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SCHOOL OF PUBLIC HEALTH

COLLEGE OF HEALTH SCIENCES

UNIVERSITY OF GHANA

FACTORS INFLUENCING TUBERCULOSIS TREATMENT OUTCOME IN SAWLA TUNA KALBA DISTRICT

BY

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DECLARATION

I, MAHAMA MUTALA, hereby declare that except for references made to other works which have been duly acknowledged, this is my own work.

……..

MAHAMA MUTALA

(STUDENT)

DATE: ……

……

DR. PRISCILLIA NORTEY

(SUPERVISOR)

DATE: ……

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DEDICATION

This work is dedicated to my Son (Mutala Faai-z Borenyi) and Wife (Issah Kande) for their immeasurable support and encouragement.

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LIST OF ABBREVIATIONS

AIDS	-	Acquired Immune Deficiency Syndrome
CIDA	-	Canadian International Development Agency
DOT	-	Directly Observed Therapy
EPTB	-	Extra- Pulmonary Tuberculosis
FDC	-	Fixed Dose Combination
GHS	-	Ghana Health Service
HIV	-	Human Immunodeficiency Virus
IDSR	-	Integrated Disease Surveillance and Response
IEC	-	Information, Education and Communication
LMICs	-	Low and Middle Income Countries
LTBI	-	Latent Tuberculosis Infection
NGO	-	Non-Governmental Organization
NTP	-	National Tuberculosis Programme
SPTB	-	Smear Positive Tuberculosis
SNTB	-	Smear Negative Tuberculosis
SSA	-	Sub-Sahara Africa
SSM	-	Sputum Smear Microscopy
STKDHMT	-	Sawla-Tuna-Kalba District Health Management Team
UNICEF	-	United Nations International Children's Emergency Fund
WHO	-	World Health Organization

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DEFINITION OF TERMS

Adverse outcome

Defined as death, or treatment abandonment or treatment failure during therapy.

Attendant

- Person who sought TB treatment at the health facility.

Complete data

- Where all information needed to be retrieved on TB cards are available.

Cured

- Sputum smear (+) patient who is sputum (-) in the last month of treatment and at least once before.

Completed treatment

- Patient who has completed treatment but who does not meet the criteria to be classified as a cure or a failure.

Died

- A client who dies for any reason during the course of treatment.

Defaulted

- A client who at any time after registration had not collected drugs for 8 or more consecutive weeks (2 months).This clients is now considered as lost to follow up.

Incomplete data

- If any one of the information which will be retrieved on TB cards (eg.age, sex type of TB) is missing.

Pulmonary Tuberculosis

- Tuberculosis affecting the lungs.

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Relapsed

- A patient previously treated for TB, declared cured or treatment completed, and who is diagnosed with bacteriological positive TB (smear or culture).

Treatment success

- A sum of cured and completed treatment in smear- or culture-positive patients only.

Treatment failure

- Initially smear-positive or culture positive client who remained, or become smear-positive again 5 months or later after commencing treatment.

Transfer in

- A patient who has been transferred from another TB Register to continue treatment.

Transfer out

- A patient who has been transferred to another recording and reporting unit and for whom treatment outcome is not known.

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ABSTRACT

Introduction

Morbidity and mortality of tuberculosis is a rising public health issue worldwide. The Sawla-Tuna-Kalba district of the Northern Region recorded cure rate of 46.4% and completed treatment rate of 22.8%., in 2016. This culminates into a TB treatment success rate of 69.2% (Northern Regional Health Directorate Annual Report, 2016). This is below the WHO sets standards of 85%. This study aimed at assessing the factors that influence ineffective and effective TB treatment outcomes in the Sawla-Tuna-Kalba District to enable adequate evaluation of the success of TB control program.

Method

The study design was a retrospective cross sectional study, using quantitative approach. Data was collected using interviewer administered semi-structured questionnaires with 138 TB patients. Tuberculosis records were reviewed from the district TB register within the period of 2014 to 2016 using data abstraction forms. The data was analysed using Stata version 15. Association between the independent variables and the dependent variable was established using Chi-square tests of association. Logistic regression was used to estimate Odds Ratio as a measure of association. Statistical significance was checked using 95% confidence interval and p-value of <0.05 was considered significant.

Results

Out of the 138 TB patients, 34.1% were 54 years and above, 75.7% were males and 79.7% were married and 79.7% were employed. Treatment outcome for cured and completed treatment were 44.9% and 55.1% respectively. In the final multiple logistic regression, age (AOR: 0.31, 95% CI: 0.12-0.80, *p*=0.015), employment during treatment (AOR: 4.73, 95% CI: 1.20-40.34, *p*= 0.030)

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and disease classification (AOR: 0.01, 95% CI: 0.00-0.03, p<0.001), were identified as the most significant factors for TB treatment outcomes.

Conclusions and Recommendations:

It can be concluded from this study that age of TB patient, employment during treatment disease classification, education on the side effect of TB drugs are the significant predictors of TB treatment outcomes in the Sawla-Tuna-kalba District. It is recommended that, The District Health directorate must ensure the scale up of TB case detection efforts. This will ensure all smear positive cases are detected early through a strengthened contact tracing approach, case searches and TB screening campaigns in high risk areas.

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CHAPTER ONE

INTRODUCTION

1.1 Background

Tuberculosis (TB) is a disease caused by *Mycobacterium tuberculosis* (Mortaz et al., 2016). The disease most commonly affects the lungs, but sometimes affects other portions of the body (CDC, 2013). A relatively small proportion of people infected with *Mycobacterium tuberculosis* will develop TB disease. However, the probability of developing TB is much higher among people infected with the human immunodeficiency virus (HIV) according to the (World Health Organization, 2012). WHO further states that the disease is also more common among men than women, and affects typically adults in the economically productive age groups; around two-thirds of cases are estimated to occur among people aged 15–59 years.

According to the 2015 global tuberculosis report, TB is a major public health issue. It causes ill-health among millions of people each year and ranks alongside HIV as a leading cause of death globally (Biruk et al., 2016). The aim of treatment is to cure the patient and achieve non-infectiousness, hence interrupting transmission of the disease, while avoiding the emergence of drug resistance (Zarb et al., 2010) [European Centre for Disease Prevention and Control (ECDC), 2010]. Active, drug-sensitive TB disease is treated with a standard six-month course of four antimicrobial drugs that are provided with information, supervision and care to the patient by a health worker or trained volunteer. Without such supervision and support, treatment adherence can be difficult and the disease will persist (Africa, 2011).

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Preliminary estimates in 2011 indicate that globally, there are approximately 1.9 million incident TB cases and 260,000 deaths annually (Osman, Phelippeau, Drancourt, & Musso, 2017). Of this, over 95% TB-related deaths occur in low and middle-income countries where education and public health information are often less accessible (Wilson, Ramos, Castillo, Castellanos, & Escalante, 2016)

In 2014, the (World Health Organization, 2014) estimated about 9.6 million new TB cases, 5.4 million of which were among men, 3.2 million among women and 1.0 million among children. There were also 1.5 million TB deaths (1.1 million among HIV-negative people and 0.4 million among HIV-positive people), of which approximately 890 000 were men, 480 000 were women and 140 000 were children. The number of TB deaths is unacceptably high: with a timely diagnosis and correct treatment, almost all people with TB can be cured.

It is estimated that Ghana has 86 smear positive pulmonary TB cases per 100,000 population and 106 of all types of TB cases per 100,000 populations per year (WHO, 2011). The National TB Control Programme (NTP) was launched in 1994 and aims at reducing the transmission of the disease to a level where it is no longer a major public health problem. The National TB Control Programme shares in the mission of the Global Stop TB partnerships. Although Ghana does not fall into the category of countries which have a high burden of Tuberculosis (Amo-adjei, 2013), the disease does present considerable economic and health limitations to individuals infected with, and affected by the disease (Amoah, Sandjo, Bazzo, Leite, & Biavatti, 2014), as well as to the health system in general (Owusu-Dabo et al., 2006). Additionally, the social stigma associated

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with tuberculosis (TB) and its implication on disease management and treatment compliance, in Ghana are considered to be challenging (Mirghani & Magzoub, 1996).

In an attempt to fill in this gap, this study therefore seeks to throw light on the factors influencing treatment outcomes for TB with a specific focus on Sawla -Tuna -Kalba District.

1.2. Problem Statement

The current global tuberculosis epidemic has put pressure on health care managers, especially those in the developing countries to seek innovative ways of rendering better health services to ensure effective treatment of TB patients. One of the strategies adopted is DOT for all patients where the treatment kits of patients are sent to facilities closer to them to ensure proper supervision during TB treatment (Getahun, Ameni, Medhin, & Biadgilign, 2013).

In line with the Sustainable Development Goals (SDG's), the WHO has set a target for TB treatment success rate of 85% and reduce mortality rates by 50% by the year 2018 (WHO, 2016). The Sawla-Tuna-Kalba district of the Northern Region recorded a cure rate of 46.4% and treatment completion rate of 22.8%. This culminates in to a TB treatment success rate of 69.2 % (Northern Regional Health Directorate Annual Report, 2016). This is below the WHO set standards of 85%.

Even though several factors are known to influence TB treatment outcomes, it is however unclear which of these contributing factors are of relevance in the district. Failure to identify these contributory factors may result in high rates of adverse treatment outcomes (default, treatment failure and death) among clients on treatment.

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Inability of policy implementation partners to identify these factors threatens the effectiveness of TB control programmes with consequences such as multiple drug resistance development which leads to prolonged treatment periods and increased cost, increased rate of transmission of the bacteria and high incidence of morbidity and mortality (World Health Organization, 2012). This study therefore seeks to identify the possible factors influencing TB treatment outcome among TB patients in Sawla-Tuna-Kalba district.

1.3 Justification

It is expected that this study will show the factors influencing tuberculosis treatment outcome in the district and therefore help in improving treatment outcomes of TB patients.

1.4. Research Questions

Questions that the study sought to answer included the following:

1. What are the trends of cured and completed treatment outcomes for patients who were treated for TB from 2014-2016?
2. What are the factors that influence TB treatment outcome?

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1.5. Study Objectives

1.5.1 General Objective

To determine the factors influencing tuberculosis treatment outcome in Sawla-Tuna – Kalba district during the period 2014 to 2016.

1.5.2 Specific objectives:

1. To determine the trend of cured and completed treatment outcomes of TB patients treated for TB from 2014-2016.
2. To determine factors that influences these TB treatment outcomes.

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1.6. Conceptual Framework

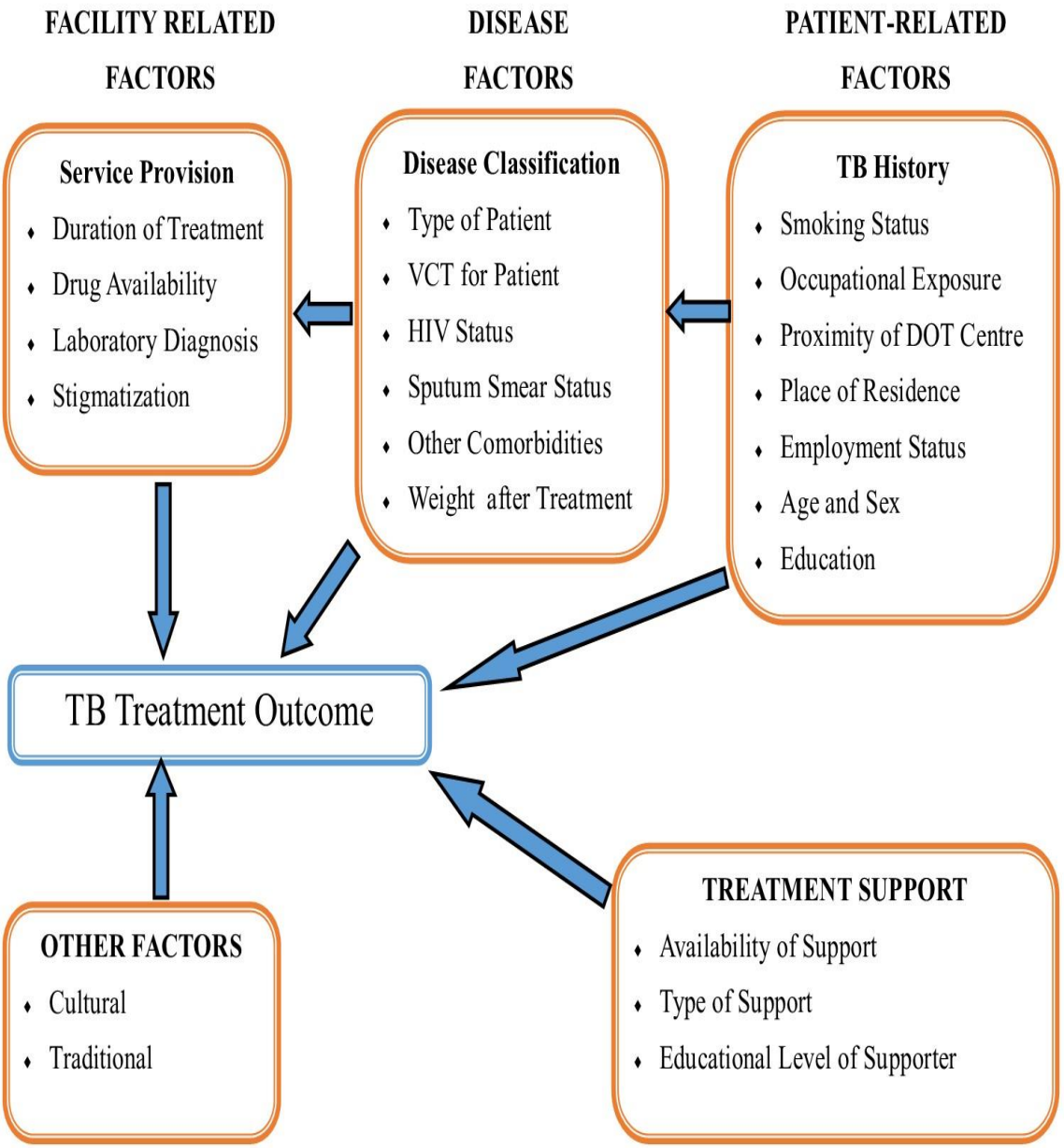

Figure 1: Frame work on factors influencing TB treatment outcome.

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Narrative of conceptual framework

The framework above illustrates the relationship among the factors that influence TB treatment outcome. These contributing factors have been grouped into categories namely service provision factors, patient related factors, treatment support and others.

Patient-related factors such as smoking status, occupational exposure, proximity of DOT centre, place of residence, employment status, education, age and sex directly affect TB treatment outcome as well as affect TB disease factors such as type of patient (new, transfer, relapse and default patients), HIV status, sputum smear status, other comorbidities, weight after treatment. For instance, sputum smear status, patient type, HIV and HIV counselling and testing for patients will work through the duration of treatment to influence TB treatment outcome (Gebremariam, Bjune, & Frich, 2010). Similarly, sociodemographic characteristics such as age, sex and education can influence employment and income level of patients which in turn could work through his/her place of residence to affect access to services (Gajbhare, Bedre, & Solanki, 2014). Additionally, patient related factors such as history of the TB patient, smoking, etc can work through age, sex, education and marital status to affect the treatment outcome and influence other co- morbidities such as hypertension, HIV/AIDS could also affect TB treatment result (Sinshaw, Alemu, Fekadu, & Gizachew, 2017). That notwithstanding, one's proximity to the DOT centre will determine the transport cost to the TB treatment centre and all this will in turn influence accessibility to services which will go a long way to affect the patient treatment outcome either positively or negatively (Annan, Singh, Dogbe, Asante, & Owusu-Dabo, 2013).

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Though TB disease related factors directly affect TB treatment outcomes, they as well influence facility or service related factors such as availability of TB drugs, laboratory diagnosis, duration of treatment and stigmatization which in turn affect treatment outcome. An example is how stigmatization and treatment duration may influence access to TB services. Additionally, the availability of a treatment supporter attached to a TB patient, the educational level of that supporter and the type of supporter (financial, emotional, information and functional) can influence ones TB treatment outcome directly or indirectly (Berhe et al., 2012).

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CHAPTER TWO

LITERATURE REVIEW

2.1. Tuberculosis Burden

Tuberculosis is a chronic communicable bacterial disease that remains an important public health problem, especially in developing countries. TB is an airborne, communicable disease caused by bacteria which primarily affect the lungs. Besides the disease burden, tuberculosis also causes an enormous socio-economic burden to Africa. Tuberculosis primarily affects people in their most productive years of life with important socio-economic consequences for the household and the disease is even more common among the poorest and marginalized sections of the community due to poor ventilation in their housing structures and inadequate health facilities in most places (Mohammed, et al. 2015).

2.2. Global Burden of TB

An initiative by the Global Health Partners and implementers from thirteen countries with high burden of TB launched a program in October 2017 to find and treat missing additional 1.5 million cases of TB by the end of 2019. It is reported that every year 10.4 million people get sick with TB (with an estimated proportion of 90% adults; 65% male and 10% people living with HIV). Nevertheless, of those individuals, 40% do not receive care and are hence missed by health systems after failing to be diagnosed, treated or reported (WHO, 2017). In 2016, an estimated 1 million children become ill of TB. According to WHO 2017 report, cases that were estimated in 2016 occurred in these

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respective WHO regions - African (25%), South-East Asia (45%) and Western Pacific (17%). Also, in comparison to the above, the extent of cases occurring in Eastern Mediterranean Region (7%), European Region (3%) and Americas (3%) were small.

From a descending order, the WHO 2017 report enlists the topmost five countries with 56% of estimated cases – these are India, Indonesia, China, the Philippines and Pakistan. Globally, the TB mortality rate is suggested to be declining at approximately 3 percent annually. Likewise, the suggested rate of new cases is declining at approximately 2 percent annually. This however, is expected to increase to approximately 4 to 5 percent annually by 2020 in order to achieve the TB target Strategy.

The case fatality ratio (CFR) of people who develop TB and expire from the disease was 16% in 2016. This however, should reduce to 10% by 2020 in order to achieve the first milestone of the End TB Strategy. There is a considerable inequality among the WHO region countries who have access to TB diagnosis and treatment. The case fatality ratio is less at 5% in these countries (Eastern Mediterranean Region, European Region and Americas), compared to most countries in the WHO African Region 20%.

2.3. Tuberculosis Burden in Ghana

It is reported that the African Region has the highest rates of TB cases and deaths per capita and accounts for 41 % of the regional cases out of a population of 1.0 billion. It is further understood that HIV co-infection has intensified the TB epidemic in the WHO African Region accounting for 31% of the world's TB/HIV co-infection cases(WHO, 2017). Although Ghana is not among the 30 high burden TB countries in the world the disease is however considered an important public health challenge. The 20 high TB

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burden countries are based on absolute number of incident cases whilst the 10 high TB burden countries were based on severity of disease burden - incidence per capita).

According to (WHO, 2013) Ghana is ranked 38th high burden TB country among 145 countries in the world and 19th in Africa.

The second nationwide TB prevalence survey that was conducted in 2013, estimated that in every 100,000 population there is a prevalence of 290 cases. The nationwide case detection rate in 2013 was 20.7%. According to Dr Frank Bonsu, the Programme Manager of the National TB Control Programme (NTCP), during the world TB day launch on 22 March 2018 at Mantse Agbona, in James Town- Accra stated that TB case notification has been declining by 33% in the last four years. He submitted that in 2017 the country recorded 14,550 new cases, which was down from the 2013 new notified cases from 15,606. According to him, the expected annual number of diagnosed TB cases countrywide is 44,000 but the country is currently detecting only 34% of this. Ghanaian men are mainly affected, with a male to female ratio of about 2:1.

The national treatment success average in 2017 was 85.2% which fell short of the GHS's ambitious set target of 90%. The TB epidemic is generalized with geographic variation. From the Stop TB Ghana Newsletter 2017 case notification rates are suggested to be particularly high among people living with HIV (PLHIV), miners, pregnant women and people with diabetes. Cases among children constitute around 5% of all notified TB cases. There is also a decline in TB reported cases in all regions with the exception of Western, Upper East and Brong Ahafo regions, however, Greater Accra, Ashanti, Eastern and

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Western, continued to record exceptionally high number of cases (Stop TB Ghana Newsletter, 2017).

There is a high TB burden among HIV patients. A baseline study of HIV amongst TB patients revealed a co-infection prevalence of 14.7%. HIV prevalence among TB patients varied in the different regions ranging from 33.4% in the Eastern Region to 9.4% in the Upper East Region. The proportion of TB patients tested for HIV rose from 17% during the first year of the introduction of TB/HIV activities to 77.8% in 2012. ART coverage among HIV-positive TB patients increased from 13.9% in 2008 to 42.6% in 2013. The number of reported drug resistant cases is suggested to have gone up in 2017, 198 cases were reported compared to 30 in 2013 (NTCP, 2017).

2.4. Demographic Characteristics Influencing TB Treatment Outcomes

Several demographic factors have been established as factors that affect the treatment of TB. They include sex and literacy status marital status, socioeconomic status, type of house, type of family and overcrowding. A study by Gajbhare et al., (2014) in Maharashtra Indian showed that the treatment success rate was higher in males, educated patients, those who were unemployed and those who were in middle socioeconomic class. According to Zenebe and Tetera (2016) in North East Ethiopia reported that female TB patients were more likely to have successful treatment outcome compared to male patients.

In a cross sectional study conducted by Mohammed et al., (2015) reveals that majority 74.4% of the TB patients were males and they were from the urban population. The study was conducted in India among pulmonary Tuberculosis patients in Madurai.

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In another study conducted by (Duru et al., 2016) in Imo State, Nigeria, it came to light that among patients with good outcome, the majority were literate and the literacy status was found to be statistically significant with treatment outcome. According to the study, an individual's disease is both a biological event with a microscopic agent and a social event with human determinants. TB is closely related to social and economic problems, people who are mostly affected live in densely populated areas, their income is poor, and they mostly lack or have little knowledge about TB (Shah et al., 2016).

The study conducted by (Lutge, Lewin, Volmink, Friedman, & Lombard, 2013) in South Africa suggests that poverty, poor nutritional status, homelessness and crowded living conditions are linked and increase the risk of TB. This is evident in the sort of names given to the disease years past. Indeed, Robert Koch, the microbiologist who discovered the TB mycobacterium, described the disease as "the outcome of misery" (Lutge et al., 2013).

TB rate has also been established to be higher in low- and intermediate income countries and socially unequal communities; hence the adverse effects of TB are greatest for poor people in due reason that their liveliness depends on physical labour. A relationship exists between TB and poverty during the duration of the disease. Although effective treatment for the disease exists and can be accessed free of charge from all public health facilities across the country, several research findings show that the negative effect of poverty on TB treatment outcome is partly due to the cost of accessing TB treatment services in the form of transport fares to and from TB treatment centres (Gupta, Gupta, & Behera, 2011)

Additionally, the poor nutritional status that often accompanies poverty is not only a risk factor for development of the disease, but undermines the outcomes of TB treatment

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(Lutge et al., 2013). It is worth mentioning that financial difficulties also influence the health seeking behaviour of TB patients. A study conducted by (Gajbhare, Bedre, & Solanki, 2014) showed that patient's socioeconomic status was a major determinant of TB treatment success, which according to them was also related to drug resistance and the persistent spread of the disease. The study noted that high socio-economic status of patients, particularly high income levels was associated with successful TB treatment outcome. The study further revealed a situation of a vicious circle between treatment outcomes and patient's financial situation. This was an indication that patients with low income tend to have poor treatment outcomes and also spend much of their little income on medical care as a result of treatment failure. The research also revealed that financial burden was the main reason for failure of patients to seek care and complete treatment.

Another study conducted by (Mohamed, Kanagasabapathy, & Kalifulla, 2015), reported a contrasting finding in their study, associating low socio-economic status of patients with shorter duration of diagnostic delay or care seeking, as compared to widely published researches whereby low socio-economic status is usually cited as a risk factor for a longer duration of diagnostic delay or care seeking. They also reported that clinical presentation of patients may be more severe in poor patients, accounting for the early care seeking. The writers associated the severity or faster progression of the disease in poor patients with poor nutritional status associated with poor patients (Mohamed et al., 2015). A very interesting finding, reported in this paper was the fact that early contact with a facility implementing DOTS did not reduce diagnostic delays. This means that majority of them clinicians at those facilities were not conscious on TB case finding, such patients were

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just treated for cough and other symptoms and TB forgotten. (Hossain et al., 2012) also acknowledged the association between poverty and TB.

According to them poverty has negative consequences on everything related to TB (exposure to infection, disease progression, delayed care seeking and above all poor treatment outcomes). They further stated that TB inflicts a lot of negative consequences on patients thereby leading to increase poverty, due to decreased resistance as a result of weakened immune system, malnutrition and other opportunistic diseases due to the increase poverty. As a result the poor are most likely to experience the worst TB conditions and run a high risk of poor treatment outcome. The researchers further assert that TB will push income insolvent patients into poverty and those deprived of food into a condition of further malnutrition (Hossain et al., 2012). In effect poverty and TB are said to be locked in a vicious cycle as one triggers the other. In fact, this is one of the reasons for making TB diagnosis and treatment free of cost. So that everybody with the disease, including the poor can access treatment. However, after several years the realities on the ground do not support this assumption as noted by Hossain et al., (2012).

Many TB patients go undetected in health facilities and communities. However, some of those detected and put on treatment finds it difficult to come to DOTS centers for their medication because of lack of money. Being employed may be associated with better socio-economic status, which allows one to afford the cost of transportation for health care, purchasing of food increasing the chance of treatment compliance. Limited financial resources served as a barrier to treatment adherence. Patients in a study conducted by (Liu, Birch, Newbold, & Essue, 2018) cited the need to use public taxis to reach the clinic and the related financial costs as a significant obstacle to accessing regular health care. Studies

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of (E.A. Dodor, 2012) also revealed in his study that some TB patients lost job opportunities because they became weak as a result of the disease, whiles others got their appointments terminated. Such patients may find it difficult to get money to transport themselves to health facilities for their drugs or even purchase food. For instance, a female patient during an interview session said she was sacked from her job as a food vendor by her aunt because of the fear that when others get to know of her situation, they would not buy her food again (E.A. Dodor, 2012). Similarly, findings from a study conducted by Berhe, Enquselassie, &Aseffa in Tigray Region, Northern Ethiopia and among smear-positive pulmonary tuberculosis patients (2012) have also shown a significant association between unemployment and unsuccessful treatment outcome. They found out that unemployed patients were about 3 times more likely to experience unsuccessful TB treatment.

Cultural factors also influence TB care. Culture can be viewed as a system of shared standards for perceiving, interpreting and interacting with others. It can be said to be a normative framework for decision making and behavioural strategies in the society. It is therefore an integral component in defining and achieving health, maintaining health and treating illness. Spiritual components of health are also central in many cultures. Hence, to a large extent, knowledge about diseases and where to seek remedies are defined by culture in a way.

2.5. Tuberculosis Treatment Outcomes

In Ghana individuals who self-report to the Out-Patient Departments (OPD) of health institutions with complaint of persistent cough lasting 3 weeks and more are suspected of

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having tuberculosis. Based on this it is required of them to undergo sputum smear microscopy and in some cases chest X-ray. Those found to be suffering from TB are then referred to the designated DOTS centres for treatment. (Emmanuel Atsu Dodor & Kelly, 2010). Three treatment regimens used in tuberculosis treatment are retreatment (RTR), short course (SC), and standard treatment (ST). This is based on the WHO recommendation and used by the NTP throughout the country (Dodor et al., 2010).

Agreeing to a study conducted by K. Jaggarajamma et al., (2012) it came to light that most defaults at the end of the intensive phase occurred within the treatment dose range of 18 – 24. The default rate of 20% was observed in their cohort study of 938 patients, among them 16 (9%) had completed the treatment but were wrongly classified as 'default', 25 (13%) died after defaulting, and 4 (2%) could not be traced due to incomplete address. The study further identified the following reasons for default: "drug related problems like nausea, vomiting, giddiness, migration, relief from symptoms, work related problems, consumption of alcohol, treatment from other private or public health facility, domestic problems, stigma, too ill to attend. Old age, other illnesses, inconvenient DOT and dissatisfaction with treatment centre and DOT provider were included as other reasons given by patients". It was suggested in the study (Jaggarajamma, Gopi, Subramani, Thomas, & Narayanan, 2012), that certain DOT default were related to factors such as; work related issues, alcohol consumption, drug related issues, migration, domestic problems and so forth. Equally, reasons such old age, concurrent illness and indifferent patient behaviour were stated.

In a study conducted by Addis Ababa, Ethiopia, (Getahun, Ameni, Medhin, & Biadgilign, 2013) among patients under directly observed treatment for TB, the establishment of the

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treatment success from 2006 to 2009 in the study was similar to the results of the study in South Ethiopia, in which treatment success for smear-positive TB improved from 38% in 1994 to 56% in 1998, 70% in 1999 and 73% in 2000.This progress may be attributed to the improvement in the diagnosis of the diseases and due to the practice of using three-way and double FDC drugs which might have provided advantages to supporting adherence and program delivery (Getahun et al., 2013).

In a research carried out at the Colombo chest clinic by (Tessema et al., 2013) 203 defaulters who responded to questionnaires, 77.8% were male while the other 22.2% were females. More than half (59.6%) of the defaulters were married and 29.5% were single. 165 of respondents (81.2%) were between the ages of 20 and 59 years. Thirty one (13.2%) had no formal education, while 28.0% of them had only an education up to grade 5 (primary). This study further revealed that 46.3% of the patient defaulted treatment in the intensive phase of anti –TB treatment, 76.9% resided within 10 kilometres of the Colombia chest clinic, 44.4% of the patients had an income less than Rs 3000 00 per month, 35% had no permanent jobs and 17.7% were employed in the private sector. 79.3% of respondent experienced delays in clinic services, most of the delays took place at the laboratory (30.4%). Non-functioning of the clinic after scheduled hours and getting the patient file from the counter to the doctors were other reasons for delay in services.

2.6. Patient related factors

A study conducted in China reported the cultural practice of visiting a traditional medical care provider as a factor that contributes to patient delays in seeking and receiving TB diagnosis and treatment(Li et al., 2013). The authors noticed that many TB patients visited

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traditional medicine practitioners for treatment before later seeking health care service at the medical facility. One of the raised concerns of late facility based seeking behaviours due to visits to traditional medicine providers is the challenges in diagnostic and treatment delays. These may also lead to poor treatment outcome in situations where patients' conditions deteriorate badly.

Again, cultural factors such as stigmatization play a negative role in TB diagnosis and treatment delays, as people turn to hide their condition. For example, in Ghana among the Gonja cultural setting TB is called "*Kichewuse*" meaning woman disease. This is also common among the Dagaati culture, they also call TB "*pakori*" both phrases implies that the disease is gotten when a man cough during sex.

The cultural belief in the cause of the disease defines the mode of treatment. Similarly, among the Sissalas the disease is called "*Kasubine*" meaning black cough and is mostly regarded as a dangerous disease. The recommended remedy for the disease in that setting is usually to prepare some traditional medicine for the patients. (Abioye, Omotayo, & Alakija, 2011) conducted a study among TB patients in Nigeria and reported that among most unsuccessful treatment outcomes stigma contributed about 53.5% and was reported as a common experience among TB patients.

A stigma is an "attribute that is deeply discrediting" and that decreases the bearer "from a whole and usual person to a tainted, discounted one",(Seeman & Goffman, 1963) shame is said to be a social determinant of health. According to (Courtwright & Turner, 2010) stigma occurs because of community and institutional standards about undesirable or disvalued behaviours or characteristics. Goffman outlined the historical use of the word

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stigma to the Greek in ancient times, which referred to a bodily sign designed to expose something unusual and bad about the moral status of the signifier. According to Goffman (1963), the signs were cut or burnt into the person's body as an indication of being a slave, a criminal or a traitor. The disgrace and shame of the stigma became more important than the bodily evidence of it.

Labelling, isolation, loss of status and discrimination can all occur at the same time and can be considered components of stigma. Further, (Seeman & Goffman, 1963) differentiate three types of stigma. The first is stigma of physical malformation, which is the deficit between the expected custom of perfect physical condition and the actual physical condition of a deformity on a person. It can take the form of any physical impairment. Many long-lasting diseases create changes in physical appearance or functions. These changes often create difference in people. The complexity of stigma stems from institutions, communities as well as inter and intra personal attitudes. Hence the community and individual norms that promote stigmatization of TB hinders the progress of the TB control programme. Mostly the fear of infection is one of the major reasons for stigmatizing TB patients. As a result stigmas contribute to increasing delay in seeking TB care and treatment noncompliance (Turner et al., 2010). For example, stigma was reported as a common experience among patients in a study conducted by (Abioye et al., 2011). Patients in the study reported being avoided by others because of their disease condition. Such findings confirm peoples fear of the disease, lack of information about TB and its treatment and more importantly, support for TB clients (Abioye et al., 2011). Stigma results in many patients hiding their diagnosis of TB or seeking TB treatment in

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their locality difficult (Gebremariam et al., 2010; Turner et al., 2010). This is due to the fact that people associate TB with HIV.

Finding from a study conducted by (Gebremariam, Bjune, &Frich, 2010). For instance Gebremariam et al., (2010) noted in a focus group discussion where a patient said "I don't want neighbours to see me here (referring to the TB clinic). One day, I saw this girl from my neighbourhood here; I was sitting outside and waiting. I wished the earth would open and swallow me. I know she would spread the gossip. I tried to hide behind the man sitting next to me. I don't think she saw me*"*. Dodor, (2012) also reported in his study that the negative attitudes of others towards TB patients affected the way they interacted with both family and community members.

In a study conducted by (Okanurak, Kitayaporn, & Akarasewi, 2008)in their study carried out in Bangkok (Thailand) to assess the TB client's factors influencing a successful treatment. A total number of 1,241 clients representing eighty one percent who had higher educational levels and knowledge of tuberculosis were positively treated. This adds to the fight that these factors are associated with healthier compliance to TB treatment and subsequently treatment success (Okanurak, et al., 2008). Several other studies has shown education to be significantly associated with the treatment outcome of TB patients.

According to the studies conducted by Mkopi et al (2013) they advanced that "Adequate knowledge about the spread of TB during treatment may prevent needless social isolation, while understanding the duration of treatment gives the patient a better outlook about his/her abilities in the near future".

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2.7. Conclusion

There seems to be less focus placed on the success of treatment and treatment outcome. Several TB related factors are outlined in literature but little is said about factors that influence treatment outcome especially in the Northern region of Ghana. From the studies identified, the few factors mentioned were patients' behavior, knowledge of patients on TB treatment, family support and transportation challenges. Other factors include attitude of healthcare providers, quality of counseling, confidentiality within the health center and stigmatization by both relatives and health workers.

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CHAPTER THREE

METHODS

3.1: Study Design

The study employed a cross sectional study design.

3.2. Study Area

The study was carried out in the Sawla-Tuna-Kalba district which is among one of the twenty-six (26) districts located in the Northern part of Ghana. The district population in 2017, was projected to be 125,525 (STKDHMT, 2017). The district has been divided into 6 sub-districts (Sawla , Tuna, Gindabour, Kulmasa, Gbeniyiri and Kalba) demarcated under this area. These demarcated sub-districts help render health services to its population. The district has 278 communities with 11 hard to reach communities. The major economic activities of the inhabitants is farming and the crops cultivated include maize, beans, groundnut, and cassava/yam production. The district has one government hospital and six health centres made up of 1 medical officer, 123 nurses, 1 pharmacist, 3 pharmacists technicians, 2 laboratory technicians and 2 health information officers, seventeen CHPS compounds in charge of IDSR activities and 210 child growth promoters (STKDHMT, 2017 Annual Report).

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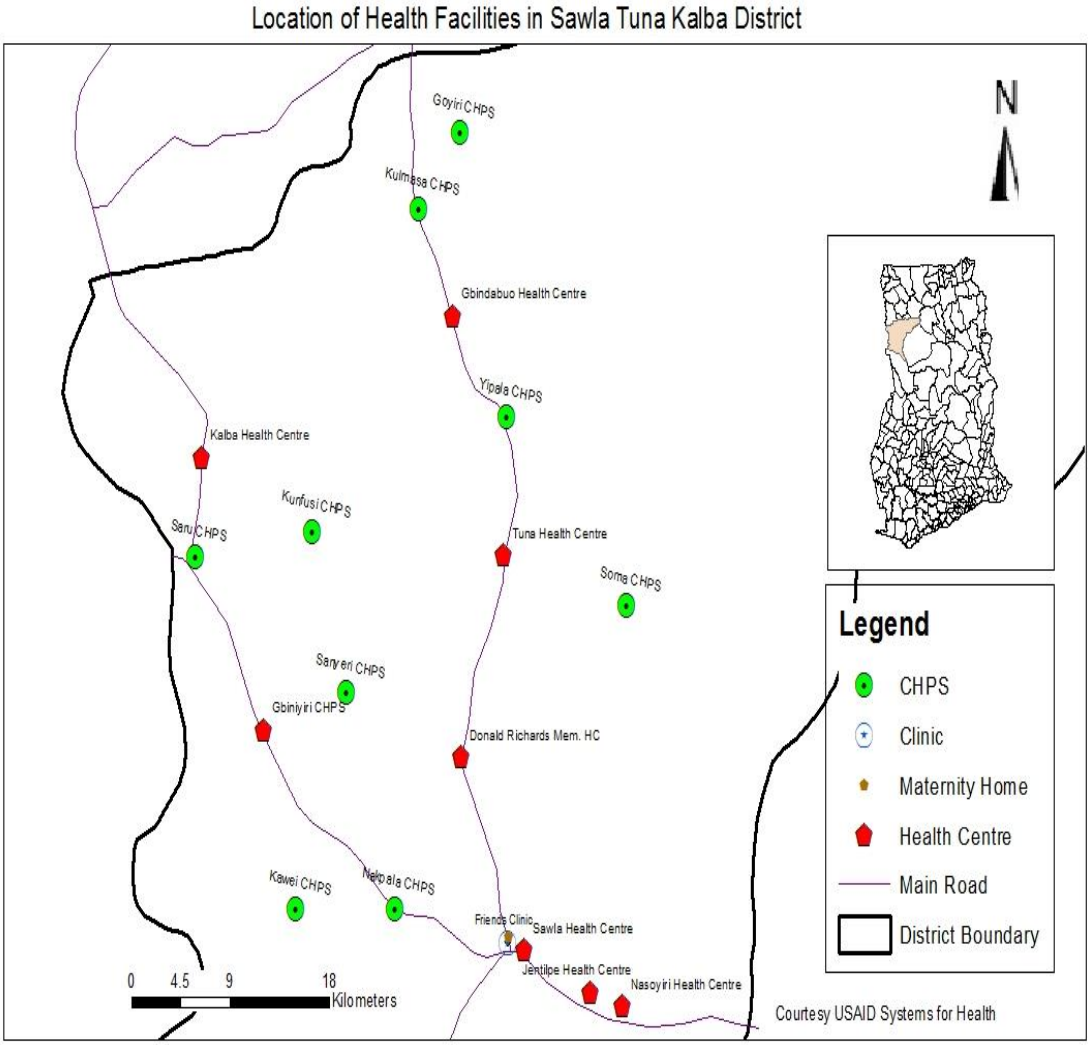

Figure 2: The map of Sawla-Tuna-Kalba District

Source: Ghana Statistical Service (2014)

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3.3. Study Variables

3.3.1 Dependent Variable

The dependent variable of the study is tuberculosis treatment outcome. Treatment outcome was classified using WHO standards and the Ghana National Tuberculosis Control Programme guidelines for measuring treatment outcome. Patients were grouped as having been cured and completed treatment.

3.3.2 Independent Variables

The independent variables include socio-demographic characteristics (age, sex, current marital status, and employment status, type of employment, current employment, and level of education), disease related factors (HIV status, disease classification, comorbidities, type of TB patient, weight and treatment outcome) and Patient related factors. Table 1 summarizes the dependent and independent variables and their scale of measurement.

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Table 1: Type and Measurement of study variables

Variables	Operational Definition	Data Source	Scale of Measurement
Dependent			
Cured	A patient who was initially smear-positive and became smear-negative in the last month of treatment and on at least one previous occasion.	TB register	Binary - Yes - No
Treatment Completion	A patient who tested smear negative at the onset of treatment, completed treatment by taking all the prescribed doses and remained smear negative at the end of treatment.	TB register	Binary - Yes - No
Independent			
Age	Age in years of a patient treated for tuberculosis.	TB register	Ordered Categorical
Disease Classification	This is defined as whether a patient is diagnosed with culture+ smear positive TB (SPTB), smear negative TB (SNTB) or extra-pulmonary TB (EPTB)	TB register	Categorical - SPTB - SNTB - EPTB
Employment status	Employment in income generating job	Patient Interview	Binary - Employed - Unemployed
Type of employment	Employment as of the time of TB treatment	Patient Interview	Categorical -Trading -Farming -Formal -Fishing -Others
Current employment	Employment during time of interview	Patient Interview	-Formal -Non-formal

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Variables	Operational Definition	Data Source	Scale of Measurement
Type of support	Support given to TB patients in the form of emotional, functional and informational support	Patient Interview	Categorical - Emotional - Functional - Information
Residence	Urban if patient lived in Sawla town and rural if lived outside township	TB register	Binary -Urban -Rural
Educational level	Highest level of education attained by patient	Patient Interview	Ordinal -None -Primary/JHS -Secondary+
Distance	Distance from patient home to the DOT centre	Patient Interview	Categorical <10km >10km
Sputum Smear status	Results of sputum smear examination	TB register	Nominal -Positive -Negative Unknown
HIV Status	Results of HIV serology test	TB register	Nominal -Positive -Negative -Unknown
Weight	Weight of patient before and after treatment	TB register	Categorical -<54kg ->54kg

3.4. Study Population

The study population consisted of all records of clients with tuberculosis who had been registered and received treatment at health facilities in the Sawla-Tuna-Kalba district during the period; January 2014 to December 2016. Those clients were contacted for follow-up interviews.

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3.4.1 Inclusion criteria

A. Eligibility for the records review was based on the following criteria:

1. TB records of clients captured from January 2014 to December 2016.
2. Complete TB records having all the indicators on the card filled on it

B. Eligibility of a client for interview was based on the following criteria:

1. Clients who have gone through TB treatment within the period 2014 to December 2016 in the Sawla Tuna Kalba District.
2. Clients who have traceable addresses and phone number.

3.4.2 Exclusion criteria

A. For a record to be considered not eligible for the records review, the following conditions must be satisfied:

1. Records from TB cards and District Registers that have incomplete data.

B. Clients who do not meet the following criteria were excluded from the study:

1. Clients who have moved out of the District
2. Those who were lost to follow-up

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3.5 Sample size determination

A total sample size of 138 was considered for this study. This was determined using the Cochran formula below:

$$n = \frac{Z^2_{\alpha/2} P(1-P)}{e^2} = \frac{1.96^2 \times 0.09(1-0.09)}{0.05^2} = 125.8 \approx 126$$

Where,

$Z_{\alpha/2}$ – score at 5% significance level = 1.96

e – 0.05, the margin of error, set at 5%

α = significance level =5%

P = Northern Regional Prevalence of TB = 9% (GHS, 2016)

n = Minimum required sample size

Adjusting for non-response rate of 10% = 126+ 0.1(126) = 138

Total sample size = 138.

3.6 Sampling Procedure

A census approach was used in enrolling all TB client records available in the district within the period under study (January 2014 to December 2016). 138 out of the total number of records, met the criteria for inclusion in the interview. Hence, all 138 clients were interviewed.

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3.7. Data Collection Tools

A data abstraction sheet was designed for data extraction from the TB 01 card (Appendix B). Information captured on the abstraction sheet included ; age, sex, type of TB patient, HIV status, weight of clients, treatment outcomes, name, address of patient, treatment outcome and district TB number among others.

A structured questionnaire was designed for the TB clients and facility staffs involved in TB control activities (Appendix C). It consisted of both open and closed ended questions. Questions asked focused on marital status, occupation, family history of tuberculosis, educational level, stigma, treatment supporter, smoking history, and distance to DOT centre among others.

3.8. Data Collection Methods

A data abstraction form (Appendix C) was used to review all records, in the district TB register, of patients who received tuberculosis treatment in the district within the period under study.

Patients who received treatment in the period Jan 2014-December 2016 were traced and interviewed. Patients were contacted using their traceable addresses provided on their treatment cards and telephone numbers. The respondents were visited at their homes where the interview was conducted. Appointments were booked in advance with clients from the hard-to-reach areas and communities in order to arrange for suitable days and periods for face-to-face interview sessions with such clients.

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3.9. Quality Control

In order to ensure effective and good quality control, the following quality control measures were considered:

a. The Principal investigator on daily basis supervised the data collection.
b. The data collected was critically examined at the end of each day.
c. Data was handled by the trained research assistant with public health background and were validated by the principal investigator for consistency and completeness by verifying from the source records (TB cards).

3.10. Pretest of Data Collection Tools

Pretesting was done at Bole district which serves communities with similar characteristics as clients with TB in terms of geographical location, ethnicity and socioeconomic status at the Sawla-Tuna-Kalba district. This was done to evaluate the time needed to complete each TB patient form, and also evaluate the training received by the research assistants and make addition or deletion of parts of the questionnaire that is deem necessary.

3.11. Statistical Analysis

The dependent variables of the study were cured and completed treatment. All TB patients treated for TB in the year 2014, 2015 and 2016 who lived in Sawla-Tuna-Kalba and were able to be traced and interviewed were used for the analysis.

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Data was coded, entered and cleaned using excel and imported into Stata version 15 for analysis. All records of TB patients from the period of January 2014 to December 2016 were assessed. Descriptive statistics were determined using frequencies and percentages. Chi square was used to ascertain association between dependent and independent variables. A p-value of 0.05 was declared as statistically significant.

To assess the determinants of TB outcomes, bivariate logistic regression was conducted on the dependent and independent variables and factors found to be significant was entered into multiple logistic regression to determine factors that are strongly associated. Both crude and adjusted odds ratio with their confidence levels were estimated for the different independent variables at 95% confidence level.

3.12. Ethical Consideration

Ethical clearance was obtained from the Ethics Review Committee (GHS-ERC: 040/01/18) of the Ghana Health Service (Appendix D). Permission was sought from the management of Sawla-Tuna-Kalba District before collection of data. Informed consent was sought from all the participants prior to the commencement of the interview. Filled responses were kept under lock and access restricted to the principal investigator and supervisor to ensure the confidentiality of their information.

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CHAPTER FOUR

RESULTS

4.1. Introduction

The study was carried out in Sawla-Tuna-Kalba District among TB patients who had been registered and received treatment at the Sawla-Tuna-Kalba district hospital during the period January 2014 to December 2016 to determine the factors that influencing the cured and completed TB treatment outcomes. There are six TB treatment outcomes. The focus of this study was the cured and completed treatment outcomes.

There were records of 413 TB patients who received treatment during the study period but only 157 met the criteria for inclusion into the study. An attempt was made to contact these clients using their telephone numbers and traceable addresses of the respondents for interviews. The flow chart (Figure 4) below illustrates the flow of patient contact.

4.2. Background characteristics of Cured and Completed treatment status

The number of records for the period was 413 out of which 138 met the inclusion criteria. All the 138 respondents recruited completed the structured questionnaire. The average age of the respondents was 46.1 years with a standard deviation of ±17.8. Majority of the TB patients were male (75.4%). Majority (34.1%) were older than 54 years and majority (73.2%) were married. Furthermore, 79.0% were employed in the informal sector. As many as 79.7% were still employed during TB treatment**.** In addition, majority of them (55.1%) had no education. However, ninety (65.2%) resided in the urban areas (Table 2).

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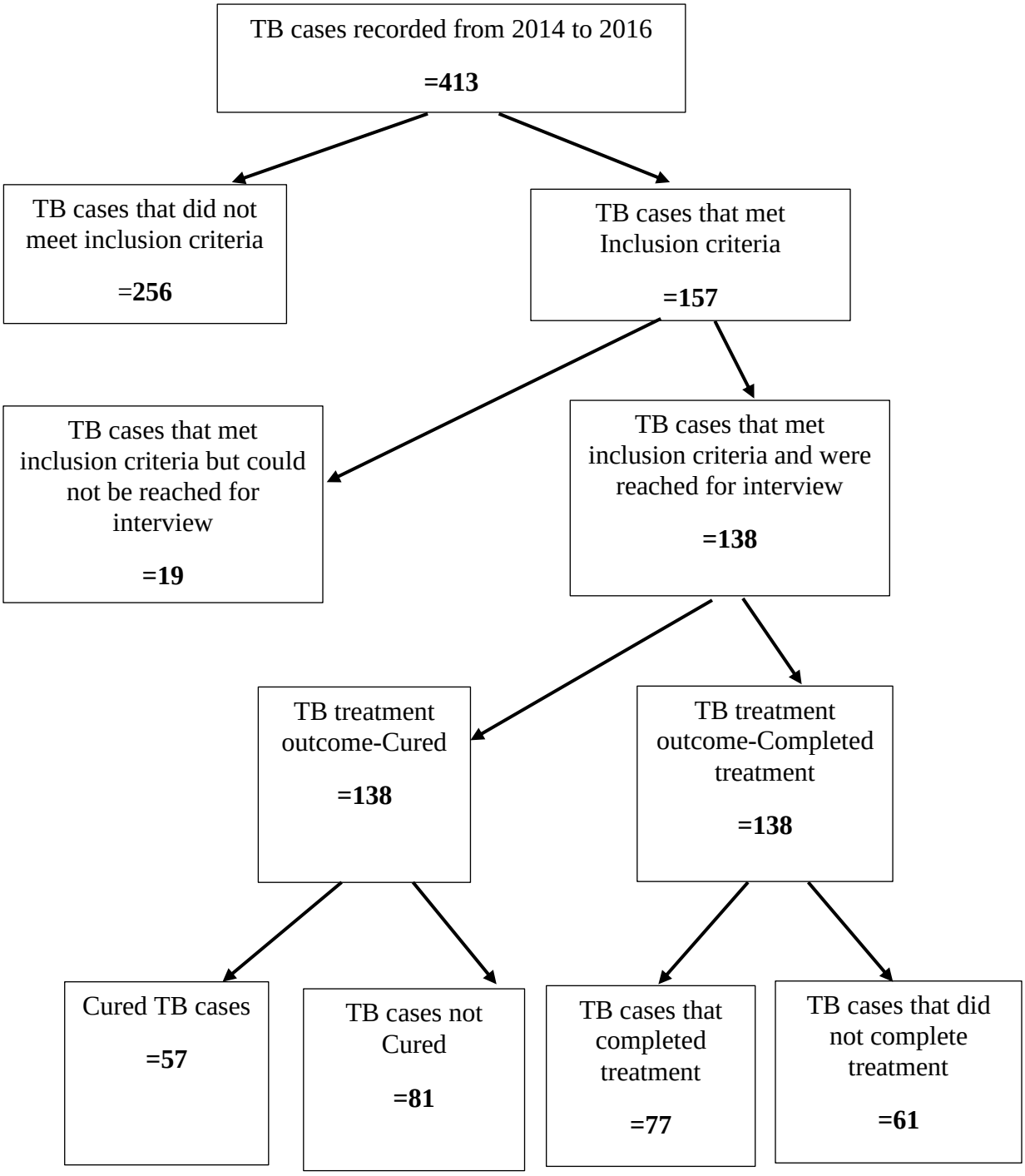

Figure 3: Chart of TB patients who were contacted and interviewed

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Table 2: Background characteristics of TB treatment status of Respondents

Variables	Frequency (n=138)	Percentage (%)
Age (mean ± SD)	46.09 ± 17.75	
15-24	13	9.4
25-34	27	19.6
35-44	34	24.6
45-54	17	12.3
>54	47	34.1
Sex		
Female	34	24.6
Male	104	75.4
Current marital status		
Married	101	73.2
Unmarried	37	26.8
Current employment		
Informal sector	109	78.9
Formal sector	29	21.0
Employment during treatment		
Employed	110	79.7
Unemployed	28	20.3
Level of education		
None	76	55.1
Primary/JHS	20	14.5
Secondary/SHS	17	12.3
Tertiary	25	18.1
Community of residence		
Rural	48	34.8
Urban	90	65.2

n: cell frequency. %: row percentage

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4.3. Tb treatment outcomes

The graph below represents the treatment outcomes for the 413 records, for the period of 2014 to 2016. The figure shows a treatment success rate of 82.0% which is below the WHO set standard of 85%. The various treatment outcome such as completed treatment, cured, default, treatment failure, died and transfer out as well as their rates were as follows (51.0%), (31.0%), (9.0%), (4.0%), (3.0%) and (2.0%) respectively (Figure 3)

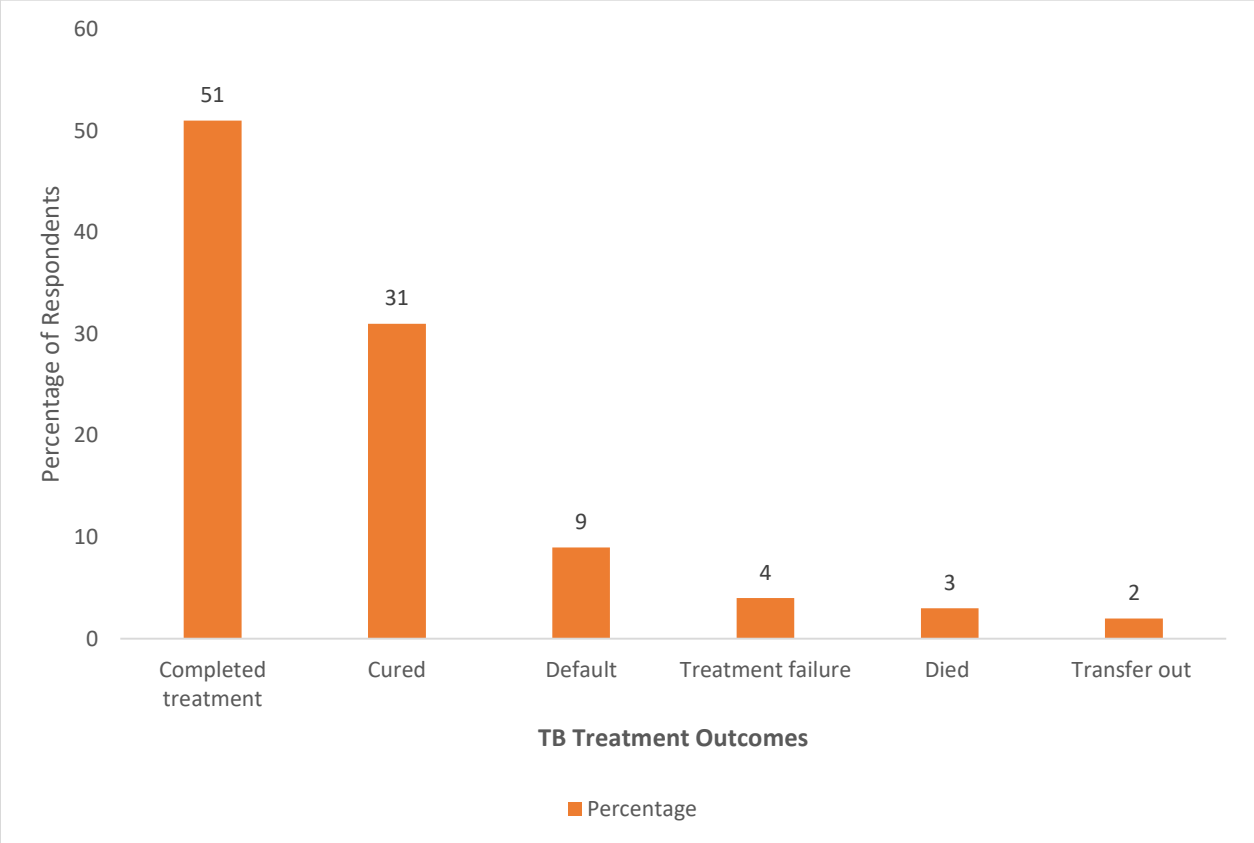

Figure 4: TB Treatment outcomes for the period 2014-2016

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4.4. Employment type during TB treatment

The graph below illustrates the employment type of patients during TB treatment. From the figure below, majority (48.0%) of the patients were farmers. The type of employment of the TB patient can influence the treatment outcome of the TB patient.

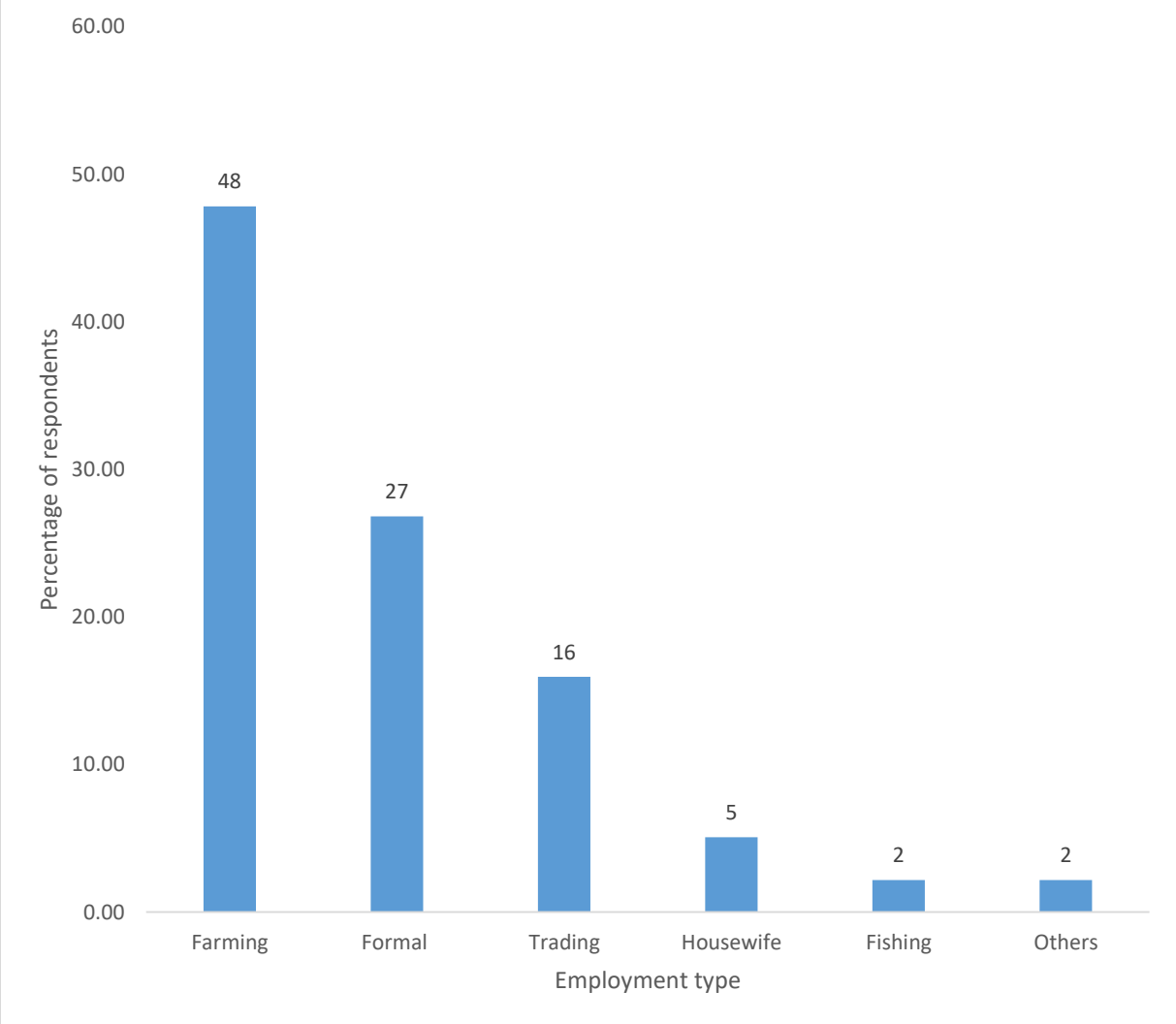

Figure 3: Employment type of TB patients as of the time of treatment

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4.5. Clinical profile of TB Patients with Cured and Completed treatment outcomes

Only 138 patients out of the 157 who met the criteria for inclusion into the study could be contacted for interview. Eleven had died and 8 patients had migrated out. Tables 3 and 4 below summarise the clinical profile of the 138 TB patients. Twenty seven (19.6%) of the TB patients smoked during treatment. The mean weight of the respondents before treatment was 53 kilograms with a standard deviation of ±6.3. There was an increase in weight after treatment, to a mean of 59.9kilograms (SD ±5.9). Majority, (72.5%), of the respondents were HIV negative. Most (55.8%) of them were also smear negative TB clients and newly diagnosed TB clients. In addition, eleven (8.0%) had comorbidities. However, (55.1%) come from families with the history of TB.

The patient folders further showed that majority (73.9%) of them reported being stigmatised during TB treatment. More than eighty percent (80.4%) lived less than 10 kilometres from their treatment centre. Most (94.2%) had access to the laboratory at their DOT centres. Many (70.8%) accepted the long duration for the treatment of TB was necessary. Many (92.8%) were comfortable to disclose their status to one or two people during TB treatment. Majority (45.7%) of the patients disclosed their status to their spouse with slightly fewer (31.9%) of them disclosing it to their friends. Over ninety-three percent (93.5%) of the patients also had support from their relatives during treatment. More than two thirds (75.4%) of the respondents disclosed their status to people after treatment.

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Table 3: Profile of TB Patients with Cured and Completed treatment outcomes

Variables	Frequency (n=138)	Percentage (%)
Smoking during treatment		
Yes	27	19.6
No	111	80.4
Weight before treatment(mean±SD)	52.99+6.33	
<=54kg	63	45.7
>54kg	75	54.4
Weight after treatment (mean±SD)	59.99+5.97	
<=54kg	18	13.3
>54kg	117	86.7
HIV Status		
Negative	100	72.5
Positive	8	5.8
Unknown	30	21.7
Disease classification		
Sputum smear negative	77	55.8
Sputum smear positive	61	44.2
Patient type		
New	133	96.4
Others	5	3.6
Had comorbidities		
Yes	11	8.1
No	127	92.0
Family had history of TB		
Yes	76	55.1
No	62	44.9
Stigmatized during treatment		
Yes	102	73.9
No	36	26.1
Distance to DOT		
<=10km	111	80.4
>10km	27	19.6
Access to laboratory		
Yes	130	94.2
No	8	5.8
Treatment duration		
Burdensome	40	29.2
Necessary	97	70.8
Disclosed TB status during treatment		
Yes	128	92.8
No	10	7.3

Abbreviations: n: cell frequency. %: row percentage

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Table 4: Profile of TB Patients with Cured and Completed treatment outcomes

Variables	Frequency (n=138)	Percentage (%)
Disclosure status during treatment		
Spouse	63	45.7
Children	14	10.2
Other relatives	17	12.3
Friends	44	31.9
Support from relatives during treatment		
Yes	129	93.5
No	9	6.5
Disclosure of status after treatment		
Yes	104	75.4
No	34	24.6
Current being stigmatized		
Yes	7	5.1
No	131	94.9
Had treatment supporter		
Yes	128	92.8
No	10	7.1
Kind of treatment support		
Counselling	14	10.1
Medication	114	82.6
None	10	7.3
Relationship with supporter		
Partner	58	42.0
Other relatives	60	43.5
Friends	10	7.6
None	10	7.3

Abbreviations: n: cell frequency. %: row percentage

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4.6. Cured and Completed treatment outcome for TB patients

Out of the 138 respondents whose records were reviewed, the cured and completed treatment rate for this study was 62 (45.0%) and 76 (55.0%) respectively, which is far below the WHO set standards of 85% (Figure 6)

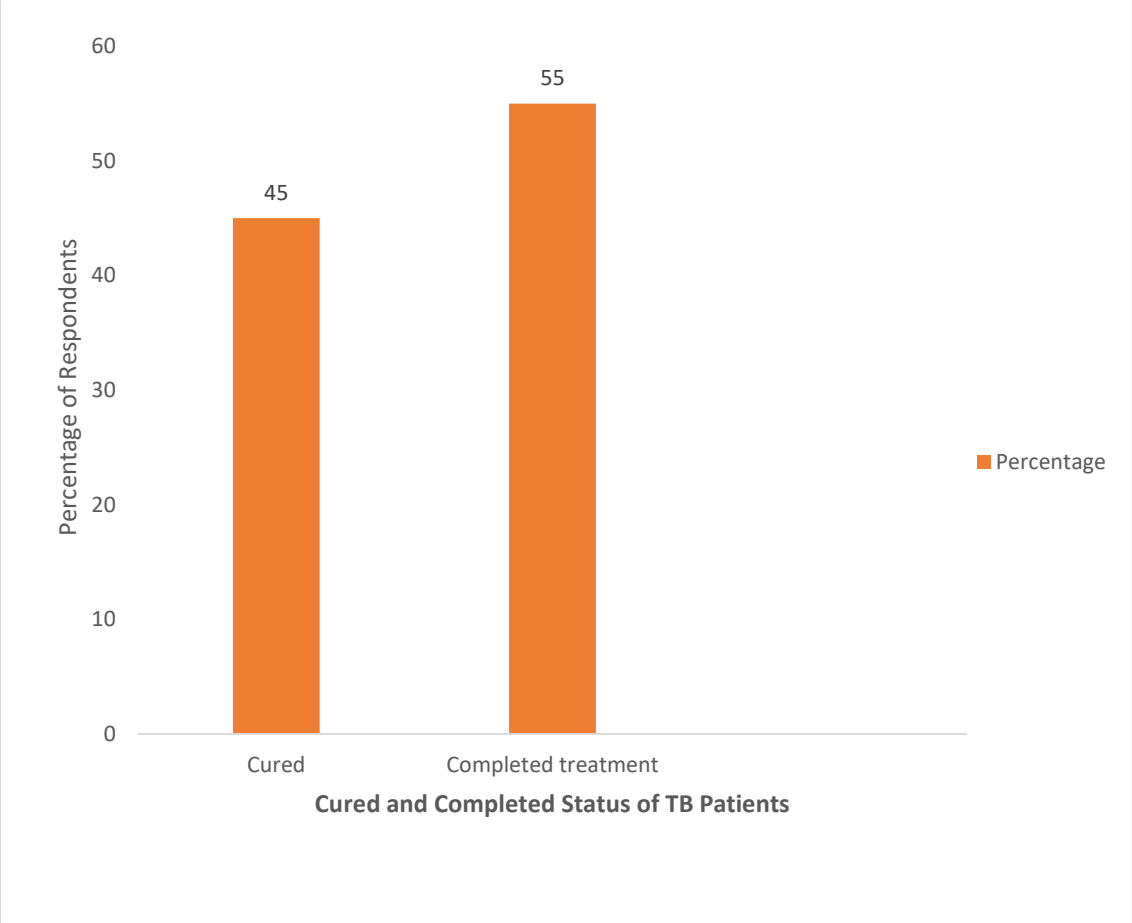

Figure 4: Cured and completed status of TB patients

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4.7. Bivariate analysis of socio-demographic factors associated with being cured of TB

Bivariate analysis investigating the association between socio-demographic factors and other TB cured status indicated that age ($p<0.001$), employment status during treatment ($p=0.007$), employment status after treatment ($p=0.036$), educational level ($p=0.027$), HIV status ($p=0.010$), disease classification ($p<0.001$), weight before treatment ($p=0.001$) and weight after treatment ($p=0.025$) were significantly associated with the cured status of TB patient. However, sex ($p=0.986$) and marital status ($p=0.780$) were found not to be significantly associated with the cured status of TB patients (Table 5).

The model (Table 4), further showed that many patients who were older than 45 years, (78.1%) were not cured. Most of these were males. Close to sixty percent of the males (58.6%) was not cured. For those who were married (59.4%) of them were also cured of their TB. In addition, the majority (64.6%) who were employed, were also cured of their TB status

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Table 5: Bivariate analysis of factors associated with TB cured status

Variables	Frequency (n=138)	Cured status		P-value
		Cured n (%)	Not cured n(%)	
Age				
< 45yrs	74(53.6)	43(58.1)	31(41.9)	
≥45yrs	64(46.4)	14(21.9)	50(78.1)	**<0.001**
Sex				
Female	34(24.6)	14(41.2)	20(58.8)	
Male	104(75.4)	43(41.4)	61(58.6)	0.986
Marital status				
Unmarried	37(26.8)	16(43.2)	21(56.8)	
Married	101(73.2)	60(59.4)	41(40.59)	0.780
Employment status during treatment				
Unemployed	28(20.3)	18(64.3)	10(35.7)	
Employed	110(79.7)	71(64.6)	39(35.4)	**0.007**
Employment status after treatment				
Informal	109(79.0)	40(36.7)	69(63.3)	
Formal	29(21.0)	17(58.6)	12(41.4)	**0.036**
Level of education				
No formal education	76(55.1)	25(32.9)	51(67.1)	
Formal education	62(44.9)	30(48.4)	32(51.6)	**0.027**
HIV status				
Negative	100(72.5)	49(49.0)	51(51.0)	
Positive	8(5.8)	2(25.0)	6(75.0)	**0.006**
Unknown	30(21.7)	6(20.0)	24(80.0)	**0.010**
Disease classification				
Smear -ve TB	77(55.8)	5(6.5)	72(93.5)	
Smear +TB	61(44.2)	52(55.3)	9(85.0)	**<0.001**
Weight before treatment				
≤54kg	63(45.6)	36(57.1)	27(42.9)	
≥54kg	75(54.4)	21(28.0)	54(72.0)	**<0.001**
Weight after treatment				
≤54kg	18(13.3)	12(66.7)	6(33.3)	
≥54kg	117(86.7)	44(37.6)	73(62.4)	**0.025**

Abbreviations: n: cell frequency. %: row percentage. : *p*-value<0.05. : *p*-value<0.01. : *p*-value<0.001

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4.8. Bivariate analysis of factors associated with completed TB treatment

Bivariate analysis investigating the association between socio-demographic factors and other TB completed treatment status. The results indicated that age (p<0.001), employment status during treatment (p=0.019), treatment supporter (p=0.032), disease classification (p<0.001), weight before treatment (p=0.005) and weight after treatment (p=0.041) were significantly associated with the cured status of TB patient. However, sex (p=0.991), marital status (p=0.803), and educational level (p=0.055) of TB patient, were found not to be significantly associated with the completed treatment status of TB patients.

In the bivariate logistics analysis model (Table 6), similarly as with those completing treatment, as much as (73.4%) of the TB patients completing treatment who were older than 45 years, had completed their treatment as compared to the other age category.

Furthermore, more than half (55.9%) of the TB patients who had completed their treatment were females. In addition, majority (56.4%) of the TB patients who were married had completed their TB treatment as compared to those who were not married. Furthermore, With regards to employment during treatment, majority (60.9%) of the TB patients who were employed, completed their treatment as compared to a higher proportion of those who were unemployed not completing their treatment (Table 6).

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Table 6: Bivariate analysis of factors associated with TB completed treatment status

Variables	Frequency(n=138)	Completed treatment status: Complete n(%)	Completed treatment status: Incomplete n(%)	P-value
Age				
< 45yrs	74(53.6)	30(40.5)	44(59.5)	
≥45yrs	64(46.4)	47(73.4)	17(26.6)	**<0.001**
Sex				
Female	34(24.6)	19(55.9)	15(44.1)	
Male	104(75.4)	58(55.8)	46(44.2)	0.991
Marital status				
Unmarried	37(26.8)	20(54.1)	17(45.9)	
Married	101(73.2)	57(56.4)	44(43.6)	0.803
Employment status during treatment				
Unemployed	28(20.3)	10(35.7)	18(64.1)	
Employed	110(79.7)	67(60.9)	43(39.1)	**0.019**
Level of education				
No formal education	76(55.1)	48(63.2)	28(36.8)	
Formal education	62(44.9)	29(46.8)	33(53.2)	0.055
Treatment supporter				
No supporter	10(7.3)	2(20.0)	8(80.0)	
Had supporter	128(92.7)	75(58.6)	53(41.4)	**0.032**
Disease classification				
Smear -ve TB	77(55.8)	70(90.9)	7(9.1)	
Smear +TB	61(44.2)	7(11.5)	54(88.5)	**<0.001**
Weight before treatment				
≤54kg	63(45.6)	27(42.9)	36(57.1)	
≥54kg	75(54.4)	50(66.7)	25(33.3)	**0.005**
Weight after treatment				
≤54kg	18(13.3)	6(33.3)	12(66.7)	
≥54kg	117(86.7)	70(59.8)	47(40.2)	**0.041**

Abbreviations: n: cell frequency. %: row percentage. : *p*-value<0.05. *:* *p*-value<0.01. : *p*-value<0.001

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4.9. Effect of Patient-related factors and TB Cured treatment outcome

After adjusting for the patient related characteristics only age was a significant predictor of the Cured status of TB patient after treatment. TB patients who were ≥45 years had their Cure status of TB treatment to be decreased by 69% as compared to TB patients who were < 45 years of age. (AOR: 0.31, 95% CI: 0.12-0.80, *p*=0.015) (Table 7).

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Table 7: Logistics Regression of the Factors associated with cured treatment outcome

Variables	Cured status		COR (95%CI)	p-value	AOR (95%CI)	p value
	Cured n(%)	Not cured n(%)				
Age						
< 45yrs	43(58.1)	31(41.9)	Ref		Ref	
≥45yrs	14(21.9)	50(78.1)	0.02(0.95-0.43)	**<0.001**	0.31(0.12-0.80)	**0.015**
Employment status during treatment						
Unemployed	18(64.3)	10(35.7)	Ref		Ref	
Employed	71(64.6)	39(35.5)	0.31(0.13-0.73)	**0.007**	0.62(0.20-1.94)	0.412
Employment status after treatment						
Informal	40(36.7)	69(63.3)	Ref		Ref	
Formal	17(58.6)	12(41.4)	2.44(1.06-5.63)	**0.036**	1.30(0.40-4.22)	0.662
Education level						
No formal	25(32.9)	51(67.1)	Ref		Ref	
Formal	30(48.4)	32(51.6)	2.18(1.06-5.63)	**0.027**	0.98(0.33-2.42)	0.820
HIV status						
Negative	49(49.0)	51(51.0)	Ref		Ref	
Positive	2(25.0)	6(75.0)	0.62(0.45-0.87)	**0.006**	0.71(0.40-1.26)	0.246
Unknown	6(20.0)	24(80.0)	0.39(0.19-0.80)	**0.010**	0.62(0.22-1.76)	0.373
Weight before treatment						
≤54kg	36(57.1)	27(42.9)	Ref		Ref	
≥54kg	21(28.0)	54(72.0)	0.21(0.14-0.59	**0.001**	0.45(0.18-1.18)	0.106
Weight after treatment						
≤54kg	12(66.7)	6(33.3)	Ref		Ref	
≥54kg	44(37.6)	73(62.4)	0.30(0.11-0.86)	**0.025**	1.20(0.30-4.76)	0.792

Abbreviations: COR: unadjusted odds ratio. AOR: Adjusted odds ratio. Reference category. ref *: p*-value<0.05. *:* *p*-value<0.01. *: p*-value<0.001

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4.9. Effect of Patient-related factors and TB Completed treatment outcome

After adjusting for the patient related characteristics, age, employment during treatment and disease classification were significantly associated with the TB "Completed" treatment outcome. TB patients who are ≥45 years, were 4.73 times less likely to have completed their TB treatment compared to those who were below 45 years of age (AOR: 4.73, 95% CI: 1.12-19.85, p= 0.034). In addition, TB patients who were employed during treatment were 6.9 times more likely to have completed their TB treatment compared to those who were unemployed (AOR: 4.73, 95% CI: 1.20-40.34, p= 0.030). The odds of completing treatment is 0.01 times among those patients who were smear positive TB compared to those who are smear negative (AOR: 0.01, 95% CI: 0.00-0.03, p<0.001) (Table 8).

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Table 8: Logistics Regression of Factors associated with TB completed treatment

Variables	Completion status: complete n(%)	Completion status: Incomplete n(%)	COR (95%CI)	p-value	AOR (95%CI)	p-value
Age						
< 45yrs	30(40.5)	44(59.5)	Ref		Ref	
≥45yrs	47(73.4)	17(26.6)	0.02(0.95-0.43)	**0.001**	4.73(1.12-19.85)	**0.034**
Employment status during treatment						
Unemployed	10(35.7)	18(64.1)	Ref		Ref	
Employed	67(60.9)	43(39.1)	2.80(1.18-6.64)	**0.019**	6.97(1.20-40.34)	**0.030**
Treatment supporter						
No supporter	2(20.0)	8(80.0)	Ref		Ref	
Had supporter	75(58.6)	53(41.4)	5.66(1.16-27.72)	**0.032**	0.95(0.08-11.02)	0.968
Disease classification						
Smear -ve TB	70(90.9)	7(9.1)	Ref		Ref	
Smear +TB	7(11.5)	54(88.5)	0.01(0.00-0.39)	**0.001**	0.01(0.00-0.03)	**<0.001**
Weight before treatment						
≤54kg	27(42.9)	36(57.1)	Ref		Ref	
≥54kg	50(66.7)	25(33.3)	2.66(1.33-5.33)	**0.005**	0.68(0.15-3.09)	0.621
Weight after treatment						
≤54kg	6(33.3)	12(66.7)	Ref		Ref	
≥54kg	70(59.8)	47(40.2)	2.97(1.05-8.49)	**0.041**	1.09(0.15-7.96)	0.930

Abbreviations: COR: unadjusted odds ratio. AOR: Adjusted odds ratio. Reference category. ref *: p*-value<0.05. *:* *p*-value<0.01. : *p*-value<0.001

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CHAPTER FIVE

DISCUSSION

5.1 Introduction

This chapter discusses the results of the study in relation to the specific objectives. The overall objective of this study was to assess the factors influencing TB treatment outcome in the Sawla-Tuna-Kalba District.

5.1. Socio-demographics and background characteristics factors

Several demographic factors have been identified in literature as factors that affect the treatment of TB. These includes; sex, age, community, marital status, unemployment status. In this present study, the age of TB patients, employment during treatment, were the demographic factors significantly associated with the cured and completed treatment of TB patients.

Majority (78.1%) of the TB patient with age greater than 45 years had not been cured. This finding is consistent with findings reported by Tessema et al. (2013) in which TB patients aged more than 40 years old were more likely to have unsuccessful treatment outcomes which might be due to non-compliance to drugs and the presence of comorbidities in the elderly as well as weak immunity level of the aged.

This study finds employment during TB treatment to be significantly associated with the cured and completed treatment status of TB patients. Majority of the TB patients (79.7%) were employed during treatment hence leading to a good treatment outcome. Those who are unemployed were more likely to develop unsuccessful treatment and those employed

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successful treatment outcome. This is consistent with similar findings from a study conducted by Berhe, Enquselassie, &Aseffa, in Tigray Region, Northern Ethiopia and among smear-positive pulmonary tuberculosis patients (2012) which showed a significant association between unemployment and unsuccessful treatment outcome. They found out that unemployed patients were about 3 times more likely to experience unsuccessful TB treatment.

Three quarters (75.4%) of the patients in this study were males and this is consistent with a similar study conducted by Mohammed in India among pulmonary Tuberculosis patients in Madurai (Mohammed et al. 2015) where majority (74.4%) of the TB patients were males**.** Having more males with TB could be due to underutilization of the DOTS service by females or could be due to higher proportion of males being exposed to the infection in the area. In addition, this could probably be due to the fact that men predisposes themselves to certain activities such as smoking and mining, hence making them more vulnerable than the females. According to Mohammed et al. a greater proportion of the males having TB could be due to their gender specific roles that would require them to have many social contacts. This could greatly exposed them to have an increased risk of getting TB.

A study conducted in Bangladesh on access to TB diagnosis and treatment also documented that women had poorer access to public outpatient clinics than men (Begum et al. 2001). This present study also shows better treatment outcomes for males compared to females. This finding agrees with a study conducted by Gajbhare et al. (2014) which showed better treatment success rate in males. The work of Zenebe and Tetera (2016) in

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North East Ethiopia showed a contrary finding. In their study, female TB patients were more likely to have successful treatment outcome compared to male patients.

5.2. TB treatment outcome for patients treated for TB in Sawla-Tuna-Kalba District.

The present study showed a treatment success rate of (82.0%) for TB patients across the three year period. This rate of successful treatment outcome is similar to a study conducted by (Gebrezgabiher et al. 2016) in southern Ethiopia where, the overall mean treatment success rate was 85.2% across the three years.

Of the sample of 138 respondents who had only cure or completed treatment outcomes, slightly under fifty percent (44.9%) were cured. This shows there is still room for improvement. Studies conducted by Mkopi et al. (2013), among health workers' performance in the application of Patient Centred Tuberculosis Treatment (PCT) in Tanzania showed that having adequate equipment and logistics about the spread of TB during treatment may prevent needless social isolation, while understanding the duration of treatment gives the patient a better outlook about his/her abilities.

The increasing trend of TB treatment success from 2014 to 2016 could be attributed to the fact that TB drugs were always frequently supplied whenever needed during treatment. These is similar to a study conducted in Addis Ababa (Getahun et al. 2013) where the progress may be attributed to the improvement in the diagnosis of the diseases and due to the practice of using triple and double FDC drugs which might have provided advantages to supporting adherence and program delivery (Getahun, Ameni, Medhin, & Biadgilign, 2013).

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5.3 Patient-related factors that influence TB treatment outcomes.

In this present study, 8 patients were HIV positive out of which 6 (75.0%) were not cured from TB. HIV status was however not significantly associated with the cured status after TB treatment.

TB patients with unknown HIV status had a reduce odds of 38% to have a successful TB treatment process compared to TB patient with negative HIV status. This findings is in contrast with a retrospective study conducted by Zenebe and Tetera, 2016 on tuberculosis treatment outcome and associated factors among smear-positive pulmonary tuberculosis patients in Afar, Eastern Ethiopia. Among different health facilities, age, HIV status and year of treatment were significantly associated with treatment success. In this present study, TB patients who had treatment supporters were seen not to be significantly associated with the cured or completed treatment status of TB treatment.

These could be attributed to the fact that most of the treatment supporters did not play their roles in reminding the TB patient to take his or her medication, collecting the medication for the patient whenever it finishes and counselling the TB patient.

The findings in this study reveal that weight before and after TB treatment is not a significant factor which influences successful TB treatment outcomes. These may be due to the fact that most of the patient are seen when they are completely deteriorated hence making it difficult for them to achieve a successful TB treatment outcome after TB treatment.

In this study, TB clients who were sputum smear positive had a 99% reduced odds of having completed their treatment compared to those who were sputum smear negative. This could probably be due to the fact that persons diagnosed of TB had multiple

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infections, sought treatment late due to late case detection, and lacked proper diagnostic equipment's to diagnose TB microscopically. This **is** consistent with a study conducted in China by '(Li et al., 2013)', which states that TB patient delays in seeking and receiving TB diagnosis and treatment finally ends up spreading the disease and hence leading to multiple infections.

5.4 Limitation of study

The cross–sectional nature of this study could have effect the study outcome. For instance since all respondents finished treatment by the first quarter of 2017, and the study was conducted in June 2018, there is the possibility of recall bias. Information bias is also likely.

5.5. Strength of Study

One major strength of this study is the involvement of individuals who completed TB treatment regime (as prescribed by certified Physician or Institutional TB Coordinator) as study participants. As such, all reported treatment outcomes of this study can be regarded to be due to treatment failure other than non-completion of TB treatment.

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CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.1. Conclusion

From the 413 TB records identified for the period of 2014 to 2016 in the Sawla Tuna-Kalba District, it was observed that (51.0%) had completed treatment and (31.0%) been cured. These culminates in to a treatment success rate of (82.0%) which is below the WHO standard of 85%.

Out of the 138 respondents who had successful treatment outcomes, only 57 (41.3%) of them were cured. Patients who are older than 45 years, were almost 5 times more likely not have had a cure, but to just have completed their TB treatment compared to those who were below 45 years of age.

Factors such as age of TB patient, employment during treatment and disease classification are the significant predictors of TB treatment outcomes. Many TB patients who were cured or completed treatment had treatment supporters.

This study did not show any significant associations between the other factors analysed, even though studies conducted elsewhere suggests associations between some of these factors. Some of these factors includes cultural and traditional. The most likely explanation for this could be due to the small sample size.

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6.2. Recommendations

Based on the findings of the study, the following recommendations are made:

1. The NTCP and the District Health directorate should educate and support TB patients who are within the older age groups, greater than 45 years in order to improve the rate of successful treatment outcomes.
2. The District Health directorate must ensure the scale up of TB case detection efforts. This will ensure all smear positive cases are detected early through a strengthened contact tracing approach, case searches and TB screening campaigns in high risk areas.
3. Further studies on TB treatment outcomes must place a focus on all the treatment outcomes such as default, treatment failure and transfer out.

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REFERENCE

Abioye, I., Omotayo, M., & Alakija, W. (2011). Socio-demographic determinants of stigma among patients with pulmonary tuberculosis in Lagos, Nigeria. *African Health Sciences*, *11*(3), 100–104. https://doi.org/10.4314/ahs.v11i3.70078

Africa, S. (2011). *Available Treatment / Prevention : Patient Inequalities : Key Inputs Needed : Conclusion :*

Amo-adjei, J. (2013). Views of health service providers on obstacles to tuberculosis control in Ghana, 1–9.

Amoah, S. K. S., Sandjo, L. P., Bazzo, M. L., Leite, S. N., & Biavatti, M. W. (2014). Herbalists, traditional healers and pharmacists: A view of the tuberculosis in Ghana. *Brazilian Journal of Pharmacognosy*, *24*(1), 89–95. https://doi.org/10.1590/0102-695X2014241405

Annan, A., Singh, A., Dogbe, J., Asante, D., & Owusu-Dabo, E. (2013). Health-seeking behaviour of tuberculosis patients and related factors in the central region of Ghana. *Journal of Science and Technology (Ghana)*, *33*(3), 27. https://doi.org/10.4314/just.v33i3.4

Berhe, G., Enquselassie, F., & Aseffa, A. (2012). Treatment outcome of smear-positive pulmonary tuberculosis patients in Tigray Region, Northern Ethiopia. *BMC Public Health*, *12*(1). https://doi.org/10.1186/1471-2458-12-537

Biruk, M., Yimam, B., Abrha, H., Biruk, S., & Amdie, F. Z. (2016). Treatment Outcomes of Tuberculosis and Associated Factors in an Ethiopian University Hospital, *2016*.

CDC. (2013). Reported tuberculosis in the united states.

Courtwright, A., & Turner, A. N. (2010). Tuberculosis and Stigmatization: Pathways and Interventions. *Public Health Reports*, *125*(4_suppl), 34–42. https://doi.org/10.1177/00333549101250S407

Dodor, E. A. (2012). The feelings and experiences of patients with tuberculosis in the Sekondi-Takoradi Metropolitan district: implications for TB control efforts. *Ghana Medical Journal*, *46*(4), 211–8. Retrieved from http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=3645176&tool=pmcentrez&rendertype=abstract

Dodor, E. A., & Kelly, S. J. (2010). Manifestations of tuberculosis stigma within the healthcare system: The case of Sekondi-Takoradi Metropolitan district in Ghana. *Health Policy*, *98*(2–3), 195–202. https://doi.org/10.1016/j.healthpol.2010.06.017

Duru, C. B., Uwakwe, K. A., Nnebue, C. C., Diwe, K. C., Merenu, I. A., Emerole, C. O., … Duru, C. A. (2016). Tuberculosis Treatment Outcomes and Determinants among Patients Treated in Hospitals in Imo State, Nigeria. *OALib*, *3*(6), 1–17. https://doi.org/10.4236/oalib.1102754

University of Ghana http://ugspace.ug.edu.gh

GNTCP. (2017). TB News Bulleting. *STOP TB Ghana News Leeter*, p 1-7

STKDHMT, 2017 Annual Report

Ghana Statistical Service (GSS), Ghana Health Service (GHS), & ICF Macro. (2014). *Ghana Demographic and Health Survey 2014*. Rockville, Maryland, US.

Gajbhare, D. M., Bedre, R. C., & Solanki, H. M. (2014). A study of socio-demographic profile and treatment outcome of tuberculosis patients in an urban slum of Mumbai , Maharashtra. *Indian Journal of Basic and Applied Medical Research*, *4*(1), 50–57.

Gebremariam, M. K., Bjune, G. A., & Frich, J. C. (2010). Barriers and facilitators of adherence to TB treatment in patients on concomitant TB and HIV treatment: a qualitative study. *BMC Public Health*, *10*(1), 651. https://doi.org/10.1186/1471-2458-10-651

Gebrezgabiher, G., Romha, G., Ejeta, E., Asebe, G., Zemene, E., & Ameni, G. (2016). Treatment outcome of tuberculosis patients under directly observed treatment short course and factors affecting outcome in southern Ethiopia: A five-year retrospective study. *PLoS ONE*, *11*(2), 1–10. https://doi.org/10.1371/journal.pone.0150560

Getahun, B., Ameni, G., Medhin, G., & Biadgilign, S. (2013). Treatment outcome of tuberculosis patients under directly observed treatment in Addis Ababa, Ethiopia. *Brazilian Journal of Infectious Diseases*, *17*(5), 521–528. https://doi.org/10.1016/j.bjid.2012.12.010

Gupta, S., Gupta, S., & Behera, D. (2011). Reasons for interruption of anti-tubercular treatment as reported by patients with tuberculosis admitted in a tertiarycare institute. *Indian Journal of Tuberculosis*, *58*(1), 11–17.

Hossain, S., Quaiyum, M. A., Zaman, K., Banu, S., Husain, M. A., Islam, M. A., … van Leth, F. (2012). Socio Economic Position in TB Prevalence and Access to Services: Results from a Population Prevalence Survey and a Facility-Based Survey in Bangladesh. *PLoS ONE*, *7*(9). https://doi.org/10.1371/journal.pone.0044980

Jaggarajamma, K. C., Gopi, P. G., Subramani, R., Thomas, A., & Narayanan, P. R. (2012). Default during the intensive phase of treatment under DOTS programme. *Indian Journal of Tuberculosis*, *52*(44), 197–202.

Li, Y., Ehiri, J., Tang, S., Li, D., Bian, Y., Lin, H., … Cao, J. (2013). Factors associated with patient, and diagnostic delays in Chinese TB patients: a systematic review and meta-analysis Medicine for Global Health. *BMC Medicine*, *11*(30), 1. https://doi.org/10.1186/1741-7015-11-156

Liu, Y., Birch, S., Newbold, K. B., & Essue, B. M. (2018). Barriers to treatment adherence for individuals with latent tuberculosis infection: A systematic search and narrative synthesis of the literature. *The International Journal of Health Planning and Management*, (January), 416–433. https://doi.org/10.1002/hpm.2495

Lutge, E., Lewin, S., Volmink, J., Friedman, I., & Lombard, C. (2013). Economic support

University of Ghana http://ugspace.ug.edu.gh

to improve tuberculosis treatment outcomes in South Africa: A pragmatic cluster-randomized controlled trial. *Trials*, *14*(1), 1. https://doi.org/10.1186/1745-6215-14-154

Mirghani, O., & Magzoub, M. E. M. A. (1996). Perinatal mortality in Wad Medani Hospital. *Saudi Medical Journal*, *17*(5), 633–639.

Mkopi, A., Range, N., Amuri, M., Geubbels, E., Lwilla, F., Egwaga, S., … Van Leth, F. (2013). Health workers' performance in the implementation of Patient Centred Tuberculosis Treatment (PCT) strategy under programmatic conditions in Tanzania: A cross sectional study. *BMC Health Services Research*, *13*(1), 1–7. https://doi.org/10.1186/1472-6963-13-101

Mohamed, S., Kanagasabapathy, S., & Kalifulla, S. (2015). Socio-economic profile and risk factors among pulmonary tuberculosis patients in Madurai , India : a cross sectional study, *3*(12), 3490–3498.

Mortaz, E., Masjedi, M. R., Abedini, A., Matroodi, S., Kiani, A., Soroush, D., & Adcock, I. M. (2016). Common features of tuberculosis and sarcoidosis. In *International Journal of Mycobacteriology* (Vol. 5, pp. S240–S241). https://doi.org/10.1016/j.ijmyco.2016.09.031

Northern Regional Health Directorate Annual Report, 2016

Okanurak, K., Kitayaporn, D., & Akarasewi, P. (2008). Factors contributing to treatment success among tuberculosis patients: A prospective cohort study in Bangkok. *International Journal of Tuberculosis and Lung Disease*, *12*(10), 1160–1165.

Osman, D. A., Phelippeau, M., Drancourt, M., & Musso, D. (2017). Diversity of Mycobacterium tuberculosis lineages in French Polynesia. *Journal of Microbiology, Immunology and Infection*, *50*(2), 199–206. https://doi.org/10.1016/j.jmii.2015.05.018

Owusu-Dabo, E., Adjei, O., Meyer, C. G., Horstmann, R. D., Enimil, A., Kruppa, T. F., … Ruesch-Gerdes, S. (2006). Mycobacterium tuberculosis drug resistance, Ghana. *Emerging Infectious Diseases*. https://doi.org/10.3201/eid1207.051028

Seeman, M., & Goffman, E. (1963). Stigma: Notes on the Management of Spoiled Identity. *American Sociological Review*, *29*(5), 770. https://doi.org/10.2307/2091442

Shah, N. S., Lin, Y. G. G., Barry, P. M., Cheng, Y. N., Schecter, Gisela, & Desmond, E. (2016). Clinical impact on tuberculosis treatment outcomes of discordance between molecular and growth-based assays for Rifampin Resistance, California 2003-2013. *Open Forum Infectious Diseases*, *3*(3). https://doi.org/10.1093/ofid/ofw150

Sinshaw, Y., Alemu, S., Fekadu, A., & Gizachew, M. (2017). Successful TB treatment outcome and its associated factors among TB/HIV co-infected patients attending Gondar University Referral Hospital, Northwest Ethiopia: An institution based cross-sectional study. *BMC Infectious Diseases*, *17*(1), 1–9. https://doi.org/10.1186/s12879-

University of Ghana http://ugspace.ug.edu.gh

017-2238-7

Tessema, B., Muche, A., Bekele, A., Reissig, D., Emmrich, F., & Sack, U. (2013). Treatment outcome of tuberculosis patients at Gondar University Teaching Hospital, Northwest Ethiopia. A five - Year retrospective study. *BMC Public Health*, *9*, 1–8. https://doi.org/10.1186/1471-2458-9-371

WHO. (2011). World Health Organization TB Facts 2011, *8*(1), 1–8.

WHO. (2017). *Global Tuberculosis Report 2017*. *Who*. https://doi.org/WHO/HTM/TB/2017.23

Wilson, J. W., Ramos, J. G., Castillo, F., Castellanos, E. F., & Escalante, P. (2016). Tuberculosis patient and family education through videography in El Salvador. *Journal of Clinical Tuberculosis and Other Mycobacterial Diseases*, *4*, 14–20. https://doi.org/10.1016/j.jctube.2016.05.001

World Health Organization. (2012). Global Tuberculosis Report. *Global Tuberculosis Report 2012*, 1–98. https://doi.org/978 92 4 156450 2

WHO's 2013 global report on tuberculosis: Successes, threats, and opportunities. *The Lancet*, *382*(9907), 1765–1767. https://doi.org/10.1016/S0140-6736(13)62078-4

World Health Organization. (2014). Global Tuberculosis Report 2014 Publication Date : 2014 Format : Report Language : English Abstract : Publisher : Topic : *WHO Int*, 211.

Zarb, P., Coignard, B., Griskeviciene, J., Muller, A., Vankerckhoven, V., Weist, K., … Suetens, C. (2010). The european centre for disease prevention and control (ECDC) pilot point prevalence survey of healthcare-associated infections and antimicrobial use. *Eurosurveillance*, *17*(46), 1–16. https://doi.org/10.2900/86011

Zenebe, T. & Tetera, J. (2016). Treatment outcomes of tuberculosis patients in Debremarkos referral hospital, North West Ethiopia (June 2008-august 2013): a five year retrospective study. IJPSR. 5(4): 1500-1505.

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APPENDICES

Appendix A: Participant Information and Consent Form

Consent Form for Participation in the study

Title: Factors influencing Tuberculosis treatment outcomes in Sawla-Tuna-Kalba District, Northern Region-Ghana.

Principal Investigator: Mahama Mutala

Address: School of Public Heath, University of Ghana, Legon

General Information about Research

Greetings, I am a student from the School of Public Health, University of Ghana(**Principal Investigator**)/ my name is ……..and I am conducting this interview on behalf of Mahama Mutala an MPH student of School of Public Health, University of Ghana(**Research Assistant**). I am conducting a study on **factors influencing tuberculosis treatment outcomes in Sawla-Tuna-Kalba District.** Records available to the district indicate that there has been low Tuberculosis treatment completion over the couple of years and this is a public health concern to the district and Ghana as a whole. This study therefore seeks to determine those factors from the community point of view, facility point of view and patient perspective. I would like you to be part of the study. If you agree to participate in this study, I would ask you a few questions centred on factors contributing to low tuberculosis case detection. The interview will take about 30 minutes of your time. You have the right to refuse to participate. You are also at liberty to withdraw from this

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study at any stage of your participation. However, I would be happy to see you participate to the end.

Procedures

The study will involve answering questions and record review on health provider factors, community related factors, socio demographic characteristic and patient related factors. This is an academic research which forms part of my work for the award of a Master Degree in Public Health.

Risks and Benefits

The results of the study will be used by policy makers and healthcare providers as well as other stakeholders in designing case detection interventions. It will also help in further research. There are no known related risks in participating in this study.

Right to refuse participation

Participation in this study is voluntary and you can choose not to answer any individual question or all the questions. You are at liberty to withdraw from the study at any time. However, your views and contributions in the study would be very much appreciated.

Anonymity and Confidentiality

I would like to assure you that whatever information you will provide will be handled with strict confidentiality and will be used purely for research purposes. Your responses will not be shared with anybody who is not part of the study team. You will not be identified by name in any dissemination of reports or publications resulting from this study. Data analysis will be done at the aggregate level to ensure anonymity. The Ghana

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Health Service Ethics Review Committee has reviewed and given ethical approval for this study to be conducted.

Before taking consent

Do you have any questions you wish to ask about the study? Yes [ ] No [ ]

(If yes, note the questions below)

……

……..……..

However, If you have any further questions regarding this study, which I could not satisfy you with the appropriate answer, you may contact Mahama Mutala on telephone number: 0246147824 or e-mail address: m.mutasco@yahoo.com, Dr. Nortey (Supervisor) lecturer-School of Public Health, University of Ghana on Tel. 0208181120 or e-mail: panortey@gmail.com and Hannah Frimpong, Ghana Health Service Ethics review Committee on Tel. 0507041223 or email: ghserc@gmail.com.

Participant Consent

I have been adequately informed about the purpose, procedure, potential risks and benefits of this study. I have had the opportunity to ask questions and have been provided answers to my satisfaction. I know that I can refuse to participate in this study without any loss of benefit for which I would be entitled. I understand that even if I agree or as I have agreed, I can withdraw my consent at any time without losing any benefits or services to which I am entitled. I also understand that the information collected will be treated confidentially and will be used only for the purpose informed. Finally findings/results may

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assist in developing effective case detection interventions and policy to increase case detection in the Sawla-Tuna-Kalba District. I freely agree to participate in this study.

ID of participant……..

Signature or Right Thumb Print of Participant ……

Date…….

If participant cannot read the form themselves, a witness must sign here:

WITNESS

I was present while the benefits, risks and procedures were read to and /or interpreted to the understanding of the volunteer. All questions will be answered and the volunteer will agree to take part in the research.

Date……

Signature or right thumb print ……

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Appendix B: Data Abstraction Form for Records Review

TREATMENT OUTCOME AND ASSOCIATED FACTORS IN SAWLA-TUNA-KALBA DISTRICT HOSPITAL

PLEASE: TICK IN IN THE BRACKET AS APPROPRIATE

Date of Review……..

Treatment Card Identification Number…….

SOCIO-DEMOGRAPHIC ASSOCIATED WITH TREATMENT OUTCOME

1) Gender- Male [ ] Female [ ]
2) Age……
3) Community of residence- Rural [ ] Urban [ ]

PREDICTOR VARIABLES ASSOCIATED WITH TREATMENT OUTCOME

4. HIV Status - Unknown [ ] Positive [ ] Negative [ ]

5. Disease Classification- Extra-Pulmonary TB [ ] Smear Positive Pulmonary TB [ ] Smear Negative Pulmonary TB [ ]

6. Other Co-morbidities (e.g. Hypertension) - Yes [ ] No [ ]

7. Type of TB patient - New [ ] Relapse [ ] Transfer in [ ] Default [ ] others [ ]

8. Weight before treatment - ……

9. Weight after treatment - ……

TREATMENT OUTCOME (Tick Only One)

10. Treatment Outcome - Completed Treatment [ ] Cured [ ] Died [ ] Default [ ] Treatment Failure [ ] Transfer out [ ]

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Appendix C: Study Questionnaire

FACTORS INFLUENCING TUBERCULOSIS TREATMENT OUTCOME IN SAWLA-TUNA-KALBA DISTRCT

SECTION 1: TO BE COMPLETED BY INTERVIEWER [for office use]

SECTION 1: TO BE COMPLETED BY INTERVIEWER [for office use]		
	Questionnaire Number	☐☐☐
	Date of interview	……../……/……..
	Name of Interviewer	

SECTION A: **SOCIO-DEMOGRAPHIC INFORMATION ON RESPONDENT**

NO.	QUESTIONS	CODING CATEGORY	
Q1	Sex-	i. Male ii. Female	
Q2	Age in completed years	☐☐	
Q3	Sub-district/Community of residence-		
Q4	Current marital Status	i. Married ii. Single iii. Divorce iv. Widowed	1 2 3 4
Q5	Employment status as of that time of TB treatment	i. Employed ii. Unemployed	1 2
Q6	Type of employment as of the time of TB treatment	i. Trading ii. Farming iii. Formal/Public Servant iv. Fishing v. Others…….	1 2 3 4 5
Q7	Current Employment	i. Formal ii. Non-formal iii. Others……. .	1 2 3
Q8	Level of education	i. None ii. Primary/JHS iii. Secondary/SHS iv. Tertiary	1 2 3 4

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SECTION B: PATIENT- RELATED FACTORS (DURING TREATMENT)

Q9	Were you smoking during treatment? ***(if No please skip to question 13)***	i. Yes ii. No iii. Don't Know	1 2 3
Q10	For how long did you smoke during your treatment?	i. Less than one month ii. 1-3 months iii. More than 3months	1 2 3
Q11	Has anybody in your family had tuberculosis before?	i. Yes ii. No	1 2
Q12	Did you experience stigma in the course of your treatment?	i. Yes ii. No	1 2
Q13	By whom did you feel most stigmatized? ***(Please tick only one response)***	i. Spouse ii. Family iii. Friends iv. Children v. Community vi. Health workers	
Q14	How often did you receive counselling and education in the course of your treatment?	i. Never ii. Once iii. 2-3 times during treatment iv. Anytime I visited the facility	1 2 3 4
Q15	How do you find the duration of TB treatment?	i. Necessary ii. Burdensome iii. Others	1 2 3
Q16	Why do you think so? ***(Please tick only one response)***	i. That duration provides complete cure ii. To avoid relapse iii. To avoid failure iv. Others…….	1 2 3 4
Q17	Were your relatives supportive during the time of your TB treatment?	i. Yes ii. No	1 2
Q18	Were you having access to laboratory investigations during treatment?	i. Yes ii. No	1 2
Q19	What was the distance from your house to the DOT centre?	…….	
SECTION B: PATIENT- RELATED FACTORS (AFTER TREATMENT)			
Q20	Did you complete the full course of the treatment?	i. Yes ii. No	1 2
Q21	What was the outcome of your treatment?	Cured Completed treatment	1 2

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Q22	**For cured clients only,** which of the following factors in your opinion contributed to your cured? ***(Tick all that apply)***	i. ii. iii. iv. v. vi. vii. viii.	Drug availability Constant/ regular supply of drugs Compliance to drug regimen Availability of a treatment supporter Absence of co-morbidities Good nutrition Proper monitoring by health professionals Others (specify)…… ……..	1 2 3 4 5 6 7 8
Q23	**For completed treatment clients only,** which of the following factors in your opinion contributed to you completing your treatment? ***(Tick all that apply)***	i. ii. iii. iv. v. vi. vii. viii.	Drug availability Constant/ regular supply of drugs Compliance to drug regimen Availability of a treatment supporter Absence of co-morbidities Good nutrition Proper monitoring by health professionals Others (specify)……	1 2 3 4 5 6 7 8
Q24	Currently do people stigmatize you because you had TB?	i. ii.	Yes No	
Q25	By whom do you feel most stigmatized currently? ***(Please tick only one response)***	vii. viii. ix. x. xi.	Spouse Family Friends Children Community	1 2 3 4 5

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SECTION C: TREATMENT SUPPORT- (PATIENT RELATED FACTORS)

Q26	Were you having a treatment supporter during treatment?	i. Yes ii. No	1 2
Q27	What kind of support were you given?	i. Counselling ii. Medication iii. Others……	1 2 3
Q28	What was the level of education of your treatment supporter?	i. Not educated ii. Primary iii. JHS iv. Secondary/vocational v. Tertiary	1 2 3 4 5
Q29	What is your relationship with the treatment supporter?	i. Partner ii. Child iii. Parent iv. Friend v. Other family member	1 2 3 4 5

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Appendix D: Ethical Approval Letter

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