting the behaviour. These concepts were proposed as accounting for people's "readiness to act" (Conner & Norman, 1996); and finally,
d. Cues to action, was added to trigger that readiness and stimulate over behaviour.

The model further proposed that cues to action could trigger health behaviour when appropriate beliefs are held. These "cues" included a diverse range of triggers such as individual perceptions of symptoms, social influence and health education campaigns. All these variables were included in the survey question and responses from respondents used to ascertain whether there is any relationship between constructs of the model and patients' adherence (Redding et al., 2000; Conner & Norman, 1996).

1. Perceived Susceptibility

Personal risk or susceptibility is one of the most dominant perceptions in prompting people to adopt healthier behaviours. According to Redding et al., (2000), each individual has his or her own perception of the probability of experiencing a condition that would adversely

affect one's health. Individuals vary widely in their perception of susceptibility to a disease or condition so does gender affects one's susceptibility. This construct holds that the greater the perceived risk, the greater the likelihood of engaging in behaviours to decrease the risk (Redding et al., 2000). For example, this is what encourages parents to ensure that their children are vaccinated against TB at birth to avoid developing TB earlier in life. This perception was applied to the study to find out if respondents adhere strictly to the treatment regimen on the basis of the fact that they think that would make them recover from their TB disease/ailment condition as postulated by Rosenstock et al., (1988), interestingly though majority of respondents indicated that they were susceptible, however, there was no significant relation between ever-missed medication and perceived susceptibility at both bivariate and multivariate levels for females, contrarily, there was an association between ever-missed medication and males at the bivariate level (p=0.028).

2. Perceived Seriousness

McCormick-Brown, (1999) refers to perceived seriousness in his work to the beliefs a person has concerning the effects and gravity of a given disease. Despite the fact that the perception of gravity is often based on medical information or knowledge, it may also come from beliefs a person has about the difficulties a disease would create or the effects it would have on his or her life in general, for instance, pain and discomfort, loss of work time, financial burdens, difficulties with family, relationships, and susceptibility to future conditions (McCormick-Brown, 1999). It is important to include these emotional and financial burdens when considering the seriousness of a disease such as TB. Again, the coping strategies patients adopt to be able to circumvent the challenges irrespective of the financial implications in terms of travel cost and stigma (McCormick-Brown, 1999).

3. Perceived benefits and barriers to taking action

1. Benefits

Taking an action towards the prevention of a disease or toward dealing with an illness is the next step to expect after an individual has accepted the susceptibility of a disease and recognised it as serious (Umeh & Rogan-Gibson, 2001). The direction of action that a person chooses will be influenced by the beliefs regarding the action (Umeh & Rogan-Gibson, 2001). People tend to observe healthier behaviour when they believe that the new behaviour will decrease their chances of getting a disease. With breast cancer, it is a known fact that the earlier the cancer is found the greater the chances of survival. It is also known that a breast self-exam (BSE), when done regularly, is an effective means of early detection (Umeh & Rogan-Gibson, 2001; Graham, 2002). An individual has to believe that adopting this behaviour is beneficial (Graham, 2002). In TB, the individual's belief that adherence to treatment will reduce the severity of TB disease progression to MDRTB is essential in determining the level of adherence. Also, the benefit of complete cure after taking the medication would encourage patients on DOT to completely adhere to the treatment regimen in spite of the duration of treatment.

2. Barriers

Barriers are hindrances to help seeking. There are various dimensions of barriers, however, action may not take place, even though an individual may believe that the benefits to taking action are effective (Umeh & Rogan-Gibson, 2001). Barriers relate to the characteristics of a treatment or preventive measure, which may be inconvenient, expensive, unpleasant, painful or upsetting (Umeh & Rogan-Gibson, 2001). These characteristics may lead a person shying away from taking the desired action. In order for a new behaviour to be adopted people have to believe that the benefits far outweigh the consequences of continuing the old behaviour (CDC, 2004). With regards to breast cancer

prevention, with all the benefits to doing a regular BSE, the barriers to performing it exert a greater influence over the behaviour than does the cancer itself (Umeh & Rogan-Gibson, 2001). These barriers translate to treatment adherence when the individual believes that the materials, physical and psychological costs of adhering to treatment far outweigh the benefits, hence, they are less likely to follow their treatment as prescribed. TB patients who have not disclosed their status are less likely to adhere to their treatment because they do not want to be seen taking TB medications out of fear of negative treatment from those around them (Umeh & Rogan-Gibson, 2001). Again, financial burden and lack of social support may serve as a burden and consequently affect treatment (Umeh & Rogan-Gibson, 2001).

4. Self-efficacy

Self-efficacy was added to the Health Belief Model in 1988. It is a term used to describe how a person views her or his own ability to carry out a particular action. This includes the patient's perception on how likely they are to change particular behaviours (Bandura, 1997). People generally are not willing to try something new unless they think they can do it. According to Umeh & Rogan-Gibson (2001) if someone believes the new behaviour is useful (perceived benefit) but does not think he or she is capable of doing it (perceived barrier), chances are that, they will not try it. As with TB treatment if an individual does not believe that they can successfully adhere to the treatment this barrier will not be overcome and they are unlikely to adhere effectively (Umeh & Rogan-Gibson, 2001). For the purposes of this thesis barriers here, include lack of social support from family, fear of stigma, time spent at health facilities, distance from home to TB clinics and negative attitude of health workers towards patients and financial difficulties.

5. Cues to Action

An individual's perception of the levels of susceptibility and seriousness provide the force to act. Benefits (minus barriers) provide the conduit for action (Graham, 2002). However, it may require a 'cue to action' for the desired behaviour to happen. These cues may be internal or external (Graham, 2002). Cues to action can be people, events or things that move people to change their behaviour, in this case behaviour of strictly adhering to TB treatment regimen irrespective of the side effects, stigma and financial position (Graham, 2002). These could be the illness of a family member, media reports, mass media campaigns (Graham, 2002) advice from others, reminder from a health care provider (Ali et. al., 2002) or health care captions that prompt adherence to DOT, that is the STOP TB poster and most importantly the use of former president of South Africa Nelson Mandela in a TB advertisement is a source of inspiration to TB patients.

3.7.2 Application of the Health Belief Model (HBM) in the study

The HBM has been applied to a spectrum of health behaviours and subject populations. In this study the HBM is applied in assessing the gender dynamics of TB treatment by examining the variables of the model to explain the following:

i. Patient and community-related factors such as knowledge of TB symptoms, Cultural beliefs about illness and treatment; Cost, accessibility and availability of services; Symptoms and perceived illness severity. Individual perceptions as in perceived susceptibility to disease and perceived seriousness, which have been duly captured in the questionnaire and interview guide for patients. Sick role behaviours, which refer to adherence with, recommended TB medical regimens, usually following professional diagnosis of the illness.

ii. Demographic and Socioeconomic factors such as age, education, income, type of residence, income, employment status, occupation, living condition, social support, family and stigma and attitude towards treatment.

iii. Service/Provider-based Factors such as education on TB, waiting time, attitude of staff, trust and confidence. Clinic use, which includes physician (or clinic) visits for a variety of reasons; in the case of TB patients, visiting for refill and/or examination and the role of the health facility in patients' recovery

3.7.3 Benefits and drawbacks of the Health Belief Model

The HBM has provided a useful theoretical framework for investigators in a wide range of behavioural studies for several years. Its constructs are easy for non-psychologists to incorporate into their studies and it can be readily and inexpensively operationalised. It has focused researchers' and health professionals' attention on modifiable psychological prerequisites of behaviour and provided a basis for practical interventions across a range of behaviours (Rosenstock et al., 1988). Qualitative distinctions between beliefs held by each construct may be important in understanding why an individual does or does not adhere to treatment regimens, undertake a specified behaviour - in this case adhering to their TB treatment regimen (Llongo, 2004).

In spite of the benefits outlined above and as proved by research findings, there are limitations to the effectiveness of the Health Belief Model. Health belief model is often used to explain psychosocial aspects of health behaviours. However, they seldom provide robust predictors of behaviour since they often fail to address, or control for, the impact of the task involved or the context or setting within which these behaviours occur ((Llongo, 2004; Haynes, 1976). The model also excludes cognitions, which have been shown to be

powerful predictors of behaviour. It fails to address the importance of intention formation or the influence that other's support may have upon behaviour (Haynes, 1976). It portrays individuals as social economic decision-makers and consequently fails to account for behaviour under social and affective control (Haynes, 1976). This study however addressed the limitation of the model by delving into cognitions through the use of In-depth Interviews (IDIs) and the role of significant others in terms of social support from families and friends in adhering to TB treatment, which invariably address the shortfalls of the model.

3.8 Conclusion of the HBM

The HBM has attempted to explain health behaviours that influence adherence. It assumes that good health is a goal of most persons and that their perception of susceptibility, seriousness, benefits, barriers and self-efficacy impact the prospect of a person taking an action that is health related by adhering to prescribed TB treatment.

There are clearly positive associations that exist between patients' adherence and their health beliefs. The HBM is particularly applicable to adherence issues in TB patients. Therefore, the study applied the HBM in an effort to demonstrate the relationship between adherence, the health beliefs of TB patients and how these influence their subsequent health behaviours by identifying the factors that may be impacting on their ability to be adherent to TB treatment regimen.

3.8 Framework used for the study

The study designed and used a framework by looking at the factors and theories discussed earlier. Factors linked to adherence/non-adherence can be grouped into those related independent variables; those related to the construct of the Health Belief Model (HBM); those related to likelihood of action and those related to the mediating factors. The diagram explains the framework of the study. From the diagram, the constructs in the health belief model affect the independent variables and the independent variables have direct effect on the dependent variables. However, there are mediating factors, which might affect the dependent variables either positively (support) or negatively (barriers). Figure 3.1 illustrates the framework for the study.

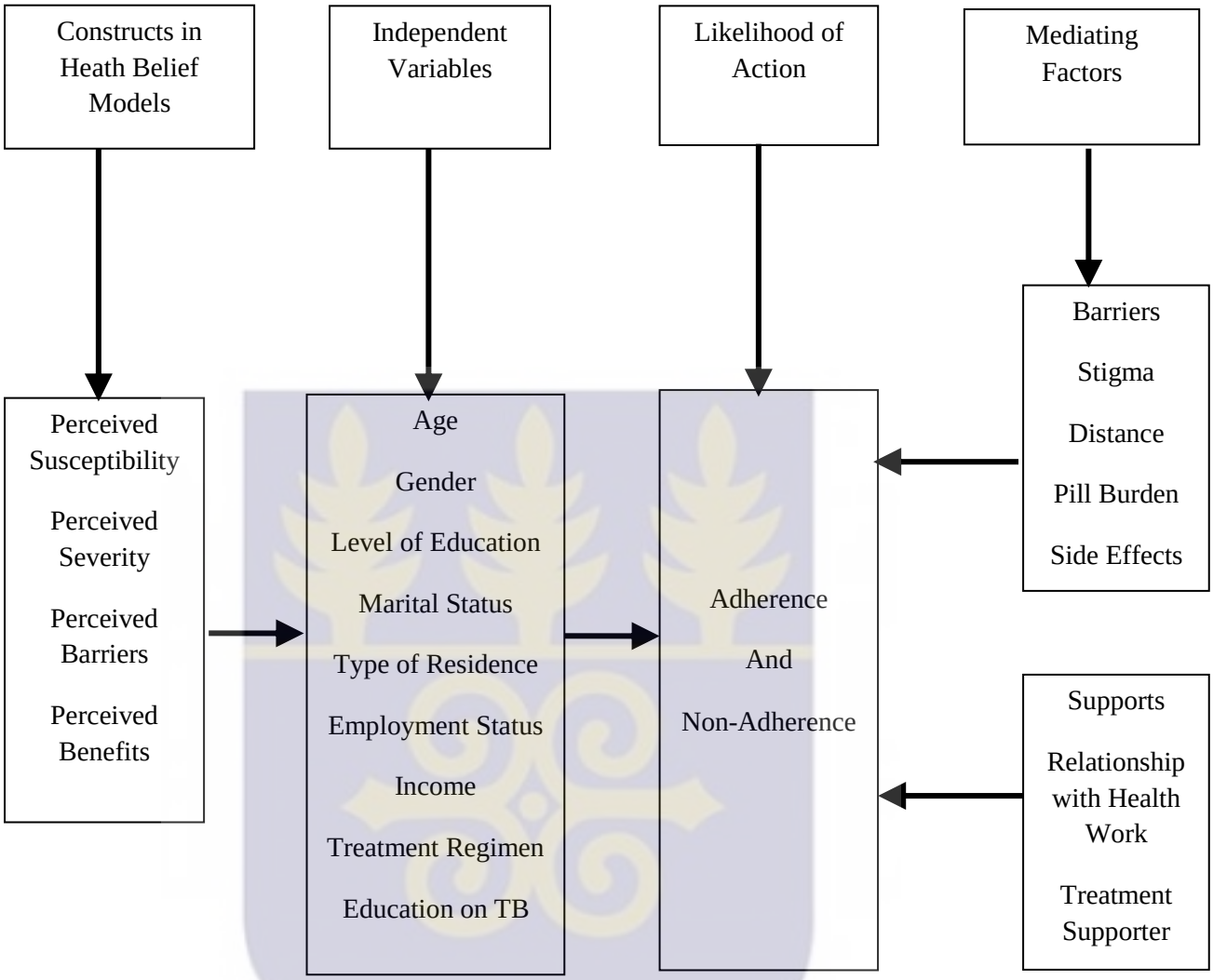

Figure 3.1: Framework of Factors affecting adherence to TB treatment

The study examined these factors from the following point of view: Construct of the Health Belief Model: Perceived susceptibility, perceived severity, perceived barriers and perceived benefits. Independent variables in the study were: gender, age, level of education, marital status, type of residence, number of years spent in current residence, distance, income, getting money for treatment, not wanting to go hospital alone and clinic visits.

Mediating factors were in two folds:

1. Enabling factors were support from significant other and communication with health care workers and
2. Barriers were seen as stigma, distance, transport fare, loss of daily wages, inadequately informed patients;

Based on the literature reviewed, the study used the framework as a guiding principle to collect quantitative and qualitative data and analysed these to find if there are indeed relationship among these variables and adherence/non-adherence.

3.9 Conclusion

In conclusion, this chapter has looked at the history and epidemiology of TB, clinical presentation, and diagnosis. It further reviewed literature on gender and health, adherence and its impact on gender and TB, the impact of the advent of HIV on TB treatment adherence. It also discussed the theories (HBM) used in advancing the study topic and ends by presenting framework that guided the study.

CHAPTER FOUR

4.0 METHODOLOGY

4.1 Introduction

This chapter explains the methodology that was used for the study. The chapter looks at the study area, study design, target and study populations, sampling techniques, research instruments, data collection techniques, data collection tools, data quality control, data management and analysis and ethical considerations.

4.2 Study Area

Greater Accra region was selected as the study area. It is bordered to the north by the Eastern Region, to the east by the Volta Region, to the south by the Gulf of Guinea, and to the west by the Central Region. It is the smallest of the 10 administrative regions in terms of land size; however, apart from the Ashanti region it is the next populous region. This has implications for public health since, as the nation's capital, many people have migrated from the other regions in search of jobs, increasing slum settlements. It occupies a total land surface of 3,245 square kilometres of the entire land size of Ghana. However, it is the second most populated region, after the Ashanti Region, with a population of 4,010,054 in 2010, and represents 15.4% of Ghana's total population, (GSS, 2013). Table 4.1 gives a breakdown of the districts and the population by gender.

Table 4.1: Population by District and Sex – Greater Accra Region

	Total	Male	Female
Name of Metropolitan/Municipal/District	24,658,823	12,024,845	12,633,978
GREATER ACCRA	**4,010,054**	**1,938,225**	**2,071,829**
Weija (Ga South) Municipal	485,643	237,558	248,085
Ga West Municipal	262,742	128,727	134,015
Ga East Municipal	259,668	127,258	132,410
Accra Metropolis	1,848,614	887,673	960,941
Adenta Municipal	78,215	39,366	38,849
Ledzokuku/Krowor Municipal	227,932	109,185	118,747
Ashaiman Municipal	190,972	93,727	97,245
Tema Metropolis	402,637	193,334	209,303
Dangme West	122,836	58,806	64,030
Dangme East	130,795	62,591	68,204

Source: *Ghana Statistical Service (GSS) 2012*

At the time of the census, La Dade Kotopon, Ningo-Prampram, Shai-Osudoku, La Nkwantanan, Kpone Katamanso, Ada West and Ada East, Nii Okaiman had not been delineated out of their mother municipalities/districts and so no definite population figure was available.

4.2.1 Ethnic and religious make-up of GAR

The main ethnic groups are the Akan (39.8%), Ga-Dangme (29.7%) and Ewe (18%). The Gas however forms the largest single sub-ethnic grouping, accounting for 18.9% of the population. This is not surprising since the region's indigenous tribes are the Ga-Dangme (GSS PHC, 2010). Christians constitute the largest religious group (83.0%), followed by

Moslems (10.2%), people who profess no religion (4.6%) and adherents of traditional religion (1.4%) (GSS PHC, 2010). Looking at the ethnic and the religious make-up of GAR, it is highly cosmopolitan; however, some ethnic and religious groups are clustered in particular suburbs such as the slums in Accra and Tema (GSS PHC, 2010). Again, there are Zongo communities, which are densely populated and serve as breeding places for diseases due to unplanned neighbourhoods and lack of basic amenities; again, the situation has implication for public health. From the data, it was found that majority of patients were Akans, this was found not to be surprising since Greater Accra region though a Ga-Dangme region habours more of Akans who migrant into the region to seek greener pastures.

4.2.2 Major industries, housing and economic activities

The major types of industry in the region according to the 2010 Population and Housing Census (PHC) are: Agriculture, Manufacturing, Construction, Salt mining, Sand/gravel winning, Stone Quarrying, Fishing, Trade and transport, Saw milling, Crafts/small scale industry (GSS, 2013).

The region is in dire need of housing facilities. About 42% of households occupy one room, 29.5% occupy two rooms while 28.3% occupy three or more rooms, this has implication for the spread of air borne diseases such TB. There are exceptions with regards to housing; the proportion of households occupying one or two rooms varies from 45.7% in Dangme East to 78.4% in Accra Metropolitan Area (AMA) (www.ghana.gov.gh).

With regards to room occupancy, it is recorded that the region has an average household size of 4.6 and the average number of rooms per household of 2.4, it has an average room density of 2.0 persons per room. With the exception of AMA, all the districts have an average room density lower than that of the entire region. Both Dangme West and Dangme

East have a density of 1.6 persons per room, the lowest in the region (www.ghana.gov.gh). An indication that there is overcrowding in AMA than in the other districts. This has implication for disease control, more especially airborne diseases for which TB is the most contagious and fatal.

Again, in terms of accommodation facilities, there are 867 (0.1%) "Homeless households" of all households in the region. The Accra Metropolitan area has the largest population in the region and habours 709 (81.8%) of these homeless households. This number represents only 0.2% of households in the metropolitan area (www.ghana.gov.gh).

With regards to age distribution, the region has population of 1,945,284 persons aged 15 years and older. There are 1,377,903 (70.8%) of them who are economically active. Among the economically active population, 82.6% had ever worked, 4.0% had jobs but did not work and 13.4% are reported to be unemployed. The region's unemployment rate which stands at 13.4% is higher than the national unemployment figure of 10.4%, the implication here is that, some end up in prostitution which increases the spread of HIV/AIDS (www.ghana.gov.gh). With regards to occupational choices, the three largest occupational groups which males are engaged in are production, transport operators and related workers (29.6%), sales workers (19.4%), and clerical and related workers (14.4%), as compared to 42.0% of females in sales occupation, 19.5% in production, transport and equipment, and finally 13.9% in service occupations. More females (39.0%) are engaged in wholesale and retail trade as compared to 22.2% of males. Females are three times more likely than males to be in the hotels and restaurant industry (www.ghana.gov.gh). In terms of ownership of employment, there are more than half of the economically active population in the region who are self-employed with employees, while a third (32.6%) is employees. Females (69.1%) dominate the private informal sector, compared with 55.8% of males in this sector. On the other hand, 40.7% of males as compared to 28.5% females

are employed in the public and private formal sectors (www.ghana.gov.gh). There are more females (62.6%) than males (41.6%) who are self-employed without employees. This is an indication that males are 1.5 times more likely than females to be employees (www.ghana.gov.gh).

Two groups of districts are prominent with regard to the type of industry of the economically active population. The main industry found in AMA, Ga and Tema is wholesale and retail trade. In the three districts, the proportion of females in wholesale and retail trade are more than males. Agriculture/hunting/forestry is the main livelihood in Dangme West (40.8%) and Dangme East (36.8%). In Dangme East, fishing is the second largest livelihood. More than half of the economically active population in Ga (56.3%) and over two-thirds in Dangme West (70.8%) and Dangme East (74.3%) are self-employed without employees. In AMA and Tema, the proportions of self-employed without employees are less than half. In all the districts, females are more likely than males to be self-employed without employees. The second largest group is employees, ranging from 14.0% in Dangme East to 38.2% in Tema (www.ghana.gov.gh).

Higher proportions of males, compared to females, are economically active. The highest unemployment rate was recorded in Tema (16.0%), Ga (13.3%) and AMA (13.2%). Each of districts has the proportion of unemployed females higher than that of males (www.ghana.gov.gh).

The analysis of the economically active population by industry highlights the dominance of the private informal sector in the economies of the metropolitan, municipal and districts. The proportion engaged in the private informal sector ranges from 57.8% in Tema to 84.5% in Dangme East. Statistics available indicate that in all the districts, the female proportions are much higher than those for males (www.ghana.gov.gh).

It has been established that there is a relationship between type of job, congestion in housing and TB; especially those who work in the mining and construction industries and those who live in crowded and congested homes are pre-disposed to contracting TB. These industries are predominantly male, hence the high prevalence of TB among males than females.

4.2.3 Key environmental challenges

Key among the environmental concerns in the region are: Poor sanitation and waste management, unplanned human settlements and poor development control, land degradation from sand winning and quarrying, water pollution of Densu River, Odaw and Lagoons, land use conflicts, Coastal erosion and pollution (www.ghana.gov.gh).. All these have implications for infectious diseases; notable among them is TB, which is contagious.

4.2.4 Major causes of morbidity in the region

Major diseases, including g malaria, hypertension, skin diseases, diarrhea, rheumatism and anemia, were recorded at the Out Patients Department (OPD) of the hospitals in the Greater Accra region from 2011 to 2013. A total of 183,597 cases of hypertension were recorded in the region, constituting approximately 6.0% of all cases seen at the OPD while a total of 54,397 (1.8%) cases of diabetes were also recorded in the region (GHS, 2013). Statistics from the National Tuberculosis Control Programme indicate that the Greater Accra Region accounts for 2901 cases (NTP, 2014). Compared to other disease conditions, TB is not one of the diseases of high mortality, but the nature of the disease calls for strategy to combat it, so that it does not became a major public health challenge like malaria, as other countries are struggling to control.

4.2.5 Health Facilities and Personnel in Greater Accra Region (GAR)

The region has one teaching hospital, a regional hospital, two psychiatric hospitals, each metropolitan, municipal and district has a hospital and a host of health centres and clinics totaling four hundred and sixty six (466) (GHS, 2013). In terms of health personnel, Greater Accra leads the regions with about 820 medical officers and other health and related professionals totaling 10,028 (GHS, 2013). In spite of the numerous health facilities and staff, the region is still confronted with challenges with medical care for which TB is part.

The Greater Accra region has approximately 20 government-run health facilities, which include: Ridge Hospital, Achimota Hospital, Princess Marie Louise Children's Hospital, Dangme West Hospital, Dangme East Hospital, and La General Hospital, Six Polyclinics, over 20 Quasi-Governmental Facilities, Ten Smaller Clinics, Two CHPS Compounds, and More than 800 private health facilities (GHS, 2013). The region recorded the highest in terms of TB detection in all forms (NTP, 2012).

The GHS runs three national programmes: The NTP, the National Buruli Ulcer Control Programme and the Expanded Programme on Immunization (EPI). TB is a major health challenge in Ghana (GDHS, 2008), and the TB Control programme began in 1994 to address this infectious disease in the country. In 1994, the country also adopted the Direct Observation Treatment Short Course (DOTS) strategy for controlling TB in Ghana (GHS, 2013). Even though TB is not among the ten common diseases in the region, it is among the diseases that have been given priority and hence it has a set up established in 1994 known as the Ghana Tuberculosis Control Programme (NTP). The programme receives funding from the Global Fund for its activities. Currently the programme is implementing the WHO STOP TB initiative (GHS, 2013).

4.3 Selected facilities for the study

Six facilities in the Greater Accra region were purposively selected for the study. These are: La General Hospital, Achimota Hospital, Kaneshie Polyclinic and Ridge Hospital: Tema Metropolitan Area, Tema General Hospital and Tema Polyclinic. These facilities were selected because the areas have diverse demographic, socio-economic and cultural characteristics and they happened to be among the facilities to record high incidence of TB in the region as per the 2012 TB report. Figure 4.1 depicts a map of the Greater Accra region showing the selected health facilities for the study and their location.

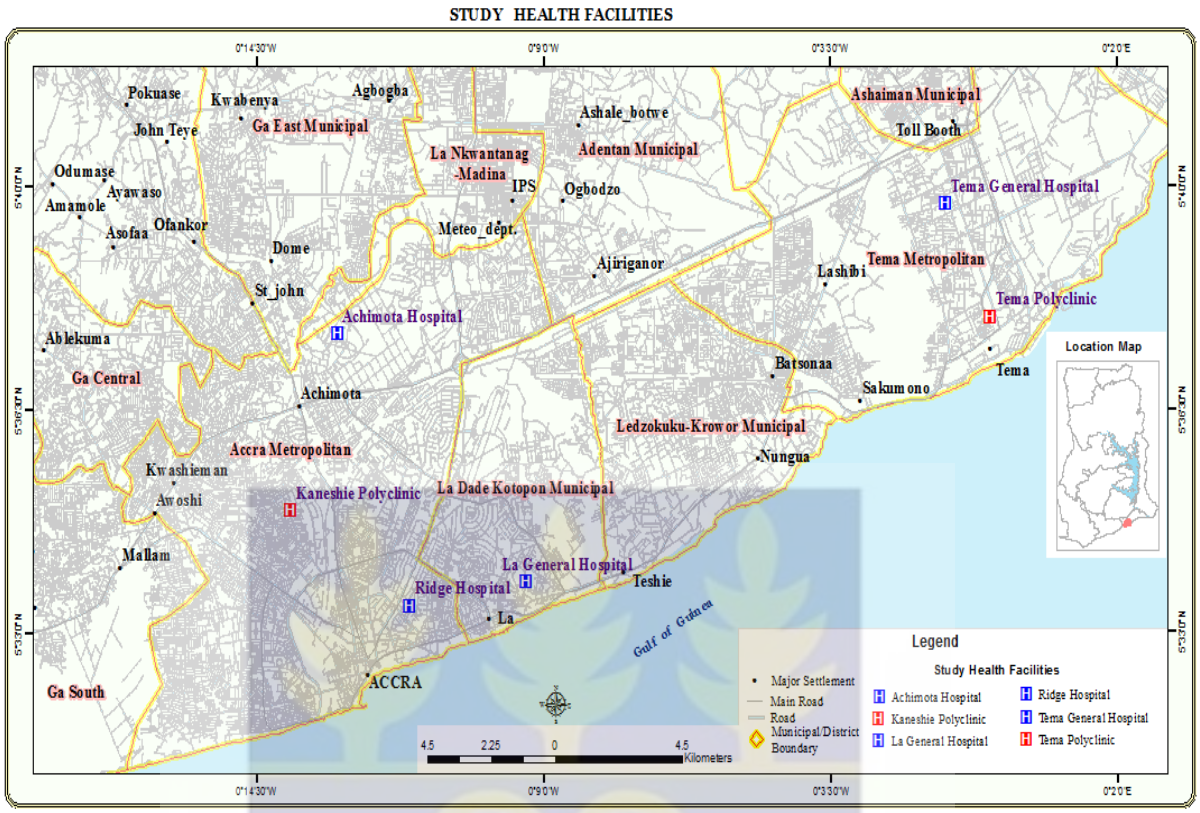

Figure 4.1: A map showing the selected health facilities for the study and their location.

4.4 Study Design

The study used descriptive designs. A descriptive study is useful because by its nature, it enables the researcher gain more information about the characteristics within a particular field of study with the purpose of providing a picture of the situation as it naturally exists (Burns & Grove, 2005). The study used descriptive cross sectional survey to describe patient related variables, such as socioeconomic/demographic characteristics, knowledge and HBM tenets, gender and adherence issues. It also attempted to establish causes or risk factors for adherence or non-adherence to TB treatment regimen by so doing enabled the study to describe these variables and to determine which factors may have contributed to TB adherence or non-adherence (Varkevisser et al., 2003).

4.5 Study Methods

The study used quantitative and qualitative methods. In their write-up, Johnson & Turner, (2003) argued that the fundamental principle of mixed methods research is that multiple kinds of data could be collected with different strategies and methods in ways that reflect complementary strengths and non-overlapping weaknesses, allowing a mixed methods study to provide insights not possible when only qualitative or quantitative data are collected Johnson & Turner, (2003). In the words of Greene, (2007) mixed methods research gives the researcher the *"opportunity to compensate for inherent method weaknesses, capitalize on inherent method strengths, and offset inevitable method biases"* (pg. xiii).

The mixed methods approach was used as sequential transformative design Johnson & Turner, (2003). Here, quantitative data were collected concurrently with qualitative data. This is critical in the sense that the chosen methods served the theoretical perspective. Both qualitative and quantitative data were analysed separately, and the findings were integrated into the interpretation phase (with descriptive data) and subsequently used to corroborate findings from the quantitative data in the discussion of the findings. This approach permitted views and perspectives of the various diverse groups of participants to be represented for deeper understanding of the issues under study.

Researchers who have used quantitative approaches to collecting, analysing and presenting findings have done so by virtue of their philosophical underpinnings of the positivist approach, which give credence to objectivity and rigour Johnson & Turner, (2003). The qualitative approach on the other hand, is more persuasive and tends to be more detailed as to the very nature of it Johnson & Turner, (2003). It is often seen by critics as too subjective for research, and hence, the rationale for use of the method which in effect compensated each other's shortfall.

4.5.1 Sampling of study sites

The following health facilities were selected based on the incidence of TB cases recorded prior to the study in 2011, which stood at 3,254 and geographical spread (sub-metro, metros, municipals. From reports of GHS, these facilities had high incidence of TB cases. Ideally, forty five respondents should have been sampled from each facility but some of the health facilities fell short of respondents hence, the difference had to be made up by selecting more from health facilities with high reported cases of TB patients. Table 4.2 presents the breakdown.

Table 4.2 study sites and number of respondents

Name of health Facility	Female	Male	Expected Number	Actual Number
La General Hospital	30	32	45	62
Ridge Hospital	14	56	45	70
Tema General Hospital	14	24	45	38
Achimota Hospital	5	44	45	59
Kaneshie Polyclinic	20	26	45	46
Tema Polyclinic	18	16	45	35
Total	**112**	**198**	**272**	**310**

Three (Accra, Tema, La Dade Kotopon) out of the ten metropolitan, municipal and district assemblies were selected. Three health facilities made up of two hospitals and a polyclinic were selected from Accra Metropolitan assembly, a hospital and a polyclinic were selected from Tema Metropolitan assembly and another hospital was selected from La Dade Kotopon Municipal assembly.

4.5.2 Study Variables

Dependent variable was adherence (adhered and not adhered).

Independent variables were type of residence, income, employment status, occupation, social support, level of social support, age, marital status, education, place of residence, number of years in community, stigma, HIV status, knowledge, tenets of the HBM, communication with HCWs, distance to facility, transportation , stigma, roles and responsibilities,

4.5.2.1 Operationalisation of selected study variables

Adherence: "consistently taking TB medication without missing any for the treatment period"

Non-adherence: "ever missed medication for five consecutive days"

Gender: a comparative construct (male and females with their corresponding roles and circumstances)

4.6 Study Population

According to Burns & Grove, (2005) a population is *"the total set of study individuals or elements."* Population is a collection of persons or other elements that share common characteristics, (Stommel & Wills, 2004). Burns & Grove, (2005) describe a target population as *"the entire set of individuals or elements who meet the sampling criteria."* The population of the study is clinic-based TB patients with or without HIV.

In the study the target population comprised all persons diagnosed with TB who have been registered in the selected facilities in the Greater Accra region during the time of conducting the survey July, 2013 – January, 2014. The accessible population comprised the section of the target population to whom the researcher had reasonable access to during the survey (Burns & Grove, 2005; Stommel & Wills, 2004). In the study the accessible population comprised all TB patients who received TB treatment, during the data collection phase in the selected health facilities.

4.6.1 Sampling Frame

The sampling frame was the patients' register which, contained names of the TB patients on DOTS attending the health facilities.

4.6.2 Inclusion Criteria

The inclusion criteria for patients included in the study was patient should be

1. Age 18 years and above
2. On TB treatment
3. On TB treatment and receiving ART while on anti-TB treatment
4. Co-infected with TB and HIV (might not have initiated ART)
5. On treatment for TB, has taken drug for at least four months

For the in-depth interview, the inclusion criteria were:

1. Age 18 years and above
2. On treatment for TB, has taken drug for at least four months
3. Co-infected with TB and HIV (might not have initiated ART)

4.6.3 Exclusion Criteria

These categories of patients were excluded from the study:

1. TB patients who had not started DOTS.
2. TB patients on DOTS who did not consent to participate in the study.
3. Too ill to be interviewed

4.6.4 Method used in sample size Calculation

A "sample" is a portion or subset of a larger group called a population. A population is the "universe" to be sampled (Burns & Grove, 2005; Stommel & Wills, 2004). A good sample is one that is representative of the population and exhibits similar characteristics (Burns & Grove, 2005; Stommel & Wills, 2004).

The sample size for the study was arrived at using the global treatment success of the TB over the past ten (10) years ranging between 45% and 85%. According to the World Health Organization (WHO) only 50% of patients take their medication as prescribed

(Claxton et al., 2001). In a meta-analysis by DiMatteo, (2004) the average non-adherence rate to medical recommendations is about 25%. This method was used because Ghana has no data on adherence of TB. The sample size for the study was calculated based on the WHO estimated TB prevalence for Ghana, which stands at 23%, which was used as a basis for calculating the sample size. This method was used to calculate the sample size for the study because at the time of study there was no accurate data on adherence or default rate for the region. Prevalence (includes HIV+TB) 23 (11–39) 92 (44–158) per 100 000 (Source: WHO profile of Ghana: www.who.int/tb/data). However, the total sample size for the study was 310 as provision was made for non-response rate of 14% and other contingencies.

Sample Size (SS) = $\frac{Z^2 (p) \times (1 - p)}{C^2}$

SS = Sample Size

Z = Z-value (e.g., 1.96 for a 95% confidence level)

P = Percentage of population picking a choice, expressed as decimal

C = Confidence interval, expressed as decimal (e.g., .05 = +/- 5 percentage points)

Z-values (Cumulative Normal Probability Table) represent the probability that a sample will fall within a certain distribution.

The Z-values for confidence levels is: 1.96 = 95% confidence level

$$\frac{SS = 1.96^2 \times (1 - 0.23) \times (0.23)}{(0.05)^2}$$

SS = 273

4.6.5 Selection of study participants

The purpose of qualitative research is to capture diversity in experiences, rather than achieving a homogeneous sample. Consequently, a heterogeneous sample targeted the

principles of maximum variation, as one strategy of purposive sampling (Patton, 2002). According to Seale et al., (2004) Purposive sampling encourages:

> *"Detecting cases within extreme situations as for certain characteristics or cases within a wide range of situations in order to maximize variation, that is, to have all the possible situations"* (Seale et al., 2004 page 418).

Maximum variation sampling allows for the capture of detailed descriptions of all aspects of the social phenomena or cases under study (i.e., experiences with TB and HIV and related care) as a means to document the distinctiveness of particular cases and instances; also it is to allow for the capture of important shared or concealed patterns that may "*cut across cases"* in spite of their heterogeneity (Patton, 2002).

Prior to sampling of participants for the IDIs, the TB coordinator at each of the facilities helped in compiling the list of all TB patients receiving TB treatment. At each Centre those on treatment for four to at least six months were extracted from the list and dates for refill were generated from the register. On average attendance at a TB centre for refill and DOTS was 10 patients and those eligible to be interviewed at each attendance was 4.

Purposive sampling was used to select respondents for the In-depth Interviews (IDIs) to explore the gender dynamics in TB treatment, patients with TB or TB and co-infected with HIV still married, patients who were divorced/separated, patients living alone, patients with supportive partners, patients co-infected with HIV were selected with the support of TB coordinators. In total twenty four (24) respondents four (4) from each health facility made up of two females and two males (2 HIV positive and 2 HIV negative) and six (6) TB coordinators (one from each health facility).

The researcher interviewed respondents' at their own convenient setting. All interviewees consented to be interviewed at the various chest clinics; since a sizeable number of them did not want people in the neighbourhood to know their condition.

4.7 Data collection methods and techniques

The following data collection methods and techniques were employed for the study: in-depth interviews, survey and observations:

4.7.1 Qualitative study

As has been discussed earlier, qualitative research seeks to bring out a deeper meaning of social phenomena by studying respondents in their natural environment. The study used qualitative methodology to elicit respondents' views on TB with regards to adherence and emphasis placed on gender and community perspectives. In-depth interviews (IDIs) were conducted among identifiable groups such as TB patients, TB patients co-infected with HIV and key informants made up of TB coordinators and observations made in the selected study sites to delve into details of experiences on the themes such as initial response to being diagnosed with TB and HIV, TB and HIV treatment experiences among participants and individual perception of alternatives treatment. These participants were purposively selected with the help of the TB coordinators.

4.7.1.1 In-depth Interview

All (6) key-informants in this study were Health Care workers (HCWs) at all the study sites. Interviews with key-informants helped contextualize the characterization of illness and healthcare experiences and linked them to the clinical, organisational and structural backgrounds to which patients are exposed in the healthcare system. Key-informant interviews allowed for some inclusion of the provider's perspective on TB care. They also drew attention to the manner in which policies are applied or challenges during day-to-day operations. The interviews were conducted at the various health facilities by the principal investigator.

The second group of In-depth interviews (IDIs) was conducted with two categories of patients; those on treatment for TB only and those co-infected with TB and HIV. This

enabled the study to identify the nuances of gender dynamics as male and female patients go through the treatment regimen and the most appropriate methods in assessing the barriers that affect adherence over time, thus, afforded further exploration and validation of information from the quantitative survey. The study objectives focused on tapping into the experiences and perspectives of individuals infected with TB and HIV as they access and take the treatment regimen for the dual diseases. Twenty-four (24) patients were interviewed: These were made up of twelve (12) males out of which six (6) were co-infected with HIV and 6 were TB patients and twelve (12) females – six (6) of which were co-infected with HIV and 6 TB only patients. All interviews were conducted in the selected health facilities with aid of structured interview guide to elicit responses based on the objectives of the study.

4.7.1.2 Observation

Observation involves systematic selecting, watching and recording behaviour and characteristics of objects and phenomena (Varkevisser et al., 2003). It could be either participant or non-participant observation. The former involves the observer partaking in the situation he or she observes and the latter involves an observer who watches the situation, either openly or concealed and does not participate in it. The study used a non-participant observation to watch the situation. Non-participant observations were made in two of the selected facilities; namely; Tema General Hospital and Tema Polyclinic, to ascertain the processes involved in registering TB patients and the counseling procedures, the daily intake of medicines by patients, attitude of patients and nurses towards treatment and the everyday activities that go on in the chest clinics of these two facilities. Particular attention was paid in developing themes based on the conceptual framework of the study. A check list was prepared to observe relevant situations related to the study such as

attitude of nurses and patients during counseling, initial registration and DOT during the intensive phase of treatment.

4.7.2 Quantitative study (Survey)

The survey was the administration of questionnaire, which involved 310 respondents. This was part of the quantitative study and generated quantitative data. The quantitative data were collected using structured questionnaire with both open and closed-ended questions. The data collected included age, sex, marital status, level of education, occupation, knowledge, attitude, gender issues, adherence issues, provider/health services issues, perception and practice on use of DOT by TB patients co-infected with HIV patients.

4.8 Secondary Data

The study made extensive use of secondary data derived from articles and journals from the international of Tuberculosis and Lung Disease and other journal sites and Regional health directorate and the National Tuberculosis Control Programme (NTP) by using search engines such as Google, Google scholar, and PubMed. Again, published documents from the WHO and the NTP were reviewed based on the objectives of the study.

4.9 Data Quality Control

The following measures were taken to ensure quality of the data collected. These are:

4.9.1 Pre-testing of data collection instruments

The interview guide and questionnaire were pre-tested at Port Medical Centre in Tema Community One. A total of ten (10) TB patients were interviewed; 4 females with 1 female co-infected and 6 males with 2 co-infected. The TB coordinator was also interviewed as part of the pre-testing. This enabled the researcher validate the instruments to ensure that they were framed well and that there were no ambiguities prior to the main

data collection phase. The data collection instruments after the pre-test, had to be fine tuned because there were some repetitions making the interview too long and a few questions were found to be leading questions. After the pretesting, the data collection instruments were modified as per results.

4.9.2 Validity

In order to ensure the validity of the data, triangulation was used to corroborate an overall interpretation of the findings (Mays & Pope, 2000). Again, all three techniques (interviews, questionnaire administration and non-participant observation) used for data collection complemented one another; more importantly the survey and IDIs. The use of triangulation of data from the various sources served to validate the data and gave more reliability to the data It also allowed discussions that strengthened the analysis of particularly qualitative data in the study, and counter balanced the influence of bias (Malterud, 2001).

4.9.3 Data Processing and Analysis

In the quantitative analysis, data were entered into the computer and checked for completeness through cleaning. The quantitative data were entered into the computer using the Statistical Package for Social Science (SPSS) version 19 and later transferred to STATA version 12 for analysis. The operational definition for Adherence in the study was patients who did not miss their TB medication and non-adherence was those who missed their medication on five (5) consecutive times. The data were analysed at three levels; descriptive, bivariate and multivariate levels and captured as frequency distribution tables, Pearson chi-square and Fisher's exact test results (Fisher's exact test where counts were less than five) and logistic regression respectively.

Demographic data were analysed using descriptive statistics in cross tabulating gender with the key variables such as age, education, gender marital status to create frequencies

and percentages. In order to compare groups, Pearson chi-square test and Fisher's exact test (for counts less than five) were used for categorical variables for association at a confidence level of 0.05. All covariates with significant results such as gender, age, marital status, income, facility, education on TB, getting money for treatment, how medication was served by HCWs, distance to facility, and transportation problem were included in the logistic regression model to identify the factors significantly associated with gender and treatment adherence. Background characteristics used in these tables (type of facility, age, education, marital status), were all assessed for association with ever missed medication using cross tabulation (chi-square and fisher's exact test (for counts less than five).

For the logistic regression, only significant variables at the bivariate level were included in the models. Here, some variables such as income, age and marital status were re-categorised/grouped to give more meaning to them.

In-depth interviews (IDIs) were transcribed verbatim in English from the audio recorder using MS Word and coded and processed with NVivo 10 using the following procedure; first, a set of transcripts was reviewed to identify possible concepts and categories. Next, a set of codes was developed based on these categories and all transcripts were subsequently coded. During the coding process, constant comparison was used to compare and review accounts given by male and female patients and healthcare workers. This approach to data analysis was to ensure that the most appropriate categories and themes had been formulated and that all perspectives were included. It also allowed emergent central messages or "themes" to be inductively derived from the statements made by the TB respondents and TB coordinators who were directly involved in TB care. Themes such as initial response to being diagnosed with TB and HIV, Beliefs about TB treatment and co-infection and gender roles, social support and how they affect adherence were created based on the objectives of the study. This gave a vivid description of the experiences of

patients on TB treatment and others who are on TB and receiving treatment for HIV as well. It has been able to explain the "why" and "how" in the proceeding chapters. Themes developed from the interviews were captured and used to support the descriptive findings.

4.9.4 Triangulation

Triangulation is application of different methodologies to study the same phenomenon, through the use of various methods, data sources or theoretical perspectives (Yeasmin & Rahman, 2012). According to Yeasmin & Rahman, 2012, triangulation may be treated as a tool to validate data from different sources, as is critical when seeking a singular truth about a phenomenon. Consequently, as with this study, triangulation was used as an interpretive tool for validation of data sources of the research. Triangulation between data sources (i.e. surveys, interviews and observation) helped capture a more complete, holistic and contextual depiction of patients' experiences with illness and care. Triangulation enriched data interpretations and helped uncover unexpected themes that were not apparent in the quantitative data.

4.10 Ethical Consideration

The study did not involve any experimental procedures on patients. However, research and ethical clearance to conduct the study was sought from the Ghana Health Services Ethics and Review Committee. Nevertheless, ethical principles of anonymity, confidentiality, and rights of withdrawal was shared and ensured among participants (TB coordinators and patients). The research participants were informed of the objectives and methods of the study and the field researchers further clarified their roles in the study. For patients in particular, it was made clear to them that participation in the study was voluntary and refusal to take part would not affect their access to services offered by the health facility. No form of inducement was used to entice participants to partake in the study. However,

refreshment and transportation were provided after the interview especially for patients who had to be called to come for the interview. To help protect the identity of the patients and prevent questioning by community members, both the questionnaire administration and individual interviews with patients were held within the hospital premises. Participants' right was ensured through an informed consent, which was obtained from them before the conduct of the interview.

Questionnaires were administered to participants who agreed to be part of the study at each of the six selected clinics. Details of ethical issues could be found in appendices 1 and 2.

4.11 Conclusion

The chapter has presented the methodology for the study. They include methodology that was used in the study, description of the study area, study design, target and study populations, sampling techniques, quality control and ethical considerations.

CHAPTER FIVE

5.0 PRESENTATION OF FINDINGS

5.1 Introduction

This chapter presents the findings of the study. It is divided into three parts; part one entails descriptive results of findings from both quantitative and qualitative data from the survey conducted through written questionnaires and in-depth interviews. The quantitative data provide frequency distribution tables, whilst the qualitative data corroborated or presented the nuances of how respondents felt about their situation as they narrated their situation in a more detailed way. Part two presents detailed results on bivariate analysis based on gender and finally part three entails a presentation of multivariate analysis using logistic regression to ascertain the relationship between the dependent and independent variables.

5.2 Background of study respondents

5.2.1 Demographic Characteristics

Age is a very significant determinant of health and to put the analysis of the study into perspective, the ages of respondents were captured. Findings from the study indicated that TB was high among those 30 – 39 years old and lower among 18 - 29 years in the study areas. This was also reflected among the interviewees. The mean age of respondents was 40.4 years – with the youngest being 18 years and oldest being 75 years. Table 5.1a presents the background characteristics.

In the social sciences, education has been found to be a protective factor as far as diseases are concerned. For this reason the study sought to determine the educational background of respondents. Respondents with no education constituted 26 (8.7%), those with primary education were 44 (14.2%), middle/JHS recorded the highest with 131 (42.3%), technical/vocational constituted 10 (3.2%), secondary education constituted 63 (20.3%), and finally respondents with tertiary education had the least with 35 (11.3%) respondents. Among the interviewees similar trend was observed – majority of them had low educational achievements. Marital status is another characteristic, which is an important determinant of health. Marital status could be either protective or risk factor to contracting or preventing ill-health. One hundred and eighteen (38%) of respondents were single, married respondents were 116 (37.4%) and for respondents who were separated/divorced/widowed constituted 54 (17.4%).

Ethnic origin has also been noted to have some association with contracting certain health condition and conversely has been protective depending on the locations and diet. TB as an infectious disease has been found to be prevalent among poor and slum dwellers. In the study ethnic origin was used to describe the distribution of TB patients' ethnic background; however it was not used for further analysis. Akans constituted the highest respondents with 104 (33.5%) whilst foreigners made up of Hausa, Moshi, Yoruba and Gabonese recorded the lowest with 16 (3.3%). Table 5.1a presents a vivid presentation of the demographic characteristics of survey respondents.

The qualitative study on the other hand found the following characteristics among those who were diagnosed with TB only: The mean age of the 24 participants (12 female and 12 male respondents) was 44.3 years (range 27 - 66 years). Nine out of the 24 participants were married, 5 were single but in some form of relationship, 5 male participants were married but had been abandoned by their wives, 5 were divorced or widowed. A large

number of the participants (12) had pre-secondary education (8 with Middle School Leaving Certificate (MSLC), 4 Junior High School (JHS), 4 technical school leavers, 3 participants with higher educational levels (a diploma and two university degree) and 2 had no education. With respect to occupation of participants, 11 out of the 24 participants were engaged in some form of employment and 13 unemployed. Most participants had their close family members as "pseudo" treatment supporters. Table 5.1b presents demographic/socioeconomic characteristics of interview participants.

Table 5.1a Background characteristics of survey respondents

Basic information	N=310	%
Gender		
Female	112	36.1
Male	198	63.9
Age (years)		
18 - 29	65	21.0
30 – 39	90	29.0
40 – 49	70	22.6
50+	85	27.4
Education		
No education	27	8.7
Primary education	44	14.2
Middle/JHS	131	42.3
Technical/Vocational education	10	3.2
Secondary education	63	20.3
Tertiary education	35	11.3
	37	11.9
Marital status		
Single	118	38.0
Married	116	37.4
Widowed /Separated/divorced	54	17.5
Ethnic origin		
Akan	104	33.5
Ga/Dangme	69	22.2
Ewe	70	22.6
Guan	6	1.9
Mole-Dagbani	45	14.5
Foreigners*	16	3.3
Total	310	100.0

* Moshi, Hausa, Yoruba and Gabonese

Table 5.1b Socio-demographic characteristics of TB and HIV participants in the qualitative interviews

	TB/HIV Respondents N = 12		TB Respondents N = 12	
TB/HIV Respondents	**Female**	**Male**	**Female**	**Male**
Marital status				
Single	1	2	1	1
Married	4	-	3	2
Abandoned	-	3	-	2
Others (widowed, divorce)	1	1	2	1
Employment				
Unemployed	4	4	1	4
Employed	2	2	5	2
Educational				
Basic education	3	4	3	2
SHS	1	-	1	1
Technical	-	2	-	2
Higher (degree)	-	-	2	1
No education	2	1	-	-
Age				
18 - 30	-	-	1	-
31 – 39	4	2	2	2
40 – 49	1	4	1	2
50+	1	-	2	2
Support				
Family	5	4	4	6
Others (pastor, partner, aunt)	1	2	-	-

5.2.2 Socioeconomic Characteristics of Respondents

Out of the 310 respondents, 204 (65.8%) were employed and among the employed 59 (52.7%) were females and 145 (73.2%) were males, showing more men than women in gainful employment. The type of employment varied among gender. Whereas majority of females 37 (62.7%) were self-employed without employees, 72 (50%) of males were employees. Interestingly, there was no female who worked as an apprentice or unpaid family worker. Incomes varied greatly with males earning the lowest (> GH¢ 200.00) and the (<GH¢ 1,000.00) highest – 38 (30.4%) and 19 (15.2%) respectively as compared to the

females of whom 12 (23.5%) and 1 (2%) were found in the same income brackets. With regards to accommodation, majority of respondents 55 (49.1%) of females and 83 (43.4%) males lived in compound houses. The number of years they had lived in these houses ranged between less than a year to almost their entire lives. Majority of respondents had lived in their current abode their entire life time, 56 (50%) for females and 101 (51%) for males (Table 5.2).

Table 5.2 Socio-economic characteristics of respondents

	Gender [N (%)]		
Characteristics	**Female**	**Male**	**Total**
Employment status			
Employed	59 (52.7)	145 (73.2)	204 (65.8)
Not employed	54 (47.3)	52 (26.7)	106 (34.2)
Type of employment			
Employee	21 (35.6)	72 (49.6)	93 (45.6)
Self-employed without employees	37 (62.7)	48 (33.1)	85 (41.6)
Self-employed with employees	1 (1.7)	21 (14.5)	22 (10.8)
Unpaid family worker	0 (0.0)	2 (1.4)	2 (1.0)
Apprentice	0 (0.0)	2 (1.4)	2 (1.0)
Total	59 (100)	145 (100)	204 (100)
Incomes (GH¢)			
<200	12 (23.5)	38 (30.4)	50 (28.4)
200 – 399	24 (47.1)	46 (36.8)	70 (39.8)
400 – 599	10 (19.6)	13 (10.4)	23 (13.0)
600 – 799	2 (3.9)	7 (5.6)	9 (5.1)
800 – 999	2 (3.9)	2 (1.6)	4 (2.3)
1,000+	1 (2.0)	19 (15.2)	20 (11.4)
Total	51(100)	125 (100)	176 (100)
Type of accommodation			
Detached house	17 (15.2)	38 (19.2)	55 (17.7)
Semi-detached house	8 (7.1)	16 (8.1)	24 (7.7)
Flat/Apartment	8 (7.1)	8 (4.1)	16 (5.2)
Compound house	55 (49.1)	86 (43.4)	141 (45.5)
Improvised house	6 (5.4)	20 (10.1)	26 (8.4)
Single room	18 (16.1)	22 (11.1)	40 (12.9)
Boys quarter	0 (0.0)	6 (3.0)	6 (1.9)
Uncompleted building	0 (0.0)	2 (1.0)	2 (0.7)
Total	112 (100)	198 (100)	310 (100)
Number of years spent in the area			
Less than one year	20 (18.0)	25 (12.6)	45 (14.5)
One year	8 (7.1)	22 (11.1)	30 (9.7)
Two years	8 (7.1)	31 (15.7)	39 (12.6)
Three years	8 (7.1)	9 (4.5)	17 (5.5)
Four years	12 (10.7)	10 (5.1)	22 (7.1)
Lived there all my life	56 (50.0)	101 (51.0)	157 (50.6)
Total	**112 (100)**	**198 (100)**	**310 (100)**

5.2.3 Knowledge, perceptions of susceptibility to TB

The study collected both quantitative and qualitative data of respondents' knowledge on TB and how their knowledge may have affected their treatment adherence based on gender. When asked the main symptoms of TB, majority of respondents 286 (96.6%) in the survey indicated that coughing for more than two weeks was an indicator of TB. The high knowledge of this symptom perhaps be explained by the fact that this was the symptoms they experienced before going to seek treatment at the hospital. Indeed, most participants in the in-depth interview had said they coughed for several weeks and months before being diagnosed with TB. About 102 (98%) females reported that coughing for more than two weeks is an indicator of TB, and only 2 (1.9%) females did not know about the symptom. About 184 (95.3%) males knew this symptom of TB. One hundred and fifty (92.6%) males and 102 (98.1%) females were able to mention correctly how TB is spread. This is an indication that there is high knowledge about TB among the respondents.

The study sought to determine how respondents perceived TB on a scale of two (high or low). On perceived susceptibility, more than half of the females 64 (57.1%) and males 116 (60.4%) respondents indicated that they were susceptible to TB. However, in the in-depth interview with participants, majority expressed worry how they contracted the disease, hence, they felt very vulnerable to TB.

With regards to whether respondents perceived TB as a serious disease, majority 99 (90%) of females and 166 (86.5%) males indicated TB as a serious disease. When asked if treatment is beneficial to them majority of females and males perceived highly the benefit of the care given them – 108 (98.2%) and 185 (96.4%) respectively. On perceived barriers only 82 (26.8%) of females and 150 (49.0%) males thought there were barriers to their treatment. These views were shared by some of the participants who were interviewed.

I was scared, because I heard TB kills. I knew about the prolonged coughing with blood, night sweat and wasting but still I knew it is very deadly and again, highly stigmatized so I felt like killing myself, initially, I did not know what to do, because I did not have money, until I was encouraged by a friend to go to the hospital because the treatment is free (A male respondent).

I was diagnosed with the disease when I attended training in Switzerland. I had no idea where I got the disease, but then, I had heard about TB and knew it could be cured so I was not afraid and of course I got support from my family and employer (A male respondent).

Finally, when asked if taking the drugs would make them feel well, all female respondents responded in the affirmative while 99% males were optimistic about the efficacy of the medication (Table 5.3).

Table 5.3 TB related Knowledge and Beliefs of respondents

	Gender [N (%)]		
Knowledge and beliefs	**Female**	**Male**	**Total**
Coughing for >2 weeks in an indicator of TB	102 (98.1)	184 (95.3)	286 (96.6)
TB is spread through coughing and sneezing openly	96 (96.0)	150 (92.6)	246 (94.0)
Chest pain is an indicator of TB			
Yes	13 (12.5)	32 (18.6)	45 (16.3)
Perceived susceptibility of TB			
Low	48 (42.9)	76 (39.6)	124 (40.8)
High	64 (57.1)	116 (60.4)	180 (59.2)
Perceived severity of TB			
Low	11 (10.0)	26 (13.5)	37 (12.3)
High	99 (90.0)	166 (86.5)	265 (87.7)
Perceived benefit of TB			
Low	2 (1.8)	7 (3.6)	9 (3.0)
High	108 (98.2)	185 (96.4)	293 (97.0)

5.2.4 Experiences of respondents at the facility level

This section describes respondents' experiences related to the DOT services. In trying to understand what respondents go through they were asked about how they receive their TB medication. Patients were asked if they had difficulty in accessing health care – 274 (89%) indicated that there was no difficulty getting care when they first reported to the Out-

Patient Department (OPD). The TB coordinators complained bitterly about the way nurses at the OPD treated suspected TB patients. This difficulty was experienced by 11% respondents was corroborated by the TB coordinators who complained this difficulty experienced by patients. Each TB coordinator had had some experience of stigma and this is what they had to say:

> *You are stigmatized once you are TB or HIV positive irrespective of your gender. Some colleagues who have the disease do not come to the clinic, we meet them somewhere and give them the medication, that is their choice and we have to understand them. Some of us are stigmatized, as I told you earlier, they call us TB people, and some Health Care workers (HCW) do not want to associate with us (A TB coordinator).*
>
> *At the OPD when HCWs get to know that the clients have TB they are stigmatized and so we don't allow the lab technicians to send the positive results there. They are directed to bring it to the DOTs clinic where immediately we educate them and go through the necessary steps to put them on treatment (A TB coordinator).*
>
> *We are confronted with stigma issues. Because of stigmatization, some patients come when the situation is out of hand. Some family members neglect them (patients) because of stigma. They don't want the family to be tagged TB or HIV family, therefore some are abandoned (A TB coordinator).*
>
> *The patients are stigmatized by their families and they themselves have self-pity because of their conditions. We as TB nurses are stigmatized by our own colleagues – they call us names (A TB coordinator).*

In order to avert such incidents and to encourage more patients with cough to seek care, they have assigned Health Care Workers (HCWs) to administer TB questionnaire so that those suspected of TB could be referred immediately for further examinations.

Majority of respondents, apart from daily supervision at the clinic by nurses, which constitute 56 (18.4%), majority go for weekly 81 (26.6%) and monthly 81 (26.6%) refill of their medication. Majority indicated that they self-administer the drugs without any direct supervision. This was found to be very worrying since, without being prompted they could easily forget taking their drugs. Indeed quite a number of respondents indicated that they sometimes missed their medication or forgot to take it as expected of them.

The relationship between HCWs and clients has been noted to be important in terms of treatment adherence and consequently full recovery. In that respect, the study sought to find out the relationship between patients and their providers. Majority of respondent 300 (97.1%) said they had very cordial relationship with the HCWs. On the issue of whether respondents were given education on TB, 292 (94.2%) reported having been educated whilst 18 (5.8%) did not receive any form of education (these group of respondents are those who came with their support from the beginning and so the treatment supporters were rather given education on the disease instead).

With respect to counselling, 104 (33.5%) respondents were counselled the first day, 67 (21.6%) respondents were given counselling on each visit. Majority of respondents 131 (42.3%) were counselled once a while, 8 (2.6%) respondents indicated that they were never counseled (Table 5.4).

Table 5.4 Service/provider related experiences of respondents

Services of HCWs	Gender [N (%)] Female	Male	Total
Experiences in accessing health care			
Difficulty in accessing care	10 (9.1)	24 (17.2)	34 (11.0)
Did not experience difficulty	100 (90.9)	174 (82.8)	274 (89.0)
Scheduled visits			
Home with DOTs volunteer	10 (3.3)	9 (3.0)	19 (6.2)
Home without DOTs volunteer	4 (1.3)	13 (4.3)	17 (5.6)
Everyday	20 (6.6)	36 (11.8)	56 (18.4)
Weekly	33 (10.9)	48 (15.8)	81 (26.6)
Twice a month	15 (4.9)	35 (11.5)	50 (16.4)
Monthly	28 (9.2)	53 (17.4)	81 (26.6)
Number of TB pills treatment consist of per day			
2 tablets	7 (6.3)	4 (2.0)	11 (3.6)
3 tablets	77 (69.4)	158 (80.2)	235 (76.3)
4 tablets	27 (24.3)	34 (17.3)	61 (19.8)
5 tablets	-	1 (0.5)	1 (0.3)
Relationship with health worker			
Very cordial	108 (97.3)	192 (97.0)	300 (97.1)
Somehow cordial	3 (2.7)	8 (3.0)	9 (2.9)
Educated on TB by HCW			
Was educated	108 (96.4)	184 (92.9)	292 (94.2)
Did not receive education	4 (3.6)	14 (7.1)	18 (5.8)
How often were you counselled?			
On the first day	37 (33.0)	67 (33.8)	104 (33.5)
Each visit	32 (28.6)	35 (17.7)	67 (21.6)
Once a while	41 (36.6)	90 (45.5)	131 (42.3)
Never counselled	2 (1.8)	6 (3.0)	8 (2.6)
Provision of privacy			
Yes	90 (80.4)	166 (86.5)	256 (84.2)
No	22 (19.4)	26 (13.5)	48 (15.8)
Waiting time			
< 2hours	101 (91.8)	188 (95.9)	289 (94.4)
3hours or more	9 (8.2)	8 (4.1)	17 (5.6)
Likeness of service			
Liked	99 (90.0)	165 (83.3)	254 (85.7)
Disliked	11 (10.0)	33 (16.7)	44 (14.3)
Helpful part of clinic			
Seen improvement in health	84 (80.7)	158 (84.9)	14 (13.5)
Free medication (drugs)	6 (5.8)	16 (8.6)	12 (6.5)
Friendly staff	14 (13.5	22 (7.6)	26 (9.0)

When asked whether in the course of counselling, they were provided privacy by the HCWs, 256 (84.2%) respondents indicated that they were provided privacy and 48 (15.8%) respondents were not provided privacy. My observation was that, patients were counselled sometimes in the full glare of other health workers and no special place assigned for counselling.

Waiting time has been associated with non-adherence among patients on long-term treatment regimen and therefore respondents were asked to indicate the number of hours they waited before being served their medication. In all, 289 (94.4%) respondents reported that they had to wait less than two hours that was found to be average waiting time (Table 5.4).

5.2.5 Description of patients' experiences in relation to treatment adherence

This section provides data on patient adherence to TB treatment regimen. It delves into non-adherence related to number of days that respondents had missed medication, timing and reasons for missing their medication among other challenges. One hundred and thirty one (42.3%) of respondents indicated that they ever-missed their medication for five consecutive days (Table 5.5). Majority 104 (79.4%) indicated timing of missing their medication was during weekdays. Various reasons were attributed to failure to take medication as prescribed. These reasons ranged from busy schedule 24 (56.5%) to too many medicines to take 45 (34.5%). A high proportion 290 (94.8%) of respondents indicated that they were motivated to take their medication because they felt by taking their medication they would be cured. Similar sentiments were expressed during the qualitative interviews:

> *This type of disease is something one has to quickly get rid of. The disease itself is a painful one so if I take painful pills that will make me get well quick I will do everything to get cured and I can feel it in my bones that the medicines are working very well. Like I said from the beginning, I read about it and know there is a cure*

> *for it, however, if you don't take all the medicines it might rather degenerate into something else and you might not be able to get cured. I also have a fiancé who has been of tremendous support throughout the medication period, he comes with me to take my medicines most of the time. His family members (sister and mum) encourage me a lot (A female respondent).*

The TB coordinator in that health facility corroborated this assertion. She indicated that the lady had had tremendous support from her fiancé – asserting that if all partners could provide this support, treatment success could be very high among patients.

Other patients attest to the benefit of taking the medication religiously.

> *I have a strong belief that I can be cured, even though I live alone, I have incorporated taking the drugs in my daily routine; as soon as I wake up after brushing my teeth I take them before bathing (Male respondent).*
>
> *The nurses encouraged me to take medication. They advise me each time I come to the hospital for my medicines and show me of Nelson Mandela's picture. They say it can be cured and I have seen the improvement in my health (A female respondent).*

When asked if treatment interfered with their daily activities, 223 (73.8%) indicated that the treatment schedule does not interfere with their daily activities (Table 5.5). On the side effects associated with taking the medication, majority indicated pains in their joints 42 (28.4%), and a few respondents indicated dizziness 22 (14.9%) and fatigue 21 (14.2%).

Table 5.5 Patient related experiences of TB medication

	Gender [N (%)]		
Adherence to drug use	**Female**	**Male**	**Total**
Ever missed TB daily dose for five consecutive days			
Ever-missed for 5 days	37 (33.0)	94 (39.5)	131 (42.3)
Never missed	75 (67.0)	104 (52.5)	179 (57.7)
Timing of missed drugs			
Weekends	12 (32.4)	15 (16.0)	27 (20.6)
Throughout the week	25 (67.6)	79 (84.0)	104 (79.4)
Reasons for missing drugs			
Busy schedules so forgot	19 (41.3)	13 (58.4)	24 (56.5)
Was not well	3 (8.1)	9 (9.57)	12 (9.2)
Too much drugs	15 (40.5)	30 (31.9)	45 (34.3)
Motivated to take TB medication			
Yes	104 (94.5)	186 (47.5)	290 (94.8)
No	6 (5.5)	10 (5.1)	16 (5.2)
Interference of treatment with your daily activities	32 (30.2)	47 (24.0)	79 (26.2)
Yes	74 (69.8)	149 (76.0)	223 (73.8)
No			
Side effect of TB medication			
Yes	54 (50.0)	96 (49.0)	150 (49.3)
No	54 (50.0)	100 (51.0)	154 (50.7)
Type of side effect			
Abdominal pain	2 (3.6)	7 (9.0)	9 (6.1)
Reduced appetite	4 (7.1)	10 (10.6)	14 (9.5)
Joint pain	13 (23.2)	29 (30.8)	42 (28.4)
Chills	2 (3.6)	2 (2.1)	4 (2.7)
Dizziness	10 (17.9)	12 (12.9)	22 (14.9)
Fatigue	9 (16.1)	12 (12.9)	21 (14.2)
Headache	-	2 (2.1)	2 (1.4)
Insomnia	-	3 (3.2)	3 (2.0)
Heart beats	-	6 (6.4)	6 (4.0
Chest pains	2 (3.6)	2 (2.1)	2 (1.4)
Itchiness	6 (10.7)	8 (8.5)	14 (9.4)
Throat pains	4 (7.1)	-	4 (2.7
Weight loss	2 (3.6)	-	2 (1.4)
Pain in the eye	2 (3.6)	1 (1.1)	3 (2.0)

5.2.6 Disclosure of TB status by respondents to relations

There were 156 (53.8%) of TB patients who were household heads and 130 (44.8%) who were members of households (Table 5.6). Those with partners were asked if they had informed their partners of their condition; 114 (67.9%) indicated in the affirmative whilst

54 (32.1%) reported not having told their partners. During the in-depth interview most females indicated that their partners did not care about their welfare therefore, there was no point informing them and others also indicated that their partners might abandon them for another lady and therefore they did not wish to disclose their condition to them. Some male participants, whose partners knew about their condition, abandoned them. The following were captured during the IDIs:

> *Nobody knows of my TB status in my family. Apart from the nurses here, I have not told anybody (A female respondent).*
>
> *My daughter is aware; she sometimes comes for my drugs when I am busy selling. My husband does not know what exactly is wrong with me, even though he knows I visit the hospital frequently. He does not give me money and does not care what I do, so I have not told him anything (A female respondent).*
>
> *My family abandoned me when they got to know I have TB, I take care of myself on my own with the support of the nurses (A male respondent).*
>
> *My nuclear family has been very supportive. I used to be a teacher, but because of the sickness, I have stopped, my parents and siblings have been encouraging me to take my medication and support me financially (A female respondent).*
>
> *My wife left me when she realized that I have TB. At that time I was not working so she left. (A male respondent)*

TB is noted to be a stigmatized disease because of the devastating effect of the infection – it leaves its victims very lean, weak and frail with prolonged cough. Respondents were asked whether people avoided them because of their condition. In response, 222 (71.8%) respondents indicated that no one avoided them, whilst 78 (25.3%) reported they felt being avoided by friends and family and a few 10 (2.9%) could not tell whether they were avoided by anybody since they had not told anyone about their condition (Table 5.6). When asked whether they want any member of their family to know about their status, 150 (48.4%) indicated that they wanted their family members to know about their status whilst 156 (50.3%) indicated that they want their status to remain a secret. This finding shows the extent to which TB is stigmatized and for that matter, those who contract the disease do

not want others to know about their condition. Reasons given for their responses were fear of being stigmatized 119 (71.4%) and wanting to keep to oneself 44 (28.6%).

The role of social support has been noted to be significant in health care seeking. It is for this reason that the study sought to find out sources of support to respondents since it is very crucial especially in treating TB. The sources of support ranged from 29 (24.2 %) respondents without support to 8 (6.6%) respondents who received support from more than four sources (Table 5.6). With regards to the level of support, 61 (23.3%) indicated that the level of support was low, 109 (41.6%) mentioned the support was medium and 92 (35.1%) mentioned the support received was high. Some participants in the IDIs had this to say:

> *Before I got TB I was a taxi driver, when the sickness started I couldn't drive so I went to live with my elder sister, but the support I get from her is nothing to write home about. I will describe the support as very low, considering the services that I render in the house. She provides a meal a day, and gives me one cedi for breakfast. Then, when she leaves for the market, I take care of the children in the house whilst she goes to the market to sell. I don't get enough food to eat as you can see from the way I have grown so lean (A male respondent).*

> *My boyfriend has been supportive of me, during the initial phase; he always accompanied me to the hospital. He made sure I took my medication right on time (A female respondent).*

Table 5.6: Disclosure of TB status by respondents

	Gender [N (%)]		
Status Declaration	**Female**	**Male**	**Total**
Status in the household			
Head	34 (33.3)	122 (64.9)	156 (53.8)
Member	68 (66.7)	62 (33.0)	130 (44.8)
Independent	-	4 (2.1)	4 (1.4)
Partner is aware about your condition			
Yes	37 (63.8)	77 (70.0)	114 (67.9)
No	21 (36.2)	33 (30.0)	54 (32.1)
Change of attitude towards you after being diagnosed by close contacts			
Yes	17 (15.3)	61 (30.8)	78 (25.3)
No	87 (78.4)	135 (61.2)	222 (71.8)
Don't know/can't tell	7 (6.3)	2 (1.0)	9 (2.9)
Preparedness to inform any member of family TB status			
Yes	64 (57.1)	86 (43.4)	150 (48.4)
No, remain a secret	47 (42.0)	109 (55.1)	156 (50.3)
Not sure/depend	1 (0.9)	3 (1.5)	4 (1.3)
Reasons for not divulging status			
Fear of being stigmatized	44 (66.7)	66 (75.0)	119 (71.4)
Want to keep it to myself	22 (33.3)	22 (25.0)	44 (28.6)
Source of social support			
No support	8 (21.6)	21 (28.3)	29 (24.2)
One source	18 (48.6)	45 (54.2)	63 (52.5)
Two sources	6 (16.2)	11 (13.3)	17 (14.2)
Three sources	3 (8.1)	-	3 (2.5)
Four sources	2 (5.4)	6 (7.2)	8 (6.6)
Level of support			
Low	22 (23.7)	39 (23.1)	61 (23.3)
Medium	41 (44.1)	68 (40.2)	109 (41.6)
High	30 (32.2)	62 (36.7)	92 (35.1)

5.2.7 Description of Diagnosis TB and HIV co-infection among respondents

This section examines TB respondents who are co-infected with HIV. One of the challenges recognised worldwide with controlling TB has been HIV, therefore the study sought to find out the prevalence of HIV among TB patients. Among the survey respondents, 37 (11.9%) were co-infected with TB and HIV. Two hundred and ninety two respondents representing (92.3%) indicated that, that was their first time of being diagnosed with TB and 24 (7.7%) respondents indicated that they were on retreatment or

relapse situation (Table 5.7). With regards to gender, 102 females representing 93.0% were new cases and 14 (7.0%) were on retreatment. Among the males 184 (91.1%) were new cases and 10 (8.9%) were on retreatment. Among the respondents who were on retreatment 14 (58.3%) indicated that they completed their treatment the first time and 10 (41.7%) did not complete their treatment. Among co-infected respondents, 17 (15.2%) were female TB and HIV co-infected and 20 (10.1%) were male co-infected respondents – this finding depicts the global and national epidemiological evidence of the gender highly affected by HIV. Of those who were co-infected, 15 (88.2%) females and 16 (80.0%) males were on medication for both TB and ART care. However, all HIV participants were receiving co-trimoxazole at the time of the interview. To be able to understand and appreciate what respondents who were on treatment for both diseases go through on a daily basis, they were asked the number of tablets taken daily. Majority took between eight and nine tablets per day. Majority 25 (80.6%) of respondents took their medication for both diseases at the same hospital. With regards to experiences respondents go through whilst on medication, 12 (38.7%) indicated no side effect, whilst the majority of them reported various side effects ranging from weakness 6 (19.4%) to headache and getting hungry frequently 4 (12.9%) (Table 5.7).

Table 5.7 Diagnosis of TB and HIV co-infection among respondents

Characteristics	Gender [N (%)]		
	Female	Male	Total
Number of times have tested positive for TB			
First time	102 (91.1)	184 (93.0)	286 (92.3)
More than once	10 (8.9)	14 (7.0)	24 (7.7)
Completion of treatment the first time			
Yes	6 (60)	8 (57.1)	14 (58.3)
No	4 (40.0)	6 (42.9)	10 (41.7)
HIV status			
HIV positive	17 (15.2)	20 (10.1)	37 (11.9)
HIV negative	86 (76.8)	158 (79.8)	244 (78.7)
Not tested	9 (8.0)	20 (10.1)	29 (9.4)
Concurrently on medication for both TB and HIV			
Yes	15 (88.2)	16 (80.0)	31 (83.8)
No	2 (11.8)	4 (20)	6 (16.2)
Drugs taken on daily basis			
6 tablets	3 (20.0)	1 (6.2)	4 (12.9)
7	4 (26.7)	5 (31.2)	9 (29.0)
8	4 (26.7)	5 (31.2)	9 (29.0)
9	2 (13.3)	5 (31.2)	7 (22.6)
10	2 (13.3)	-	2 (6.5)
Receive medication for both in the same hospital			
Yes	11 (73.3)	14 (87.5)	25 (80.6)
No	4 (26.7)	2 (12.5)	6 (19.4)
Experiences taking both drugs			
No side effect	6 (42.8)	6 (37.0)	12 (38.7)
Get hungry	2 (14.3)	2 (12.5)	4 (12.9)
Weakness	2 (14.3)	4 (25.0)	6 (19.4)
Sleeplessness	2 (14.3)	2 (12.5)	4 (12.9)
Itchy body	1 (7.1)	1 (6.2)	2 (6.5)
Chest pains	1 (7.1)	-	1 (3.2)
Headache	1 (7.1)	1 (6.2)	2 (6.5)

5.3 Bivariate Analyses

This part uses Pearson's chi-square and Fisher's exact (employed for count less than five) test to ascertain the effect of socio-economic, health related and patient related on the dependent variables - adherence and non-adherence (ever-missed medication for 5 consecutive days for the purpose of determining the empirical relationship).

5.3.1 Association between Gender and adherence to TB medication

The study compared gender with ever-missed medication. The analysis showed that, the type of facility in which respondents underwent treatment had significant relationship with adherence and non-adherence, irrespective of gender; p=0.016 and p=0.017 for females and males respectively. There was no significant association (p=0.275) between all the categories of age groups and ever-missed medication among females, however, there was a significant association (p<0.000) between age and ever-missed medication for males (Table 5.8). With regards to the education, a fisher's exact test produced an association between all the levels of education and being female (p<0.014), with males (p<0.560) having no significant association. Marital status of females was found to be significantly associated with ever-missed medication (p<0.01) and no significant association for male (p=0.366) (Table 5.8).

Table 5.8: Association between Background characteristics and adherence

	Ever missed medication (%)		Chi-square/ Fisher's P-value
	Female	**Male**	
Name of facility			
La General Hospital	37.8	23.4	F=0.017* M=0.016
Ridge hospital	8.1	23.4	
Tema General Hospital	16.2	17.0	
Achimota Hospital	-	17.0	
Kaneshie Polyclinic	21.6	10.6	
Tema Polyclinic	16.2	8.5	
Age			
18 - 29	27.0	18.1	F=0.275 M=0.000
30 – 39	13.5	39.4	
40 – 49	21.6	29.8	
50+	37.8	12.8	
Education level			
No education	21.6	6.4	F=0.014* M=0.560*
Primary	5.4	11.7	
Middle/JHS	56.8	37.2	
Secondary	5.4	23.4	
Technical	-	6.4	
Tertiary	10.8	14.9	
Marital status			
Single	29.7	38.3	F=0.003* M=0.366*
Married	21.6	42.6	
Widowed	32.4	4.3	
Separated/divorced	16.2	14.9	
Total	**100.0**	**100.0**	

* Fisher's exact test p-value. F = Female, M = Male.

5.3.2 Association between socio-economic characteristics and adherence to TB medication

The following variables were used to measure socio-economic status and adherence to TB medication; employment, income, type of accommodation, breadwinner of the home. There was no significant association between employment for females and males (p=0.123 and 0.385 respectively), type of employment (female p=0.342 and male p=0.309) (Table 5.9). However, there was a significant association between – income and ever-missed medication, breadwinner of the home and ever-missed medication, being a breadwinner

and ever-missed medication yielded significant association for both gender ($p<0.001$ and $p<0.034$) for female and male respectively. Whilst income yielded a significant association between males ($p<0.025$) and ever-missed medication, there was no association between income and ever-missed medication for females ($p=0.079$). On the other hand, there was a significant relationship between ever-missed medication and being a female ($p<0.018$) as compared to males ($p=0.408$). With regards to the number of years spent at current abode there was no significant association ($p=0.581$) for female but there was significant association ($p<0.014$) for males (Table 5.9).

Table 5.9 Association between socio-economic characteristics, Gender and ever-missed medication

Variable description	Ever missed medication (%)		Chi-square/ Fisher's P-value
	Female	Male	
Currently employed			
Yes	62.2	76.6	F=0.123
No	37.8	23.4	M=0.385
Type of employment			
Employee	20.7	39.0	F=0.342*
Self-employed without employees	55.2	34.1	M=0.309*
Self-employed with employees	3.4	12.2	
Unpaid family worker	-	2.4	
Unemployed	20.7	12.2	
Income (GH ¢)			
<200	30.0	44.4	
200-399	40.0	33.3	F=0.079*
400-599	10.0	11.1	M=0.025*
600-799	10.0	3.7	
800-999	10.0	-	
1,000+	-	7.4	
Type of accommodation			
Detached house	29.7	21.3	
Semi-detached house	5.4	10.6	
Flat/Apartment	5.4	4.3	F=0.018*
Compound house	37.8	44.7	M=0.408*
Improvised house (kiosk/container)	5.4	6.4	
Single room	16.2	10.6	
Boys quarter	-	2.1	
Breadwinner of the home			
Self			
Husband/Wife	34.3	59.8	
Mother	17.1	-	
Father	17.1	8.7	F=0.001*
Sister	5.7	6.5	M=0.038*
Brother,	5.7	4.3	
Relative	8.6	4.3	
Children	-	6.5	
Friend	11.4	9.8	
Total	**100.0**	**100.0**	

* Fisher's exact test p-value. F = Female, M = Male.

Table 5.9b Association between socio-economic characteristics, Gender and ever-missed medication

Variable description	Ever-missed medication (%)		Chi-square/fisher's P-value
	Female	Male	
Number of years at current abode			
Less than one year	16.2	6.4	
One year	10.8	17.0	F=0.581*
Two years	5.4	16.0	M=0.014*
Three years	10.8	2.1	
Four years	5.4	4.3	
Always	51.4	54.3	

* Fisher's exact test p-value. F = Female, M = Male.

5.3.3 Association between gender characteristics and TB treatment

More males (57%) indicated that they managed household budget as compared to females (55.2%). These variables did not produce significant association between managing household budget and ever-missed medication (p=0.071 and p=0.519) for males and females respectively; getting permission to go to the clinic and ever-missed medication for both gender; was not statistically significant (p=0.489 and p=0.752) for females and males respectively (Table 5.10). However, there was significant association between, cooking as domestic chores, distance to the health facility and difficulty getting money for treatment for males p<0.026, p<0.003 and p<0.002 respectively and ever-missed medication. Taking care of sick family members was the only variable that showed significant association with females p<0.000 (Table 5.10).

Table 5.10 Gender factors associated with adherence

Variable description	Ever missed medication (%)		Chi-square/ Fisher's P-value
	Female	Male	
Manage household budget as a domestic chore			
I manage household budget	55.2	57.0	F=0.519
I don't manage household budget	44.8	43.0	M=0.071
Difficulty in getting permission to go to the clinic			
I have difficulty	10.8	4.4	F=0.489*
I don't have any difficulty	89.2	95.6	M=0.752*
Cooking			
I cook	69.7	31.0	F=0.136
I don't cook	30.3	69.0	M=0.026
Distance to health facility a problem			
Distance is a problem	16.2	41.3	F=0.875
Distance is no problem	83.8	58.7	M=0.003
Difficulty in getting money for treatment			
Difficulty in getting money			F=0.335
Don't have any difficulty	37.8	55.3	M=0.002
	62.2	44.7	
Takes care of ill family members			
Sister	13.5	9.0	
Brother	8.1	4.7	
Mother	16.2	7.0	
Father	5.4	2.3	F=0.000*
Both parents	5.4	2.3	M=0.069*
Self	43.2	52.3	
Relative, etc.	-	8.1	
Wife	-	7.0	
Children	16.2	2.3	
Friend	-	4.7	
Total	**100.0**	**100.0**	

* Fisher's exact test p-value. F = Female, M = Male

5.3.4 Gender and Social support in relation to TB treatment adherence

The role of social support has been found to be a predictor of fast recovery from any health condition. Therefore, the study sought to investigate the extent to which social support has played a role in respondents' treatment in relation to adherence and in doing so find out

which of the gender receives social support and its relationship with the outcome variable ever-missed medication.

Among the respondents who reported ever missing their medication for five consecutive days, female status in the household had a significant association with ever-missed medication ($p<0.055$) as compared to males with ($p=0.114$). There was a significant association between level of social support received and ever-missed medication for males ($p<0.000$) and no significant association for females ($p=0.274$) (Table 5.11).

Table 5.11: Gender and social support in relation to TB treatment adherence

Support	Ever missed medication (%) Female	Male	Chi-square/ Fisher's P-value
Status in the household			
Household head	45.7	62.5	F=0.055
Member	54.3	37.5	M=0.114*
Sources of social support received			
None	28.6	10.0	F=0.274*
One source	42.9	80.0	M=0.000*
Two sources	28.6	10.0	
Level of social support			
Low	12.1	22.2	F=0.151
Medium	51.5	40.0	M=0.939
High	36.4	37.8	
Effect of illness on work	21.4	16.3	
None	53.6	51.2	F=0.797*
Interrupted my work	21.4	25.6	M=0.471*
Stopped work up to now			
Lost job and have no job up to now	3.6	7.0	
6 months treatment an obstacle for work			
Yes	51.9	69.2	F=0.129
No	48.1	30.8	M=0.616
Total	**100.0**	**100.0**	

* Fisher's exact test p-value. F = Female, M = Male.

5.3.5: Knowledge and Health Beliefs associated with TB treatment

There were mixed reactions with regards to knowledge about TB, its associated health beliefs and their association with adherence. The following variables were significant; detection of ailment (males, $p<0.038$), encouraged to visit the clinic (females, $p<0.024$ and males, $p<0.002$), perceived susceptibility (males, $p<0.028$) and perceived benefits (males, $p<0.014$). Knowledge on how TB is spread (Table 5.12).

Table 5.12: Association between knowledge and health beliefs characteristics and treatment adherence

Variable description	Ever missed medication (%)		Chi-square/ Fisher's P-value
	Female	Male	
Tuberculosis is spread from one person to another through food			
Yes	6.9	12.8	F=1.000*
No	93.1	87.2	M=0.859
Tuberculosis is spread from one person to another through coughing or sneezing			
Yes	100.0	94.9	F=0.320*
No	-	5.1	M=0.288
Tuberculosis is spread from one person to another through sexual contact			
Yes	13.8	-	F=0.057*
No	86.2	100.0	M=0.121*
Coughing for > 3 weeks is an indicator of TB disease			
Yes	100.0	92.7	F=1.000*
No	-	7.3	M=0.153*
Coughing with blood is an indicator of TB disease			
Yes	25.8	24.4	F=0.353
No	74.2	75.6	M=.287
Fever at night is an indicator of TB disease			
Yes	12.9	22.0	F=0.063*
No	87.1	78.0	M=0.492
Night sweats is an indicator of TB disease			
Yes	19.4	14.6	F=0.200*
No	80.6	85.4	M=0.202
Weight loss is an indicator of TB disease			
Yes	38.7	52.4	F=0.628
No	61.3	47.6	M=0.367
The standard length of treatment for a newly diagnosed case of TB			
3-4 months	-	4.3	
5-6 months	40.5	42.4	F=0.194*
> 6 months	43.2	47.8	M=0.339*-
Don't know	16.2	5.4	
Total	**100.0**	**100.0**	

* Fisher's exact test p-value. F = Female, M = Male.

Table 5.12b: Association between socio-economic characteristics, Gender and ever-missed medication

Characteristics	Ever missed medication (%)		Chi-square/ Fisher's P-value
	Female	Male	
TB can be cured through general antibiotics			
Yes	6.1	2.2	F=0.584*
No	93.9	97.8	M=1.000*
TB can be cured through herbal remedies			
Yes	6.1	2.2	F=0.584*
No	93.9	97.8	M=0.228*
Detection of ailment			
Through test	73.0	70.2	F=0.691
Through self-examination	27.0	29.8	M=0.038
Encouraged by anybody to go to the hospital			
Yes	73.0	71.3	F=0.024
No	27.0	28.7	M=0.002
Found difficulty in accessing health care			
Yes	10.8	12.8	F=0.730*
No	89.2	87.2	M=0.118
Perceived susceptibility			F=0.117
Low	32.4	31.5	M=0.028
High	67.6	68.5	
Perceived severity			F=0.497*
Low	5.7	13.3	M=0.937
High	94.3	86.7	
Perceived benefits			
Low	5.7	-	F=0.099*
High	94.3	100.0	M=0.014*
Perceived barriers			
Low	81.1	75.0	F=0.187
High	18.9	25.0	M=0.464
Total	**100.0**	**100.0**	

* Fisher's exact test p-value. F = Female, M = Male

5.3.6 Patients experiences with services and health care workers

Health or service related factors have been found to affect patients' medication intake and invariably treatment adherence in general and TB in particular because of the nature of the disease and the treatment duration. Therefore, the study sought to ascertain the relationship between services provided and TB patients' adherence to medication. Majority of both females and males indicated that they had very cordial relationship with their providers. However, the association between the experiences and providers was not significant; p=1.000 and p=0.685 for females and males respectively. On the issue of counselling, the relationship was equally not significant for female (p=0.145) and males (p=0.649) irrespective of the time of visit. With regards to privacy of respondents, (p=0.521) females and (0.937) males indicated that HCWs provided privacy while being attended to. Again, privacy of patients did not yield any significant association.

The current TB treatment regimen involves direct observation by HCWs in the health facility during the first two months also known as the intensive phase. However, in the continuation phase patients are required to refill drugs on weekly basis and other pre-arranged periods depending on the patients. It is during this stage that some patients forget to take their medication because majority of them feel quite well. It is against this backdrop that the study sought to find out how respondents refilled their drugs in relation to gender. The drug dispensation yielded no significant association for females (p=0.377) but there was an association for males (p<0.019). To find out about whether respondents were educated on the disease before treatment, there was no significant relationship between both gender; female (p=0.598) and males (0.063). The waiting time yielded a significant association for females (p<0.027) and no association for males (p=0.378).

For both gender, there was an association between number of scheduled clinic visits attended and ever-missed medication. A Fisher's exact test yielded a p<0.001 for both

females and males. When asked to indicate the most helpful part of the TB clinic, majority indicated that they had seen some improvement in their health (Table 5.13). This did not yield any significant association for both females and males, however the least helpful part of the TB clinic produced some significant association for only males ($p<0.001$).

Table 5.13: Experiences of respondents with services and health care workers

Facility Services	Ever missed medication (%) Female	Male	Chi-square/ Fisher's P-value
Relationship with HCW			
Very cordial	97.2	97.9	F=1.000*
Somehow cordial	2.8	2.1	M=0.685*
Counselling on the condition by HCW			
On the first visit	24.3	34.0	F=0.145*
On each visit	32.4	14.9	M=0.649*
Once a while	37.8	48.9	
Never counselled	5.4	2.1	
HCW provided privacy while attending to you at the hospital			
Yes	83.8	86.7	F=0.521
No	16.2	13.3	M=0.937
Drug dispensation on each visit to the clinic			
Daily dose	16.2	27.7	F=0.377
Weekly dose	45.9	38.3	M=0.019
Twice a monthly	16.2	12.8	
Month	21.6	21.3	
Health professional provided education on disease condition			
Yes	94.6	89.4	F=0.598*
No	5.4	10.6	M=0.063
Wait at clinic on each visit where served with the drugs			
< 2 hours	100.0	95.7	F=0.027*
3 hours		2.2	M=0.378
4 hours	-	2.2	
Total	**100.0**	**100.0**	

* Fisher's exact test p-value. F = Female, M = Male.

Table 5.13b: Experiences with services and health care workers related factors

Facility services	Ever missed medication (%)		Chi-square/ Fisher's P-value
	Female	Male	
No. of scheduled clinic visits attended			
None	-	2.1	F=0.000* M=0.000*
All	62.2	57.4	
Most	32.4	38.3	
Some	-	2.1	
Few	5.4	-	
Most helpful part of TB clinic			
Seen improvement in health	74.2	83.7	F=0.233* M=0.467*
Totally cured	-	2.3	
Free drugs	12.9	9.3	
Cordiality of HCW	12.9	4.7	
Least helpful part of TB clinic			
None	59.3	48.7	F=0.861* M=0.001*
Transportation problems	18.5	19.2	
Financial problems	-	10.3	
Delays and fatigue	14.8	7.7	
Interruption of my business	7.4	9.0	
Shouting on patients	-	2.6	
Drug	-	2.6	
Total	**100.0**	**100.0**	

* Fisher's exact test p-value. F = Female, M = Male.

5.3.7 Association between patients' related factors and TB treatment adherence

Of the 310 respondents, 131 (42.3%) ever-missed their medication for five consecutive days, of this 37 (11.9%) were females and 94 (30.3%) were males Out of the 131 who ever-missed their medication 19 (24.89%) were co-infected, of which 5 (4.5%) were females and 14 (7.1%) were males. Consequently, there was a significant association ($p<0.013$) between ever-missed medication and gender (Table 5.14). The big tablets are those given to patients during the intensive phase the RHZE 150/75/400/275 mg (RHZE which contains the drugs rifampicin, isoniazid, pyrazinamide and ethambutol) and the continuation phase RH 150/75 mg (RH which contains rifampicin and isoniazid) are given. A fisher's exact test showed no significant association ($p=0.324$) between ever-missed medication and type of medication. However, what served as a cue to taking their

medication yielded significant association ($p<0.041$). Smoking has been seen to compromise the lungs and therefore predisposes one to contracting TB. Smoking cigarette had a strong association with ever-missed medication ($p<0.000$). In order to find out timing of missing medication the following were captured (Table 5.14) but which did not yield any significant association.

Table 5.14: Association between patient related factors and treatment adherence

Variable description	Gender (%)			Chi-square/ Fisher's
	Female	Male	Total	
Ever missed medication for 5 consecutive days				
Yes	33.0	47.5	42.3	P=0.013
No	67.0	52.5	57.7	
Type of drug missed				
Big	40.5	47.8	45.7	P=0.324*
Small	54.1	40.2	44.2	
Both	5.4	12.0	10.1	
Remembering to take medications				
Family member reminds me	8.9	3.0	5.2	
Keep medications visible	16.1	15.2	15.5	P=0.041
Incorporate into daily routine	74.0	81.8	79.3	
Ever smoked				
Yes	5.4	51.0	34.5	P=0.000
No	94.6	49.0	65.5	
Missed any of TB medications in the last 7 days				P=0.822
Yes	22.2	20.4	20.9	
No	77.8	79.6	79.1	
Miss anti-TB medication on weekends				P=0.492
Yes	21.6	16.5	18.0	
No	78.4	83.5	82.0	
Day missed medication				
Saturday	80.0	50.0	58.8	P=0.338*
Sunday	20.0	50.0	41.2	
Total	**100.0**	**100.0**	**100.0**	

* Fisher's exact test p-value

5.3.8 Association between TB and HIV co-infection and TB treatment adherence

Out of the 131 who ever-missed their medication, 19 (24.9%) were co-infected of which 5 (13.5%) were females and 14 (14.9%) were males. Among the non-adherent respondents who were co-infected, females constituted 4 (80.0%) and 11 (78.6%) males were on ART. There was no significant association between ever-missed medications and being on medication for females (p=1.000), however, there was an association for males (p<0.037).

For co-infected respondents majority had complained of the drug burden, a number of them took as many as between seven and ten tablets (depending on weight) per day. With regards to the gender the situation varies, whereas no female took less than six tablets per day but takes a maximum of ten tablets, males took a minimum of six and a maximum of nine tablets. Number of tablets taken per day, experiences in taking both drugs and not wanting any member of the family to know about TB status showed no significant association with ever-missed medication (Table 5.15). However, there was a significant association for females ($p<0.003$) who indicated that they wanted their TB status to be kept a secret and ever-missed medication but no association was found for males ($p=0.325$) (Table 5.15).

Table 5.15: Association between TB and HIV co-infection and treatment adherence

Variable description	Ever missed medication (%)		Chi-square/ Fisher's P-value
	Female	Male	
No. of times tested positive for TB			
First time	94.6	90.4	F=0.809*
More than once	5.4	9.6	M=0.104
HIV positive			
Yes	13.5	14.9	F=1.000*
No	78.4	72.3	M=0.037
Have not been tested	8.1	12.8	
If yes, on medication for TB and ARVs			
Yes	80.0	78.6	F=0.515*
No	20.0	21.4	M=1.000*
Drugs taken on a daily basis			
6	-	9.1	
7	50.0	27.3	F=0.707*
8	25.0	18.2	M=0.313*
9	-	45.5	
10	25.0	-	
Experiences in taking both drugs			
No effect	25.0	36.4	
Get hungry	-	18.2	
Weakness	-	18.2	F=0.421*
Sleeplessness	25.0	9.1	M=0.945*
Itchy body	-	9.1	
Nothing	25.0	9.1	
Chest pains	25.0	-	
Disclosure of TB status to any member of family			F=0.893*
Yes, remain secret	59.5	42.6	M=0.827*
No	40.5	55.3	
Don't know/Not sure/Depend	-	2.1	
Reasons to keep it a secret			F=0.003
Fear of being stigmatized	90.9	79.5	M=0.325
Want to keep it to myself	9.1	20.5	
Total	100.0	100.0	

* Fisher's exact test p-value. F = Female, M = Male.

5.4 Analysis of experiences of co-infected patients in the qualitative interviews

Respondents who were co-infected shared the following experiences:

5.4.1 Initial response to being diagnosed with TB and HIV

This was a period most patients are in a state of confusion when they are first informed of their prognosis. To some it was the end of the world and they even felt they were better off dying than living especially those who were diagnosed with HIV, because it is not treatable. For those who have had friends and relations with similar conditions they were able to manage the situation better. Participants who were interviewed shared their experiences of how they felt when they were first told that they were infected with TB and HIV. Some participants indicated that they felt their lives had come to an end, others said they were able to overcome their feeling of hopelessness very quickly because they had heard that TB is curable, and they knew of one or more people who were infected with the disease. The following constitute the feelings of some participants when they were first diagnosed with the diseases:

> *I felt like committing suicide, because at that time there was no free medication for HIV. We had to buy out of our pocket. Stigma was heavy – people looked down on HIV patients and so it was like a death sentence (A female participant).*
>
> *I was so afraid; I felt my world had crumbled. Initially, I didn't tell anybody, but later they got to know, because I could not work and so I lost my job. At that time my wife abandoned me. She left with our son. I am now living with my aged mother (A male participant).*
>
> *I got the HIV before the TB, when my family members got to know about my condition they all abandoned me, now I live in a prayer camp. I know my illness is spiritual, somebody gave me the disease in the spirit – I have since been praying about it. (A male participant)*
>
> *I knew I have led some lifestyle so I expected it because one of my girlfriends was diagnosed of the disease and she eventually died. So when I started falling sick from time to time I was prepared for anything when I visited the hospital and was taken through counselling (A male participant).*
>
> *I never expected to have this type of disease. It should rather have been diabetic or hypertension, but this is too much. I could lock myself indoors and cry the whole*

day. But what has happened cannot be changed; we pray that one day there will be a cure just like TB (A female participant).

Early diagnosis of these two diseases is easier to treat and thereby ensuring favourable treatment outcome. When asked how long it took the respondents to know their status, respondents gave varied responses. Majority of patients did not suspect TB at onset and were probably unaware of the disease before accessed health care.

I had malaria for well over six months, then, I got rashes all over my body including shingles and the doctor advised me to do HIV test and to my utmost shock I was told I had HIV. I was however, diagnosed with TB six months ago, when the coughing became uncontrollable (A male participant).

It took the doctors eight months to know that I have HIV. At the time, I was like a ghost. I got TB about five months ago (A female participant).

I was diagnosed six months ago with both HIV and TB. I spent so much money in hospitals for about three years before I was tested for both (A male participant).

5.4.2 Awareness of symptoms of HIV and TB

Almost all the 24 participants in the in-depth interviews had some knowledge about the two diseases. For those who had HIV before contracting TB, they were more versed in the knowledge of co-infection than those who were diagnosed with the two diseases at onset and were probably unaware of the disease before they visited the health facilities.

I have been told that, if one has HIV and does not take care of himself he can get TB (A male participant).

I read that TB is an opportunistic infection of HIV, if one's eating habit is not good one's immune system will be weak and you can easily get TB (A female participant).

5.4.3 Beliefs about TB, TB treatment and co-infection

Majority of participants acknowledged the fact that TB could be cured, in spite of their predicament (HIV infection), on the other hand, others thought that it was more difficult to be cured when one had HIV.

Being HIV positive makes TB treatment difficult. This is because of the many drugs taken. Those without HIV are cured very fast. It takes a long time for you to regain your strength (A male participant).

Contrary to the belief of the male participant, a female participant was of the view that a patient ought to take the TB medication religiously as prescribed by the TB nurse to be able to regain his/her strength.

> *To me one has to take what the nurse gives you, if you want to survive and take care of your family. You may only survive if you take the medicines correctly. With two deadly diseases, they can kill you if you are not careful with your medication and feeding (A female participant).*

This assertion was corroborated by HCWs; this is what one of them had to say:

> *It takes a long time for the drugs to work on HIV positive, this is because a lot of them, many are whom are males do not eat well. This has a toll on them (A TB coordinator).*

HWCs acknowledged that once patients were aware that even if they do not take their medication for one day the probability that they will be put on injection is high and considering the painful ordeal, patients adhered to the treatment. The knowledge of this belief among patients motivated them to take their TB treatment properly because of the fear of getting severe relapse in symptoms.

There were conflicting views among patients about which disease they thought was the most severe when comparing TB and HIV. Some mentioned HIV as being the most serious illness that they feared more, while others thought that TB was more dangerous. Patients' views about severity affected the decision about which drugs to discontinue for those patients who decided to take one of the drugs and stop the other. A few (2 co-infected), also non-adherent patients made the decision to discontinue with the ART drugs because of adverse effect as a result of not having enough food to eat.

> *I was told that HIV does not kill but TB kills if you don't take your medicines properly so I decided not to take the HIV drugs because I become very weak when I take both. I will continue with my HIV drugs when I finish with my TB. I know there will not be any problem because my girlfriend has HIV and does not take ART but she is fine, the people at the fever's clinic say she is ok when they checked on her the first time (A male participant).*

A factor that most HCWs believed helped patients to gain hope was the improvement they observed in other patients who had previously been critically ill. According to the HCWs, the evidence of knowing that a person co-infected could be cured from TB helped patients believe in the efficacy of treatment and hence gave them hope. A TB coordinator had this to say:

> *I think many patients are encouraged to take their medication because they see critically ill patients with co-infection who have improved, some get here looking helpless, but once they start the medication and with proper counselling and constant education, they regain their strength. That gives them lots of encouragement and hope (A TB participant).*

5.4.4 TB and HIV treatment experiences among participants

The TB coordinators indicated that there were societal gender discrimination practices that exist within the community and impacted on patients' TB and HIV treatment experiences. The burden, they explained was heavily borne by women. They expressed the belief that discrimination against women with TB resulted in lack of support from their families and sometimes led to abandonment and rejection by their spouses and family. They also believed that it was the same for men, because they have wider social network and support system from wives and others. As a result of the disclosure they are likely to be stigmatised too.

> *We have had experiences where husbands have had to neglect their wives because they have HIV and TB. We always invite and counsel the men. We also do so with the wives, but most of the time their partners don't even respond to our invitation (TB coordinator).*

5.4.5. Individual perception of alternative treatment

Almost all participants except the younger ones knew of alternative treatment options for TB. They all mentioned the use of traditional herbal concoction, which they thought, was

equally efficacious and does not also involved long treatment. However, the cost of these herbal medicines was so high that patients sought treatment in the health facility because it is free of charge.

> *There are very good herbal medicines that can cure TB and even HIV, but it is so expensive so I cannot afford it. A gallon is about fifteen cedis and one mustn't take it for too long a time, as it is an orthodox medicine (A male participant).*

> *I have heard that there is treatment for HIV. I was told an HIV positive needs a bottle to take for he/she to be cured. I understand a bottle cost one million five hundred cedis, so once I complete the treatment of the TB I will buy one to relieve me of the HIV disease (A female participant).*

5.4.6 Gender roles, social support and how they affect adherence

All participants including HCWs were of the view that men were more vulnerable to TB than women; a trend confirmed by the quantitative study. On probing why this was the case participants' responses clustered around two main themes – social behaviour and type of employment:

> *More men contract TB because of their reckless lifestyle such as smoking and drinking and the nature of work they do such as driving and working in the construction industry (A TB coordinator).*

Most participants argued that more males than females were infected with TB as they were more likely to work in more hazardous and dusty environments and also lead reckless lifestyles such as excessive drinking and smoking. Participants expressed that there was nothing like gender bias in the homes. However, both female and male participants reported stereotypical gender roles in cultural and social norms. Women are supposed to stay at home to care for the family and at the same earn a living by working outside the home, whilst men do no household chores or very little household chores and provide economic sustenance for the family.

> *The women take care of the burdens of the entire family. They have to multi-task by taking responsibility for the upbringing of the children and the husband, manage*

the home and apart from that, work to bring money home just like the men (A TB coordinator).

Even though I am not well I still have to go out there to look for money. My husband does not care about my condition. I have to look for money to take care of the children or else they will starve to death (A female participant).

Studies have shown that not all the factors that influence adherence to treatment exhibit such pronounced gender differences; there are some factors that affect both men and women equally. Getahun & Aragaw, (2001) community based study in Ethiopia identified clinical improvement as the most common reason for treatment discontinuation, followed by the distance of the treatment facility. In their study, family and social supports were found to be critical in promoting treatment adherence. Similar opinions were shared by participants in the study.

.....the whole family, but they do not care about what happens to me. My friends no longer hang around me. (A male participant)

My aunt provides social support, I live with my three siblings but they do not know what is wrong with me. I am dating a guy if I tell him he will leave me. I am waiting for the appropriate time to tell my boyfriend about it (A female participant).

.....nobody, there is no point telling people what is wrong with your health, they can't help you but they will gossip about you to other people (A male participant).

My sister is the one who bears the cost of treatment since my husband is not aware of my condition. In fact he has never ever bothered to find out what exactly is wrong with me. I know him too well if he gets to know about my condition he will leave me (A female participant).

5.4.7 Service/Provider factors affecting treatment adherence

Participants praised the TB nurses for having patience for them unlike being at the outpatient department (OPD) where nurses shout at them. However, some of them complained about a few nurses. The following were reports given by respondents on the account of services and attitude of services:

The health workers were very nice to me and encouraged me to take my medication. But I didn't trust them with my problems (A female participant)

They were ok, but they will let me sit far from them as if to say that they are afraid I might infect them with my sickness. A few of them were rude; if you don't come to take your medicines they talk to you anyhow (A male participant).

There is this nurse who does not understand issues, sometimes you want to travel and you need refill, but she won't so it means you have to skip the period (A female participant).

Contrary to the above experiences of some participants, others had very good story to tell about the HCWs:

They always call to remind me a day before my medicines are finished. They are very good. I remember I was not feeling well and there was no one to come for my medicines they visited me in the house (A male participant).

An interview with the nurses provided an understanding of what went on within the chest/TB clinics. According to the TB coordinators, they had recalcitrant patients who did not attend clinics as prescribed and therefore they needed to let them come to the clinic to take their medication even at the continuation phase. These were patients who were non-adherent during the intensive phase so they could not trust them by giving the medication to them without supervision. Again, to the nurses, these patients would have to be called several times to honour their appointment schedules.

5.4.8 Stigma and its effect on adherence

The study found out that, not only were patients stigmatized, nurses at the TB clinics were equally stigmatized by their own colleagues. A situation found to be very disturbing, in the sense that if health workers who are not infected are stigmatized then, what is the fate of patients on treatment with TB? This is what the nurses had to say concerning the way they were stigmatized by their own colleagues:

It is not easy at all even some of us (TB nurses) are referred to as TB people: our colleagues treat us as if we have TB. A doctor in our hospital refused to use a pen from the DOTs centre because it is from TB clinic (A TB coordinator).

> *Our colleagues even look down on us because of the nature of patients we handle. We are on a daily basis stigmatized by our own colleagues (A TB coordinator)*

Some participants perceived being stigmatised as another major challenge being infected with TB and HIV. Many of the participants interviewed said that they felt stigmatized even though not directly and so had to withdraw from members of their close social network because they felt ashamed of their condition. Some participants reported being directly stigmatized within their families, to the extent that, they were given different utensils to eat from and different sleeping arrangements made for them. The majority of participants indicated that they have resolved not to disclose their TB and or (HIV) status for fear of being stigmatized.

> *Having the two diseases is very deadly, I was managing with the HIV, but when I got the TB I became very weak and frail, before the TB, if I don't tell anybody I have HIV they won't know but people started asking questions especially when I started coughing profusely and grew very lean. (A female participant)*

> *When my family members got to know about my situation they changed their attitude towards me. I now use different utensils and sleeps in the living room (Male respondent).*

> *When my wife got to know about my HIV and TB status she left me. At the moment my brother takes care of me financially (A male participant).*

Contrary to the above experiences, other participants had support of their family members. The following are the experiences of some respondents about their situation.

> *My husband supports me financially but I don't see him often because I live with my mother now. My mum who takes care of me thinks I am a burden on her. (A female participant)*

> *My partner has HIV too so she supports me. At the moment she is not on any medication (A male participant)*

> *I never told my husband because he is not concerned about what I do, for the past year that I have been treating these diseases, he has never asked me what's wrong with me. The only person who knows about my health condition is my sister. She takes care of my medical bills (A female participant).*

Participants indicated that disclosure of their TB and HIV status might possibly lead to double stigma. Some of the co-infected patients initially did not open up to the researcher.

They only disclosed the TB infection initially until the researcher probed further and reassured them of confidentiality. Goffman (1963) opined that when individuals try to preserve their identities they present themselves to others in certain ways, which might not be consistent with the "true self" - a typical reflection of the attitude of co-infected patients in the study.

HIV patients were perceived negatively, and women were found to be more affected by the socio-cultural consequences of TB, as has been discussed in the preceding paragraphs. Participants described negative perceptions of TB and HIV patients on the part of the general population in their various communities. These negative perceptions resulted in rejection for both men and women with the disease. Females, however, reported feeling the burden of TB and HIV stigma more intensely than men. For this reason, most females and some males chose to keep their diagnosis a secret from family members and people outside their close family due to fear of rejection and stigma. Most females mentioned experiences of being stigmatised because of their diagnosis.

> *I had to give up selling on table-top because people got to know about my condition and stopped patronising my ware (Female participant).*
>
> *Some of the neigbhours point fingers at me trying to find out what exactly is wrong with me (Female participant).*

Though the study showed that people with TB are stigmatized, this was observed as a motivating factor for some to take their medication

> *……nobody knows about my condition apart from the nurses here. I'm afraid people will not respect me if they get to know about my situation. I don't wont anybody to know about my situation. I have decided to continue to take my medication so that the disease will completely go out of my body and I can go about my normal work (Female participant).*

This was in contrast to males who seemed unconcerned about the attitude of others with regards to their condition.

5.4.9 Factors facilitating TB treatment adherence among TB & HIV patients

In the study, the respondents adhering to TB and HIV treatment indicated that it was not really difficult to follow the treatment regimen. Adherence to the treatment regimen rested on a few factors; efficacious medicine available free of charge, timing of intake, experiencing relief of the symptoms of the disease, the knowledge that another known person recovered from TB by taking the medication, and the hope that they would be fully cured by taking the treatment as prescribed. Reasons commonly given for adhering to the TB medication are illustrated by some participants below:

> *I have to discipline myself so that I can complete the TB medication and go about the normal duty. My work does not affect my treatment; the feeling of getting better soon makes me take my drugs every day without missing (A female participant).*

> *My aunt who happens to be a nurse is the only person among my family members who knows my HIV and TB status. I get encouragement from her; she has been counseling and encouraging me irrespective of the side effects that I experience sometimes (A female participant).*

> *As for the ART drugs they could be taken with food, so I take my TB medication early in the morning by 5.00 am and then, at six am I eat, after eating I take my ART drugs. I always make sure there is plenty of food in the house. I think that the drugs are working very well, so no matter what I have to take the medicines (A male participant).*

> *I have been taking my treatment every day without missing any. I don't have any problems. On the contrary, since I have been taking my treatment I feel a big relief from pain I always felt before I was put on the medication (A male participant).*

5.4.10 Factors impeding TB treatment adherence among TB & HIV patients

Participants who took their TB and HIV medications or did not take their medication at any particular point in time were mainly influenced by attitudinal, social and economic resources available to them, more importantly, the social and cultural setting especially, family and the environment within which they live. For most of the non-adherent respondents who had HIV before contracting TB, they indicated that, it was as a result of

the discontinuing with their medication that brought about their present condition. Some also mentioned financial challenges, which had to do with taking transportation, money for their general upkeep since majority of them unlike those with only TB were not currently working. Some also complained that the drug burden was high and the side effects they experienced taking several tablets per day were unbearable. This is what some of the respondents had to say:

> *Transportation to and from this place is too much; the nurses did not agree to give me the TB tablets so I will be taking them. Where I take my ART, we are given the drugs monthly and that is ok for me, but I have to come here every week and sometimes I don't have money for transportation because I don't work (A male participant).*
>
> *My being a woman hasn't affected my treatment in any way. It is sometimes social roles (funerals) that affect my medication. If I travel and overstay my visit it means I have to miss my drugs. (A female participant)*
>
> *My work schedules affect my medication and the other way round. I lose sales because I have to visit the hospital for my medication especially during the intensive phase, when I had to go the hospital every day for my medicines I lost a lot of sales (A male participant).*
>
> *Coming to the hospital every day is a problem because my husband complains about the money he gives for transportation (A female participant).*
>
> *The medicine makes me weak so if I don't have money to buy food I don't take it at all because my work involves hard work (A male participant).*

5.5 Regression Analysis

This section provides data on the estimates on adherence using logistic regression models. Only variables which were statistically significant ($p<0.05$) at the bivariate level were included in these models (logistic regression) and recategorised into five factors (demographic and socioeconomic factors, patient-related factors, health/service related factors, community-related factors and gender-related factors.

5.5.1 Binary logistic regression using background/socioeconomic characteristics

Table 5.16 is an adjusted logistic regression model using selected background/socioeconomic characteristics (gender, age, income, facility and living abode) as the independent variables and ever-missed medication as the dependent variable. These variables were selected for the logistic regression based on their statistical significance at the bivariate (chi-square/fisher's exact test) level.

In Table 5.16, the number of observations was 308. The variables used in this model were gender, age, income, facility, living abode and the outcome variable "ever missed TB medication" to ascertain the effect on gender. In this model the odds of males ever missing their TB medication compared to females was (AOR) 2.83 (CI 95%, 1.44 - 5.58, p<0.003) all other factors remaining constant; males were one 183% more likely to ever-miss their medication. The variables that accounted for adherence in the model were age, marital and income. The AORs at 95% Confidence Intervals (CIs) for the age category; 30 – 39, 40 – 49, 50 – 59, 60+ were 0.41 (0.16 - 1.07, p<0.070), 0.23 (0.07 - 0.72, p<0.012), 0.03 (0.01 - 0.12, p<0.000), 0.24 (0.06 - 1.00, p<0.051) respectively and that of the income category; 200 – 399, 400+, Not sure or stated were 0.13 (0.05 - 0.36, p<0.000), 0.19 (0.07 - 0.53, p<0.002), 0.52 (0.20 - 1.37, p<0.188) respectively. Marital status was also a protective factor for adherence; married patients were 0.33 (0.001 – 0.80, p<0.014) times or 67% less likely to be non-adherent, widowed respondents were 0.03 (0.01 – 0.13, p<0.000) times or 99.7% less likely to be non-adherent and those respondents who were divorced/separated were 0.29 (0.10 – 0.79, p<0.015) times or 71% less likely to be non-adherent.

The risk of non-adherence was attributable to the facilities where respondents accessed care. All the facilities were risk factor for non-adherence with AORs: 5.72 (2.24 - 14.57, p<0.000), 1.09 (0.38 - 3.11, p<0.070), 7.81 (3.06 - 19.95, p<0.000), 3.91 (1.41 - 10.86, p<0.009), 3.28 (1.13 - 9.55, p<0.029) were recorded for Ridge Hospital, Tema General

Hospital, Achimota Hospital, Kaneshie Polyclinic and Tema Polyclinic respectively. Again, number of years respondents had lived in current abode was also found to be a risk factor for non-adherence - 4.24 (1.42 - 12.68, p<0.010), 1.76 (0.51 - 6.02, p<0.010), 2.98 (1.13 - 7.88, p<0.28) for those who had lived in current abode less than a year, 1 – 2 years, 3 – 5 years and those who had lived in the abode their entire lives respectively

Table 5.16: Relationship adjusted by selected background/socioeconomic characteristics (gender, age, income, facility, and living abode

Variable description	Adjusted Odds Ratio @ 95% Confidence Interval	P-value
Gender		
Female	1	
Male	2.83 (1.44, 5.58)	0.003
Age (years)		
<30	1	
30 – 39	0.41 (0.16, 1.07)	0.070
40 – 49	0.23 (0.07, 0.72)	0.012
50 – 59	0.03 (0.01, 0.12)	0.000
60+	0.24 (0.06, 1.00)	0.051
Marital status		
Single	1	1
Married	0.33 (0.14, 0.80)	0.014
Widowed	0.03 (0.01, 0.13)	0.000
Divorced/separated	0.29 (0.10, 0.79)	0.015
Income		
>200	1	
200 – 399	0.13 (0.05, 0.36)	0.000
400+	0.19 (0.07, 0.53)	0.002
Not sure or stated	0.52 (0.20, 1.37)	0.188
Number of years in abode		
Less than a year	1	
1 – 2 years	4.24 (1.42, 12.68)	0.010
3 – 5 years	1.76 (0.51, 6.02)	0.010
Always	2.98 (1.13, 7.88)	0.028

5.5.2 Binary logistic regression using provider/service-related characteristics

The next model is a logistic regression on provider and service-related factors using adherence, gender, mode of receiving medication, education on TB and clinic visits. In all,

there were 310 observations. In Table 5.17, males were found to be 85% more likely to be less adherent compared to females with AOR 1.85 (CI 95% 1.05 - 3.23, p< 0.032), all other factors being constant. With regards to education on TB, those who said they were not given enough education were found to be more likely to be non-adherent AOR 2.88 CI 95% (0.93, 8.94, p<0.067). However, the p-value was not significant indicating some element of chance.

The relationship between ever missed medication and number of clinic visits produced very interesting findings. Those who visited the clinic weekly were found to be more adherent (AOR 0.78 (0.14, 4.34, p<0.778) compared to those who visited the clinic twice in the month and monthly; 10.50 (1.63, 67.39, p<0.013) 1.96 (0.19, 20.69, p<0.574) respectively. This result showed very extreme values, an indication of unreliability; probably the effect of small sample size.

Table 5.17: Relationship adjusted by selected service provider characteristics (Education and clinic visit)

	Adjusted Odds Ratio @ 95% Confidence Interval	**P-value**
Gender		
Female	1	
Male	1.85 (1.05, 3.23)	0.032
Education by HCW about TB		
Yes	1	
No	2.88 (0.93, 8.94)	0.067
Clinic visit		
Daily	1	
Weekly	0.78 (0.14, 4.34)	0.778
Twice in a month	10.50 (1.63, 67.39)	0.013
Monthly	1.96 (0.19, 20.69)	0.574

5.5.3 Binary logistic regression using some Gender-related characteristics

Table 5.18 had 302 observations and it is adjusted with “not wanting to go to clinic alone” and “money needed for treatment”. There were only two variables that were significant at

the bivariate level. These were getting money for treatment and not wanting to go to the clinic alone. Again, males were 1.71 (CI 95%, 1.04 - 2.83, p<0.035) times or 71% more likely to be non-adherent than their female counterparts. Gender issues were found to be significantly associated with adherence. For those who reported getting money for treatment was not a problem, they were less likely to be non-adherent as compared to those who reported that money was a problem. Again, those who indicated that they had no problem going to the clinic alone, were less likely to be non-adherent AORs 0.47 (0.29 - 0.77, p<0.002) and 0.53 (0.28 - 1.02, p<0.056) respectively. This showed really that males in the study were more vulnerable as far as adhering to treatment regimen was concerned.

Table 5.18: Relationship adjusted by selected gender-related factors (Money for treatment and not wanting to go to clinic only)

Variable description	Adjusted Odds Ratio @ 95% Confidence Interval	P-value
Gender		
Female	1	
Male	1.71 (1.04, 2.83)	0.035
Getting money for treatment		
Yes	1	
No	0.47 (0.29, 0.77)	0.002
Not wanting to go alone		
Yes	1	
No	0.53 (0.28, 1.02)	0.056

5.5.4 Binary logistic regression using Patient related Characteristics

Table 5.19 used patients' related factors such as gender, mode of treatment and ease of treatment. There were a total of 300 observations. Males were AOR 2.36, CI 95%, (1.38 - 4.03, p>0.002) times or 136% more likely to be non-adherent than females. Those who said the treatment schedule was difficult were AOR 2.59 (1.52 - 4.43, p<0.000) more likely to be non-adherent compared to those who indicated that the schedule was not difficult. Mode of receiving medication produced varied results; those who received their

medication daily (AOR 2.10, CI 95%, 0.68 - 6.50, p<0.199) weekly (AOR 2.05, CI 95%, (0.69 - 6.06, p<0.196) were found to be more likely to be non-adherent whilst those who received their refill daily (AOR 0.15 CI 95%, (0.02 - 0.92, p<0.041), twice a month (AOR 0.67 CI 95%, 0.21 - 2.16, p<0.498) and monthly (AOR 0.57 CI 95%, (0.19 - 1.72, p<0.318) were found to be less likely to be non-adherent. This is probably, the reason why during the continuation phase DOT is not used, since patients could take care of themselves without being supervised.

Table 5.19: Relationship adjusted by selected patients' related factors (Mode of receiving medication and difficulty of treatment)

Variable description	Adjusted Odds Ratio @ 95% confidence interval	P-value
Gender		
Female	1	
Male	2.36 (1.38, 4.03)	0.002
Mode of receiving medication?		
Home with DOT	1	
Home without DOT	0.15 (0.02, 0.92)	0.041
Daily	2.10 (0.68, 6.50)	0.199
Weekly	2.05 (0.69, 6.06)	0.196
Twice a month	0.67 (0.21, 2.16)	0.498
Monthly	0.57 (0.19, 1.72)	0.318
Treatment is difficult		
Yes	1	
No	2.59 (1.52, 4.43)	0.000

5.5.5 Binary logistic regression using community related factors

Closely related to the patient-related factors model (Table 5.20) are the community-related factors. The number of observation in this model was 304. Logistic Regression on adherence using community related factors (distance and transportation problems) showed that males were more likely to be non-adherent compared to females, an AOR 1.55 (0.94 - 2.55, p<0.087). Both community-related factors were found to have contributed to adherence. The adherence was lower among patients who reported that distance and

transportation were no hindrances (Table 5.20). The possible explanation for this finding might be due to the fact that some respondents felt the need to travel long distance to seek care for fear of being found by their neigbhours and so whatever it took them, they were poised to circumvent the challenges of transportation and distance.

Table 5.20: Relationship adjusted by selected community related factors (distance and transportation)

Variable description	Adjusted Odds Ratio @ 95% confidence interval	P-value
Gender		
Female	1	
Male	1.55 (0.94, 2.55)	0.087
Distance problem		
Yes	1	
No	0.74 (0.37, 1.50)	0.406
Transport problem		
Yes	1	
No	0.53 (0.27, 1.04)	0.065

5.6 Conclusion

This chapter has presented an in-depth analysis of data from the study by describing the important variables of the study using frequencies and percentages that have been able to give a picture of the situation of TB in the selected study areas. It also analysed the data at the bivariate and multivariate levels to determine which of the variables actually enhanced adherence and those that contributed to non-adherence. Key among the findings and which featured prominently in the discussion section were gender, income, age, distance, stigma and adherence, disclosure and its effects on adherence, the role of communication between health care workers and patients and the role of social support in adherence to TB treatment

CHAPTER SIX

6.0 DISCUSSIONS

6.1 Introduction

The main objective of the study was to assess gender dynamics in TB treatment adherence in the Greater Accra region of Ghana.

It discusses findings related to background/demographic and socioeconomic characteristics, community-related and patient-related factors, provider and service-related, gender based factors and delved into gender dynamics and treatment adherence among TB and HIV co-infected patient. The final part of this chapter looks at the study weaknesses, strengths and limitations.

6.2 Gender and socioeconomic divide in adherence to TB treatment

The variables used in the demographic and socioeconomic factors are gender, age, income, facility, living abode and the outcome variable "ever missed TB medication". Findings from the binary logistic regression analysis indicate that males are more likely to be non-adherent compared to females (OR 2.83 (CI 95%, 1.44 - 5.58, p<0.003). The findings are consistent with Gosoniu et al., 2008; Weiss et al., 2008; Fochsen et al., 2006; Eastwood et al., 2004; Hamid Salim et al., 2004; Sanou et al., 2004; Thorson et al., 2004; Chan-Yeung et al., 2002 studies, which also found more males than females being non-adherent. Among the variables in the model that aided adherence were age, marital status and income. The study findings are consistent with Strebel et al., (2006) who found out that all age categories were predictive of adherence when it was controlled for in the model with other demographic and socioeconomic variables. However, on the bivariate level and based on gender, there was no significant (p=0.275) association between adherence and being female, comparatively, there was significant association (p=0.000) between all the

age categories of males and adherence. On the contrary, a study by Suhadev et al., (1995), found age a reliable predictor of non-adherence for patients 45 and above. On marital status, bivariate analysis found no significant association (p=0.366) between males and adherence, but there was a significant association (p=0.003) between females and adherence. Kaona et al., (2004) studies have found similar results. On the other hand, variables that were predictors of non-adherence were being male, health facility and number of years respondents had lived in the community. Upeklar at al., (2001) have argued that females high adherence to TB treatment regimen is due in part to their commitment to ensure they are fully treated, because they felt vulnerable to stigma and therefore in order to avoid the stigma, they needed to completely remove the disease from their system. Indeed, female respondents acknowledged that though it was difficulty to take medication continuously for six months they were prepared to go through with the medication and get on with their lives, hence, their high levels of adherence. Even though the model was on demographic and socio-economic factors, other factors such as the role of stigma and other socio-cultural factors have significant roles to play in contributing to the adherence of female patients.

In general populations, socio-economic status has not consistently been found to be an independent predictor of adherence, since TB though a disease of poverty affect people across social strata, also, the reason being that TB treatment unlike ART and other diseases which require long treatment is free in many countries including Ghana. Balasubramanian et al., (2004) study in India, found that in terms of cost of treatment, women spend more money in treatment than men. Contrary to the findings in India, a study in Zambia concluded that, although men spent more money in accessing TB care than women, it was still more affordable for them when taken in the context of their ability to pay and the great disparities in the median individual income between men and women

(Aspler et al., 2010). Other studies based on qualitative methodology have also revealed that men were more frequently focused on financial concerns and the effects of TB on the family economy, such as interference with livelihood activities, the loss of wages, financial difficulties, reduced capacity for work, poor job performance, and the consequences of long absence from work (Weiss et al., 2008 and Weiss et al., 2006). Studies in Ghana have also shown a relationship between financial difficulties encountered by TB patients; a default rate of 13.9% was found in a study combining focus groups with cross sectional survey which showed that a good relationship between patients and health workers was the main facilitator of adherence while financial difficulty was the main barrier to adherence (Dodor & Afenyadu, 2005). Those with no income, lack of social support and problems relating with others while on treatment were also significantly associated with non-adherence (Dodor & Afenyadu, 2005). The qualitative findings reveals that most respondents had to stop work entirely or take some time off work especially those who are self-employed to be able to undergo the full treatment regimen. As a result, they encountered financial difficulties. Females on the other hand, have to circumvent the difficulties to ensure that they went through the treatment without recourse to financial support from close associate with whom they would have to disclose their status to.

In the study, both gender were concerned about their inability to work since during their initial phase of the treatment, they had to stop work to concentrate on their health, some men interviewed said that they had to depend on other family members, who were already overburdened with family problems - hence very limited social support. On the contrary, women who had to depend on family members had to be discrete in disclosing their TB status for fear of being stigmatised whereas males complained of lack of finance as the main reason for non-adherence.

6.3 The role of Health Care Workers (HCWs) support to adherence to TB treatment

The interaction between HCWs and patients is crucial to treatment adherence. Variables that were significant at the crude level and used in the adjusted model were gender, education by HCWs and clinic visit. Indeed, data from quantitative, qualitative and observations indicate that there was remarkable good relationship between HCWs and TB patients that resulted in some level of adherence. The binary logistic regressions indicated that males were more likely to be less adherent than females with OR 1.85 (CI 95% 1.05 - 3.23, $p<0.032$), all other things being equal. Those who did not receive any education on TB from HCWs were more likely to be non-adherent OR 2.88 (0.93 – 8.94, $p<0.067$) and those who visited the clinic twice monthly and monthly were OR 10.50 (1.63 – 67.39, $p<0.013$) and 1.96 (0.19 – 20.69, $p<0.574$) respectively.

In contrast to Weiss et al., (2006) study, where it was reported that health provider's instructions were not given directly to the female patients, but to an accompanying person, consequently, limiting women's access to healthcare and their control over the healthcare experiences, the study finds that HCWs educated both gender equally. It should be noted that, the health care system in Ghana is gender neutral and therefore, there is no gender discrimination when it comes to women and men accessing health care. What is missing is the ability of the HCWs to identify the different needs of women and men so as to address it as enshrined in the Health Sector gender policy. It is worth noting that, HCWs interviewed admits that they have not been trained in gender issues, but then, they use their discretion to educate their clients as and when the need arises. Contrary to literature on provider/service related factors Weiss et al., (2006) which sought to affect adherence, the findings from the study offer a positive relationship between HCWs and TB patients. An example in Ghana, is Dodor & Afenyadu, (2005) study which found cordial relationship between patients and health staff as the main motivating factor for completion of

treatment. The study also reports through the qualitative study that, males did not adhere simply because taking the TB medication makes them eat a lot and if they do not have money to buy food they do not take the drugs.

6.4 Community support and patient factors affecting TB treatment adherence

In the study, patient-related factors represent the resources, knowledge, attitudes, beliefs, perceptions and expectations of the patient. Some studies that have investigated patient-related factors as the main focus of adherence and non-adherence, have conceded that adherence issues are partly behavioural and many other factors tend to affect patients as already indicated in the demographic/socioeconomic model (Daniel et al., 2006; Kaona et al., 2004). In the study variables that are used to measure adherence at the multivariate level are gender, mode of treatment and ease of treatment. The study finds differences between males and female adherence and non-adherence levels with regards to patient related factors. This study reports that males are more likely to be non-adherent than females. Among the variables that are predictive of non-adherence are difficult treatment schedules, receiving medication daily and weekly. On the contrary, receiving refills twice a month and monthly were predictors of adherence. This explains why during the continuation phase DOT is not used. However, some of the key informants interviewed in some facilities report that recalcitrant patients have to be observed daily even though they were in the continuation phase hence the data on daily refills. The HBM variables did not offer any significant results and explanations on patients' adherence or non-adherence at logistic regression levels. That notwithstanding, at the bivariate levels the variables perceived susceptibility (p=0.028) and perceived barriers (p=0.014) produced some significant association. This finding supports the literature on HBM, arguably, since males were non-adherent, it goes to explain the relationship between their health belief and their adherence levels. It is worth noting that, there are several factors that go to explain

adherence levels and not just a model since. All other factors are interrelated to serve as motivators and risk factors. On the other hand, female respondents reported that, their motivation to adhere to the treatment was influenced by the value that they put on the family and avoidance of being stigmatised, hence the levels of confidence in being able to adhere strictly to the treatment regimen. This type of intrinsic motivation exhibited by some female respondents are behavioural treatment targets that must be addressed concurrently with biomedical ones if overall adherence is to be improved in males to achieve utmost adherence among them.

Closely associated with the variables mode of receiving treatment and difficulty of treatment are the distance and transportation. This was measured using gender, distance and transportation problems. The results showed that males were more likely to be non-adherent compared to females, an OR 1.55 (0.94 - 2.55, $p<0.087$). Both community-related factors contribute to adherence among respondents who reported that they had no difficulty in accessing health care. However, the result was not statistically significant. This finding has been reported in several studies that have examined adherence and distance and/or transportation to and from TB treatment centres - Getahun & Aragaw, (2001) study found that both gender discontinued treatment as a result of the distance of the treatment facility. Other studies have equally found distance and cost of transportation to be a risk factor for non-adherence (Gosoniu et al., 2008; Weiss et al., 2008; Fochsen et al., 2006; Eastwood et al., 2004; Hamid Salim et al., 2004; Sanou et al., 2004; Thorson et al., 2004). Bam et al., (2005) and Jaiswal et al., (2003) studies found that patients who had to travel long distance were non-adherent. On the contrary, the qualitative findings indicated that females were more comfortable travelling long distance to TB clinic for treatment for fear of being noticed by neigbhours leading to stigma. Therefore irrespective of the cost and distance, they preferred travelling far away for TB treatment. This

experience also put pressure on them in respect of looking for extra finance for treatment. Except for a male participant who complained of attitude of TB nurses in his community that led to relocation, male participants in the in-depth interview (IDI) indicated that, they had to travel long distances bearing higher cost of transportation because there were no TB clinics in their neighbourhood. This is a clarion call to the Ghana National Tuberculosis Control Programme (NTP) to ensure TB clinics are sited within communities be it private or public.

6.5 The effects of Gender on TB treatment adherence

Many studies have reported several combinations of factors leading to patient's adherence or non-adherence among the gender (Eastwood et al., 2004: Fochsen et al., 2006; Gosoniu et al., 2008; Hamid Salim et al., 2004; Sanou et al., 2004; Thorson et al., 2004; Weiss et al., 2008).

In the study, an attempt is made to use roles and responsibilities both gender engage in to assess or measure the effect on adherence or non-adherence. However, majority of the variables that were used at the bivariate and multivariate levels did not yield any significant results hence, were not used in the adjusted logistic regression model. That notwithstanding, this study has gone beyond what feminist scholars deemed binary (Annadale & Riska, 2009; Greaves, 2012). Indeed, there are dynamics with regards to gender and these are multifaceted constructs. It is for these reasons that the study finds that more females than males were more likely to be adherent. The significant variables used in the model designated gender-related factors are "not wanting to go to the clinic alone" and "difficulty and getting money for treatment". In spite of the fact that males earned high incomes compared to females in the study, overall, males are more likely to be less adherent compared to females (OR 1.71, CI 95%, 1.04 - 2.83, $p<0.035$), as has been

reported in almost all studies reviewed in the literature. That notwithstanding, those who reported having no difficulty in getting money and going to the clinic were found to be less likely to be adherent. It is worth noting that, the qualitative results corroborated the quantitative data. Indeed, the females interviewed were poised to adhere strictly to their treatment than the males, partly due to the stigma attached to the disease and the ability to go back to their normal routine as homemakers and breadwinners of their family. Studies that have tended to look at gender issues have not considered these variables. Interestingly, at the bivariate level variables that yielded significant associations between, cooking as domestic chores, distance to the health facility and difficulty and getting money for treatment for males p=0.026, p=0.003 and p=0.002 respectively. On the contrary, the same variables did not produce any significant results. One may ask if males are the endangered specie, since they are at a disadvantaged here, as feminist scholars (Connell, 2000 and Bird & Reiker, 2008) have posited that females health conditions is as a result of their position in the family. Do we also say the same for the male respondents in this study? With regards to gender roles, this finding is inconsistent with studies conducted by Gosoniu et al., 2008; Weiss et al., 2008; Fochsen et al., 2006; Eastwood et al., 2004; Hamid Salim et al., 2004; Sanou et al., 2004 and Thorson et al., 2004, which found the reverse for females. However, taking care of ill family members was the only variable that produced significant association at the bivariate level for females (p=0.000). Perhaps, this was significant considering the important role females' play when it comes to caregiving (Wood & Eagly, 2010; Allotey & Gyapong, 2008; Bird & Reiker, 2008). These (gender roles) variables were not significant enough to be included in the adjusted model of the logistic regression – probably due to lack of power, but it is worth discussing those females as caregivers have been overburdened with the dual and multiple roles they perform on a daily basis, therefore these impinge on their health as well. It is important to point out that the study

took a cue from Allotey & Gyepong, (2008) study by not over-emphasising on the role of women without recourse to the roles and responsibilities of men, which also impinge on their treatment. The study is novel because it attempted to use variables (role and responsibilities, decision making), which have been on top of the research agenda (Allotey & Gyepong 2008; Bird & Rieker, 2008; Wood & Eagly, 2010). On the other hand, Bird & Rieker, (2008) work on gender and health have posited that gender constraints are the reasons for the high morbidity and mortality among women who contract TB. Again, this finding might also confirm studies that revealed that once women have been able to circumvent the barriers of seeking healthcare they invariably ensure that they go through the treatment regimen religiously and are better adherent than men do (Balasubramanian et al., 2004). The qualitative study however, revealed that females experienced a different form of constrained contrary to Wood & Eagly, (2010) assertion. This type of constraint had to do with lack of care from their partners in the form of showing concern. Indeed, some women interviewed reported that they did not receive any form of support from their husbands and that throughout their treatment; their husbands did not bother to find out why the frequent visits to the hospital. Another constraint found in the study has to do with the fear of being ill with TB. Females were uncomfortable disclosing their TB and/or HIV status to partners for fear of being abandoned or divorced. On the part of males, they were not bothered about stigma or openly disclosing their status. Unlike the females co-infected who were more comfortable discussing TB and not HIV, the males openly disclosed their condition without prompting. Again, the issue of stigma was not a barrier to adherence to both gender in this study. To most females perceived benefits of the medication far outweighed the social and economic costs.

Indeed, the qualitative data indicate that stigma was the main reason for adherence by females interviewed, as they were poised to completing their medication without anybody

associating TB with them. This finding is consistent with Woith & Larson, (2008) study in Russia where stigma was a motivator for adhering and completing treatment. Though, consistent with this study, it should be noted that the finding in Woith & Larson, (2008) study had to do with the general population and not females to be specific. The motivating factor for male respondents was to complete the treatment so they could go back to work to earn a living for themselves and family. On the other hand, the barriers noted in the study were that of social responsibilities on the part of the female patients – travelling outside home to attend funerals and other social commitments. These findings support the study by Karim et al., 2007; Sanou et al., 2004 and Thorson & Johansson, 2004. For the males, financial burden was the main reason why they missed their medication. As was found to be consistent with other studies (Weiss et al., 2008; Weiss et al., 2006). Another reason attributed to non-adherence was forgetfulness on the part of males who worked whilst on treatment (traveling out of town).

6.6 Gender and TB & HIV co-infection and TB treatment adherence

It is a fact that gender in itself is a health determinant, however, gender is influenced in part by biological, psychological (and environmental factors) as have already been discussed in previous sections. Gender implication of co-infection with HIV in Ghana, is one that reflects the African picture and perhaps a global one – more females with HIV compared to males (Long, 2000), however, the reverse is true with TB.

In the qualitative study, gender as a constrained variable played out in different form – males are found to be more vulnerable to non-adherence due to their circumstances. Many studies have found females to be disadvantageous in several issues including health and these have been well documented (Allotey & Gyapong, 2008; Bird & Rieker, 2008; WHO, 2003; Connell, 2000). However, in the study, males are rather disadvantageous; this is

because females have to circumvent the challenges they face as the "endangered specie". For those who are in a coital relationship, majority did not disclose their TB/HIV status to them for fear of being abandoned or divorced. For those who disclosed their status to their partners did so because they knew their partners were also infected with the disease. This led to mutual understanding between the couple in question.

The study finds in the quantitative study that there are more females (15.2 %) co-infected with HIV as compared to males (10.1%), out of which 29.4% females and 70% males have not been adherent. The qualitative study involved six females and six males, of which two females are not adherent compared to three males. This shows that non-adherence was higher among TB/HIV co-infected participants. This is consistent with studies comparing adherence among these category of patients (Makombe et al., 2007; Daniel & Alausa, 2006; Rowe et al., 2005).

Findings from the qualitative study provides a platform for understanding the numerous factors involved in adhering/non-adhering to TB treatment regimen among patients on concomitant treatment for HIV. Comparatively, there was no marked difference in terms of adherence, between respondents who had TB and that of TB & HIV co-infected. However, among the TB & HIV co-infected more females than males were found to be less likely to be non-adherent. For co-infected participants side effects and high pill burden were some of the reasons why participants missed their medication for both gender. On the other hand, lack of finance was the main reason male participants missed their medication. This is in contradiction of Needham et al., (2001) and Karim et al., (2007) studies that found higher costs for women than for men. Participants who did not adhere to treatment were of the view that, it was easier taking the TB medication than the ART. Among the non-adherents, one patient was found to have given up ART treatment and continued with the TB treatment after weighing the benefits and costs associated with disease severity.

The study found that knowledge about the curability of TB was enough motivation for adherence. This was reflected in the earlier response from respondents who expressed optimism of the curability of TB and again adverse effect of TB if not treated properly. Most participants in the IDI have knowledge that TB kills when it is not treated properly especially among patients co-infected with HIV, therefore traded their HIV treatment for the former.

Pill burden and side effects were major challenges to concomitant treatment, more especially with male respondents. This was found to be consistent with studies by Ingersoll and Cohen, 2008; Chesney, 2003 and WHO, 2003. Findings from the study show that adherence counseling facilitates medication adherence among those who saw such side effect as part of the treatment. Some patients expressed zeal that they were effectively counseled on the side effects so it did not affect their intake of medication. Effect of adverse drug effect was felt more among males than females. Indeed, two male respondents indicated that they had to stop taking the medicines for more than a week as a result of the side effects.

Studies on stigma have also suggested that it is a potential barrier to treatment because it makes patients reluctant to attend treatment in clinics located in their neighbourhoods and leads to non-disclosure of illness. Other studies have found that disclosure can play a positive role because it can help the patient mobilise social support thereby facilitating adherence; and is also important for public health reasons such as avoidance of further infection transmission. Contrary to many studies on stigma, this study found that stigma was a protective factor, as has been expressed by female respondents. In a situation where consequences of disclosure are uncertain, it may be rational for a patient not to disclose or to have very selective disclosure. Studies have highlighted the negative impacts of HIV-

related stigma on TB treatment in co-infected patients (Dodor & Afenyadu, 2005). However, female participants (co-infected) are more comfortable talking about their TB status and not HIV. This is because of the high level of stigma attached to HIV in Ghana. Again, respondents concealing their HIV status are as a result of the fact that TB is curable and HIV is not. Many people associate HIV with promiscuity and so females feel shy disclosing their status. Among the six female co-infected patients three of them earlier denied having HIV. These three did not also disclose their status to their partners for fear of being divorced or abandoned. On the other hand, male respondents who divulged their condition to their wives had them abandoning them to their fate. The situation was aggravated when the males had to stop working because of the adverse effect of the medications. The finding is consistent with similar study in Thailand (Ngamvithayapong et al., 2000). As a result of the stigma, co-infected patients accessed care very far away from where they lived. This was found to be characteristic of females and some male respondents as they avoided meeting people they may know. This finding supports a study from Nigeria where patients defaulted because their treatment centres were relocated to neighbourhood, which was closer to their homes (Daniel & Alausa, 2006). While TB and HIV are not exclusively diseases of the poor, the association between poverty and TB and HIV co-infection rates is well documented and these are well known. In the study comparatively, co-infected patients were more likely to be unemployed than their TB counterparts and male respondents were found to be poorer leading to inconsistency in appointment schedules. The TB coordinators in the various facilities corroborated this finding.

The study found that there was good relationship between HCWs and patients, leading to high clinic attendance among adherent patients. This study is consistent with a similar one conducted in Ghana by Dodor & Afenyadu (2005), which showed that a good relationship

between patients and health staff was the main facilitator of adherence.

Evidence (Baker et al., 2008) has shown that there is a link between poverty and vulnerability to TB. TB can make patients more vulnerable to poverty; in the case of most of the respondents who have to quit their jobs to concentrate on their treatment. There were gender differences with regards to the level of support that respondents received from their partners, family and friends depending on disclosure. Male respondents who disclosed their condition to close family members had some form of support. This level of support is not adequate has revealed by a couple of them. Again, disclosure by some male co-infected respondents led to their partners abandoning them. This group is those who did not adhere to treatment. On the other hand, two female respondents did not adhere because of work and family responsibilities. They explained that, they missed her medication because of attending funerals and work commitments. Majority of the females interviewed said that they had very close confidants whom they confided in and they have been of tremendous support to them.

6.7 Strengths, weaknesses and limitations of the study

The study has identified some strength, weaknesses and limitations, which is worth discussing. These are as follow:

6.7.1 Weaknesses

1. The study used purposive sampling to select the facilities for the study, hence it was subject to weaknesses inherent in such sampling.
2. One of the inclusion criteria was patients' on treatment for a minimum of four months. The study therefore did not capture adherence levels among those who might have missed their medication in the intensive phase.

3. In accessing the adherence levels among respondents, the self-report method was used. Patients were therefore asked to recall the number of days they missed medication. Those who missed medication less than five consecutive days were not included in computing the non-adherence levels. Again, to be able to ascertain the exact data on non-adherence two methods should have been used to complement for each instead of the only one used for this study.

6.7.2 Strengths

1. A major strength of our study is the fact that it used a combination of both quantitative and qualitative methods. The combination of the two methods made room for triangulation that made the understanding of adherence, which is a complex phenomenon, better. The triangulation in the study also allowed for validation of results.
2. The study used both patients' and health workers' perspectives of treatment barriers and facilitators.

6.7.3 Limitations

1. The study was conducted in the Greater Accra region, in six public health facilities providing both anti-TB and HIV care. The results can therefore be generalized only to patients attending treatment in similar treatment centers in the region. The findings cannot be generalized to other patients, for example those receiving TB treatment in private clinics, since they may have their specific barriers and facilitators with regards to provider/service related factors. In order to account for the shortfalls in sampling, six facilities made up of four hospitals and two polyclinics were selected for the study. Again, for the population to be representative, almost all the patients (except for those who did not consent to be

part of the study) who met the inclusion criteria were interviewed. In spite of the fact that a total of 24 patients and 6 health professionals were included in the qualitative study, the study has been able to achieve through the sample size, sufficient diversity among respondents. Again, the findings were largely similar and repeatable among respondents and therefore, the results are transferable to similar contexts in Ghana.

2. All data collected were self-reported and so the propensity of concealing one's adherence status might be high. However, nurses were quick to inform the researcher of recalcitrant patients who defaulted and are not regular with their appointments. The researcher was also able to check from patients' folder to ascertain the truth or otherwise of respondents who were not consistent with their interviews.

6.8 Conclusions

This chapter focused on findings of the study. It delved into the main findings, which were presented in themes (factors). These were background and socioeconomic, community-related/patient-related factors, service/provider-related and gender based factors, nuances of treatment adherence among TB and HIV co-infected patients and finally delved into the study weaknesses, strengths and limitations. Findings from the study suggest that the differences between the gender is no different for those who have only TB as compared with those who are co-infected with TB and HIV.

CHAPTER SEVEN

7.0 SUMMARY, CONCLUSION, RECOMMENDATIONS

7.1 Introduction

This chapter provides a summary of the major findings, relevant conclusions with contributions of the study to knowledge, implications of the study for public health decision-making, recommendations of the study and suggestions for further research.

7.2 Summary of study

The study assessed the gender dynamics in TB treatment adherence in the Greater Accra region of Ghana. In assessing the factors that influence TB treatment adherence, other pertinent issues with regards to HIV were also delved into, such as assessing the effect of TB with concomitant HIV.

The study design was descriptive and analytical and used two methodologies; qualitative and quantitative. The qualitative involved the use of in-depth interviews with 24 patients made up of 12 HIV and TB co-infected patients and 12 TB patients, as well as all 6 TB coordinators in the 6 facilities and observations at two of the six facilities, where data were collected. The quantitative method involved the administration of questionnaire to 310 respondents made up of 112 females and 198 males. The main findings of the study are:

1. Males are more likely to be non-adherent compared to females in all aspect. Factors accounting for non-adherence are multifaceted; ranging from demographic/socioeconomic, patient/community related to provider/ service related factors and gender factors.

2. Key factors identified as contributing to low adherence are facility, daily clinic visits, distance and cost of transportation, lack of social support, number of years

spent in community and overall financial support for treatment, since majority of respondents had to interrupt or stop work entirely in order to seek treatment and then, those working complained the scheduled visits conflicted with their work schedules.

3. Side effects and high pill burden were some of the causes of non-adherence found among male respondents.

4. Social and family responsibilities were found to be predictive of non-adherence among female respondents.

5. The factors found to be predictive of adherence are age, marital status, income, knowledge of TB (severity and benefit), receiving education and counselling from HCWs, clinic visits (weekly and monthly), quality of social support, enough money for treatment, waiting time at the TB clinic for refill.

6. Among the patients on TB treatment, HIV patients are burdened with high levels of drug intake due to the co-infection, resulting in side effects and low adherence.

7. There is no gender difference in treatment adherence between TB and those who are co-infected with TB and HIV.

8. Stigma remained an important determinant of adherence. Among females interviewed stigma was a motivator for adherence to the treatment regimen to avoid being associated with TB. Others also for fear of stigmatisation had to conceal their status from family and friends who might act as social support thereby depriving lots of patients the needed support throughout the treatment phases.

9. Males disclose their disease condition to their partners, whilst females disclose theirs to other family members either than their partners for fear of being abandoned or divorced.

7.3 Conclusions of study

The study focused on gender and used it as a basis for comparison. Adherence is influenced by gender dynamics in relationship to the circumstances women and men find themselves at one point in time.

There is the need to appreciate the challenges that disclosure, stigma and distance have on gender and strategies develop to avert them so that the problems associated with non-adherence to TB treatment such as multi-drug resistance TB does not become a major challenge in the TB control in Ghana

The Ghana National TB Control programme ensures that patients put on TB treatment remain on the treatment until they complete the full course. However, other critical issues regarding adherence have not been taken seriously especially during the continuation phase where patients are not directly observed. There is the likelihood that data collected on adherence might just be the "tip of the iceberg", and that more patients are not adhering religiously as they should considering the treatment outcomes that are recorded at the facilities and the case fatality rate of 9% for the country.

It is important for the NTP to ensure that factors which have been identified in the study as predictors of non-adherence are looked into to ensure that patients who are put on treatment religiously adhered to the treatment regimen so as to prevent them from degenerating into multi-drug resistant.

7.4 Contributions of the study to knowledge

- The findings presented and discussed in this study contribute to the current discourse on gender and TB but more importantly on treatment adherence by looking at the role gender plays in TB treatment adherence.
- Contrary to studies on stigma as a major factor to drop out and/or defaulting or non-adherence to treatment regimen especially the female, this study has proved that stigma as female patients' perceived in the study serves as a motivator for treatment adherence and completion. This was expressed by majority of female respondents as the main reason why they wanted to completely treat themselves and get on with their lives.
- This study has also proved that females are more adherent than males in all spheres. In spite of their financial circumstances, they were able to circumvent the challenges to their advantage, as the family is their priority in all respect.
- Males disclose their TB and HIV status to their partners whilst females disclose to their family members either than their partners.

7.5 Recommendations

Based on the major findings of the study; the following recommendations have been made:

1. **National Tuberculosis Control Programme (NTP) and Health facilities**
   - The various hospitals where DOT is provided should endeavour to put in place early detection mechanisms and management of side effects.
   - Health communication should include educating patients and the community about TB drugs and dealing with beliefs that exist about side effects, since what patients relate to is largely the perceived side effects of TB, although many have actually experienced side effects while on treatment. It is worth noting here

that the impact of side effects and pill burden are affected by popular beliefs about drugs and side effects; these therefore also become part of factors related to patients' beliefs, which ultimately affect treatment adherence.

- NTP in collaboration with DOT centres should recruit the help of successful former DOT patients to act as mentors/treatment supporters.

2. Ministry of Gender and Social Protection

- The various TB centres should liaise with the ministry to put in place measures such as weekly/monthly stipends to support women and men who are abandoned by spouses and family.

3. Metropolitan/Municipal/District Health Management Teams

- Design Behavioural Communication Change strategies for TB nurses to educate their patients
- DOT alone may not be sufficient to ensure patient adherence. Consequently, the provision of multiple forms of patient incentives should be incorporated into DOT treatments. These incentives can be rather inexpensive, such as refreshments, snacks and lunches and free phone use at the DOT centres. More practical incentives such as money for transportation should be included in treatment programmes.

7.6 Further Research

1. Further research should be conducted to find out the impact on adherence of DOT treatment performed outside clinic settings, using family members, private facilities, community-based DOT.
2. A comparison of setting specific such as TB treatment adherence at clinic-based and community-based DOTS is also required.

3. A longitudinal study of TB patients on DOT registered and followed for the treatment period to ascertain treatment adherence and treatment outcomes.

References

Addo, K.K., Owusu-Darko, K., Dan-Dzide, M., Yeboah-Manu, D., Ablordey, A., Caulley, P., Minamikawa, M., Bonsu, F., Lienhardt, C., Akpedonu, P., & Ofori-Adjei, D. (2006). Situation analysis of TB microscopy centres in Ghana. *International Journal of Tuberculosis and Lung Disease*; 8: 870-875.

Adjei, A.A., Adiku, T.K., Ayeh-Kumi, P. F., & Hesse, I.F.A. (2005). Prevalence of human immunodeficiency virus infection among tuberculosis suspect patients in Accra, Ghana. *West Africa Journal of Medicine*, 25(1): 38-41.

Advocacy to Control TB Internationally: Women and Tuberculosis: Taking a Look at a Neglected issue (2010). Retrieved from: issuewww.action.org.

Ali, A., Mariam, D. H., & Tekle, B. (2002). Defaulting from DOTS and its determinants in three districts of Arzi Zone in Ethiopia. *International Journal of Tuberculosis and Lung Disease*, 6(7), 573-9.

Allotey, P., & Gyapong, M. (2008). Gender in tuberculosis research. *International Journal of Tuberculosis and Lung Diseases;* 12: 831–836.

Armijos, R. X., Weigel, M. M., Qincha, M., & Ulloa, B. (2008). The meaning and consequences of tuberculosis for an at-risk urban group in Ecuador. *Review of Panam Salud Publica.*;23:188–197.

Annadale, E., & Riska, E. (2009). New connections: towards a gender-inclusive approach to women's and men's health. *Current Sociology*, 57:123-133.

Annadale, E. & Hunt, K. (2000). From gender inequalities in health: research at the crossroads. In *Gender Inequalities and Health*. Edited by Annadale E, Hunt K. Buckingham, Philadelphia: Open University Press:1-35.

Apfel, R. (1982). How are women sicker than men? *Psychotherapy and Psychosomatics*, 37, 106–118

Aspler, A., Chong, H., Kunimoto, D., Chui, L., Der, E., Boffa, J. & Long, R. (2010). Sustained intra- and inter-jurisdictional transmission of tuberculosis within a mobile, multi-ethnic social network: lessons for tuberculosis elimination. *Canadian Journal of Public Health*, 101(3).

Atre S.R., Kudale A.M. et al. (2004). "Cultural Concepts of Tuberculosis and Gender Among the General Population without Tuberculosis in Rural Maharashtra, India." *Tropical Medicine and International Health* 9(11): 1228–38.

Ayvazian, F. L. (1993). History of tuberculosis. In L. B. Reichman and E. S. Hershfield (Eds.), *Tuberculosis: A comprehensive international approach* 1–20. New York: Marcel Dekker.

Baker, M., Das, D., Venugopal, K., & Howden-Chapman, P. (2008). Tuberculosis associated with household crowding in a developed country. *Journal of Epidemiology and Community Health;* 62:715-721

Balasubramanian, R., Garg, R., Santha, T., Gopi, P. G., Subramani, R., Chandrasekaran, V., Thomas, A., Rajeswari, R., Ananadakrishnan, S., Perumal, M.,Niruparani, C., Sudha, G., Jaggarajamma, J., Frieden, T. R., & Narayanan, P. N. (2004). Gender disparities in tuberculosis: report from a rural DOTS programme in south India. *International Journal of Tuberculosis and Lung Disease*; 8:323–32.

Balasubramanian, V.N., Oommen, K. & Samuel R. (2000). DOT or not? Direct observation of anti-tuberculosis treatment and patient outcomes, Kerala State, India. *International Journal of Tuberculosis and Lung Disease*, 4:409-413.

Bandura, A. (1997). Self-efficacy: The exercise of control. New York: Freeman.

Barnhoorn, F., & Adriaanse, H. (1992). In search of factors responsible for noncompliance among tuberculosis patients in Wardha District, India [Erratum appears in *Social Science & Medicine*, 1992 June, *34*(11), II]. *Social Science and Medicine, 34*(3), 291–306.

Bennstam, A. L., Strandmark, M. & Diwan, V. K. (2004). Perception of tuberculosis in the Democratic Republic of Congo: wali ya nkumu in the Mai Ndombe district. *Qualitative Health Research*; 14: 299–312

Bernatas, J. J., Ali, I. M., Ismael, H. A., Matan, A. B. & Aboubakar, I. H. (2003). Decentralisation of directly observed treatment in a large African city: evaluation of the experience of Djibouti. *International Journal of Tuberculosis and Lung Disease*, 7:724-729.

Bird, C. E., & Rieker, P.P. (2008). Gender and Health, Effects of Constrained Choices and Social Policies, Cambridge, UK: Cambridge University Press.

Borgdorff, M. W. Nagelkerke, N. J. D. Dye, C. Nunn P. (2000). Gender and tuberculosis: a comparison of prevalence surveys with notification data to explore sex differences in case detection *International Journal of Tuberculosis and Lung Disease*; 4(2):123–132

Bottorff, J. L., Oliffe, J. L., Robinson, C. A. & Carey, J. (2011). Gender relations and health research: A review of current practices. *International Journal of Equity Health,* 12.1186/1475-9276-10-60

Bottorff, J. L., Oliffe, J. L., Kalaw, C., Carey, J. & Mroz, L. (2006). Men's constructions of smoking in the context of women's tobacco reduction during pregnancy and postpartum. *Social Science & Medicine,* 62:3096-3108.

Bovet, P., Burnier, M., George, M.,Waeber, B., & Paccaud F. (2002). Monitoring one-year compliance to anti-hypertension medication in the Seychelles. *Bulletin of the World Health Organization,* 80:33-39.

Burman, W. J., Cohnm D. L., & Rietmeijer, C. A. (1997). Noncompliance with directly observed therapy for tuberculosis. *Chest*; 111: 1168-73.

Burns, N.B., & Grove, S.K., (2005). The practice of nursing research: Conduct, critique, and utilization. 5th edition. St Louis: Elsevier/Saunders.

Byakika-Tusiime, J., Oyugi (2005). Adherence to HIV antiretroviral therapy in HIV+ Ugandan patients purchasing therapy. *International Journal of Sexually Transmitted Diseases, AIDS 16(1) 38-41*

Cambanis, A., Ramsay, A., Yassin, M. A., & Cuevas, L. E. (2007). Duration and associated factors of patient delay during tuberculosis screening in rural Cameroon. *Tropical Medicine of International Health*; 12: 1309–14.

Centers for Disease Control and Prevention (2000). Core curriculum on tuberculosis: What the clinician should know (4th edition.). Atlanta, GA: US Department of Health and Human Services

Champion, V. L. (1984). Instrument development for health belief model constructs. *Advances in Nursing Sciences,* 6, 73-85

Chan-Yeung, M., Noertjojo, K., Chan, S. L., & Tam, C. M. (2002). Sex differences in tuberculosis in Hong Kong. *International Journal of Tuberculosis and Lung Disease,* 6:11-18.

Chesney, M. (2003). Adherence to HAART regimens. *AIDS Patient Care STD*S. 17:169–77.

Claxton, A. J., Cramer, J., & Pierce, C. (2001). A systematic review of the associations between dose regimens and medication compliance. *Clinical Therapy;* 23(8):1296-3100

Connell, R. W. (1987). *Gender and Power*. Stanford, CA, Stanford University Press.

Connell, R. W. *The Men and the Boys*. (2000). Cambridge: Polity Press;

Connell, R. W. & Messerschmidt, J. W. (2005). Hegemonic masculinity: rethinking the concept. *Gender & Society*, 19:829-859.

Connell, J. W. *Gender*. (2009). *In World Perspective*. Cambridge: Polity Press.

Conner, M. & Norman, P. (1996). Body weight and shape control: examining component behaviours, *Appetite,* 27, 135–50.

Connolly, M., and Nunn, P. (1996). Women and tuberculosis. *World Health Statistics Quarterly, 49*(2), 115–119.

Coreil, J., Lauzardo, M. & Heurtelou, M. (2004). Cultural feasibility assessment of tuberculosis prevention among persons of Haitian origin in South Florida. *Journal of Immigration Health*; 6: 63–9.

Courtenay, W. H. (2000). Constructions of masculinity and their influence on men's well-being: a theory of gender and health. *Social Science and Medicine*, 50:1385-1401.

Cramer, J. A., Roy, A., Rurrell, A., Fairchild, C. J., Fuldeore, M. J., Ollendorf, D. A. & Wong, P. K. (2008). Medication Compliance and Persistence: Terminology and Definitions. Value in Health 11, 1, *International Society for Pharmacoeconomics and Outcomes Research* (ISPOR)

Culqui, D. R., Munayco, C. V. E., Carlos G. Grijalva, C. G., Joan A. Cayla, J. A., Horna-Campos, O., Kenedy Alva Ch., Luis A. & Suarez L. A. O., (2012). Factors Associated With the Non-completion of Conventional Anti-Tuberculosis Treatment in Peru. *Arch Bronconeumol*. 2012;48 (5):150–155

Daftary, A., (2011). Integrating Patients into Integrated Healthcare: Perspectives from Individuals Coinfected with Tuberculosis and HIV. An unpublished doctoral thesis

Daniel, O. J., Oladapo, O.T., & Alausa O.K. (2006). Default from treatment programme in Sagamu, Nigeria, *Nigeria Journal of Medicine*; 15 (1): 63-67.

Daniel, O. J. & Alausa, O. K. (2006). Treatment outcome of TB/HIV positive and TB/HIV negative patients on directly observed treatment, short course (DOTS) in Sagamu, Nigeria. *Nigeria Journal of Medicine* 15(3): 222-6

Daniel, T. M. (1997). *Captain of death: The story of tuberculosis*. Rochester, NY: University of Rochester Press.

Daniel, T. M. (2000). The origins and precolonial epidemiology of tuberculosis in the Americas: Can we figure them out? *International Journal of Tuberculosis & Lung Disease, 4*(5), 395– 400.

Davidson, K. W., Kitzinger, J., & Hunt, K. (2006). The wealthy get healthy, the poor get poorly? Lay perceptions of health inequalities. *Social Science and Medicine*, 62(9), 2171-2182

Davis, A. L. (2000). A Historical Perspective on Tuberculosis and its Control. In L. B. Reichman and E. S. Hershfield (Eds.), *Tuberculosis: A comprehensive international approach* (43–54. New York: Marcel Dekker.

Dean, G. L., Edwards, S. G., Ives, N. J., Matthews, G., Fox, E. F., Navaratne, L., Fisher, M., Taylor, G. P., Miller, R., Taylor, C. B., de Ruiter, A., & Pozniak, A. L. (2002). Treatment of tuberculosis in HIV-infected persons in the era of highly active antiretroviral therapy. *AIDS* 4;16 (1):75-83.

Demissie, M. & Kabede, D. (1994). Defaulting from tuberculosis treatment at the Addis Ababa TB Centre and factors associated with it, *Ethiopian Medical Journal*, 32(2): 97-106

Demyttenaere, K. (1998). Noncompliance with antidepressants: who's to blame? *International Clinical Psychopharmacology*, 13 (Supplementary 2):S19-S25.

Denton, M., Prus, S. & Walters, V. (2004). Gender Differences in Structural and Behavioural Determinants of Health: An Analysis of the Social Production of Health: *Social Science and Medicine*. 48: 1221 - 1235

Dhingra, V. K., & Khan, S. (2009). A Sociological Study on Stigma among TB Patients In Delhi, *Indian Journal of Tuberculosis*. 57(1): 12-8.

Dick, J., & Schoeman, J. H. (1996). Tuberculosis in the community: The perceptions of members of a t uberculosis a voluntary health worker programme. *Tubercle & Lung Disease, 77*(4), 380–383.

DiMatteo, M. R. (2004). Variations in patients' adherence to medical recommendations: a quantitative review of 50 years of research. *Medical Care* 42:200-9.

Diwan, V. K., & Thorson, A. (1999). Sex, gender, and tuberculosis. Lancet. 353 (9157): 1000-1.

Dodor, E. A. (2009). An exploration of the causes and manifestations and consequences of tuberculosis stigma in an urban district in Ghana. An unpublished PhD dissertation

Dodor, E. A., & Afenyandu, G.Y. (2005). Factors associated with tuberculosis treatment default and completion at Effia-Nkwanta Regional Hospital in Ghana, *Transnational Royal Society of Tropical Medical Hygiene*, 99(11): 827-832.

Dodor, E. A., Neal, K. & Kelly, S. (2008). An exploration of the causes of tuberculosis stigma in an urban district in Ghana, *International Journal of Tuberculosis and Lung Disease*; 12(9):1048-54.

Dolin, P. (1998). Tuberculosis epidemiology from a gender perspective. In: Diwan VK, Thorson A, Winkvist A, eds. *Gender and tuberculosis*. Göteborg, The Nordic School of Public Health, 20-40.

Donovan, J. L., & Blake, D. R. (1992). Patient non-compliance: Deviance or reasoned decision-making? *Social Science & Medicine, 34*(5), 507–513.

Doyal, L. (2002). Sex, gender and the 10/90 gap in health research: a briefing document and resource guide. Geneva, Global Forum for Health Research Retrieved from (http://www.globalforumhealth.org/pages/index.asp)

Dubos, R., & Dubos, J. (1952). The white plague: Tuberculosis, man, and society. New Brunswick, NJ: Rutgers University Press.

Eastwood, S.V. and Hill, P.C (2004). A gender-focused qualitative study of barriers to accessing tuberculosis treatment in The Gambia, West Africa. *International Journal of Tuberculosis and Lung Disease*; 8(1): p. 70-5.

Edginton, M.E., Sekatane, C.S., & Goldstein, S.J. (2002). Patients' beliefs: Do they affect tuberculosis control? A study in a rural district of South Africa. *International Journal of Tuberculosis and Lung Disease, 6,* 1075-1082.

Emslie, C., Ridge, D., Ziebland, S., & Hunt, K. (2006). Men's accounts of depression: reconstructing or resisting hegemonic masculinity? *Social Science & Medicine*, 62:2246-2257.

Fair, E., Islam, A., & Chowdhury, S. (1997). Tuberculosis and gender: treatment seeking behavior and social beliefs of women with tuberculosis in rural Bangladesh. Dacca, BRAC. No. 1.

Farmer, P. (1999). Infections and inequalities: the modern plagues. Los Angeles, CA, University of California Press.

Feinstein, A. R. (1990). On the white coat effect and the electronic monitoring compliance. *Archives of Internal Medicine*: 150; 1377 - 8

Fochsen, G. K., Deshpande, & Thorson, A. (2006). Power imbalance and consumerism in the doctor-patient relationship: health care providers' experiences of patient encounters in a rural district in India. *Qualitative Health Research*, 16(9): pages 1236-51.

Ganapathy, S., Thomas, B. E., Jawahar, M. S., Selvi, K. J., Sivasubramaniam, & Weiss, M. (2008). Perceptions of gender and tuberculosis in a south Indian urban community. *Indian Journal of Tuberculosis*; 55:914.

Getahun, H., & Aragaw, D. (2001). Tuberculosis in rural northwest Ethiopia: community perspective. *Ethiopian Medical Journal*, 39:283-291.

Ghana Demographic and Health Survey (2008). ICF Macro Calverton, Maryland, U.S.A. Retrieved from dhsprogram.com/pubs/pdf/FR221/FR221%5B13Aug2012%5D.pdf

Ghana Health Service, (2007). Implementation of TB/HIV Collaborative activities in Ghana: Technical Policy and Guidelines

Ghana Health Service, (2009). Health Sector Gender Policy, Ministry of Health, Republic Ghana, ISBN – 978-9988-1-2170-9

Ghana Health Service, (2010). The Health Sector in Ghana: Facts and Figures; Retrieved from www.moh-ghana.org

Ghana Health Service, (2013). Ghana Health Service official website: www.ghanahealthservice.org

Ghana Statistical Services, (2010). Population and Housing Census. Retrieved from www.statsghana.gov.gh/docfiles/.../National_Analytical_Report

Ghana Statistical Services (2012) Population and Housing Census. Retrieved from www.statsghana.gov.gh › Feb 14, 2013 - Producer(s), Ghana Statistical Service - Ministry of Finance and Economic Planning.

Ghana Statistical Services (2013). Population and Housing Census. Retrieved from www.gh.undp.org/.../ghana/.../UNDP_GH_

Godfrey-Faussett, P., Kaunda, H., Kamanga, J., van Beers, S., & van Cleeff, M. (2002). Why do patients with a cough delay seeking care at Lusaka urban health centres? A health systems research approach. *International Journal of Tuberculosis and Lung Disease,* 6:796-800.

Gosoniu, G. D., Ganapathy, S., Kemp, J., Auer, C., Somma, D., Karim, F., & Weiss, M. G. (2008). Gender and socio-cultural determinants of delay to diagnosis of TB in Bangladesh, India and Malawi. *International Journal of Tuberculosis and Lung Disease,* 12(7): 848-855.

Government of Ghana official portal: www.ghana.gov.gh (retrieved 20/01/2014)

Graham, M. E. (2002). Health Belief and self-breast examination in black women. *Journal of Cultural Diversity*, 9(2), 49-54

Grant RW., Devita NG., Singer, DE. & Meigs JB. (2

Greaves, L. (2012). Why put gender and sex in health research? In *Designing and Conducting Gender, Sex, and Health Research*. Edited by Oliffe, J. L., & Greaves, L. Thousand Oaks, California: Sage;3-14.

Greene, J. C. (2007**).** Mixed methods in social inquiry. Jossey-Bass, San Francisco, CA.

Grymonpre, R. E., Didur, C. D., Montgomery, P. R. & Sitar, D. S. (1998). Pill count, self-report, and pharmacy claims data to measure medication adherence in the elderly. *PubMed* 32 (7-8): 749-54.

Gyasi, R. K., Kumoji, R., & Akosa, A. B. (2000). Tuberculosis associated deaths - A comparative autopsy study in Accra, Ghana. *Ghana Medical Journal*; 34:147-151.

Halpin, M., Phillips, M., & Oliffe, J. L. (2009). Prostate cancer stories in the Canadian print media: representations of illness, disease and masculinities. *Sociology of Health & Illness*, 31:155-169.

Hamid Salim, M. A., E. Declercq, A. Van Deun, & Saki, K. A. R. (2004). "Gender differences in tuberculosis: a prevalence survey done in Bangladesh." *International Journal of Tuberculosis and Lung Disease*. 8(8): 952-957

Haynes, R. B. (2001). Interventions for helping patients to follow prescriptions for medications. Cochrane Database of Systematic Reviews

Haynes, R. B. (1979). Determinants of Compliance: The disease and the mechanics of treatment. Baltimore MD, John Hopkins University Press

Hesse, I. F. A., & Neequaye, A. R. (2003). HIV infection in pulmonary tuberculosis patients admitted to the Korle Bu Teaching Hospital, Accra, Ghana in 1996-1997. *Ghana Medical Journal*; 37(1):7-11.

Hoa, N. P., Thorson, A. E. K., Long, N. H. & Diwan, V. K. (2003). Knowledge of tuberculosis and associated health-seeking behaviour among rural Vietnamese adults with a cough for at least three weeks. *Scandinavian Journal of Public Health, 62 (Supplementary).*

Holmes, C. B., Hausler, H., & Nunn, P. (1998). A review of sex differences in the epidemiology of tuberculosis. *International Journal of Tuberculosis & Lung Disease, 2*(2), 96–104.

Hudelson, P. (1996). "Gender Differentials in Tuberculosis: The Role of Socio-economic and Cultural Factors." *Journal of Tubercle and Lung Disease* 77(5): 391–400.

Ingersoll, K. S., & Cohen, J. (2008). The impact of medication regimen factors on adherence to chronic treatment: a review of literature. *Journal of Behavioural Medicine 31 (3):213-24*

Institute of Medicine, (2000). Ending neglect: The elimination of tuberculosis in the United States. Washington, DC: *National Academy Press*

Jackson, L. & Yuan, L. (1997). Family physicians managing tuberculosis. Qualitative study of overcoming barriers. *Canadian Family Physician.*;43:649–55.

Jaggarrajamma, K., Ramchandran, R., Charles, N., Chandrasekaran, V., Muniuandi, M., & Ganapathy, S. (2008). Psychosocial dysfunction: Perceived and enacted stigma among tuberculosis patients registered under RNTCP. *Indian Journal of Tuberculosis*; 55: 179-187.

Jaiswal, A., Singh, V., Ogden, J. A., Porter, J. D., Sharma, P. P., Sarin, R., Arora, V. K., & Jain, R. C. (2003). Adherence to tuberculosis treatment: lessons from the urban setting of Delhi, India. *Tropical Medicine in International Health*; 8(7):625-33

Jaramillo, E. (1999). Tuberculosis and stigma predictors of prejudice against people with tuberculosis. *Journal of Health Psychology*, *4*, 71-79.

Jay, S., Litt, I. F., & Durant, R. H. (1984). Compliance with therapeutic regimens. *Journal of Adolescent Health Care*. 5:124–36.

Johansson, E., Long, N. H., Diwan, V. K., & Winkvist, A. (1999). Attitudes to compliance with tuberculosis treatment among women and men in Vietnam. *International Journal of Tuberculosis and Lung Disease, 3*(10), 862–868.

Johansson, E. Long, N. H., Diwan, V. K., & Winkvist, A. (2000). Gender and tuberculosis control: perspectives on health seeking behaviour among men and women in Vietnam. *Health Policy* 52:33-51.

Johansson, E. & Winkvist, A. (2002). Trust and transparency in human encounter in tuberculosis control: Lesson learned from Vietman. *Qualitative Health Research 12: 473-491*

Johnson, B., & Turner, L. A. (2003). Data collection strategies in mixed methods research. In Tashakkori, and C. Teddlie (Eds.), Handbook of mixed methods in social and behavioural research (p. 297 – 319). Thousand Oaks, CA: Sage.

Johnson, J. L. & Oliffe, J. L. (2012). Gender and community health. In *Community Health Nursing: A Canadian perspective*. Toronto, Canada: Pearson: 300-310.

Johnson, J. L., Greaves, L., & Repta, R. (2009). Better science with sex and gender: facilitating the use of a sex and gender-based analysis in health research. *International Journal for Equity in Health*, 8:1-11.

Kamel, M. I., Rashed, S., Foda, N., Mohie, A. & Loutfy, M. (2003). Gender differences in health care utilization and outcome of respiratory tuberculosis in Alexandria. *Eastern Mediterranean Health Journal, 9(4), 741-756*

Karim, F., Islam, A., Chowdhury, A. M. R., Johansson E., & Diwan V.K., (2007). Gender differences in delays in diagnosis and treatment of tuberculosis. *Health Policy & Planning* 22, 329-334.

Karim, F., Begum, I., Islam K., & Chowdhury A. (2003). Gender Barriers to tuberculosis control:Fade-out or in? Key findings and recommendations from the preliminary analysis. BRAC Centre 75, Mohakahli Dhaka 1212, Bangladesh.

Kaona, F.A.D., Tuba, M. Siziya, S., & Sikaona, S. (2004). An assessment of factors contributing to treatment adherence and Knowledge of TB transmission among patients on TB treatment *BMC Public Health 29*;4:68.

Karim, F., Islam, A., Chowdhury, A. M. R., Johansson E., & Diwan V.K., (2007). Gender differences in delays in diagnosis and treatment of tuberculosis. *Health Policy & Planning* 22, 329-334.

Karim, F., Begum, I., Islam K., & Chowdhury A. (2003). Gender Barriers to tuberculosis control:Fade-out or in? Key findings and recommendations from the preliminary analysis. BRAC Centre 75, Mohakahli Dhaka 1212, Bangladesh.

Kawachi, I., Kennedy, B. P., Gupta, V. & Prothrow-Smith, D. (1999). Women's status and the health of women and men: a view from the States, *Social Science and Medicine*, 48(1): 21–32.

Khan, M. S., M. S. Khan, C. Sismanidis & P. Godfrey-Faussett (2012). "Factors influencing sex differences in numbers of tuberculosis suspects at diagnostic centres in Pakistan." *International Journal of Tuberculosis and Lung Disease* 16(2): 172 – 177.

Kiwuwa, M.S., Charles, K. & Harriet, M. K. (2005). Patient and health service delay in pulmonary tuberculosis patients attending a referral hospital: a cross-sectional study. *Biomed Central Public Health*; 5: 122.

Koch, R., Nobel Lecture. (1905). Noble Prize website: www.nobleprize.org

Laine, C., Newschaffer, C. J., Zhang, D., Cosler, L., Hauck, W. W. & Turner, B. J. (2000). Adherence to antiretroviral therapy by pregnant women infected with Human Immunodeficiency Virus: A pharmacy claims-based analysis. Obstetrics and Gynecology. 95:167–173

Lawn, S. D., (2000). Tuberculosis in Ghana: social stigma and compliance with treatment. *International Journal of Tuberculosis and Lung Disease,* 4**,** 1190-1191.

Lerner, B. H. (1997). From careless consumptives to recalcitrant patients: the historical construction of noncompliance. *Social Science & Medicine,* 45; 9;1423-1430.

Liefooghe, R., Baliddawa, J. B., Kipruto, E. M., Vermeire, C., & Munynck, A. O. (1997). From their own perspective. A Kenyan community's perception of tuberculosis. *Tropical Medicine and International Health, 2*(8), 809–821.

Litt I. F. & Cuskey W. R. (1980). Compliance with medical regimens during adolescent. Pediatrician Clinic North America: 27: 3 -15. In Jay S, Litt I. F. and Durant H. (1984). Compliance with Therapeutic Regimens. Journal of Adolescent Health Care; 5: 124 – 136. *Elsevier Science Publishing Company. New York*

Llongo, I. (2004). Tuberculosis Health Beliefs gaps and suspected tuberculosis cases in New York City. *International Journal of Clinical and Health Psychology* 4(1) 69-90

Long, N. H., Johansson, E., Diwan, V. K., & Winkvist, A. (1999). Different tuberculosis in men and women: Beliefs from focus groups in Vietnam. *Social Science and Medicine, 49,* 815–822.

Long, N .H. (2000). Gender specific epidemiology of tuberculosis in Vietnam (Unpublished dissertation). Stockholm, Karolinska Institute.

Long, N. H., Johansson, E., Diwan, V.K. & Winkvist, A. (2001). Fear of Social Isolation as consequences of tuberculosis in Vietnam: a gender analysis. *Health Policy*, 58(1): 69-81).

Lyons, A.C. (2009). Masculinities, femininities, behaviour and health. *Social and Personality Psychology Compass*, 3:394-412.

Maamari, F. (2008). Case-finding tuberculosis patients: diagnostic and treatment delays and their determinants. *East Mediterranean Health Journal*;14:531–45.

Macq, J.C.M., Theobold, S. Dick, J., & Dembele, M. (2003). An exploration of the concept of directly observed treatment (DOT) for tuberculosis patients: from a uniform to a customised approach. *International Journal of Tuberculosis and Lung Disease,* **7**(2): 103-109.

Mahalik, J. R., Burns, S.M., Syzdek, M. (2007). Masculinity and perceived normative health behaviors as predictors of men's health behaviors. *Social Science & Medicine*, 64:2201-2209.

Mahendradhata, Y., Lambert, M. L., Van Deun, A., Matthys, F., Boelaert, M. & Van der Stuyft, P. (2003). Strong general health care systems: a prerequisite to reach global tuberculosis control targets. *International Journal of Health Planning and Management* 18 (Supplementary 1): S53–S65

Makombe, S. D., Harries, A. D., Yu, J. K., Hochgesang, M., Mhango, E., Weigel, R., Pasulani, O., Fitzgerald, M., Schouten, E. J., & Libambia, E. (2007). Outcomes of tuberculosis patients who start antiretroviral therapy under routine programme conditions in Malawi. *International Journal of Tuberculosis and Lung Disease* 11(4):412-6.

Malterud, K. (2001). Qualitative research: standards, challenges, and guidelines. Lancet, 358: 483-488

Markowitz, A. J. & Winawer, S. J. (1999). Screening and surveillance for colorectal cancer. Seminars in Oncology, 26:485-498.

Mays, N. & Pope, C. (2000). Qualitative research in health care: Assessing quality in qualitative research. *British Medical Journal*, 320: p. 50-52.

McCromick Brown, K. (1999). Health Belief Model. Retrieved from http://hsc.usf/~kmbrown/health_Belief_Model_Overview.htm.

Meisel, P. (2002). Letter to the Editor: Cancer, Genes and Gender. Carcinogenesis, 23, 1087-1088.

Meulemans, H., Mortelmans, D. & Liefooghe, R. (2002).The limits to patient compliance with directly observed therapy for tuberculosis: a socio-medical study in Pakistan. *International Journal of Health Planning and Management*; 17:249-267

Morankar, S. & Weiss, M. G. (2003). Impact of gender on illness experience and behaviour: implications for tuberculosis control in rural Maharashtra. *Health Administrator, 15:149-155*

Munseri, P. J., Talbot, E. A., Mtei, L., Von Reyn, C.F. (2008). Completion of isoniazid preventive therapy among HIV-patients in Tanzania. *International Journal of Lung Disease.* 12(9) 1037-1041

Murray, C. J. L. & Lopez, A., (1996). The Global Burden of Disease. Geneva, World Health Organization.

Naidoo, P., Dick, J., & Cooper, D. (2009). Exploring tuberculosis patients' adherence to treatment regimens and prevention programs at a public health site. *Qualitative Health Research,* 19: 55-70.

Nair, D. M., George, A. & Chacko, K. T. (1997). Tuberculosis in Bombay: new insights from poor urban patients. *Health Policy and Planning*, 12:77-85.

National Tuberculosis Control Programme (NTP) - Ghana (2004). Annual Report: National Tuberculosis Control Programme. Accra, Ghana Health Service.

National Tuberculosis Control Programme (NTP) -Ghana (2006). Managing tuberculosis in Ghana: A training course, Accra: Ghana, Ghana Health Service-National Tuberculosis Control Programme.

National Tuberculosis Control Programme (NTP) -Ghana (2011). Monitoring and Evaluation Report Ghana Health Service (GHS)

National Tuberculosis Control Programme (NTP) - Ghana (2012). NTP Training Manual: Ghana Health Service

National Tuberculosis Control Programme (NTP) - Ghana (2014). World Tuberculosis Day celebration Report

Needham, D.M., Foster, S.D., Tomlinson, G., & Godfrey-Faussett, P. (2001). Socio-economic, gender and health services factors affecting diagnostic delay for tuberculosis patients in urban Zambia. *Tropical Medicine and International Health*, 6:256-259. New York City Department of Health (1999). *Clinical policies and protocols.*

Ngamvithayapong J, Uthaivoravit W, Yanai H, Akarasewi P, Sawanpanyalert P. (1997). Adherence to tuberculosis preventive therapy among HIV-infected persons in Chiang Rai, Thailand. AIDS 11(1):107-12

Ngamvithayapong, J., Petchawan, P., & Yanai, I. I. (1998). Compliance to tuberculosis: A gentler perspective, in: Diwan VK, Thorson A and Winkvist (Eds), *Gender and tuberculosis*. N.Y. The Nordic School of Public Health. 127-148.

Nicas, M., Nazaroff, W. W., & Hubbard, A. (2005). "Toward understanding the risk of secondary airborne infection: emission of respirable pathogens," *Journal of Occupational and Environmental Hygiene*, 2;3: 143–154,

Ogden, J., Rangan, S., & Lewin, S. (1999). Tuberculosis control in India: a state-of-the-art review. Bombay. *The Foundation for Research in Community Health and London*, London, School of Hygiene and Tropical Medicine: pp 22.

Oliffe, J. L., Grewal, S., Bottorff, J. L., Dhesi, J., Kang, H. B. K., Ward, A., & Hislop, T.G. (2010). Masculinities, diet, and senior Punjabi Sikh immigrant men: food for western thought? *Sociology of Health & Illness*, 32:761-776.

Onifade, D. A., Bayer, A. M., Montoya, R., Haro, M., Alva, J., Franco, J., Sosa, R., Valiente, B., Valera, E., Ford, C. M., Acosta, C. D. & Evans, C. A. (2010). Gender-related factors influencing tuberculosis control in shantytowns: a qualitative study. BioMed Central Public Health. doi: 10.1186/1471-2458-10-381PMCID: PMC2910677

Ott, K. (1996). Fevered lives: Tuberculosis in American culture since 1870. Cambridge, MA: Harvard University Press.

Patton, M. Q. (2002). Qualitative research & evaluation methods (3rd edition.). Thousand Oaks, CA: Sage.

Promtussananon, S., & Peltzer, K. (2005) Perceptions of tuberculosis: attributions of cause, suggested means of risk reduction., and preferred treatment in the Limpopo province, South Africa. *Journal of Health Population and Nutrition*. 23(1): 74-81.

Pungrassami, P., Kipp, A. M., Nailmanat, K., Sengupta, S., Poole, C., Strauss, R. P., Chonguvivatwong, V. & Van Rie, A. (2008). Socio-demographic and AIDS-related associated with tuberculosis stigma in Southern Thailand: a quantitative, cross-sectional study of stigma among patients with TB and healthy community members. *BMC Public Health. 10.1186/1471-2458-11-675*

Rand, C. S. (1990). Issues in the measurement of adherence. In Sumakere S. A., Schronj B., Ockenec K., Parker T., Probste J. L. and Wolle D. J. M. (Eds). *The handbook of health behaviour change.* 102–110. New York Springer

Redding, C.A., Rossi, J. S., Rossi, S. R., Velicer, W. F., Prochaska, J. O. (2000). Health behaviour models. *International Electro Journal of Health Education.* **3**:180–193. Retrieved from http://www.oiiq.org/SanteCoeur/docs/redding_iejhe_vol3_nospecial_2000.

Reid, D., Abramson, M., Raven, J., & Walters, H. E., (2000). Management and treatment perceptions among young adults with asthma in Melbourne: the Australian experience from the European Community Respiratory Health Survey. *Respirology*;5:281-7.

Rhines, A. S., (2013). The role of sex differences in the prevalence and transmission of tuberculosis. *Tuberculosis* 93: 104 - 107.

Rintiswati**, N.,** Mahendradhata, Y.**,** Suharna**,** Susilawati**,** Purwanta**,** Subronto**, Y.,**CM Varkevisser**, C.** M. & van der Werf**,** M. J. (2009**).** Journeys to tuberculosis treatment: a qualitative study of patients, families and communities in Jogjakarta, Indonesia. *BMC*. Public Health, 9: page 158.

Rocha, M., Pereira, S., Ferreira, L., & Barros, H. (2003). The role of adherence in tuberculosis HIV- positive patients treated in ambulatory regimen. *European Respiratory Journal;* 21(5):785-8

Rolfe, A., Orford, J., & Dalton, S. (2009). Women, alcohol and femininity: a discourse analysis of women heavy drinkers' accounts. *Journal of Health Psychology*, 14:326-335.

Rosenstock, I. M., Strecher, V. J., & Becker, M. H. (1988). Social Learning Theory and the Health Belief Model. *Health Education Behaviour*, 15(2), 175-183

Rowe, K. A., Makhubele, B., Hargreaves, J. R., Porter, J. D., Hausler, H. P., Pronyk, P. M. (2005). Adherence to TB preventive therapy for HIV-positive patients in rural South Africa: implications for antiretroviral delivery in resource-poor settings? *International Journal of Tuberculosis and Lung Disease* 9(3):263-9

Rubin, A., Babbie, E., & Lee, P. A. (2008). Research methods for social work: Custom Edition prepared exclusively for San Jose State University. Belmont, CA: Wadsworth/Thomson Learning.

Ryan, F. (1993). The forgotten plague: How the battle against tuberculosis was won—and lost. (1st edition.). Boston: Little, Brown.

Sanou, A., Dembele, M., Theobald, S., & Macq, J. (2004). Access and adhering to tuberculosis treatment: barriers faced by patients and communities in Burkina Faso**.** *International Journal of Tuberculosis and Lung Disease* 8(12):1479-83

Scambler, G. (1998). Stigma and disease: Changing paradigms. Lancet, 352, 1054 – 1055.

Schofield, T., Connell, R. W., Walker, L., Wood, J. F & Butland, D. L. (2000). Understanding men's health and illness: a gender-relations approach to policy, research, and practice. *Journal of American College Health*, 48:247-256.

Seale, C., Gobo, G., Gubrium, J. E., & Silverman, D. (2004). Introduction: Inside qualitative research. In Seale, C., Gobo, G., Gubrium, J. E., and Silverman, D. (Eds.), *Qualitative research practice* (pp. 1 -11). London: Sage.

Somma, D., Auer, C., Abouihia, A., & Weiss, M. G. (2005). Gender in tuberculosis research. Geneva, Switzerland: WHO.

Somma, D., Thomas, B. E., Karim, F., Kemp, J., Arias, N., Auer, C., Gosoniu, G. D., Abouihia, A. & Weiss, M. G. (2008). Gender and socio-cultural determinants of TB-related stigma in Bangladesh, India, Malawi and Colombia [Special section on gender and TB]. *International Journal of Tuberculosis and Lung Disease*, 12**,** 856-866.

Stein, M. D., Rich, J.D., Maksad, J., Chen, M. H., Hu, P., Sobota, M., & Clarke, J. (2000). Adherence to antiretroviral therapy among HIV-infected methadone patients: effect of ongoing illicit drug use. *American Journal of Drug Alcohol Abuse*. 26:195–205

Stommel, M., & Wills, C. 2004. Clinical research. Concepts and principles for advanced practice nurses. Philadelphia: Lippincott, Williams & Wilkins.

Strebel, A., Crawford, M., Shefer, T., Cloete, A., Henda, N., Kaufman, M., Simbayi, L., Magome, K. & Kalichman, S. (2006). Social constructions of gender roles, gender-based violence and HIV/AIDS in two communities of the western cape, South Africa. *Journal of Social Aspects of HIV/AIDS*, 3:516-528.

Suhadev, M., Ganapathy, S., Sivasubramaniam, S., & Santha Devi, T. (1995). A retrospective study of "non-compliant" patients in controlled trials of short course chemotherapy. *Indian Journal of Tuberculosis* 42: 221-225.

Sumartojo, F. (1993). When tuberculosis treatment fails; A social behavioral account of patient adherence. *American Review of Respiratory Disease*, 147, 1311-1320.

Suri, A., Gan, K., & Carpenter, S. (2007). Voices from the field: perspectives from community health workers on health care delivery in rural KwaZulu-Natal, South Africa. *Journal of Infectious Disease*; 196 (Supplementary 3): S 505–11

Tandon, M., Gupta, M., Tandon, S., & Gupta, K. B. (2002). DOTS versus Self Administered Therapy (SAT) for patients of pulmonary tuberculosis: a randomized trial at a tertiary care hospital. *Indian Journal of Medical Science*; 56: 19-21.

The Stop TB Partnership (2003). *TB and Women.* [Web site] Geneva, Switzerland. Retrieved from: http://www.stoptb.org/tuberculosis/tb.women.html.

The Stop TB Strategy. (2006). building on and enhancing DOTS to meet the TB- related Millennium Development Goals. Geneva, World health organisation, (Who/hTM/TB/2006.368).

Thorson, A., Hoa, N. P., Long, N. H., Allebeck, P., & Diwan, V. K. (2004). Do women with tuberculosis have a lower likelihood of getting diagnosed? Prevalence and case detection of sputum smear positive pulmonary TB, a population-based study from Vietnam. *Journal of Clinical Epidemiology; 57:398–402.*

Thorson, A., Hoa, N. P., & Long, N. H. (2000). Health-seeking behaviour of individuals with a cough for more than 3 weeks Lancet; 356:1823-24

Thorson, A., & Diwan, V. K. (2001). Gender inequalities in tuberculosis aspects of infection, notification rates, and compliance: *Current opinion on Pulmonary Medicine* 7: 165 -169

Thorson, A., & Johansson, E. (2004). Equality or equity in health care access: a qualitative study of doctors' explanations to a longer doctor's delay among female TB patients in Vietnam. *Health Policy*; 68: pages 37–46.

Thorson, A., & Long, N. H. (2001). Health-seeking behaviour for cough – authors' reply. Lancet, 357:1533.

Timmr eck, T. C., & Randolph, J. F. (1993). Smoking cessation: clinical steps to improve compliance. *Geriatrics*, 48:63–66.

Umeh, K., & Rogan-Gibson, J. (2001). Perceptions of threat, benefits and barriers in breast self-examination among young asymptomatic women. *British Journal of Health Psychology* 6(4) 361 371)

Uplekar, M., Rangan, S., & Ogden, J. (1999). Gender and tuberculosis control: towards a strategy for research and action. Geneva, World Health Organization (WHO/CDS/TB/2000.280).

Uplekar, M. W., Rangan, S., Weiss, M. G., Ogden, J., Borgdorff, M. W., & Hudelson, P. (2001). Attention to gender issues in tuberculosis control. *International Journal of Tuberculosis and Lung Disease*, 5:220–224

Urquhart, J. (1996). Patient non-compliance with drug regimens: measurement, clinical correlates, economic impact**.** *European Heart Journal***;** 17 Supplementary A: 8-15

Varkevisser, C .M., Pathmanathan, I., & Brownlee, A. (2003). Designing and Conducting Health Systems Research Projects Volume I: Proposal Development and Fieldwork KIT Publishers Mauritskade 63, 1090 HA Amsterdam, the Netherlands publishers@kit.nl/www.kit.nl

Verbrugge, L. (1985). Gender and health: an update on hypotheses and evidence. *Journal of Health and Social Behavior* 24, 16 - 30.

Wang**,** J., Yang Fei, Y., Shen, H., & Xu, B. (2008). Gender difference in knowledge of tuberculosis and associated health-care seeking behaviors: a cross-sectional study in a rural area of China. *BMC; Public Health* 2008, 8:354

Walia, K. (2002). Current Issues in HIV/TB co-infection Symposium on HIV& TB *Indian Journal of Tuberculosis;* 49, 21

Walsh, D.C., Sorensen, G., Leonard, L., (1995). Gender, health and cigarette smoking. In: Amick, B., Levine, S., Tarlov, A. & Chapman-Walsh, D. (Eds.), Society and Health. Oxford University Press.

Watkins, R. E., & Plant, A. J. (2004). Pathways to treatment for tuberculosis in Bali: patient perspectives. *Qualitative Health Research*; 14: 691-703.

Weiss, M. G., Sommerfeld, J., & Uplekar, M. W. (2008). Social and cultural dimensions of gender and tuberculosis. *International Journal of Tuberculosis and Lung Disease* 12(7): 829–830.

Weiss, M. G., Auer, C., Somma, D., Abouihia, A., Kemp, J., Jawahar, M., Fazlul, K., & Arias, N. (2006). Gender and tuberculosis: cross-site analysis and implications of a multi-country study in Bangladesh, India, Malawi and Colombia. Special Programme for Research andTraining in Tropical Diseases (UNICEF/UNDP/World Bank/WHO), TDR/SDR/SEB/RP/06.1. Report series no. 3. Geneva: WHO.

Wingood, G. M., & DiClemente, R. J. (2000). Application of the Theory of Gender and Power to Examine HIV-Related Exposures, Risk Factors, and Effective Interventions for Women

Woith, W., M. & Larson, J. L. (2008). Delay in seeking treatment and adherence to tuberculosis medications in Russia: a survey of patients from two clinics. *International Journal of Nursing Studies*; 45:1163–74.

Wood, W., & Eagly A. H. *(*2010). *Gender* Chapter 17 Retrieved from *dornsife.usc.edu/wendywood/wood.eagly.handbook.2010.pdf*

World Health Assembly (1993). Resolution WHA44.8. Tuberculosis control programme. In: Handbook of resolutions and decisions of the World Health Assembly and the Executive Board. Volume III, 3rd ed. (1985–1992). Geneva, World Health Organization, 1993 (WHA44/1991/REC/1):116.

World Health Organisation Global TB Report, (2014). WHO/HTM/TB/2013.11 Retrieved from www.who.int/tb/data

World Health Organisation Global TB Report, (2013). WHO/HTM/TB/2013.11 Retrieved from www.who.int/tb/data

World Health Organisation (Report 2011) Global Tuberculosis Control, WHO/HTM/TB/2011.16 (NLM classification: WF 300)

World Health Organisation Global tuberculosis Control Report, (2010). Retrieved from www.who.int/tb/data

World Health Organization (2009). Fact sheet no. 334: Women's Health. Online, World Health Organization. retrieved from (http://www.who.int/mediacentre/factsheets/fs334/en/.

World Health Organisation. (2007). Stop TB department and department of HIV/AIDS strategic framework to decrease the burden of TB/HIV Retrieved from .http://www.afro.who.int/strategyimplementation.htm

World Health Organization (2006). The Stop TB Strategy, Building on and enhancing DOTS to women's health 20, Avenue Apia Geneva, Switzerland. meet the TB related Millennium Development Goals, WHO/HTM/STB/2006.37, Geneva, Switzerland

World Health Organization (2005). Gender in tuberculosis research Department of Gender, Women and Health Family and Community Health.

World Health Organization (2004). The Burden of Tuberculosis: Social Burden. Online, World Health Organization. (Retrieved from <http://www.who.int/trade/distance_ learning/gpgh/gpgh3/en/index5.html>)

World Health Organization, (2003a). Gender and tuberculosis. Department of Gender and Women's health 20. Avenue Apia Geneva, Switzerland

World Health Organization, (2003b). Adherence to long-term therapies, Evidence for Action, Chapter 5. (1): 11-18, 145 – 152.

World Health Organization (2002). *Gender and tuberculosis.* Geneva, World Health Organization Retrieved from (http://www.who.int/gender/other_health/en/genderTB.pdf,

World Health Organization, (2001a). Transforming health systems: gender and rights in reproductive health, Retrieved from (http://www.who.int/reproductive-health/gender/glossary.html).

World Health Organization, (2001). Guidelines for social mobilization: A human rights approach to tuberculosis; Retrieved from www.stoptb.org

World Health Organization, (1974). Expert Committee on Tuberculosis Ninth Report. World Health Organization Technical Report Series No. 552. Geneva: ISBN 9241205520

Yamasaki-Nakagawa, M. (2001). *Gender difference in delays to diagnosis and health care seeking behaviour in rural area of Nepal.* International Journal of Tuberculosis and Lung Disease, 5:24-31.

Yeasmin, S. & Rahman, K. F. (2012). 'Triangulation' Research Method as the Tool of Social Research. *BUP Journal*, 1; 1: 2219 - 4851

Xu, B., Fochsen, G., Xiu, Y., Thorson, A., Kemp, J. R., & Jiang, Q. W. (2004). Perceptions and experiences of health care seeking and access to TB care - a qualitative study in Rural Jiangsu Province, China. *Health Policy*, 69**,** 139-149.

Zhang, T., Liu, X., Bromley, H., & Tang, S. (2007). Perceptions of tuberculosis and health seeking behaviour in rural Inner Mongolia, China. *Health Policy*, 81**,** 155-165.

Appendix 1

Informed Consent Form

INFORMATION SHEET

TOPIC: GENDER DYNAMICS AND ADHERENCE TO TUBERCULOSIS TREATMENT IN THE GREATER ACCRA REGION

HANNAH BENEDICTA TAYLOR ABDULAI - PHD STUDENT – SCHOOL OF PUBLIC HEALTH, DEPARTMENT OF SOCIAL AND BEHAVIOURAL SCIENCES, UNIVERSITY OF GHANA, LEGON

Information Sheet for individuals who participating in the research "Gender Dynamics and Adherence to Tuberculosis Treatment in the Greater Accra Region"

This is a PhD research by Hannah Benedicta Taylor-Abdulai (PhD Student – School Of Public Health, Department of Social and Behavioural Sciences, University Of Ghana, Legon)

Purpose of the research:

The thesis aimed at delving into the gender dynamics and adherence to Tuberculosis treatment in the Greater Accra Region.

This is an invitation to you to participate in a study like this, which seeks to find out the factors that affect patients to adhere to TB treatment regimen. The resurgence of TB is a major public health problem in Ghana and the Greater Accra Region is one of the worst affected regions. Currently there are few studies that have been done in the area of socio-behavioural. There has not been any study of this nature in the country. Again, this study is timely since many researchers have called for an in-depth study in gender and tuberculosis.

Procedures involved in the study

The procedures used to elicit responses were administration of questionnaire and in-depth interviews. Respondents were interviewed based on a pre-prepared set of questionnaires and structured interviewed schedule.

Risks and Discomforts:

In terms of risks, there is none. However, you may feel uncomfortable sharing some personal or confidential information with the research team. Or that you may feel uncomfortable talking about some of the topics raised during interview. However, we do not wish this to happen, and you may refuse to answer any question or refuse to answer questions that you feel are personal or just talking about them makes you feel uncomfortable.

Benefits:

There would be no direct benefit to you personally, however, in the near future; the study might inform programmers in the intervention strategies to adopt so that TB would be reduced in the region to the barest minimum.

Incentives:

You will not be provided any incentive to take part in the research. However refreshment and/or transport fare will be provided anytime you are required to make yourself available to the research team in the course of your participation in the study.

Right to refuse or withdraw:

You do not have to take part in this research if you do not wish to do so, and this will not affect you in anyway. Although, this research is going to take place in your health facility,

it would not be linked to your medical records and would therefore not affect your future treatment at the health facility in any way should you refuse or withdraw your participation. You would still have all the benefits that you would otherwise have. You may stop participating in the research at any time that you wish to, without losing any of your rights as a member of this community. Your position in this community would not be affected in any way, even if you decide to stop participating in the research.

Confidentiality:

The information that would be collected from this research would be kept confidential. All information about you that would be collected during the study will be stored in a file which will not have your name on it, but a number assigned to it. There would be total discretion in the handling and management of data collected for the purpose of the study. It would not be divulged to anyone except the research team.

Data Handling and Record Keeping

Any information provided by you would be recorded on a paper and appropriate storage devices. Additionally, the data and record would be kept only by the research team in a safe and appropriate storage device. The information recorded would be deemed confidential, and no one else except the research team will have access to them when working on them.

Who to contact:

If you have questions you may ask them now or later. If you wish to ask questions later, you may contact me on **0244245005; 0208150873:**

Appendix 2

CERTIFICATION OF INFORMED CONSENT

GENDER DYNAMICS AND ADHERENCE TO TUBERCULOSIS TREATMENT IN THE GREATER ACCRA REGION

I, ... of ....., having understood the contents of the attached sheet, after it has been thoroughly explained together with this consent form to me in a language that I have understood. I have had the opportunity to ask questions about it and any question I have asked have been answered to my satisfaction. I consent voluntarily to participate as a respondent/participant in this study and understand that I have the right to withdraw from the study at any time without it affecting my further medical care.

Name of Participant: .....

Sex: ..... Age: .....Date: .....

Signature/Thumbprint of Participant: .....

Name of Witness: .....

Signature/Thumbprint of Witness: .....Date: .....

Name of Interviewer: .....

Signature of interviewer: .....Date:.....

Appendix 3

ASSESSING THE GENDER DYNAMICS AND ADHERENCE TO TUBERCULOSIS TREATMENT IN THE GREATER ACCRA REGION

NAME OF METROPOLITAN/MUNICIPAL..... LOCALITY NAME..... DETAILED ADDRESS OF HOUSE…..... NAME OF FACILITY…..……..... DATE OF INTERVIEW DD MM YY ☐☐☐☐☐☐ TIME SPENT IN MINUTES ☐☐☐	STAGE OF TB TREATMENT INTENSIVE 01 (DO NOT INTERVIEW) CONTINUOUS 02 (GO AHEAD WITH INTERVIEW)

INFORMED CONSENT

Hello. My name is Hannah Benedicta Taylor-Abdulai, a student of University of Ghana, Legon. I am conducting a survey as part of my course on Gender Dynamics and Adherence to Tuberculosis Treatment in the Greater Accra region.

I would very much appreciate your participation in this survey. The interview will take between 45 and 60 minutes to complete. Whatever information you provide will be kept strictly confidential and will not be shown to other persons. Participation in this survey is voluntary and you can choose not to answer any individual question or all of the questions. However, I hope that you will participate in this survey since your views are important. At this time, do you want to ask me anything about the survey?

May I begin the interview now?

Signature of interviewer:…… Date:……

RESPONDENT AGREES TO BE INTERVIEWED.

RESPONDENT DOES NOT AGREE TO BE INTERVIEWED
END

	QUESTIONNAIRE	ID NUMBER:
SECTION 1: BACKGROUND INFORMATION		
01.	How old are you?	Age in complete years: …… Don't know 08
02.	What is your sex?	Female .....01 Male 02
03.	Have you ever attended school?	Yes ……...01 No ……..…….…….....02 If no, skip to question 05

04.	What is the highest level of school you attended:	No Education……..……..00 Primary ……01 Middle/JHS ...…….....02 Secondary/SHS…...…….…….....03 Higher ……..04 Other…….98
05.	Which ethnic group do you belong to?	Akan.....01 Ga/Dangme.....02 Ewe.....03 Guan .....04 Mole-Dagbani .....05 Grussi .....06 Gruma .....07 Hausa .....08 Other ……..…….....98 _____ (SPECIFY)
	SECTION 2: SOCIO-ECONOMIC FACTORS	
06.	Are you currently employed?	Yes…….....01 No……..……02 If no, skip to question 13
07.	What is your employment status	Employee .....01 Self-employed without employees.....02 Self-employed with employees.....03 Unpaid family worker.....04 Apprentice.....05 Domestic employee (house help).....06 Other.....98 _____ (SPECIFY)
08.	Did you have a job before you became ill with TB?	Yes ……01 No ……..……02
09.	If yes: What kind of job did you have then?	I was employed as a …….....01 I had my own work……02
10.	To those with a job: What was the effect of your illness on your job?	It had no effect ……...01 I interrupted my work for……02 Stopped my work up to now ……..03 I lost my job, but found a new one after……04 I lost my job and have no job up to now……..…….....05 Other……98 _____ Specify
11.	To those with a job: Did the six months of getting medication become an obstacle for your work?	Yes…….....01 No……02

12.	Were you the only one in your household who had an income before you had TB?	Yes……01 No……02
13.	In your opinion, were there some people who changed their attitude towards you when they heard that you TB?	Yes……01 No ……02 A little bit……03 Don't know ……08
14.	Did you feel that some people avoided you when you had TB?	Yes……01 No……02 A little bit……03 Don't know……08
15.	What is your monthly income	Indicate the amount…… NA……99
16.	What is your marital status	Single……01 Married……02 Widowed……03 Separated/divorced……04
17.	What kind of accommodation do you live in?	Separate house……01 Semi-detached house……02 Flat/apartment……03 Compound house……04 Hut/building (same compound)……05 Improvised home (kiosk/container)……06 Living quarters attached to office……07 Other……98 _____ (SPECIFY)
18.	How long have you been living continuously in (Name of current place of Residence)? If Less Than one year, Record '00'	☐☐ YEARS Less than one year……00 One year……01 Two years……02 Three years……03 Four year……04 Always ……95 Visitor ……96
19.	Who knows about your status?	Yes / No Spouse/partner ☐ ☐ Family in the household ☐ ☐ Extended family ☐ ☐ Friend/Colleague ☐ ☐
	SECTION 3: GENDER ROLES AND RESPONSIBILITY	
20.	Many different factors can prevent people from getting medical advice or treatment for themselves. When you are sick and want to get medical advice or treatment, is each of the following a big problem	

	or not? Getting permission to go? Getting money needed for treatment? The distance to the health facility? Having to take transport? Not wanting to go alone? Concern that there may not be any health provider? Concern that there may be no drugs available?	**Yes** **No** Permission to go……01 02 Getting money……...01 02 Distance……01 02 Taking transport……01 02 Go alone……01 02 No provider……...01 02 No drugs……01 02
21.	Which of these people do you receive support from?	Yes No Spouse/partner ☐ ☐ Family in the household ☐ ☐ Extended family ☐ ☐ Friend/Colleague ☐ ☐ Other.....98 _____ (SPECIFY) NA……99
22.	How would you describe the level of support you receive?	Low.....01 Medium.....02 High.....03 NA……99
23.	What is your status in your household?	Household head.....01 Member.....02
24.	Who in the family is the breadwinner	Self……...01 Husband……...02 Wife……...03 Mother……...04 Father……...05 Sister……06 Brother……07 Other……98 _____ (SPECIFY) NA……99
25.	Which of these domestic chores do you do?	YES NO Manage the budget ☐ ☐ Buying food ☐ ☐ Cookin ☐ ☐ Washing dishes ☐ ☐ Cleaning house ☐ ☐ ☐ ☐

		Doing laundry Any of the above ☐ ☐
26.	Who provides for the family needs?	……
27.	When a family member is ill, who takes care of them?	……

SECTION: 3 KNOWLEDGE AND ATTITUDE

28.	What is/are the main symptom(s) that are used as an indicator for infectious, active TB disease?	Please check all that apply. Cough ≥2 weeks……..01 Cough with blood……..……...02 Fever……03 Night sweats……04 Weight loss……..05 Don't know……..08
29.	How does tuberculosis spread from one person to another? PROBE: Any other ways? Record All Mentioned.	Through the AIR when Coughing Or Sneezing……..……...01 Through Sharing Utensils……..……..02 Through touching a person with TB……03 Through Food……..……04 Through Sexual Contact……..……05 Through mosquito bites……..….06 Don't Know……..……...08 Other……98 _____ (SPECIFY)
30.	What is the standard length of treatment for a newly diagnosed case of TB?	<1 month……..00 1 – 2 months……01 3 – 4 months……02 5 – 6 months……03 6 - 9 months……04 Don't know……..08
31.	How can someone with TB be cured?	Please check all that apply. TB cannot be cured, only managed…....01 Herbal remedies……..……02 Bed rest without medicine……..….03 General antibiotics……..……04 Specific anti-TB regimen……..…...05 Don't know ……..……...08
32.	How did you detect your ailment?	.....
33.	Were you encouraged by anybody to go to the hospital?	.....

34.	Did you find difficulty in accessing health care?	.....
	Rate the following about TB as low or high	
35.	Perceived susceptibility (do you feel you are vulnerable?)	Low .....01 High.....02
36.	Perceived severity (do you think TB is a very deadly disease?)	Low .....01 High 02
37.	Perceived benefits (do you think that taking your medication would make you well?)	Low .....01 High 02
38.	Perceived barriers (are there barriers that may prevent you from seeking treating and therefore make you not complete your treatment?)	Low.....01 High.....02
39.	Can tuberculosis be cured?	Yes……01 No……02 Don't Know……08
40.	Would you like any member of your family to know that you have tuberculosis, would you want it to remain a secret or not?	Yes, Remain a Secret……..…..01 No……02 Don't Know/Not Sure/Depend……08
41.	Why would you like to keep it a secret?	Fear of being stigmatised……..01 Want to keep it to myself……..02 Nobody would patronised of ware.....03
42.	How many times have you been tested positive for TB?	First time……(skip to question 44) More than once……
43.	If more than once, did you finish/complete the 6-8 months of treatment on your previous TB infection?	Yes……01 No……..02 Don't Know……...08
44.	Are you HIV positive?	Yes……....01 No……..02 Have not been tested ……....03 Do not wish to disclose……04
45.	If yes to question 44, are you on medication for both TB and ARVs?	Yes……01 No……..02 If No, skip to question……...49
46.	Do you receive medication for both at the same facility?	……
47.	On a daily basis how many drugs do you take?	……
48.	What are/is experience(s) with taking both drugs	……

49.	How do you receive your TB treatment?	At home with DOTS volunteers…..……..01 At home without DOTS volunteers ……..02 Come to the clinic everyday ……....03 Come to clinic weekly…..……04 Come to clinic twice a month……..……..05 Come to clinic monthly…..…….....06 Other ……98 _____ (SPECIFY)
50.	Who supervises your treatment at home if you do not go to the clinic every day for your drugs	Self……01 Husband……02 Wife……..03 Mother……...04 Father……05 Sister……06 Brother……..07 Other……98 _____ (SPECIFY) NA……99
51.	Have you ever missed to take your TB pills during your current treatment?	Never ……01 Once before ……..…02 2-5 times ……...03 more than 5 times……....04
52.	On the days that you missed treatment, did you take anything else?	Yes……01 No……..02 Don't Know……...08
53.	How long were you showing symptoms of TB (coughing, losing weight, loss of appetite etc) before you came to the clinic?	1-2 days……01 3-5 days……02 About a week……..…….....03 About 2 weeks……..…….....04 About a month…..……..05 More than a month……..……...06
54.	How many pills does your treatment dose consist of?	……
55.	How long have you been on treatment	Four..……01 Five ……...02 Six……..03
56.	Have you ever missed your dose?	Yes.....01 No 02
57.	When in the day do you take your treatment? Give time(s) for each period	Morning…...……..01 Afternoon…...……...02 Evening……...……...03
58.	Do you remember to take your treatment on time?	Yes……..……01 No……..……02
SECTION 4: PATIENTS' RELATED FACTORS		

59.	Are you motivated to take your treatment regularly?	Yes……01 No ……02
60.	Who motivates you to take your medication?	Yes / No Spouse/partner ☐ ☐ Family in the household ☐ ☐ Extended family ☐ ☐ Friend/Colleague ☐ ☐ Other.....98 _____ SPECIFY
61.	Taking my treatment will help me get better.	Yes ……01 No ……02
62.	Is the treatment programme easy to follow?	Yes ……01 No ……02
63.	Does treatment interfere with your daily life?	Yes ……01 No ……02
64.	Do you have to hide from others when taking your treatment?	Yes…..……..01 No.....……02
65.	On a daily basis how many times do you eat?	Once…….....01 Twice…….....02 Three…….....03
66.	Have/did you experience(d) any side effect whilst taking your medication?	Yes…..……..01 No…..……02
67.	Indicate the side effects (if any) that you experience. You can choose more than one (specify severity):	Abdominal pain.....01 Reduced appetite.....02 Joint pain.....03 Constipation.....04 Depression.....05 Diarrhoea.....06 Dizziness.....07 Fatigue.....08 Fevers.....09 Gas & bloating.....10 Headache.....11 Insomnia.....12 Other.....98 _____ (SPECIFY)
68.	By which means do you travel to this clinic?	Foot .....03 Public.....04 Private.....05
69.	Have you ever smoked?	Yes.....01 No 02

70.	When do you take your medications?	Morning……01 Afternoon……02 Evening……03 At Bed time……..……..04
71.	How do you take your medications?	With food……..01 Without food……02 Other .....98 _____ (SPECIFY)
72.	How do you remember to take your medications?	Family member reminds you……01 Keep medications visible…….....02 Incorporate to a specific daily routine (e.g., dinner, brushing teeth, etc.)…….....03 Other ……..……...98 _____ (SPECIFY)
SECTION 6: DIFFERENTIAL ADHERENCE WITH TREATMENT		
73.	Have you ever missed your medication continuously for up to 5 days?	Yes.....01 No 02
74.	Reasons for missing medication?	……
75.	If yes what type of pills did you miss? (Show samples) Encourage respondent to describe drugs they missed.	Small drugs……01 Big drugs……02 Other ……98 _____ (SPECIFY) NA……..99 If not applicable skip to question 81
76.	In the last 7 days, did you miss any of your TB medications?	Yes.....01 No……...02
77.	If yes, how many doses did you miss?	Indicate the number.....
78.	Some people find that they forget to take their pills on the weekend days. Did you miss any of your anti-TB medications last weekend – last Saturday and Sunday?	Yes……..01 No……...02 If yes encouraged respondent to indicate specific day …… (SPECIFY DAY)
79.	Ask this if number missed doses were reported in questions 77. Otherwise skip to question 81. When was the last time you missed any of your TB medications?	Within the past week……..…01 1-2 weeks ago……..…...02 2-4 weeks ago…...……...……...03 More than one month ago……..……04 Never missed medication……..……05
80.	Did you sometimes stop taking your medication because you felt unwell?	Quite frequent……01 Only sometimes ……02 Seldom ……...03 NA……..99

SECTION 7: PROVIDER-BASED FACTORS		
81.	Did you have to visit the TB Clinic for the medication on a regular basis?	Yes..……..01 No..……...02
82.	What/how is your relationship with your health worker (TB nurse)?	Very cordial.....01 Somehow cordial.....02 Not cordial.....03 Other…….....98 _____ (SPECIFY)
83.	Are you satisfied with the services provided by TB clinic?	Yes .....01 No.....02 Somehow.....03 Other…….....98 _____ (SPECIFY)
84.	How often were you counseled on the condition by the care providers?	On the first visit……....01 On each visit……02 Once a while……..……...03 Never counseled……04
85.	Did the care providers provide privacy while attending to you at the hospital?	Yes……01 No……02
86.	How were you always served with your drugs on each visit to the clinic?	Daily dose……01 Weekly dose……....02 Monthly……03 Other…….....98 _____ (SPECIFY)
87.	Did the health professionals educate you on the disease condition?	Yes ……...01 No ……02
88.	Did the health care providers give card indicating your review date?	Yes ……...01 No ……02
89.	How long did you have to wait at the hospital on each visit before you are served with the drugs?	<1hrs……01 2hrs ……02 >3hrs ……...03
90.	How many of the scheduled clinic visits did you attend?	NONE……...00 All .....01 Most .....02 Some .....03 Few.....04
91.	Overall, how did you like or dislike your daily/weekly/monthly clinic visits?	liked …….....01 Disliked.....02
92.	Did they explain to you well how you should take your medication?	Yes……01 No……02
93.	What did they tell you in the health facility why you had to come and get medication for six months?	…… ……
		……

94.	What was the most helpful part of the TB clinic?	
95.	What was the least helpful part of the TB clinic?	……
96.	What should be done to improve upon the services of the TB clinic?	……

THANK YOU FOR YOUR TIME

Appendix 4

Interview Guide – TB Coordinators

Hello. My name is Hannah Benedicta Taylor-Abdulai, a student of University of Ghana, Legon. I am conducting a survey as part of my course on Gender Dynamics and adherence to Tuberculosis Treatment in the Greater Accra region.

I would very much appreciate your participation in this survey. The interview will take between 40 and 50 minutes to complete. Whatever information you provide will be kept strictly confidential and will not be shown to other persons. Participation in this survey is voluntary and you can choose not to answer any individual question or all of the questions. However, I hope that you will participate in this survey since your views are important.

At this time, do you want to ask me anything about the survey?

May I begin the interview now?

Incentives: depending on location, participants may be given T & T and refreshment.

Recording of discussions: the sessions would be tape-recorded for the study only and data transcribed into text for the purposes of analysis only. Data would be stored until after the study is over.

Facilities and training

1. Tell me about your role at this facility?
2. What training have you received in TB (or HIV)?
3. Tell me about TB/HIV co-infection in your set up?
4. Have you received any training on healthcare for TB and HIV coinfection?
5. Is there a system in place to facilitate referral of TB patients for the evaluation and treatment of other medical problems (e.g., HIV infection)?
6. How do you promote collaborative TB/HIV services?
7. In your experience, what are the advantages and disadvantages of such collaboration?
8. What types of problems are you confronted with when trying to treat patients for both TB and HIV?

9. How do you overcome these problems?

10. How are collaborative activities monitored at this facility?

Probe: explore referral patterns; what is the current trend in delivering dual care; explore their performance indicators; do they have to meet targets or quotas; again, what are the mechanisms for accountability.

11. How can the service improve upon the delivery of health services in relation to TB on one hand and co-infection of TB and HIV?

ADHERENCE ISSUES

1. What are the common problems you encounter in patients with co-infection?
2. From your experience, is non-adherence to tuberculosis treatment in patients with co-infection a common problem?
3. What are barriers to adherence in these patients, from your experience?
4. What factors facilitate adherence in these patients, from your experience?
5. How do you assist patients with their adherence to treatment?
6. How do you see the interaction between patients and health professionals here?
7. What strategies do you believe would assist patients with their adherence to treatment?

GENDER ISSUE

1. Does the different roles and status of women and men within the community and household (for example, roles in decision-making and different access to and control over resources and services) affect the activities to be undertaken?
2. As part of your clinical care and services, is there any deliberate effort at addressing gender issues?
3. In your estimation which gender adheres to treatment regimen?
4. Where is the greatest dropout in terms of gender?

5. What are the reasons for that?

BARRIERS TO ADHERENCE

1. What barrier(s) need to be addressed?
2. What interventions will best address the selected barrier(s)?
3. What measures have you put in place to ensure confidentiality of patients?
4. Is there written policies and procedures for clinical care and services?
5. Does the program evaluates patients for the causes of non-adherence to therapy and creates a plan to address the barriers identified?
6. Does the TB programme facilitate TB reporting from various community sources (e.g., MDs, clinics, laboratories, hospitals and pharmacies)?
7. What could be done/put in place to ensure that patients adhere to TB treatment regimen?

Thanks for your time.

Appendix 5

Interview guide for TB and/or HIV Patients

Hello. My name is Hannah Benedicta Taylor-Abdulai, a student of University of Ghana, Legon. I am conducting a survey as part of my course on Gender Dynamics and Adherence to Tuberculosis Treatment in the Greater Accra region.

Objectives of the study: To assess gender based factors that influence TB treatment adherence.

Length of the discussion: may span a week depending on the availability of respondents.

Confidentiality: participants were assured of full confidentiality and the possibility to withdraw at wish and time.

1.0 PATIENT-RELATED FACTORS

1. How old are you?
2. What is your job?
3. Are you married?
4. Do you have children?
5. Can you estimate your monthly income for me?
6. When were you diagnosed with TB? (and with HIV?)
7. Tell me about your illnesses (HIV/TB)?
8. How did the illnesses first start?
9. What did you then do or whom did you consult?
10. How did you feel when you were told about the illnesses?
11. Tell me what you know about TB (and HIV?)
12. Do you think there is a relationship between TB and HIV?
14. If yes, what do you think is the relationship between them?
15. Tell me about your experience taking the TB medications?
16. What is/was difficult for you taking the medications?

Probe on: costs, side effects, pill burden, stigma, attitude of health personnel, effects of drug intake on daily routines, DOT, waiting times at the clinic…

14. What made it easier/assisted you with taking the medications?

Probe: belief on efficacy of treatment, social support, health professional support…

15. What impact has being HIV positive had on your TB treatment? (in the case of co-infection)

Probe: perception of prognosis, efficacy of treatment, stigma…

16. How about the concomitant intake of ART?

Probe on: Pill burden, perception of side effects…

17. What was your experience like as a patient in the TB and in the ART clinics?

Probe: attitude of health personnel, communication with health personnel, information received from health personnel, attitude towards DOT, collaboration between the clinic.

18. What do you think can be done for patients to facilitate medication intake in this situation?

2.0 GENDER AND SOCIAL SUPPORT ISSUES

1. Do men's and women's different roles within the household influence how decisions are made, e.g., who within the household will seek health services and when they will seek them?
2. Do men's and women's different responsibilities within the household make them more or less susceptible to health problems?
3. Is there any gender difference in the perception about TB in your community? (probe; how and why?
4. Who makes the decision if somebody is sick and has to seek care in the family? Probe further.

5. If a man or a woman has TB, how does the family react to the news? Are they treated differently based on gender?
6. What support is given to such a person?
7. If one is working how does TB affect one's work? How and why?
8. Does one's sex (gender) impede treatment of TB?
9. Recommend solutions in reducing the gender gap in TB treatment.

3.0 SOCIO-CULTURAL FACTORS

1. Are there poor or conflicting community knowledge of signs and causes of TB and of requirements for TB treatment?
2. Are there availability of other types of treatment in the community?
3. What is your preference for other types of treatment?
4. Do you receive adequate support from your employer/family members/spouse?
5. How do family members treat you? Probe more
6. What are/were your experiences in taking your medication?
7. Is there a day or week that you failed to take your medication?
8. Why did you forget your medication? Probe further
9. Did you tell your support/health worker about your inability to take the medication?
10. Where there days/weeks that you felt the nature of the chores you perform inhibits you from taking your medication?
11. What can be done to improve upon taking medicines by TB patients

4.0 SERVICE FACTORS

1. Is there availability and accessibility of services (including cost of treatment)?
2. What is/are your views on clinic management (poor reception of patients, inadequate counseling, no drugs)?

3. What is your views on support services (poor training, supervision, drug supply)
4. Does seriousness of the patient condition at onset of treatment leads to adherence?
5. What are your physical response to the treatment (complications? or quick recovery?

Thanks for your time

Appendix 6

Ethical Clearance

GHANA HEALTH SERVICE ETHICAL REVIEW COMMITTEE

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

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

Research & Development Division
Ghana Health Service
P. O. Box MB 190
Accra
Tel: +233-302-681109
Fax + 233-302-685424
Email: nanatuesdaykad@yahoo.com

1st August, 2013

Hannah Benedicta Taylor-Abdulai
School of Public Health
University of Ghana
Accra

ETHICAL APPROVAL - ID NO: GHS-ERC: 14/03/13

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

"Gender Dynamic of Tuberculosis treatment adherence in the Greater Accra Region"

This approval requires that you inform the Ethical Review Committee (ERC) when the study begins and provide Mid-term reports of the study to the Ethical Review Committee (ERC) for continuous review. The ERC may observe or cause to be observed procedures and records of the study during and after implementation.

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

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

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

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

SIGNED.....

PROFESSOR FRED BINKA
(GHS-ERC CHAIRMAN)

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