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# SOCIO-CULTURAL AND HEALTH SYSTEM FACTORS AFFECTING TUBERCULOSIS CASE DETECTION AND TREATMENT IN THE UPPER WEST REGION OF GHANA

BY

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## DECLARATION

I, Philip Teg-Nefaah Tabong hereby declare that except the references cited in this thesis which have been duly acknowledged, this thesis is a product of my own PhD research work conducted under the supervision of Prof. Philip Baba Adongo and Dr. Patricia Akweongo. I further declare that no part or whole of this thesis has ever been submitted for the award of any degree in this University or any University elsewhere.

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## DEDICATION

I dedicate this thesis to my wife and children:

To my wife, Doris Ningwiebe Dumah, thank you for all the sacrifices you made during this academic voyage. Thank you for all your encouragement, the soothing words in times of difficulty and your understanding which made it possible for me to concentrate on my academic work.

To my daughter, Jasmine Ngmenamaale Teg-Nefaah and my son, Jarvis Ang-gangmen Teg-Nefaah, thank you for your frequent calls to find out how I was faring and encouraging me to complete the programme on time. Your unconditional love made every second of this journey worthwhile. You are truly my darlings. I relay this button of academic excellence to you to keep the name of the family in high esteem in academic discourse.

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## ABSTRACT

**Background:** Since the year 2005, Ghana has been implementing the new Stop TB strategy in all health facilities nationwide. This new strategy aims at increasing case detection rate (CDR) to 70% by 2010 and beyond. However, the Upper West Region (UWR) of Ghana could only increase case detection to 37% in 2010 and to 42.1% in 2014. This study therefore assesses the socio-cultural and health systems factors responsible for low case detection and prompt treatment.

**Methodology:** This descriptive study employed a mixed method (quantitative and qualitative). The quantitative study adopted multi-stage sampling technique to select six hundred (606) respondents, ≥ 18 years from four randomly selected sub-districts across four districts in the region for a community survey. With regards to the qualitative study, purposive sampling technique was used to sample 15 people with tuberculosis, seven treatment supporters (for TB patients who had treatment supporters), 24 stakeholders; health workers at district hospitals, district health directorates, sub-district level, and traditional healers for in-depth interviews. In addition, eight focus group discussions (N=72) were conducted, stratified by gender and type of residence. The quantitative data was analyzed using STATA 13. Univariable, bivariable and multivariable logistic analysis were conducted with p-value of <0.05 considered as significant. The qualitative data were recorded digitally, transcribed verbatim and analyzed using thematic content analysis with the aid of NVivo 11 software. Data triangulation strategy was used to present both the quantitative and qualitative findings of the study.

**Results:** The study revealed that TB locally referred to as *korongkpong* and *kusibine* can be caused by cough during sex, a curse or bewitchment. These beliefs had a profound influence on the health seeking behaviour for TB. The cultural connotations for the causes of TB made people with the condition to first seek health care from spiritualists and traditional healers. This affected case detection and prompt treatment. The study further found that females were 3.9 times more likely (aOR=3.93, 95% CI=1.1745, 3.1789) to use biomedical health facility than males for productive cough. People belonging to the least poor households were 3.7 (aOR=3.79, 95% CI=0.3392, 0.8127) times more likely to use biomedical health facilities with productive cough though people in the poorest socio-economic status are more vulnerable to TB. The study reported that there was low level of knowledge about TB in the study area. This low knowledge was further worsened by the various misconceptions about the disease in the community and low TB related promotion activities. The study further found that health workers were not routinely screening for TB among patients that report with cough. Of the 132 respondents who had reported to a health facility with cough for more than two weeks, only 31 (23.5%) of them were screened for TB with 13 (41.9%) of those screened having the disease. This lack of screening was further undermined by laboratory workers unwillingness to conduct sputum microscopy for TB diagnosis because of inadequate motivation. This resulted in delays in getting test results, a situation that affected patients' confidence in the health system and encouraged the use of non-orthodox health care outlets and self-medication. Furthermore, the study found low coordination between district health directorate, hospitals and sub-district health facilities with regards to TB related work. This low coordination affected the screening of

patients for TB and perception about motivation of staff involved in the clinical care aspect of TB control.

**Conclusions:** Tuberculosis has been given a superstitious label by community members and therefore the treatment they seek is often inappropriate which undermined case detection and treatment. Health workers were not screening people who report at health facilities with productive cough for more than two weeks as required by the DOTS policy. Delays in getting test results and lack of coordination between district health directorates and district hospitals affected early case detection and favoured the use of non-orthodox health care outlets.

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## LIST OF ABBREVIATIONS

| | |
|---|---|
| AFB | Acid Fast Bacilli |
| AIDS | Acquired Immuno-Deficiency Syndrome |
| AOR | Adjusted Odds Ratio |
| BCG | Bacille Calmette-Guérin |
| BMC | Budget Management Centre |
| CDC | Centre for Disease Prevention and Control |
| CDR | Case Detection Rate |
| CHPS | Community-based Health Planning and Services |
| CNR | Case Notification Rate |
| CR | Cure Rate |
| DHIMS | District Health Information Management System |
| DALYs | Disability-Adjusted Life Years |
| DOTS | Directly Observed Therapy Short Course |
| EnP | Enablers Package |
| EPTB | Extrapulmonary Tuberculosis |
| FGDs | Focus Group Discussions |
| GHS | Ghana Health Service |
| GoG | Government of Ghana |
| GSS | Ghana Statistical Service |
| HAART | Highly Active Anti-Retroviral Treatment |
| HCWs | Health Care Workers |
| HIV | Human Immuno-deficiency Virus |
| IDIs | In-depth Interviews |
| IGF | Internally Generated Fund |
| IPT | Isoniazid Preventive Therapy |
| ISTC | International Standard for Tuberculosis Care |
| KIIs | Key Informant Interviews |
| LED | Light-Emitting Diodes |
| LMIC | Lower-and-Middle Income Country |
| LTBI | Latent Tuberculosis Infection |
| MDGs | Millennium Development Goals |
| MDR-TB | Multiple Drug Resistant Tuberculosis |
| MIS | Management Information System |
| MOH | Ministry of Health |
| MSH | Management Science for Health |
| NHIF | National Health Insurance Fund |
| NTP | National Tuberculosis Control Programme |
| OLA | Ontario Lung Association |
| OR | Odds Ratio |
| PAL | Practical Approach to Lung health |
| PDA | Personal Digital Assistant |
| PLWHA | People Living with HIV and AIDS |

| | |
|---|---|
| PPM | Private-Public Mix |
| PTB | Pulmonary Tuberculosis |
| SDGs | Sustainable Development Goals |
| STBP | Stop Tuberculosis Programme |
| TB | Tuberculosis |
| TGF | The Global Fund |
| UN | United Nations |
| UNICEF | United Nations Children's Fund |
| UWR | Upper West Region |
| WHA | World Health Assembly |
| WHO | World Health Organization |
| XDR | Extensively Drug Resistant |

## DEFINITION OF TERMS

| | |
|---|---|
| Case Detection Rate | The number of cases reported divided by the number of incident cases estimated for that year |
| Case Notification Rate | The proportion of cases which have been reported to the health authorities. Often computed per 100, 000 population |
| Directly Observed Treatment | A strategy of treatment in which a specifically trained health care worker observes the patient swallowing his or her anti-TB drugs. |
| Extensively Drug Resistance Tuberculosis (XDR-TB) | Type of TB that is resistant to virtually all the available five main medications for treating TB including isoniazid and rifampicin which are the best first line drugs and fluoroquinolones such as levofloxacin, gatifloxacin, moxifloxacin and at least one of the three injectable second-line drug; amikacin, kanamycin, or capreomycin |
| Multidrug-Resistant Tuberculosis (MDR-TB) | Strains of Mycobacterium tuberculosis resistant to at least isoniazid and rifampicin, the two most efficacious anti-TB drugs |

# CHAPTER ONE

# 1.0 INTRODUCTION

## 1.1 Introduction

This chapter provides a background to the study. The background covers global, regional and national overview of tuberculosis situation. It further examines the global strategies for TB control as well as those strategies adopted in Ghana. This chapter also contextualizes the problem that the study addresses, the general and the specific objectives, and the research questions that the study seeks to answer. The chapter concludes by providing a description of the theories that are adopted for the study and the conceptual frame work that was used for the study.

## 1.2 Background

The World Health Organization (WHO) has indicated that about three million people die of TB yearly, with majority of these deaths occurring in developing countries. Eighty percent of the TB deaths globally are among people within the most economic and productive age (WHO, 2012a). In the year 2013, the estimated number of new TB cases was 8.7 million (13% co-infected with HIV) with 1.4 million people dying from the disease. These deaths included about one million deaths among HIV-negative individuals and 430, 000 among HIV-positive individuals (WHO, 2014b). In the year 2015, the number of new cases increased to 10.4 million, out of which 5.9 million were males, 3.5 million females, and 1.0 million among children. The number of new cases among people with HIV was 1.2 million (WHO, 2016). Tuberculosis has also been reported to be one of the

top killers of women, with 300, 000 deaths among HIV-negative women and 200, 000 deaths among HIV-positive women in 2011 in the world (WHO, 2012b). There are however geographical differences in TB morbidity and mortality with Africa remaining the most affected. In 2015, Nigeria, India, Indonesia, Pakistan, South Africa and China accounted for 60% of the world's TB cases (Clayden et al., 2016). These countries also have the highest rates of cases and deaths per capita (WHO, 2014b). In addition, in the year 2015, the African Region had 28% of the world's cases and the most severe burden relative to population: 281 cases for every 100 000 people, more than double the global average of 133 (WHO, 2015a).

In Ghana, an estimated 44,000 new TB cases were reported in 2014 which translates to 165 newly infected people per 100,000 population. This makes Ghana one of the high TB incidence rate countries in the world in reference to an incidence rate of ≥40 per 100,000 in the world (WHO, 2015b). The high TB prevalence is even more complicated with HIV and AIDS as people with HIV are more susceptible to TB. An AIDS-impact model projects an additional 30,000 new TB cases in Ghana attributable to HIV and AIDS annually by the year 2015 (GHS, 2006).

To reduce the burden of TB in the world, in the year 2005, WHO in partnership with the global alliance to Stop TB inaugurated the plan to achieve 50% reduction in TB prevalence and mortality which was set as a Millennium Development Goal (MDG) target (WHO,

2014b). The Stop TB Strategy provided the operational plan to reach these targets which included a comprehensive approach to improve TB case detection and treatment outcomes (WHO, 2014a). To this end, there was an increase in funding by external donor agencies and some national governments (UN, 2013). From 2016, the global agenda is to end TB and this was adopted in May, 2014 during the World Health Assembly and incorporated into Sustainable Development Goal (SDG) three (World Bank, 2016). Therefore, countries are expected to work towards reducing the number of TB deaths to 90% by the end of 2030 (compared with 2015 levels), and also reduce new cases by 80% (WHO, 2015b).

The main strategy for TB treatment globally is the directly observed treatment short course (DOTS). This strategy relies mainly on case detection and treatment with multiple antimicrobial drugs for a period of 6-12 months depending on the case classification. Despite the increased investment in DOTS, it has been reported that TB control in the world faces two main challenges; delay in diagnosis of tuberculosis suspects and non-completion of treatment as a result of high defaulter rates (Qureshi, Morkve, & Mustafa, 2008). For example, in the year 2014, 6 million new cases of TB were reported to WHO which is two-thirds (63%) less than the 9.6 million people estimated to have been infected and developed the condition in that same year (WHO, 2015b). This means that about 37% of new cases were not detected and put on treatment. These undetected TB cases in the community serve as reservoirs for high transmission within the community (Pronyk, Makhubele, Hargreaves, Tollman, & Hausler, 2001; WHO, 2007). A contagion parameter predicts that where tuberculosis is endemic, each undiagnosed case of TB will often result in between

10-20 secondary cases annually depending on the environment (Varaine & Rich, 2014). Early case detection therefore remains one of the important strategies for effective tuberculosis control in Ghana. Several strategies have been employed to increase case detection and treatment in Ghana and in the Upper West Region (UWR). These strategies involve community sensitization about TB, training of biomedical scientists on TB diagnosis, provision of diagnostic equipment, ensuring regular drug supply, surveillance, building capacity for TB treatment and control, provision of enablers' package, use of treatment supporters who will directly supervise treatment of patients. Despite the adoption of these strategies to increase TB case detection in Ghana, in the UWR, low case detection has consistently been reported which undermine efforts to reduce the burden of TB in the region (Ahorlu & Bonsu, 2013; NTP, 2014). A multitude of factors may be responsible for low reporting of cases and low case detection in the UWR of Ghana. This study seeks to identify these factors affecting low TB case detection and prompt treatment.

## 1.3 Problem Statement

Tuberculosis prevalence for adults in Ghana is 290 per 100,000 population, more than twice the estimated World Health Organization (WHO) value for all ages (Bonsu et al., 2014). Though there are regional variations in the prevalence, the Upper West Region (UWR) is one of the regions in Ghana with a high TB prevalence of 330 per 100,000 population and lowest in terms of case detection (NTP, 2014). Following the launch of the new Stop TB, which focused on DOTS in the year 2005, Ghana has been implementing the policy in all health facilities nationwide. Key among the objectives of the new strategy is to increase case detection rates from 36% to 70% and cure rates from 71% to 85%

beginning 2005 to 2010 as a step to achieving MDG by 2015 (GHS, 2007). However, records available indicate the UWR was not able to achieve this. The region was only able to increase case detection rate from 35% in 2005 to 37% in 2010, and to 42.1% in 2014 (GHS, 2015), a clear indication that there are challenges in case detection and treatment.

The National Tuberculosis Health Sector Strategic Plan for Ghana, 2009–2013, clearly identified low TB case detection rate as one of the main challenges facing TB control in Ghana and in the UWR (MOH, 2009b). In this strategic plan, a target was set to increase TB case detection rate (all forms) from 45% in 2010 to 72% in 2013. However, this was also not achieved by the UWR as case detection was 42.1% in 2014. Speaking at the launch of the 2015 World TB day, the programme manager observed that the TB prevalence survey that was conducted in 2014 across Ghana showed TB prevalence was even higher than 165/100,000 population previously estimated indicating that across Ghana there are more undetected cases in the communities. Despite the fact that the UWR has high TB burden and prevalence (NTP, 2014), two districts in the region were found not to have even reported a single TB case between years 2010-2012. This made the national TB control programme to undertake a study in one of those districts (Sissala West) only to discover that there were actually TB cases in communities in this district but these cases had not been detected (Ahorlu & Bonsu, 2013).

Social, cultural and health systems have been found to affect tuberculosis case detection. Social factors such as local beliefs, stigma, staff attitude and health seeking have been reported to affect tuberculosis case detection (Ayisi et al., 2011; Date & Okita, 2005; Li et

al., 2013). For Ghana to be able to eliminate TB as envisioned in the sustainable development goals (SDGs), bottlenecks to case detection need to be addressed because treatment success rate is above 86% which has exceeded the global target (NTP, 2014). This indicates that once the cases are detected, they will be treated successfully. In addition, interventions that either prevent cases or lead to early detection of cases have been found to have the biggest impact in TB control regardless of underlying epidemiologic characteristics of the setting (Oxlade, Piatek, Vincent, & Menzies, 2015). This study therefore investigated the socio-cultural and health system factors responsible for low case detection and reporting, prompt treatment to TB to provide evidence that may improve tuberculosis control in the UWR of Ghana.

## 1.4 Research Questions

Questions the research addressed included;

1. What socio-cultural factors affect tuberculosis case detection and treatment?
2. What is the health seeking behaviour of community members and tuberculosis patients?
3. How does health seeking behaviour affect tuberculosis case detection and treatment?
4. What health system factors affect tuberculosis case detection and treatment?

## 1.5 Objectives of the Study

### 1.5.1 General Objective

The general objective of this study is to assess the socio-cultural and health system factors affecting tuberculosis case detection and treatment in the UWR of Ghana.

### 1.5.2 Specific Objectives

1. To determine the socio-cultural factors affecting tuberculosis case detection and treatment.
2. To assess health seeking behaviour of community members and tuberculosis patients.
3. To examine how health seeking behaviour affects tuberculosis case detection and treatment.
4. To assess health system factors affecting tuberculosis case detection and treatment.

## 1.6 Significance of the Study

Tuberculosis currently is seventh in the world ranking of leading causes of mortality in human, killing about one person every 15 seconds (WHO, 2014b). This is against the backdrop that medicines that can treat TB have been discovered over 50 years ago. Generally, case detection and treatment has been widely found to be very essential to TB control (WHO, 2016), however efforts to control TB have often been hampered by both socio-cultural and health system-related issues. Being very sensitive and most challenging issues to address in health care intervention, socio-cultural issues have received little

attention of programme implementers and in policy. The belief system of people which is grounded in their folklore and passed on from generation to generation is often difficult to change using conventional health education strategies that tend to espouse biomedical model of health care delivery.

These belief systems may influence the health seeking behaviour of the community. It is therefore important to identify these socio-cultural barriers to TB case detection and treatment to be able to device community appropriate interventions to address them. Ghana is a secular state and the practice of medical pluralism is common. In a plural medical systems, people may identify with one or more of the three health systems; professional sector (biomedical), folks and the popular system (Kleinman, 1978) and in recent times, spiritual sector. Hence, it would be essential to move further to explore from respondents their beliefs about what TB is, the causes, the various types and their cure and what can be done to increase case detection and treatment from the perspective of the community. Good policies are often grounded on research findings and hence a research such as this is required to provide policy direction to help increase TB case detection and treatment.

Health system factors are also indispensable in TB control in Ghana. However studies in health system have often focused on epidemiology of the tuberculosis, emerging multiple drug resistance and pharmacological aspect of TB medication. However, to be able to break the cycle of infection and control TB, the cases must be detected early enough by the health

system to prevent cross infection. Staff attitude, availability of screening materials, staff knowledge, health care practice and effective implementation of the tenets of the DOTS strategy are all health systems related factors that can improve case detection and treatment as documented by studies in other countries. However, these have received little attention in Ghana. It is therefore important to identify the specific health system factors that are barriers to case detection and strategies to improve the system's ability to detect TB cases.

Generally, the decision to employ effective interventions by policy and decision-makers to curtail the burden of TB in a country depends on the availability of resources and existing supporting scientific evidence. The availability of scientific evidence is extra vital in ensuring the judicious use of limited resources most especially in resource-constrained settings such as Ghana with high disease burden. This study may therefore provide evidence on community-based strategies to improve case finding and increase adherence to treatment. The study may further provide measures to help address health system constraints in tuberculosis control. In addition, the study may identify alternative strategies to improve on tuberculosis control in Ghana.

## 1.7 Theoretical Underpinnings and Conceptual Framework for the Study

Theories guide research and explain human behaviours (Green, 2000). Therefore, theories are very essential in designing a social science research (Venable, 2006). Several theories and models have been used to explain human behaviours and the health system. This study however adopted four of such models and theories; Lipsky's street bureaucratic theory,

Piot health system effectiveness model, social cognitive theory and the PEN-3 model. These theories have been integrated because not one of them better explains the tenets of the socio-cultural and health system factors that may be affecting TB case detection and treatment. The theories are used in the design of the conceptual framework, the research instruments and also employed in the review of literature, presentation of results and the discussion of the study findings.

The Lipsky's Street Level Bureaucrats theory highlights the role that frontline health care providers play in achieving policy objectives. The directly observed therapy short course (DOTS) system was introduced to provide new policy direction to increase case detection and treatment adherence. Thus, the policy is essentially implemented by frontline health workers who play a pivotal role in TB case detection and treatment. Lipsky's street bureaucrats theory argue that frontline health workers do not always implement policies developed by their superiors to the level of fidelity required by the policy (Lipsky, 2010). The implementers of a given policy use their discretion to circumvent gaps between policy requirements and resources available to implementers creating a conflict that needs to be resolved. Lipsky is of the view that the implementers adopt what is called "coping mechanisms" to fill the available gap. The bureaucrats include; health workers, teachers, public lawyers, social workers, judges, police officers, and other public employees who provide government services, enforce the law, and distribute public benefits to citizens directly (Lipsky, 2010). This theory has previously been used to study the implementation of the safe abortion policy in Ghana (Aniteye & Mayhew, 2013).

Despite the fact that this theory has been widely adopted in health system research, critics of the street-level bureaucracy theory argue that Lipsky places a lot of discretional powers in the hands of public service workers. However, these same critics acknowledge that workers play an important role in policy decisions and implementation strategies and do not merely implement decisions made by their superiors (Evans & Harris, 2004). This theory has been identified as relevant in this study because of its focus on frontline providers of TB control activities in the UWR.

The second theory essential in explaining both community and health system factors that may affect TB case detection and treatment is Piot health effectiveness model. The Piot's model describes a series of nine steps that an individual with a distressing situation of ill-health is likely to go through before being cured (Mumba, Visschedijk, van Cleeff, & Hausman, 2003). The Piot's model provides a framework for analysing disease control strategies such as TB control to identify the bottlenecks that inhibit achieving objectives of control programmes (Mumba et al., 2003). This model integrates both community-related and health systems framework and shows how these interact to reduce the effectiveness of interventions in disease control (Rao, Schellenberg, & Ghani, 2013).

The nine step identified by Piot (1967) specifically for TB control include:

1. Awareness: Where an individual needs to recognise and identify that he/she is suffering from a particular disease, which will require treatment. In this case the individual being aware that he/she has TB, which will require treatment.
2. Motivation to seek treatment: In this stage, after the individual has identified the disease condition, he/she needs to take steps or be motivated to seek treatment at a health facility. Motivation to seek treatment may be influenced by several individual, family, community and societal factors as well as health system-related factors.
3. Selection: The health professional whom the person reports to should from the presentation of clinical signs and history suspect TB and request a sputum examination for TB bacilli.
4. Examination/Diagnosis: This step is basically a health system factor, which involves the individual undergoing the appropriate diagnostic process upon reporting to the health facility. Thus the failure to arrive at the appropriate diagnosis has implications for the type of treatment that will be given.
5. Sensitivity: This refers to the ability of the test to detect the TB bacilli in the specimen. That means the smear should be positive if the patient has TB bacilli in his/her sputum.
6. Prescription: The newly identified case of TB should receive the correct treatment prescription in accordance with TB treatment protocol. Thus, the prescriber should have an understanding of the treatment protocols for various TB classifications.
7. Treatment: This stage involves the individual being able to receive the recommended treatment in the right dose to commence treatment. Therefore, the

availability of the recommended medications at the health facility has direct effect on this stage. For TB control, the availability of anti-TB medication is essential to effectively implement this stage.

8. Regularity/Adherence: This means the TB patient taking the medications regularly as required and for the appropriate duration of between 6-12 months.
9. Efficacy of medications: This step looks at the ability of the medication to treat the condition. Thus the ability of the anti-TB medication to cure TB. Therefore the medication should be stored appropriately to maintain their efficacy.

Generally, an individual has to pass through these stages successfully to receive cure. However, there is the possibility of an individual not proceeding to the next stage from a preceding step and, this break in the continuum has implications for TB control. Although this theory provide explanation for both community and health systems related factors to TB control, it fails to account for the environmental exposure to the micro-organisms and the psychosocial factors that may affect an individual's motivation to seek for health care. An individual first needs to live in an environment that exposes him/her to any of the micro-organisms that can cause TB. After inhaling the micro-organisms, the internal environment should also favour the organism's ability to cause pathological changes in the affected individual. It is these changes that cause a distressing situation or illness for the individual to seek for health care as espoused by the Piot model. Hence, the theory that provides a better explanation to these two factors (environment and psychosocial factors influencing health care) is the Albert Bandura social cognitive theory.

The third theory that has been used in this study to examine community-related factors in case detection is the social cognitive theory by Albert Bandura. The social cognitive theory describes the reciprocal relationship between three constructs; cognition/personal, behaviours, and the environment (Bandura, 1999). These factors can act independently but may also interact in a reciprocal manner. The cognitive/personal determinant includes factors such as beliefs about one's competence; causes of success and failure; and a sense of control, values, and goals. In this study, personal determinants look at individual level factors that may affect case reporting such as knowledge, attitude, and beliefs. The environmental component includes factors such as the cultural context, exposure to a disease, and social support that may be reinforcing or inhibiting a positive behaviour. The behaviour (or the performance) of the individual includes health seeking, medication adherence and coping responses. Figure 1.1 shows the reciprocal relationship between the various constructs in the social cognitive theory.

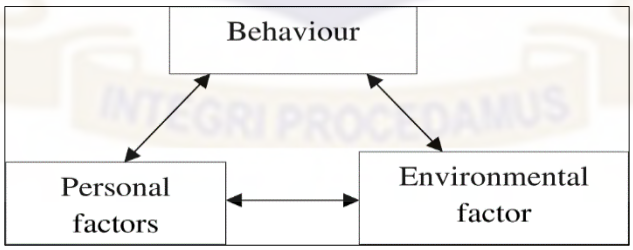



Figure 1.1: Social Cognitive Theory

Source: Bandura, 2004

The social cognitive approach focuses on the demand side of promoting health (Bandura, 2004), and therefore an important theory to explain why people with prolong cough do not report to the health facilities for tuberculosis screening. The social cognitive theory is also relevant in explaining the health system experiences of people with TB. This theory transects with the Lipsky's street bureaucrats model and Piot theory in explaining the health system experience of people with tuberculosis and the experiences of health workers working in DOTS centres.

The PEN-3 model which is the fourth theory that was used in this study was developed to situate culture at the centre of determinants of human behaviour in health promotion and disease prevention interventions (Airhihenbuwa, Ford, & Iwelunmor, 2014). The PEN-3 cultural model consists of three primary domains: (1) Cultural Identity, (2) Relationships and Expectations, and (3) Cultural Empowerment. Each domain includes three factors that form the acronym PEN; Person, Extended Family, Neighborhood (Cultural Identity domain); Perceptions, Enablers, and Nurturers (relationship and expectation domain); Positive, Existential and Negative (Cultural Empowerment domain), (Airhihenbuwa, 1995). These factors interact to determine the individual health-related behaviour. This model was therefore relevant in supplementing the social cognitive model in explaining the determinants of the health seeking of individuals with tuberculosis in the community. It has previously been used to study the role culture plays in domestic violence (Yick & Oomen-Early, 2009) and type 2 diabetes (Melancon, Oomen-early, & Rincon, 2009). Figure 1.2 is an illustration of the PEN-3 model.

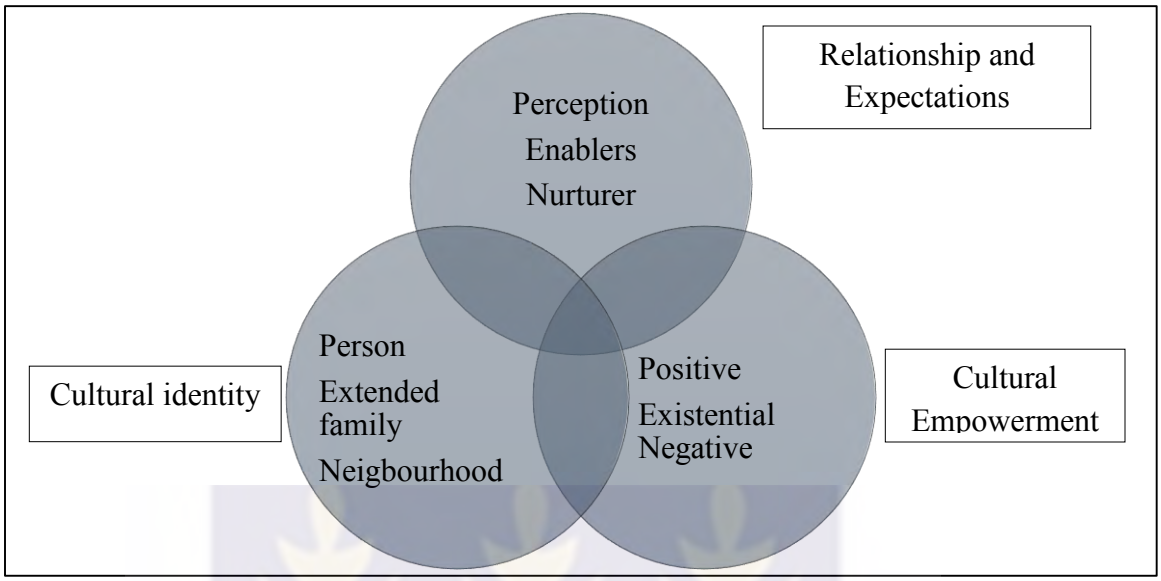



Figure 1. 2: PEN-3 Model

Source: Airhihenbuwa, Newsome & Iwelunmor, 2013

The four theories have been found to be relevant in explaining various aspects of the study. Building on these four theories, adapted conceptual framework has been developed to explain the linkages and interactions between TB, the health system and socio-cultural factors (Figure 1.3). Generally, health care utilization and making of health-related decision have been found to be influenced by socio-demographic characteristics of people. Both social cognitive and PEN-3 theories recognise that personal factors such as age, sex, marital status, educational attainment and socio-economic status affect an individual's knowledge and awareness, health decision making and health seeking. Older people are often equipped with autonomy to make health-related decisions whilst younger people who may still be dependents will have to rely on their parents or guardians for key decisions. Also, in some societies especially among patrilocal and patriarchal societies, females do

not have the autonomy to make key decisions at household level and this may include health-related decision such as type of health service to seek.

Also, socio-economic status of the individual has been found to affect health care utilization and health seeking behaviour. People of low socio-economic status tend to be more vulnerable to TB than those with higher socio-economic status. Yet, it has been found that the poor are less likely to seek for health care at biomedical health facilities than the rich.

Tuberculosis case detection is dependent on an individual experiencing a distressing situation such as productive cough and seeking health care from a facility that is equipped to diagnose the condition. However, health seeking behaviour has been found across the world to depend on the individual's perception of the cause of the ill-health. Thus, perception of cause, local beliefs and health seeking have been reported to affect tuberculosis case detection. If a distressing situation is perceived to be caused by factors which are not biological, help would be sought outside the biomedical facility and this has been reported in several studies where biomedical facilities were believed to be unable to handle spiritual and social conditions (Abubakar et al., 2013; Bello & Rehal, 2014; Tabong & Adongo, 2013). However such health outlets (spiritual and traditional healers) may be ill-equipped to diagnose TB as such those cases will remain undetected. Perceived cause has also been reported to result in delay in health seeking (Viney et al., 2014).

Perceived cause, local beliefs and health seeking are also shaped or are being shaped by the community experience of the individual. This therefore has bearing on case detection. An individual experience with health system will also determine whether the person would subsequently seek for health care at the biomedical health system or not. A negative experience with health system has been reported to lead to refusal to patronize the facility whilst a good experience can result in higher likelihood of the individual returning to that facility (Nnoaham, Pool, Bothamley, & Grant, 2006).

The components of the health system such as human resources, service delivery, health financing, logistics and supplies, leadership and governance and management information system all affect tuberculosis case detection. If there are no qualified health workers to screen suspected tuberculosis patients, then cases will go unnoticed and this will affect case detection. Poor services delivery may lead to people refusing to patronize the services at biomedical health facilities, which will affect case detection. This is because people with cough will refuse to attend health facilities where they can be diagnosed. However, if the services are perceived to be good, it may lead to high patronage of the services offered at the biomedical health facilities. In addition, if the services provided are not patient centred and provide privacy that will minimize stigma, this may deter patients from accessing appropriate services.

At the heart of the health system factors is Lipsky's street bureaucratic theory that provides an explanation to how the DOTS system is being implemented to meet policy objectives. Good governance and leadership also play important role in the effective and efficient use of resources and have been found to increase work output. Hence, good leadership in the tuberculosis control programme may lead to high case detection (USAID, 2014). The availability of logistics such as laboratory equipment to test people for tuberculosis will ensure all suspected tuberculosis cases are screened which can increase case detection. Other health system factors such as human resources, information for decision-making have also been found globally to affect TB case detection. The availability of adequate supply of trained and motivated health personnel have significant impact on health outcomes. The health system factors can on their own affect directly TB case detection and treatment or may influence an individual health seeking behaviour and thus affect case detection. Figure 1.3 provides the conceptual framework for this study.

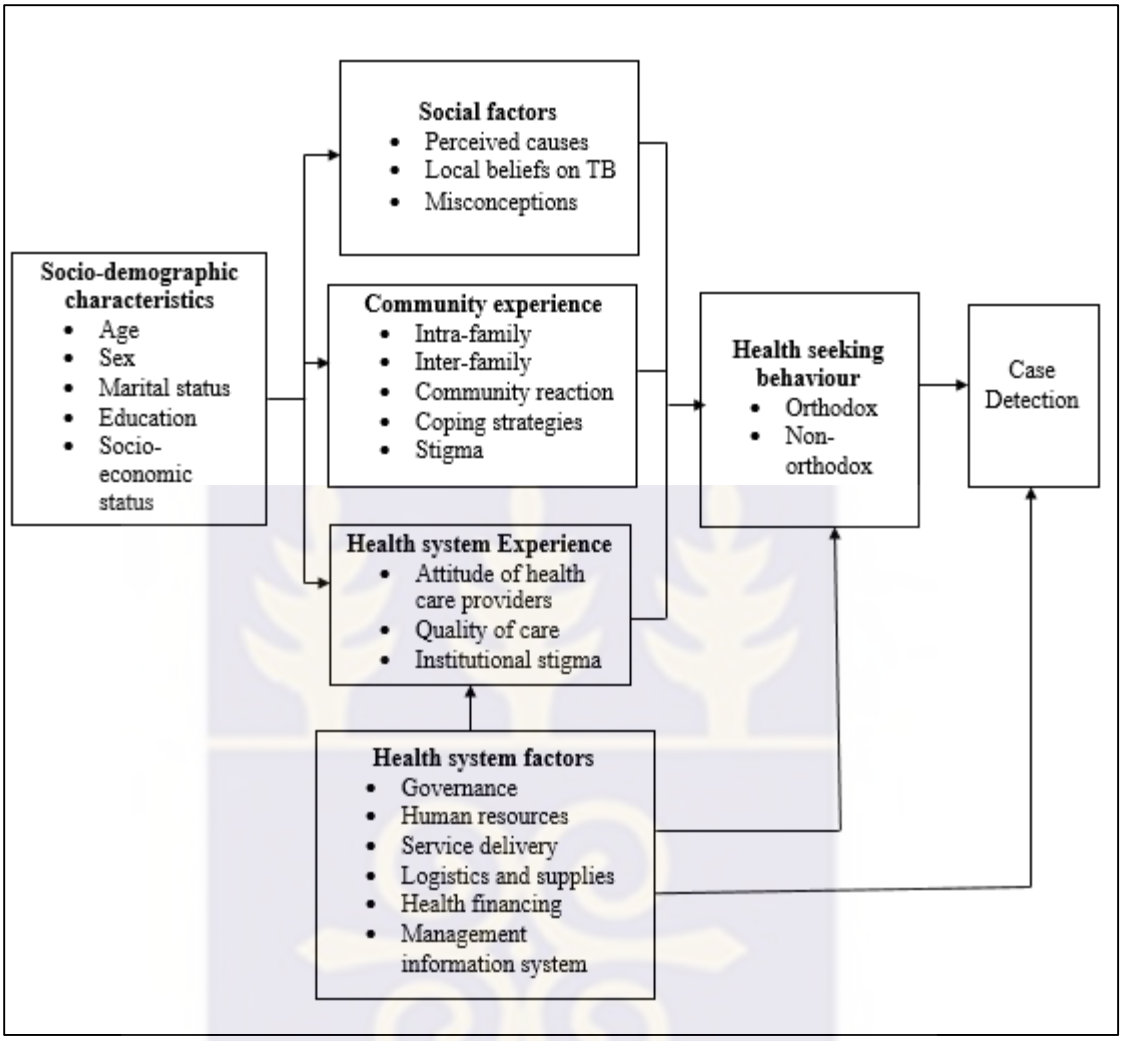



Figure 1.3: Conceptual framework for socio-cultural and health system factors affecting TB case detection and treatment

# CHAPTER TWO

# 2.0 LITERATURE REVIEW

## 2.1 Introduction

This chapter looks at existing literature that provides evidence available to put this present study in context. The review is guided by the objectives and the conceptual framework for the study. The review covers areas such as the burden of tuberculosis and mode of transmission. The chapter also describes the signs and symptoms (clinical manifestations) of TB, the method of diagnosing TB and the management of it. Furthermore, existing literature on case detection are reviewed as well as the socio-cultural and health system factors affecting tuberculosis case detection and treatment.

## 2.2 Burden of Tuberculosis

Worldwide, 9.6 million people are estimated to have been infected and developed TB in 2014. This include 5.4 million men, 3.2 million women and 1.0 million children (WHO, 2015b). Globally, 12% of the 9.6 million new TB cases were also HIV-positive (WHO, 2015b). About 70% of the total number of TB-HIV co-morbidity reported in the year 2014 occurred in countries with high burden of TB. Furthermore, majority of the deaths among TB patients occur in people with TB-HIV co-morbidities. In this regard, about half a million of the deaths occurring among HIV infected people are attributed to TB and this accounted for a quarter of deaths among HIV positive people (WHO, 2013b). As a result of higher risk of HIV infection among women, they are also reported to be more susceptible to develop active TB than menfolk. Thus, some studies have found TB as the leading infectious cause of death in young women in developing countries (Atre, Kudale,

Morankar, Gosoniu, & Weiss, 2011; Rao, 2009). For example in 2007, TB was reported to account for 2.5 % of the global burden of disease and the commonest cause of death in young women, killing more women than all causes of maternal mortality combined (WHO, 2007). In 2014, TB was responsible for the death of 1.5 million people (1.1 million HIV-negative and 0.4 million HIV-positive). These mortalities comprised of 890, 000 men, 480, 000 women and 140, 000 children making TB ranked alongside HIV as leading causes of death worldwide (WHO, 2015b).

Reports available also suggest an increasing number of TB among children despite the availability of vaccination against the disease. The greatest burden of TB in children appears to be between 12–23 months of age (1.2/100 person years) with the highest disease severity in this age group (Moyo et al., 2010). While some countries have reported declines in TB incidence in children, others have reported dramatic increases, particularly with HIV coinfection, which has been estimated to occur in 8%–55% of newly diagnosed children with TB (Cavanaugh et al., 2012; Moyo et al., 2010).

Most of the TB High Burden Countries (TB-HBC) in the world have rates of between 150 and 300 cases/100,000 population. Among the 22 TB-HBCs in the world, Brazil and China are reported to have lower rates. However, rates of above 500/100,000 population have been reported 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,

it has been reported that TB occur in at least 1 in every 100 people, thus about 1000 or more per 100,000 population develops TB annually (WHO, 2016).

## 2.3 History of Tuberculosis

Tuberculosis (TB) is a very serious disease, which has a devastating effect on individuals, their households and the country as a whole. TB is infectious and is caused by the bacteria, *Mycobacteria tuberculosis* (WHO, 2015c). The disease typically affects the lungs where it is known as pulmonary TB. However, it can also affect other parts of the body in which case it is described as extrapulmonary TB. Nonetheless, it is only the pulmonary TB that is transmissible from one person to another. TB is an ancient disease, as it has been reported to have been identified among the mummies from Egypt as far back as 5,400 years ago (Daniel, 2006). TB has also been reported to be well-known in classical Greece, where it was called *phthisis,* a Greek word meaning dwindling or wasting away (Daniel, 1997). This description was probably due to the fact that TB infection is often characterized by severe weight loss. Since that time, advance in science, including the discovery of the tuberculosis mycobacterium and the development of new drugs and the Bacille Calmette-Guérin (BCG) vaccine has relatively reduced the burden of TB. The understanding of the pathogenesis of tuberculosis has been documented to have started with the work of Théophile Laennec at the beginning of the 19$^{th}$ century (Daniel, 2006).

Following the work of Theophile Laennec, Jean-Antoine Villemin identified the transmissibility of *M. tuberculosis* in the year 1865. However, the work of Robert Koch in

identifying the tubercle bacillus set the tone for more studies on how to treat and prevent TB. TB was initially referred to as Koch's disease in recognition of his role in the identification of the tubercle bacillus in 1882 (Daniel, 2006). Another scientist recognized in the history of TB is Clemens von Pirquet who developed the tuberculin skin test in 1907. Three years later Clemen von Pirquet used the tuberculin skin test to demonstrate latent TB infection in asymptomatic children (Daniel, 2006). Albert Calmette and Camille Guérin are also well known in the history of TB because of their role in developing the Bacille Calmette-Guérin, a vaccine used to protect children against TB in 1921 in Pasteur Institute of Lille, Paris. Following the adoption of that vaccine into national immunization programme, many children have received this vaccine which has offered them protection against this deadly condition.

During the 17$^{th}$ to 19$^{th}$ centuries, there were advances in scientific work on the pathophysiology and clinical presentation of TB (Ayvazian, 1993). This therefore ignited a global search for medicines that could cure TB. In that direction, the work of Jorgen Lehmann is worth mentioning as he first discovered para-amino salicylic acid (PAS) in 1943, which was used to treat TB. Another scientist, Gerhard Domagk discovered thiosemicarbazone during wartime in Germany in 1945. This compound was found to be efficacious for TB treatment. Albert Schatz, Elizabeth Bugie, and Selman Waksman were also instrumental in the discovery of therapeutic medications for TB as they have been reported to be the first to extract streptomycin isolates which were found to have bactericidal effect against *M. tuberculosis* in 1945 (Daniel, 2006).

Further medicines were developed later. Para-Aminosalicylic acid was discovered in 1945, isoniazid in 1952, ethambutol in early 1960s and rifampicin in the 1970s (Murray, Schraufnagel, & Hopewell, 2015). These developments led to effective intervention to reduce the burden of the disease. The availability of effective medication also resulted in the expanding of TB treatment to people with latent TB infections. In the year 1974, a policy guideline for TB control for the next two decades was released by the WHO Expert Committee on Tuberculosis (WHO, 1974). Despite, these global efforts, TB continued to spread cross the world, which has been exacerbated by the emergence of HIV and drug resistant strains of the *M. tuberculosis.*

## 2.4 Causes and Transmission of Tuberculosis

Tuberculosis is a communicable disease caused by a bacterium. The bacterium comprised of a complex of various types of organisms which include *M. tuberculosis, M. bovis, M. africanum, M. microti, and M. canetti* (Varaine & Rich, 2014). All these micro-organisms can cause TB in human but the majority of TB cases are caused by *M. tuberculosis* (CDC, 2013). However, in Africa, TB caused by *M. africanum* is also common (CDC, 2013). In Ghana, a study found that majority (97.6%) of TB cases are caused by *M. tuberculosis* whilst 2.4% are caused by *M. africanum* (Addo, Addo, Mensah, Mosi, & Bonsu, 2017).

The main source of TB infection is untreated smear-positive pulmonary tuberculosis (PTB) patient discharging the bacilli (WHO, 2004b). TB is mainly spread by airborne route when the infected patient expels droplets containing the bacilli. The bacilli which is about 1-5

microns in diameter are released unto the air during speaking, coughing or sneezing (Varaine & Rich, 2014). Sunlight and ventilation are effective in reducing the ability of the bacilli to infect a susceptible person once the organisms are released into the air (CDC, 2013; Varaine & Rich, 2014). *Mycobacterium bovis* which is a species of *Mycobacterium* can also be transmitted by consumption of raw milk containing the bacilli (CDC, 2013; Shargie, Mørkve, & Lindtjørn, 2006; Varaine & Rich, 2014).

The risk of *Mycobacterium* infection depends on the susceptibility of the host, the extent of exposure and the degree of infectiousness of the index case (Harries & Dye, 2006; Varaine & Rich, 2014). Once an individual inhales the infectious aerosols, the bacilli lodge into the alveoli where it multiplies to form a primary lesion (Knechel, 2009). Under normal conditions, the immune system either clears the bacilli or arrests the growth of the bacilli within the primary lesion in which case the individual is said to harbour Latent TB Infection (LTBI), (Andrews et al., 2012). However, in 5 - 10% of the cases, the bacilli overwhelm the immune system of the human, resulting in a primary TB within a few months to years. In the rest, post-primary TB occurs with reinfection or the LTBI is reactivated (Andrews et al., 2012). The lifetime risk of developing active TB is 5 - 10% but could be higher with underlying conditions such as HIV infection, diabetes mellitus and other medical conditions that suppress the immunity of the person (Gupta, Shenoy, Bairy, Srinivasa, & Mukhopadhyay, 2011). If the individual's immune system is not able to suppress the infection, pathological changes occur at the site of infection (e.g. lungs for pulmonary TB), which results in some signs and symptoms.

## 2.5 Signs and Symptoms of Pulmonary Tuberculosis

The clinical presentation of tuberculosis depends on the site of infection, the organ affected and its severity. However, patients with pulmonary tuberculosis will often present with pulmonary symptoms like productive cough, haemoptysis (coughing out blood), chest pain and shortness of breath. They may also present with constitutional symptoms such as fever (temperature >38.5$^{O}$C), poor appetite, weight loss (more than 1.5 kg in a month), night sweats, anorexia and other symptoms depending on the site of the infection (Knechel, 2009).

The presentation of these signs and symptoms may vary across individuals despite the fact that many will often present with these manifestations. A study among TB patients in Nigeria found that cough and coughing out of blood (haemoptysis) were the common symptoms as it was reported by 88% of the participants (Nissapatorn, Kuppusamy, Sim, Quek, & Khairul Anuar, 2005). Another study in Zambia found that the most common signs and symptoms of people with TB were prolonged cough and fever but eight (10%) individuals with TB denied having any symptoms at all (Ayles et al., 2009). In another study in Uganda on the prevalence of various signs of tuberculosis, it was found that 65% presented with cough and 38.5% had wasting (i.e. body mass index of <18.5 kg/m$^2$). Constitutional symptoms such as fever, anorexia, night sweats and weight loss were reported by 32.1% (Kirenga et al., 2015).

Tuberculosis can also present with non-respiratory manifestations. The presenting symptoms are often specific to the site of the infection but may include swelling of lymph nodes, headache or neck stiffness in meningeal disease. In some instance, bone pain/joint swelling, lower back pain, recurrent pus in urine when the urinary system is involved, abdominal pain when the disease affects the genitourinary tract (OLA, 2009). Although the signs and symptoms provide the background for Clinicians to suspect TB, the patient has to be taken through some clinical investigations to arrive at the diagnosis.

## 2.6 Diagnosis of Tuberculosis

Tuberculosis is diagnosed among patients self-reporting to the Outpatient Department (OPD) of healthcare facilities. Individuals who present with a cough lasting two weeks or more first have to be screened by the use of TB screening questionnaire to determine the level of exposure. This screening question elicits information from patients in nine areas. These areas include: history of cough, sputum production, coughing out blood, loss of weight in the last three months, drenching night sweats, fever, chest pains, history of contact with TB patient and history of alcohol intake or smoking. Further diagnostic test are conducted depending on the individual response to these questions.

The three most common diagnostic test for TB include: Mantoux tuberculin skin test (TST), chest x-rays and sputum smear microscopy (CDC, 2011; WHO, 2010). The Mantoux tuberculin skin test or the TB blood test can be used to test for *M. tuberculosis* infection. The Mantoux tuberculin skin test is performed by injecting a small amount of

fluid called tuberculin into the skin in the lower part of the arm. The test is read within 48 to 72 hours by a trained health care worker, who looks for a reaction (induration) on the arm (CDC, 2011). However, when this test is positive, additional tests are required to confirm TB disease.

Chest x-ray is taken on the posterior-anterior part of the chest to identify changes in the lungs which may be suggestive of TB. These changes can appear at any part of the lungs and may vary in size, density, and shape (CDC, 2011). These abnormalities may suggest TB, but cannot be used to definitively diagnose TB (Mburu & Richardson, 2013). Nonetheless, a chest radiograph may be used to rule out the possibility of pulmonary TB in a person who has had a positive reaction to a TST or TB blood test without symptoms of the disease (CDC, 2011; Mburu & Richardson, 2013).

The third test for TB is diagnostic microbiology for the presence of acid fast bacilli (AFB) in the sputum of the individual. The presence of AFB on a sputum smear or other specimen often may indicate TB disease (CDC, 2011; Mburu & Richardson, 2013). Acid-fast microscopy using the Ziehl-Neelsen stained smear is easy and quick, but it does not also confirm a diagnosis of TB because some acid fast bacilli are not *M. tuberculosis*. Also, in Uganda it was found that using direct Ziehl-Neelsen microscopy alone could miss about 60% of possible TB case (Muwonge et al., 2014). Therefore, sputum is taken for culture as a step toward confirming the diagnosis. Culture of *Mycobacteria* is generally considered

the goal standard in TB diagnosis (Burman et al., 1997; Muwonge et al., 2014). Nonetheless, in recent times, there are concerns about using culture to confirm TB diagnosis. This is because a study in Uganda found that 50% of smear-positive TB cases had their culture results being negative (Sekandi et al., 2014).

In recent times, some new techniques have been developed to test for tuberculosis within a short period. One such technique is the Gene Xpert Multi-drug TB/Rifampicin-resistant (MTB/RIF) system which can detect *M. tuberculosis* as well as rifampicin resistance-conferring mutations directly from sputum, and provide results within two hours (TGF, 2011). Light-emitting diodes (LED) have also been developed to offer the benefits of fluorescence microscopy in some countries. In 2009, LED was found to be more sensitive, had better quality, and less costly than conventional fluorescence and Ziehl-Neelsen microscopy (TGF, 2011).

Another test for screening people for active TB is the use of lateral flow urine lipoarabinomannan assay (LF LAM). Lipoarabinomannan is a lipopolysaccharide which is present on the cell wall of mycobacterial organism (Swaminathan & Rekha, 2012). This antigen is released from metabolically active or degenerating bacterial cells (Peter et al., 2015). LAM appears to be present predominately in people with active TB disease and has shown only low cross-reactivity with nontuberculous mycobacterial infections (Qvist et al., 2014).

Although this test is deemed to be a breakthrough in providing point-of-care test for TB, it has been reported to have low sensitivity and specificity (Lawn, 2012; Wood et al., 2012). A meta-analysis of studies using commercial urine LAM assays in patients with microbiologically confirmed pulmonary TB found the sensitivity to range from 13% to 93% and specificity from 87% to 99% (Pai, Minion, Sohn, Zwerling, & Perkins, 2009). Sensitivity was increased in HIV-positive cases and was highest in those with advanced immune suppression (Pai et al., 2009). A study on LAM for the diagnosis of TB in Ghana found an increasing sensitivity among HIV patients and those with advanced stage of the disease (Bjerrum et al., 2015). Based on the increased sensitivity of the test among HIV patients, the World Health Organization is recommending it as an alternative test for people living with HIV and AIDS (WHO, 2015d). In 2014, an enhance LAM which used a magnetic immunoassay platform with high avidity monoclonal antibodies for the detection of LAM reported a sensitivity of the test as 82% and the specificity as 100% (Hamasur, Bruchfeld, VanHelden, Källenius, & Svenson, 2015).

In Ghana, all people with cough reporting at the OPD are supposed to be screened using the screening checklist. Where the individual is eligible for further test, sputum will be requested from the patient for microbiology to isolate tuberculosis bacilli. The general practice is that when test are conducted, laboratories are expected to report positive results on smears and cultures within 24 hours to the primary health care provider for registration and commencement of treatment accordingly (NTP, 2012). This is done to reduce the

infected individual from transmitting the bacilli to other people. However, the non-availability of the test or failure of health workers to request for the test will affect case detection. Also, the inability of the health worker to detect the presence of the micro-organism in the sputum will affect case detection. Chest x-rays are available in Ghana and used to detect changes in the lungs indicative of TB. Hence, diagnosis of TB is a key health system factors that can either facilitate or hinder TB case detection. Once the diagnosis is confirmed, the individual is put on the appropriate treatment.

## 2.7 Treatment for Tuberculosis

Five main medicines are used in the treatment of tuberculosis. These medications are given codes, which allow for the use of short forms to identify the medications. These medications include: rifampicin (R), isoniazid (H), pyrazinamide (Z), streptomycin (S) and ethambutol (E) which are often used in combination (ATC/CDC/ADSA, 2003; WHO, 2010). These medications are given in combination formula such as isoniazid with rifampicin (HR), isoniazid combined with rifampicin and pyrazinamide (HRZ) and finally isoniazid combined with rifampicin, pyrazinamide, and ethambutol (HRZE) (NTP, 2014).

There are two phases in TB treatment. These are the intensive and continuation (NTP, 2014; WHO, 2010). The intensive phase of treatment occurs in the first two months and the medications are often taken using direct observation treatment (DOT) strategy. This strategy requires that patients take the drugs in the presence of a health worker. 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 DOT. Patients who live near the treatment centres are expected to attend clinic every morning for DOT.

Generally, about 90% of patients are managed daily on this ambulatory basis for the entire intensive phase of two months in Ghana (NTP, 2014). 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). Daily intake of the drugs in the presence of health worker may require commuting to health facilities daily and this may have financial implications. This could therefore be a barrier to regular intake. Also, TB is a condition that is stigmatized, hence daily visits to health facility have socio-cultural implications as people may want to hide their condition. This arrangement could also inhibit case detection as people with cough may refuse to go to health facilities to be put on this 2 months DOT during the intensive phase of TB treatment.

The continuation phase of treatment is given for either four or seven additional months depending on the type of treatment and outcome of sputum test after the completion of the intensive phase of two months. The four-month continuation phase is used in large majority of patients. The seven-month continuation phase is recommended only for three groups: 1). patients with cavitary pulmonary tuberculosis caused by drug-susceptible organisms and whose sputum culture obtained at the time of completion of two months of treatment is still positive; 2). patients whose initial phase of treatment did not include pyrazinamide; and 3). patients who are treated with once weekly isoniazid and rifampicin and whose sputum culture obtained at the time of completion of the initial phase was positive (ATC/CDC/ADSA, 2003; WHO, 2010).

This continuation phase of TB treatment period does not require daily supervision of drug intake by a health worker. In this phase, patients are given medication for a period to take home and are encouraged to take the medication in the presence of treatment supporter. The patients are however expected to report at scheduled appointment times to receive their medications and for medical assessment (NTP, 2014).

Since signs and symptoms of the condition may subdue at the continuation phase, some patients may refuse to continue to honour follow-up visits to collect their medication and that can adversely affect TB treatment. The use of a treatment supporter also requires disclosure of the condition to someone which may have socio-cultural implications in communities where TB is stigmatized. This arrangement also requires a robust health information system, which can be used to track defaulters. Hence, the inability of the health system to track patients who default will have negative implications for TB control.

The treatment regimens as stated in the WHO TB Treatment guide (WHO, 2010) comprise:

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

Category II: This applies to previously treated TB patients such as relapse, treatment failure, and treatment after default cases. They are often put on an eight-month regimen consisting of three months of daily supervised rifampicin, isoniazid, pyrazinamide and ethambutol, supplemented by streptomycin during the first two months. This is then followed by five months of daily rifampicin, isoniazid and ethambutol.

Category III: This category refer to children < 12 years. They are put on a six-month regimen, consisting of two months of isoniazid, rifampicin and ethambutol. This is then followed by a four months of isoniazid and rifampicin.

In view of the lack of effective vaccine for TB among adults, the concept of preventive treatment for latent TB infection (LTBI) has emerged in recent times. In this strategy, TB drugs are used to treat LTBI as one of the best ways to prevent it from developing into active TB disease. If active disease has been ruled out, the most common treatment for latent TB infection is isoniazid. Isoniazid preventive therapy (IPT) reduces the risk of developing active TB. The standard regimen is 300 mg daily of isoniazid for six to nine months in adults and adolescents and 5 mg/kg for children. However, the WHO recommends a 36 months or more of treatment for people with HIV, including children (CDC, 2016). Isoniazid and rifapentine can also be combined in some instances (CDC, 2016). Despite the availability of medications to manage both active and latent TB, concerns have been raised about drug resistance in TB treatment.

## 2.8 Drug Resistance and Tuberculosis

Resistance to drugs occurs when a micro-organism is able to overcome the effects of medicinal product and transfers this ability to newly produced micro-organisms (Flora et al., 2013). In this process, the entire strain of bacteria inherits this capacity. In that case it becomes impossible to treat people with that type of bacteria. Regarding tuberculosis, the causes of drug resistance are well known which include failure to adhere to treatment or inappropriate use of anti-tuberculosis medications (Flora et al., 2013). In TB control, multiple drug resistance TB (MDR-TB) is defined as TB that does not respond to at least two of the standard combination of first line drugs with rifampicin, isoniazid, pyrazinamide, and ethambutol. MDR-TB has now emerged in many countries in the world (WHO, 2013a). WHO estimates show that up to 50 million persons worldwide may be infected with drug resistant strains of TB. On yearly basis, it has been estimated that about 300,000 new cases of this type of TB occur across the world. In the year 2012, there were an estimate of 450, 000 new cases of MDR-TB globally (WHO, 2013a).

There are however concerns about the health systems ability to identify and report MDR-TB. This is because Gene Xpert machine which is required to test for MDR-TB is expensive and special skills are required to perform this test. The absence of this test equipment in a health facility implies the inability of that health facility to detect MDR-TB. This is therefore a critical health system barrier to TB case detection. For example, in the year 2014, about 480, 000 cases of MDR-TB were estimated to have occurred, however only about a quarter of these (123, 000) were detected and reported (WHO, 2015b). Despite

this, some studies have shown that a good proportion of emerging TB cases are MDR. In Kenya, it was found that among TB patients, drug resistance (to any drug) accounted for 21.1% while MDR-TB defined as resistance to rifampicin and isoniazid was detected in 6.3% of patients (Kirenga et al., 2015). In Ghana, it was estimated in the year 2010 that 0.9% of all new TB cases and 14% of retreatment cases are MDR-TB (WHO, 2011a). In 2014, the number of notified MDR-TB was reported as 220, 000 among new cases and 180 per 100,000 population for retreatment cases (WHO, 2014c).

Recently, another type of MDR-TB known as extensively drug-resistant tuberculosis (XDR-TB) was discovered. This type of TB (XDR-TB) has been described as a threat to TB treatment because the available anti-tuberculosis cannot treat this type of TB (CDC, 2012). This is because it is resistant to virtually all the available five main medications for treating TB including isoniazid and rifampicin which are the best first line drugs (WHO, 2007) and fluoroquinolones (levofloxacin, gatifloxacin, moxifloxacin) and at least one of the three injectable second-line drug; amikacin, kanamycin, or capreomycin (CDC, 2012). As at 2012, XDR-TB was reported in 84 countries and the average proportion of MDR-TB with XDR-TB was estimated to be 9% (WHO, 2013a). However, no cases of XDR-TB have been reported in Ghana (NTP, 2014).

The effects of drug resistant TB are enormous. Drug resistant TB (MDR-TB and XDR-TB) requires relatively enormous resources, drugs with greater toxicity and is often

associated with high mortality rates (Ahuja et al., 2012). Drug resistant TB has considerable cost implications for households with TB patients since the treatment period is significantly prolonged (from 6 months up to 2 years). This prolonged treatment period may likely impose economic burden on households and the public health system since very expensive drugs and equipment are needed for its management. Furthermore, high cost is required to diagnose drug resistant TB as advanced diagnostic devices and reagents are required (Pooran, Pieterson, Davids, Theron, & Dheda, 2013).

In addition to the effects described above, treating MDR-TB and XDR-TB will require the patient to be hospitalized which can predispose the person to nosocomial infections (Ahuja et al., 2012) and the likelihood of relapse is high (WHO, 2013a). The effects of MDR-and-XDR-TB are exacerbated by TB-HIV co-infections.

## 2.9 Tuberculosis and HIV Co-infection

A complex interaction exists between TB and HIV infection and this has been well documented. In persons infected with *M. tuberculosis* only, the lifetime risk of developing TB ranges between 5-10% whilst those co-infected with HIV, have an annual risk that can exceed 10% (Girardi et al., 2005; Girardi, Raviglione, Antonucci, Godfrey- Faussett, & Ippolito, 2000). It has even been estimated that the risk of developing TB disease is 7-10% per annum for persons who are infected with both *M. tuberculosis* and HIV and who are not receiving highly active anti-retroviral treatment (HAART) for HIV (Swaminathan et al., 2000). This is because HIV increases the risk of infection through reactivation of LTBI

thereby increasing the progression to active disease (WHO, 2006). TB is also one of the most common causes of morbidity and the most common cause of death in HIV-positive adults living in less-developed countries (WHO, 2013b). Because of the increasing risk of TB among HIV patients, case notification rate (CNR) has increased four to six times in sub-Saharan Africa among people living with HIV and AIDS (PLWHA), (Kassu et al., 2007). Nevertheless, it is important to note that people with TB and HIV co-infection are less likely to be infectious to other people. TB-HIV co-infected individuals are either more likely to die early or seek prompt treatment in which case they become less infectious (William & Maher, 2007). As a result of increasing level of TB-HIV co-infection, collaboration between HIV and TB control programmes has been suggested as an appropriate strategy to improve TB case finding in HIV infected individuals and to reduce the risk of HIV infection in TB patients (WHO, 2004a; William & Maher, 2007). Therefore, a system has been put in place by WHO and adopted by TB and HIV endemic countries to screen people with TB for HIV (WHO, 2014b). This strategy has been reported to increase passive case detection. In a study in Western Kenya, it was found that HIV-infection was associated with faster passive case detection (OR 3.5, 95% CI= 2.0, 5.9), (Van't Hoog et al., 2013). In that case, collaboration between HIV and TB control programmes may have potential to increase case detection since co-infections for these conditions are common. Hence, an overview of TB control programme will provide an understanding of the situation globally and in Ghana.

## 2.10 Overview of Tuberculosis Control Programmes

Tuberculosis control programmes are multi-sectorial activities that aim at reducing the burden of the disease. Understanding the control programme is therefore important in any research on tuberculosis prevention and control. Historically, TB has been used as a prime example of a social disease which require the integration of social, economic and environmental interventions in its control strategies (Lönnroth, Jaramillo, Williams, Dye, & Raviglione, 2009). This notwithstanding, initial focus of control activities were rooted in medical models with little attention to socio-cultural dimension of the disease (Amrith, 2002; Brimnes, 2007). After the Second World War, the medical model became the main focus for TB control (Amrith, 2002). This medical model was also complemented with mass vaccination with BCG (Brimnes, 2007; Brimness, 2011). However, it was later discovered that the protective effect and epidemiological impact of BCG vaccination were limited (Rieder, 1999). When effective chemotherapy for TB became available at the end of the 1940s and beginning of 1950s, the control model switched to an almost completely curative focus (Lönnroth et al., 2009). This was because statistical models had predicted that good coverage of effective treatment could result in a rapid decline in TB incidence which was essential in TB control (Styblo & Bumgarner, 1991).

In the year 1991, the World Health Assembly (WHA) resolution recognized TB as a disease that require international attention and this led to increase in efforts to curb its effects across the world (WHA, 1993). In that light, new goals were set for TB control which was to detect about 70% of new smear positive cases, and cure for 85% of such cases, by the year

2000. It was envisioned that achieving these goals could cascade into reducing the incidence rate of TB by 11% per year, and reduce mortality rate by 12% annually (WHA, 1993). Later in 1994, WHO recommended a new strategy named Directly Observed Therapy Short Course (DOTS) to control TB. DOTS strategy has five key components: 1). political commitment by national governments, 2). use of passive case detection strategy, 3). treating confirmed cases using available medications, 4). adequate drug supply and patient adherence, and 5). putting in place a monitoring and evaluation system for TB control activities (WHO, 1994).

The WHO have reported that the DOTS system has resulted in remarkable achievements in TB control within a short period in countries that adopted and implemented it. The number of patients who had been treated under DOTS were reported to have risen to more than 20 million by 2004 (WHO, 2006d). The cure rate across the world for new smear-positive TB cases was 83% in the year 2003, and in the year 2004, the case detection rate was 53% (WHO, 2006d). Despite these achievements, it has been argued that effective and robust health system in addition to identifying contextual issues in various countries is required to sustain these achievements (Macq, Theobald, Dick, & Dembele, 2003; Mahendradhata et al., 2003). This is because some scholars were of the view that the DOTS strategy was developed on the basis of a few controlled studies, and transferred to a variety of other social, economic and cultural contexts without clear guidelines for implementation (Lienhardt & Ogden, 2004).

Likewise, some health researchers claimed that there has been little focus on whether the implementation in different settings is user friendly. Another areas of contention with DOTS strategy was how to address the degree to which clinics and health personnel are culturally-sensitive and whether or not the coercive elements (enforced daily clinic-based treatment) are ethically acceptable (Lienhardt & Ogden, 2004). These counter views were supported by an earlier randomized controlled trial in South Africa which compared DOTS versus self-supervision of treatment. This study findings concluded that the use of DOTS showed no significance in terms of cure-rates (Zwarenstein, Schoeman, Vundule, Lombard, & Tatley, 1998). However, the findings of this study did not result in a policy change because WHO raised issues about the study design. Another two randomized controlled trials followed to reassess the findings of the one conducted in South Africa. One of them, conducted in Thailand, showed a clear benefit from DOTS versus self-administration (Kamolratanakul et al., 1999). In this study in Thailand, family member administered DOTS with weekly support visits from health personnel. The other trial conducted in Pakistan showed no difference between DOTS and self-administration. However, higher cure rates were observed in the group where a family member provided DOTS compared to a health worker providing DOTS (Walley, Khan, Newell, & Khan, 2001). The lessons from these three trials are inconclusive, but raised some doubts about the effectiveness of TB control programmes when DOTS executed by health personnel is a key element of the strategy in its implementation (Lienhardt & Ogden, 2004). This notwithstanding, another study that compared community DOTS and family DOTS system in Nepal showed that community DOTS (DOTS situated at community level) and family-member DOTS (DOTS by family member) achieved success rates of 85% and 89%

respectively. This same study showed an estimated case-finding rates of 63% with the community strategy and 44% with family-member DOTS (Newell, Baral, Pande, Bam, & Malla, 2006). Generally, from the existing literature, it would appear there is no consensus on the effectiveness of DOTS because of contradictory findings in studies conducted in different countries. Tuberculosis control in Ghana has also gone through various historical events in the context of current global DOTS strategy.

## 2.11 Tuberculosis Control in Ghana

Tuberculosis control activities pre-date the independence of Ghana. Reports available at Ghana Health Service (www.ghanahealthservice.org) showed that, as early as July 1954, the Ghana Society for the Prevention of TB was inaugurated. This society was to provide leadership and support to government's determination to reduce the burden of the disease. To foster the activities of TB control following the establishment of this society, nurses were sponsored to Israel where they were trained on TB case management in the early 1960's (GHS, 2015b). In addition, mobile x-ray vans were deplored to communities to facilitate detection and management of TB cases. The National Tuberculosis Control Programme (NTP) was established following a recommendation by Dr. Moses Adibo, former Director of Medical Services between July 1965 and April 1968, when he was working at Winneba government hospital (GHS, 2015b). Since the establishment of NTP, it has been coordinating all tuberculosis-related activities in Ghana.

In the year 1994, NTP of Ghana launched the WHO's DOTS strategy, adopting global target of detecting 70% of people with infectious TB and treating such cases with a cure rate of 85% (NTP, 2014). Based on WHO standards, Ghana is among the countries in which the DOTS strategy has been implemented, covering over 80.6% of the population (WHO, 2009a). Through various strategies implemented by the NTP, Ghana was reported as among the few countries in Africa that had met the World Health Assembly target of 70% TB case detection and 85% treatment success target. TB incidence and prevalence had reduced almost by 50% (WHO, 2013a), though regional variations exist in Ghana across all the dimensions of TB control.

The NTP implements the new Stop TB Strategy of WHO along six strategic areas. The first strategy is to pursue high quality DOTS expansion and enhancement programme. To achieve this, the programme envisioned it would require high political commitments to increase funding for TB related activities. It also requires an improvement in quality of bacteriology to increase case detection. In addition, NTP implemented measures to standardize the treatment for TB by providing supervision to patients, improve drug supply system and good monitoring and evaluation. This first strategy is health system factors to improve diagnosis and expand treatment outlets to remove geographical barriers to treatment.

The second key strategic plan is to address TB/HIV, MDR-TB challenges. This will be accomplished through increasing collaboration between TB and HIV control activities, implement programmes to control MDR-TB and targeting at risk groups such as prisoners, and refugees. This strategy is designed to screen people with increased vulnerability to TB. This is aimed at increasing case detection by expanding screening services to most susceptible group of people.

The third anchor on the strategic plan is strengthening the health system. To do this, NTP took steps to share their innovations with other collaborators and also adopt their own. The fourth pillar in the new stop TB strategy is to increase public-public and public-private mix (PPM) in TB control activities and also ensure adherence to international standards for TB case (ISTC). Through this the NTP collaborates with NGOs and about 135 CSOs in various ways to enhance public awareness about TB with the goal of increasing TB case detection (Bonsu et al., 2014). Both the third and fourth pillars look at research to find innovative ways to increase case detection and treatment. Public-private partnership is aimed at expanding TB case detection and treatment outlets. The fifth strategy adopted is community empowerment through advocacy, communication, social mobilization, and development of a patients' charter for TB patients. Enablers Package (EnP) which is a form of incentive was introduced for TB patients and supporters to offset some of their operational cost. The value of the EnP is US$40 dollars per TB patient registered in Ghana (NTP, 2014). Finally, the sixth strategy is to create enabling environment for operational research and in the area of developing new diagnostic tools, drugs and vaccines. Generally,

all these strategies have been adopted to improve the health system´s ability to detect TB cases to initiate prompt treatment.

## 2.12 Tuberculosis Case Detection

The global DOTS agenda also places emphasis on early case detection and initiation of appropriate treatment. Two main approaches of case detection are available and often used either concurrently or in sequence; passive case detection (findings) and active case findings. Passive case findings (detection) is the strategy of detecting TB among symptomatic patients who present to health facilities with ill-health (van't Hoog et al., 2011). Though this method of case detection is widely used in many TB endemic countries, it is more a reactionary approach by health sector and may miss cases in the community who do not utilize biomedical facilities. This is because passive case search depends on an individual with TB symptoms first recognizing that they have symptoms of TB, and then making a decision to seek health care in a facility resourced to screen people for TB as required in Piot nine stage model of health care effectiveness (Rao et al., 2013). This is a patient-initiated pathway to TB diagnosis involving: 1). a person with active TB experiencing symptoms that he or she recognizes as serious; 2). the person having access to and seeking health care, and presenting spontaneously at an appropriate health facility; 3). a health worker correctly assessing whether the person fulfills the criteria for suspected TB; and 4). The successful use of a diagnostic algorithm with sufficient sensitivity and specificity (WHO, 2013b). Nonetheless, passive case-finding may also involve an element of systematic screening if the identification of people with suspected TB is done systematically for all people seeking care in a health facility or clinic.

This policy was born out of the results of case-finding studies in India and Kenya in the 1970s and 1980s, which found that most people with TB had sought care previously for their respiratory symptoms (Golub, Mohan, Comstock, & Chaisson, 2005; Raviglione & Pio, 2002). The findings of these studies suggest that improved case detection in health facilities would effectively identify people with TB. However, in recent times, the inability to detect all TB cases who need care has renewed interest in using active case finding strategy as opposed to only waiting for people with undiagnosed TB to seek care (Blok et al., 2014).

In Ghana, passive case detection is the main strategy used. Despite the implementation of this policy in all health facilities in Ghana, it is generally reported that case detection remains low. These low case detections have been attributed to health system and community factors. Since 2009, many steps have been taken by the national TB programme and the Ghana Health service to address these challenges identified. In March 2010, Ghana developed standard operating procedures which was aimed at optimizing and standardizing TB case detection activities in both public and private health. In addition, all health facilities in Ghana are expected to have a TB control team to provide oversight responsibility in TB case detection and treatment using the national guidelines or standard operating procedures (SOPs).

Active case detection involves health workers moving into the community in search of suspected TB cases (WHO, 2013b). This approach was adopted to increase TB case detection among people who might have come into contact with TB patients and also general search for TB patients who may not go to biomedical health facility with distressing symptoms. Again, the adoption of this strategy was informed by research findings. An earlier study had shown that an intervention to use nurses on outreach programme to screen for TB (active case search) increased TB case detection rate by 2.2% and increased the proportion of patients appropriately managed by 10% (Fairall et al., 2010). Prior to the adoption of this strategy, this method was only used by countries to determine the prevalence of TB in communities and the nation. Nevertheless, active case findings has been reported to be less cost effective in areas with low TB endemicity (Azman, Golub, & Dowdy, 2014).

Another approach employed in recent times is systematic screening for active TB. Systematic screening for active TB is defined as the systematic identification of people with suspected active TB, in a predetermined target group (risk group), using tests, examinations or other procedures that can be applied rapidly (WHO, 2013b). A risk group may be a group of people sharing a specific individual-level risk profile. These include close contact with a person who has active TB; or living with HIV or having diabetes; or being a migrant, prisoners and people living in an urban slum (WHO, 2013b). Screening for TB among all these categories of people is considered important because of the availability of data to support their vulnerability to TB. A systematic and meta-analysis on

tuberculosis prevalence among contacts (systematic screening) has shown that about 4.5% of contacts developed TB (Morrison, Pai, & Hopewell, 2008). Blok et al., (2015), also found that contact investigation contributed between <1% and 14% to all sputum confirmed cases diagnosed in eleven TB high endemic countries. The risk of infection among contacts has been reported to be high in the first year of exposure, with children under five years having higher odds of getting infected (Fox, Barry, Britton, & Marks, 2013; Jaganath et al., 2013).

The NTP policy document requires that people with cough who attend OPD are screened for TB in line with the requirements of passive case finding strategy. Also, contacts of people with TB are also expected to be screened for TB. In addition, by way of systematic and active case detection, patients with HIV are screened for TB and their close associate are also screened (NTP, 2014). Furthermore, systematic screening for TB among vulnerable groups including diabetic clinics, children's clinics, admission wards and other patient waiting areas are being implemented across health facilities in Ghana (Bonsu et al., 2014).

Trends in TB case detection have generally been fluctuating in the UWR of Ghana. In the year 2007, 27% of the cases were detected in the region and this increased to 28% in 2008. In 2009, the case detection rate was 34% which also decreased to 27% in 2010. However, in the year 2014, case detection rate increased to 42% (UWRHD/NTP/The World Bank,

2015). Despite this, many cases remain undetected at the community and socio-cultural factors have been identified as partly responsible for the low case detection in some TB endemic settings (Sreeramareddy, Harsha, & Arokiasamy, 2013; West, Gadkowski, Ostbye, Piedrahita, & Stout, 2008).

## 2.13 Socio-Cultural Factors Affecting Tuberculosis Case Detection and Treatment

Several socio-cultural factors have been reported to affect tuberculosis case detection, treatment, adherence to treatment and treatment outcomes. These factors may vary across countries and regions in the world. Some of these factors are individual, family, community and societal level factors. Earlier scholars have indicated that the human and cultural elements of TB control is often disregarded (Grange & Festenstein, 1993; Rubel & Garro, 1992; Westaway & Wolmarans, 1994) though the health culture of the people have been found to be capable of causing a significant improvement in TB control (Rubel & Garro, 1992). These beliefs range from the causes, mode of transmission, signs and symptoms to the management and prevention of TB.

### 2.13.1 Beliefs about Causes, Mode of Transmission and Signs and Symptoms of Tuberculosis

The local beliefs about causes of a condition are essential as it has implications in service utilization and health seeking. Medical anthropologists are of the view that understanding local world views of causes of condition and illness is required for appropriate interventions (Blumhagen, 1980; Nichter, 1994). For tuberculosis infections, studies indicate the existence of local beliefs about the causes and mode of transmission of the disease. In Philippines, TB was perceived to be caused by a weak lungs (Nichter, 1994). In

Zambia, Mogensen (1997) reported a form of TB called "*kahungo"* which is believed to be caused by having sex with a woman who has just had a miscarriage among the Tonga people. This condition was believed to be similar to HIV infection. Associating tuberculosis to HIV and AIDS has also be found to prevent people from seeking health care for fear of being diagnosed of HIV in Malawi (Woolf, Salaniponi, & Kemp, 2006), a situation which can affect case detection. As a study in Kenya showed, TB was believed to be caused by unhealthy lifestyles, intake of local alcoholic drinks, smoking, sharing of facilities with TB patients and inheritance (Liefooghe, Baliddawa, Kipruto, Vermeire, & De Munynck, 1997). Among Vietnamese, respondents believed there are four types of TB with different causative factors. These were (1). "*Lao truyen*" which is believed to be hereditary (2) "*Lao luc*" which is referred to as physical TB which is caused by hard work, "*Lao tam*" which is referred to as mental TB with worrying too much being the aetiological factors and (4). "*Lao phoi*" which is TB of the lungs with biological aetiologic factors (Nguyen Hoang Long, Johansson, Diwan, & Winkvist, 1999).

In South Africa, people believed that TB was caused by violation of cultural norms which requires an individual from abstaining from sex after the death of a family member and post-spontaneous abortions for women (Edginton, Sekatane, & Goldstein, 2002). A study in Morocco also reported that people attributed TB to excess water in the abdomen (Ottmani, Obermeyer, Bencheikh, & Mahjour, 2008). In their study in Nalgonda district in South India, it was found that people attributed TB to spiritual causes such as a sin against the gods, punishment from a deity, witchcraft, evil eye, fate, and imbalance in hot-cold

qualities in the body, and bad blood (Venkatraju & Prasad, 2010). In Colombia, Hernandez et al., (2013) found that communities believed TB was a disease of both the body and spirit and could be transmitted either through direct contact or witchcraft and hence traditional healers were believed to be better placed to handle such conditions. A study in Ghana reported that TB was believed to be spiritual condition and caused by ancestral punishment (Cofie & Liu, 2014). This therefore had the potential to undermine TB case detection.

Another area of interest is local beliefs about mode of transmission of TB in the community. In North Carolina, respondents in a study believed TB was transmitted the same way as HIV infection in addition to sharing of eating utensil and transmission by fomites (West, Gadkowski, Ostbye, Piedrahita, & Stout, 2008). One study in India reported that people believed TB could be transmitted through food (32.4%), sharing utensils (18.2%), and touching a person with tuberculosis (12.3%), (Sreeramareddy, Harsha, & Arokiasamy, 2013). In Tanzania, Ismail & Josephat (2014) also found similar findings regarding the transmission of TB through sharing of utensils, food, sexual contacts and mosquito bites. In the Pacific Island, Viney et al., (2014) found that people attributed TB to smoking of cigarettes, kava, ingestion of contaminated food, abuse of alcohol, sharing of utensils and sorcery. A study in the Shama Ahanta Metropolitan district in Ghana reported that the community believed TB could be transmitted through stepping in sputum, sharing cooking utensils/plates/cups with a patients with TB, working in a dusty environment, hard work and spiritual or evil forces (Dodor, Neal, & Kelly, 2008).

Despite the different beliefs about the cause of tuberculosis, cough has been widely reported as the main symptom that is used to recognize the disease. However, from all indications various forms of cough exist and have been documented in literature (Long et al., 1999; Mogensen, 1997; Viney et al., 2014). This notwithstanding, a study among Kenyans found that initial symptoms such as cough and fever were believed to be due to malaria and common cold and therefore given little attention. The main symptoms often recognized as TB by the community is coughing out blood, chest pains, loss of appetite, difficulty in breathing and severe weight loss (Liefooghe et al., 1997). Smith (1994) has earlier reported that in Nepal, cough, chest pains and difficulty in breathing were the symptoms that are used to recognize TB.

The beliefs on cause, mode of transmission and signs and symptoms determine the type of management of the condition in the community.

### 2.13.2 Beliefs about Management of Tuberculosis

Beliefs about management of TB can also affect TB case detection. A study in Peru found that patients with cough suspected to be TB used home remedies and local treatment. In that study, 63% self-medicated and 52% used traditional remedies (Oeser et al., 2005). In Kenya, respondents generally recognized that hospital treatment was necessary however, prolonged self-treatment and use of herbal medication were deemed to be more appropriate for TB cure with shorter duration than western medicine (Liefooghe et al., 1997). Similarly, another study in Rwanda found that people with chronic cough used herbal medicine (Ngang, Ntaganira, Kalk, Wolter, & Ecks, 2007). Though the efficacy of local plants in treating TB is unknown, participants in one study mentioned over 30 medicinal plants

which patients with TB are given to take when they visit traditional medical practitioners (Orodho, Kirimuhuzya, Otieno, Magadula, & Okemo, 2011).

In another study, it was reported that the concept of perceiving TB as a traditional illness affected longer diagnostic delay among illiterate patients. In that same study, the reaction of male relatives to TB patients was also found to influence positively treatment outcomes for females with TB (Date & Okita, 2005). The perception that TB was a traditional illness made people with such symptoms to use non-orthodox health outlets resulting in delay in case diagnosis and detection. Visits to traditional healers have also been reported to contribute to delay in seeking health care and diagnosis in other studies (Rajeswari et al., 2002; Uplekar et al., 2001; Yamasaki-Nakagawa et al., 2001). Similarly, a study among TB patients in Western Kenya found that majority of the patients initially self-treated with herbal remedies or drugs purchased from kiosks or pharmacies before seeking professional care when such treatment did not subside symptoms (Ayisi et al., 2011). In China, it was found that some patients first sought health care from traditional medical practitioners which affected case detection as such health outlets were not well equipped to diagnose TB (Li et al., 2013) as required in Piot model (Rao et al., 2013) and social cognitive theory (Bandura, 2004). Contrary to this findings, a study in Pacific Island reported about 89% of the respondents believed the hospital was the best place for TB treatment (Viney et al., 2014). A study in Southern and Northern Ghana found that people believed TB was a traditional and spiritual condition and therefore sought health care at non-orthodox health outlets (Ahorlu & Bonsu, 2013; Dodor & Afenyadu, 2005). The variations in these beliefs

about the management of TB also affect the community views about how to prevent the condition.

### 2.13.3 Beliefs about Prevention of Tuberculosis

Local beliefs about the prevention of TB are essential in TB control. However, there is paucity of literature regarding ways of preventing tuberculosis. In their study conducted in the 1960s, it was found that half of participants indicated TB could be prevented through avoiding exposure to the bacteria from infected people, fresh air, good rest and taking balanced diet. In this same study, 34% believed TB could be prevented through regular test and going for medical checkup, however, 19% believed nothing could be done to prevent TB (Kirscht, Haefner, Kegeles, & Rosenstock, 1966). In North Carolina, it was reported that participants employed hand washing and other hand hygiene techniques as ways of preventing TB (West et al., 2008). This belief is capable of reducing an individual's perceived vulnerability and health seeking behaviour for cough as it creates a false sense of security (Carey et al., 1997), a situation that can affect case detection and treatment.

In addition, TB is believed to be preventable through reduction of an individual's workload. This is because, overwork was believed to make the individual lungs weak, making the person vulnerable to pneumonia which is a precursor to TB (Nicher, 1994). Similarly, avoiding dust, overwork and smoking were identified as the best ways to prevent TB (Steen & Mazonde, 1999). In Ghana, a study found that community believed TB could be prevented through avoiding contacts with people with the condition and avoiding spiritual aetiological factors (Ahorlu & Bonsu, 2013). These preventive strategies are generally

grounded on the perceived causes and mode of transmission of TB in the community and affect how people relate to people with TB. Hence, it is important to explore the experience of people with TB.

### 2.13.4 Experiences of Tuberculosis Patients

Studies have reported on positive and negative experiences of tuberculosis both at the community and health system. In Vietnam, Johansson et al., (1996) reported TB was believed to be a "dirty" disease and hence people with TB received less respect and were stigmatized. Another study found that TB patients indicated both family and friends shunned them upon discovering they had the disease (Kelly, 1999). A study among TB patients in London showed that they were being stigmatized but expressed satisfaction about care they received at the clinic (Nnoaham, Pool, Bothamley, & Grant, 2006). Venkatraju and Prasad (2013) also found that majority of patients with TB indicated they were very surprised at the diagnosis and were going through some psychosocial distress.

A study among TB patients in Kenya reported friends and community members generally avoided patients with TB. However, this study found that close relatives provided support to patients (Liefooghe et al., 1997). In Nigeria, a study among patients with TB showed that they were stigmatised by both family members and the community (Abioye, Omotayo, & Alakija, 2011). In Ghana, a study among TB patients in southern part of the country has revealed that TB patients were stigmatised and as a result they experienced depression, exhibited some suicidal tendencies and isolated within families and communities (Dodor, 2012), a factor which affected their health seeking behaviour and invariably case detection.

Perceived stigma and lack of awareness have also been reported to contribute to the late presentation and low detection rate of TB in a study in southwestern Ethiopia (Abebe et al., 2010). Contrary to these findings, a study in southern Thailand found that stigma does not have a clinically relevant effect on TB case detection and patient delay in seeking for health at orthodox health care facilities (Pungrassami et al., 2010). It is therefore essential to review the health seeking behaviour of people and how it can affect TB case detection and treatment. This is required to complete the spectrum of the community related factors that may affect TB case detection and prompt treatment.

## 2.14 Health Seeking Behaviour and How It Affects tuberculosis Case Detection

Using the conceptual models (cognitive behavioural and PEN-3 model) that guided this study, several factors can influence health seeking behaviour and therefore affect tuberculosis case detection. These factors can be put into three main categories. These categories according to the model include: Personal level, behaviour and environment level factors (which in PEN-model is referred to as nurturers and enhancers). Both social cognitive theory and PEN-3 model agree that sometimes in arriving at a decision to either seek health or not, two or more of these factors may be appraised (Airhihenbuwa *e*t al., 2014; Bandura, 2004). This accounts for the reciprocal determinism in the social cognitive theory (Bandura, 2004).

Tuberculosis case detection is predicated on passive case findings, hence knowledge on tuberculosis transmission, signs and symptoms, treatment and management are important

consideration in health seeking. This is what Piot health effectiveness model refers to as awareness (stage 1). In India, it was found that knowledge about TB symptoms, modes of transmission of TB, and misconceptions about TB transmission among the general public had an impact on health-care seeking behaviour of people with disease (Sharma et al., 2005; Suganthi et al., 2008). In another study among 476 pulmonary TB suspects, 395 (83.0%) reported to have heard of TB but 50.4% of the respondents believed it was caused by "evil eye", therefore spiritual remedies were deemed more appropriate and pursued (Abebe et al., 2010). Furthermore, a study in Uganda reported that respondents believed TB was contagious but not necessarily airborne. Therefore, combining care from traditional healers and the biomedical system was reported to be common in this study (Buregyeya et al., 2011). In a related study, it was found that appropriate health-seeking behaviour (biomedical) was positively associated with knowing the disease, knowing key symptoms, and perceived curability, (Luis, Kamp, Mitchell, Henriksen, & Van Leth, 2011). Similar findings were also reported in Kenya where misinterpretation of early symptoms was found to be the most common reason people with TB did not report to health facility for treatment (Ayisi et al., 2011).

The Ghana Demographic and Health Survey (GDHS) showed that knowledge about the mode of transmission of tuberculosis is high in Ghana. The GDHS found that 78% of women and 81% of men aged 15-49 years correctly responded that TB is spread through air by coughing with higher knowledge among urban than among rural respondents.

However, this survey reported lowest knowledge of 58.7% and 64% for females and male respondents from UWR respectively (GSS/GHS/Macro International, 2015).

Age is another factor that can affect health seeking behaviour of individuals. In their study among Gambians, it was discovered that patients with tuberculosis that visited an alternative health provider first were significantly older than those who visited biomedical health system first (Kasse et al., 2006). Perceived risk of condition is also closely related to age as TB is reported to be common among certain categories of age groups (children and those above 40 years) and therefore an important factor in determining health seeking. In their study in Angola, Luis et al., (2011) found that respondents who perceived a personal risk for TB were less likely to have an appropriate intended health-seeking behaviour. Another important individual level factor is the perception of lack of control over ones condition (subjective norms). The importance of subjective norms as a predictor of behavioural intentions have also been confirmed in other studies from sub-Saharan Africa (Bosompra, 2001; Giles, Liddell, & Bydawell, 2005). The lack of control has been reported to have a disempowering effect, reducing the drive for seeking treatment in South Africa (Murray et al., 2013).

Another individual level factor that has been reported to determine health seeking is socio-economic status which has often been described in terms of level of income, level of education, place of residence and wealth index. A study conducted by Xu et al., (2010)

revealed that patient's socio economic status is a major factor influencing TB treatment seeking and success. The study noted that high socio-economic status of patients particularly high income levels was associated with seeking treatment and successful TB treatment outcome. The study further described a situation of a vicious cycle between treatment outcomes and patients financial situation, indicating that patients with low income tend to seek treatment late and therefore have poor treatment outcomes and also spend much of their little income on medical care as a result of treatment failure. However, another study conducted in Indonisia, reported a contrasting finding associating low socio-economic status with early treatment seeking. Ahmad et al., (2009) found in their study that clinical presentation of patients may be more severe in poor patients which accounts for the early care seeking. The authors associated the severity or faster progression of the disease in poor patients to poor nutritional status. To this end, as a measure to reduce the burden of TB and increase health seeking at biomedical health facility, TB treatment has been made free. Another study has showed that people who are aware that TB treatment was free were more likely to seek health care at biomedical health facilities than those who did not know that TB treatment was free (Luis et al., 2011).

Furthermore, another individual level factor which determine health seeking behaviour is gender with different reasons adduced as responsible for this behaviour. In a study in Vietnam, it was found that the main factor contributing to delay among women in seeking health was fear of social isolation from their family or the community. However, the main factor contributing to delay among men was described as fear of individual costs of

diagnosis and treatment (Johansson, Long, Diwan, & Winkvist, 2000). In a related study in Bangladesh, it was found that men delay in seeking health care than women with a mean patient delay for seeking health as 63 days (range 14-210 days). This study findings further revealed that gender differences in treatment seeking behaviours was associated with socio-cultural barriers, particularly among females in their access to TB care (Ahsan et al., 2004). In related study in Peru, it was reported that gender difference in seeking care was because people generally perceived TB for woman as less important as compared to men (Onifade et al., 2010).

Staff attitude though more of health system factor has also been identified as an important consideration in health seeking behaviour both among males and females. Staff attitude which falls under the environmental factors is a predictor of where an individual will seek for health care. In a study, staff attitudes and quality of health service facilities were described as not always consistent to people's expectations of appropriate health services and therefore made people hesitant in using the biomedical health facilities (Johansson et al., 2000).

Therefore, a study such as this is required to identify the health seeking behaviour of community members and people with TB to design strategies that can help increase appropriate health seeking to avoid delays that affect case detection. The undetected cases are also responsible for maintaining the disease transmission cycle in the community. It is

important to break this cycle to be able to control TB in the community. Nonetheless, breaking the cycle at the community level alone cannot ensure effective TB control unless barriers at the health system are identified and addressed.

## 2.15 The Health System and TB Case Detection and Treatment

The WHO defines the health system, as all activities with the primary purposes to promote, restore or maintain health (WHO, 2009b). In the year 2007, the WHO identified six building blocks that are deemed relevant in strengthening the health system. These building blocks include: leadership/governance, service delivery, health workforce, management information system, medical supplies/equipment, and health financing (JCIE, 2009). These building blocks have also be identified as essential in any disease control (WHO, 2009b). The six WHO strategies on DOTS referred to earlier are structured along the six building blocks of health system strengthening.

### 2.15.1 The Role of Service Delivery in TB Case Detection and Treatment

Service delivery is an output of the inputs into the health system, such as the health workforce, procurement and supplies, and financing (WHO, 2006b). Availability of health facilities to provide service to community is a core component of service delivery. These health service delivery points are therefore very important in TB case detection and treatment. The main health facilities that are directly involved in TB case detection and treatment are hospitals, clinics, pharmacies, maternity homes, laboratories and other diagnostic centres where people with cough may report for care or TB could be suspected whilst attending to clients. As at 2015, there were about 2,438 hospitals, 515 pharmacies and 215 maternity homes providing healthcare in Ghana. Also, there were about 94

laboratories, and 4 diagnostic centres across Ghana (GHS, 2015). The UWR has 144 hospitals, 12 pharmacies, 5 maternity homes with several health centres and clinic where people with cough may report for care. The average number of hospitals in Ghana is 224 as against 144 in UWR. There are 21 laboratories that can conduct test for TB in the UWR. The health facilities resourced to diagnose TB are often located at the district levels (GHS, 2013). Thus, people with cough suggestive of TB will have to travel to these places to be able to undergo test for diagnosis. This can affect case detection if the service outlets are far from the patient's place of residence.

Studies have revealed that, the way and manner health professionals receive and treat patients at health facilities has the tendency to either encourage or discourage them from coming for treatment. For instance, findings from a study conducted by Gebremariam et al., (2010) showed that patients who received good care were encouraged to go to health facilities for treatment. Another study has reported that TB patients did not seek for health care at biomedical facilities or refuse to go for treatment after a treatment is missed because they were afraid they will be reprimanded by a health worker (Munro et al., 2007). This refusal to honour follow-up health appointments has the tendency to affect TB treatment as it will lead to patients defaulting and dropout. In Ghana, an earlier study found that a cordial relationship between patients and health staff motivated TB patients to complete their treatment (Dodor & Afenyadu, 2005).

In Ghana, TB services are offered at public health facilities, including faith-based institutions as well as designated private health clinics. There are 257 TB diagnostic sites and 661 laboratories country wide and about 1,600 TB treatment sites, however majority are located in urban areas (NTP, 2014). The service delivery is both health facility-based and community-based. Health facilities make the diagnoses and put the patients on treatment whilst community health workers and volunteers assist in the management and case detection. Community health workers and community volunteers participate as treatment supporters and also engage in household TB education, defaulter prevention and tracing. Their activities are supported by an incentive system known as the Enablers Package (EnP) of US$40 dollars per TB patient (NTP, 2014).

According to the NTP's guidelines, 50% of the EnP is often given to TB patients, 30% to the health care providers involved in TB care and 20% to the facility that provide the TB care. This is known as the 50:30:20 rule in the administration of the DOTS system. Good service delivery and the incentive package is expected to encourage people with TB to report and also the health workers to intensify the search for cases. Nonetheless, a study in southern Ghana showed that most patients found the attitude and behaviour of health professionals towards them demeaning (Dodor, 2012) and this may discourage them from going to the health facility when they experience symptoms of TB.

Provision of health education and knowledge on TB can promote good health seeking. Adequate knowledge about the spread of TB during treatment may prevent needless social isolation, while understanding the duration of treatment has been reported to give the patient a better outlook about his/her abilities in the near future (Mkopi et al., 2013). Also, providing adequate information on the potential side effects of TB drug before the start of the treatment can also help to sustain adherence. However, it has been found in a study that providing information on the potential side effects of TB drugs did not appear to be a priority for a significant number of healthcare providers, since approximately one-third of patients did not receive any information on side effects (Munro et al., 2007). This is even against the background that a study has found an association between experiencing side effects and adherence to TB treatment with patients who experience side effects more likely to discontinue treatment (Siemion-Szcześniak & Kuś, 2009). A related study in Uganda reported that community's concerns about pill burden and quality of care affected health seeking at biomedical health facilities (Buregyeya et al., 2011).

Choices of place to seek health and treatment has also been reported as a health system related factor that affects case detection. In their study, Mkopi et al., (2013) found that many patients were not given a choice by health workers to decide their place of treatment. The study revealed that facility based treatment was forced on patients which was likely to compromise adherence particularly in the situation where the distance between the patient's residence and the health facility was too far (Mkopi et al., 2013). Also, cost of transportation to treatment centres can affect patients ability to go to treatment centres and

this is particularly a challenge for patients who are poor. On the other hand, if patients are forced to follow home-based DOT, this may also result in poor treatment adherence especially when they do not have a reliable treatment supporter (Mkopi et al., 2013). If the human resources for TB control programme are adequate and fairly distributed across communities, patients can be given the option to decide their preferred place for TB care which can improve TB case detection and treatment.

### 2.15.2 Human Resources in TB Control

Human resources are often measured as an indicator of number of qualified health workers per population. This is done by assessing the number of health personnel (physicians, nurses and midwives) that are employed full-time in a given year in public and private health establishments expressed as the density per 10,000 population (PAHO/WHO, 2011). Based on this formula, the WHO targets for developing country is a ratio of one doctor or nurse to 1,000 population.

Aside this ratio, a comprehensive score sheet has been developed which is used to monitor the management aspect of human resource which is also essential in service delivery. This comprises of a set of eight questions by the WHO to monitor human resource management in health service delivery (see Appendix H). These questions collect data on availability of human resource units and functions within the overall administrative structure. According to WHO, this checklist should be completed by individuals in the health system who are qualified to be key informants in human resources (PAHO/WHO, 2011). It is

recommended that at least two people complete this checklist for an average to be determined for interpretation.

Apart from these areas, periodic in-service training is also required to ensure that workers update their knowledge and are well-equipped with the knowledge and skills required to deliver quality health service (USAID, 2011). Many studies have showed that good human resources affect the quality of health care (Dieleman, Gerretsen, & van der Wilt, 2009; Pallikadavath, Singh, Ogollah, Dean, & Stones, 2013; Teklehaimanot & Teklehaimanot, 2013).

The health human resources engaged in TB related activities in Ghana, work in both public and private sectors. The private-for-profit health sector employs about 10% of the professional health workers, although they have 39% of health facilities in the country (MOH, 2014). It is however reported that many of the health professionals employed full-time in public sector also spend part of their time working in the private facilities for extra income (MOH, 2011). In the year 2013, the doctor to population ratio was one doctor per 10,170 in Ghana, which is less than the WHO recommendation of one doctor to 1,000 population. The nurse population ratio was one nurse to 8,000 citizens which also falls short of WHO target of one nurse per 1,000 citizens (MOH, 2014). It has been well documented that coverage rates of key health interventions and performance on key indicators are lower in areas with relatively low numbers of health workers than in areas

with higher concentrations of health workforce (Chen et al., 2004; Speybroeck, Kinfu, Dal Poz, & Evans, 2006).

Even though the doctor-patient and nurse-patient ratios have progressively improved over the years, rural-urban inequities still exist, as majority of the health workers are reported to be working in urban areas (MOH, 2011; MOH, 2014). These staff work in all health-related programmes including the tuberculosis control programme in Ghana. Shortage of staff, their schedules and funds to perform tasks such as patient education, treatment supervision, home visits and case finding also hinder the success of the TB control programmes (Watkins, Rouse, & Plant, 2004). One major challenge in human resource has been identified as competing demand on staff time. This is because the health system runs many programmes with few staff, creating a situation where one person can handle more than one programme. Consequently, they do not have time to visit patients (Dieleman & Harnmeijer, 2006), which could be used as opportunity to screen households for TB. The idea of the vertical TB control programme was to have dedicated staff for TB activities but staff at the district level are still involved in several other programmes. This coupled with dwindling financial resources makes monitoring and follow up activities difficult (USAID, 2014).

Shortage of staff also has effect on delays in care at the health facility which can affect quality of care (Dieleman & Harnmeijer, 2006). A study which compared delays at health

facilities reported that compared with men, women experienced longer delays at various stages of the clinical process of help seeking for TB in Bangladesh, which were attributed partly to shortage of staff (Karim, Islam, Chowdhury, Johansson, & Diwan, 2007).

Additionally, staff level of education/capacity to rapidly detect TB is important to improve case detection and initiation of early treatment. Watkins et al., (2004), revealed in their study among nurses and professional paramedics that majority of them were of the view that their training did not adequately prepare them for their role in TB control. A study in Indonisia, for example reported that early contact with a facility implementing DOTS did not reduce diagnostic delays as majority of the patients with cough suggestive of TB were treated for cough and other symptoms without screening them for TB (Ahmad et al., 2009). Another study undertaken in Zimbabwe attributed low TB case detection to nurses not routinely requesting for sputum for examination in patients presenting with a cough or history of previous treatment for cough (Chadambuka et al., 2011). Requesting for sputum from all patients who report with cough at OPD is a core component of DOTS. However, this area remains unexplored in research in Ghana. This notwithstanding, effective implementation of all key areas in the DOTS policy will require good leadership and governance.

### 2.15.3 Leadership and Governance in TB Control

Governance and leadership include a range of structures and processes through which policies, both formal and informal are developed to achieve health-related goals, including legislation, regulation of implementation of policies and oversight. Governance also

encompass accountability structures and providing incentives, and policies to set and maintain strategic direction in health service (Brinkerhoff & Bossert, 2014; WHO, 2009b). There are two African-relevant ways of measuring governance. These include the World Bank governance index (WHO, 2008) and the Ibrahim Index of African Governance (Mo Ibrahim Foundation, 2010). These indices assess various aspects of leadership and governance and have in recent times being used to assess the impact of good governance on under five mortality (Emamgholipour & Asemane, 2016) and health system performance (Olafsdottir, Reidpath, Pokhrel, & Allotey, 2011). Though these indices measure leadership and governance in generally, three interrelated areas emerged as important in assessing leadership and governance in health. These include: 1). setting strategic direction and objectives; 2). Making policies, laws, rules, regulations, or decisions, and raising and deploying resources to accomplish strategic goals and objectives; and 3). Overseeing and making sure that the strategic goals and objectives are accomplished (USAID, 2014). These key areas are therefore often used to assess the role leadership and governance is playing in the health system by transforming them into indicators.

In general, leadership and governance has been reported to have positive impact on health interventions. In Uganda, good governance was reported to have resulted in significant increase in the weight of infants and reduction in under five mortality by 33% (Bjorkman & Svensson, 2009). In their study of 46 African countries, Olafsdottir et al., (2011) found an inverse relationship between good governance and under five mortality rate after

controlling for other variables such as health care, finance, education, and water and sanitation. In their study among 29 Organization for Economic Co-operation and Development (OECD) countries, it was also found that good governance significantly reduced under five mortality (Emamgholipour & Asemane, 2016). A longitudinal study conducted in six provinces in Kenya between 2000 to 2010 showed that training of key health managers such as nurses, doctors and other paramedical staff in a Leadership Development Programme (LDP) led to a significant increase ($p<0.05$) in their performance and health indicators (Selemani et al., 2013). In Ghana, it was found that decentralizing the flow of information from government to health facilities and health facility administrators to health workers were relevant in improving health service performance (Amporfu & Nonvignon, 2015).

Leadership and governance related issues have been reported to affect TB case detection and treatment. A multiple case studies of district health systems in TB control in Cameroon found that the management teams' in-charge of the District Health Services are not involved in TB control. In this study, the researchers identified that district hospitals that were well-managed performed better in terms of TB control than those not well managed (Keugoung, Macq, Buve, Meli, & Criel, 2013). Since majority of TB control programmes are multi-donor funded projects, it therefore appears that integrating such funded project into existing National Health Service programmes to promote efficiency remains a challenge.

Leadership and governance structure of tuberculosis control programme is structured along the three-tier administrative system of the Ghana Health Service: National, Regional and District levels. However, in terms of service delivery a five-tiered is operational: Tertiary, Regional, District, Sub-district and Community Health Planning and Services (CHPS) Zones (MOH, 2011). Tuberculosis control in Ghana is fully integrated to the Ghana Health Service. At the National level, there is Director in-charge of the tuberculosis control, a regional tuberculosis control coordinator at the regional level. In some regions, the TB team is made up of various professionals: regional laboratory biomedical scientist, pharmacist, doctor in-charge of the TB clinic, district director of nursing services, and regional disease control/surveillance officer. In other regions the team consists of only the TB coordinator supported by the deputy director of public health (MOH, 2009b). At the district level is a district tuberculosis coordinator. However, the regional TB coordinators and the district TB coordinators report to the regional directors and in some instance the National TB director and district directors respectively. These individuals provide leadership at various levels (NTP, 2014). Despite this, the main leadership and governance issue reported to affect TB control in Ghana is the lack of communication between sub-district facilities and the district hospital. This was found in a study in the Sissala East district in the UWR (Ahorlu & Bonsu, 2013). Poor coordination between various service delivery points also has negative effects on logistics and supply management (USAID, 2014) which can affect TB control activities.

### 2.15.4 Logistics and Supplies for TB Control Activities

Logistics and supplies entail a system of ensuring that the right products and commodities are delivered at the right time, right place and in right quantities. There are eight related areas in the management cycle of logistic and supplies. These include; storage management, good inventory management and stock control, distribution of appropriate stock from the health facility storeroom, good dispensing practices, rational prescription and use of medicines, disposal of expired, damaged, or obsolete items and training and performance improvement (USAID, 2014). When these practices are fully operationalized, it would lead to the availability of health commodities for use by patients. Therefore in assessing the system for logistics and supplies management, these factors are often applied (USAID, 2014).

To effectively diagnose and treat patients to protect the population from further transmission of this infectious disease, an uninterrupted supply of quality-assured facilities and equipment and various medication are required. Studies across countries with high TB prevalence have shown that logistical challenges are a major barrier to TB control. A study that explored the barriers to TB case detection in district health system in Malawi found logistical problems as the main health system barrier (Woolf et al., 2006). In Zimbabwe, it was also found that the lack of logistics and ineffective management of tuberculosis logistics were barriers to tuberculosis control activities in that country (Printz, Alt, Mudzimu, & Ndlovu, 2009).

The supply of medicines have also been reported as one barrier to effective TB case management in the health system (WHO, 2015c). This emanates from ineffective and inefficient pharmaceutical systems. Consequently, nations implementing the vertical programme on HIV and TB control were entreated to implement systems to improve pharmaceutical supply management (WHO/UNAIDS, 2011). To this end, many countries including Ghana have set up a central essential medicine supply system which consist of Central Medical Store and distributions to the regional and district level (MOH, 2009; WHO, 2014a).

Another medicine related challenge reported in other countries is the use, supervision and management of TB-related medicinal commodities. In the Democratic Republic of Congo, it was found that supervision of drug management for TB programme was being hampered by the lack of motor vehicles or other means of transport. It was also found that the private sector is not usually involved in TB drug treatment because of the free service in the public sector including drugs (USAID, 2014). This therefore limited the number of health facilities available for TB case detection and treatment.

In Ghana, as part of strategic plan to enhance tuberculosis control, all district directors were supposed to set up DOTS centres in all health facilities (at least two functioning microscopes for 100,000 population), (MOH, 2009b). This was envisioned to increase case detection and make treatment accessible to Ghanaians. In line with that, all district hospitals

and sub-district health centres have DOTS centres and manage the finance they receive for TB control activities.

### 2.15.5 Health Financing of TB Control Programmes

Health financing is concerned with accounting and budgeting, and how health service is being financed (WHO, 2009b). This looks at how health interventions are funded and how individuals pay for the health care they seek. Total funding for the health sector in Ghana has been reported to be growing nominally at 34% per annum between 2009 and 2014, with the highest growth of 53% experienced in 2012 over 2011 expenditure and with the minimal growth of 22% in 2014 over 2013 (WHO, 2015e). The health sector is financed mainly from four main sources; Government (GOG), National Health Insurance Fund (NHIF), Internal Generated Funds (IGF) and external financing. For the year 2014, GOG accounted for 28.2%, as against 21.1% for NHIF, 31.9% for IGF and 18.3% for external financing (WHO, 2015e). The proportion of government Medium Term Expenditure Framework allocated to the health sector in Ghana has been reported to remain above the Abuja target of 15% (MOH, 2014).

Globally, the main sources of funding for TB control programme have been through donor and government (WHO, 2011b) and this is also applicable in the Ghanaian context (MOH, 2014). Funding for TB control have been reported to have increased since the launched of stop TB control programme (WHO, 2014a). It has been documented that total funding grew from $1·7 billion in 2002 to $4·4 billion in 2011 which were mostly spent on diagnosis and treatment of drug-susceptible TB globally (Floyd, Fitzpatrick, Pantoja, & Raviglione,

2013). It has also been reported that 43 million people were successfully treated for tuberculosis at a unit cost of usually $100-500 per person between 2002 and 2011, which translates to less than $1250 per death averted in the world (Tiemersma, van der Werf, Borgdorff, Williams, & Nagelkerke, 2011).

Though data is not readily available on amount used specifically for tuberculosis control in Ghana, it is worth noting that the Global Fund has been providing support for TB control. The Global Fund has been supporting health programmes in Ghana since 2002 especially those related to malaria, tuberculosis and HIV (TGF, 2012). To date, Ghana health programmes have received a total of approximately US$ 500 million for TB/HIV and malaria control (TGF, 2014). USAID/Ghana has disbursed about $1,195,000 for fiscal years 2008 to 2010 for tuberculosis control through tuberculosis control partners such as Management Sciences for Health (MSH), to increase training of health workers and provision of logistics for TB case detection and treatment (USAID, 2011).

Another area of health financing is how treatment for TB is funded. In Ghana, laboratory investigations and treatment for tuberculosis is free. The National Health Insurance Scheme is also available and subscribers with valid membership are eligible for free treatment covering about 95% of common diseases people in the country (Witter & Garshong, 2009). This means that people with tuberculosis who develop other conditions will have access to free treatment provided they have enrolled to the scheme and have valid

card. It has been reported that health insurance member coverage in Ghana was about 65% but with active membership of between 38-40% (Odeyemi & Nixon, 2013). Though, there are variations in memberships across regions and socio-economic status, earlier studies have reported that this pro-poor policy may not be reaching the poor as enrollment is high among the rich than the poor in Ghana (Akazili et al., 2014; Mensah, Oppong, & Schmidt, 2010). Given this observation and the many studies referred to earlier that have documented high prevalence of TB among poor, it may be important to explore whether financial barriers could affect TB case detection and treatment. Nonetheless, to determine the case detection and treatment regarding TB at community, sub-district and district level require a good information system that collects and collate all activities on TB for informed decision-making.

### 2.15.6 Management Information System for TB Control Decision-making

Health information provides the information support to the decision-making process at all levels of the health system regarding TB control. The health management information system (HMIS) for TB control ranges from paper-based to electronic data management. A standardized paper-based recording and reporting of the number of cases and treatment was developed by WHO in the mid-1990s. This system was based on the success of national model programmes established in southern and east Africa in the 1980s (Murray, Styblo, & Rouillon, 1990). This paper-based system includes TB treatment cards that record information about the patient's history of treatment; TB registers in which data for all cases within a particular health-care facility are documented; quarterly reporting forms

for sending summaries of aggregated data on notifications and treatment outcomes for all cases within a particular geographical area to higher administrative levels (WHO, 2012a).

Following the launched of the Stop TB strategy in 2005 by WHO, a revised paper-based system was developed to capture data covering all the six components of the policy (WHO, 2005b, 2006a, 2006c). It was envisioned in this new policy that a well-functioning TB surveillance system will produce accurate and standardized TB disease surveillance information. Thus, this information could be used to improve case detection and assessments of TB patients outcome as well as provide data which could be used for monitoring and evaluation of national TB programme (WHO, 2005a). This modified paper-based HMIS strategy was used in all countries implementing the Stop TB programme. However, with the advent of technology across the globe, there are increasing demands for the transition from paper-based to electronic data management in TB control programme. Therefore, an electronic surveillance system was launched to complement the paper-based surveillance system. In this system, data from paper-based forms and registers are entered into an electronic format during data processing. This data can then be analyzed electronically and reported according to international standards (Nadol et al., 2008).

There is however limited number of studies on how health information system could be used to improve tuberculosis and treatment. This notwithstanding, using data for informed decision making has been found to be essential to monitor the progress of TB patients and

contact tracing in Brazil (Braga, 2007). In a systematic review, it was found that underreporting of the TB cases in health information was undermining efforts to control the disease (Pinheiro, Andrade, & Oliveira, 2012). This implies that a good health information system is required to address this challenge as it affects the quality of TB control decisions. In US, a health information system which is used to document TB genotyping was found to improve TB control activities (Ghosh et al., 2012).

In Ghana, a combination of the paper-based and electronic TB reporting is being used. The TB forms and registers are used to capture surveillance and TB management data. These data are then transferred into an electronic system at a point in the data processing. The electronic system known as the District Health Information Management system 2 (DHIMS 2) is used to collect data from multiple health programmes for reporting at the national level (NTP, 2014). DHIMS 2 is being used by all the 216 districts in Ghana (GHS, 2015a). This system is used by health facilities, sub-district and district health directorates to collect, collate, transmit and analyze routine health services data including that of TB across the nation.

## 2.16 Conclusion of Literature Review

Several studies have looked at various aspects of tuberculosis. The main socio-cultural factors responsible for low case detection found in literature had been perception and beliefs about the condition. Generally, TB was believed to be caused by a multitude of factors including weak lungs, imbalance in hot and cold fluid in the body, excessive fluid

in the abdomen, hereditary, curse, and germs. TB was also believed to be transmitted through sharing of utensils and other facilities, houseflies, touching of infected persons and close contacts with infected individuals. It was also perceived that TB could be transmitted through exposure to bad air and other airborne modes. The main manifestations used to recognize TB is cough, difficulty in breathing, coughing out blood, chest pains and loss of weight. However, the early signs of cough were attributed to other conditions.

Literature also showed that the belief about the cause of TB affected the health seeking behaviour of the TB patients. Patients with TB use self-medication, herbal medicine and also seek biomedical health care in some instances. This is generally in line with what exists in plural medical systems (Kleinman, 1978). The literature also showed both positive and negative experiences of people with TB but with many reporting being isolated and stigmatized. Nevertheless, close relatives were reported to be supportive of TB patients in some studies. This study also intends to identify the socio-cultural factors that may be relevant to TB control and ways to address them to increase case detection and treatment.

Whereas in the literature many studies have assessed TB control using fewer than the six health system building blocks, this study seeks to understand the role of the six health systems building blocks in TB control that may provide a comprehensive understanding of how to improve case detection in the region. Therefore a study that considers the interplay

of biological, socio-cultural and health system factors in order to understand factors inhibiting early case detection are required and this study seek to address these gaps.

# CHAPTER THREE

# 3.0 STUDY METHODOLOGY

## 3.1 Introduction

This chapter discusses the methodology for this study. It looks at the study design, providing a justification for the appropriateness of the chosen design. It further gives a detailed description of the study areas placing it in context and justifying the selection of the study areas. In addition, this chapter delineates the study population and how the sample size was determined clearly stating the assumptions. Furthermore, the sampling techniques that were used to sample respondents in this study are covered in this section as well as the ethical issues that were considered in this research. The final part of this chapter describes how the data collected were analyzed and how the results are presented.

## 3.2 Study Design

The study design was descriptive and it employed mixed quantitative and qualitative research methods. Quantitative research approach is used when a researcher wants to create meaning through objective measurement of the situation and presents the findings of the study numerically (Williams, 2007). Qualitative research on the other hand, involves a holistic approach to research where the researcher develops a level of detail from high involvement in the actual experiences and the data presented in textural form (Creswell, 2009; Williams, 2007). So, a mixed methods approach to research requires the researcher to combine both quantitative and qualitative research methodologies and also present both

numerical and textural data (Creswell & Garrett, 2008; Teddlie & Tashakkori, 2010; Williams, 2007).

Creswell & Garrett (2008) have emphasized that a strong mixed methods design necessitates that qualitative and quantitative data hold independent research purposes, and that the qualitative and quantitative components work together to mutually strengthen the research findings from each source. There are six core characteristics in a mixed quantitative-qualitative methods study design (Teddlie & Tashakkori, 2010). These include:

1. An approach to research that has a philosophical foundation of both quantitative and qualitative paradigms.
2. Persuasive and rigorous procedures for the qualitative and quantitative methodologies.
3. The use of a specific mixed methods design that involves a concurrent or sequential integration (and equal or unequal emphases).
4. The collection of both qualitative and quantitative data (open- and closed-ended) in response to research questions.
5. The analysis of both qualitative and quantitative data.
6. The integration of these two data sources either through merging, connecting, or embedding.

The mixed quantitative-qualitative methodology employed in this study took into consideration these six characteristics. The quantitative part of this study was a household survey to assess their knowledge on the cause, predisposing factors and epidemiology including community perception of TB and attitude to people with tuberculosis. The quantitative component also elicited information on health seeking since TB case detection is mainly through passive screening which requires the individual with TB symptoms to go to places that are well-equipped to diagnose TB. Important elements of the health system factors such as screening of people who report to health facilities with productive cough for TB were also collected using the quantitative approach to research. The qualitative part of this study on the other hand adopted phenomenological approach to qualitative research to identify the health system and community experiences of people with tuberculosis as well as some of the socio-cultural factors responsible for low case detection in the UWR.

In phenomenological research, it is the participants' perceptions, feelings, and lived experiences that are paramount and that are the object of study (Wertz, 2005). This approach was therefore adopted because the qualitative component of this study intended to explore the experiences of people with tuberculosis both in the community and their contact with various health care providers. Intentionality, noema and noesis are three concepts central to phenomenology (Moustakas, 1994). Noema is that which the individual has experienced, that is, ill-health and TB. Noesis on the other hand refers to the way the phenomenon is experienced, that is, the individual with ill-health and TB experience with the condition at levels of both community and health system. Therefore, if any researcher

is interested in studying a phenomenon in the way it is being experienced, situating it in the context of the larger society, then phenomenology as a research approach is recommended (Moustakas, 1994). These constructs are central in determining the health system and socio-cultural factors affecting TB case detection and treatment.

### 3.3 Philosophical Foundations of the Study

An important consideration in any research process is the philosophical underpinnings of the study as this provides the foundation upon which the study is conducted. The two important philosophical issues to consider in designing a study are ontology and epistemology (Teddlie & Tashakkori, 2010). Ontology refers to the form and nature of the reality that the researcher investigates and how this reality can be measured. Epistemology on the other hand, examines the relationship between the researcher and what is being researched (Creswell, 2009). These philosophical paradigms therefore often influence the design of the study and the methodology that is often employed to acquire the knowledge that the research sets to investigate.

The concept of ontology often leads to dichotomy in study designs (quantitative and qualitative) with a most recent design that combines these two strategies. Quantitative study design operates on the positivist philosophy that holds the view that reality is one, fixed and can therefore be measured by following a set of laid down objective procedures. Qualitative study designs on the other hand operates on the interpretivist philosophy that views reality as subjective and multiple, as seen by participants in the study (Bernard,

2006). The concept of epistemology on the other hand looks at how the knowledge is acquired by examining the relationship between the researcher and the researched. In adopting the positivist approach to research, which is the quantitative, the researcher embarks on the study of the reality by maintaining a distance between him/herself and the researched. Contrarily to this approach, researchers who hold the view of interpretivists (qualitative) adopt strategies which will lessen the distance between him/herself and what is being studied (Creswell, 2009).

Guided by these philosophical stands, my ontological view regarding TB case detection and treatment is that, the reality could vary between individuals as experiences may vary and be shaped by the society one lives in. However, it is still possible to measure this reality with some level of objectivity. In measuring this reality (socio-cultural and health system) factors affecting case detection and treatment, one needed to get closer to the situation to be able to gain a deeper understanding of the situation. This has therefore led to the adoption of the mixed quantitative and qualitative approach for this research. There may be explanations required to clarify the objective measurement and the qualitative approach will address this aspect of the study.

### 3.4 Study Area

This study was conducted in the Upper West Region (UWR) of Ghana. The UWR is the smallest Region in Ghana with a population of 702,110 and 989 settlements. The region is located in the north-western part of Ghana. The region covers a total land area of 18,476

$km^2$, with a population density of 32 persons per square kilometre (GSS, 2011). The region is bordered to the south by the Northern region, to the north and West by Burkina Faso, to the east by the Upper East region (UER). There is high trans-border activities between people in the UWR and Burkina Faso, another country with high TB prevalence 226/100,000 (WHO, 2012b). In addition, the UWR is also reported to be among the poorest regions in Ghana.

The region is divided into eleven administrative districts (Figure 3.1). The Ghana poverty mapping shows that the incidence of poverty is highest in Wa West (92.4%) followed by Wa East (83.8%) and Sissala West (81.2%) districts with Wa West recording 59.0% poverty level (GSS, 2015). There are basically four indigenous ethnic groups: Dagaaba, Waala, Lobi and Sissala. The predominant religions in the UWR are Christianity, Islam and Traditional African Religion (GSS, 2013a). Traditional religion and beliefs are more prominent in the rural areas.

Health care delivery in the region also follows the decentralized structure: regional, district, sub-district and community level (GHS, 2015a). The region has a total of 174 health facilities comprising of one regional hospital (located at the regional capital), eleven district hospitals and the others are clinics, health centres, Community-based Health Planning and Service (CHPS) and some private health facilities. The national tuberculosis programme

coordinates all tuberculosis control programme in Ghana including the tuberculosis control related interventions in the UWR.

This study was however conducted in four districts with one being a municipality in the region. These districts include: Wa Central Municipality, Wa East, Wa West, and Jirapa. The Wa Municipal has the highest (66.3%) concentration of urban dwellers whilst Wa West, and Wa East are completely rural and Jirapa district is 85.6% rural (GSS, 2013b). The Wa Municipality (Wa as capital) shares administrative boundaries with Nadowli District to the north, Wa East District to the east and to the west and the south Wa West District. The population of Wa Municipal, according to the 2010 Population and Housing Census (PHC), is 107,214 representing 15.3% of the region's total population. Males constitute 49.7% and females represent 50.6% with about 34% of the population residing in rural localities (GSS, 2014c). The Wa East district on the other hand is located in the south-eastern part of the UWR. Funsi, the district capital is about 115 km away from Wa, the regional capital. The district shares boundaries with West Mamprusi to the northwest, West Gonja to southeast and the Sissala East district to the north. The population of Wa East District, according to the 2010 PHC, is 72,074 representing 10.3% of the region's total population. Males constitute 50.5% and females represent 49.5%. The district localities are completely rural with no urban settlements (GSS, 2014b).

The Wa West District has Wucheu as her district capital and shares borders to the south with Northern Region, north-west by Nadowli District, east by Wa Municipal and to the west by Burkina Faso. The population of Wa West District, according to the 2010 PHC, is

81,348 representing 11.6 percent of the region's total population. Males constitute 49.5% and females represent 50.5% and the district is entirely rural (GSS, 2014d). The proximity of Wa West District to Burkina Faso allows for the movement of inhabitants between the Wa West District and Burkina Faso. The District has one health centre and 12 Community-based Health Planning and Services (CHPS) Compounds. The Jirapa district on the other hand is located in the north-western corner of the UWR. Jirapa District is bordered to the south by the Nadowli-Kaleo District, to the north by the Lambussie District, to the west by Lawra District and to the east by the Sissala West District. The population of the district is 88,402 representing 12.6% of the region's total population. Males constitute 47.0% and females represent 53.0%. About 85.6% of the population live in rural settlements (GSS, 2014a). The district has a district hospital at Jirapa, health centres and CHPS compound around some sub-districts and communities.

The selection of the districts was based on dominance of the four ethnic groups in the region (Waala, Dagaaba, Sissala and Lobi). The Wa Central Municipality is dominated by the indigenous Waala ethnic group and is the district with the regional capital. The Wa West on the other hand is also inhabited by the Lobis whilst the Wa East has Sissala ethnic group. Jirapa district is also dominated by the Dagaaba. Figure 3.1 shows the map of UWR showing the districts and the study areas.

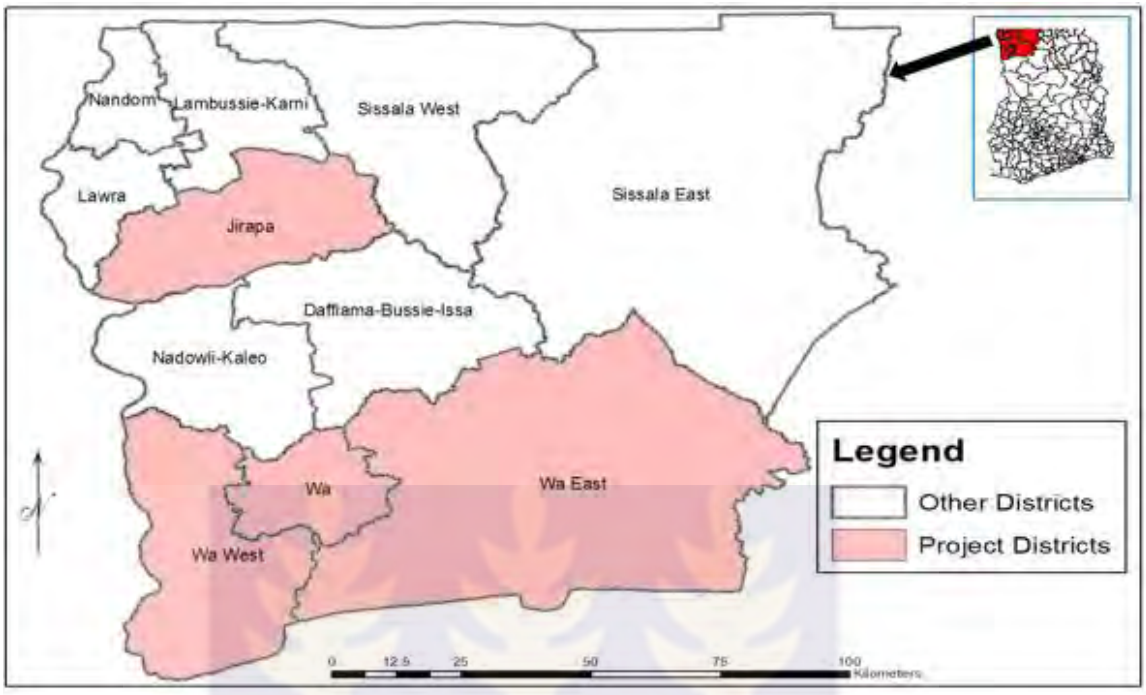



Figure 3.1: Map of UWR with Study Districts Highlighted

## 3.5 Quantitative Study

This section describes the population, sample size and sampling strategy that was used in the quantitative aspect of the study. It also describes the data collection tool, data collection procedure, variables, quality control and data analysis for the quantitative survey.

### 3.5.1 Study Population

A study population is the total of all the individuals who have certain characteristics and are of interest to a researcher (Bowling, 2014). The population for the quantitative aspect of this study included community members. The study participants comprised of both males and females 18 years and above as this is the legal age for informed consent in Ghana (The Constitution of Ghana, 1992). The population of adults aged 18 years and above in the region has been estimated to be about 402, 224 based on the 2010 PHC (GSS, 2013a).

### 3.5.2 Sample Size Determination for Community Survey

The sample size for the quantitative aspect of the study was determined using the Yamane's formula for population proportion (Yamane, 1967). Yamane's formula combines Cochran formula for determining sample size for a cross-sectional survey with categorical outcome (Cochran, 1977) with provisions to cater for both population-related adjustments and proportion of outcome variable of interest.

$$n = \frac{z^2 p(1-p)N}{z^2 p(1-p)+Ne^2} \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where:

n= the minimum sample size

Z is the standard normal variate for population distribution. In this study, a 95% confidence interval was used. Therefore, a 5% type 1 error was allowed and the level of significant placed at p <0.05. At p<0.05, Z =1.96.

p= is the proportion of some relevant characteristic, in this case TB case detection which stands 47% =0.47 (GHS, 2013).

N=the population which has been estimated based on the 2010 PHC using annual regional population growth rate is 407,224.

e= the margin of error to be tolerated which has been set at 5% or 0.05.

Since both the numerator and denominator for equation (1) contain $z^2 p\ (1-p)$, equation (1) can be simplified to:

$$n = \frac{N}{1+Ne^2} \ldots\ldots\ldots\ldots\ldots (2)$$

Therefore submitting the figures above into equation (2):

$$\text{n} = \frac{407,224}{1 + 407{,}224 * 0.05^2}$$

n=404

However, since in sampling, the districts were first grouped into four clusters based on the predominant ethnic groups, the sample size has been adjusted to cater for the design effect (Som, 1973). The design effect is defined as the ratio of the variance when a complex sample design is used to the variance that would be expected for a simple random sample of the same size (Snijders, 1992). The design effect can be calculated as DEFF = 1 + (m – 1)r, where m is the number of elements selected in each cluster and r is the intraclass (or intracluster) correlation coefficient, defined as $r = sc^2/(s^2 + sc^2)$ (or the ratio of between-cluster variability to total variability), (Som, 1973). Using this formula, a designed effect of 1.5 was determined. Therefore:

$$\text{n} = 404 * \text{design effect of } (1.5) = 606$$

$$\text{n} = 606$$

### 3.5.3 Sampling Procedure for Quantitative Study

Four stage sampling procedure was employed in the quantitative aspect of this study. First stage involved the selection of the districts in the region. The 11 districts in the region were

firstly grouped into the four main ethnic groups in the region: Dagaaba, Waala, Sissalas and Lobi. For each group, the names of the districts were written out and randomly, one district each was selected from each group. In the second stage of selection, one sub-district each was then selected from each of the four selected districts. The sample size of 606 was distributed to the sub-districts proportional to the population of the district. At the sub-district level, four villages were randomly selected (Figure 3.2). Using the villages, structural listing of households was carried out and households with adults, 18 years and above were selected (see Appendix I). In each household, eligible persons were given unique numbers. Random numbers were generated using Microsoft excel random numbers generator and individuals bearing those numbers were contacted and interviewed. Where a selected individual refused to participate in the study, resampling was conducted to replace such individuals. In all twelve of such refusals were recorded and replaced accordingly in this study. The quantitative survey was conducted between March-September, 2016.

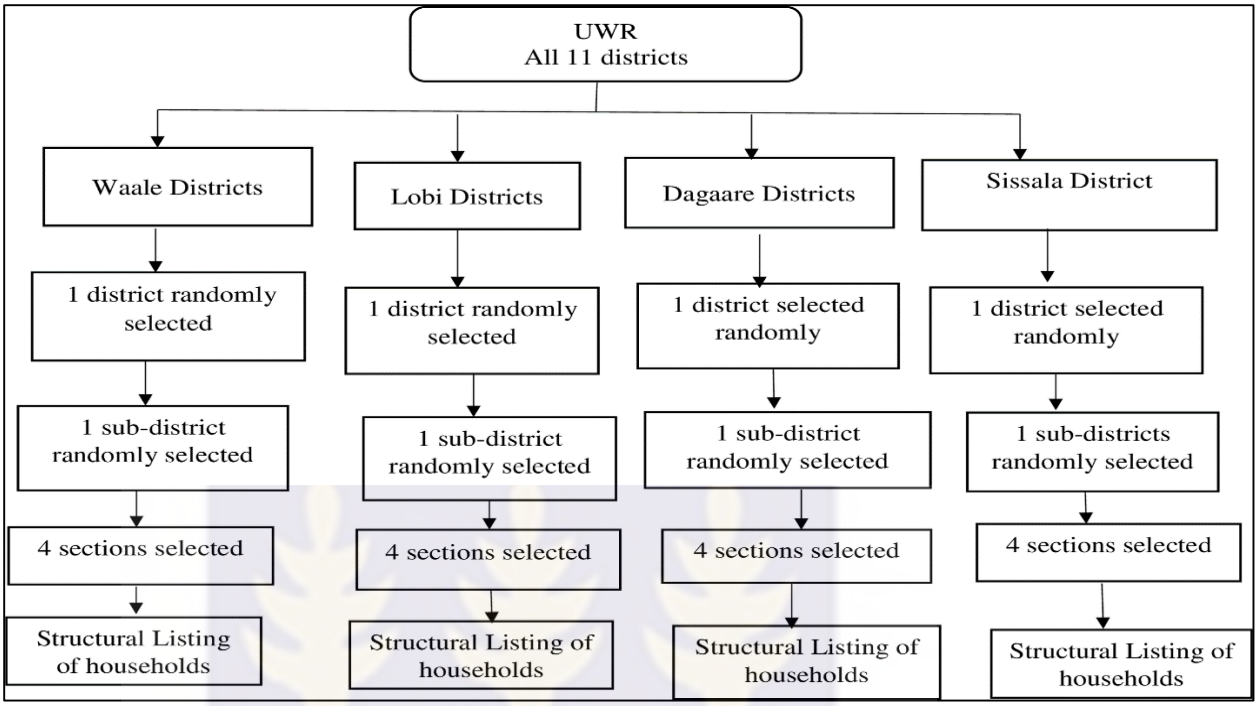



Figure 3. 2: Multi-stage sampling strategy used in the community survey

### 3.5.4 Inclusion and Exclusion Criteria for the Quantitative Survey

The study included individuals' aged 18 years and above irrespective of their religious affiliation or ethnic backgrounds. The study however excluded those who were qualified and listed but were unwilling to participate in the study. The study also excluded individuals who were listed and sampled but were unwell at the time of the data collection.

### 3.5.5 Key Variables in Quantitative Survey

An independent variable is defined as those variables that a researcher manipulates to measure the effect of the manipulation on another variable. A dependent variable on the other hand is the variable that respond to the effects of independent variables (Fan, 2010; Leatham, 2012). By purposefully manipulating the value of an independent variable, the

researcher hopes to cause a response in the dependent variable to establish the relationship and the strength of that relationship (Fan, 2010).

The dependent variable in this study include health seeking for productive cough which was categorized into hospital, health centre, clinic, traditional healer, self-medication, spiritual healer. This is because TB case detection is predicated on passive case findings which require an individual to seek health care from a facility which has the capacity to diagnose TB. The independent variables include age, sex, educational attainment, socio-economic status, and decision making as community-related factors (Table 3.1).

Table 3.1: Study Variables

| Variables | Operational Definition | Level of Measurement | Categories |
|---|---|---|---|
| **Dependent variable** | | | |
| Health seeking behaviour | Source of health care for productive cough | Categorical | Hospital, health centres, clinic, self-medication, traditional healer, spiritual healer |
| **Independent Variables** | | | |
| Age | Completed chronological age computed from birth | Continuous | Absolute age in years |
| Sex | Biological feature of being a male and female | Categorical | Male, female |
| Marital status | Being formally married or not | Categorical | Never Married, Married, Divorced, Separated |
| Educational Attainment | Highest educational level attained | Ordinal | No formal education, primary, secondary, tertiary |
| Wealth Index | Wealth based on assets and possessions | Ordinal | Poorest, poor, better less poor, least poor |
| Screening for TB | Reporting to health facility with productive for more than two weeks and being screened for TB | Categorical | Screened for TB, not screened for TB |
| Experience | Narrative of personal experience of the individual as expressed by self | Continuous | Personal illustrated quotes |

### 3.5.6 Data Collection Tool for Quantitative Survey

A structured questionnaire was designed for the quantitative survey. The questionnaire covered questions such as knowledge of causes of TB, signs and symptoms, perceptions on TB, local meaning of TB, and health seeking behaviour. The questionnaire also elicited information on community beliefs about TB and management of TB (Appendix A). The

questionnaire was designed on a snap survey platform, a software for the electronic collection of data. Snap survey is software that is used for designing and collection of data electronically using a mobile phone or tablet as a personal digital assistant (PDA), (http://www.snapsurveys.com/survey-software/snap-mobile-anywhere/). The snap mobile anywhere platform allows for the collection of data, which are saved automatically on the mobile device and uploaded unto an online server. In this study multiple mobile lines were provided to research assistants to ensure that data collected were immediately transferred to the server where they were downloaded daily for preliminary analysis. However, since internet connectivity was not optimal in the UWR, in places where there was no internet service, the data were saved on the PDA and uploaded anytime internet was available. At the end of the survey, all the data was then downloaded in the form of Microsoft (MS) excel sheet for analysis.

### 3.5.7 Quantitative Data Analysis

The submission of the data on the online platform of the snap survey was exported as excel files. These files containing the data were imported into STATA 13 for analysis. Continuous variables such as age were categorized into age ranges with intervals of 10. Gender, religion, marital status, and educational attainment were collected as categorical variables and these categorization were maintained during analysis. Residence of participants were classified as rural and urban based on Ghana Statistical Service (GSS) categorization (GSS, 2013a). Socio-economic status was measured using wealth index score. This is often preceded by determining the principal components of household assets and possessions that should be considered in the wealth index. In this study, we collected

data on household ownership of facilities such as bicycles, motorbike, television and a car, materials used in housing, possession of domestic animals such as goats, sheep, cattle and pigs. These household assets and possessions may be correlated in an unknown and complex way. When a set of variables are correlated in a complex and unknown ways along several dimensions, Principal Component Analysis (PCA) is employed to reduce those variables by assessing which variables behave in a similar manner. Based on the variables and their relationship to each other, PCA creates a new set of variables, each called a principal component (Fry, Firestone, & Chakraborty, 2014). Using this strategy, household assets and possessions collected during the study were assigned weights based on principal components analysis and the resulting scores were standardized to a standard normal distribution. Information on assets and possessions that were binary variables (which elicited "No" and "Yes" responses) were recoded as either 0 or 1 from their default entry (snap survey platform) of 1 or 2. However, for continuous variables such as the number of animals such as fowls, sheep, goats, and cattle that an individual has, their absolute values were maintained before running the PCA. After the PCA, variables with eigenvalue value (measure of its power to explain variation between participants) above one were put together to determine the wealth of an individual. Usually, a factor is considered important and worthy of inclusion/retention in the scale if its eigenvalue exceeds the threshold of >1 (Bowling, 2014). In all 14 household assets and possessions were retained in the final model to determine the wealth of households. Based on these aggregate scores, individuals and their households were put into five quintiles. Asset based wealth measures allows ranking of households and have been shown to be more stable, i.e. less sensitive to transient

fluctuation than other proxy ways of determining socio-economic status (Howe, Hargreaves, & Huttly, 2008).

Knowledge of respondents was measured at two levels. At first, an individual's knowledge was measured at specific dimensions such as cause, signs and symptoms, and predisposing factors. This was done to ascertain specific areas that may be relevant to highlight in health education and behavioural change communication strategies. Bowling (2014) is of the view that just reporting aggregated/weighted average scores have the tendency to mask the nuances available in any data to help address some specific intervention points. After the analysis at the individual variable levels, these individual variables were recoded (0 score for wrong answer/no idea, 1 for correct answer). A mean was computed for each category of response: causes, signs and symptoms, mode of transmission and vulnerability. Based on that composite (weighted average) score was developed to measure knowledge on causes, and signs and symptoms of TB. Thereafter, individuals were classified as either having low knowledge or high knowledge based on their score. Respondents who scored above the average were classified as having high knowledge whilst those whose score fell within the mean and below were classified as having low knowledge in each category (causes, signs and symptoms). A Cronbach Alpha index was computed to test the reliability of this measurement strategy. This gave rise to Cronbach Alpha of 0.79 with an inter-item correlation of 0.76 both of which were within the acceptable limit (Streiner & Norman, 2003, 2008). This meant that the model developed to test knowledge at the composite level was reliable. The model used to classify respondents in this study into high and low

knowledge had previously been used in testing knowledge in others studies on tuberculosis and found to be a reliable measure (Buregyeya et al., 2011; Seyoum & Legesse, 2013; Westerlund, Tovar, Lönnermark, Montoya, & Evans, 2015).

Health seeking behaviour was also recategorized into two levels: orthodox and non-orthodox. The orthodox health facilities refer to biomedical facilities such as hospitals, health centres, clinics whist the non-orthodox health facilities refer to traditional healers, self-medication using herbs and medicine bought from drugstores, itinerant drug sellers and spiritual healers.

In doing the analysis, weighing was done to cater for the clustering that was used in sampling the respondents. Descriptive statistics were used to present the proportions on background characteristics of the respondents at the univariable level. This was followed by a bivariable analysis using Chi-square test. Bivariable analysis or models are used to predict an association between an independent and dependent variable (Mishra & Min, 2010). Pearson's chi-square test of independence was performed to test for individual independent association ($p<0.05$) between the independent and dependent variables with observations more than six. This is because Pearson's Chi-square has been reported to demonstrate more stability and gives a better estimator for such type of variables (Camilli, 1995). However, for variables with observations less than six, which were also nominal and dichotomize, a Fisher's exact test were used to determine the associations (Routledge,

2005). For ordinal variables such as ranking of the preferred places for health care, Spearman's ranked correlation was used.

After the binary analysis, multivariable logistic regression was used to determine the strength of association between categorical variables. One challenge commonly reported in multivariable regression is multicollinearity which describes a situation where the independent variables used in the regression model have a strong correlation (Kaycheng, 2015; O'Brien, 2007). This has been reported to have the tendency of producing a biased estimation of the parameter of interest (O'Brien, 2007). Therefore, in doing the logistics regression analysis in this study, Variance Inflation Factor (VIF) was first used to test the variables for multicollinearity. The VIF for each level of the logistic regression ranged between 2.64-3.58 which indicates that multicollinearity was not a problem as VIF of more than 20 often indicates multicollinearity among independent variables (O'Brien, 2007). In running the logistic regression the first observation in each of independent variables was used as the reference category.

The multivariable logistic regression was done at two levels. The first was to establish the crude level of association between the independent variables and the dependent variable for categorical variables. In this strategy, all independent variables were added to the first model to establish the crude relationship with the dependent variable at various levels of measurement. Afterwards, variables that were significant in the first model and at the

bivariable analysis level were put in a multivariable logistic regression model to adjust for the effects of those variables. A p-value of less than 0.05 was deemed to be significant. The results of the quantitative data are presented in tables.

## 3.6 Qualitative Research Approach

This section also describes the population, selection of the study participants for the qualitative study. It also describes the data collection strategies that were employed in the study and how the qualitative data was analyzed.

### 3.6.1 Population for Qualitative Research

The study population for the qualitative aspect included people with tuberculosis (clients/patients), health care providers working at DOTS centres, biomedical scientists, nurse managers (head of nursing), nurses working at the outpatients department of health facilities, traditional medical practitioners and TB control programme managers at various levels.

### 3.6.2 Selection of Study Participants

The qualitative component of this study employed purposive sampling, a non-probabilistic sampling procedure. In purposive sampling technique, the researchers choose the sample based on who they think are appropriate for the study (Green & Thorogood, 2004). Patton (2002) recognized that purposive sampling technique is widely used in qualitative research and is appropriate to identify and select information-rich cases for the most effective use of limited resources. In this study, the researcher collected a list of all DOTS centres within each selected sub-district in the region. The DOTS centres were then visited and eligible

DOTS clients selected. These prospective respondents were visited on days that they have been booked to collect their medication and were interviewed. In addition, the treatment supporters of patients who were available were also interviewed. Furthermore, both male and female non-TB community members were purposely selected for focus group discussion. Health workers working in DOTS centres and district TB programme managers were also purposively selected for interview.

### 3.6.3 Inclusion and Exclusion Criteria for Qualitative Component of the Study

The study included community members who were aged 18 years and above. This person should have been resident in the community for at least five years. This was done because the study wanted to elicit information about common practices in the community. Hence, to know these information will require some number of years stay in the community. For people with TB, the study included those who have been on medication for at least one month. In the qualitative aspect of the study people with tuberculosis who were clinically very ill to be interviewed were excluded from the study.

### 3.6.4 Qualitative Data Collection Methods

Three main data collection methods were used in the qualitative study. These included: focus group discussions, in-depth interviews and key informant interviews.

### 3.6.5 Focus Group Discussions

Focus group discussion (FGD) is a qualitative data collection method in which one or two researchers and between 8-10 participants meet as a group to discuss a given research topic (Mack, Woodsong, Macqueen, Guest, & Namely, 2005). In this study, FGDs were conducted to corroborate interview data on normative ideas and practices in the

community. These were also relevant in developing themes, interpretation, exploring concepts derived from individual interviews for greater details, and identifying contradicting information. Eight (8) FGDs were conducted, four (4) for female and four (4) for male community members who were not TB patients. Four of the FGDs were held in urban communities and four in rural communities (Table 3.2). Each group consisted of between 8-10 individuals (N=72) and the discussants sat in a horse-shoe fashion with the moderator and note-taker sitting in the middle. All FGDs were conducted in the community at agreed time suitable for the discussants. All the FGDs were conducted in local languages (Dagaare, Sisali, Waali and Lobi). During FGDs, each participant was given the opportunity to make his/her contribution to any question posed before moving to another question. Probing was used to clarify any unclear points raised or emerging areas of interest. It took between 60-80 minutes to complete a FGD.

Table 3.2: Summary of FGD Participants

| | **Rural Community** | | **Urban Community** | |
|---|---|---|---|---|
| **Gender** | **Number of FGDs** | **Number of Participants** | **Number of FGDs** | **Number of Participants** |
| Male | 2 | 17 | 2 | 18 |
| Female | 2 | 18 | 2 | 19 |
| **Total** | **4** | **35** | **4** | **37** |

### 3.6.6 In-depth Interviews

In-depth interviews (IDIs) from a life history perspective can give rich information on personal experience and ideology, as well as on social structures and institutions (Plummer, 1983). With this approach, respondents have the opportunity to situate their own life experience within the larger social context. While some researchers hold the view that

personal reflections may not be fully accurate, others assert that the strength of telling one's own story rests precisely in this interaction between the present respondent and his or her past self (Miescher, 2005). In this study, fifteen (15) IDIs were conducted with people with TB and seven with TB patients' treatment supporters to share their experiences at both the community and health system level. Seven treatment supporters were interviewed because some patients either had no treatment supporters or they were unavailable at the time of data collection. In all, 10 of the TB patients were males whilst five were females (Table 3.3). Six of the TB patients were in intensive phase (1-2 months) and 9 in continuation phase (>2 months) of treatment. IDIs were conducted in Dagaare, Waali, Sissali and Lobi. The age range for the people with tuberculosis was 21-70 years. Eight of them were married, five single and two had separated from their marriage.

IDI with people experiencing a particular phenomenon (TB patients and Monitors) draws attention to the process of change itself, revealing the "cumulative nature of experience" (Allen & Pickett, 1987). Miescher has opined that retelling one's history becomes a means of depicting one's current self (Miescher, 2005). Through this interactive process, people were given the opportunity to provide their own interpretations and understandings of tuberculosis, health seeking and personal experiences on tuberculosis even though this approach is naturally subjective, as it requires respondents to interact with their past selves (Miescher, 2005). Collecting present and past experiences provided the opportunity in this study to analyze past experience and how it affects current health seeking behaviour and tuberculosis control in the community.

According to Weiss (1994), researchers can anticipate IDIs lasting between 90-120 minutes, if there are no time constraints on both the respondent and interviewer. While some interviews can go significantly longer with breaks at least every two hours, interviews under 30 minutes are generally believed to be unlikely to yield a coherent picture of respondents' experiences (Weiss, 1994). In this light, it took between 45-60 minutes to complete an IDI.

### 3.6.7 Key Informant Interviews

Twenty-four (24) Key informant interviews (KIIs) were conducted with people who were deemed knowledgeable about the community and tuberculosis control programme. The purpose of these KIIs were to collect information from a wide range of people on tuberculosis control including community leaders, health professionals, and non-orthodox health practitioners who have firsthand knowledge about the community regarding tuberculosis and its control programme. The health professional included district TB control coordinators, nurses working at DOTS centres and at Outpatients Department (OPD) of hospitals, nurse managers (head of nursing services) and biomedical scientists (Table 3.3). KII with health workers was conducted in English whilst that of traditional healers were conducted in Sissali and Dagaare.

Table 3.3: Summary of Participants in Individual Interviews

| | Gender | | |
|---|---|---|---|
| **Type of Participants** | **Male** | **Female** | **Total** |
| **In-depth Interview Participants** | | | |
| TB Patients | 10 | 5 | 15 |
| Treatment Supporters | 4 | 3 | 7 |
| **Total (IDIs)** | **14** | **8** | **22** |
| **Key Informant interviews (KIIs)** | | | |
| District Directors | - | 2 | 2 |
| DOTS Centre In-charge | - | 3 | 3 |
| Nurses working in TB wards | - | 4 | 4 |
| Nurses working at OPD | 2 | 1 | 3 |
| Nurse Managers (head of nursing services) | - | 2 | 2 |
| District TB Coordinators (Disease Control Officers) | 3 | - | 3 |
| Biomedical Scientists | 2 | - | 2 |
| Traditional Medical Practitioners | 2 | - | 2 |
| Administrators | 3 | | 3 |
| **Total KII** | **12** | **12** | **24** |
| **Total (IDIs + KIIs)** | **26** | **20** | **46** |

### 3.6.8 Data Collection Tools and Procedures for Qualitative Research

Semi-structured FGDs, IDI, and KII guides (Appendix C, D, E, and F) were used to collect the qualitative data. While an unstructured interview is said to be led by the respondent whilst structured interview is led by the interviewer (Mack, Woodsong, Macqueen, Guest, & Namely, 2005), semi-structured interview is driven concurrently by both the respondent and the interviewer. The FGD guide elicited normative information on the socio-cultural, behavioural and health system issues regarding tuberculosis case detection and treatment in the region. The IDI guides however contained themes such as perception of illness, how health care was sought, and people's attitude towards people with TB and health system experience of TB patients. The KII guides obtained information on both community and health system related TB control system and the challenges in TB control. It further elicited information on strategies to increase TB case detection in the region. These guides were

designed in English and translated into Dagaare, Sissali, Lobi and Waali, the four main languages spoken by people in the UWR of Ghana. The translation was done using back-to-back strategy. In this strategy, a language expert proficient in English and any of the local languages was made to first translate the interview guide from the English language to the local language. Another language expert was then made to retranslate the guide from the local language back to English and the two versions compared. Where there were differing views, this was discussed by the two language experts to agree on the most appropriate translation. This was done to ensure uniformity in the data collection tools.

The interviews for TB patients and caretakers were mostly conducted in the local language (Dagaare, Sissali, Lobi and Waali) but that of the health workers were conducted in English. All FGDs were conducted in the local language. However, during FGDs individuals who requested to make a particular contribution in English were allowed. Such contributions in English were immediately translated to local language by the moderator for the other members of group before proceeding with the discussion. All the interviews were conducted between March-September, 2016.

### 3.6.9 Field-notes

According to Bernard (2006), there are three types of field-notes that a researcher can document during field work. These include methodological, descriptive and analytic field-notes. Methodological notes deal with technique in collecting data and are useful to guide future researchers when designing their research methodology. Descriptive field- notes on the other hand involve taking notes on the researcher interaction with the respondents

during data collection such as the demeanor of the respondent. However, analytic field-notes is where you lay out your ideas about how you think the culture you are studying is organized (Bernard, 2006). In this study descriptive field-notes were documented through watching and listening during data collection. Field-notes on the interviewer-interviewee interaction (descriptive field-notes) were written after each in-depth interview to circumvent recall challenges which may result from delay in writing down the field-notes. These field-notes provided a distinctive resource for preserving experience close to the moment of its occurrence. Generally, field-notes are reported to deepen reflection and understanding of those experiences in the field (Emerson, Fretz, & Shaw, 1995). Field-notes were taken on initial reactions of the interviewee to the interview. Notes were also documented on the first analytical reflections from the interview content, and any useful occurrence and interpretations that could not be captured by digital recording. For instance, the researcher took note of the disposition of the respondent, his or her body language and mood, and any informal conversation that took place before, during and after the interview. The field-notes also covered the environment in which the interviews were conducted. This information was valuable during the analysis process, as it connected the researcher to my memories of each individual respondent and were transformed into data, anonymised and analysed with other data that were collected in this study.

### 3.6.10 Key Themes in Qualitative Study

The themes for the qualitative study consisted of both socio-cultural and the health system related aspects of the study. However, the socio-cultural aspect has been listed under the variables for quantitative study. Regarding health system factors, the variables include

human resources, health management information system, health financing, leadership and governance, logistics and supplies, and service delivery. Table 3.4 provides a summary of the various health system factors, their operational definition, how they were measured and the categories.

Table 3.4: Study Themes (Health System Factors)

| **Main themes** | **Subthemes** |
|---|---|
| Governance and leadership | -Focal person or coordinator for TB at district<br>-Programme of work for TB<br>-Yearly district plans includes TB<br>-Political factors<br>-Resources allocated for TB?<br>-Committees on TB at community level |
| Human Resources | -Staff numbers<br>-Number of Skilled trained staff for TB<br>-Number of in service training for TB in the year |
| Service delivery | -DOTs service available in district<br>-TB leaflets on education<br>-TB screening service available<br>-Community identification and notification service available<br>-Times service available<br>-Service available at community level<br>-Defaulter tracing |
| Supply management systems | -All TB drugs available at DOTS centre<br>-Stocks (quarterly, yearly)<br>-Diagnostic tools for detecting TB available, |
| Health information system | -Data capture forms for TB available<br>-Routine reports of TB on case detection, treatment rates, treatment failure, defaulters available<br>-Time plan for reporting available<br>-Adherence to timeliness of reporting |
| Financing | -Sources of funding for TB<br>-Amount of funding available<br>-Cost of TB case detection/cost on TB management<br>-Out-of-pocket payments for TB |

### 3.6.11 Qualitative Data Analysis

The qualitative data were audio-taped using a digital voice recorder. After each interview session, the recordings were replayed to participants to listen and to make the necessary additions, subtractions or further clarify points they deemed necessary. Maynard & Purvis (1994) have indicated that participants listening to tapes after interviews is an important step in qualitative data analysis even though this is often overlooked. The taped interviews were then transcribed into Microsoft word. Qualitative researchers are divided on the most appropriate way to transcribe recorded interviews. Whilst some researchers advocate for absolute content in the transcription process, others recommend that some level of editing should be done. However, the editing should be done in such a way to maintain the original meaning of the statement by the respondents (Poland, 1995). Corden and Sainsbury (2006) are of the conviction that editing can greatly improve the readability and flow of the text as well as increase comprehension as normal speech are often marred with word repetitions and "stops and starts".

In order to ensure that what the respondents wanted to express were not obstructed by English language challenges, the researcher decided to follow the position of researchers who choose to tidy up the language of participants who were interviewed in English to make confusing statements or statements with grammatical deficiencies readable. However, in doing that, the researcher strictly followed Poland's suggestions to ensure that what was being removed does not appreciably alter the meaning of what was said (Poland,

1995). In select cases, the statements that may be confusing were left in their original form and the refined versions, which is more meaningful to a wider audience put alongside the original version.

Analysis of data occurred concurrently with data collection. Analysis included reading and rereading of the interviews and focusing on the identification of themes relating to the explanation of tuberculosis illness experiences at community, health centre and hospital levels, community and health system that are relevant in TB case detection and treatment. Data in local language was first translated into English by the interviewer and another independent person. The translation was compared for consistency. Where there were variations in views in the transcription, it was discussed and resolved by the translators. The transcripts were imported into NVivo 11 for Windows for analysis. Thematic analysis was adopted in analysing the data. Thematic data analysis process consists of data reduction, display, identifying theme in the data, drawing conclusions and verifying the entire analysis process to ensure that the conclusions are supported by the data (Guest, Macqueen, & Namey, 2012; Miles & Huberman, 1994).

A codebook was first created for the main themes and sub-themes from preliminary reading through the transcripts. These themes were beliefs about causes of TB, mode of transmission, signs and symptoms, and management of various types of conditions that present with cough. The themes also covered health system factors such as availability of

diagnostic services, types of services provided, patient satisfaction with services, logistic and supply. The codebook defined the various themes that were used during coding, their definition, when to use and when not to use such a code and examples of statements that should be considered for coding unto a particular code. These codes were turned into nodes within the software. Following that, a line-by-line reading of all transcripts within the NVivo 11 software was done and relevant portions of statements made by respondents coded unto existing nodes and new nodes. The nodes were initially created as free nodes but as the coding progressed, relationship emerged and the nodes were transformed into tree nodes to reflect the relationships.

Since, the respondents were stratified based on some variables (for example gender, place of residence), these variables were captured as attributes in NVivo. The various codes were analysed into themes based on the codes to reflect the content of the data collected. This allowed the performance of thematic analysis of relevant coded segments for presentation. Whilst doing the coding, memos were written on specific relevant areas. Memoing involves putting down initial ideas, issues, observation and patterns that can be connected, compared or contrasted while doing the coding (Creswell, 1998). Various forms of queries were also run in NVivo to quantify some of the qualitative data and the results were exported and added to the qualitative data in the results. The results of the qualitative data were then presented in narrative and supported with illustrative quotes from respondents.

## 3.7 Data Triangulation

Data triangulation refers to the combination of two or more data collection strategies in a single research (Yeasmin, 2012). Triangulation is often premised on the reasoning that no single method ever adequately solves the problem of rival or counter explanations (Patton, 1999; Patton, 2002), and that the weaknesses in each single method will be compensated by the counter-balancing strengths of another (Teddlie & Tashakkori, 2010). Since both quantitative and qualitative data were collected in this study, data triangulation strategy was employed to report the findings of this study. Triangulation techniques are helpful for cross-checking data validity and used to provide confirmation and completeness when two or more different types of research data collection strategies are used. The approach was therefore used to increase the credibility and validity of both the qualitative and quantitative results (Bekhet & Zauszniewski, 2012; Denzin, 2012; Fielding, 2012; Yeasmin, 2012). Qualitative data on causes, mode of transmission, signs and symptoms, and management of TB was triangulated with the quantitative data that also elicited information in these areas. In addition, quantitative data on screening of patients with productive cough at Outpatients Department of health facilities was also clarified by the qualitative data.

## 3.8 Quality Control

Research assistants were trained on all aspects of the research process. The training was a combination of theoretical work and mock exercises in both English and the local languages after which they were deployed to collect the data. As a quality control measure, 5% of samples of people who had been interviewed by research assistants were re-sampled and re-interviewed using the same data collection tools and the data compared for

consistency. Field-notes were also written immediately after each interview. The quantitative data were collected using a snap survey platform with inbuilt checks. This measure reduced data collection and entry errors. No data entry was also required since the data collected came in the form of excel sheet with responses to the questions. During data collection, the geolocation were activated on the PDAs used for the data collection. So in places with internet connectivity, the exact location of the respondents was captured during the data collection. In that case the location of data collectors were monitored during data collection. In addition, daily supervision of data collection were carried out and re-sampling of some of the respondents done and re-interviewed by the researcher and compared with what was conducted by the research assistants.

The transcription was undertaken by the interviewer and an independent person for comparison and quality control. Where there were variations, these were discussed and agreed upon by the transcribers and researcher by listening to voices and comparing it with the transcribed data because of foreknowledge of the local languages. Member checking through sharing the transcriptions from interviews with individual participants (Thomas, 2017) was done as a quality control measure. As required in phenomenology, bracketing was used as a strategy to separate my personal biases from the qualitative research findings (Giorgi, 2010).

## 3.9 Ethical Consideration

The proposal for this study was reviewed and approved by Ghana Health Service Ethics Committee (GHS-ERC 17/11/2015, Appendix J). A letter of introduction from the School of Public Health, University of Ghana was sent to the Regional Health Directorate and the selected districts for the study, requesting for permission to conduct this study. At the community level, the principal investigator and the research assistants first met with community leaders to discuss the study and to formally request for permission to embark on the study. This was necessary because the quantitative aspect of the study involved mapping of houses, and household listing of the community members. There was therefore the need to engage community leaders to facilitate community acceptance.

Selected individuals for the study were provided with information about the study (objectives, duration of interview, and why they were selected). They were also informed about the fact that participation in the study was voluntary and they have the right to withdraw from the study at any point in the study without any consequence. They were also informed that there is no risk in participation in this study and the study had no direct benefit to them. Individual who agreed to participate were provided with informed consent form to read and ask any question for clarification. For those who could not read, it was read to them in a language they understood. Thereafter, they were made to sign the informed consent form. To ensure privacy and confidentiality, participants were not required to provide their names. The socio-demographic data of respondents was also de-linked from the interview recordings.

# CHAPTER FOUR

# 4.0 RESULTS

## 4.1 Introduction

This chapter starts by providing the socio-demographic data of the respondents. The main results sections are presented along the study objectives and the conceptual framework that was used for this study. Hence, results are presented on the socio-demographic characteristics of respondents, socio-cultural factors, health seeking behaviour and factors that affect such behaviours, and health system factors that were identified as affecting tuberculosis case detection and treatment. Since TB case detection is predicated on passive case detection, the knowledge and beliefs of respondents regarding tuberculosis (TB) was presented. This chapter also covered the six building blocks of the health system that play various roles in TB case detection and treatment. In presenting the results, considerations were also given to the models that were adopted for the study; Lipsky's street bureaucratic model, Piot model for TB control, PEN-3 model, and social cognitive theory.

## 4.2 Socio-demographic Characteristics of Respondents

The total number of respondents in the study was 606. The modal age group of participants was 40-50 years (33.0%) whilst the age group with the least number of participants was people above 61 years 35 (5.8%). Majority, 337 (55.6%) of the participants were males. Regarding the religious affiliation of participants, Christians, 319 (52.6%) and Moslems, 167 (27.6%) were the majority. Also majority, 399 (65.8%) of the respondents were married. The ethnicity of most participants, 352 (58.1%) were Dagaabas, and 87 (14.4%)

were Waalas. Furthermore, more than half of participants, 332 (54.8%) had no formal education (Table 4.1a).

Table 4.1a: Socio-demographic Characteristics (SDCs) of Study Participants

| SDCs | Frequency (n) | Percentage (%) |
|---|---|---|
| **Age (years)** | | |
| 18-28 | 147 | 24.2 |
| 29-39 | 200 | 33.0 |
| 40-50 | 177 | 29.2 |
| 51-61 | 47 | 7.8 |
| >61 | 35 | 5.8 |
| **Sex** | | |
| Male | 337 | 55.6 |
| Female | 269 | 44.4 |
| **Religion** | | |
| Christianity | 319 | 52.6 |
| Islam | 166 | 27.6 |
| Traditional African Religion | 120 | 19.8 |
| **Marital Status** | | |
| Never Married | 113 | 18.7 |
| Currently Married | 399 | 65.8 |
| Co-habiting | 52 | 8.6 |
| Divorced | 9 | 1.5 |
| Widowed | 33 | 5.4 |
| **Ethnicity** | | |
| Dagaabas | 352 | 58.1 |
| Waalas | 87 | 14.4 |
| Sissalas | 83 | 13.7 |
| Lobis | 77 | 12.7 |
| Others | 7 | 1.1 |
| **Educational Attainment** | | |
| No Formal Education | 332 | 54.8 |
| Primary | 56 | 9.2 |
| Vocational | 11 | 1.8 |
| Middle School/JSS/JHS | 90 | 15.0 |
| Secondary/SSS/SHS | 71 | 11.7 |
| Tertiary | 45 | 7.5 |

Results on the occupation of the respondents showed that 242 (39.9%) were farmers, 138 (22.8%) were traders and 88 (13.5%) were housewives. Furthermore, a little over 80% of respondents were residing in areas classified as rural. Results on health-related decision making showed that majority of respondents, 326 (53.8%) make decision on their own, 142

(23.5%) depended on both parents for health-related decision making but with more depending on their fathers 118 (19.5%) than their mother (4.0%). The study further showed that 296 (48.8%) of the respondents owned a radio and 331 (54.6%) of the respondents had mobile phone (Table 4.1b).

Table 4.1b: Economic Characteristics of Study Participants

| Economic Characteristics | Frequency (n) | Percentage (%) |
|---|---|---|
| **Occupation** | | |
| Farmers | 242 | 39.9 |
| Traders | 138 | 22.8 |
| Housewives | 82 | 13.5 |
| Civil/Public Servants | 49 | 8.1 |
| Students | 60 | 9.9 |
| Artisans | 32 | 5.3 |
| Others | 3 | 0.5 |
| **Wealth Index** | | |
| Poorest | 122 | 20.1 |
| Poor | 130 | 21.4 |
| Better | 121 | 20.0 |
| Less poor | 120 | 19.9 |
| Least poor | 113 | 18.6 |
| **Type of Residence** | | |
| Rural | 486 | 80.2 |
| Urban | 120 | 19.8 |
| **Health-related Decision Making** | | |
| Self | 326 | 53.8 |
| Father | 118 | 19.5 |
| Mother | 24 | 4.0 |
| Husband | 118 | 19.5 |
| Wife | 14 | 2.3 |
| Grandparents | 6 | 0.9 |
| **Own a radio** | | |
| Yes | 296 | 48.8 |
| No | 310 | 51.2 |
| **Own a mobile phone** | | |
| Yes | 331 | 54.6 |
| No | 275 | 45.4 |

## 4.3 Socio-cultural Factors affecting Tuberculosis Case Detection and Treatment

This section presents results on the socio-cultural factors identified in the study to affect TB case detection and treatment. These included knowledge about the causes, mode of

transmission and signs and symptoms of TB, perceptions and beliefs about the disease and management of the condition.

### 4.3.1 Knowledge and Perceptions about Tuberculosis

The results of the study showed that all respondents indicated they had heard of disease TB before but less than half, 296 (48.9%) of them were aware that tuberculosis was caused by germs. Respondents were of the view that TB was hereditary 143 (23.6%), transmitted through sharing of utensils, 145 (23.9%), sharing of food 146 (24.1%), mosquito bites 203 (33.5%), bewitchment, 137 (22.6%), sexual intercourse 279 (46.0%) and cough during sex, 292 (48.2%).

FGDs and IDIs among community member revealed that some members believed TB could be transmitted through the activities of houseflies. Sharing of utensils and food were also believed to be capable of spreading TB. Therefore, people with TB were compelled to get their own utensils and were not allowed to share food with other members of the family. The following quotes illustrate these points:

> *"Houseflies can transmit TB…flies can transmit the organism to your food and when you eat the food you get it"* (31-years woman, FGD, rural).

> *"Since the time I was told I had TB and put on the treatment, I don't share anything with my family: food, bowls, cooking utensils. It is the believe of the community that when you share these things with someone with the condition, you can get it"* (51-years male TB patients, IDI).

The study further showed that some participants believed TB had spiritual causes. The belief that TB could be caused by curse or bewitchment emerged well-entrenched in all FGDs bothering on uniformity. This was closely related to the belief that cough during sex could cause TB. Hence, an individual could be cursed and as a result will cough during sexual intercourse to get the condition. This belief emerged in both FGDs among rural and urban residence and across gender groups. Some respondents however believed that the individual who coughs during the process of having sex is free but the other partner gets the condition if the person does not cough back. The following quotes from respondents support these points:

> *"When one cough during sex, you get that condition….It could either be the man or the woman but the one who cough is free but the other person get infected unless the person cough back"* (45-years male, FGD, rural).

> *"A person can be cursed to get the koronkpong (Tuberculosis). In such a case, you are cursed to cough during sex and this will make you get it"* (36-years Old, woman, FGD, urban).

> *"….I also heard that when you are having sex with a woman and she coughs in the process, you will get TB and if you also cough, the woman will get TB"* (41-years male TB Patient, IDI).

An individual who gets *korongkpong*/*kusibine* through curse and cough during sex will have to undergo some spiritual cleansing before the condition can be cured. Without this spiritual cleansing to remove the curse, biomedical medicines are believed to be ineffective as illustrated:

> *"When you are cursed to cough during sex and you get the korongkpong you will need to see a spiritualist or the herbalist to take you through some rituals which will clean your soul and spirit from that curse. Otherwise you can get any*

*medication for hundred years but you will never get curse"* (Traditional Healer-1, IDI).

*"The korongpilah that one get because you coughed during sex is a curse. So that curse will have to be removed before any medicine can work. Without that ritual no medicine will work. That is why we see the traditional healers who know how to remove the curse"* (63 year man, FGD, rural).

The study also showed that some community members often attribute persistent cough to *kaakii*, a local term used to describe asthma. The term *kaakii* is used to describe the condition because of the retraction of the chest and the sound the person makes when breathing. Use of herbs and other home remedies were believed to be more effective than western medicine. It was believed that when such a person is sent to the hospital, the person will die. Hence treatment is sought from herbalist where some marks will be made on the chest of the individual using either a blade or a knife and herbs applied as illustrated:

*"One of the reasons why people with cough do not go to hospital is because some of the cough is often attributed to kaakii which we believe herbs are very effective against it"* (48-years male, FGD rural).

"*Some of the cough is always due to kaakii and in this community we have some herbs that are very good for this cough. The herbalist can use their special knife to make marks on the chest and apply the herbs. So people with cough resulting from kaakii will not go to the hospital because it is believed that when you send such people to the hospital, they will die"* (36-year female, FGD, rural).

Some coughs were also attributed to *"maarong"* or *"nyabiebaalong",* a local term to describe pneumonia. This condition was also believed to be due to exposing the chest (nyabie) to cold weather, hence the term. Applying warm compresses produced from herbs to the chest or boiling some herbs for the person to expose the chest to the steam after

which the person bath the water were the two ways to manage this condition. It could also be treated by applying hot compresses to the anus or enema for children as illustrated:

> *"We have different types of disease that make you cough. One is the nyabiebaalong which affect your chest. You will cough, have sores in your anus and also chest pains. This one the herbalist will give you some herbs to boil, bath and in some instance you use it as enema".*

The most common sign of TB identified by respondents was weight loss 475 (78.4%), and productive cough 458 (75.8%) whilst night sweats was least known 177 (29.2%). Knowledge about these signs was also common among FGDs and IDIs. Contrary to the fact that loss of weight was the most identified sign of TB in the quantitative survey, among FGDs and IDIs participants, productive cough was more known. This productive cough was described as deep and it lasts for longer period than the type of cough people get when they have catarrh or common cold, which is described as *"Korong"* (cough). The deep and persistent nature of the cough has therefore resulted in TB been referred to locally as *"Koronkpong" or Korongpilah* (in Dagaare/Waale) *or korongkpieng"* (in Lobi) or *"Kusibine"* (in Sissala) which literally means "big cough". The word *"korongpilah"* was also used to describe TB because the cough makes the individual to become emaciated with the skin of the person becoming whitish as illustrated by the following quotes from respondents:

> *"This condition will make you cough too deep for weeks until your chest can no longer take it. That is why it is call koronkpong which is different from common Korong. The person also become white like he does not have blood so we also call it korongpilah"* (35-years male, FGD, rural).

> *"One of my neighbours had that condition, he can cough until he is running short of breathe. This made us to suspect that she was suffering from the koronkpieng. It*

*is a very bad condition, you cannot even sleep in the night"* (31-years female, FGD, urban).

*"....We call the condition kusibine in our local language because of the nature of the troubling cough that the person gets. This cough is often worse in the night and the person cannot sleep"* (54-year male, FGD, rural).

Other key signs and symptoms such as fever, loss of weight and loss of appetite were also mentioned in IDIs and FGDs with community members. The loss of weight according to respondent is often due to loss of appetite and the vomiting during and after meals. To FGD respondents, the deep and persistent nature of the cough will make the individual suffering from TB to vomit. This vomiting and persistent loss of weight according to respondents make the disease to bear similarity to "*gbemiele baalong"* a local term used to refer to HIV which is translated literally as extreme wasting of the legs as a result of weight loss. The following illustrative quotes buttress these points:

*"That person's body will also be hot and he cannot eat. Anytime the person is eating, or the person stomach is full, the cough becomes serious, so they end up growing very lean"* (56-year man, IDI).

*"Apart from the cough which is the beginning of the condition, when you do not seek treatment early, your chest also become painful, your body becomes hot and you vomit anytime you eat food. This will make you grow lean as if you have gbemiele baaalong (HIV)"* (34-year female, FGD).

Both FGDs and IDIs identified various types of conditions that present with cough, their causes and management (Table 4.2). However, it emerged that the inability of people to differentiate between these conditions because of similarity of initial signs makes it difficult for people to determine if the condition is TB as illustrated:

*"We have so many conditions here that are similar to TB….For example we have Korihiin/Keehin-hilia which also starts with cough and is purely a spiritual condition. We treat it putting special padlock around the child's neck"* (48 year man, FGD).

Table 4.2: Types of TB/Cough related illness, causes, symptoms, treatment and prevention

| TB/Cough related illness | Local name (Dagaare/Lobi/ Sissali | Cause(s) | Signs/Symptoms | Treatment | Prevention |
|---|---|---|---|---|---|
| Asthma | Kaaki | Spiritual, bewitchment, and hereditary | Cough, chest of lizard (badarenyaa), irregular movement of the chest | Use of local herbs, divination, incision of the chest and smearing the incised area with herbs or cola | Making of marks on the chest and applying herbs |
| Catarrh (Cold) | Korong | Exposure to cold air, exposure of chest to cold | Running nose, dry cough, pain in swallowing | Use of ginger, herbs, self-medication with cough mixture | Covering of the body in night, avoiding cold water during dry season |
| Pneumonia | Maarong or Nyabiebaalong | Exposure to cold weather especially the chest | Cough, chest pains, flaring of nose, sores at the anus | Use of warm compresses on chest, and anus, use of local herbs, hot compresses of nose and chest | Avoid exposure of chest to when the weather is cold, covering of children in cold weather, avoid drinking cold water |
| Whooping cough (Pertussis) | Korihiin/Keehin -hilia | Caused by spirits, curse, bewitchment | Cough, chest pain, shortage of breathe, flaring of the nose | Hanging of padlock key on the neck to drive way spirit, wearing of talismans on neck and arm, use of herbs, making of marks on the chest and applying herbs | Wearing of the padlock key and talisman, avoid offending the gods, and adults |
| Tuberculosis | Korongkpong or Korongkpieng or korongpilah or Kusibine or Kesubine | Spiritual, sex, cough during sex | Cough, chest pains vomiting loss of appetite, loss of weight, fever, whitish skin, blood in sputum, emaciation | Spiritualist, herbal, medical | Avoid having sex with people partners, avoid use of alcohol, avoid sharing utensils and close to person with the disease |

Majority, 562 (92.7%) of the participants believed that everybody could be infected with TB. Respondents were aware that smokers 426 (70.3%), contact with TB patients 332 (54.6%), caretakers of TB patients 377 (62.2%) and alcohol abusers 269 (44.4%) had a higher risk of infection. Majority, 470 (77.6%) of respondents believed TB could also be

cured (Table 4.3). IDIs and FGDs also revealed that respondents believed TB could be cured as illustrated:

> *"The 'koronkpong' is curable, you only have to get the person who has the medicine for the condition and you will be fine"* (38-years Male, FGD, rural).

> *"Oooh….there is a cure to the disease 'kusibine', it can easily be treated and the person will become fine. There are people who have a solution and when you consult them, they will give the medicine which you will take for some weeks and it will disappear"* (32-years, Female, IDI).

However, there were varied opinions on how it could be cured as many respondents believed in a combination of treatment options which may be sought simultaneously or in sequence. About, 350 (57.8%) of the respondents believed TB could be managed by biomedical facilities whilst 256 (42.2%) believed in the use of other remedies. Table 4.3 shows respondents' level of knowledge regarding TB.

Table 4.3: Community Knowledge and Perception about Tuberculosis

| Community Knowledge | Frequency | Percentage (%) |
|---|---|---|
| **Knowledge on causes of TB** | | |
| Ever heard of TB | 606 | 100 |
| Caused by germs | 296 | 48.9 |
| Hereditary | 143 | 23.6 |
| Curse | 133 | 22.1 |
| Sharing utensils | 145 | 23.1 |
| Sharing food | 146 | 23.9 |
| Bewitchment | 137 | 22.6 |
| Mosquitoes | 203 | 33.5 |
| Sex | 279 | 46.0 |
| Acquired through cough during sex | 292 | 48.2 |
| **Knowledge on signs and symptoms** | | |
| Dry cough | 475 | 78.4 |
| Cough > 2 weeks | 351 | 57.9 |
| Productive cough | 458 | 75.6 |
| Cough with blood | 339 | 55.9 |
| Night sweats | 177 | 29.2 |
| Fever (>38$^{o}$C) | 276 | 45.5 |
| Shortness of breathe | 343 | 56.6 |
| Weight loss (>10kilograms) | 475 | 78.4 |
| Chest pain | 418 | 69.0 |
| Loss appetite | 301 | 49.7 |
| **Vulnerability** | | |
| Everybody | 562 | 92.7 |
| Smokers | 426 | 70.3 |
| Alcohol Abusers | 253 | 41.8 |
| People Infected with HIV/AIDs | 269 | 44.4 |
| Contacts with TB patients | 332 | 54.8 |
| Caretakers of TB patients | 377 | 62.2 |

Although respondents believed the use of alcohol was a major predisposing factor for TB in the community, in the qualitative study 'alcohol' as a predisposing factor was seen to result from punishment due to misbehaviour in society. Therefore such people contract TB as punishment by people they have offended. This is because *koronkpong/Kusibine* was believed to be a condition one gets when you cough whilst having sex. Therefore, people who have the habit of *"sleeping with other people's partners"* could easily get the condition and alcohol abuse was believed to facilitate this promiscuous lifestyle:

*"In this community, both males and females drink a lot of alcohol and this make them to go about sleeping (having sex) with other people partners. Therefore you can be cursed to get that condition, so that you cannot sleep with anybody partner again"* (36-female, FGD, rural).

*"You see this boy over there (pointing to a man), when he get up in the morning, he goes round from bar to bar drinking. Some months ago, he was influenced by the alcohol and he slept with another man's wife and has been given the condition koronkpong. Now see how lean he is, he cough from morning to evening"* (68-year opinion leaders, IDI).

The results of the weighted scores showed that 310 (51.2%) of respondents had low knowledge on the causes of TB. However, a little over half (52.0%) of the respondents had high knowledge on signs and symptoms of TB. Knowledge on mode of transmission was also low (59.0%) whilst over half of respondents had high knowledge on vulnerability to TB (Table 4.4).

Table 4.4: Weighted Knowledge on TB

| Composite Knowledge on TB | Frequency (n) | Percentage (%) |
|---|---|---|
| **Knowledge on causes** | | |
| Low | 310 | 51.2 |
| High | 296 | 48.8 |
| **Knowledge on signs and symptoms** | | |
| Low | 291 | 48.0 |
| High | 315 | 52.0 |
| **Knowledge on mode of transmission** | | |
| Low | 360 | 59.4 |
| High | 246 | 40.6 |
| **Knowledge on vulnerability** | | |
| Low | 281 | 46.4 |
| High | 325 | 53.6 |
| **Knowledge on Treatment** | | |
| Low | 362 | 60.2 |
| High | 241 | 39.8 |

#### 4.3.1.1 Association between Socio-demographic Characteristics of Respondents and Knowledge on TB

A bivariable analysis was conducted to determine the association between knowledge on TB and demographic characteristic of the respondents. The results showed that age, sex, education and religion were associated with knowledge on causes, transmission, vulnerability, signs and symptoms and treatment of TB. The study found that age was significantly associated with knowledge on causes, transmission, vulnerability, signs and symptom and treatment for TB. With regards to cause, 64.5% and 68.6% of respondents between the ages of 29-39 years and >61 years respectively had high knowledge, however, on transmission of TB, and vulnerability, the highest knowledge was found among participants within the age group of 18-28 years. The differences were significant across all the three variables; cause ($p<0.0001$), transmission ($p<0.0001$) and vulnerability ($p=0.001$). Again, age was associated with knowledge on signs and symptoms ($p<0.0001$) and treatment ($p=0.014$). Sex of the respondent was also found to be associated with knowledge about TB with males having high knowledge than females. The difference between the genders was significant for knowledge on cause ($p=0.001$), transmission ($p=0.018$), vulnerability ($p=0.005$) but was not significant for sign and symptoms ($p=0.977$) and treatment ($p=0.066$).

Educational attainment of respondent also emerged as having a significant association with knowledge about TB with participants with higher level of education having more knowledge than those with lower educational attainment and those without formal

education. These differences were significant across all the variables; causes ($p<0.0001$), transmission ($p=0.001$), vulnerability ($p<0.0001$), signs and symptoms ($p<0.0001$) and treatment ($p<0.0001$). With respect to religion, it emerged that more Christians had high knowledge relative to Moslems and African Traditional Religion. The difference was significant for causes ($p=0.002$), vulnerability ($p=0.009$), signs and symptoms ($p<0.0001$) but was not significant for knowledge on transmission ($p=0.276$) and treatment ($p=0.050$). Ethnicity was also found to have a significant association to knowledge on TB with more Dagaabas reporting better knowledge across all five dimensions; causes ($p<0.0001$), transmission ($p=0.039$), vulnerability ($p<0.0001$), signs and symptoms ($p<0.0001$) and treatment ($p<0.0001$). Both marital status and socio-economic status was also significantly associated with knowledge across all the five dimension. People who were not married and those who belonged to higher socio-economic status had high knowledge about cause, transmission, vulnerability, signs and symptom and treatment for TB (Table 4.5).

Table 4.5: Association between socio-demographic characteristics of respondent and knowledge about TB

| SDC of Respondent | Causes | | | Transmission | | | Vulnerability | | | Signs and symptoms | | | Treatment | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Low | High | df/ $X^2$ p-value | Low | High | df/ $X^2$ p-value | Low | High | df/ $X^2$ p-value | Low | High | df/$X^2$ p-value | Low | High | $X^2$ p-value |
| **Age** | | | | | | | | | | | | | | | |
| 18-28 | 81 (55.1) | 66 (44.9) | | 58 (40.1) | 88 (59.9) | | 55 (37.4) | 92 (62.6) | | 80 (54.4) | 67 (45.6) | | 44 (29.9) | 103 (70.1) | |
| 29-39 | 71 (35.5) | 129 (64.5) | (4, 606) | 123 (61.5) | 77 (38.5) | (4, 606) | 82 (41.0) | 118 (59.0) | (4, 606) | 75 (37.5) | 125 (62.5) | (4, 606) | 75 (37.5) | 125 (62.5) | (4, 606) |
| 40-50 | 123 (69.5) | 54 (30.5) | **<0.0001** | 119 (67.2) | 58 (32.8) | **<0.0001** | 93 (52.5) | 84 (47.5) | **0.001** | 111 (62.7) | 66 (37.3) | **<0.0001** | 82 (46.9) | 94 (53.1) | **0.014** |
| 51-61 | 24 (51.1) | 23 (48.9) | | 40 (85.1) | 7 (14.9) | | 30 (63.8) | 17 (36.2) | | 11 (23.4) | 36 (76.6) | | 21 (44.7) | 26 (55.3) | |
| >61 | 11 (31.4) | 24 (68.6) | | 19 (54.3) | 16 (45.7) | | 21 (60.0) | 14 (40.0) | | 14 (40.0) | 21 (60.0) | | 18 (51.4) | 17 (48.6) | |
| **Sex** | | | | | | | | | | | | | | | |
| Male | 152 (45.1) | 185 (54.9) | (1, 606) | 186 (55.2) | 151 (44.8) | (1, 606) | 139 (41.3) | 198 (58.7) | (1, 606) | 162 (48.1) | 175 (51.9) | (1, 606) | 123 (36.5) | 214 (63.5) | (1, 606) |
| Female | 158 (58.7) | 111 (41.3) | **0.001** | 174 (64.7) | 95 (35.3) | **0.018** | 142 (52.8) | 127 (47.2) | **0.005** | 129 (48.0) | 140 (52.0) | 0.977 | 118 (43.9) | 151 (56.1) | 0.066 |
| **Education** | | | | | | | | | | | | | | | |
| No formal | 190 (57.2) | 142 (42.8) | | 201 (60.5) | 131 (39.5) | | 191 (57.5) | 141 (42.5) | | 163 (49.1) | 169 (50.9) | | 153 (46.1) | 179 (53.9) | |
| Primary | 46 (82.1) | 10 (17.9) | (5, 606) | 33 (58.9) | 23 (41.1) | (5, 606) | 15 (26.8) | 41 (73.2) | (5, 606) | 38 (67.9) | 18 (32.1) | (5, 606) | 22 (39.3) | 34 (60.7) | (5, 606) |
| Middle/JSS | 57 (62.6) | 34 (37.4) | **<0.0001** | 54 (59.3) | 37 (40.7) | **0.001** | 47 (51.6) | 44 (48.4) | **<0.0001** | 62 (68.1) | 29 (31.9) | **<0.0001** | 35 (38.5) | 56 (61.5) | **0.000** |
| Vocational | 6 (54.6) | 5 (45.4) | | 9 (81.8) | 2 (18.2) | | 9 (81.8) | 2 (18.2) | | 4 (36.4) | 7 (63.6) | | 4 (36.4) | 7 (63.6) | |
| Secondary | 11 (15.5) | 60 (84.5) | | 28 (39.4) | 43 (60.6) | | 14 (19.7) | 57 (80.3) | | 20 (28.2) | 51 (71.8) | | 24 (33.8) | 47 (66.2) | |
| Tertiary | 0 (0.0) | 45 (100) | | 10 (22.2) | 35 (77.8) | | 5 (11.1) | 40 (88.9) | | 4 (8.9) | 41 (91.1) | | 3 (6.7) | 42 (93.3) | |
| **Religion** | | | | | | | | | | | | | | | |
| Traditional | 66 (55.0) | 54 (45.0) | (2, 606) | 78 (65.0) | 42 (35.0) | (2, 606) | 70 (58.3) | 50 (41.7) | (2, 606) | 52 (43.3) | 68 (56.7) | (2, 606) | 59 (49.2) | 61 (50.8) | (2, 606) |
| Christianity | 151 947.3) | 168 (52.7) | **0.002** | 138 (43.3) | 181 (56.7) | 0.276 | 134 (42.0) | 185 (58.0) | **0.009** | 129 (40.4) | 190 (59.6) | **<0.0001** | 123 (38.6) | 196 (61.4) | 0.050 |
| Islam | 105 (62.9) | 62 (37.1) | | 101 (60.5) | 66 (39.6) | | 90 (53.9) | 77 (46.1) | | 110 (65.9) | 57 (34.1) | | 59 (35.3) | 108 (64.7) | |
| **Ethnicity** | | | | | | | | | | | | | | | |
| Dagao | 174 (49.4) | 178 (50.6) | | 139 (39.5) | 213 (60.5) | | 147 (41.7) | 205 (58.3) | | 160 (45.5) | 192 (54.5) | | 154 (43.6) | 198 (56.4) | |
| Waale | 67 (77.0) | 20 (23.0) | (4, 606) | 47 (54.0) | 40 (46.0) | (4, 606) | 51 (58.6) | 36 (41.4) | (4, 606) | 75 (86.2) | 12 (13.8) | (4, 606) | 76 (87.4) | 11 (12.6) | (4, 606) |
| Sissala | 54 (65.1) | 29 (34.9) | **<0.0001** | 57 (68.7) | 26 (31.3) | **0.039** | 58 (69.9) | 25 (30.1) | **<0.0001** | 25 (30.1) | 58 (69.9) | **<0.0001** | 45 (54.2) | 38 (43.8) | **0.000** |
| Lobi | 43 (55.8) | 34 (44.2) | | 45 (58.4) | 32 (41.6) | | 56 (72.7) | 21 (27.3) | | 29 (37.7) | 48 962.3) | | 46 (59.7) | 46 (59.7) | |
| Others | 2 (28.6) | 5 (71.4) | | 2 (28.6) | 5 (71.4) | | 2 (28.6) | 5 (71.4) | | 2 (28.6) | 5 (71.4) | | 0 (0.0) | 7 (100.0) | |
| **Marital status** | | | | | | | | | | | | | | | |
| Never married | 53 (46.9) | 60 (53.1) | | 56 (49.6) | 57 (50.4) | | 44 (38.9) | 69 (61.1) | | 68 (60.2) | 45 (39.8) | | 48 (42.5) | 65 (57.5) | |
| Married | 195 (48.9) | 204 (51.1) | (4, 606) | 224 (56.1) | 175 (43.9) | (4, 606) | 194 (48.6) | 205 (51.4) | (4, 606) | 194 (48.6) | 205 (51.4) | (4, 606) | 141 (35.3) | 258 (64.7) | (4, 606) |
| Cohabiting | 27 (51.9) | 25 (48.1) | **<0.0001** | 40 (76.9) | 12 (23.1) | **<0.0001** | 11 (21.2) | 41 (78.8) | **<0.0001** | 21 (55.6) | 31 (59.6) | **<0.0001** | 18 (34.6) | 34 (65.4) | **0.000** |
| Divorced | 5 (55.6) | 4 (44.4) | | 7 (77.8) | 2 (22.2) | | 2 (22.2) | 7 (77.8) | | 5 (55.6) | 4 (44.4) | | 6 (66.7) | 3 (33.3) | |
| Widowed | 30 (90.9) | 3 (9.1) | | 33 (100) | 0 (0.0) | | 30 (90.0) | 3 (9.1) | | 3 (9.1) | 30 (90.9) | | 28 (84.8) | 5 (15.2) | |
| **Socio-economic status** | | | | | | | | | | | | | | | |
| Poorest | 94 (77.1) | 28 (22.9) | | 81 (66.4) | 41 (31.5) | | 65 (53.3) | 57 (46.7) | | 44 (36.1) | 78 (63.9) | | 92 (75.4) | 30 (24.6) | |
| Poor | 65 (50.0) | 65 (50.0) | (4, 606) | 89 (68.5) | 41 (31.5) | (4, 606) | 47 (36.1) | 53 (63.8) | (4, 606) | 75 (57.7) | 55 (42.3) | (4, 606) | 80 (61.5) | 50 (38.5) | (4, 606) |
| Better | 46 (38.0) | 75 (62.0) | **<0.0001** | 53 (43.8) | 68 (56.2) | **0.001** | 55 (45.5) | 66 (54.5) | **<0.0001** | 74 (61.2) | 47 (38.8) | **<0.0001** | 46 (38.0) | 75 (62.0) | **0.000** |
| Less poor | 35 (29.2) | 85 (70.8) | | 52 (43.3) | 68 (56.7) | | 48 (40.0) | 72 (60.0) | | 46 (38.3) | 74 (61.7) | | 56 (46.7) | 64 (53.3) | |
| Least poor | 21 (18.6) | 92 (81.4) | | 44 (38.9) | 69 (61.1) | | 39 (34.5) | 74 (65.5) | | 52 (46.0) | 61 (54.0) | | 51 (45.1) | 62 (54.9) | |

Individual and community knowledge and beliefs about TB would often influence their attitude towards people with the condition.

### 4.3.2 Community and Family Attitude to Tuberculosis

The quantitative survey showed that community members generally perceived TB as a dangerous condition and people are likely to avoid people with such conditions. The study found that 247 (40.8%) of respondents were of the view that they would be worried should they be told that they have TB, 143 (23.6%) said they were afraid of the condition. It also emerged that 279 (46.0%) of community members indicated they would avoid people with TB, whilst 121 (20.0%) indicated TB patients were likely to be rejected by the community. Regarding personal attitude to people with TB, this study found that 181 (29.9%) indicated they would keep a distance from TB patients with only 98 (16.2%) willing to provide support to people with TB at the community level. The study further found that majority of respondents, 368 (60.7%) indicated they were likely not to inform people if they should be diagnosed of TB and another 462 (76.2%) were of the view they were likely to hide themselves from people if they were to have TB. When respondents were asked about their greatest concern about TB, it emerged that the greatest ranked concern was stigma (42.4%), followed by fear of the treatment (24.4%), (Table 4.6).

Table 4.6: Respondents Attitude to TB and people with the disease

| Attitude to TB | Frequency (n) | Percentage (%) |
|---|---|---|
| **Feeling if one believe he/she had TB** | | |
| Afraid | 143 | 23.6 |
| Embarrassed | 88 | 14.5 |
| Desperate | 43 | 7.1 |
| Worried | 247 | 40.8 |
| Normal | 85 | 14.0 |
| **Views on Likely community attitude to TB patient** | | |
| Avoid TB patients | 279 | 46.0 |
| Reject | 121 | 20.0 |
| Likely to help/provide support | 206 | 34.0 |
| **Personal attitude to TB patients** | | |
| Supportive and help | 98 | 16.2 |
| Keep a distance | 181 | 29.9 |
| Afraid to be infected | 136 | 22.4 |
| Feel sorry for the patient | 166 | 27.4 |
| Feel indifferent | 25 | 4.1 |
| **Will tell someone if you have TB** | | |
| Yes | 368 | 60.7 |
| **Will have to hide oneself if you have TB** | | |
| Yes | 462 | 76.2 |
| **Greatest concern about TB** | | |
| Fear of stigma | 257 | 42.4 |
| Fear of treatment | 148 | 24.4 |
| Cost of treatment | 134 | 22.1 |
| Attitude of health workers | 67 | 11.1 |

The study further showed that some TB patients were isolated and stigmatised by their family members whilst others reported good family support. The study found that male respondents reported more family support than female among people with TB. However, across all respondents, it emerged that family members were generally afraid of getting infected and as such refused to share utensil and bowls with people with TB. They are also made to sleep in a different room where household living arrangement allows for that. It was also found that in extreme cases people who were married have their partners leaving them as a result of this condition. The following quotes illustrate these points:

> *"....I have my eating bowl and drinking cup which I use alone. I don't share them with my wife and children. When I was diagnosed as having TB, I have been sleeping alone in the other room and my wife and the children are also sleeping in the other room*" (36-years male TB patient, IDI).

> "*I get some support from my family except that they don't share utensils with me because they are afraid they will contract the condition from me"* (42-years male TB patient, IDI).

> *"One man in this community, his wife run away when the man had the condition because the woman was afraid she will also get the condition. So if you get it and you are married and you don't have a good partner the person may run away from you"* (42-years female, FGD, rural).

This negative attitude of people towards TB patients was closely linked to the fear of contracting the condition. This often resulted in a situation where people with TB hide their disease condition from community members. This notwithstanding, because this condition often presents with severe cough of long duration, people are still able to suspect that such individuals with prolonged cough could be suffering from TB. Some respondents indicated that they stay away from public gathering for fear of being humiliated. This according to respondents is even more pronounced during religious gatherings that require people to either sit or stand close to one another. It was reported that people will refuse to join your row or may move away from where you are seated to avoid contact. The following quotes support these assertions:

> *"It is very difficult living with this condition, people don't want you to come close to you. Even in public place, people will not want to come close and when they see you coming close to them they move a distance"* (52-year male TB patient, IDI).

> *"For me, since I was told I had Koronkpong and put on treatment, I don't go to public gathering because people will be pointing fingers at you as the person with disease. In church when you sit at a particular bench, no one will join that row"* (42-years female TB patient, IDI).

> "*Even during religious gatherings, people will refuse to join where you are sitting. So to avoid just embarrassing situation you worship at home until such a time you become free from the condition"* (62-years male TB patients, IDI).

The fear for the condition among community member resulted in their negative attitude towards people with the condition. This notwithstanding, the experience of TB patients was not different with the health system.

### 4.4 Experience of TB Patients with the Health System

The study also elicited information on the experience of people with TB with the health system during IDIs. There were also mixed findings with generally, many TB patients reporting that they were happy with the quality of care they received. They indicated that health workers in the TB control programme provided them with support during medication. Some indicated that disease control officers and volunteers pay them regular visits to find out how they were faring and to monitor their progress with adherence to the medication. This according to the respondents was essential as it encouraged them to continue taking medications. The following quotes illustrate these points:

> *"The health workers are very supportive…some even come and visit me sometimes to inquire how I was faring. But for their support it would [have] been difficult for me to continue to take this medication to now. I am now in my fifth month after starting the treatment"* (37-year female TB patient, IDI).

> "*It not easy at all to be on treatment for such a long time but the health workers will call me or my brother who assist me to take the medication and to remind me that I am supposed to come for my medication. They are doing very well"* (42-years male TB patient, IDI).

Despite this, some patients were of the view that some health workers do not treat them very well and some refer to them using the disease condition instead of using their real names to call them, which they felt in their view was derogatory. This in the view of some patients has contributed to the stigma and isolation they have to suffer at the community. Other patients were of the view that health workers should be blamed for the stigma associated with TB at the community level because they often demonstrate their unwillingness to come close to TB patients. The location of the TB treatment centres within health facilities was also cited as responsible for the stigma associated with TB. This is because TB treatment centres are often located at isolated areas of the health facility and some of the treatment centres are sometimes referred to as "isolation ward or unit". So, when the community observes this behaviour at the hospitals or clinic, they also become afraid. The following quotes support these views:

> *"Some of the health workers do not want to come close to us and treat us as if our condition is different from other conditions. I once fell sick and went to the hospital to join the queue. When the nurse at a point realized I was on TB treatment, she shouted saying why I did not come to tell her I had TB and have gone to sit with other patients. She asked if I wanted to give my condition to other people. I felt so embarrassed*" (42-years male TB patient, IDI).

> *"You see the health worker do not treat us well, sometimes they will not call your name but will say they should call the TB patient for them. But there is new health worker who is very friendly. I am sure if all people behave like her, people with TB will be willing to come the hospital"* (37-years female TB patient, IDI).

> *"A neighbour once told me that even health workers who are supposed to know this condition better are afraid of it. He said when you go to the hospital, you see that the nurses wear something to cover their nose and mouth before attending to people with TB. Even in our hospital, the TB ward is located far away from the other wards and is referred to as isolation ward. So we have the right to be afraid"* (62-year male TB Patient, IDI).

The study further found that a person with TB has to also incur expenses. This is because the biomedical facilities that patients are supposed to receive treatment from are located far away from their actual places of residence. Also, multiple health outlets are often used and this comes with a lot of financial strain on households with TB patients. The following illustrative quotes illuminate these assertions:

> *"Financial difficulty is my main problem. I have to travel to Wuchau for my medication and it is difficult. Also, when you are taking the drugs, you get more appetite but it is not easy, because of the sickness I cannot do any work"* (37-years male TB patients, IDI).

> *"I use both western and local medicine and all this comes with cost. You have to do some sacrifice and donate some things to the traditional healer. Also, you will have to travel to the clinic or hospital for the treatment. All these involve the use of money meanwhile you don't have the energy to farm"* (62-years male TB patient, IDI).

The lack of money and cost of treatment emerged as a barrier to health seeking, which is another important factor in TB case detection and treatment.

### 4.5 Health Seeking Behaviour of Respondents and How It Affects TB Case Detection

Health seeking behaviour has been found to affect TB case detection and treatment. Respondents were asked about the health seeking behaviour of their most recent experience of productive cough and what they will do if they suspected they had TB. Also, people with TB were also asked to describe their health seeking behaviour when they started experiencing ill-health until they were finally diagnosed as suffering from TB.

The results of the study showed that health seeking behaviour among community members was varied. About 110 (18.1%) had sought health care from government hospital and 218 (36.0%) from health centres for the most recent ill-health. Other respondents, 91 (15.0%) had bought some medications from drug stores. A similar proportion that sought care from hospital also utilized the services of a traditional healer in the most recent ill-health. Less than 8% indicated they had used spiritual outlets. This study further elicited information on reasons for the choice of health care outlets and found that proximity to the people emerged as the most common reason 159 (26.2%) for choosing a place for health care. Better quality of health care, 119 (19.6%) care emerged as the second common reason for the choice of health care outlet whilst cost of health care emerged as the least consideration in choosing a health care outlet (Table 4.7).

Table 4.7: Source of Health Care (SHC) of Respondents and Reason for Choice

| **SHC of Participants and Reason for Behaviour** | **Frequency (n)** | **Percentage (%)** |
|---|---|---|
| **SHC for most recent ill-health** | | |
| Government hospital | 110 | 18.1 |
| Government health centre | 218 | 36.0 |
| Private health facility | 26 | 4.3 |
| Bought medicine | 91 | 15.0 |
| Traditional healer | 113 | 18.7 |
| Spiritual | 48 | 7.9 |
| **Reasons for behaviour** | | |
| Closer | 159 | 26.2 |
| Better care provided | 119 | 19.6 |
| More convenient | 115 | 19.0 |
| Trust | 77 | 12.7 |
| More privacy Provided | 73 | 12.1 |
| Cheaper | 63 | 10.4 |

From participants of FGDs and IDIs, it was obvious that many would first try self-medication at home. For cough, herbs are often initially taken at home before considering any other remedy if that fails to provide the desired results. Generally, it emerged there were traditional medical practitioners across the region who claim to have herbs and concoctions that are capable of curing tuberculosis. These healers live in the communities and are sometimes very close to the people, thus easily accessible to community members as illustrated:

> *"For me when my family member is sick I first get some medicines from the drugstore or one doctor who goes round to sell drugs [itinerate drug vendor] ....in many instances, this is always able to take away the condition but if it does not get better, I then consider other measures, may be the clinic"* (54-years male, FGD, rural).

> *"We give traditional herbal medicine and when the person is not better we send the person to the clinic. The herbalist live with us in the community, so it is easy to go to them*" (45-years Married man, FGD, rural).

> *"There is even one at Gurungu (Community) and one at Tokali (community). They have the local medicine for TB and I went there for treatment first but one day I felt dizzy and fell down and was rushed to hospital"* (36-years Male TB Patient, IDI).

Interviews with health workers showed that they were aware of the activities of traditional medical practitioners in their various communities. Health workers also believed the proximity of traditional healers to the communities and the fact that they share a common belief system about the cause of TB as responsible for the utilization of such health outlets. The following illustrative quotes support these claims:

> *"We are aware of the traditional medical practitioners in this community, but you cannot prevent the people from patronizing their services. It is their belief system"* (Disease Control Officer-2, IDI).

> *"In these communities, especially at the villages, there are several traditional healers who claim they have herbs that can cure TB, so many people often go to them first. The traditional healers are close to them and also share the same belief system with them. So it is one of our biggest challenge"* (District Director 1, IDI).

This study further explored from disease control officers/TB coordinators and district health directors on collaboration between the biomedical health system and the other health outlets such as traditional healers as they are aware some people use such alternative health outlets. Findings showed that one of the study district had initiated a system where various traditional healers were registered and meetings were held with them regularly to enhance collaboration. Some traditional believers were of the view that traditional healers play an important role in health care delivery as health facilities are not optimally distributed. Hence, in their view, in some rural areas where there are no biomedical health facilities, many have to depend on their services in times of ill-health. Traditional healers interviewed in this study believed a good collaboration between them and the biomedical health facilities will be very useful. Traditional healers intimated that each traditional healer has specialized in some disease conditions and there is already in existence an inter-traditional healer's referral system for conditions they have no expertise in managing. So this could be extended to the orthodox health system as they indicated their willingness to refer patients that have physical conditions that they do not have expertise in managing. The following quotes illustrate these points:

> *"In my district we have a list of the traditional healers. An NGO based in Tamale organized them and we are collaborating with them. They have cards which they use to refer cases to the health facilities…it is helpful because, whether we like it or not some people will go to their facilities. So collaborating with them will afford*

*us the opportunity to train them to prevent them from keeping patients for long thereby causing delays"* (District Director 2, IDI).

*"The doctors in the hospitals do not believe we have medicines for the conditions we cure. So some of the nurses and doctors will be telling people not to come to us but the people come and their problems are solved. So, it will be important they recognize our service and provide us accreditation even for the national health insurance. People come to me a lot"* (Traditional Healer 2, IDI).

*"You see this man here (pointing to man), he has attended several hospitals with his condition and did not get cure and finally went to see another healer at Bulenga (community) and that person asked him to come and see me. In our area, if the person comes and you see that you don't have the medicine for that condition, you tell the person and advise him to see another healer. Sometimes, I even ask people to try the hospital in addition to my medicine. Our elders say that it is difficult for a rabbit that is being chased by two dogs to get missing but the health workers think we are not important"* (Traditional Healer 1, IDI).

Interview with people with TB showed that many reported taking some medications (self-medication) at home when they started experiencing cough. Others had reported to some itinerant drug sellers (referred to in the community as mobile doctors) who gave them some medications at home. Others indicated they had sought help from traditional medical practitioners in the community. They only reported to the hospital when the condition became unbearable or when they did not get better from the traditional and home remedies. They all acknowledged that initially they never imagined that their condition could be TB and therefore sought inappropriate treatment. They however acknowledged the ability of the biomedical system in managing TB better and wished they had reported earlier to the hospital. The following quotes illustrate these points:

*"When my condition started, I complained to one doctor who goes round selling medicine to us and he gave some drugs. I took the drug but it did not get better and my neighbour advised me to see one powerful traditional healer. So I went there to see him and he gave me some concoction but my condition was getting worse. So I*

*decided to go the clinic where I was referred to Wa hospital where finally I was told I had TB and put on treatment"* (36-years male TB patient, IDI).

*"....my condition started like a normal cough and later when I cough I find blood, so I was taken to a traditional healer by my husband where he gave me some concoction. At first when I took the concoction, I felt better but weeks later my condition became serious and I was growing very lean and people started saying that I have gbemiella baalong (HIV). So my husband decided to take me to the hospital since he was afraid I may die. It was at the hospital they did the test and told me I had TB and put on treatment and I am now feeling better"* (38-years female TB patient, IDI).

Differences in health seeking behaviour exist among community members and socio-demographic factors may be affecting this practice.

### 4.6 Socio-demographic Factors Affecting Health Seeking Behaviour

A bivariable analysis was conducted to identify socio-demographic factors affecting health seeking behaviour in the community. The results showed that age was an important factor that affects heath seeking behaviour. Among people who were within the age group of 18-28 years, 66 (48.5%) had sought for health at non-orthodox health outlet as against 70 (51.5%) who sought for health care at orthodox (biomedical) health facility. Also majority, 137 (72.9%) of the respondents between the ages of 29-39 years had used an orthodox health facility. However, among respondents between the ages of 40-50 years, a majority, 88 (53.7%) had used a non-orthodox health outlet. The difference across the age group was significant ($p<0.0001$).

Also, sex was found to be a significant ($p<0.0001$) factor affecting health seeking behaviour with more female reported to use biomedical health facilities than males. In addition, majority 66.4%, of Christians and 51.6% of Moslems used biomedical health facilities whilst over half of adherents to traditional religion used non-orthodox health outlets ($p=0.001$). Furthermore, the results of this study showed that ethnicity also affected health seeking behaviour. Members of the Sissala ethnic group were more likely to use non-orthodox health outlets as compared to other ethnic groups ($p=0.012$). Marital status ($p=0.033$), occupation ($p=0.001$) and socio-economic status ($p<0.0001$) were significant factors affecting health seeking behaviour (Table 4.8).

Table 4.8: Socio-demographic factors affecting health seeking behaviour

| Socio-demographic factors | Health seeking behaviour | | Df | $X^2$ p-value |
|---|---|---|---|---|
| | Nonorthodox, n (%) | Orthodox, n (%) | | |
| **Age (years)** | | | | |
| 18-28 | 66 (48.5) | 70 (51.5) | | |
| 29-39 | 51 (27.1) | 137 (72.9) | (5, 606) | **<0.0001** |
| 40-50 | 88 (53.7) | 76 (46.3) | | |
| 51-61 | 11 (28.2) | 28 (71.8) | | |
| >61 | 14 (45.2) | 17 (54.8) | | |
| **Sex** | | | | |
| Female | 76 (31.3) | 167 (68.7) | | |
| Male | 154 (48.9) | 161 (51.1) | (1, 606) | **<0.0001** |
| **Educational attainment*** | | | | |
| No formal education | 134 (43.6) | 173 (56.4) | | |
| Primary | 27 (51.9) | 25 (48.1) | | |
| Middle/JSS | 30 (37.5) | 50 (62.5) | (5, 606) | 0.199 |
| Secondary | 21 (31.8) | 45 (68.2) | | |
| Vocational | 3 (30.0) | 7 (70.0) | | |
| Tertiary | 15 (34.9) | 28 (65.1) | | |
| **Religion** | | | | |
| Traditional | 57 (50.9) | 55 (49.1) | | |
| Christianity | 97 (33.6) | 192 (66.4) | (2, 606) | **0.001** |
| Islam | 76 (48.4) | 81 (51.6) | | |
| **Ethnicity*** | | | | |
| Dagao | 126 (39.5) | 193 (60.5) | | |
| Wala | 26 (32.9) | 53 (67.1) | (4, 606) | **0.012** |
| Sissala | 43 (53.1) | 38 (46.9) | | |
| Lobi | 35 (47.9) | 38 (52.1) | | |
| Others | 0 (0.0) | 6 (100) | | |
| **Marital status** | | | | |
| Never married | 39 (37.5) | 65 (62.5) | | |
| Married | 163 (43.8) | 29 (56.2) | | |
| Cohabiting | 16 (34.0) | 31 (66.0) | (4, 606) | **0.033** |
| Divorced | 5 (83.3) | 1 (16.7) | | |
| Widowed | 7 (24.1) | 22 (75.9) | | |
| **Occupation** | | | | |
| Farmer | 106 (47.1) | 119 (52.9) | | |
| Trader | 55 (43.6) | 71 (56.4) | | |
| Housewife | 18 (24.7) | 55 (75.3) | (5, 606) | **0.001** |
| Civil servant | 17 (37.0) | 29 (63.0) | | |
| Student | 28 (49.1) | 29 (50.9) | | |
| Artisan | 6 (19.3) | 25 (80.7) | | |
| **Socio-economic status** | | | | |
| Poorest | 66 (57.9) | 48 (41.1) | | |
| Poor | 66 (55.5) | 53 (44.5) | (4, 606) | **<0.0001** |
| Better | 74 (65.5) | 39 (35.5) | | |
| Less poor | 47 (42.0) | 65 (58.0) | | |
| Least poor | 75 (75.0) | 25 (25.0) | | |

*Fisher Exact test conducted

In both IDIs and FGDs showed that one important reason for health seeking behaviour is the belief about the cause of ill-health. Participants generally believed that decision on

where to seek for health is often arrived upon by an appraisal of what the possible cause of the condition may be, an essential feature in the social cognitive theory. Once it has been determined that the cause may be germ, they will then go to biomedical health facilities. However, if the cause of the condition is believed to be spiritual or resulting from a curse, then they will use traditional health practitioners or spiritual leaders. Another consideration in health seeking is how accessible the services outlets are. To many respondents they will prefer to go to health care outlets that are closer to them. The following quotes illustrate these points:

> *"There are some condition which can be managed by the hospitals and clinic but they are others which you have to use herbs or use spiritual means. So for me it depends on the type of condition. For example, the korokpong we talked about, you will need to get treatment from traditional healers because it is spiritual condition"* (52 years man, FGD, Rural).
>
> *"We use the traditional healers because they are closer to us and when you go there, you receive the care very fast and you can go back home to continue with your work"* (36-years woman, FGD, Rural).

Another consideration in health seeking from IDIs and FGDs was quality of care. Respondents were of the view that they would go to facilities that will provide them with very good medical attention and attend to them quickly. Generally, respondents were of the opinion that there were always delays at orthodox medical facilities. Therefore, they prefer to either buy their own medication or use the traditional health outlets, which in their opinion relate with the clients better and would provide them with quick care to enable them go home to continue with their work. Some were also of the view that because of high attendance at clinics and hospitals, doctors do not pay much attention to patients and

sometimes do not request for laboratory test or even examine patients. This in their view is contrary to what pertains at traditional health outlets where according to them patients receive much attention and in many instances the *"Kpimie/Saakumine"* (gods/ancestors) are consulted before they are given treatment or a remedy.

> *"Usually these days when you go to the health centre or the hospital, you spend a lot of time waiting and when it is even time for you to see the doctor because of the number of people waiting to see the doctor, they will not "feel you well' (examine you well)…whilst you are busy telling the doctor your problem, he is busy writing drugs. So for me I prefer to use local medication. They will listen to you, consult the kpimie/saakumine (gods/ancestor) before giving you treatment"* (56-year man, FGD, rural).

> *"As for the clinic here you only go there if you don't have any work to do on that day. Because once you go there you will spend the whole day there only to be given paracetamol. So, for me I go to the drug store here to tell them my problem and they will provide me with medicines"* (43-years female respondent, FGD, rural).

> *"…because of the health insurance, the clinic and hospitals are always full, so the doctors and nurse do not have time for people. It is a big problem now but you will have spent a lot of time there"* (36-years female FGD, urban).

## 4.7 Determinants of Health Seeking Behaviour

The results showed there were difference in health seeking behaviour for productive cough between males and females. Females were 3.9 times more likely (aOR=3.93, 95% CI=1.1745, 3.1789) to use biomedical health facility than their male counterparts. Christians were also found to have 2.9 times (aOR=2.91, 95% CI=1.9633, 3.4185) the odds of seeking health at orthodox health facilities relative to adherents of traditional religion. However, 48% (aOR=0.52, 95% CI=0.3739, 0.6073) of people who were Moslems were less likely to use a biomedical health facility in times of ill-health.

This study found that Waalas were 64% (aOR=0.36, 95% CI=1.1244, 6.7834) less likely to use biomedical health facility when they are sick compared to Dagaabas whilst Sissalas were 52% (aOR=0.48, 95% CI=0.4903, 0.9218) less likely to use biomedical health facilities. Lobis were also 60% (aOR= 0.40, 95%CI=0.4362, 0.8861) less likely to use orthodox health facilities compared to Dagaabas in this study. This study also found that married people were 3.3 times (aOR= 3.32, 95% CI=0.3512, 0.8977) more likely to use biomedical health facilities compared to those who were unmarried. Socio-economic status of respondent also emerged as an important determinant of health seeking. Generally, the study found that people belonging to least poor households were 3.7 (aOR=3.79, 95% CI=0.3392, 0.8127) times more likely to use biomedical health facilities compared to people in the poorest household (Table 4.9).

Table 4.9: Determinants of health seeking behaviour

| SDC of Respondent | Unadjusted | | | Adjusted | | |
|---|---|---|---|---|---|---|
| | OR | p-value | 95% CI | OR | p-value | (95% CI) |
| **Age (years)** | | | | | | |
| 18-28 | 1.00 | - | - | 1.00 | - | - |
| 29-39 | 3.11 | 0.002 | 1.5197-6.3736 | 2.86 | 0.004 | 1.3896-5.8835 |
| 40-50 | 0.48 | 0.057 | 0.2207-1.0231 | 0.66 | 0.238 | 0.3298-1.3175 |
| 51-61 | 1.21 | 0.739 | 0.3903-3.7683 | 1.52 | 0.452 | 0.5105-4.5296 |
| >61 | 1.66 | 0.377 | 0.5391-5.1062 | 2.00 | 0.202 | 0.6902-5.7991 |
| **Sex** | | | | | | |
| Male | 1.00 | - | - | 1.00 | - | - |
| Female | 4.05 | 0.009 | 1.1967-3.5156 | 3.93 | 0.010 | 1.1745-3.1789 |
| **Religion** | | | | | | |
| Traditional | 1.00 | - | - | 1.00 | - | - |
| Christianity | 3.95 | 0.020 | 1.1093-3.4394 | 2.91 | 0.030 | 1.0633-3.4185 |
| Islam | 0.46 | 0.005 | 0.3505-2.0969 | 0.52 | 0.003 | 0.3739-0.6078 |
| **Ethnicity** | | | | | | |
| Dagaaba | 1.00 | - | - | 1.00 | - | - |
| Wala | 0.44 | 0.022 | 1.1769-8.3743 | 0.36 | 0.027 | 1.1244-6.7834 |
| Sissala | 0.54 | 0.001 | 0.4451-3.4382 | 0.48 | 0.002 | 0.4903-0.9218 |
| Lobi | 0.35 | 0.000 | 0.6413-0.7651 | 0.40 | 0.002 | 0.4362-0.8861 |
| Others | 1.44 | 0.540 | 0.6893-3.6850 | 1.32 | 0.248 | 0.5821-4.3881 |
| **Marital status** | | | | | | |
| Never married | 1.00 | - | - | 1.00 | - | - |
| Married | 4.61 | 0.000 | 0.2981-1.2392 | 3.32 | 0.001 | 0.3612-0.8977 |
| Cohabiting | 0.75 | 0.570 | 0.2756-2.0327 | 0.88 | 0.802 | 0.3238-2.3921 |
| Divorced | 0.61 | 0.064 | 0.0032-1.1753 | 0.08 | 0.060 | 0.0066-1.1041 |
| Widowed | 1.18 | 0.806 | 0.3187-4.3555 | 1.74 | 0.413 | 0.4604-6.6013 |
| **Occupation** | | | | | | |
| Farmer | 1.00 | - | - | 1.00 | - | - |
| Trader | 1.21 | 0.580 | 0.6060-2.4464 | 1.20 | 0.590 | 0.6135-2.3341 |
| Housewife | 2.51 | 0.035 | 1.0651-5.8950 | 1.81 | 0.184 | 0.7535-4.3521 |
| Civil servant | 1.26 | 0.734 | 0.3262-4.9060 | 0.88 | 0.790 | 0.3449-2.2478 |
| Student | 1.10 | 0.858 | 0.3767-3.2298 | 0.78 | 0.650 | 0.2771-2.2263 |
| Artisan | 4.88 | 0.007 | 1.5341-15.5330 | 3.62 | 0.031 | 1.1232-11.6685 |
| **Socio-economic status** | | | | | | |
| Poorest | 1.00 | - | - | 1.00 | - | - |
| Poor | 0.63 | 0.219 | 0.2968-1.3207 | 0.68 | 0.270 | 0.3387-0.9591 |
| Better | 1.31 | 0.450 | 0.6483-2.6578 | 1.17 | 0.642 | 0.5975-2.3068 |
| Less poor | 4.41 | 0.013 | 0.2033-0.8303 | 3.37 | 0.006 | 0.1865-0.7566 |
| Least poor | 4.75 | 0.006 | 0.4018-0.8199 | 3.79 | 0.001 | 0.3392-0.8127 |

## 4.8 Health Systems Factors Affecting Tuberculosis Case Detection

This part presents results of the health system factors that affect TB case detection in the study area examining it from the six building blocks of health system strengthening: service delivery, human resource, health financing, leadership and governance, logistics and supplies and health information.

### 4.8.1 Lack of Health Promotion Activities and Screening Affecting TB Case Detection and Treatment

Exposure to information on TB is important to increase knowledge and promote positive behavioural change towards TB control interventions. Thus, the study assessed participants' exposure to TB-related information in the last six months. The study found that only 130 (21.4%) had received some form of education on TB. Among those who had received some form of health education, 64 (49.2%) received the education from health workers, 19 (14.6%) received the education from community health volunteers. Other sources of the education were family members 23 (17.7%) and friends 18 (13.9%).

For those who indicated they had received some form of health education on TB, the study collected information on the content of the education. The results showed that 82 (63.1%) had received education on the causes of TB and 101 (77.7%) had received education on the fact that TB was curable. Areas least covered in health education were management 49 (37.7%) and the fact that TB treatment was free 49 (37.7%), (Table 4.10).

Table 4.10: Exposure to TB Education

| Exposure to information on TB, sources of the information and content | Frequency (n) | Percentage (%) |
|---|---|---|
| **Exposure to TB information ( N=606)** | | |
| Received health education in last 6 months | 130 | 21.4 |
| No health education in last 6 months | 476 | 78.6 |
| **Source of health education (N=130)** | | |
| Health worker | 64 | 49.2 |
| Community Health volunteers | 19 | 14.6 |
| Opinion Leaders | 6 | 4.6 |
| Family Members | 23 | 17.7 |
| Friends | 18 | 13.9 |
| **Content of Education (N=130)** | | |
| Causes of TB | 82 | 63.1 |
| Mode of transmission | 78 | 60.0 |
| TB is curable | 101 | 77.7 |
| Signs and symptoms | 94 | 72.3 |
| Health seeking | 70 | 53.8 |
| Management of TB | 49 | 37.7 |
| TB treatment being free | 49 | 37.7 |

Community members in the FGDs shared a similar experience indicating they had not received any health education on TB for a long time. Respondents were of the view that in the past, health workers paid more attention to health education to community on TB but this appears not to be the case now. In interviews with TB control officers/disease control officers, they admitted that there had been a declined in health promotion activities including health education. They however blamed that on lack of logistics and transport facilities to enable them travel to communities to provide health education. The following quotes illuminate these points:

> *"It has been a very long time since I last received health education on TB. Now when nurses come around, they only talk about how we should take care of our children and pregnant woman"* (28-year female, FGD, urban).

> *"To be frank with you my brother, it has been a very long time since we have received health workers in this community to educate us about TB. Even on radio, in the past, almost every day you hear education about TB but now it does not happen. All you hear now on radio is politics but this condition is killing us"* (67-year old male, FGD, urban).

> *"Those days, we used to have vans come around to educate us on TB but it has stopped. Even on radio, we don't hear of TB any longer but is a big problem in this community. You find people having productive cough but they will not go to hospital"* (56-year man, FGD, rural).

> *"We have challenges in moving to the community to provide health education because of logistical problem. I use my own motorbike for all my activities and they do not provide me with fuel"* (Disease Control Officer-1, IDI).

FGD participants were of the view that the absence of such education from health workers meant that the community will continue to hold their views about the conditions based on their local beliefs irrespective of how wrong such beliefs may be as illustrated:

> *"We in this community have our beliefs about TB, which may not be helping us but if you do not get experts like nurse and doctors to educate us about the condition, we will continue to hold on to the local beliefs. I am really happy you are here this evening for us to discuss this"* (43-year female, IDI, rural).

Another service-related area that is essential in TB case detection is screening of people with signs and symptoms suggestive of TB, once the person reports at the health facility. This study however showed that screening services at health facilities were low. About 132 respondents in this study indicated ever reporting at a health facility with productive cough which lasted for more than two weeks but only 31 (23.5%) of them were screened for TB. Of the 31 people who were screened, 13 representing 41.9% indicated they were positive and put on TB treatment (Table 4.11). The study also found that those who were put on treatment either completed the treatment, 10 (76.9%) or were still taking the medication, 3 (23.1%).

Table 4.11: Screening at health facilities

| TB Screening at Health Facilities | Frequency (n) | Percentage (%) |
|---|---|---|
| **Ever reported at health with productive cough for more than 2 weeks (N=606)** | | |
| Yes | 132 | 21.8 |
| **Screened for TB (N=132)** | | |
| Yes | 31 | 23.5 |
| **Outcome of screening (N=31)** | | |
| Positive | 13 | 41.9 |
| **Put on Treatment (N=13)** | | |
| Yes | 13 | 100 |

The study found that patients who report to the OPD with cough are made to sit with other patients until it is their turn to either see the doctor or medical (physician) assistant. Consequently, the cough register was not being used to ensure that people with cough are attended to separately such that they do not spend more time with other patients to infect them. The following quotes illustrate these points:

> *"All patients who come here go through the same procedure except for emergencies. Even if you are coughing, we take your vital signs and you join the queue to see the doctor"* (Male Nurse, IDI).
>
> *"Cough is a common complain of people who come to the hospital….but all people go through the same procedure; taking of history and vital signs and waiting in the queue to go to the consulting room"* (Female, Nurse, IDI).
>
> *"I am not aware of triaging system for people with cough. I have not seen the checklist before and we make all patients go through the same procedure"* (Male Nurse, IDI).

The use of the cough register and screening people with cough using the checklist can provide a background for further diagnostic test to be conducted. However, conducting

diagnostic test for TB also emerged as an area that requires attention in TB control in this study.

### 4.8.2 Challenges in Diagnostic Services for TB

The results of the study showed that district hospitals in the study area have the capacity to undertake laboratory test and chest X-ray for TB diagnosis. However, the district hospitals do not have the capacity to conduct test for multi-drug resistant TB. The Gene Xpert machine for multi-drug resistant was placed at the regional hospital but was also not in use at the time of data collection as a result of lack of reagents. The following quotes illustrate these points:

> *"We do chest x-ray and sputum for microscopy to diagnose TB. We have trained laboratory staff who can do the test"* (Biomedical Scientist-1, IDI).
>
> *"When we suspect a TB case, we take the sputum to the [name of hospital removed] hospital where they will carry out the test for us"* (District TB coordinator-1, IDI).
>
> *"The region now has some reported cases of multi-drug resistant TB….there is a Gene Xpert machine for multi-drug resistant TB but we have run out reagents now"* (Biomedical Scientist-2, IDI).

Despite the availability of laboratory service for the diagnosis of TB, the study found there were delays in getting sputum test done and reporting back to the facility that requested for the sputum. These delays were perceived as one of the key challenges in TB case detection and treatment. This is because suspected TB patients sometimes have to wait for several months before getting feedback on the outcome of the test. Some suspected cases sometimes even wait in vain as the test results are never received at the sub-district or

community level that sent these specimens. These delays according to study participants compelled some people to resort to local remedies for their cough. This finding transcended in interviews with health workers, TB patients and community members. The following quotes illustrate these points:

> *"Sometime you send this sputum to the district hospital and it will take you months to get the results. In some instance, you even go and they cannot trace the specimen you first sent and you will have to go to the patient to get a new specimen"* (Disease Control Officer-1, IDI).

> *"I once had a patient who waited for close to five months before it was confirmed. Now you can imagine the number of people such a person would have infected. The laboratory workers are not helping us at all"* (Disease control Officer-2, IDI).

An FGD discussant also shared her experience with delays in getting test results for a brother who have been experiencing productive cough:

> *"One of my relative was coughing and we took the person to the nurse at the clinic and they ask him to cough and produce some sputum for test. They took this to [hospital name removed] hospital. We waited and waited until one day the nurse came that she should produce the sputum again because they said the other one was missing. This has also taken close to 3 months so we are now using herbs"* (46-year old female, FGD, rural).

The researcher made a follow up to the client referred to in this FGD and assisted them to have the test conducted in a health facility. The results indicated the client was a TB patient. This client was subsequently put on treatment. Three months after initiation of treatment, the participant in FGD (sister to client) was also diagnosed of TB.

The study also found that disease control officers generally believed that biomedical officers do not conduct the microbiological test required to diagnose tuberculosis. This in their opinion served as a disincentive to disease control officers and other health workers in taking sputum samples:

> *"I strongly believe that laboratory workers do not test the sputum that we take to them Sometimes, you find someone who shows all the features of tuberculosis and when you take the sputum, they will write that it is negative"* (Disease Control Officer 2, IDI).

> *"This laboratory workers are always unhappy when you send sputum to them. They sometimes talk to us anyhow. They say when there is money we keep it to ourselves but expect them to do dirty work. So I doubt if they sometimes actually perform the test before giving your results*" (Disease Control Officer 3, IDI).

Interview with laboratory workers (biomedical scientists) brought to light that there were generally challenges in conducting microscopy on sputum specimens for tuberculosis. It was acknowledged that many biomedical scientists are unwilling to perform that task when assigned. Among biomedical scientists there was a general believe that monies for tuberculosis control are often used by the district management team to motivate their staff whilst they were expected to do what they described as "dirty job" of conducting test on sputum, which put them at risk of the condition. The following quotes illustrate these points:

> *"We have problem assigning people to do conduct microscopy on sputum because nobody is willing to do that work"* (Head of Laboratory-Biomedical Scientist, IDI).

> "*Today is Friday, go to the District Health Directorate and the sub-districts and you will find our colleague there wearing TB branded shirts which was given to them for free…..None of us here get those things and yet they expect us to risk our*

> *lives in conducting this test. They are spending the money and expect us to be doing the dirty job"* (Biomedical Scientist-1, IDI).

Despite these challenges and delays in getting test results, the study found that the use of treatment supporters or monitors improve adherence and reduce TB-related stigma.

### 4.8.3 Treatment Supporters Improves Adherence and Reduces Stigma

The study also explored views of people with TB and their treatment supporters on the DOTS system. The results showed that patients found the system as very useful in ensuring that they take their medications. This strategy according to respondents served as a motivating force to adherence to medication and regular visit to health facility. This was also believed to be essential in reducing the fear associated with the condition among community members. The involvement of the treatment supporters was also perceived to be very helpful in treatment adherence as well as reducing the stigma associated with TB. To people with TB, the fact that someone is taking care of them and providing daily support without getting infected is capable of reducing the fear associated with the condition among family and community members. Because of the use of treatment supporters system, people are beginning to change their views about TB. People are now aware that it is possible to take care of TB patients without getting infected. The following quotes illuminate these points:

> *"It is very encouraging, because at least someone will daily encourage you to take the drugs, otherwise I am sure many of us with the condition will not complete the treatment. It is not easy taking drugs for such a long time"* (21-year male TB patient, IDI).

> *"At the beginning, I was finding it difficult to take the drugs but because I had to take it in the presence of someone, I was forced to take. I will confess, if it was not for that I would have stopped the medication because initially it was difficult. People were also afraid of me but because my brother is always with me and has not contracted the condition, people are beginning not to fear the condition"* (36-year female TB patient, IDI).

> *"I encourage my brother to take the medications daily. Sometimes he does not want to take it because he gets some side effects but with my encouragement he does not default and will soon complete the treatment….In doing that I am no longer afraid of the condition"* (28-years female treatment supporter-2, IDI).

The study further explored from both TB patients and their treatment supporters if they had received health education on the possible side effects of the treatment and what to do when they are experiencing the side effects. Generally, the results showed that health workers were not providing TB patients and their supporters' education on the side effects of the medications. The emphasis was often put on the need to complete the treatment and the follow up visits for treatment. The following quotes support these assertions:

> *"Initially when I started taking the drugs, it was not easy because I was vomiting and having generally bodily weakness…but I was not given any education on the possible experience when I start taking the drugs"* (21-years male TB patient, IDI).

> *"My father started experiencing some bad feeling when he started taking the drugs. So I called the nurse to inform her and she said it was the side effects of the drugs. It was at that point that I encouraged him to continue to take the drugs because the nurse said it will eventually stop"* (32-year male TB supporter-3, IDI).

> *"I am lucky, so far I have been taking the drugs for 5 months now and it is being smooth. However, I was only told how to take the medications and the duration of the treatment but was not provided any information on the side effects"* (36-years female TB patient, IDI).

### 4.8.4 Human Resource Factors Impeding TB Control Activities

The study found that human resource management at the district and regional level to ensure the right size and skill mix was in place for service delivery. Despite this, respondents reported human resource challenges in TB control. Generally, health workers involved in TB control were of the opinion that inadequate staffing was a major challenge with the available staff overworking to meet the increasing demand of TB control activities. Disease control officers were of the view that they were engaged in multiple activities at the district level and this made it very difficult for them to embark on community visits to provide health education and TB case findings. Biomedical Scientists who are supposed to conduct test on specimen for TB also conducted other tests for both inpatient and outpatients of the various hospitals. Thus, specimen from patients for TB test was not given priority because the specimen may have been brought in by either a nurse or a disease control officer without the patient accompanying it. In that case, priority is given to other outpatients and inpatients physically present. The following quotes illustrate these points:

> *"Staffing is a major problem in the region, we are few and we are the same people doing all the other health promotion and disease control activities. So it is difficult to adequately perform community visits to provide health education"* (Disease control Officer-1, IDI).

> *"Those of us who work in the laboratory have to conduct others tests for patients who are waiting to see the doctor, so this test will have to be conducted first. We usually have several tests coming in at the same with only a few of us. So it is difficult. I think the TB control programme should employ its own workers who will be dedicated to conduct these test. This will help the process"* (Biomedical Scientist-2, IDI).

> *"One of the challenges is the fact that we take the specimen to the hospital without the patient, so the laboratory workers will prefer to attend to test request coming from the doctor in the hospital they work or patients at the OPD who are waiting to collect their results to see the doctor. So they end up forgetting that they have*

> *specimen for TB test because they become tired after conducting other test"* (Disease Control Officer-1, IDI).

The study also showed that health workers were not willing to accept posting to work in TB treatment centres and wards because their colleague health worker stigmatize people who work in such places. Nurses who work at TB wards also felt there was some level of discrimination in assigning nurses to work in TB units/wards. To them such units/wards are only left for auxiliary staff and aged professional nurses. Nurses who worked in tuberculosis treatment units/wards perceived their work as a form of punishment.

> *"Usually, it us the old nurses or health assistants that are kept in the TB wards. No young professional nurse will accept to work in this unit"* (Female Nurse-1, IDI).

> *"People stigmatized people who work in TB wards, so nobody wants to work there. Even health workers who are supposed to know better do not want to come. Even doctors do not do ward runs to the ward"* (Female Nurse-2, IDI).

> *"....Even nurse leaders can tell a nurse that if you don't change your attitude to work, I will send you to the chest ward. So you see, it is like a punishment to work in this unit"* (Female Nurse, IDI).

Interviews with health workers who were engaged in direct care with people with TB revealed that they did not have any pre-placement screening for TB and they have never had the opportunity to be screened for the disease. All the participants in this category perceived working in such places as risky with high vulnerability to getting infected with TB. To that end, they were of the opinion that there should be some incentives for people working in TB units. Also staff working in TB control programmes whose work require

them coming into direct contact with TB patients and specimen should receive periodic screening for the condition. The following quotes illustrate these points:

> *"It is not easy working with TB patients, we are at high risk. You can be attending to a patient and the person will cough direct into your face and you know the disease is airborne. Nobody wants to work here so those of us who agree to work here must be given incentives"* (Disease Control Officer 2, IDI).

> *"I have worked in this ward for some years now and nobody has ever screened me for TB. These days they just send you to any ward without medical examination to see if your health [will] allows you to work in such a place. It is only God…So I tell the patients that they should be praying for us because we have agreed to take care of them. There should be a system of screening health workers that come in direct contact with TB patients and sputum"* (Female Nurse 1, IDI).

> *"I visit the TB ward here regularly to update my data and statistics about TB as the TB coordinator. It is true that you have old people working in those units, some of whom are non-professional despite that fact it is a risky place to work which require a lot of professionalism"* (District TB Coordinator, IDI).

Nurse Managers confirmed earlier assertions that there were no formal structures in place to determine who was assigned to work at the TB wards. They however alluded to the fact that such places are left for old nurses because working in TB wards/units was perceived to be less demanding. So nurses who are weak and unable to cope with rigorous work requirements in other units are placed in such wards/units for treating TB patients. The facilities do not have a system to screen nurses before placement. They however acknowledged the risk in working in TB wards and could recall that some health workers who had previously worked in the TB units became infected with the condition. The following quotes buttress these points:

> *"We do not have a system or policy to determine who is assigned to TB wards but you know the work there is minimal so we reserve that place for old nurses and the auxiliary staff"* (Nurse Manager 1, IDI).

> *"I agree with you there is risk in working in TB wards and I know some nurses who developed TB whilst working in the TB ward. So many people do not like to work there especially the young ones. I once tried to assign a young nurse there and she declined and asked me if I did not want her to get a husband. Even their colleague worker will make fun of them. So we are forced to assign old health worker to such unit*" (Nurse Manager 2, IDI).

The study also found that health workers that are assigned to work at TB treatment centres did not receive pre-placement training on TB control apart from what was provided to them in school during their professional training. This training is specially designed to orient health workers engaged in specialized health care to equip them with the knowledge and skills required to work in such places. Health workers acknowledged that formal orientation in the form of training before placement could help improve their work and increase case detection. Receiving training on stigma and infection prevention and control could be helpful and was highlighted by staff. The following quotes illustrate these points:

> *"I have been working as disease control officer for two years after school….Apart from the training I received in school, I have not received any other training after school"* (Disease Control Officer-2, IDI).

> *"Training is very important especially infection prevention and control and stigma. You know we are working at this unit and at risk and the training will enable us take precaution against getting infected"* (Nurse 1, IDI).

> *"…training on how to reduce stigma and discrimination will be helpful so that we can also teach the patients how to handle such situations in the community. Our own colleagues stigmatize us and we need to be taught how to handle it"* (Nurse 2, IDI).

### 4.8.5 Setting of Targets and Collaboration between District Health Directorates, District Hospitals, and Community Essential for TB Control

The study revealed that some level of community engagement was taking place regarding tuberculosis case detection and treatment. All tuberculosis patients were encouraged to get treatment supporters who will provide daily supervision in taking their medication in line with DOTS policy. Community Health Volunteers (CHVs) were also being used in tuberculosis programme. Furthermore, the study found that CHVs were generally used to provide treatment support and assist in finding suspected TB cases at the community. It was found that the contact details of patients on TB treatment are provided to the CHVs to aid them to provide some form of community-based support which essentially links the services of the community level health workers to the sub-district and district level. Also, CHVs are used for contact tracing and to trace defaulters as illustrated in the following responses:

> *"The health volunteers play a very important role in TB control. Once, we put you on treatment, we link you up with the volunteer at the community. They know the community very well so they are able to visit patients to encourage them to take their medicine"* (Disease Control Officer-2, IDI).

> *"I have been using the community health volunteers. Just last week, I went to a community to use a volunteer to trace a TB patient….Usually, we screen all TB patients for HIV but I realized this patient was not screened for HIV, so I had to go and get the patient for the HIV test to be carried out"* (District TB Coordinator, IDI).

The study further explored how the activities of the CHVs are supervised in TB control activities. District control officers reported that, they were supposed to provide support and regular visit to volunteers. However, this activity was not regularly undertaken because of lack of transport. Disease control officers generally believed that the lack of transport to

regularly visit communities to provide health education and provide support to the community level structures for disease control was undermining case detection in the study districts. Nonetheless, the district team undertook quarterly supervision often to the sub-district level. The following quotes illustrate these points:

> *"In every community we have health volunteers who are supposed to do some disease surveillance for us. All TB patients are encouraged to come with treatment supporters"* (DOTS centre In-charge).

> *"We have challenges moving to communities to do our work such as providing health education. This is a big challenge in TB case detection. If you go to the community, someone may tell you that there is this person who has been coughing so that you can take specimen for screening. We only wait till we receive some funds from National TB Control Programme"* (Disease Control Officer-3, IDI).

> *"We provide facilitative supervision to the sub-district staff during which we also provide support on TB control activities. This we try to do every quarter"* (District Director-1, IDI).

Leadership and governance was also explored to measure performance of key stakeholders engaged in TB control. The results showed that some appraisal system was in place at the various levels of the health care system in the region. Nonetheless, it emerged that no targets were set for disease control officers and district TB coordinators regarding TB case detection. In an interview with TB coordinators on ways to increase TB case detection, respondents suggested targets could be set for disease control officers on case detection. This according to them would encourage people to adopt strategies that can increase case detection since TB was one of the diseases that required more attention in the region. The following illustrative quotes support these points:

> *"The district should institute a system that will set targets for disease control officers on TB case detection. Our formal director used to do that and it was helpful. During that time, the district was doing better with TB case detection than now. We used to meet monthly to report on TB cases we detect and we were rewarded but this one does not do that"* (Disease Control Officer-1, IDI).

> *"We have appraisal but I must be frank, TB case detection is not emphasized…..it would have been important for it to be stressed because TB is a big problem in the region. So regional priority diseases should be added to the appraisal"* (District TB Coordinator-3, IDI).

The results further showed that, there was no good coordination between the district health directorate who were mostly engaged in preventive aspect of TB-related activities and people engaged in TB control at the sub-district level and the hospitals who were supposed to conduct test and treat people with TB (providing clinical service). This lack of coordination created a perception among people engaged in the clinical care aspect of TB control that funds for TB control were often used to provide incentives for staff working at the district health directorate to the neglect of those engaged in TB clinical care. The following quotes illuminate these points:

> *"One of the problems in the TB control is the lack of coordination between those of us at the district who are often engaged in health promotion activities and those in the hospital…people working in the hospital hold the view that we get money for TB control and use it to motivate ourselves without giving them some"* (District TB corrdinator-1, IDI).

> *"Sometimes when you go to the hospital with specimen or anything related to TB, the workers in the hospital do not receive you well. We are not working as it is supposed to be. The hospital see us as doing our things at the district with monies from global fund whilst they have to do the risky part of the jobs which is diagnosing and treating TB"* (District TB corrdinator-3, IDI).

These incentives could be financial or non-financial. However, financial challenges also emerged as barrier to the implementation of DOTS.

### 4.8.6 Financial Challenges Affecting the Implementation of DOTS

This study elicited information on cost of treatment for TB, health insurance and respondents' views about the financing of TB control programmes in general. The results showed only 132 (21.8%) were aware that TB treatment was free. Regarding holding of health insurance, about half, 304 (50.2%) of the respondents were registered and had valid NHIS cards, 178 (29.4%) were registered with the NHIS but were invalid at the time of data collection.

Interviews with participants in the qualitative aspect of the study also supported the results of the quantitative. Many respondents were unaware of the fact that TB treatment was free for drugs and laboratory services. The general belief was that TB was the same as other disease conditions which will either require the individual paying for the health service or use of the health insurance if the individual had a valid card. The following quotes support these assertions:

> *"….TB is like all other conditions, we have to pay from your pocket or if you have a valid insurance card, you use the card to pay for the treatment"* (36-years male, FGD, rural).

> "*Honestly, I did not know that treatment for TB is free, I am just hearing it from the contribution made by previous speaker. If people know that the treatment is free, I think they will go the hospital or clinic when they have this condition"* (32-years female, FGD, urban).

Despite the fact that treatment was free, interviews with people with TB revealed that there were still some financial challenges with cost of transportation to health facilities and food emerging as major concerns. The daily intake of medication made them feel hungry frequently and had to take more food than they usually would do before the sickness. People with TB had to also commute from their place of residence to collect their medications at DOTS centres monthly which put some financial strain on the patient and their households as illustrated:

> *"It is difficult to get money to come all the time to collect my medication….that may be some of reasons why some people use herbal treatment or are unable to complete the treatment"* (48-year male TB patients).

> *"Since my sister started taking the drugs, it has increased her food intake and this is making things very difficult for us. When it is time for us to go for the medications, I have to transport her and myself to the health facility. Now the lorry fare is high and we are suffering"* (female TB treatment supporter, IDI).

When they were asked about the enablers' package, which is supposed to provide some financial relief to TB patients and their supporters, it emerged that many believed it was inadequate. Some TB patients indicated they had not received any enablers' package. Interviews with TB coordinators indicated that there were shortages of the package and thus some patients on treatment are actually yet to receive their package as illustrated:

> *"I was told that when you have the condition and you come to the hospital for treatment, you will receive oil and some money to buy food but nobody has given me anything yet"* (61-year male TB patients, IDI).

> *"Yes…they are supposed to receive enabler's package, but it is unavailable now, so we put them on the treatment and anytime we receive the package, it would be given to them. Even with that many of the patients complain it is not adequate"* (TB coordinator, IDI).

Financial challenges from the health system also posed difficulties in funding TB activities in addition to financial constraints reported by TB patients. Results showed that TB control coordinators do not prepare annual budgets on TB control activities. This is because coordinators believed that their activities are mainly donor-funded therefore they only prepare budgets for activities when they have received funding from national TB Control Programme (NTP) for a particular activity. According to the health managers, government subventions were not regular. This was therefore affecting funding of health activities at the district and sub-district levels. The following quotes reinforce these points:

> *"I usually do not prepare annual budget on TB control programmes. When the district receives money for TB control activities, the money specifies what it should be used for, so you prepare the budget based on the activity"* (District TB Coordinator, IDI).

> *"You know TB control is mainly donor-funded mostly by global fund, so the district wait when they receive money, then you plan the activity…even the money comes with instruction on the activities to use the money for. For the government subvention, it is not regular"* (District Director 1, IDI).

Whilst it is clear that financial challenges were inhibiting TB control activities at district and sub-district level, heath information system could be used to address some of these challenges, coordinate activities between sub-district and district level and trace defaulters.

### 4.8.7 Using Health Information for Defaulter Tracing of TB Patients

In monitoring the management of people with TB and also to follow up and screen contacts with TB patients in line with current DOTS protocol, this study therefore collected data on availability of health information system specific to TB control. The study found that there is a database to trace patients who default. Data was collected on; the name of the section

of the community the patients' lives, head of the family, and mobile phone number where available. These data were also supplied to the nearest community health volunteer for follow-up. Therefore, it was possible to trace defaulters with the help of the community health volunteers. They however acknowledged that, the poor addressing system in the localities sometimes make tracing defaulters difficult. TB patients who had ever defaulted reported that the disease control officer was able to trace them to the community to encourage them to continue with the treatment. The following quotes illustrate these points:

> *"….Usually, we provide the community health volunteer the addresses of TB patients near them and with their help, it is possible to trace them. You know the community volunteer live in those communities and they are very familiar with all the sections and compounds in the community"* (DOTS centre in-charge 1, IDI).

> *"When I started the treatment, life became difficult, I could not continue to go for my treatment, so I decided to start some herbal treatment but one day, I was there and some people came to me. One was…I think a nurse and the son of one of the elders in the next community (volunteer). They told me they came to visit me because I have stopped coming for my drugs"* (61-year male TB patient, IDI).

The study also found that reports from the sub-district level are sent to the district to be used to track the performance of the district on TB control and to inform decision-making. Interviews with health managers showed that they were generally satisfied with flow of health data from the lower levels to the district in terms of completeness and timeliness as illustrated by the following quotes:

> *"Data management on TB control is not a problem, the sub-districts submit their reports to us at the district. We also have the data in the DHIMS. These data were submitted on time and it was often complete. I am very concern about that so the sub-districts are doing well"* (District Director 2, IDI).

> *"We submit our reports on time to the district through the monthly and quarterly reports we submit. When you send the report, it is reviewed by the district health information officer before it is accepted"* (DOTS in-charge-1, IDI).

The study also assessed the utilization of health information for decision-making on TB control by health managers. The findings showed that health managers at the district levels often refer to the available data on TB control in their district for decision-making. Nonetheless, the facilities at the community level and sub-districts where the data emanates do not utilize these data for decision-making on TB control. Also, the study found that there was no integration of data from private health care providers with the district health information management system (DHIMS), despite the fact that private-public collaboration is one of the strategic areas in DOTS. Consequently, the data may usually not reflect the health situation of the district and sub-districts as illustrated:

> *"For now we do not collect data from the private health providers into the main system…we will need a system that collects data from them as well. It may be because for now no private clinic is supplied with anti-TB medications"* (District Director1, IDI).

> *"…but I hardly use this in planning. Once it is submitted, that is all and sometimes we are under pressure to produce these reports you do not have time to really examine it to see how it help in your work"* (DOTS in-charge-1, IDI).

Engaging private health practitioners in TB control activities also involves extending the provision of logistics and supplies to such facilities.

### 4.8.8 Provision of Medical Supplies for TB Control Activities

The study collected data on TB diagnosis and treatment related logistics. The results showed that the district hospitals had specimen collection containers and equipment for sputum microscopy for TB. The district hospitals were also resourced with laboratory equipment to conduct test sputum microscopy for TB. Also, the hospitals hard x-ray machines for chest x-ray, one of the ways to diagnose TB.

> *"The district hospital has the logistics to test for TB and when we take specimen we send them to the hospital for the necessary test"* (District Director 1, IDI).

> *"We have the equipment to screen people for tuberculosis. We do the sputum test for acid fast bacilli and culture"* (Biomedical Scientist-1, IDI).

Regarding supply of anti-TB medications, the study found that DOTS centres had regular supply of medications from the regional medical store. The DOTS centres also kept records of the supplies and there were systems in place to manage stock levels to avoid shortage of medications. Interviews with TB patients also showed that they had regular supply of TB medications. None of the patients reported ever visiting a DOTS centre without being supplied with medication because of shortage of the medications as illustrated by the following quotes:

> *"We get our medicines regularly. I have this book that I record drugs I receive for my patients and anytime, my stock get to some level, I request for more medication…I have never sent a request and was told that they are no medicines. So drug shortage is not a problem"* (DOTS centre in-charge-2, IDI).

> *"Anytime, I come for my drugs, I get the right quantity. I have never been told that there was a shortage of drugs so I should go and come back"* (53-year male TB patients, IDI).

> *"Nooo! I have never heard of shortage of our drugs. I get my drugs regularly but I don't know of other patients"* (36-years female TB patient, IDI).

Furthermore, the study found that logistics for recording TB cases such as health facility TB suspect register, TB case notification forms, TB laboratory register, TB DOTS register and district TB register were available. The following quotes elucidate these points:

> *"We have all the registers in adequate supply to all our district DOTS and TB treatment facilities. At the hospital, we have TB register and TB suspect register where I visit to collect data on TB. We have forms and registers at the district level which contain summaries from the entire district. We also have the various notification forms"* (District TB coordinator-1, IDI).

> *"Here are some of the registers we have. As for the registers we have adequate supply and even have extra ones in the stores*" (DOTS in-charge-1, IDI).

From the results, both socio-cultural and health systems have been identified as affecting tuberculosis case detection and treatment in the study districts. The discussion section further expands on these factors whilst comparing the findings with earlier studies.

# CHAPTER FIVE

# 5.0 DISCUSSION

## 5.1 Introduction

This study used mixed methods to identify the socio-cultural and health system factors affecting tuberculosis case detection and treatment. Four theories (Piot's health effectiveness model for TB control, Lipsky's Street Bureaucratic, social cognitive, and PEN-3) were used to guide the study and to construct the conceptual framework for the study. Theory triangulation method was used as no single theory could fully explain the tenets of this study. This section therefore discusses the findings of the study. It discusses findings addressing each of the four objectives.

## 5.2 Socio-demographic Status of Respondents

Majority (86%) of the respondent in this study were 18-50 years. This age category constitutes the vulnerable age for TB infections. It has been reported that the risk of acquiring TB infection increases with age from infancy to early adult life with people between the ages of 15-50 years being more susceptible (WHO, 2009a). This vulnerability could be probably due to increasing number and frequency of contacts with people with TB resulting in reactivation of LTBI (Getahun, Sculier, Sismanidis, Grzemska, & Raviglione, 2012). Generally, as transmission falls, the caseload shifts to older adults mainly because of reactivation of LTBI at later ages (Getahun et al., 2012).

## 5.3 Socio-cultural Factors Affecting Tuberculosis Case Detection and Treatment

This section provides discussion of the various socio-cultural factors responsible for low case detection and treatment in study districts. From the results, the main socio-cultural factors identified were lack of knowledge on TB (causes, signs and symptoms and management), misconception about the condition, inability to differentiate TB from other endemic conditions, which are perceived to be spiritual and stigmatized.

### 5.3.1 Lack of Knowledge about TB Affecting Case Detection and Treatment

Although all respondents have ever heard of TB, nonetheless, less than half, 296 (48.9%) are aware that tuberculosis is caused by germs. This is because there is generally a lack of exposure to health education from health workers and experts in the community about TB. From the study, only 21.4% of the survey participants received education on TB in the last 6 months. Even with that, about 66 (47.5%) received the health education from community members and friends who are not experts in TB. It is therefore clear that there is a gap in the provision of information on TB to community members. In the absence of information from experts and health workers, community members relied on local beliefs, and information on TB from lay community members, many of which are misconceptions. In Ethiopia, it was also found that out of the 94.9% of study participants who had indicated they had ever heard about TB, only 22.9% were aware that it was caused by bacteria (germ), (Tolossa, Medhin, & Legesse, 2014). Similar findings were reported in earlier studies in other TB endemic countries such as Kenya, Pakistan and Somalia (Khan et al., 2006; Liefooghe, Baliddawa, Kipruto, Vermeire, & De Munynck, 1997).

The most common manifestations that respondents identified are weight loss (78.4%), and productive cough (75.8%). These two signs are cardinal in TB screening as they constitute two of the main signs that should indicate to a health worker to request for TB test. With such high knowledge of signs and symptoms of TB, it would have been expected that people with such condition would visit the health facilities to be screened and treated for TB. However, this is not the case because TB is believed among participants to be a spiritual condition and therefore not a condition for biomedical health care. Also, the study finds only 132 (21.8%) of the survey participants are aware that diagnostic test and treatment for TB is free. This can therefore prevent people especially those without health insurance to visit the hospital. A similar study in Ethiopia showed persistence cough 72.4% as the most commonly stated sign of TB (Tolossa et al., 2014). Nonetheless, a study among Ugandans found that less than half of the respondents were aware that persistent productive cough was a sign of TB (Obuku et al., 2012).

The study also reports that various local conditions presents with cough. However, majority of these conditions are believed to have spiritual causative factors, which biomedical health facilities cannot handle. For example "*kaakii"* (Asthma), and "*korhiin/keehin-hilia"* (whooping cough) present as cough and difficulty in breathing which are also similar to the initial symptoms of TB. These conditions are generally believed to be spiritual in nature and can therefore be treated either by traditional herbal practitioners or spiritualists. These folk beliefs are accentuated by the lack of knowledge about both the causes, and mode of transmission of the TB. To treat "*Korhiin/Keehin-hilia"* the patients wear a special padlock

around the neck meaning the disease has been imprisoned and therefore cannot cause harm to the patient. The general belief is that such conditions could become fatal if it is sent to a biomedical facility.

The weighted average score for level of knowledge of TB shows that 51.2% of respondents have low knowledge of the causes of TB while little over half (52.0%) have high knowledge of signs and symptoms of TB. Knowledge on mode of transmission is also low (59.0%) whilst over half of respondents report high knowledge on vulnerability and treatment for TB. The low knowledge on cause of TB also shows lack of exposure to health education on causes of TB and widespread misconceptions on TB transmission such as cough during sex, houseflies, mosquito and spiritual. The high knowledge on vulnerability of alcohol abusers and caretakers of TB patients was due to certain local beliefs. For example, people who abuse alcohol are believed to engage in the practices of having sex with other people's partners and they could be cursed to cough during sex to get the condition. TB is also generally believed to be a dangerous condition which invoke intense fear among community members. Hence, people did not want to get close to TB patients. The use of terms such as "*korongpilah"* meaning a cough that makes you emaciated and anaemic typically demonstrates the community fear for the condition. These local beliefs affected health seeking behaviour and therefore negatively affected TB case detection. TB case detection is predicated on passive case finding and this strategy requires that individuals have better knowledge of TB to improve health seeking as required by Piot's model for health system effectiveness in TB control. Low knowledge on causes of TB,

mode of transmission and symptom have been found to influence health seeking in favour of traditional healers in other countries (Gele, Bjune, & Abebe, 2009; Yimer, Bjune, & Alene, 2005). However, traditional healers are not well-resourced to diagnose and treat TB. In another study, it was found that knowledge on TB was associated with timely health seeking (Samal, 2016), an essential factor in early case detection and breaking the chain of infection. This is because a delay in diagnosis and prompt treatment increases the risk of infecting other people. This will therefore undermine efforts to eliminate TB in the community by 2030 as envisioned in the end TB target in SDGs.

The results of the study further shows that only 17.5% of respondents know the duration for TB treatment with 17.5% having the belief that someone with TB can take the medications and stop once the symptoms subside. This low knowledge on the duration of treatment is also due to health care workers not educating people on the duration of TB treatment. Of the 130 people who received health education on TB in the last 6 months, only 37.7% had education on duration of TB treatment. This has implication in the management of TB as this has the potential to influence adherence and completing treatment for TB. An earlier study found that knowledge on duration of TB treatment was associated with adherence as well as behavioural intention to adhere (van den Boogaard et al., 2012) as espoused by the cognitive behavioural model (Bandura, 2004) used in this study. In Kenya, it was found that low knowledge on duration of treatment was associated with defaulting among TB patients (Muture et al., 2011).

Generally, this study finds that level of knowledge of TB is significantly associated with age, marital status, educational attainment, religion, ethnicity, and socio-economic status. People in the older age groups which is above 50 years have low knowledge of TB even though prevalence of TB is higher among this group of people in Ghana (NTP, 2014). The prevalence of TB is highest among people between the ages of 65-74 years (GHS, 2015a). People within this age group are also the elderly in the community and are more likely to be in-charge of making very important decision at the household level. Hence their low knowledge has implications in TB control since they will be providing information on TB as well as make decisions based on their local beliefs and misconceptions about TB. It has been found that TB-related misconceptions are high among the elderly in society (Esmael et al., 2013; Vukovic, Nagorni-Obradovic, & Bjegovic, 2008).

People with higher level of education also have high knowledge of TB than people with lower education. Education on TB is mostly in print leaflets and posters which requires some level of formal education and ability to read to understand. Also, people with higher education are also less likely to hold local beliefs about TB. In Tanzania, and Uganda, it was found that knowledge of TB was high among people with higher education because of higher exposure to information, education and communication materials on TB (Haasnoot, Boeting, Kuney, & Van Roosmalen, 2010; Obuku et al., 2012).

### 5.3.2 Addressing Perceptions and Misconceptions about TB to Improve TB Control

Despite the heavy investment of resources in TB control in Ghana (TGF, 2014), this study finds that on an average, one-quarter (23.6%) of the respondents believed TB is hereditary, caused by a curse (22.6%), transmitted through sharing of utensils (23.9%), food (24.1%) and mosquito bites (33.5%). Other perceived causes of tuberculosis found in this study are bewitchment (22.6%), sexual promiscuity (46.0%) and cough during sex (48.2%). These beliefs are misconceptions. Misconceptions are defined as beliefs or opinions about TB that are commonly held to be true but which are indeed not known causes of TB (Picou et al., 2011). These misconceptions are generally due to lack of knowledge about TB and local beliefs about the condition. These misconceptions can negatively affect TB control. The belief that sharing of food, houseflies and sharing utensils can spread TB can lead to over estimation of the risk of transmission and negative attitude towards people with the condition. Overestimation of risk of transmissibility of infectious conditions have often resulted in discriminatory attitude towards people with infectious conditions (Letamo, 2003, 2007). A study among Chinese in southern Shanxi Province found that people who had high level of misconceptions also had a stronger tendency to stigmatize and discriminate against patients (Qian et al., 2009).

The belief that TB infection is spiritual, caused by witchcraft or supernatural conditions in this study has implications for the prevention and care of TB patients. This belief in supernatural causes often results in inappropriate health seeking behaviour. This study

shows that individuals with such beliefs seek health care from traditional and spiritual healers as biomedical remedies are deemed ineffective for such conditions. Similar finding have been reported in earlier studies across the world (Abubakar et al., 2013; Bello & Rehal, 2014; Tabong & Adongo, 2013). The finding of this study clearly shows that both knowledge of individuals and the community as a whole about TB is lacking, leading to misconceptions about the condition. This finding raises doubts about the effectiveness of the current strategies that are used to provide health education to community on TB. There is therefore the need to refocus and strategize on the medium and channels that is used to provide this health education.

### 5.3.3 Fear and Stigma Affecting Health Seeking and TB Management

Tuberculosis is generally perceived as a fearful condition in this study and described as *korongkpong/Kusibine* (big cough) with no biomedical remedy. This perception has the tendency to result in stigmatization and social isolation of TB patients and their family. Among the Akan speaking people of Southern Ghana, tuberculosis is described as *"Nsamanwa"*, a term which literally means "ghost cough" (Dodor, 2008; Dodor, Kelly, & Neal, 2009), which depicts the perceived deadly nature of tuberculosis. Despite the contextual and cultural differences between the southern and northern Ghanaian, common fear for the condition exist. It has also been documented that tuberculosis is often perceived as very dangerous, infectious and an incurable disease (Gelaw, Genebo, Dejene, Lemma, & Eyob, 2001). Tuberculosis has been reported to reduce marriage prospects for young TB patients and even for family members of people with tuberculosis (Baral, Karki, & Newell, 2007). Tuberculosis in one of the partners has also been reported to cause divorce with

negative effects on the sufferers and victims (Gelaw et al., 2001; Long, Johansson, Diwan, & Winkvist, 2001). This study also shows that TB can cause divorce among partners because of fear of getting infected.

These negative effects experienced by people with TB have been reported to occur in several places including; home, workplace, institutions and in the community (Gelaw et al., 2001) and make people with the condition deny the diagnosis as well as reject treatment they were offered (Liefooghe, Michiels, Habib, Moran, & De Muynck, 1995). In southern Ghana, a study found that TB patients were feeling depressed, isolated and had suicidal ideations (Dodor, 2012). This current study also found that stigmatization of people with TB occurs at health facility, family level, and community, and even in religious gatherings and this makes people hide the condition. This is therefore affecting case detection as people with cough will not want to go to hospital to be diagnosed of TB. It also affects TB treatment because the DOTS system requires a patient to get a monitor or treatment supporter to supervise taking of medications at home. This arrangement requires disclosure of the disease to someone and this has socio-cultural implications in settings where the disease condition is highly stigmatized.

Generally, the socio-cultural factors identified in this study work in synergy to affect TB case detection and treatment and interventions should target specific areas to reduce the burden of the disease in the community (Figure 5.1).

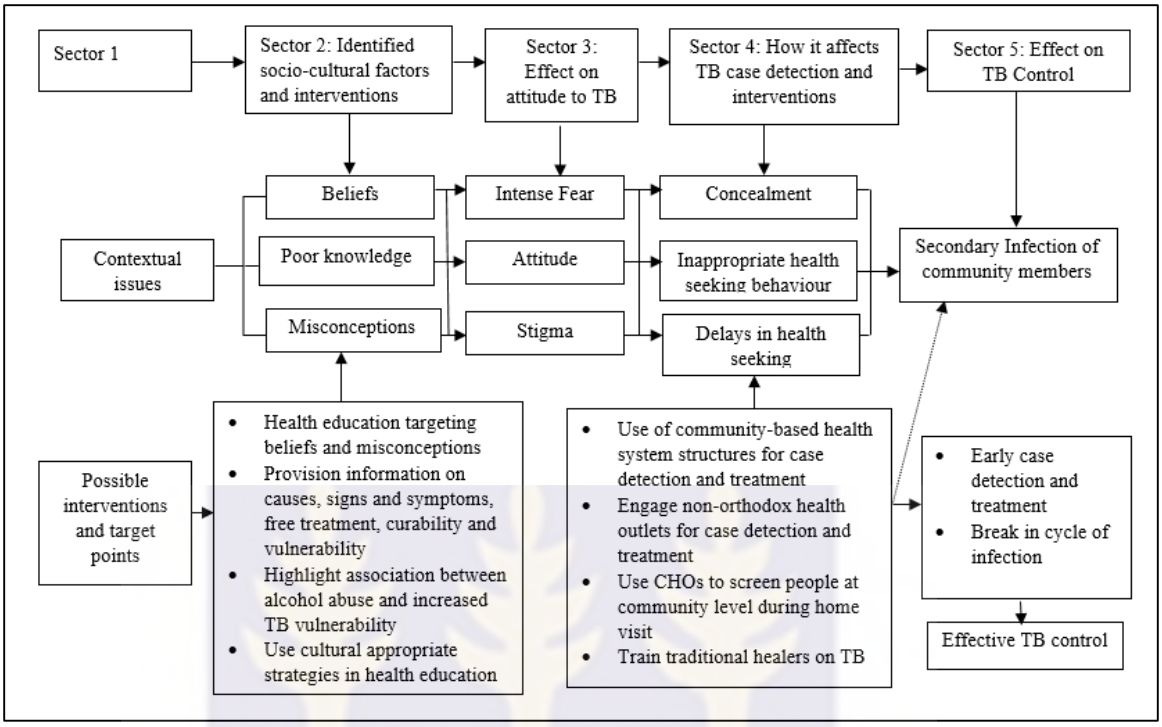



Figure 5. 1: Contextual socio-cultural factors affecting TB case detection, treatment and possible interventions

**Sector 1:** Sector 1 of the framework basically illustrates the contextual issues that need to be resolved to be able to increase TB case detection in the study area and the suggested interventions to help address these barriers to TB case detection in the UWR of Ghana.

**Sector 2:** The key factors identified in the study area as barriers to TB case detection are local beliefs about the condition. These beliefs about the causes, mode of transmission and treatment of the condition placed little emphasis on biological causative factors. The symptoms of TB are also similar to several other cough-related conditions, which are generally believed to be conditions not suitable for management by orthodox medical facilities. There is therefore the need for interventions, which are aimed at improving knowledge about the condition and also targeting the many misconceptions that have been identified in this study. Health education on the condition using cultural and community

appropriate strategies are required to provide the community with the right information about TB to increase knowledge and disabuse the misconceptions.

**Sector 3:** The sector looks at the effects of the poor knowledge, beliefs and the misconceptions. Many of the beliefs about TB in the community are biologically inexplicable yet creates a situation where communities are of the view that it is very easy to spread TB. For example, the notion that houseflies, mosquitoes, sharing cooking utensils and simply coming into contact with TB patient even on treatment could make one get the condition created intense fear, stigma and negative attitude of the community to TB with it associated effects illustrated on sector 4 of the frame work.

**Sector 4:** In response to the fear and stigma and negative attitude to TB, people with the disease tend to conceal the condition, and delay in seeking health. The local beliefs about the aetiology also make them to seek inappropriate health care at places without biomedical facilities to detect the condition. Specific interventions to address the barriers at this level will include the use of community-based health system structures for case detection and treatment, engaging non-orthodox health outlets for case detection and treatment, use of CHOs to screen people at community level during home visits and training of traditional healers on TB. This will positively impact TB case detection.

**Sector 5:** This sector looks at how the preceding factors discussed can either facilitate or impede TB case detection. Concealment of the condition, delay in seeking appropriate health care negatively affects TB case detection. Per the current health system in Ghana, TB can only be diagnosed and confirmed bacteriologically, culture and sensitivity or by radiology. These investigations can only be conducted in biomedical health facility.

However, where people with cough suspected to be TB who refused to use biomedical health outlets, the cases will remain undetected and they will continue to pose risk to other susceptible community members. This will adversely affect TB case detection as reported in this study. However, if the community level interventions are implemented to include screening for TB at non-orthodox health outlets and other alternative health care outlets. This has the potential to detect cases early, prompt management of condition to break the cycle of infection.

### 5.4 Utilization of Services of Community-based Informal Health Care Providers Affect Early TB Case Detection

The findings of this study show that respondents often seek for health care from both biomedical and nonorthodox informal health outlets in times of ill-health. The biomedical facilities are the clinic, health centres and hospital. The informal health care system consists of traditional practitioners, spiritualist and other community-based outlets where health care are sought, either than designated formal health care facilities (Fenny et al., 2014). However, given the fact that productive coughs are perceived to have traditional and spiritual aetiological causes, health care would often be sought from non-biomedical sources as medical facilities are deemed to be ineffective in handling such conditions (Tabong & Adongo, 2013; Viney et al., 2014). Since those non-orthodox health outlets are not well-equipped to diagnose the tuberculosis, the affected individuals continue to pose a risk to community members. As reported by Dodor (2012), majority of patients with TB in Ghana only go to hospital after several attempts at other alternative health care sources due to the trust they have in traditional medicine and spiritual healing.

Self-medication is also reported as a common practice among community members in this study. Self-medication is sometimes by buying medicines from drugstore and itinerant drug peddlers in the community. These drug peddlers are not currently trained to screen people who report to them with cough for TB. The findings of this study therefore show that the first sources of health care in the community are places that do not screen people for TB. This therefore results in delays in case detection and potential infection to other close associates. Use of such outlets to screen people for TB could be a form of active case findings which can contribute to prompt case detection as they constitute the first source of health care. A number of studies have shown that TB cases detected through active case find could be supported to obtain better treatment outcomes as those detected through passive case finding (Datiko & Lindtjørn, 2009; Shah, Qayyum, Abro, Baig, & Creswell, 2013; Yassin et al., 2013) despite differences in their health seeking behaviour. Self-medication and use of herbal preparation has also been reported to increase defaulter rates in Kenya (Muture et al., 2011).

There are socio-demographic factors associated with health seeking behaviour in this study. After adjusting for the effect of education on TB treatment sources, respondents between the ages of 29-39 years are 2.8 times more likely to seek health care in a biomedical health facility than those 18-28 years. However, people within the older age group >50 years are most likely to use nonorthodox medical care for ill-health and also attributed TB to other social causes. It has also been found in an earlier study that older people were more likely to hold on to misconceptions about TB and this affected their

health seeking behaviour (Vukovic et al., 2008). It has been reported that elderly people contribute a large proportion of Disability-Adjusted Life Years (DALYs) for TB and in some instance about 51% of tuberculosis DALYs occur in individual who are 50 years and older (Negin, Abimbola, & Marais, 2015). The elderly have also be found to be the main source of infection for children through close contact (Dodd et al., 2016). Since people on TB treatment become less infectious to close contact, many of these infections could have occurred because of failure to seek for health care at places from where the condition can be diagnosed and treated.

The results also show that females are 3.9 times more likely to use biomedical health facilities than males. This is because men have low knowledge and more local beliefs on social causes of illness than females. Though findings on the prevalence of TB among sexes have been mixed, generally many studies have shown that males are more susceptible to TB infection and have a relatively higher prevalence with a male to female ratio of 2:1 reported in many instances (Rhines, 2013; Sharma, Kumar, & Singh, 2010). A study in India however found that more female (40%) than males (13%) resorted to home remedies and non-orthodox health care upon the onset of TB signs and symptoms (Kaur, Sodhi, Kaur, Singh, & Kumar, 2013) which is contrary to the findings of this study.

Generally, the study finds that people belonging to less poor and least poor households are 3.3 times more likely to use biomedical health facilities than people in the poorest group.

This is mainly due to financial challenges as many of the biomedical health facilities are located far away from their place of residence whilst non-orthodox health outlet are closer. Proximity of health facility is a key consideration in deciding on sources of health care in this study. Given the fact that poor people are more susceptible to TB, yet the findings of this study clearly shows they were more likely to use non-orthodox medical outlets, these individuals who are infected with the condition will turn to infect the households and community members. This will therefore be undermining TB control. Earlier studies have shown that people will often seek for health care from facilities that are closer to them (Buregyeya et al., 2011; Fatiregun & Ejeckam, 2010; Zhao et al., 2013).

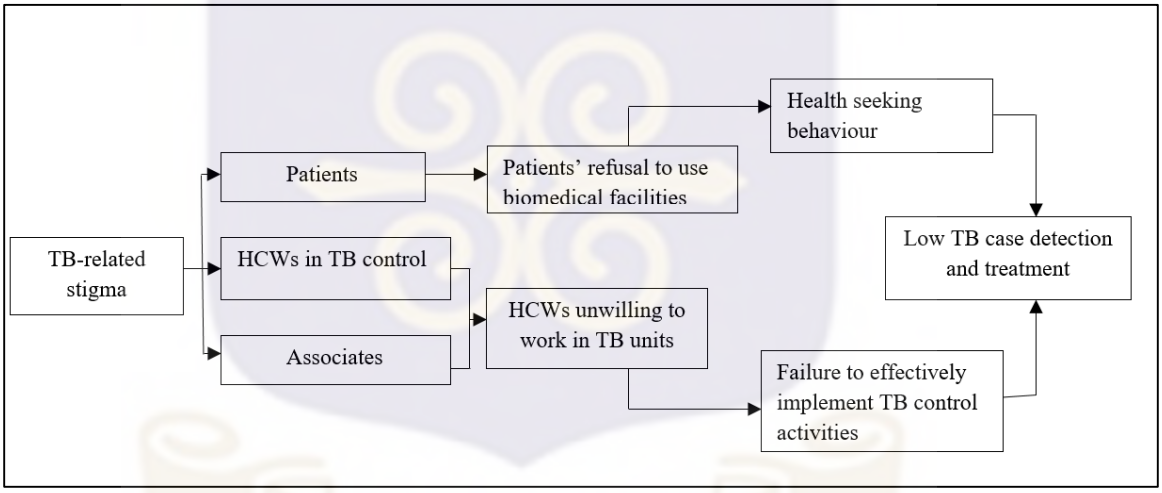
## 5.5 Health System Factors Affecting Tuberculosis Case Detection and Treatment

This section discusses results of the main health system factors, which affect TB case detection and treatment in the study area. These health systems factors include: stigma, screening of patients with cough, use of treatment supporters, delay in laboratory investigations and lack of coordination between district health directorates and district hospital that are supposed to diagnose and treat TB patients.

### 5.5.1 Stigma Affects Willingness of Health Workers to Provide Care in TB Control

Health Care Workers (HCW) assigned to work in TB units generally perceive their work to pose danger to their health. Hence, many health workers are unwilling to work in such units. However, the unwillingness to work in TB wards and units is not only because of the perceived risk of infection but largely because of the stigma associated with the disease. The stigma was both from the health workers and the community. This stigmatization was due to the general belief that health workers in TB control come into direct contact with

patients and are therefore likely to be infected with the disease. Also, the location of DOTS and TB wards at isolated areas of health facilities affected community views about the condition and creates intense fear among community members. The issue about stigmatization of TB patients by both community and health workers as observed in this study is not sui generis as earlier studies have documented this (Courtwright & Turner, 2010; Dodor et al., 2009). However, stigmatizing health workers working in TB wards and engaged in TB control is new in the study area. This finding brings to light another dimension of stigmatization as it may create a situation where health workers may refuse to take care of TB patients (Figure 5.2). This entwines with perceived risk to health workers will adversely affect tuberculosis case detection and treatment.




5.2: Contextual issues on the effects of TB-related stigma on TB case detection

The results of the study also shows that people working in TB unit believed they did not receive fair treatment from their colleagues with some holding the view that working in such units was a form of punishment. Generally, the study finds that people working in TB

were demoralized and this could negatively affect their output. Also, the study finds that people working in TB control believed there is the need for some incentives to promote their work because of the risk involved in taking care of people with TB and few staff who are often overworked. USAID (2014) in their report indicated that health staff who are demoralized and overworked are not motivated to deliver high quality health care as it affects their output. Motivation of health staff has also been found to improve work output of health staff and treatment outcomes of their patients (Chaulk & Kazandjian, 1998; Munro et al., 2007).

### 5.5.2 Screening of Patients and Delays in Test Results: Barriers to Case Detection and Treatment

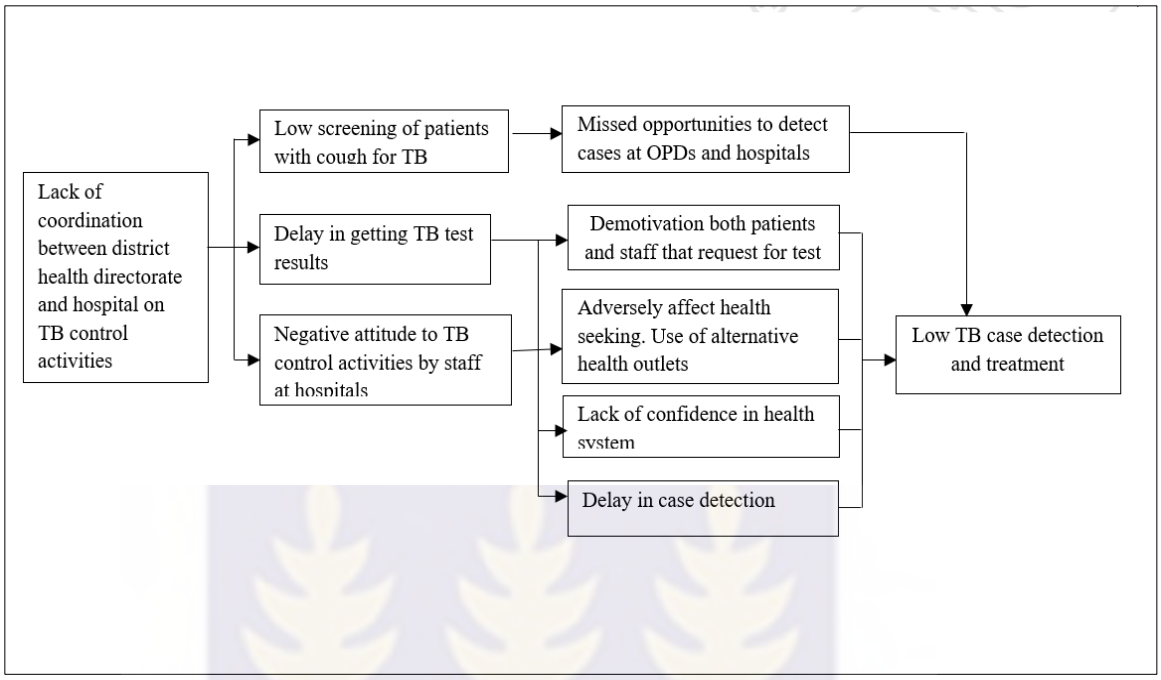
The DOTS policy requires that all people with productive cough are screened for TB once they report at the health facilities, an important strategy in passive case detection. However, this study finds that screening is not being conducted and this was undermining TB case detection. The study finds that about 132 respondents indicate they ever reported at health facility with productive cough, which lasted for more than two weeks but only a quarter of them were screened for TB with 41.9% being TB cases. The findings of this study clearly indicate a gap in the DOTS policy and its implementation because the frontline health workers are not screening for TB. Clearly, this finding agrees with Lipsky's street bureaucratic model which posits that frontline health workers sometimes fail to implement a policy to the level of fidelity required to achieve policy objectives (Lipsky, 2010). The low screening for patients with cough was due to health facilities not keeping a cough register at the OPD and creating a triaging system to clearly identify people who report

with cough. This is therefore undermining TB case detection as passive case finding is the common practice in Ghana. Hence if patients who report with cough at the health facilities are not screened, the health system loses the opportunity to also screen household members as a form of active case finding. A study in the Nkwanta south district of the Volta region of Ghana found that of only 24.6% of patients who report to health facilities in that region with cough for more than two weeks were screened for TB, of which 24.8% were positive TB cases (Amenuvegbe, Francis, & Fred, 2016).

In addition, the DOTS system requires microscopic test for Acid Fast Bacilli (AFB) are conducted on sputum sent to laboratory and results reported within 24 hours to commence prompt treatment. However, this study finds that there are challenges in conducting the TB diagnostic test on time. The study finds that laboratory workers (biomedical Scientists) are unwilling to conduct test resulting in delays in getting test results. Laboratory workers perceived conducting test for TB a high risk work and as an extra work that require special remuneration. They were also of the view that funds for TB control are used to motivate workers of the district health directorate to the neglect of clinical staff working at district hospitals. This delays resulted in people having negative attitude towards biomedical health facilities, whilst encouraging self-medication or utilization of the services of other informal health care outlets in the community. This delays coupled with the belief among some health workers that laboratory workers do not often conduct the test for TB discourage disease control officers and nurses from requesting for sputum specimen from suspected TB patients. Ahorlu & Bonsu (2013) have also found delays in getting test results as

challenge to TB case detection in their study in the Sissala east district of the UWR of Ghana. Delays in TB diagnosis adversely affect TB control as the infected individuals serve as reservoir for the transmission of TB (Ngangro et al., 2012; Sreeramareddy, Panduru, Menten, & Ende, 2009; Takarinda et al., 2015).

The low level of screening of patients with cough and delays in test results are also due to lack of coordination among the district health directorate, district hospitals and sub-district health centres. The lack of coordination resulted in a negative perception among laboratory workers that their work is not recognized by the district health directorate who is mainly involved in the preventive aspect of TB control. This lack of coordination is also responsible for the health workers not routinely screening people who report to the hospitals and health centres with productive cough for more than two weeks. These therefore results in the health system missing the opportunity to detect TB cases at OPD, demoralized staff engaged in TB case search, and patients' lack of confidence in the health system whilst favouring the use of alternative health care outlets available in the community which eventually results in low TB case detection and treatment (Figure 5.3).




5.3: Contextual effects of lack of coordination between district health directorate and hospitals

### 5.5.3 DOTS Promotes Adherences to Treatment and Reduces Stigma

This study finds that the DOTS system which requires patients to daily take their anti-tuberculosis medications in the presence of treatment supporter (monitor) plays an important role in compliance and adherence to treatment. Treatment supporter are seen as motivators to patients because they provide daily encouragement to patients to take their medication. Treatment supporters also accompany patients to DOTS centres to collect medication and therefore promotes adherence and reduced defaulter rates. The findings of this study therefore clearly show that the DOTS system is essential in promoting adherence. This notwithstanding, some studies in the past have indicated DOTS did not play any role in patient care whilst other indicated it was an effective way to manage TB to promote

adherence (Kamolratanakul et al., 1999; Lienhardt & Ogden, 2004; Walley et al., 2001; Zwarenstein et al., 1998). Nonetheless, the finding of this study clearly shows that DOTS promotes treatment adherence in the Ghanaian context.

In addition, treatment supporters play an important role in reducing TB-related stigma and fear of the condition at household and community levels. This is because when people see that treatment supporters are close to patients without contracting the condition, they tend to have less fear for the condition which leads to reduced stigma for patients with the condition. The use of treatment supporters is therefore a risk attenuator for community members. This is an important observation which health promotion officers can use in their behavioural change community. Factors that either attenuate or amplify risk are relevant in social discourse on infectious disease because of its ripple effects and impact (Kasperson & Kasperson, 1996). Nonetheless, this study finds that distance between DOTS centres and the communities has negative effects on the activities of treatment supporters as they are supposed to commute to DOTS centres with TB patients for their treatment, which impose some financial obligation on them. The enablers package of USD 40 per patient which is distributed as 50% to the patient, 30% to the health staff, and 20% to the participating health facility (MOH, 2009b) is said to be inadequate by patients. Providing financial support to treatment supporters has been found to be effective in promoting their activities (Kliner et al., 2015).

## 5.6 Limitation of the Study

Although the study has identified socio-cultural and health systems factors affecting TB case detection and treatment in the study area, it is important to situate the conclusions in the context of the limitation of the study. The study was conducted in four of the 11 districts in the region and hence there may be a limit to the extent to which the findings can be generalized to the other districts that were not selected. However, to circumvent the effects of this limitation, districts and sub-districts were randomly selected. The districts were also clustered to reflect the four indigenous ethnic groups as it is believed that these ethnic groups share common socio-cultural practices.

# CHAPTER SIX

# 6.0 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

## 6.1 Introduction

This chapter provides a summary of the major findings of the study in line with study objectives, and relevant conclusions for each objective. It further provides the novel findings in this study as contributions of the study to knowledge. It concludes by providing the implications of the study for public health decision-making, recommendations of the study, suggestions for further research and for policy makers.

## 6.2 Summary of Findings

This study employed mixed quantitative and qualitative approach to assess the socio-cultural and health system factors affecting tuberculosis case detection and treatment in the UWR of Ghana. A survey was conducted with 606 adults aged 18 years and above in four randomly selected districts in the region based on dominance of the four indigenous ethnic groups in the region. The qualitative aspect of the study employed phenomenology approach to qualitative enquiry. Purposive sampling was used to recruit 15 people with TB and seven treatment supporters, 24 stakeholders in TB control at community, sub-district and district levels for an in-depth interview. In addition, eight FGDs were held among male and female community members to elicit information on the normative behaviour in the various communities. The main findings of the study include:

1. The study revealed that people believe that TB can be caused by cough during sex, a curse or bewitchment. These beliefs had a profound influence on health seeking behaviour for TB. The cultural connotations for the causes of TB made people with

the condition to first seek care from spiritualists and traditional healers. This affected case detection and prompt treatment.

2. The study reported that there was low level of knowledge about TB in the study area. This low knowledge was further worsened by the various misconceptions about the disease in the community and low TB related promotion activities.
3. The study found that health workers are not routinely screening patients with cough for more than 2 weeks for TB. This lack of screening was further undermined by laboratory workers unwilling to conduct sputum microscopy for TB diagnosis because of perceived lack of incentives and stigma. This resulted in delays in getting test results, a situation that affected patients' confidence in the health system and encouraged the use of non-orthodox health care outlets and self-medication.
4. The study reported stigmatization at individual, community and institutional level. Individuals, their families and health workers were highly stigmatized. This stigmatization made suspected TB patients to hide their condition and health workers uncomfortable working in TB treatment centres which affected case detection and prompt treatment.
5. The study reported low coordination among district health directorate, hospitals and sub-district health facilities with regards to TB related work. This low coordination affected the screening of patients for TB and perception about motivation of staff involved in clinical aspect of TB control.

## 6.3 Conclusions

First, tuberculosis has been given a superstitious label by community members and therefore the treatment they seek is often inappropriate, a key social factor that affects case detection. This has wide-ranging public health implications with the current passive case detection strategy being employed by the National Tuberculosis Control Programme (NTP), as those non-orthodox health outlets are not currently collaborating with NTP programme. Second, owing to the misconceptions about the causes of TB, many seek health care from non-orthodox health outlets who are not well-resourced to diagnose and treat TB. TB-related health promotion activities have also plummeted in recent time, a factor that has impact on people's knowledge about TB. Stigmatization of patients, and health workers is negatively affecting TB control. In addition, TB case detection is also hampered by health workers not implementing the DOTS policy requirement of routinely screening patients who present to the biomedical health facility with cough. Third, delays in getting laboratory test for TB was a key barrier to clients seeking for health care at biomedical facilities and health workers requesting for testing patients who report with coughing, and this affected case detection and treatment. The use of treatment supporters was found to improve adherence to treatment and also reduced TB-related stigma.

## 6.4 Contributions of the Study to Knowledge

1. First, the study findings that community belief that TB was caused by cough during sex, a curse or bewitchment explains the health seeking pattern adopted for TB in the community. This further explains the low TB case detection rate.

2. Second, the study finding that laboratory technicians and technologists were highly stigmatized and not motivated made them unwilling to conduct sputum test which led to delays in getting results and low case detection.
3. Third, the DOTS strategy of allowing patients to have treatment supporters contributes to reducing TB-related stigma at the community level and promotes adherence to treatment.

## 6.5 Recommendations

This section looks at recommendations of the study. It first makes recommendations for practice to improve TB case detection and treatment. Also, recommendations are made on future research areas to improve TB control.

### 6.5.1 Recommendations for practice

1. Health workers at district health directorate in TB control should intensify health education to community members. This will increase the knowledge and reduce misconceptions about the disease.
2. NTP should organize training for clinical staff working in various hospitals and clinics to orientate them on DOTS system and its implementation strategies especially the TB diagnostic algorism. These will increase screening of people who report to health facilities with productive cough for more than 2 weeks as failure to do so was undermining case detection at the health facility.
3. The district health management team should engage traditional healers within the district in TB control activities. This will provide an opportunity to take care of both social and biomedical causes of TB. This collaboration could also make

traditional healers serve as referral points to refer those who consult them to biomedical health facilities.

4. NTP should provide incentives to laboratory workers who conduct sputum microscopy for TB diagnosis. This motivation is required to position hospitals to diagnose TB early and to offer prompt treatment.

### 6.5.2 Recommendations for Future Research

1. There should be an implementation study on using traditional and other community-based health system structures for tuberculosis case detection.
2. There should also be an implementation research on the use of community DOTS system using CHOs who are currently used in the CHPS concept in Ghana. This could guide the decentralization of DOTS to the community level.

### 6.5.3 Recommendation for Policy makers

1. The DOT policy should be reviewed to include the use of other community-based health providers who are outside the biomedical system through the integrated complementary and alternative medicine use.

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# APPENDICES

## Appendix A: Consent Form for Household Survey

### Socio-cultural and health system factors affecting tuberculosis case detection and treatment in Upper West Region in Ghana

**Purpose**

Hello! My name is _____ and I am from School of Public Health, University of Ghana, Legon. I am conducting a study on socio-cultural and health system factors affecting tuberculosis case detection and treatment. The purpose of the study is to understand people's views on tuberculosis and the interventions that Ghana Health Services has implemented to control tuberculosis. I will be speaking with a sample of health workers and community members within Ghana. I hope that the information I will obtain from this study will help us to identify the problems with tuberculosis control and enable the health authorities make the programme work better.

**Procedure**

I am inviting you to participate in the study to share your knowledge, opinions and experiences on primary health care system regarding tuberculosis control. You have been selected to participate in the study because you are a key stakeholder with regards to the implementation and running of the tuberculosis control program. I will read out questionnaire to you on tis mobile phone and your responses will be entered directly onto the mobile phone. Note that I am recording you voice.

Your participation in the study is voluntary. If you agree to participate in the study, it may take between 30-45 minutes to complete this questionnaire. During answering this questionnaire, you can refuse to answer any question that you are not comfortable with or withdraw your consent to participate in the study. If you decide not to participate in the study, nothing will happen to you, and it will not affect your relationship with any health care provider or your rights to health care services in anyway. However, if you agree to participate in this study, it is important for you to be very sincere and honest in your views, so we can better understand the situation and how to improve on tuberculosis control work in the communities/districts.

**Risks and Discomforts**

The risks involved in taking part in this study are minimal. These include the inconvenience that the interview will cause you, and the time that you will spend answering the questions. Some of the questions may seem personal and sensitive. You can however choose not to answer any question that you do not feel comfortable answering.

**Benefits**

There are no direct benefits to you for your participation in the study. However, the information that will be obtained from this study will help in addressing issues relating to health care in the district and nationwide.

**Confidentiality**

Any information you share during the discussion will be treated confidentially and no personal identifying information concerning you or any person will be presented in the analysis or publications of this study. The information would not be shared with anyone and will be used only for the purposes of this study. I will not mention any of your names in the report of this study, and nobody will be able to trace your answers back to you.

All personal information will be kept strictly confidential. I will do everything to keep your data secured. Despite all of the efforts, unanticipated problems, such as a stolen computer may occur, although it is highly unlikely. All data will be coded by numbers and separated from your name or any other way to identify you. The information you provide will be used only in combination with other data, and results will be presented only in aggregated form. The following individuals and agencies will be able to look at and copy your research records: the investigator, study staff and other medical professionals who may be evaluating the study, authorities from University of Ghana, Ghana Health Service and Institute of Infectious Diseases of Poverty who are providing some financial support for this study.

**Right to refuse or withdraw**

Before participating in the study, please understand that your participation is voluntary. You do not need to participate in the research if you do not want to. If you decide not to be part of this study, your decision will not affect your relationship with the staff of the Ghana Health Service in anyway. You will also not lose any benefits that you would have otherwise been entitled. If you agree to take part in the study, you can still withdraw from the study at any time and this will not affect you in any way.

Your participation in this study ends after completing the questionnaire.

This study has been reviewed and approved by the Ethical Review Committee of Ghana Health Service. If you would like to find out more about the study, you may contact any of the following persons: Prof. Philip Baba Adongo (first academic supervisor) on phone number: 0244806015, Dr. Patricia Akweongo (second academic supervisor) on 0244827067 or Secretary to the GHS Ethics Committee, Madam Hannah Frimpong on 0243235225 or 0507041223 or contact Mr. Philip Teg-Nefaah Tabong (Principal Investigator) on phone number: 0244468378.

Are you willing to participate in the interview? 1. Yes [ ] 2. No [ ]

I have reviewed the above with the participant and he/she has freely agreed to participate in the interview.

Study Participant

Name_____Signature/Thumbprint_____Date_____

Person obtaining consent

Name_____Signature/Thumbprint_____Date_____

Method of Communication:

1. Read by Self (Interviewee) [ ]

2. Read and Interpreted by interviewer [ ]

3. Consent through witness [ ]

Date of interview……

Name of Interviewer……...

## Appendix B: Structured Question for Survey

**Socio-cultural and health system factors affecting tuberculosis case detection and Treatment in the Upper West Region in Ghana**

**SECTION 1: IDENTIFICATION**

Name of interviewee_____ RNAME

| | | |
|---|---|---|
| COMPOUND NAME/ID. | | CMPNAID |
| DATE OF INTERVIEW | | DAINT |
| FIELDWORKER CODE | | FWCODE |
| FIELD SUPERVISOR CODE | | FSCODE |
| RESULT OF INTERVIEW: | | RESULT |
| DISTRICT | | |
| SUB-DISTRICT | | |
| SUB-DISTRICT CLASSIFICATION<br>URBAN……1<br>RURAL……2 | | |
| COMPLETE, INTERVIEW | 1 | |
| INCOMPLETE, REFUSED | 2 | |
| INCOMPLETE, TO BE COMPLETED LATER | 3 | |
| OTHER_____<br>(SPECIFY) | | |

## SECTION 2: BACKGROUND CHARACTERISTICS OF RESPONDENTS

| No | Questions and filters | Coding Categories | Skip to ≠ |
|---|---|---|---|
| 1 | How old are you now? (Completed years) | [ ][ ] | |
| 2. | Sex of Respondent | Male……1<br>Female……..2 | |
| 3. | What is the highest level of school you attended? | No Formal education……1<br>Primary……2<br>Middle/JSS……3<br>Secondary/SSS……4<br>Tertiary/Higher……5<br>Vocational ……6<br>Other (specify)……7 | |
| 4. | What is your religion? | Traditional……1<br>Christianity……2<br>Islam……3<br>Other (specify)……4 | |
| 5. | What is your Tribe? | Dagaaba ……1<br>Wale……2<br>Sisaala……3<br>Lobi……4<br>Other (specify)……5 | |
| 6. | What is your marital status now? | Never married……1<br>Married……2<br>Living together……3<br>Divorced……4<br>Widowed……5<br>Separated……6<br>Other (specify)……7 | |
| 7. | What is your main occupation? | Farmer……1<br>Trader……2<br>Housewife……3<br>Civil servant/Public Servant……4<br>Student……5<br>Artisan……6<br>Other (specify)……7 | |
| 8. | Who makes decision on type of health care members of this household seek | Self……..1<br>Father……2<br>Mother……3<br>Husband……4<br>Wife……5<br>Grandparents……6 | |

| | | | | | |
|---|---|---|---|---|---|
| 9. | Do you have any of the following assets in your household | | Yes | No | |
| | | Television | | | |
| | | Electricity at home | | | |
| | | Radio | | | |
| | | Refrigerator | | | |
| | | VCD/DVD player | | | |
| | | Bicycle | | | |
| | | Motorbike | | | |
| | | Motor king | | | |
| | | Mobile phone | | | |
| | | DS TV/Multi-TV | | | |
| | | Car | | | |
| | | Live in Own house | | | |
| | | House Roofed with Zinc | | | |
| 10. | How many of the following animals do you have? | | Number | | |
| | | Goats | | | |
| | | Sheep | | | |
| | | Cattle | | | |
| | | Fowl/Guinea Fowls | | | |
| | | Rabbits | | | |
| | | Pigs | | | |
| | | Guinea pigs | | | |
| **Knowledge and attitude about tuberculosis** | | | | | |
| 11. | What is/are the cause (s) of TB? | | Yes | No | |
| | | Germ/Micro-organism/bacillus | | | |
| | | Hereditary | | | |
| | | Being exposed to cold air | | | |
| | | Curse | | | |
| | | Being bewitched | | | |
| | | Through mosquito bites | | | |
| | | Through having sex | | | |
| | | Other (Specify): | | | |
| 12. | What is/are the main symptom(s) of TB disease? | | Yes | No | |
| | | Dry cough | | | |
| | | Cough > 2 week | | | |
| | | Productive cough | | | |
| | | Cough with blood | | | |
| | | Night sweats | | | |
| | | Fever (High Temperature) | | | |

| | | | | | |
|---|---|---|---|---|---|
| | | Shortness of breath | | | |
| | | Weight loss | | | |
| | | Chest pains | | | |
| | | Loss of appetite | | | |
| 13. | Is TB transmittable? (Be transmitted from one person to another) | Yes ……1<br>No……2 | | | |
| 14. | Who can contract TB | | Yes | No | No idea |
| | | Anybody | | | |
| | | Smokers | | | |
| | | Alcohol or drug users | | | |
| | | HIV/AIDS patients | | | |
| | | People who have contacts with patients | | | |
| | | People who take care of TB patients | | | |
| 15. | How does tuberculosis spread from one person to another? **(DO NOT READ OUT ANSWERS) PROBE: Tick all that apply.**<br><br>**(After the person has finished mentioning all, now probe for the remaining and write "P" against the response)** | | Yes | No | No idea |
| | | Coughing Or Sneezing | | | |
| | | Sharing food | | | |
| | | Through touching a person with TB | | | |
| | | Through Sharing Utensils | | | |
| | | Through Sexual Contact | | | |
| | | Through Mosquito Bites | | | |
| | | Through smoking | | | |
| | | Through the air | | | |
| | | Through Houseflies | | | |
| | | Bewitchment | | | |
| | | Sharing food | | | |
| | | | | | |
| 16. | Do you thinks TB is a curable condition? | Yes……1<br>No……2 | | | |
| 17. | In your opinion how can TB be | | Yes | No | No idea |

| | | | | | | |
|---|---|---|---|---|---|---|
| | managed? (Tick all that apply) | Medication provided by health facility | | | | |
| | | Treatment with medical supervision | | | | |
| | | Patient isolation | | | | |
| | | Through taking of herbal medication | | | | |
| | | Consulting spiritualist | | | | |
| | | Taking concoctions provided by traditional medical practitioner | | | | |
| | | Prayers | | | | |
| | | Others (Specify) …….. | | | | |
| 18. | What do you know about treating TB in a health facility? | It is free……1<br>It is expensive……...2<br>Don't know……...3 | | | | |
| 19. | How long does it take to treat TB? | <6 months……..1<br>6-12 months……...2<br>Take the drugs and stop when one feels better……..3<br>TB is untreatable……4<br>Don't know……5 | | | | |
| 20. | In your view is TB a health problem in this community? | Yes……1<br>No……..2 | | | | |
| **Socio-cultural factors influencing case detection** | | | | | | |
| 21. | Have you ever been diagnosed as having TB? | Yes……1<br>No……2 | | | | |
| 22. | Have you ever had a prolonged productive cough for more than 2 weeks? | Yes……1<br>No……..2 | | | | **If "No" skip to 28** |
| 23. | If "YES" did you seek treatment for it? | Yes……1<br>No……2 | | | | **If "No" skip to 28** |
| 24. | Where did you seek treatment? | Health facility……...1<br>Herbalist……...2<br>Spiritualist……3<br>Self-medicated……..4<br>Others (specify)…..……...5 | | | | |
| 25. | How (would/ did) you feel (if / when) you know you (had/have) TB? | Afraid……...1<br>Ashamed/embarrassed ……2<br>Desperate……..3<br>Worried……4<br>Would not feel anything……..5<br>Others (specify)……....6 | | | | |

| | | | |
|---|---|---|---|
| 26. | Do you think you may need to hide yourself from people when you have TB? | Yes……..1<br>No……2 | |
| 27. | Do you know anyone who has ever had or is currently having TB before? | Yes……1<br>No……2 | **If "NO" skip to 32** |
| 28. | Who do you know had TB? | Family member……1<br>Friend……...2<br>Neighbour……3 | |
| 29. | What will be your feelings towards TB patients? | Supportive and want to help……1<br>Supportive but would keep a distance……..2<br>I will be afraid to be infected……..3<br>Feel sorry for them……..4<br>No feelings towards them……5<br>Others(specify)……6 | |
| 30. | How will/did community members treat or relate to you if/when they know you have TB? | May avoid your company/avoided me……..1<br>May reject you/rejected me……..2<br>May help me/helped me……3 | |
| 31. | What will you do if you thought you had TB? | Would go to the health centre……...1<br>Would treat myself with herbs……2<br>Would see the spiritualist……3<br>Will consult a traditional medical practitioner……4<br>Don't know what to do……4 | |
| 32. | Who (will/did) you talk to (if/when) you suspect you have TB | Health worker……..1<br>Spouse……2<br>Parents……3<br>Children……..4<br>Other family members……5<br>Friends……6<br>Religious leader (pastor/imam)……7<br>No body……8 | |
| 33. | At what point would you consider going to a health facility if you have TB | When symptoms persist for more than 15 days……...1<br>As soon as I realized that the symptoms are TB……..2<br>After initial treatment with herbs fail……..3<br>I don't know when to start going……4 | |
| 34. | If you were told you have got tuberculosis, would you want it to remain a secret or not? | Remain a secret……1<br>Will tell a family member……..2<br>It depend……..3<br>Not sure……4 | |

| | | | |
|---|---|---|---|
| 35. | What are your main concerns when you think about TB? **(Multiple answers allowed)** | Access to treatment……..1<br>Transmitting the disease to family members……2<br>Contracting it……...3<br>Dying……4<br>Lack of information about treatment……5<br>Cost of treatment……..6<br>Attitude of health workers……7 | |
| 36. | Why do you think people with TB will refuse to go hospital for diagnosis in this community **(Do not read out answers, probe for answers)** | Fear of diagnosis……1<br>Linking TB to HIV AIDS……..2<br>Believe TB is spiritual……...3<br>Fear of stigma……....4<br>Fear of attitude of health workers……5<br>Fear of the treatment……6<br>Fear of the cost of treatment……7 | |
| 37. | What will be your greatest reason that will make you not go to hospital/health centre/clinic if you suspect you have TB? **(Do not read out answers, if several reasons are mentioned, circle the first and write 1, 2, 3 to rank the remaining)** | Fear of the treatment……..1<br>Fear of stigma from treatment……2<br>The belief that the disease is better handled by other treatment outlets……..3<br>Fear of the adverse effects of the drugs……..4<br>The delays in the hospital……5<br>The cost of the treatment……6<br>Fear of the attitude of health workers……7<br>Distance to hospital……8<br>Others (specify)…… | |
| | | | |
| **Health Seeking Behaviour and Determinant of Health Seeking Behaviour** | | | |
| 38. | Where do seek for health when you are sick? | Self-treatment……1<br>Traditional healer……..2<br>Public clinic/Hospital/Health center……..3<br>Private practitioner……4<br>Pharmacist/Vendor……5<br>Other (specify)……..6 | |
| 39. | Reason for choice of answer | Is cheaper……..1<br>Is closer……2<br>More convenient……...3<br>Better care provided……4<br>Better attitude from care providers……...5<br>Trusted more……6 | |
| 40. | Where would you prefer to be treated for TB? | Government Hospital……1<br>Government Health Centre……2<br>Private Health Facility……..3<br>Traditional healer……4<br>Spiritual healer……...5 | |

| | | | |
|---|---|---|---|
| 41. | Give reason for choice (Multiple answers allowed) | Is cheaper…….. ☐<br>Is closer…… ☐<br>More convenient…….. ☐<br>More Privacy provided…… ☐<br>Better care provided…….. ☐<br>Better attitude from care providers……..... ☐<br>Trusted more…….. ☐ | Rank Reasons |
| 42. | Who do you think will make decisions on the type of care to seek for TB? | Self……1<br>Parents……2<br>Head of Household……3<br>Husband……4<br>Wife……..5 | |
| 43. | Do you feel at risk of getting TB | Yes……1<br>No……..2 | |
| 44. | Where did you seek treatment for you most recent episode of productive cough for more than 2 weeks | Government Hospital……1<br>Government Health Centre……2<br>Private Health Facility……..3<br>Bought medicine from drugstore/pharmacy…….4<br>Traditional healer……5<br>Spiritual healer……..6<br>Others (Specify)…… | |
| 45. | Where did you seek for health on your most recent illness? | Government Hospital……1<br>Government Health Centre……2<br>Private Health Facility……..3<br>Bought medicine from drugstore/pharmacy…….4<br>Traditional healer……5<br>Spiritual healer……..6<br>Others (Specify)…… | |
| 46. | What are the most common places people seek for health care in this community | Government Hospital……1<br>Government Health Centre……2<br>Private Health Facility……..3<br>Bought medicine from drugstore/pharmacy…….4<br>Traditional healer……5<br>Spiritual healer……..6<br>Others (Specify)…… | |
| 47. | What do you thinks are the reasons for people preference? | Is cheaper…….. ☐<br>Is closer…… ☐<br>More convenient…….. ☐<br>More Privacy provided…… ☐<br>Better care provided…….. ☐<br>Better attitude from care providers……..... ☐<br>Trusted more…….. ☐ | Rank Answers by writing 1,2,3.. in boxes provided |
| **Health System Factors Affecting TB Case Detection and Treatment** | | | |
| 48. | Do you think biomedical health facilities (hospital, health centre, clinic) are accessible to you | Yes……..1<br>No……2 | |

| | | | |
|---|---|---|---|
| 49. | Do you know any place that treats TB patients here in this community? | Yes……1<br>No……2 | If "NO" skip to 52 |
| 50. | If "YES" to Q40 what type of facility is it? | Public……1<br>Private……2<br>Mission facility……3<br>Traditional Medical Practitioner……4<br>Spiritual Healing Centre……5<br>Other (specify)……6 | |
| 51. | Provide name of the place I community | | |
| 52. | You said you have ever had cough for more than 2 weeks and you sought treatment at clinic/health centre/hospital, where you screened for TB? | Yes……1<br>No……2<br>Don't know……3 | **If "NO or Don't Know, skip to q53** |
| 53. | What was outcome of the screening? | Positive……1<br>Negative……2<br>Don't Know……3 | If "Negative" or "Don't know" skip to Q59 |
| 54. | Were you put on treatment | Yes……1<br>No……2 | If "NO" skip to Q59 |
| 55. | Have you completed the treatment | Yes……1<br>Still taking treatment……2<br>Have stopped taking treatment……3 | If "Yes" skip to Q59<br>If "still taking treatment" move to Q56<br>If "have stopped" skip to Q57 |
| 56. | For how long have you taking the medication? | | |
| 57. | How long did take the medicine and stopped? (indicate duration) | | |
| 58. | Reason for stopping treatment | Side effects……1<br>Cost of treatment……2<br>Felt better……3<br>Others…… | |

<table>
<tr><td>59.</td><td>Have you received health education on TB in the last six months</td><td>Yes……1<br>No……..2</td><td>If “NO” skip to Q64</td></tr>
<tr><td>60.</td><td>If “YES” from whom did you receive the health education?</td><td>Health worker……..…..1<br>Community health volunteer……2<br>Opinion leader……3<br>Family member……4<br>Friends……5</td><td></td></tr>
<tr><td>61.</td><td>From which medium did you receive this health education</td><td>One-on-One education……..1<br>Mass face-to-face education……..2<br>Radio……3<br>Television……..4<br>Newspaper……5</td><td></td></tr>
<tr><td>62.</td><td>What was the content of the health education? I was educated on:</td><td><table><tr><td></td><td>Yes</td><td>NO</td></tr><tr><td>Causes of TB</td><td></td><td></td></tr><tr><td>Fact that fact TB is curable</td><td></td><td></td></tr><tr><td>Signs and Symptoms of TB</td><td></td><td></td></tr><tr><td>What to do if one suspects he/she has TB</td><td></td><td></td></tr><tr><td>How TB is managed</td><td></td><td></td></tr><tr><td>Duration of TB treatment</td><td></td><td></td></tr><tr><td>The fact that TB treatment in free</td><td></td><td></td></tr></table></td><td></td></tr>
<tr><td>63.</td><td>Do you thinks the health education is provided in one way that make it easy for you to understand?</td><td>Yes……..1<br>No……2</td><td></td></tr>
<tr><td>64.</td><td>What is your most preferred medium of education on TB?</td><td>One-on-One education……..1<br>Mass face-to-face education……..2<br>Radio……3<br>Television……..4<br>Newspaper……5</td><td></td></tr>
<tr><td>65.</td><td>Are you registered with national health insurance scheme</td><td>Yes……1<br>No……..2</td><td>If “no” end the interview</td></tr>
<tr><td>66.</td><td>Do you have a valid national health insurance card</td><td>Seen Valid……1<br>Seen Invalid……..2<br>Yes but not available……3</td><td></td></tr>
</table>

## Appendix C: Consent form for in-depth interview and FGD participants

Socio-cultural and health system factors affecting tuberculosis case detection and treatment in upper west region of Ghana

**Purpose**

Hello! My name is _____ and that of my colleague is _____. We are from School of Public Health, University of Ghana, Legon. We are conducting a study on socio-cultural and health system factors affecting tuberculosis case detection and treatment. The purpose of the study is to understand people's views on tuberculosis and the interventions that Ghana Health Services has implemented to control tuberculosis. We will be speaking with a sample of health workers, community health volunteers, and community members within Ghana. We hope that the information we will obtain from this study will help us to identify the problems with tuberculosis control and enable the health authorities make the programme work better.

**Procedure**

We are inviting you to participate in the study to share your knowledge, opinions and experiences on primary health care system regarding tuberculosis control. You have been selected to participate in the study because you are a key stakeholder with regards to the implementation and running of the tuberculosis control program.

Your participation in the study is voluntary. If you agree to participate in the study we will have a discussion with you. The discussion will last about 45-60 minutes. During the discussion, you can refuse to answer any question that you are not comfortable with or withdraw your consent to participate in the study. If you decide not to participate in the study, nothing will happen to you, and it will not affect your relationship with any health care provider, or your rights to health care services in anyway. However, if you agree to participate in this study, it is important for you to be very sincere and honest in your views, so we can better understand the situation and how to improve on tuberculosis control work in the communities/districts. The discussions or interviews will be recorded with your permission using a digital recorder such that the process can move on fast. The voice recordings will be kept in a safe place till the award of the degree. However the transcriptions from the voices will be kept for discarded two years after the award of the degree.

**Risks and Discomforts**

The risks involved in taking part in this study are minimal. These include the inconvenience that the interview will cause you, and the time that you will spend answering the questions. Some of the themes for discussion may seem personal and sensitive. You can however choose not to answer any question that you do not feel comfortable to answer.

**Benefits**

There are no direct benefits to you for your participation in the study. However, the information that will be obtained from this study will help in addressing issues relating to health care in the district and nationwide. Further, all participants will receive a reimbursement for any travel expenses they may incur and two bars of soap as a token of appreciation for your time.

**Confidentiality**

Any information you share during the discussion will be treated confidentially and no personal identifying information concerning you or any person will be presented in the analysis or publications of this study. All the information collected will be used only for the purposes of this study. The discussion will be tape-recorded so that I can listen carefully to everything and accurately write down everything that has been said. After writing out everything on the tapes, the tapes would be stored for a period of two years before being destroyed. The information would not be shared with anyone and will be used only for the purposes of this study. We will not mention any of your names in the report of this study, and nobody will be able to trace anything we discussed here back to you.

All personal information will be kept strictly confidential. We will do everything we can to keep your data secure, however, complete confidentiality cannot be promised. Despite all of the efforts, unanticipated problems, such as a stolen computer may occur, although it is highly unlikely. All data will be coded by numbers and separated from your name or any other way to identify you. The information you provide will be used only in combination with other data, and results will be presented only in aggregated form. The following individuals and agencies will be able to look at and copy your research records: the investigator, study staff and other medical professionals who may be evaluating the study, authorities from University of Ghana and Institute of Infectious Diseases of Poverty who are providing some financial support for this study.

**Right to refuse or withdraw**

Before participating in the study, please understand that your participation is voluntary. You do not need to participate in the research if you do not want to. If you decide not to be part of this study, your decision will not affect your relationship with the staff of the Ghana Health Service in anyway. You will also not lose any benefits that you would have otherwise been entitled. If you agree to take part in the study, you can still withdraw from the study at any time and this will not affect you in any way.

Your participation in this study ends after this interview.

This study has been reviewed and approved by the Ethical Review Committee of Ghana Health Service. If you would like to find out more about the study, you may contact any of the following persons: Prof. Philip Baba Adongo (main academic supervisor) on phone number: 0244806015, Dr. Patricia Akweongo (second supervisor) on 0244827067 or

Secretary to the GHS Ethic Committee, Madam Hannah Frimpong on 0243235225 or 0507041223 or Mr. Philip Teg-Nefaah Tabong (Principal Investigator) on phone number: 0244468378.

Are you willing to participate in the interview? 1. Yes [ ] 2. No [ ]

Do we have your permission to record the interview? 1. Yes [ ] 2. No [ ]

I have reviewed the above with the participant and he/she has freely agreed to participate in the interview.

Study Participant

Name_____Signature/Thumbprint_____Date_____

Person obtaining consent

Name_____Signature/Thumbprint_____Date_____

Method of Communication:

1. Read by Self (Interviewee) [ ]

2. Read and Interpreted by interviewer [ ]

3. Consent through witness [ ]

INSTRUCTIONS

- After presentation, and consent and switching on the recorder, try to make the interview as similar as possible to an informal conversation. It is very important the person you are interviewing feels comfortable with you.

- You can change the order of the questions.

-You should adjust the past/present tense of the questions as appropriate depending on whether you are referring to past or present.

Date of interview……

Name of Interviewer……...

## Appendix D: IDI Guide for People with TB

### Demographic Data

Demographic Data: Age, Sex, Marital status (for how long), Number of Wives (males only), Number of children, Educational level, number of child (ren), how long have been having the condition?

### Preparatory Question

1. Can you share with me things that make you so excited

### Causes and Health Seeking Behaviour

2. What do you think are the cause(s) of tuberculosis? (*probe answers further for collaboration e.g. biomedical, socio-cultural, gender differences)*

3. What are the beliefs on the various types of tuberculosis? (*probe further on the differences between the types*)

4. When you realised you were not well what did you do? *(Probe further on chronology of care sought e.g. biomedical, herbal, spiritual, what informs type of services sought?)*
5. What do think are some the reasons why some people with tuberculosis refuse to report to get treatment?
    a. Probe on beliefs in the community
    b. Probe on health seeking
    c. Probe on attitude of health workers
    d. Probe on delays at health workers
    e. Probe on access to health facilities
    f. Probe on diagnostic delays
    g. Probe on perceived shortage of health communities

### Psychosocial Effects of tuberculosis

6. Can you share with me your experiences with tuberculosis? *(Probe answers further e.g. local jargon used to describe them, attitude of community to them, denial of some rights, decline in sexual patterns).*

7. How has your condition affected your relationship? *(Probe answers further relationship with partner, In-laws, friend, community)*

8. [Did you notice / Have you noticed] any changes in community members' attitudes towards you because of your condition?*(if having children find out if the children have complained about the condition or attitude of community members to them)*

**Coping Strategies**

9. How are you coping with your condition? (*probe answers further e.g. social, spiritual, emotional* )

10. Do you have any suggestions about how to better implement tuberculosis control? (*probe further for clarity of any unclear answer*)

11. Is there any way you could [have been / be] better supported to implement tuberculosis case detection and control in your community (*probe further taking into consideration human resources, service delivery, logistics/supplies, information system, leadership and governance, health financing*)?

**Health System Factors Affecting Case Detection and Treatment**

12. Can you share with me you experience with the health system regarding treatment for TB?
    a. Can you please share with me how you were finally diagnosed to be suffering from TB?
        i. Probe on sequence of events (number of times he/she went to hospital, point at which investigation were conducted for TB)
        ii. Probe on views on sequence of events (probe on delays, probe on whether person feel this system can result in people refusing to come to the hospital)
    b. Probe on service provided by health workers
        i. Attitude of health workers
        ii. Views on quality of care
        iii. Privacy on the care provided
        iv. Probe on views about DOTS (benefits, flexibility and role in ensuring adherence and treatment outcomes
    c. Probe on availability of logistics/supplies/drugs
        i. Probe on any instance of lack of drugs on any logistic for care
    d. Probe on information system
        i. Probe on system on retrieval of files
        ii. Probe on delays in accessing records

13. I have finished with my questions. Is there anything else you would have love us to discuss?

    Thank you very much, I would like to replay our discussion for you to listen and make additions, subtractions or clarification where necessary. Once again thanks and be assured that any information you have provided would be treated as confidential.

## Appendix E: IDI Guide for Health Care Providers

Used the same consent form on Appendix A

Date of interview……

Name of Interviewer……...

**Demographic Data**

Demographic Data: Age, Sex, Marital status, Number of Wives, Number of children, Educational level, professional background, How long he/she has been working on TB control programme?

**Preparatory Question**

1. What are some of health problems in this community**?**

**Causes and Management of Tuberculosis**

2. What are some the community perception of the causes of tuberculosis?

   *(Probe answers further difference types, modes of transmission, treatment)*

3. How is tuberculosis managed in this community?

   (*Probe answers further e.g. where do people go for treatment?)*

4. What do you think are some of the reasons for people not reporting to the hospital with tuberculosis? (*probe further to more clarity on unclear area or emerging areas of interest*)

5. Can you please describe some of procedures people are taken through when they report to the facility with tuberculosis (*Probe answers further)*
6. Can you please share with me your experience working in the tuberculosis? *(probe further on how staff are assigned to the unit, review duty roster for staff mix*)

**Tuberculosis Control Programme**

7. Can you tell me what programme are in place to control tuberculosis? (*Probe further for level of community involvement, health workers views on the approaches adopted).*

8. What is the view of community members with regards tuberculosis control programmes?(*probe further on socio-cultural perspective)*

9. In your opinion what strategies do you think when adopted would help improve tuberculosis control in this community? (*probe answers further on health facility strategies, community strategies, collaboration)*

**Health System Factors Affecting Case Detection and Treatment**

10. Have you received training on tuberculosis?
    a. Probe on in-service training on TB case detection and treatment
    b. Probe on content of training and perceived adequacy of training
    c. Probe on how long ago the person received training (Probe on views on adequacy of the frequency)
11. How were you selected to work in TB Unit?
    a. Probe on training before placement
    b. Probe on whether person is happy working in TB Unit
    c. Probe on if person wish to work in any other unit
    d. Probe on views about the number of people working in the TB unit
12. Can you share with me you views on the supply of logistics in TB control?
    a. Probe on shortage of drugs and screening materials
    b. Probe on instances where patients come and could not be supplied with medications
    c. Probe on supply system and monitoring
13. How is your work supervised?
    a. Probe on facilitative support visit
    b. Probe on views on governance of TB control programme (are they areas you feel should be changed?)
14. How will you describe the type of services you render to your clients?
    a. Probe on whether they feel clients are satisfied with type of services
    b. Probe on challenges in service delivery
15. What is view about how information concerning tuberculosis is being managed?
    a. Probe on information retrieval and management
    b. Probe on communication with community and other levels of health system

**Ways of improving on case detection and tuberculosis control**

12. Do you have any suggestions about how to better implement the TB control programme?

- Is there any way you could [have been / be] better supported tuberculosis case detection and treatment in this community?

Thank you very much. Is there anything else you would have love us to discuss? If not replay the audio for concordance

## Appendix F: FGD Guide for Community Members

### Demographic Data

Demographic Data: Age, Sex, Marital status (for how long), Number of Wives (males only), Number of children, Educational level, number of child (ren), how long have been having the condition?

### Preparatory Question

1. Can you share some of the health problems in this community?

### Causes and Health Seeking Behaviour

2. What do you think are the cause(s) of tuberculosis? (*probe answers further for collaboration e.g. biomedical, socio-cultural, gender differences)*

3. What are the beliefs on the various types of tuberculosis? (*probe further on the differences between the types*)

4. What are the various types of cough-related condition (*probe on local names, causes, signs and symptoms, management and prevention*)

5. When one is not feeling well in this community what is done? *(Probe further on chronology of care sought e.g. biomedical, herbal, spiritual, what informs type of services sought?)*
6. What do think are some the reasons why some people with tuberculosis refuse to report to get treatment? (*Probe further to clarity any answer*).

### Psychosocial effects of tuberculosis

7. Can you share with me your experiences with tuberculosis in this community? *(Probe answers further e.g. local jargon used to describe them, attitude of community to them, denial of some rights, decline in sexual patterns).*

8. What will be your attitude to someone with TB? *(Probe answers further relationship with partner, In-laws, friend, community)*

9. [Did you notice / Have you noticed] any changes in community members' attitudes towards you because of your condition?*(if having children find out if the children have complained about the condition or attitude of community members to them)*

### TB control in community

10. In your opinion how can case detection be improved in the community? (*probe answers further on household level, community level* )

11. Do you have any suggestions about how to better implement tuberculosis control? (*probe further for clarity of any unclear answer*)

12. What way can you support in the implementation of TB control programme to increase tuberculosis case detection and control in your community (*probe further taking into consideration human resources, service delivery*)?

13. I have finished with my questions. Is there anything else you would have love us to discuss?

## Appendix G: IDI Guide for District and Sub-district TB Focal Persons/ DOTS In-Charge

Used the same consent form on Appendix A

Date of interview……

Name of Interviewer……...

**Demographic Data**

Demographic Data: Age, Sex, Marital status, Number of Wives, Number of children, Educational level, professional background, How long he/she has been working on TB control programme?

**Preparatory Question**

1. What are some of health problems in this community**?**

**Causes and Management of Tuberculosis**

2. What are some the community perception of the causes of tuberculosis?

   *(Probe answers further difference types, modes of transmission, treatment)*

3. What are some of cough-related conditions in this community

   *(Probe on local names, causes, their recognition (signs and symptoms), management and treatment.*

4. How is tuberculosis managed in this community?

   (*Probe answers further e.g. where do people go for treatment?)*

5. What do you think are some of the reasons for people not reporting to the hospital with tuberculosis? (*probe further to more clarity on unclear area or emerging areas of interest*)

6. Can you please describe some of procedures people are taken through when they report to the facility with tuberculosis (*Probe answers further)*
7. Can you please share with me your experience working in the tuberculosis? *(probe further on how staff are assigned to the unit, review duty roster for staff mix*)

**Tuberculosis Control Programme**

8. Can you tell me what programme are in place to control tuberculosis? (*Probe further for level of community involvement, health workers views on the approaches adopted).*

9. What is the view of community members with regards tuberculosis control programmes?(*probe further on socio-cultural perspective)*

10. In your opinion what strategies do you think when adopted would help improve tuberculosis control in this community? (*probe answers further on health facility strategies, community strategies, collaboration)*

**Health System Factors Affecting Case Detection and Treatment**

11. Have you received training on tuberculosis?
    a. Probe on in-service training on TB case detection and treatment
    b. Probe on content of training and perceived adequacy of training
    c. Probe on how long ago the person received training (Probe on views on adequacy of the frequency)
12. How were you selected to work in TB Unit?
    a. Probe on training before placement
    b. Probe on whether person is happy working in TB Unit
    c. Probe on if person wish to work in any other unit
    d. Probe on views about the number of people working in the TB unit
13. Can you share with me you views on the supply of logistics in TB control?
    a. Probe on shortage of drugs and screening materials
    b. Probe on instances where patients come and could not be supplied with medications
    c. Probe on supply system and monitoring
14. How is your work supervised?
    a. Probe on facilitative support visit
    b. Probe on views on governance of TB control programme (are they areas you feel should be changed?)
15. How will you describe the type of services you render to your clients?
    a. Probe on whether they feel clients are satisfied with type of services
    b. Probe on challenges in service delivery
16. What is view about how information concerning tuberculosis is being managed?
    a. Probe on information retrieval and management
    b. Probe on communication with community and other levels of health system

**Ways of improving on case detection and tuberculosis control**

17. Do you have any suggestions about how to better implement the TB control programme?

    - Is there any way you could [have been / be] better supported tuberculosis case detection and treatment in this community?

Thank you very much. Is there anything else you would have love us to discuss? If not replay the audio for concordance.

## Appendix H: Criteria for assessing human resource

| **Human Resource for Health Unit** | | Yes | No |
|---|---|---|---|
| 1 | Does an HRH Unit exists in the region? | 10 | 0 |
| **Level of strategic function** | | | |
| 2 | Does the HRH function as part of the leadership team, and/or providing national strategic direction? | 1 | 0 |
| 3 | Does a dedicated HRH unit or function develop HRH policies for implementation to ensure fair distribution? | 1 | 0 |
| 4 | Does the HRH unit or a dedicated function plan the number and type of required human resources for the country? | 1 | 0 |
| 5 | Does the HRH unit or a dedicated function provide a strategic steering role in the management of human resources for health, the in-service training, and the approach towards problems and determinants? | 1 | 0 |
| 6 | Does a dedicated HRH unit or function track, with an updated information system, the inventory of HRH (numbers, types, locations and educational levels)? | 1 | 0 |
| 7 | Does a dedicated HRH unit or function negotiate inter-sectoral relationships with education, employee and union sectors? | 1 | 0 |

# Appendix I: Study Participants Listing Form

**PHD RESEARCH HOUSEOLD ENUMERATION FORM FOR ADULTS ≥ 18 YEARS Page_____ of_____**

**HOUSEHOLD LISTING FORM**

**SUB-DISTRICT/AREA NAME_____ LOCALITY NAME_____**

| **LEAVE BLANK** | | SERIAL NO OF STRUCTURE (1) | ADDRESS/DESCRIPTION OF STRUCTURE (2) | RES Y/N (3) | SERIAL NO OF HH IN STRUCTURE (4) | NAME OF HEAD OF HOUSHEOLD (5) | HH SIZE (6) | NO ADULTS IN HH (7) | CONTACT PERSON NO (8) | REMARKS (indicate date and time hh can be me (9) |
|---|---|---|---|---|---|---|---|---|---|---|
| HH TO INTERVIEW (A) | CUMM NUM OF HH WITH ELIGIBLES (B) | | | | | | | | | |
| | | | | **Y N** | | | | | | |
| | | | | **Y N** | | | | | | |
| | | | | **Y N** | | | | | | |
| | | | | **Y N** | | | | | | |
| | | | | **Y N** | | | | | | |
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| | | | | | | | | | | |

**Interviewer's Name…….**

## Appendix J: Ghana Health Service Ethical Approval Letter

GHANA HEALTH SERVICE ETHICS REVIEW COMMITTEE

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

*My Ref: GHS-ERC [illegible]*
*Your Ref: No.*

Research & Development Division
Ghana Health Service
P. O. Box MB 190
Accra
*Tel: +233-302-681109*
*Fax: +233-302-663424*
*Email: Hannah.Frimpong@ghsmail.org*

11th March, 2016

Philip Teg-Nefaah Tabong
School of Public Health
University of Ghana
P. O. Box 13
Legon

**ETHICS APPROVAL - ID NO: GHS-ERC: 17/11/15**

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

**"Socio-cultural and Health Systems Factors Affecting Tuberculosis Case Detection and Treatment in the Upper West region of Ghana"**

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

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

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

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

Please note that this approval is given for a period of 12 months, beginning 11th March, 2016 to 10th March, 2017. However, you are required to request for renewal of your study if it lasts for more than 12 months.

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

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

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