DELAY IN DIAGNOSIS OF TUBERCULOSIS AMONG PATIENTS ATTENDING KAMPALA CAPITAL CITY AUTHORITY TB DIAGNOSTIC AND TREATMENT UNITS IN UGANDA

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2013-MPH-FT-001

A POST GRADUATE RESEARCH DISSERTATION SUBMITTED TO THE INSTITUTE OF HEALTH PO LICY AND MANAGEMENT IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF A MASTERS OF SCIENCE PUBLIC HEALTH OF INTERNATIONAL HEALTH SCIENCES UNIVERSITY

DECEMBER -2014

DECLARATION

I, ALIMAH KOMUHANGI, declare to the best of my knowledge that this report is original and a result of my personal study excluding where otherwise acknowledged; it has never been presented anywhere for any award.

I am therefore submitting it to the Institute of International Health Policy and Management in partial fulfillment of the requirement for the award of masters of Science in Public Health of International Health Sciences University.

…… ……..

Alimah Komuhangi Date

This dissertation has been submitted for examination with the approval of my supervisor;

…… ……

Dr. Kasujja Asuman Date

DEDICATION

I dedicate this piece of work and the entire master's degree to the almighty God who made it possible within the required time frame.

I also dedicate this work to my parents Mr. and Mrs. Kashillingi Ahmed for the values they installed in me, especially the belief to always work hard and aim high.

I dedicate this report to my husband Dr. RICHARD OLEKO JOHN REHAN for his tremendous support and encouragement throughout my year of study. I sincerely appreciate his sacrifice of time, understanding and endurance while I worked on this report.

I also dedicate this report to my brother Mr. Rugaba Hussein Kashillingi for always believing in me and never letting me down at all times.

Finally I dedicate this report to my lovely children Tisha, Jason, Chloe and Jaden for the joy and happiness they bring into my life that keeps me wanting to aim higher.

ACKNOWLEDGEMENT

I would like to thank everybody who contributed generously their time, energy and money to this study. In particular I would like to thank in a special way my supervisor Dr. KASUJJA ASUMAN for his expertise and skilled inputs he made towards this study. He tirelessly guided me through this work despite his busy schedules to enable me come up with this report.

I would like to acknowledge and thank Dr. OKELLO AYEN DANIEL, the director of Public Health and Environment at KCCA for allowing me to conduct this study in the KCCA TB diagnostic and treatment units despite the fact that they are busy units, for introducing me to the TB team at KCCA and for guiding me during the development of the research proposal.

I also thank Dr. ZALWANGO SARAH, the TB focal person at KCCA for providing me with all the necessary data required for the study.

I generally thank the KCCA Public health and environment staff for their hospitality, they made my visits to KCCA comfortable and every one was willing to corporate with me, this made my work very easy.

Special thanks go to the in charges of all the KCCA TB diagnostic and treatment units for providing me with all the necessary information regarding TB services provided at the TB units and for allowing me to use secondary data (patients' medical records).

I also thank Dr. Anguzu Ronald, a research fellow at Makerere University School of public health and Mr. Sempeera Hassard, a supervisor at Family Health Research and Development

Centre at Kasangati for their guidance and support and the research assistants who worked with me tirelessly.

In a special way, I thank Ms. Ayot Evelyn the registrar at International Health Sciences University and the lectures especially Dr. John Ndyahikayo, Mr. John Charles Okiria, Mr. Alege John Bosco, Dr. Kirabira Peter, Dr. Amongin Florence, Mr. Ochieng Titus and Mrs. Ondia Miriam for their corporation and guidance during the academic year.

I would like to acknowledge and thank my husband Dr. Richard Oleko John Rehan for his tremendous invaluable financial support and guidance during the study.

I thank my sisters Mrs. Kasente Busingye Zubedah and Mrs. Namara Birungi Shakillah who contributed all the cost of printing and photocopying.

I also appreciate the time and effort my reading partners; Ms. Nakakande Martha, Ms. Gune Florence, Ms. Atim Fiona and Ms. Naiga Maureen put in during the academic year.

It is my sincere hope that all the stake holders will follow up and put in action as per the recommendations that will go a long way to reducing continuous transmission of tuberculosis in Kampala and the nation at large.

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ABBREVIATIONS

AFB	Acid Fast Bacilli
AOR	Adjusted Odds Ratio
AIDS	Acquired Immunodeficiency Syndrome
CDR	Case Detection Rate
DOTS	Directly Observed Therapy Shots
HIV	Human Immunodeficiency Virus
IQR	Inter Quartile Range
IRR	Incidence Risk Ratio
KCCA	Kampala Capital City Authority
MNRH	Mulago National Referral Hospital
NTLP	National TB and Leprosy Program
OR	Odds Ratio
PTB	Pulmonary Tuberculosis
W H O	World Health Organization
ZN	Ziehl –Neelsen

OPERATIONAL DEFINITIONS

Case detection	Tuberculosis is diagnosed in a patient and is reported within the national surveillance system and then to WHO
Case Detection Rate (CDR)	The ratio of the number of notified TB cases to a number of incident TB cases in a given year.
Health facility delay	Time interval in days between first consultation with the health care facility and receipt of TB results.
New case	Tuberculosis in a patient who has never received anti-TB treatment before or who has received anti- TB drugs for a period of less than a month.
Patient delay	Time interval in days between debut of cough and first consultation with any health care facility.
Total delay	Summation of patient and health facility delay.
TB data collection tools	Laboratory request forms, patient identity cards and registers (laboratory, treatment, basic management, suspect, contacts and quarterly reports).
Tuberculosis diagnosis	Finding mycobacterium tuberculosis species in a clinical specimen taken from a patient. Other investigations may strongly suggest TB as a diagnosis but cannot confirm.

ABSTRACT

Introduction

Kampala Capital City Authority (KCCA) TB diagnostic and treatment units are the main public health units offering free TB diagnostic services in Kampala City, so identifying factors contributing to the delay to diagnose TB would be a step forward in reducing TB transmission, morbidity and mortality.

Delay in diagnosis of tuberculosis (TB) results in severe disease and higher mortality. It also increases the duration of infectivity in the population (WHO, 2013). Early detection and diagnosis of TB cases is the hallmark of all successful TB control programs.

Objective of the study

The main objective of the study was to determine the factors contributing to the delay to diagnose TB among patients attending KCCA TB diagnostic and treatment units in the period of July to August 2014. The specific objectives were to determine the socio-demographic, patient and health facility factors contributing to the delay to diagnose TB among patients attending KCCA treatment and diagnostic units in the period of July to August 2014.

Methodology

A cross sectional study of 281 PTB diagnosed patients was conducted at the 7 public health TB diagnostic and treatment units in Kampala, from July to August 2014.

Quantitative methods of data collection using a researcher administered questionnaire and qualitative methods using focus group discussion and key informant guide were utilized.

Poisson regression model was used to estimate the incidence risk ratios (IRR) and their 95% confidence interval for the delays comparing them with the independent variables.

Results

The mean total delay (interval from onset of cough to first contact with the health facility and interval from first contact with health facility to receipt of TB results) was 78 days (S.D =72). 58% of patients often sought care from drug shops or pharmacies before visiting a TB diagnostic and treatment unit (incidence risk ratio [IRR] =1.05; 95% CI: 1.0-1.3). Other factors that contributed to the 'Total delay to diagnose TB' were identified: being unemployed (IRR =1.09; 95% CI: 1.0-1.2), cohabiting (IRR =1.14; 95% CI: 1.0-1.3), never taken alcohol (IRR =0.88; 95% CI: 0.8-1.0), private means of transport (IRR=1.15; 95% CI: 1.0-1.3), and more than three TB clinic visits prior to diagnosis (IRR=1.15; 95% CI: 1.0-1.3). Smoking, HIV status and perceived TB stigma were not associated with total delay in TB diagnosis.

Conclusion

Delay in diagnosis of PTB is unacceptably high in Kampala. A huge proportion (86.8%) of patient factors contributed to the delay to diagnose TB than the health care related factors (13.2%). Majority 88.3% (248/281) of PTB patients in Kampala take 78 days from onset of cough to TB diagnosis, a factor that increases the rate of TB transmission, morbidity and mortality.

Recommendations

The Uganda NTLP should pay more attention to certain specific groups such as alcoholics and the unemployed in order to improve their health seeking behavior.

TB diagnostic services should be accessible to the general population through community outreaches and contact tracing, so that patients residing more than 5 km from a TB diagnostic unit are diagnosed at home.

KCCA TB focal persons should ensure that TB diagnostic supplies are provided to all TB units in order to avoid stock outs and enhance early diagnosis of TB.

KCCA TB management team should conduct continuous community sensitization to enable patients understand the importance of early diagnosis.

The National Drug Authority should strengthen policies regarding administration of medicines in drug shops/pharmacies without prescription from registered health professionals.

Drug shop/pharmacy employees have to be trained in order to have a high index of suspicion for tuberculosis when cardinal symptoms exist.

Further areas of research should be conducted in order to enhance early TB diagnosis.

CHAPTER ONE: INTRODUCTION

Tuberculosis (TB) is a highly contagious and airborne bacterial infection caused by mycobacterium species affecting mostly young adults in their reproductive years. It is generally transmitted from one person to another by inhaling infected air during close contact. TB can stay in a dormant state (inactive) for several years minus causing symptoms or being transmitted to other individuals. However, if a patient with inactive TB gets a weakened immune system, the dormant TB can become reactive (active) and cause an infection in the lungs or any other parts of the body. The occurrence of HIV/AIDS has been responsible for an increased frequency of TB (Montoro *et al.,* 2007).

The most common TB symptoms include; fatigue, fever, weight loss, coughing, hemoptysis and night sweats. Skin tests, chest x-rays, sputum analysis (smear and culture), and PCR tests to detect the genetic material of the causative bacteria can be carried out to diagnose TB. Inactive TB can be treated with isoniazid to prevent the TB infection from becoming active while the active TB can be successfully treated with isoniazid in combination with one or more of several drugs such as rifampicin, ethambutol, pyrazinamide and streptomycin (Storla *et al.,* 2008).

Research in Uganda has shown low levels of TB-related knowledge and considerable delays in diagnosis. These patterns contribute to TB-related morbidity and mortality and growing drug resistance. Early detection and treatment of TB is critical to controlling the disease. Delay before test-seeking can result in more serious illness by the time of diagnosis and increased TB transmission within the community (Kansiime *et al*., 2014).

The purpose of this research was to determine the factors contributing to the delay to diagnose TB within a typical urban African setting (KCCA TB diagnostic and treatment units). The total delay was calculated by summing up the patient delay and health facility delay and the standard cut- off for patient delay was a cough for 14 days. Persistent cough was chosen to define the delay because it is the most sensitive symptom for smear positive PTB and used as the symptom for entry for TB diagnosis in the Uganda NTLP. The standard cut –off for health facility delay was 3 days because ideally 2 sputum specimens should be collected in 8- 24 hour interval, and results should be available within 24 hours of sputum collection (WHO, 2009).

1.1 Background to the study

Tuberculosis is a global public health problem, one of the leading causes of morbidity and mortality worldwide with approximately 2 billion people (1/3) of the population affected with the disease where 8.6 million incident cases and 1.8 million deaths are registered annually (Raviglione *et al.,* 2012).

The reemergence and association with HIV/AIDS has made TB a global threat by reactivating latent tuberculosis infection and increasing the risk of rapid TB progression after infection or re-infection with mycobacterium species. In 2011, there were approximately 430,000 deaths among people living with HIV/AIDS and 14 deaths per 100,000 women, with more than 90% of the global TB cases and deaths occurring in the developing countries associated with lack of awareness, scarce resources and poor infrastructure for control of disease (WHO, 2012).

Numerous factors such as poverty, poor health seeking behavior, and limited access to health care facilities, rural residence, congestion, and alcohol and drug abuse are also associated with the delay, meaning that both patients and health care systems are responsible for the delay to diagnose TB. The African Region accounts for 1/3 of the global tuberculosis burden were 40% of the population is infected with tuberculosis. Majority of the assessed number of new cases of TB arose from Asia (59%), Africa (26%), Eastern Mediterranean Region (7.7%), European Region (4.3%) and a proportion of 3% in the American Region. In 2013, the 22 high TB burden countries accounted for 82% of all the estimated cases worldwide, the top five countries with majority of the incident cases include; India (2-2.5 million), china (0.9- 1.1 million), South Africa (0.4 – 0.6 million), Indonesia (0.4 – 0.5million) and 0.3 – 0.5 million from Pakistan (Raviglione *et al.,* 2014).

Uganda and her neighbors such as Kenya and the Democratic Republic of Congo (DRC) are among the 22 TB high burden countries, with Kenya ranking 10th, DRC ranking 6th and Uganda ranking 18th with a prevalence of 170/ 100,000, Incidence of 330/100,000 and the burden is high in urban & peri -urban centers among young adults (WHO, 2013).

TB control and eradication is based on the rapid identification of cases and their effective treatment. In areas with a high prevalence of TB, an early diagnosis is considered as one performed within 14 days after the onset of clinical symptoms which is mainly cough. Therefore, an acceptable time delay in diagnosis of 14 days would be effective for disease control. Any delay in diagnosis and treatment of TB can increase chances of morbidity and mortality hence playing an important role in continuous spread of the bacilli (WHO, 2010).

A WHO report (2012) on TB indicted that out of the 22 high burden countries, 16 were able to reach or exceed the 85% target in 2011, apart from Ethiopia and Nigeria. However, Uganda reported lower rates of treatment success (71%) missing the 85% target. According to Dr. Frank Mugabi, the commissioner in charge of the Uganda NTLP, the lag was due to lack of awareness among communities, lack of functional treatment support systems and failure by patients to treatment. He also noted that the country did not have enough diagnostic equipment (the gene expert machines) for early detection of TB. Ideally every TB diagnostic and treatment unit should have this equipment but a very huge gap exists; treatment cannot be done if patients are not diagnosed. He also noted that nearly 20,000 cases of TB are missed due to diagnostic failures. Patients are also not able to seek for TB diagnostic services due to other several reasons (Ayebazibwe, 2013).

Coughing and fever which are the most common symptoms of TB are prevalent in the general population and are mainly associated with other illnesses, individuals with such symptoms are rarely considered to be presumptive TB cases by both patients and health care providers resulting in the delay to detect TB hence continuous spread (Kansiime *et al.,* 2014).

Understanding the factors contributing to the delay to diagnosis TB is necessary to reduce the period of TB transmission, reduce the risk of exposure of other community members, and thus facilitate disease control. Few studies have evaluated these factors, so our findings might be useful in planning, defining and formulating a national policy to improve early diagnosis and eventually reduce the burden of TB in the country.

1.2 Statement of the problem

Delay to diagnose a single TB case can lead to an average infection of 10 contacts annually and over 20 during the natural history of the disease until death, a factor that increases continuous transmission of TB in the community (WHO, 2006). According to the Uganda NTLP, nearly 20,000 TB cases are missed annually due to diagnostic failures which translate to a Case Detection Rate of 57.4% that is quite below 70% recommended by WHO (Ayebazibwe, 2013). Despite the fact that TB is curable, Kampala residents delay to seek for TB health care services even when they present with all the TB symptoms, and when they finally decide to seek for services, delay also occurs at the health facilities.

Ideally, cough lasting 14 days should be treated as a presumptive case, 2 sputum specimens should be collected in 8- 24 hour interval, and results should be available within 24 hours of sputum collection and 48- 72 hours for the skin test (WHO, 2009). However, that is not what happens in Kampala despite the Uganda NTLP creating TB awareness through advocacy and community sensitization, indicating that there could be other factors contributing to this delay.

Delaying to diagnose TB increases TB transmission, morbidity and mortality in the country, this study therefore determined the factors contributing to the delay to diagnose TB hoping that the findings can be used to improve early diagnosis and eventually reduce the burden of TB in the country.

1.3 Research objectives

1.3.1 General objective

To determine the factors contributing to the delay to diagnosis TB among PTB patients attending KCCA TB diagnostic and treatment units in the period of July to August 2014.

1.3.2 Specific objectives

i. To determine the socio-demographic characteristics of PTB patients contributing to the delay to seek for TB diagnostic services at KCCA TB diagnostic and treatment units in the period of July to August 2014.

ii. To determine the PTB patient factors contributing to the delay to diagnose TB at KCCA TB diagnostic and treatment units in the period of July to August 2014.

iii. To assess the health provider factors contributing to the delay to diagnose TB among PTB patients attending KCCA TB diagnostic and treatment units in the period of July to August 2014.

1.4 Research questions

i. What are the socio-demographic characteristics of PTB patients contributing to the delay to seek for TB diagnostic services at the KCCA TB diagnostic and treatment units in the period of July to August 2014?

ii. What are the PTB patient factors contributing to the delay to diagnose TB at the KCCA TB diagnostic and treatment units in the period of July to August 2014?

iii. What are the health provider factors contributing to the delay to diagnose TB among PTB patients attending KCCA TB diagnostic and treatment units in the period of July to August 2014?

1.5 Significance of the study

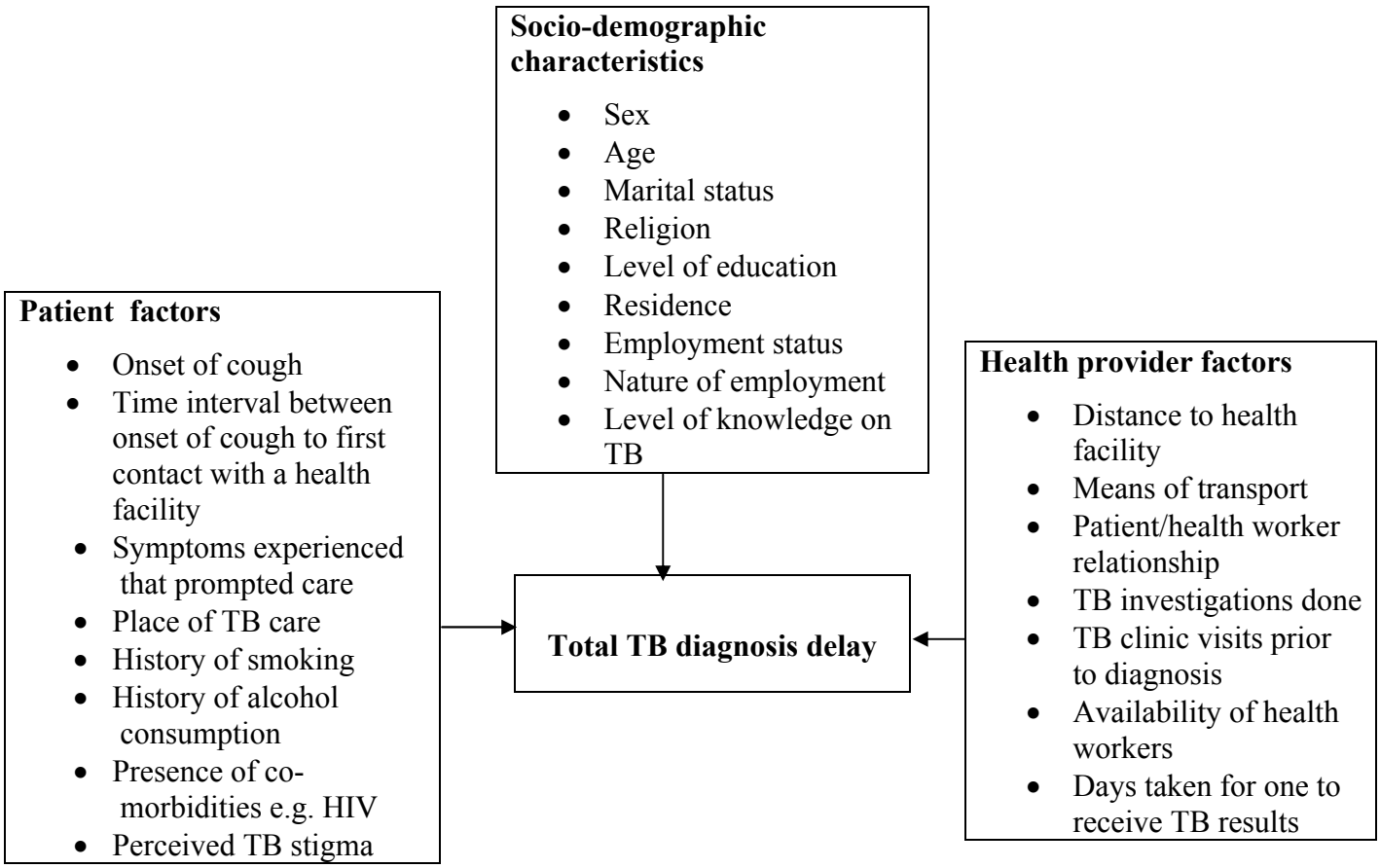
TB is one of the leading causes of morbidity and mortality in Uganda. The consequences of delaying to diagnose TB can be very substantial and may include increased transmission within communities, morbidity and mortality (WHO, 2003).

There is inadequate data on the factors contributing to the delay to diagnose TB in Kampala City to be used for devising a strategy towards reducing the prevalence of the disease, although Uganda has progressed towards reversing TB incidence by 2015, the incidence (330/100,000) is falling very slowly (WHO, 2013).

The aim of this study was to determine the factors contributing to the delay to diagnose TB. Analysis of the factors delaying TB diagnosis may help TB control programs to diagnose and treat patients more effectively. Therefore, the findings of this study can be essential to the Uganda NTLP and TB managers of the KCCA TB diagnostic and treatment units for developing a strategy for early detection of TB.

This strategy will benefit the patients in terms of early TB diagnosis and early initiation of treatment and the community will benefit in terms interruption of TB transmission cycle. This will reduce the burden of TB in the country at large.

1.6 Conceptual frame work



Narrative of the frame work

The framework highlights several socio-demographic characteristic, patient factors and health facility factors that in one way or the other could contribute to the delay to seek for TB diagnose TB among PTB patients attending KCCA TB diagnostic and treatment units.

The socio-demographics characteristics such as age, sex, religion, and marital status, level of education, employment status, and nature of employment, residence, and level of TB knowledge can contribute to the delay to seek for TB health care.

The patient factors such as onset of cough, time interval between the onset of cough to first contact with a health facility, symptoms experienced that prompted TB care, place of TB care, history of smoking and alcohol consumption, co-morbidities e.g. HIV, perceived TB stigma may also contribute to the delay to diagnose TB.

The health provider factors that could also contribute to the delay to diagnose TB include; distance from place of residence to health facility, means of transport to the facility, health worker- patient relationship, investigations done, TB clinic visits prior to diagnosis, availability of health workers and days taken for one to receive TB results.

CHAPTER TWO: LITERATURE REVIEW

2.0 Introduction

This is a review of relevant literatures; it has been categorized into several sections according to the objectives: the socio- demographic characteristics, individual clinical factors and health care related factors contributing to the delay to diagnose TB.

2.1 Socio- demographic characteristics of PTB patients contributing to the delay to seek for TB diagnostic services

Farah *et al.,* (2006) conducted a study to assess delays in the start of TB treatment and the risk factors for the delays among patients in Osio/ Akerhus region- Norway. Data was collected from medical notes of 83 TB patients. The results showed that; 86% were born abroad, the median patient, health care system and total delays were 28, 33 and 63 days respectively with a range of 1-434 days. Patients with extra PTB had longer delays than PTB patients (median total delay; 81 & 56 days respectively). The age group 60+ years had shorter patient delays at the multivariate analysis. Considering extra PTB as a differential diagnosis in unresolved cases especially for immigrants from high TB prevalence countries was recommended (Farah *et al.,* 2006). This study used only secondary data and included patients with extra PTB. However, our study employed both secondary and primary data but excluding patients with extra PTB.

Basnet (2008) conducted a cross sectional study using a structured questionnaire to assess the delay in TB diagnosis among patients attending TB healthcare services in Banke district- Nepal. A total of 307 participants were involved in the study and the results indicated that majority of

the participants were males (59%) and illiterate (62.2%). The main occupations of the participants were farmers (48.2%) and house wives (19.9%); and 76% of the participants reported being unemployed (Basnet, 2008). The results in this study were based on quantitative data from patients only. Our study employed both quantitative and qualitative data collection techniques involving TB focal persons of the TB units and patients.

Saqib *et al*., (2011) conducted a cross sectional study to assess the delay in TB diagnosis at the National TB Centre in Rawalpindi, Pakistan. A total of 252 TB patients were involved in the study and the results were as follows; the proportion of male and female patients was nearly equal i.e. 49.6% and 50.4% respectively. It was found that females within the age group of 15-19 years were affected more (42.1%) as compared to males (26.7%). Majority were skilled workers (42%) followed by housewives (25%), students (14%), unemployed (10%) and 4% were government servants (Saqib *et al*., 2011). This study was conducted in one public health facility in Pakistan, so it could be possible that individuals attending a particular facility have similar characteristics. Our findings were slightly different because data was collected from seven public health TB units.

In 2009 Wei and colleagues conducted a study among 34 migrant patients registered on the Shanghai TB program as newly diagnosed PTB patients to identify the barriers to TB care among migrant TB patients. Result showed that the financial constraints were reported as the biggest barriers to accessing TB services among migrant patients. The government free policy only covered a small fraction of patients' total costs. Migrants had limited knowledge of TB and reported being laid off for work or avoided after having TB (Wei *et al*., 2009).

Li and colleagues (2013) included 23,917 patients in a systematic review and meta-analysis of factors associated with diagnostic delays in Chinese TB patients in 2013. The results indicated that living in the rural area is a risk factor for delays in seeking tuberculosis services and women living in the rural area where more likely to delay to seek for medical attention compared to men, patients with low level of education (primary level and below) opted to seek TB health services from Chinese traditional medicine healers before visiting a formal health facility. The researcher recommended removal of financial barriers to accessing health care particularly in the rural areas, sensitization and implementation of tuberculosis guidelines in all health facilities in order to reduce the burden of TB in china (Li *et al*., 2013).

Lawn *et al.,* (2006) conducted a cross-sectional study among adult hospitalized TB patients in a general tertiary care hospital to determine risk factors associated with delayed TB diagnosis. Results indicated a median delay of 6 days prior to diagnosis. 54.4% of the patients were diagnosed less than 6 days and 45.6% were diagnosed more than 6 days after admission. The main factors associated with TB diagnostic delay were unemployment, extra PTB and negative sputum smear. Though hospitalization permitted a faster diagnosis and rapid management of TB, an unacceptable time delay to seek for health services was noted, more studies focusing on an attempt to explain reasons of TB diagnostic delay were recommended (Lawn *et al.,* 2006). This study assessed delays among only the hospitalized patients focusing mainly on whether one was diagnosed before or after admission. Our study considered delay from onset of cough to first consultation with a health facility (patient delay) and from first contact with health facility to receipt of TB results.

Mauch *et al*., (2011) included a total of 208 patients in a study to identify barriers in accessing TB care in nine public health facilities in two districts in Kenya. Results indicated that TB patients in both districts had a substantial burden of direct (out of pocket; USD55.8) and indirect (opportunity; USD 294.2) costs due to TB. Inability to work was a major cause of increased poverty. Results confirmed a medical poverty trap in the two districts and the researcher suggested early diagnosis to reduce the delays (Mauch *et al*., 2011).

Guwatudde *et al.,* (2003) conducted a study to determine the prevalence and incidence of TB in one of Uganda's poor peri-urban areas. A sample of 263 households with 1142 individuals was selected using multi-stage sampling and the findings revealed that majority of the participants were females (64%) and 49% were less than 16 years old. The mean age was 18.1(SD 15.2). The educational level was low as most of the participants had attained only primary level of education. The researcher concluded that the rate of TB in that peri-urban area was exceptionally high and recommended need for interventions aimed at reducing TB transmission in this, and other similar communities with high case rates (Gwatudde *et al*., 2003).

A cross sectional study to determine factors associated with health service delay in diagnosis and initiation of treatment among 266 newly diagnosed PTB patients presenting to the National Referral Hospital-Mulago was conducted by Kansiime *et al.,* (2014). The results indicated that 65.4% experienced health systems delay. The median health service delay was 9 days (IQR=8-19). Factors associated with health service delay were: 1n-patient (OR= 4.68, 95% CI: 1.91-11.45), secondary as highest level of education attained (OR= 3.56, 95% CI: 1.18-10), presence of fever (OR= 3.28, 95% CI: 1.05-10.79), and patient delay at health facility (OR= 5.01, 95% CI:

1.33-18.9). Paying more attention to febrile conditions especially in hospitalized patients was one of the recommendations (Kansiime *et al.,* 2014).

2.2 PTB patient factors contributing to the delay to diagnose TB

A cross sectional study in the Mid-Western region of Nepal was conducted by Basnet *et al*., (2009) to assess the duration of delay in TB detection and identify the determinants. The results indicated that, majority (83%) had cough, fever (74%) and body weakness (64%). 58.3% sought advice first from drug shops/ pharmacies when the symptoms appeared. 60.9% reported that they , walked to DOTS treatment centers. The median patient delay was 50 days. Smokers using more than 5 cigarettes per day had significantly higher risk of patient delay, 46.9% of the respondents reported regular use of alcohol before diagnosis (Basnet *et al*., 2009). In this study patient delay was shorter, probably because participants were selected from both private and public health facilities yet in our study participants were selected from only public health facilities.

In 2011, Saqib and colleagues carried out a cross sectional study to describe the healthcare-seeking behavior of presumptive TB cases and early diagnostic work up before consultation at the National TB Centre in Rawalpindi. The results indicated a median delay of 56 days was associated with cough and fever. Half (50%) had a history of previous contact with diagnosed TB patients while 63% had visited health care providers within 21 days of onset of symptoms, yet only 35% were investigated for tuberculosis. Fever and cough were ignored by both health care providers and patients. Involving private health practitioners in early detection and

treatment of tuberculosis and increasing public awareness were recommended in order to reduce the delay (Saqib *et al*., 2011).

A prospective cohort study in 23 selected health facilities was conducted by Long and colleagues (2008) to assess the health seeking behavior of TB presumptive cases among migrants and permanent residents of Chongqing municipality in china. Results revealed that 68% of the migrants delayed more than 14 days before seeking TB care compared to 54% of the residents ($p<0.001$). Migrants were 1.5 times more likely to use less expensive community level health services than the permanent residents and only 5% of those who visited such services were referred to a TB unit. 'Patient-' and 'provider-' related factors included: low awareness and poor knowledge among the presumptive TB cases, low financial capacity to pay for care and diagnostic tests. Delays were unexceptionally high among migrants (Long *et al*., 2008). Long and colleagues used a prospective cohort study design comparing the total delay in two groups of TB patients (migrants and permanent residents) but in our study we focused on PTB patients attending public TB diagnostic and treatment units in Kampala city and we used a cross sectional study design.

Rajeswari *et al.,* (2002) conducted a study to investigate the factors associated with delay in care seeking and diagnosis by health providers among 531 smear positive TB patients in South India using a structured questionnaire. The results revealed that the median patient, health system and total delays were 20, 23 and 60 days, respectively. 29% of patients delayed seeking care for >1 30 days, of whom 40% attributed the delay to their lack of awareness about TB. Men postponed seeking care for longer periods than women ($P = 0.07$). In multivariate analysis, the patient delay

was greater if the patient had initially consulted a government provider (adjusted odds ratio [AOR] 2.2, $P \leq 0.001$), resided at a distance >2 km from a health facility (AOR 1.6, $P = 0.04$), and was an alcoholic (AOR 1.6, $P = 0.04$). Health system delay was >7 days among 69% of patients. Factors associated with health system delay were: first consultation with a private provider (AOR 4.0, $P < 0.001$), a shorter duration of cough (AOR 2.6, $P = 0.001$), alcoholism ($P = 0.04$) and patients residing >2 km from a health facility (AOR 1.8, $P = 0.02$). The total delay resulted largely from a long patient delay when government providers were consulted first and a long health system delay when private providers were consulted first (Rajeswari *et al*., 2002).

Meintjes and colleagues (2008) conducted a cross sectional study to describe patient provider delay in TB diagnosis in presumptive cases requiring admission. They interviewed a total of 125 patients. Majority (84%) of the patients tested HIV negative, provider delay (median = 30 days) was double that of patient delay (median = 14 days). Patients had a median of 3 contacts with formal health care services before referral. Factors associated with longer patient delay were male gender, cough, and first health care visit being to a public sector clinic. Provider delay > 30 days was associated with increased mortality. Delay was more attributable to provider than patient delay. Interventions to expedite TB diagnosis in primary care were recommended (Meintjes *et al.,* 2008).

Ford *et al*., (2009) conducted a cross sectional survey to explore the impact of psychosocial and cultural-based factors on delay in test-seeking behavior for symptoms of TB in Iquitos-Loreto. Results indicated a median delay of 61 days (IQR 30–91). 75% sought testing within 91 days of symptom onset. Reasons for delay were due to; attributing symptoms to another illness (29%),

work (21%), child care (20%); self-medication (20%), no money for medical care (9%) and 1% felt they had not been sick enough to justify tuberculosis testing. The researcher recommended more health education on the symptoms of TB (Ford *et al*., 2009).

In 2001, Lienhardt conducted a study to identify the risk factors influencing the delay between onset of symptoms and initiation of treatment among 152 TB patients was conducted in Gambia, West Africa. Data was collected using semi-structured interviews and the results revealed that the median delay was 8.6 weeks (range 5-17). The delay was independent of sex but shorter in younger TB patients. The median delay was longer in the rural than urban (12 weeks [8.5-17], $p < 0.01$) and in those who did not attend school. Patients who reported hemoptysis as one of the initial symptoms had shorter delays to treatment. The researcher concluded that creating awareness of signs and symptoms and ensuring easy access to TB diagnostic and treatment facilities would enable patients start treatment early hence reducing disease transmission (Lienhardt *et al*., 2001) .

A cross sectional study to determine the length of delays and factors affecting the delay from onset of PTB symptoms until initiation of treatment among 384 newly diagnosed PTB patients was conducted by Yimer *et al.,* (2005) in TB units in Amhara- Ethiopia. The results indicated that, the mean total delay was 80 days. The median health-seeking period and health providers' delays were 15 and 61 days, respectively. The median patients' and health systems' delays were 30 and 21 days, respectively. Patients' delays were strongly associated with first visit to non-formal health providers and self-treatment ($P < 0.0001$). Prior attendance to a health post/clinic

was associated with increased health systems' delay ($p < 0.0001$). Health providers' and health systems' delays represented the major portion of the total delay (Yimer *et al*., 2005).

Storla *et al.,* (2008) tried to extract findings from 58 studies with the aim of achieving a realistic global understanding of diagnosis delays in tuberculosis. From all the studies, the main factors contributing to delayed TB diagnosis were; HIV/AIDS, co-existence of chronic cough, lung cancer, extra pulmonary TB, substance abuse, incomprehensive beliefs, history of previous visits to traditional healers, history of immigration, self –medication and stigma. The five common symptoms experienced were cough (85%), fever (65%), weight loss (62%), chest symptoms (50%) and hemoptysis (25%). Other symptoms that were less frequently experienced were; sputum, fatigue and increased sweating. Delay in TB diagnosis was more on the patient side than health system failures (Storla *et al.,* 2008).

A cross sectional descriptive study involving a total of 296 TB patients reporting to a health facility in Mwanza region, Tanzania was conducted by Wandwalo *et al*., (2000) to detect factors responsible for delay from onset of symptoms of PTB to initiation of treatment. Results indicated that the mean total delay was 185 days, with up to 90% of this being patient delay. The health service delay was 23 days. Significant longer delays were in patients from the rural area, with lower level of education, those with no information on TB prior to diagnosis and those who visited traditional healers. Facilitation of utilization of health services, raising awareness of the disease and incorporation of private practice into TB control were the recommendations (Wandwalo *et al*., 2000). This study compared delays among patients from the rural area and

urban area, our study was carried out in an urban setting with majority of the patients being urban residents.

Ngadaya *et al.,* (2009) conducted a cross sectional study to assess the delay in TB case detection in Pwani region -Tanzania. The results revealed that, majority (66.5%) were males. The mean total delay was 125days. Out of 206 patients, 38.35% delayed to seek TB health care. Health facility delay was observed among 58.7% of the patients. Risk factors for delay were poor knowledge that chest pain may be a TB symptom (OR = 2.9; 95% CI 1.20- 7.03), the belief that TB is associated with HIV/AIDS (OR = 2.7; 95% CI 1.39-5.23). Risk for delay was low among patients who first presented to a government health facility (OR = 0.3; 95% CI 0.12- 0.71) and those presenting with chest pain (OR = 0.2; 95% CI 0.10-0.61). There was a considerable delay in TB case detection in Pwani mainly contributed by patients (Ngadaya *et al*., 2009).

Kiwuwa *et al*., (2005) conducted a cross-sectional survey, of 231 newly diagnosed PTB patients to determine Patient delay (> 2 weeks) and health service delay (> 4 weeks) in PTB patients attending a referral hospital in Kampala. The median total delay was 12 weeks. Patients often presented to drug shops/ pharmacies (39.4%) as initial contacts. Independent predictors of 'patient delay' were identified: being hospitalized (0R= 0.32; 95% CI: 0.12–0.80), alcohol consumption (OR = 3.7; 95% CI: 1.57–9.76), subsistence farming (OR = 4.70; 95% CI: 1.67–13.22), smoking (OR= 5.54; 95% CI: 2.26–13.58). Independent predictors of 'health service delay' were: >2 health seeking encounters per month (OR = 2.74; CI: 1.10–6.83), and medical expenditure on TB related symptoms >29 US dollars (OR = 3.88; CI: 1.19–12.62). Perceived TB stigma and education status were not associated with either form of delay. The researcher

concluded that delay in diagnosis of TB is prolonged at the referral center with a significant proportion of Health service delay (Kiwuwa *et al*., 2005).

In 2009, Sekandi and colleagues conducted a house to house survey in 5 randomly selected villages in Kampala to identify those with chronic cough. Results revealed that 20% (189/930) had chronic cough and out of those with chronic cough 33% were undiagnosed smear positive cases with a median cough duration of 30 days. 55% had AFB 1+ sputum smear grade. The researcher concluded that active case finding could supplement DOTS to yield additional smear positive TB cases and lead to early diagnosis thus shortening the duration of infectiousness (Sekandi *et al* ., 2009).

2.3 Health provider factors contributing to the delay to diagnose TB

WHO assessed the strength of evidence for same-day diagnosis ("spot-spot") approach (microscopic examination of two sputum samples) and there was evidence that same – day diagnosis approach is equivalent to conventional approach in terms of diagnostic accuracy. Same –day approach was on average 2.8% less sensitive compared to the conventional approach (95% CI: -5.2-3), which indicates that this approach would be no more than 5% worse compared to the conventional approach. The specificity (98%; 95% CI, 97-99) of the two approaches was identical. On this basis, WHO recommends that countries using spot- morning approach, consider a gradual change to same –day diagnosis, especially where patients are most likely to default from diagnostic process (WHO, 2009).

Golub and colleagues (2006) conducted a prospective cohort study to determine the association between total treatment delay and TB transmission among patients and their close contact using data from local health departments in Maryland. Results indicated that 49% of PTB patients had total treatment delay > 90 days. Close contact of 54/310 US born patients and 70/ 393 foreign born cases had received tuberculin skin tests (TSTs). Among contacts of US-born patients with a total treatment delay of ≥90 days, 40% had positive TSTs vs. 24% contacts of patients with shorter delays (AOR 2.34; $P = 0.03$). Other patient factors associated with TST positivity among contacts of US-born cases were black race (AOR 3.03; $P = 0.05$), sputum smear positive for AFB (AOR 3.29; $P = 0.01$) and chest radiograph with cavitation (AOR 3.11; $P = 0.01$). No associations were observed between foreign-born patients and risk of TST positivity among their contacts. The researcher concluded that among US-born patients, delay in TB diagnosis was associated with greater transmission of infection to contacts and could be used independently of other index patient factors to identify contacts at greatest risk of TB (Golub *et al*., 2006).

Greenaway *et al*., (2006) conducted a study to define the occurrence, associated patient risk factors, and outcomes among 429 newly diagnosed PTB patients and exposed workers of delayed diagnosis of active PTB in 4 Canadian cities. Results showed that initiation of appropriate treatment was delayed 1 week or more in 127 (30%). This was associated with a typical clinical and demographic patient characteristics, admission to hospitals with low TB admission rate of 0.2–3.3 per 10,000 admissions (OR: 7.4; 95% CI: 3.2-17.5), intermediate TB admissions of 3.4–9.9/10,000 (OR: 2.3; CI: 1.6-3.2), preventable (late) intensive care unit admission (OR: 16.8; CI: 2.0-144) and death (OR: 3.3; CI: 1.7-6.5]). In hospitals with low TB

admission rates, initially missed diagnosis, smear-positive patients undergoing bronchoscopy, late intensive care unit admission (OR: 2.3; CI: 0.1,56), and death (OR: 3.8; CI: 1.2,12.1) were more common than in hospitals with high TB admissions (> 10/ 10,000); a similar trend was seen in hospitals with intermediate TB admissions. Even after adjustment for workers' characteristics and ventilation in patients' rooms tuberculin conversions were disproportionately high in hospitals with low and intermediate TB admission rates and significantly higher in hospitals with overall TB mortality rate above 10% (OR: 2.5; CI: 1.6,3.7). In the hospitals studied, as the rate of TB admissions decreased, the likelihood of poor outcomes and risk of transmission of TB infection per hospitalized patient with TB increased. Institutional risk of TB transmission was poorly correlated with number of patients with TB and better correlated with indicators of patient care such as delayed diagnosis and treatment and overall TB-related patient mortality (Greenaway *et al.,* 2006).

Lack of knowledge among health workers in the private health facilities can hamper their understanding of the implications of undetected TB cases in the community. Early detection of TB cases by sputum smear microscopy requires high level of suspicion of TB among the private health practitioners (Al-Manir *et al.,* 2008). The study revealed that private general practitioners appear to have low suspicion and poor knowledge of TB in Oman. The study by Al-Manir was conducted among both private and public health practitioners, while this study was conducted in only public health units with PTB patients as the main respondents and TB focal persons as the key informants.

A cross sectional survey was conducted to assess retrospectively the duration of delay in diagnosis of TB and its determinants among a total of 307 new cases of TB registered by the National Tuberculosis Program (NTP) in 55 DOTS centers in Nepal. The results showed that the median health system delay was 18 days. The 18 days were found to be shorter than any other similar studies carried out in other districts of Nepal. The estimated time that patients took from home to the DOTS centers by foot was 30 minutes and the doctors in Banke easily diagnosed patients quickly before sending them to NTP for free TB treatment (Basnet *et al*., 2009). This study employed only quantitative data collection techniques. Our study employed both quantitative and qualitative methods of data collection.

Lusingnani *et al*., (2013) conducted a cross-sectional study involving 385 TB patients who visited 21 DOTS clinics in Luanda to analyze the risk factors for delays. Results indicated that the median patient & health care system delays were 30 and 7 days respectively. Primary education (AOR=1.75; p = 0.029) and the health center of the first contact differing from the DOTS center (AOR=1.66; p = 0.046) were independent risk factors for patient delay >4 weeks. Living in a suburban area (AOR=2. 32; p=0.011), having a waiting time in the center >1 hour (AOR=4.37; p=0.002) and transport problems to the DOTS center (AOR=5.68; p =0. 001) were factors influencing the system delay. The delay was due to the time elapsed between the onset of symptoms and the first consultation (Lusingnani *et al* ., 2013).

In 2002, Demissie and colleagues conducted a cross sectional survey that included all public health centers in Addis Ababa to determine the factors influencing the delay to diagnose TB among PTB patients. Data was collected using a structured questionnaire from a total of 700

PTB patients and the results were as follows; the median patient delay was 60 days. There was a significant difference in distance from home to the facility and knowledge about TB among the smear negatives. The health service delay was low (median delay; 6 days). Longer health service delay (delay more than 15 days) was associated with far distance and inadequate knowledge on TB. The researcher therefore recommended further decentralization of TB services, use of active case findings and raising public awareness on TB (Demissie *et al*., 2002).

A cross sectional study was conducted by Cambanis and colleagues among patients attending Bushallo health center in Ethiopia to assess their health seeking behavior based on clinical experience. A total of 243 presumptive cases were interviewed and results showed that the mean age was 32.5 (S.D = 15.8). 57% were male. All patients took 1-4 hours to reach the health center, a total of 102 (42%) had no prior contact with a health center, 85% had waited 10 days from symptom onset until seeking help. 15% used traditional medicine and 90% reported having visited the health center because of persistence of their symptoms and failure to improve. (Cambanis *et al*., 2005).

Belay *et al*., (2012) conducted a cross sectional study involving 216 TB patients who visited 2 health facilities in Afar region- Ethiopia to assess the delay in diagnosis and treatment of TB. Patient and health system delays were analyzed and results revealed that the median patients' and health system's delay were 20 and 33.5days, respectively. The median total delay was 70.5days. On multivariate logistic regression, self-treatment (OR. 3.99, CI 1.50-10.59), first visit to non-formal health providers (OR. 6.18, CI 1.84-20.76) were observed to be independent predictors of patients' delay. On the other hand, having extra- PTB (OR. 2.08, CI 1.08- 4.04), more visits to

health posts/clinics (OR. 19.70, CI 6.18-62.79), health centers (OR. 4.83, CI 2.23-10.43) and private health facilities (OR. 2.49, CI 1.07-5.84) were found to be independent predictors of health system's delay (Belay *et al*., 2012).

Sendagire and colleagues conducted a cross-sectional study at a public primary health facility in Kampala city to quantify diagnostic delay among PTB patients, assess associated factors, and describe trajectories of patients' health care seeking among 253 smear-positive PTB patients. The results indicated that the median total delay was 8 weeks, median patient delay was 4 weeks and median health service delay was 4 weeks. 24% of the patients had long total delay (14 weeks), 29.3% had long health service delay (6 weeks) and 19.4% had long patient delay (8 weeks). 91% had visited one or more health care providers before diagnosis, for an average of 4 visits. Patients who knew that TB was curable were less likely to have long total delay (OR 0.28; 95% CI 0.11–0.73) and long patient delay (OR 0.36; 95% CI 0.13–0.97). Being female (OR 1.98; 95% CI 1.06–3.71), staying for more than 5 years at current residence (OR 2.24 95% CI 1.18–4.27) and having been tested for HIV before (OR 3.72; 95% CI 1.42–9.75) were associated with long health service delay resulting in missed opportunities for diagnosis (Sendagire *et al.,* 2010).

CHAPTER THREE: METHODOLOGY

3.0 Introduction

This chapter describes the methods of how the study was carried out. It includes the study area, study scope, study design, sources of data, study population, inclusion and exclusion criteria, sample, sample size determination, sampling unit, sampling procedure, study variables, data tools, how the quality of data was maintained, plan for analysis, ethical considerations and limitations of the study.

3.1 Study Area

Kampala Capital City Authority (KCCA) existed following the enactment of the KCCA act that formed the city authority as a corporate body. The KCCA TB diagnostic and treatment units are located in the five divisions of Kampala which include; Central, Nakawa, Rubaga, Makindye and Kawempe divisions, with the following catchment area; 130,734, 357,265, 438,205, 450,090 and 389,231 respectively.

In the Central division, the KCCA TB diagnostic and treatment units include; AIDS Information Center, Bank of Uganda clinic, Case Medical Center, International Organization for Migration, Kamwokya health facility, Kisenyi Health Center, the Surgery Clinic and Uganda cares clinic.

In Nakawa division, the KCCA TB diagnostic and treatment units include; Butabika Hospital, Family Hope Clinic, Kiswa Health Centre, Mbuya Barracks, Murchison Bay, Nagguru Hospital, Reach Out Banda, Reach Out Kinawataka, Reach Out Mbuya, SAS Clinic and Staff Clinic Luzira.

In Makindye division, the KCCA TB diagnostic and treatment units include; Alive Medical Center, Hope Clinic Lukuli, International Hospital Kampala, Kibuli Hospital, Mukwaya General Hospital, Nsambya Hospital, Nsambya Police Clinic, Safeguard Nursing Home, Kisugu Health Center and Zam Clinic.

In Lubaga division, the KCCA TB diagnostic and treatment units include; Galilee Community Hospital, Joint Clinical Research Center, Joy Medical Center, Kitebi Health Center, Mengo Hospital, Namungona Hospital, Lubaga Hospital and Kawaala Health Center.

In Kawempe division, the KCCA TB diagnostic and treatment units include; Baylor Mulago, Infectious Disease Institute, Kawempe Home Care Facility, Komamboga Health Center, Maria Asumpta, Mulago Ward 15, Mulago Ward 5 & 6, St Steven Hospital Mpererwe and The AIDS Support Organization.

3.2 Study Scope

The study was carried out at only seven TB diagnostic and treatment units specifically focusing on the factors contributing to the delay to diagnose TB. Six KCCA owned TB diagnostic and treatment units were selected and they include; Kiswa health center III, Kisugu health center III, Kawaala health center III, Kitebi health center III, Komamboga health Center III and Kisenyi health Center IV, Mulago Hospital was chosen as the seventh KCCA TB diagnostic and treatment unit because it offers TB services to a greater population in Kampala, though not owned by KCCA, Mulago Hospital TB diagnostic and treatment units are directly supervised by KCCA.

3.3 Study Design

This was a cross sectional study employing both quantitative and qualitative data collection techniques. This kind of design was best suited to determine the factors contributing to the delay to diagnose TB at a point in time.

3.4 Sources of Data

Data was collected primarily from newly diagnosed PTB patients and those that had been on TB treatment for at most six weeks as respondents using face- to- face interviews and focus group discussions. The key informants (TB focal persons of the KCCA TB diagnostic and treatment units) also provided primary data. Secondary data was collected from patient TB cards and facility TB medical records where patients were not able to recall exact dates.

3.5 Target population

The target population comprised of PTB patients in Kampala city.

3.6 Study Population

The study population comprised of PTB patients attending KCCA TB diagnostic and treatment units.

3.7 Inclusion and Exclusion Criteria

3.7.1 Inclusion criteria

A respondent was included in the study only if he or she was 18 years and above and newly diagnosed of PTB or on TB treatment for at most six weeks, attending any of the 7 selected KCCA TB diagnostic and treatment units in Uganda.

3.7.2 Exclusion criteria

All patients with other forms of TB other than PTB and those critically ill to respond were excluded from participating in the study.

3.8 Sample Size Determination

The number of respondents in the study was determined using Kish and Leslie formula of 1965. The Kish and Leslie formula was preferred because it is best suited when dealing with infinite populations.

The formula is;

$n = z^2pq/d^2$

Where n = desired sample size

z = z score corresponding to 95% confidence interval- 1.96

p = proportion of PTB patients who delay to seek TB diagnostic services in Kampala = 0.241 (24%) derived from a study to determine Long Delays and Missed Opportunities in Diagnosing Smear-Positive Pulmonary Tuberculosis in Kampala, Uganda by Ibrahim Sendagire and colleagues in 2010.

q = 1-p which is (1- 0.241) = 0.759

d = margin of error at 95% level of significance, which is 0.5

Substituting in the formula above

$n = 1.96^2 * 0.241 * (1- 0.241)/ 0.05^2$

n = 3.8416 * 0.241 * 0759/ 0.0025

n = 281.08

Therefore, the desired sample size is 281 diagnosed pulmonary TB patients.

3.9 Study Unit

The study unit was a PTB patient receiving TB services at the selected KCCA TB diagnostic and treatment units.

3.10 Sampling Procedure

3.10.1 Selection of KCCA TB diagnostic and treatment units

A purposive selection of 7 KCCA TB diagnostic and treatment units was done and these included; Kiswa health center III, Kisugu health center III, Kawaala health center III, Kitebi health center III, Komamboga health Center III and Kisenyi health Center IV and Mulago Hospital TB treatment units. These units were selected because they offer free TB diagnostic and treatment services and they attend to a reasonable number of TB patients in Kampala.

3.10.2 Selection of TB patients for quantitative data collection

A total of 281 newly diagnosed PTB patients and those on treatment for at most six weeks were selected to participate in the study. For each of the KCCA TB diagnostic and treatment units, a stratified method of sampling was used to calculate a proportional number of TB patients to represent a particular unit as illustrated below;

Table 1: Proportional number of PTB patients to represent a particular KCCA TB diagnostic & treatment unit

Division	KCCA TB diagnostic and treatment unit.	Number of new smear positive cases detected in the last quarter (Jan – Mar 2013). (a)	Desired sample size (c) c =(a/b) * n
Nakawa	Kiswa	165	50
Lubaga	Kitebi	50	15
Makindye	Kisugu	66	20
Kawempe	Mulago	331	100
Lubaga	Kawaala	103	31
Central	Kisenyi	165	50
Kawempe	Komamboga	50	15
Total	7	930 (b)	281 (n)

In each of the KCCA TB diagnostic and treatment units, a list of patients from the head of the TB unit was used to systematically select the K^{th} number and the TB patients possessing that number were selected to participate in the study. If a respondent selected was not present to answer the questionnaire on two different occasions or not willing to participate, the same procedure was repeated to select another respondent.

3.10.3 Selection of participants for qualitative data collection

A total of 7 TB focal persons from each of the selected TB units were purposively selected as key informants. They were chosen because they had all the information related to the procedure of diagnosing TB patients and challenges in diagnosing TB. From each TB unit a total of 6-10 PTB patients were conveniently selected for a focus group discussion

3.11 Study Variables

3.11.1 Dependent variable

Total TB diagnosis delay in terms of; delay (> 17 days) or no delay (≤ 17 days). Total TB diagnosis delay was defined as summation of patient delay (> 14 days) and health facility delay (> 3 days). Total TB diagnosis delay was measured in days.

3.11.2 Independent variables

The following independent variables were measured to determine the factors contributing to the delay to diagnose TB among PTB patients attending KCCA TB diagnostic and treatment units.

1. **Socio- demographic factors of TB patients**

- Sex
- Age
- Marital status
- Religion
- level of education
- Residence
- Employment status
- Nature of employment
- Level of knowledge on TB

2. **Patient factors**

- Onset of cough
- Time interval between onset of cough to first contact with a health facility
- Symptoms experienced that prompted care
- Place of TB care
- History of smoking
- History of alcohol consumption
- Presence of co-morbidities e.g. HIV
- Perceived TB stigma

3. **Health provider factors**

- Distance to the health facility
- Means of transport to the facility
- Health worker- patient relationship
- Investigations done
- TB clinic visits prior to diagnosis
- Availability of health workers
- Time taken for one to receive TB results

3.12 Data collection tools

Quantitative tools

A semi- structured researcher administered questionnaire with both open and closed ended questions was used for quantitative data of sampled PTB patients.

Qualitative tools

A focus group discussion was used to collect qualitative data from PTB patients and a key informant guide was used to collect qualitative data from purposively selected TB focal persons from each selected TB unit based on their knowledge on TB diagnosis.

3.13 Description of the tools

A semi- structured researcher administered questionnaire consisted of 31 questions that sampled PTB patients answered and where necessary the researcher filled the answer in the space provided. Some questionnaires were translated in the local language (luganda) for respondents who could not understand English. Luganda was chosen because it is a language spoken by majority of the people in Kampala. A key informant guide consisted of 5 questions for the selected key informants to answer. And 7 groups consisting of 6 -12 patients representing a particular TB diagnostic and treatment unit were involved in focus group discussions where 6 open ended questions were asked.

3.14 Quality Control

The quality of data was ensured by taking into account the following measures;

Pre- visit to the study area

A pre- visit was conducted to the study area (7 KCCA TB diagnostic and treatment units) to identify the number of PTB patients that had been newly diagnosed or on TB treatment for at most six weeks.

Training of research assistants

Seven research assistants with adequate knowledge on TB were recruited and trained on how to collect data. The data collection tools were studied and translated into Luganda to ensure consistency with the ones in English.

Editing of data

Editing of data and corrections were done immediately at the end of each data collection day to rule out any missing data. Double data entry was done using Epi data version 3.1 and cleaning was done to reduce chances of errors made during the entry.

3.15 Data Analysis

Exploratory analysis was done on all variables to detect any missing and any data inconsistencies. Descriptive analysis was also done on all variables to determine the proportions and for all continuous data variables, the means and their standard deviations (SD) were calculated.

The outcome of the study was total delay to seek TB diagnostic services which was measured in days and defined as summation of patient delay and health facility delay. Patient delay was defined seeking TB diagnostic services from a health facility more than 14 days from onset of cough and health facility delay was defined as receipt of TB results more than 3 days from the first contact with a health facility.

Poisson regression model was used to estimate the incidence risk ratios (IRR) and their 95% confidence interval for the delays comparing them with the independent variables and robust standard errors were estimated. The Poisson regression model was used because it is best suited for determining the relationship of a dependent variable with multiple independent variables when the outcome of interest (the patient and health provider delay) is more than 10% (87% and 13%) respectively. All variables in the bivariate analysis with $p<0.15$ or potential confounders

were included in the multivariate analysis. All statistical analyses used Stata version 12. Data was presented in tables and figures as shown in the results section.

Data management and analysis of qualitative data

Data collected from key informant interviews and focus group discussions was transcribed from the audio recordings. Further analysis was done using coded word processed text organized and analyzed using content and factor analysis with Atlas/ti software.

Data was divided into meaningful analytical units and marked with descriptive words. The codes were merged into lager categories and themes. Content from each coded groups were summarized and illustrated with direct quotes from the discussion. A 10% back translation was done for quality control.

3.16 Ethical Consideration

Permission and approval to conduct the study was obtained from International Health Sciences University and directorate of public health and environment at KCCA. A letter of introduction was obtained from IHSU and presented to the office of Public Health and environment at KCCA seeking access to the various sampled TB diagnostic and treatment units.

Informed consent was obtained from respondents after explaining adequately the aim, procedures and anticipated benefits of the study. It was also explained to the study participants that their participation was voluntary with no payment involved and they were free to withdraw consent at any time during the study.

Respect for PTB patients was observed, those who were not ready to be interviewed at a particular time were scheduled for another day. Confidentiality was also maintained throughout the study period and no participant was harmed during the study.

3.17 Plan for dissemination of a report

A report of findings was submitted to International Health Sciences University (IHSU) in partial fulfillment of a master's degree of Science in public health. A copy was submitted to the department of Public Health and Environment at KCCA for an appropriate consideration and possible use in improving tuberculosis diagnostic services and for publication with the consent of the university.

3.18 Limitations of the study

Data was retrospectively obtained from respondents, so recall bias could have influenced the results.

We only included pulmonary TB patients in the study; the picture might have been different if patients with other forms of TB were also included in the study.

Because of sampling, the population sampled may not have represented all the views of Pulmonary TB patients in Kampala.

CHAPTER FOUR: RESULTS OF THE STUDY

4.0 Introduction

This chapter presents quantitative findings of the study under the following sections; according to the study objectives; socio- demographic characteristics of PTB patients, patient factors and health provider factors contributing to the delay to diagnose TB among patients attending KCCA TB diagnostic and treatment units. Qualitative findings are also presented in this chapter; results from the key informants (TB focal persons of the selected KCCA TB diagnostic and treatment units) and results from the focus group discussions.

4.1 Descriptive Analysis

4.1.1 Socio-demographic characteristics of respondents

The age of the respondents was normally distributed with a mean of 31 years (SD =7). Two thirds 66.2% (186/281) of the respondents were males. The highest proportion 38.0% (106/281) of TB patients was married, followed by those who were single 33.0% (92/281). Less than half 42.0% (118/281) of the respondents were Catholics.

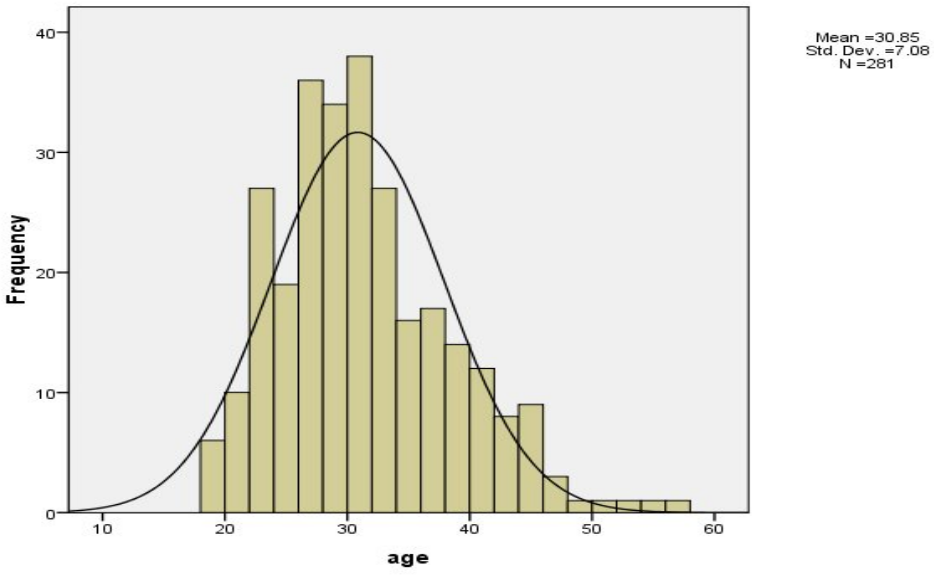
The highest proportion 42.4% (119/281) of the respondents had attained secondary level of education, followed by 34.9% (98/281) who had attained primary level of education.

Majority 84.7% (238/281) of the respondents were urban residents; this could be due to the fact that the study was conducted in an urban setting.

Table 4.1 Socio-demographic characteristics of PTB patients

Variable	Frequency (N= 281)	Percentage
Sex		
Male	186	66.2
Female	95	33.8
Marital status		
Single	92	32.7
Married	106	37.7
Divorced	45	16.0
Cohabiting	31	11.0
Widowed	7	2.6
Religion		
Catholic	118	42.0
Protestant	68	24.2
Muslim	62	22.1
Others	33	11.7
Education level		
None	24	8.5
Primary	98	34.9
Secondary	119	42.3
Tertiary/ university	40	14.3
Residence		
Urban	238	84.7
Rural	43	15.3

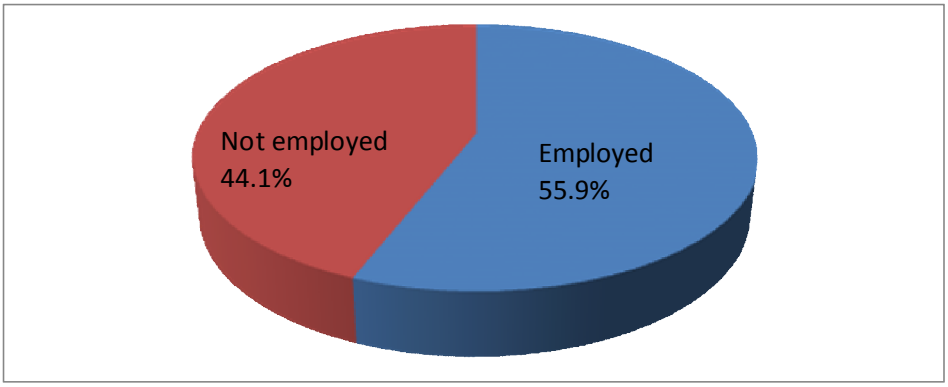
Figure 4.1 Histogram showing the age distribution of the respondents



4.1.2 Proportion of respondents employed

More than half 55.9% (157/281) of the respondents were employed. The remaining 44.1% (124/281) of the respondents could have been dependents that probably needed to consult their caretakers before seeking for TB diagnostic services.

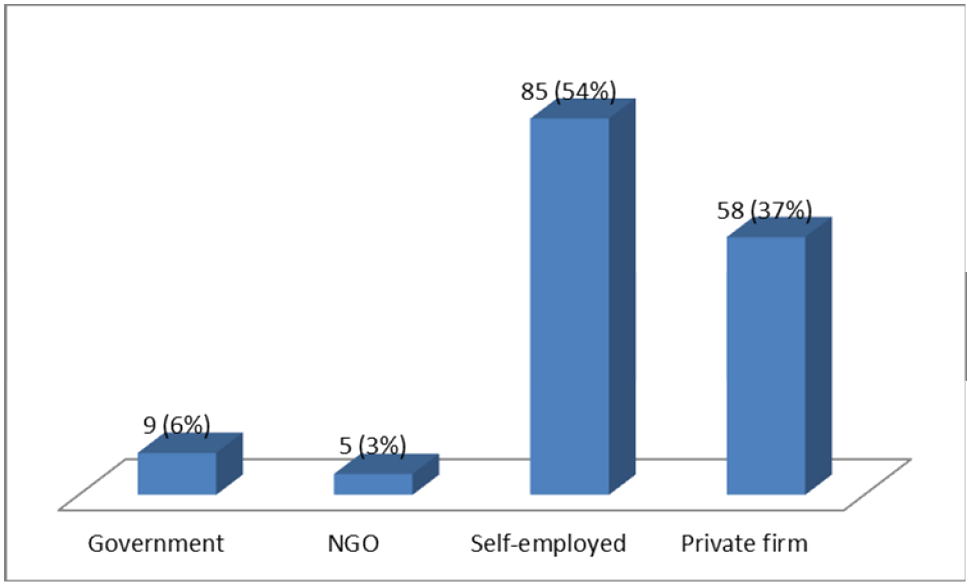
Figure 4.2 Proportion of respondents who are employed



4.1.3 Nature of employment of the respondents

Basing on the results in figure 4.3; of those who were employed (157), the highest proportion 54.0% (85/157) was self-employed, this probably contributed to the delay to seek for TB diagnostic services, since self -employed people tend to maximize all the available time to make extra income. 37.0% (58/157) of the respondents were working in private firms meaning that they also needed to seek consent from their employers before seeking for TB diagnostic services.

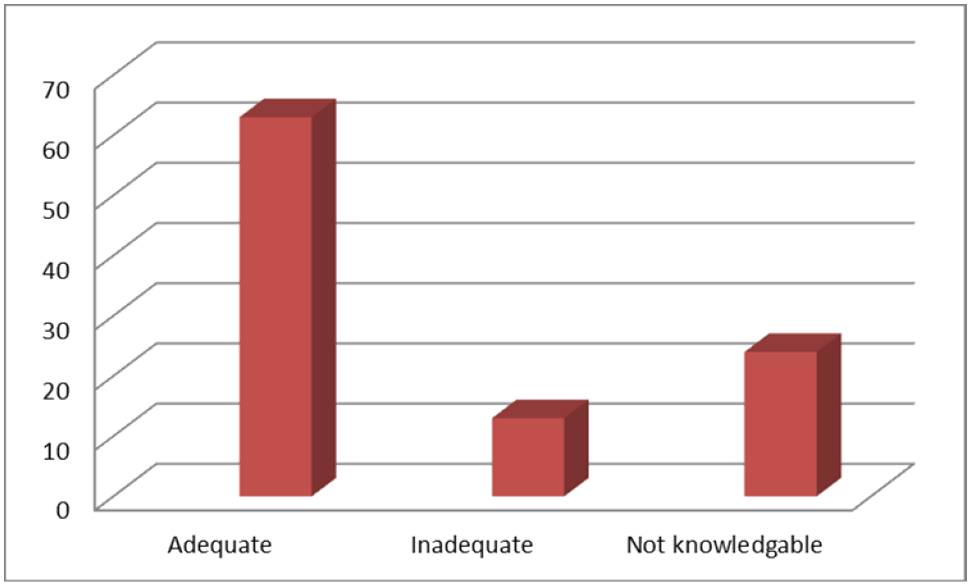
Figure 4.3 Nature of employment of the respondents



4.1.4 Level of knowledge of respondents on TB

Respondents' level of knowledge was categorized on the following scale; adequately, inadequately and not knowledgeable. A respondent was categorized adequately knowledgeable if was able to mention all symptoms of TB, state that TB is curable and transmitted through droplet. While a respondent was categorized as inadequately knowledgeable if was able to mention one TB symptom and mode of transmission, and not knowledgeable if not able to answer all the three questions correctly.

Figure 4.4 Level of knowledge of respondents on TB



Almost two thirds 63.0% (177/281) of the respondents were adequately knowledgeable regarding TB, 23.8% (67/281) were not knowledgeable and 13.2% (37/281) had inadequate knowledge regarding TB.

4.2 Patient factors contributing to the delay to diagnose TB

Majority 88.3% (248/281) of the respondents sought TB care elsewhere (relatives/friends, traditional healers and drug shops/pharmacies) before attending a TB diagnostic unit with more than half 57.7% (143/248) of the respondents seeking TB care from a drug shop/pharmacy and 42.7% (106/248) of respondents sought TB care due to persistent cough. Slightly more than half 50.9% (143/281) of the TB patients were HIV positive. 45.6% (128/281) of respondents had never smoked while 37.4% (105/281) of the respondents reported having stopped drinking alcohol, followed by 33.8% (95/281) who were currently taking alcohol.

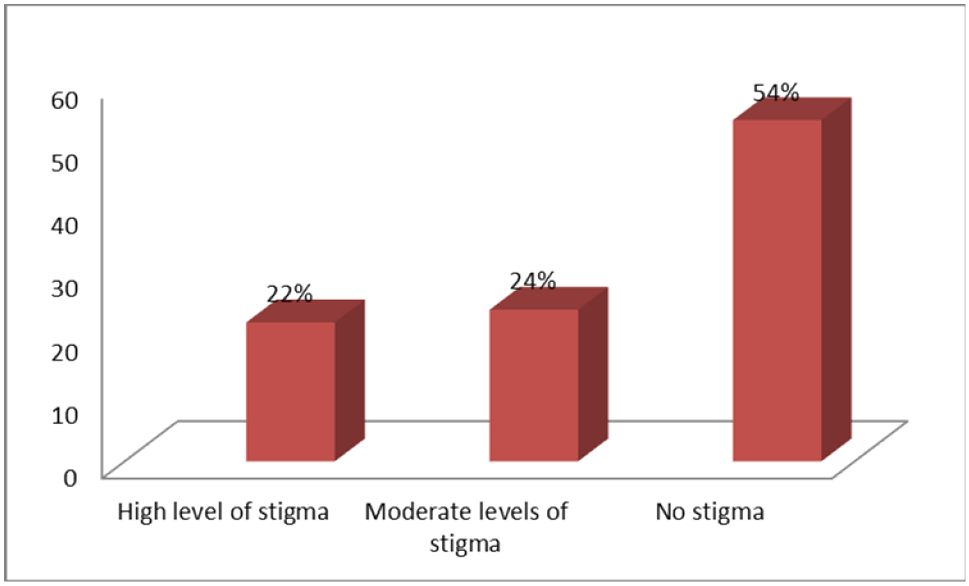
Table 4.2: Individual clinical factors contributing to the delay to diagnose TB

Variable	Frequency (N = 281)	Percentage
Seek TB care		
Yes	248	88.3
No	33	11.7
Symptom prompted care	**n=248**	
Evening fever	43	17.3
Night sweats	17	6.9
Cough	106	42.7
Loss of weight	35	14.1
Chest pain	18	7.3
Hemoptysis	29	11.7
Place of care	**n=248**	
Traditional healer	36	14.5
Family friend/ relative	5	2.0
Pharmacy / drug shop	143	57.7
Health facility	64	25.8
HIV status		
Positive	143	50.9
Negative	138	49.1
Smoking		
Current smoker	88	31.3
Never	128	45.6
Stopped smoking	65	23.1
Alcohol		
Currently drinking	95	33.8
Never	81	28.8
Stopped drinking	105	37.4

4.2.1 Stigma associated with TB

Stigma was measured on a scale of 0 to 3. A respondent was categorized as having very high levels of stigma if he or she scored zero, moderate levels of stigma if scored 1-2 and no stigma if they scored three. Respondents were required to either agree or disagree to 3 statements. Score 0 was given if the respondent agreed and score 1 was given if they disagreed. Results in figure 4.5 below show that more than half 54.0% (152/281) of the respondents had no stigma.

Figure 4.5 Patient's stigma associated with TB



4.3 Health provider factors contributing to the delay to diagnose TB

More than half 55.5% (156/281) of the respondents were residing more than 5km from the nearest TB unit and the highest proportion 53.7% (151/281) accessed the nearest TB unit by taxi. Respondents rated the way they were treated by health workers on their first visit to the TB unit and the vast majority 84.4% (237/281) reported to having been treated in a good way. Majority 84.7% (238/281) of the TB patients had sputum examinations carried out on the first day of arrival at the TB unit. The highest proportion 37.7% (106/281) of respondents visited the TB unit twice before being diagnosed. Respondents were required to state whether on any occasion at the TB unit there were no health workers to attend to them and the vast majority 84.7% (238/281) reported that health workers were available at all times as indicated in table 4.3.

Table 4.3: Health provider factors contributing to the delay to diagnose TB

Variable	Frequency(N=281)	Percentage
Distance to facility		
Below 5km	125	44.5
5km and above	156	55.5
Means of transport		
Foot	62	22.1
Taxi	151	53.7
Motorcycle	57	20.3
Private means	11	3.9
Treatment by health workers		
Poor	4	1.4
Fair	40	14.2
Good	237	84.4
TB investigation		
X - ray	43	15.3
Laboratory	238	84.7
TB clinic visits		
Once	81	28.8
Twice	106	37.7
Thrice	45	16.0
More than thrice	49	17.5
Health worker absenteeism		
Yes	43	15.3
No	238	84.7

4.4: Total delay of TB diagnosis among patients (Dependent Variable)

According to the findings in table 4.4 below; the vast majority 88.3% (248/281) of the respondents took more than 14 days from the onset of cough to first contact with a health facility and more than 3 days from first contact with the health facility to receipt of TB results (total delay). Most of the delay was due to patent delay as opposed to health facility delay (86.8% and 18.9%) respectively.

Table 4.4 Dependent variable (Total delay)

Variable	Frequency (N=281)	Percentage
Patient delay		
Delay	244	86.8
No delay	37	13.2
Health provider delay		
Delay	53	18.9
No delay	228	81.1
Total delay		
Delay	248	88.3
No delay	33	11.7

The mean total delay was 78 days (S.D=72).

4.5: Bivariate Analysis

4.5.1 Patient's socio- demographic characteristics contributing to the delay to diagnose TB

From table 4.5 below, marital status was found to be one of the factors contributing to the delay to seek for TB diagnostic services, with TB patients who were cohabiting being 1.11 times more likely to delay to seek for TB diagnostic services from a health facility than the single TB patients with a p-value of 0.040 (95% CI=1.0-1.2). Those who were widowed were 1.15 times more likely to delay to seek for TB care than the single ones with a p-value of 0.001 (95% CI=1.1-1.2).

The study revealed that those who were not employed were 1.09 times more likely to delay to seek for TB diagnostic services than those who were employed with a p-value of 0.046 (95% CI=1.0-1.2).

Table 4.5: Bivariate analysis of the patient's socio- demographic characteristics contributing to the delay to seek for TB diagnostic services

Variable	Total TB Diagnosis Delay IRR (Confidence Interval)	P-value
Sex		
Male	1	
Female	1.03 (0.8-1.3)	0.452
Age group		
18-28	1	
29-39	0.98 (0.9-1.1)	0.735
40-49	0.95 (0.8-1.1))	0.491
50+	0.96 (0.8-1.1)	0.612
Marital status		
Single	1	
Married	0.98 (0.9-1.1)	0.679
Divorced/ separated	1.07 (1.0-1.2)	0.213
Cohabiting	1.11 (1.0-1.2)	0.040 **
Widowed	1.15 (1.1-1.2)	0.001 **
Religion		
Catholics	1	
Protestants	1.05 (1.0-1.1)	0.300
Muslims	0.93 (0.8-1.1)	0.311
Others	1.04 (0.9-1.2)	0.674
Residence		
Urban	1	
Rural	0.91 (0.8-1.1)	0.191
Employment status		
Employed	1	
Not employed	1.09 (1.0-1.2)	0.046 **
Nature of employment		
Government	1	
NGO	1.14 (0.6-2.0)	0.662
Self- employed	1.33 (0.9-2.0)	0.178
Private firm	1.14 (0.7-1.7)	0.550
Level of knowledge		
Adequate	1	
Inadequate	0.99 (0.9-1.1)	0.819
Not knowledgeable	0.89 (0.8-0.9)	0.097

***** Statistically significant at 0.05 level of significance***

4.4.2 Patient's factors contributing to the delay to diagnose TB

Basing on table 4.6 below, seeking TB care elsewhere before visiting a health facility contributed to the delay to diagnose TB. Patients who consulted relatives/friends were 1.13 times more likely to delay to be diagnosed than those who had visited a health facility (p- value 0.046; 95% CI=1.0-1.3) and those who visited drug shops/pharmacies were 1.05 times more likely to delay to be diagnosed than those who visited the health facility (p- value 0.032; 95% CI= 0.9-1.2).

Table 4.6 Bivariate analysis of the patient factors contributing to the delay to diagnose TB

Variable	Total TB Diagnosis Delay IRR (Confidence Interval)	P-value
Sought TB care		
Yes	1	
No	0.95 (0.8-1.1)	0.524
Place of care		
Health facility	1	
Family friend/ relative	1.13 (1.0-1.3)	0.046 **
Pharmacy / drug shop	1.05 (0.9-1.2)	0.032**
Traditional healer	0.89 (0.8-1.1)	0.207
HIV status		
Positive	1	
Negative	0.98 (0.9-1.1)	0.631
Smoking		
Currently smoking	1	
Never	0.97 (0.9-1.1)	0.530
Stopped smoking	0.95 (0.8-1.1)	0.372
Alcohol		
Currently drinking	1	
Never	0.91 (0.8-1.0)	0.082
Stopped drinking	0.96 (0.9-1.0)	0.325
TB Stigma		
High	1	
Moderate	1.00 (0.9-1.1)	0.081
No stigma	0.88 (0.8-0.9)	0.090

***** Statistically significant at 0.05 level of significance***

4.4.3 Health provider factors contributing to the delay to diagnose TB

From table 4.7, patients who used private means of transport were 1.15 times more likely to delay to be diagnosed than patients who accessed the TB unit by foot and those who had a good relationship with the health workers were 0.88 times less likely to delay to be diagnosed than those with a poor relationship. Patients who visited the TB unit more than thrice were 1.17 times more likely to delay to be diagnosed than those who visited the TB unit once.

Table 4.7 Bivariate analysis of health provider factors contributing to the delay to diagnose TB

Variable	Total TB Diagnosis Delay IRR (Confidence Interval)	P-value
Distance		
Below 5km	1	
Above 5km	1.03 (0.9-1.1)	0.511
Transport means		
Foot	1	
Taxi	1.03 (0.9-1.1)	0.643
Motor cycle	0.99 (0.9-1.1)	0.856
Private means	1.15 (1.0-1.3)	0.005 **
Patient-health worker relationship		
Poor	1	
Fair	0.93 (0.8-1.0)	0.084
Good	0.88 (0.8-0.9)	0.000**
TB Investigations		
X-ray	1	
Laboratory	0.94(0.9-1.0)	0.233
TB Clinic visits		
Once	1	
Twice	1.05 (0.9-1.2)	0.468
Thrice	1.06 (0.9-1.2)	0.426
More than thrice	1.17 (1.1-1.3)	0.004 **
Health worker abscentism		
Yes	1	
No	0.97 (0.9-1.1)	0.613

*** Statistically significant at 0.05 level of significance***

4.5 Multivariate Analysis

4.5.1 Multivariate analysis of factors contributing to the delay to diagnose TB

All variables in the bivariate analysis with p<0.15 or potential confounders were included in the multivariate analysis and the following factors were found to be significantly associated with the delay to diagnose TB; marital status, employment status, visiting drug shops/pharmacies as initial contacts, alcohol consumption, means of transport and TB clinic visits prior to diagnosis. Basing on the findings in table 4.8; Cohabiting patients were 1.14 times more likely to delay to seek for TB health care services from a health facility than the single patients (95% CI=1.0-1.3, p-value =0.018) and those who were not employed were 1.09 times more likely to delay to seek for TB diagnostic services than the employed (95% CI=1.0-1.2, p-value =0.025).

Patients who sought TB care from drug shops/pharmacies before contacting a TB diagnostic unit were 1.05 times more likely to delay to be diagnosed than those whose initial contact was a TB diagnostic unit (95% CI=0.9-1.2, p-value =0.026). Patients who had never taken alcohol were 0.88 times less likely to delay to seek for TB healthcare services than those who were currently taking alcohol with a p-value of 0.044 (95% CI=0.8-1.0).

Respondents who accessed a TB unit by private means of transport were 1.15 times more likely to delay to be diagnosed than those who accessed the TB unit by foot (95% CI=1.0-1.3, p-value =0.022) while those who visited the TB Unit more than thrice prior to diagnosis were 1.15 times more likely to delay to be diagnosed than those who had only one TB clinic visit (95% CI=1.0-1.3, p-value =0.007).

Table 4.8: Multivariate analysis of factors contributing to the delay to diagnose TB

Variable	Total TB diagnosis delay IRR (95%CI)	P-value
Marital status		
Single	1	
Married	1.01 (0.9-1.1)	0.812
Divorced	1.02 (1.0-1.3)	0.108
Cohabiting	1.14 (1.0-1.3)	0.018 **
Widowed	1.10 (0.9-1.3)	0.316
Employed		
Yes	1	
No	1.09 (1.0-1.2)	0.025 **
Place of care		
Health facility	1	
Family friend/ relative	1.13 (1.0-1.3)	0.060
Pharmacy / drug shop	1.05 (0.9-1.2)	0.026 **
Traditional healer	0.89 (0.8-1.1)	0.227
Alcohol		
Currently drinking	1	
Never	0.88 (0.8-1.0)	0.044 **
Stopped drinking	0.99 (0.9-1.1)	0.576
Means of transport		
Foot	1	
Taxi	1.05 (0.9-1.2)	0.401
Motorcycle	0.99 (0.9-1.1)	0.967
Private means	1.15 (1.0-1.3)	0.022 **
TB clinic visits		
Once	1	
Twice	1.04 (0.9-1.2)	0.453
Thrice	1.03 (0.9-1.2)	0.663
More than thrice	1.15 (1.0-1.3)	0.007 **

***Significant at 0.005 level of significance*

4.6 Qualitative Data

A total of seven key informant interviews were conducted to determine the factors contributing to the delay to diagnose TB, challenges and solutions to improve TB diagnostic services. The seven key informants were the TB focal persons of the KCCA TB diagnostic and treatment units. These were selected because they have all the information regarding TB diagnostic services in the units. They were six females and one male who had been in practice for at least two years.

What is the procedure of diagnosing TB patients?

The procedure of diagnosing TB patients was similar at all the KCCA TB diagnostic and treatment units.

There are patients who come directly to the health facility to test for TB, so those ones are directly sent to the TB unit. Then there are those who go through OPD like any other patient, they get screened from there and when they suspect TB, they are sent to the TB unit for further investigations.

Do you see TB patients on only TB clinic days?

All the key informants reported that TB patients were seen on a daily basis.

No, we see patients on a daily basis from Monday to Friday. We do have TB clinic days but when the new cases show up, they are definitely seen.

These TB clinic days are mainly for reviews, like for MDRTB, and those on appointment to pick their drugs.

Do health workers involved in TB diagnosis receive in service training on TB management?

All the key informants reported that all the health workers attend CME's and others attend workshops**.** Though most of the time it is the TB focal persons that attend workshops.

They attend workshops, even at times they go for CME's. Every health professional in this TB diagnostic unit has had in service training, even our support staffs are sensitized and sometimes they attend these CME's. But most of the time, we the TB focal persons are the ones that attend workshops and then educate the rest of the TB management team.

What challenges do you face regarding TB diagnosis?

Majority (5/7) of the TB focal persons reported having experienced interruptions with medicines and supplies, power interruptions, patients having no contacts and not being able to pick results on time. They also noted that some patients still have stigma.

Our microscope was taken for repair, it is now four months but it has not been returned. Samples are taken to Assessment center lab; this has affected us because sometimes we get results after 5 days.

We have greatly experienced shortages for 2 years now; we have not had sputum mugs, so patients have to buy them. At times we also run out of drugs, this means that patients cannot start treatment on time.

Patients get screened and never turn up; others bring samples and do not wait for the results. We try to follow them up but at times it is difficult since others give us false contacts or contacts that are always off.

Some patients are not serious, when you call them, they say they are no longer coughing, they took some herbs and got cured, and at times we plead with them to come back but majority never return. Some patients still have stigma and do not want their neighbors, relatives or friends to know that they have TB, so when we ask for contacts of any one close to them, most of them deny staying with any one.

Patients get offended when we tell them to put on masks; they think we are being rude and they do not pay attention during health education, they just want to get their results and run away. For example, we tell them to take 4 tablets at once but when they show up, they tell us how they are taking 2 tablets twice a day.

We also have a problem with electricity, when there is no power, we tell patients to come back later, or to go to a nearby TB unit.

What do you think can be done to improve TB diagnostic services in this unit?

All the TB focal persons suggested regular supply of drugs and medical supplies; they also recommended continuous health education. Others suggested that standby generators should be provided.

Laboratory supplies should be supplied as soon as they are needed, especially sputum mugs and drugs. They should provide us with standby generators.

The community should be sensitized on the importance of early diagnosis, so that they can come and get screened. They should also be educated on the importance of knowing their results on time so that they do not just leave samples behind and disappear.

4.6.1 Results from the focus group discussions (FGDs)

A total of seven FGDs, each constituting of 6-10 participants (N=54) were conducted to determine the factors contributing to the delay to diagnose TB among PTB patients attending KCCA TB diagnostic and treatment units. The 54 participants were newly diagnosed or PTB patients on treatment for at most six weeks and 18 years and above that had not been involved in face to face interviews.

Results

Participants were interviewed about their experiences as PTB patients at the KCCA TB diagnostic and treatment units.

Most of the participants (45/54) complained about health workers reporting late for work, this discouraged them from coming to the facility. However, other participants had certain conflicting social roles that made them miss appointments. Others had difficulties with transport costs.

I come early but then I leave when it is late, on reaching my work place, my customers have left because my co- workers have attended to them. The doctors come late to attend to us at the facility yet they tell us to come early.

Sometimes we have no one to stay with the children at home yet it is tiresome to carry them along to the facility, so we miss appointments. Transport to these facilities is also a problem.

Do you pay for the TB services?

All participants agreed that TB diagnostic services at the KCCA TB diagnostic and treatment units were offered for free but still majority had issues with transport costs to the TB units and other patients were required to buy certain items.

We don't pay for TB services, we only incur transport costs, and some of us come from very far.

The services are free but we spend a lot on transport.

They also ask us to buy own sputum mugs.

How do the health workers at this facility treat you?

Majority (49/54) of the respondents said they were not treated poorly though some thought that doctors were friendlier than other cadres (nurses). Most of the participants also referred to the laboratory personnel as doctors.

Doctors treat us in a good way but sometimes the nurses shout at us, they talk for long without paying attention to our needs. I think sometimes they are tired so they tend not to be very polite. But there are some doctors who are very good and friendly.

What could be the reasons as to why PTB patients delay to be diagnosed?

Majority (44/54) of the participants reported seeking care elsewhere before coming the health facility, most of them self- medicated themselves and only reported to the health facility when the cough persisted. And others were delayed at the health facility.

For me I first bought drugs from the pharmacy, then I bought herbs thinking that I was having cough, when I failed to get healed that is when I visited this facility for medical care.

I was buying drugs from a clinic, but I failed to get cured of cough and the doctors decided to send me for an X-ray and they told me that my lungs were infected with TB and they advised me to come to this facility for TB management.

Sometimes we do not realize that we have TB, we think it is simple cough that will go away but unfortunately it persists. We go to the drug shops and they give us medicine (amoxyl, cipro, ampiclox) but we continue coughing.

I personally came to this facility like 4 times and the doctors were prescribing for me drugs for cough and I would come and tell them it has not healed and they would prescribe other drugs until I was told to go to the TB unit.

How long did it take you to get your TB results?

On average majority got their TB results three days after first contact with the health facility.

It took me 3 days to get my sputum results. The first day I was given a sputum container, I put in my sputum and I gave it to a doctor who then told me to bring a second sample in the morning, when I brought the second sample he told me to come back the next day making it 3 days.

What do you think can be done by both patients and health workers to reduce the delays?

Participants suggested that health workers should report early for duty, call patients if they do not show up for appointments and sensitize the community. They also proposed recruitment of more laboratory personnel.

Doctors should come early to attend to patients because we come early and sit for long hours waiting for them yet we have to do some work at home.

Since patients leave their contacts, they should be called when they delay to come for appointments.

Sensitization is needed because many people do not know about TB and people in the community fear TB so much that they are scared to know they have it.

They should also employ more health workers especially laboratory personnel in order to reduce the waiting time at the laboratories because it is unbearable.

CHAPTER FIVE: DISCUSSION

5.1 Introduction

This chapter discusses the study findings, compares and contrasts them with the findings of related studies done before.

5.2 Socio -demographic factors contributing to the delay to seek for TB diagnostic services

A surprise finding from our study was that cohabiting was a determinant of delay in seeking TB diagnostic services (Table 4.8). No similar studies carried out on the delay to diagnose TB had established a significant association between marital status and the delay to seek for TB diagnostic services. This poses an opportunity to carry out further studies exploring priorities in different marital categories especially in relation to their health seeking behavior.

Unemployment was found to be a predictor of delay in seeking TB diagnostic services among PTB patients attending KCCA TB diagnostic and treatment units (Table 4.8). This is consistent with reports from Nepal, Peruvian Amazon, Pakistan and Sub-Saharan Africa (Basnet *et al.,* 2008, Ford *et al.,* 2009, Saqib *et al.,* 2011 and Lawn *et al.,* 2012) respectively were unemployment was identified as one of the factors contributing to the delay in seeking TB diagnostic services. A study done in Kenya found that poverty was the main barrier in accessing TB care in nine public health facilities (Mauch *et* al., 2011). Mauch's research team attributed it to inability to work. In other words employed individuals tend to have better health seeking behavior. So in order for TB programs to be successful in Kampala, the level of unemployment in the society has to be reduced or TB diagnostic services have to be offered at household level.

Poverty eradication programs and improvement of livelihood projects in Kampala and generally in Uganda can contribute to better health seeking behavior of TB services.

In this study, we found no association between the level of education and the delay to seek for TB diagnostic services. This finding was in disagreement with what Li *et al.,* 2013 found out in their study where patients with low level of education (primary and below) opted to seek TB health services from Chinese traditional medicine healers before visiting a formal health facility. The discrepancy could be due to the fact that Li's study was conducted in the urban and rural areas of China (which is also one of the high burden TB countries in the world) while this study was carried out in the urban area (Kampala) where majority (56%) of the respondents had attained at least secondary level of education.

Like a previous study in Uganda (Kansiime *et al*., in 2014), majority of the PTB patients had attained secondary level of education; however it was revealed that they were more likely to delay to be diagnosed. This discrepancy could be attributed to the fact that Kansiime and colleagues conducted their study in only one public health facility and it could be possible that patients attending a similar health facility have similar characteristics.

5.3 Patient factors contributing to the delay to diagnose TB

Consumption of alcohol was a predictor of the delay to diagnose TB (Table 4.8). This is consistent with other studies conducted in India, Uganda and Nepal (Rajeswari *et al*., 2002, Kiwuwa *et al.,* 2005 and Basnet *et al.,* 2009) respectively where daily consumption of alcohol was one of the factors that contributed to the delay to diagnose TB. This means that patients who take alcohol regularly prefer to use the available resources to get alcohol than to seek for TB

diagnostic services. This is a great opportunity for the National TB and Leprosy Program in Uganda to target this particular group during their TB community awareness programs.

Seeking care from drug shops or pharmacies before visiting a TB diagnostic unit was a predictor of the delay to diagnose TB (Table 4.8). This is in agreement with what Basnet *et al.,* (2009) found out in their study to assess the duration of delay in TB detection in Nepal where majority (58%) of the TB patients had sought care from a drug shop/ pharmacy before visiting a TB diagnostic and treatment unit.

Other studies by Kiwuwa *et al* (2005) and Storla *et al* (2008) conducted in Uganda and Ethiopia respectively also had similar findings where one of the factors contributing to the delay in TB diagnosis was self-medication. It could be possible that the providers at these drug shops/pharmacies were not able to identify presumptive TB cases, so they find no reason to refer patients for smear examinations. There is need to strengthen policies regarding administration of medicines in drug shops/pharmacies without prescription from registered health professionals. In addition to that, drug shop/pharmacy employees have to be trained in order to have a high index of suspicion for tuberculosis when cardinal symptoms exist.

Certain responsibilities such as taking care of children at home and work contributed to the delay to seek TB diagnostic services. When patients were asked why they delayed to seek for TB diagnostic services, they said that they had no one to leave their children with and it was expensive to carry them along to the TB unit and others were scared of losing their clients at work. This finding is in agreement with what Ford *et al* (2008) found out in their study to explore the impact of psychosocial and cultural-based factors on delay in test-seeking behavior

for symptoms of TB in the province of Loreto. It could be possible that due to the above mentioned responsibilities, patients fail to return for second smear examinations and others are not even able to wait for the results. This means that it is essential to create awareness on TB with more emphasis on the importance of early diagnosis.

Smoking was not significantly associated with the delay in TB diagnosis. This is in disagreement with what Basnet *et al* (2009) found out in their study where smokers using more than 5 cigarettes per day had significantly higher risk of patient delay. The difference could be attributed to difference in the study settings as majority (56%) of the respondents attending KCCA TB diagnostic and treatment units had attained at least secondary level of education meaning that they are aware of the risks of smoking, so any slight symptom would definitely prompt them to seek for TB diagnostic services.

Having HIV/AIDS did not have a significant association with the delay in TB diagnosis. This finding is contradicting with what Ngadaya *et al* (2009) found in their study in the Eastern part of Tanzania where the belief that TB is always associated with HIV was identified as one of the factors contributing to the delay to diagnose TB, which coincided with what Storla *et al* (2008) found out in their study in Ethiopia. This difference may be attributed to the fact that majority (92%) of people living with HIV/AIDS in Kampala are attached to HIV clinics where they receive comprehensive care, so any symptom of TB can easily be detected and diagnosed.

Perceived TB stigma did not have any significant association with the delay to diagnose TB. This finding was in line with what Kiwuwa *et al* (2005) found out in their study to determine the time taken for patients later confirmed as having TB to present with symptoms to the first health

provider and the time taken between the first health care visit and initiation of TB treatment in Mulago National Referral Hospital. The consistence could be due to the similarity in the study setting.

5.4 Health provider factors contributing to the delay to diagnose TB

More than three TB clinic visits before diagnosis was a determinant of delay to diagnose TB. This is in agreement with what Sendagire and colleagues (2010) found out in their study at a public primary health facility in Kampala where patients who had an average of four TB clinic visits prior to diagnosis had contributed to 50% of the health service delay. This also coincided with what Baley *et al* (2012) found out in their study to determine factors contributing to the delay to diagnose TB. This shows that the signs and symptoms of TB are considered for other illnesses and this makes it hard for TB investigations to be carried out at an early stage.

It could also be attributed to shortage of laboratory supplies since patients had complained of buying their own sputum mugs, or electricity problems since majority (5/7) of the TB focal persons reported sending patients to other units due to electricity problems. The heads of the different TB diagnostic and treatment units should encourage prompt sputum tests for all presumptive TB cases once they arrive at the facility and also ensure adequate laboratory supplies, meaning that if the health workers detect and diagnose TB on the very first visit, the percentage of health facility delay will definitely decrease. The TB units should be provided with standby generators so that as soon as patients present their samples, they are examined and results availed in the shortest possible time.

Accessing the TB diagnostic and treatment unit by private means of transport also contributed to the delay to diagnose TB (table 4.8). This is in line with what Lusingnani *et al* (2013) found out in their study at 21 DOTS clinics in Luanda where transport problems to the DOTS centers were factors influencing the system delay. The fact that TB services at the KCCA TB diagnostic and treatment units are free does not mean that they are accessible; some patients still find it hard to transport themselves to the TB units. This is an indicator of inaccessible TB services in Uganda that is a threat to TB control efforts which needs to be addressed. Early detection and effective treatment are fundamental approaches to control TB transmission. However, early detection would be possible if TB patients reported to the health facilities early enough and health professionals diagnosed them within a reasonable time frame.

Another factor contributing to the delay to diagnose TB was treating patients who had cough with antibiotics such as Amoxicillin, Ciprofloxacin and Septrin, and only considering sputum tests when the cough has persisted. Many studies (Kansiime *et al.,* 2014, Basnet *et al*., 2009, Saqid *et al*., 2011, Meintjes *et al.,* 2008 and Storla *et al*., 2008) have shown that cough is the most frequently experienced symptom among PTB patients. So for patients to frequent a TB unit with cough as one of the symptoms and miss an opportunity of being diagnosed, is a clear indicator of inadequate use of diagnostic tests at the TB diagnostic and treatment units that needs to be addressed. It is probable that PTB patients are treated with numerous doses of antibiotics before TB is suspected leading to the delay to diagnose TB or health workers wait till the patient is too ill before a smear examination is ordered yet in the NTLP guidelines, a cough for ≥ 14 days is considered a reason for smear examination. It is also possible that patients who were

given Ciprofloxacin in the drug shops/pharmacies got some relief since the drug is a second generation fluoroquinolone and all the anti TB drugs contain quinolones but then they would take it for five to seven days and then the cough reoccurs.

Compared to a similar study in Uganda by Kiwuwa *et al* (2005), the mean total delay in the current study is short by 6 days. The discrepancy could be due to the progress Uganda has made towards meeting the Millennium Development Goal 6; in 2011 the prevalence of TB in Uganda was 183/100,000 population and in 2013 it was brought down to 170/100,000 population, meaning that we are progressing but at a slow rate. However, if TB cases are diagnosed early enough and treated as soon as possible, we shall be able to achieve the 2015 prevalence target (103/100,000 population).

Another study that had longer mean total delay than our study was conducted in Ethiopia (Yimer *et al*., 2005) with a mean total delay of 80 days. This may be due to the fact that Ethiopia carries the highest burden of TB in the horn of Africa, standing in the 8th position among the 22 high burden countries in the world with an incidence rate of 327/ 100,000 population (WHO, 2013).

CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS

6.0 Introduction

This chapter highlights the conclusion and recommendations derived from the study findings.

6.1 Conclusion

Delay in diagnosis of PTB is high in Kampala. A huge proportion (86.8%) of patient factors contributed to the delay to diagnose TB than the health care related factors (13.2%). Majority 88.3% (248/281) of PTB patients in Kampala take 78 days from onset of cough to TB diagnosis, a factor that increases the rate of TB transmission, morbidity and mortality.

6.2 Recommendations

i. The Uganda NTLP should pay more attention to the alcoholics and the unemployed in order to improve their health seeking behavior.
ii. TB diagnostic services should be accessible to the general population through community outreaches including contact tracing, so that patients who reside more than 5 km from a TB diagnostic unit are diagnosed at home.
iii. TB diagnostic supplies should be provided to all TB units in order to avoid stock outs and enhance early diagnosis of TB.
iv. During TB community sensitization, TB programs should put more emphasis on the importance of early diagnosis.
v. The National Drug Authority should implement policies regarding administration of medicines in drug shops/pharmacies without prescription from registered health professionals.
vi. Drug shop/pharmacy employees have to be trained in order to have a high index of suspicion for tuberculosis when cardinal symptoms exist.
vii. Further areas of research should be conducted in order to enhance early TB diagnosis.

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APPENDICES

Appendix 1: information sheet and informed consent form

Dear sir/madam,

My name is KOMUHANGI ALIMAH; I am from International Health Sciences University, we are conducting the following study;

Title of the study: Delay in Diagnosis of Tuberculosis among Patients Attending Kampala Capital City Authority TB Diagnostic and Treatment Units in Uganda.

Purpose of the study: The aim of this study is to determine the factors contributing to the delay to diagnose TB and provide baseline information for the development of a strategy to enable patients seek for tuberculosis services as soon as possible and enhance early tuberculosis diagnosis at the health facilities in order to limit the spread of TB.

Procedures for the study: Interviews will be conducted at the study area, all the answers given will be recorded in the questionnaire by the research assistants and serial numbers will be used as opposed to participant's names.

Voluntary consent: You are under no obligation to participate in this study, participation is voluntary and you are free to withdraw consent to participate at any time without prejudice. Feel free to ask any questions before, during or after the interview. There is no payment attached.

Confidentiality: Confidential nature of this study will be maintained throughout the study period till the finalization of the report, to which you have the right to know the interview results.

Benefits: The possible expected benefits of this study will include; providing baseline information to be used by TB managers in Uganda to develop a strategy that will encourage prompt seeking of tuberculosis services and early diagnosis and detection of tuberculosis so as to reduce the burden of the disease in the country.

Risks: No risks will be posed to you as a result of this study.

Statement of informed consent

Undertaking by study participant:

I have been asked to participate in the study to determine the factors contributing to the delay diagnose TB among patients attending Kampala Capital City Authority TB diagnostic and treatment units. I have read the above and understood the purpose of this study, its nature and procedures and all my questions have been answered to my satisfaction. Therefore, I do agree to participate freely in this study.

Signature of respondent: ----------Date: ----------
signature of researcher: ---------- Date: ----------

Appendix 2: Questionnaire

Delay in diagnosis of TB among patients attending Kampala Capital City Authority TB diagnostic and treatment units in Uganda

Instructions: please tick the most appropriate answer and where necessary fill in the answer in the space provided.

QN	Description	Responses	skip
	Part 1: Socio-demographic factors		
Qn1	What is your sex?	Male……[1] Female……[2]	
Qn2	What is your age?	_____	
Qn3	What is your marital status?	Single ……[1] Married ……[2] Divorced ……[3] Cohabiting ……[4] Widowed ……[5]	
Qn4	What is your religion?	Catholics……[1] protestants ……[2] Muslims ……[3] Other …… ……[4]	
Qn5	What is your level of education?	None ……[1] Primary ……[2] Secondary ……[3] Tertiary/university ……[4]	
Qn6	Where do you reside?	Urban ……[1] Rural ……[2]	
Qn7	Are you employed?	Yes ……[1] No ……[2]	If no Skip to qn 9
Qn8	If yes, what is the nature of employment	Government……[1] NGO ……[2] Self-employed ……[3] Private firm ……[4]	
	Level of knowledge on TB		
Qn9	Is TB curable?	Yes ……[1] No ……[2]	
Qn10	What is the mode of transmission?	Droplet ……[1] Saliva ……[2]	

		Contact ……...[3] Sex ……[4]	
Qn11	Give any symptom of TB?	_____	
Part II: Patient factors			
Qn12	When did the cough start?	_____	
Qn13	From the onset of the cough, how long did it take you to visit a health facility?	_____	
Qn14	Did you seek any TB care before coming to this facility?	Yes ……[1] No …….....[2]	If no Skip to qn17
Qn15	What symptoms did you experience that prompted you to seek care?	_____	
Qn16	Where did you seek care?	Health facility …….....[1] Relative/friend ……...[2] Drug shop/pharmacy …….... ….[3] Traditional healer ……...[4]	
Qn17	What is your HIV status?	Positive ……[1] Negative …….....[2]	
Qn18	If positive, are you attached to any HIV clinic?	Yes ……[1] No ……..[2]	If negative skip to qn19
Qn19	Do you smoke?	Current smoker ……..[1] Never ……[2] Stopped smoking ……...[3]	
Qn20	Do you take alcohol?	Currently taking ……[1] Never ……[2] Stopped taking ……...[3]	
	Stigma associated with TB		
Qn21	I am ashamed of having TB	I agree ……...[0] I disagree ……..[1]	
Qn22	I cannot share my TB results with anyone.	I agree ……...[0] I disagree ……..[1]	
Qn23	People with TB should not leave with those who are not infected.	I agree ……...[0] I disagree ……..[1]	
Part III: Health provider factors			
Qn24	When did you visit this		

	facility for TB care?	_____	
Qn25	How far is this facility from your place of residence?	Below 5km ……..[1] More than 5km ……..[2]	
Qn26	What means of transport did you use the first time you came to this health facility?	By foot……[1] By taxi……..[2] By motorcycle ……..[3] Private means ……..[4]	
Qn27	How were you treated by the health workers who attended to you on your first visit to this facility about your TB illness?	Poorly ……..[1] Fairly ……..[2] Good ……..[3]	
Qn28	What investigations were done?	x- rays ……..[1] Laboratory..……..[2]	
Qn29	How many times did you come to this facility before you were told you have TB?	_____	
Qn30	During your visits to this facility before receipt of results, is there any occasion where there were no health workers to attend to your TB illness?	Yes……..[1] No ……..[2]	
Qn31	From the time you visited this health facility, how long did it take you to receive your TB results?	_____	

Thank you.

Appendix 3: Key informant guide for TB focal persons of the TB diagnostic and treatment units.

1. What is the procedure of diagnosing TB patients?
2. Do you see TB patients strictly on TB clinic days?
3. Do health professionals involved in TB diagnosis and treatment receive in service training on TB? If yes how often?
4. What challenges do you face regarding TB diagnosis?
5. What do you think can be done to improve TB diagnostic services in this unit?

Thank you.

Appendix 4: Focus group discussion with selected PTB patients

1. What is your experience as a TB patient at this facility?
2. Do you pay for the TB services?
3. How are you treated by the health workers at this facility?
4. What could be the reasons as why patients delay to seek for TB services from health facilities?
5. How long does it take for you to get results?
6. What do you think can be done by both patients and health workers to reduce the delays?

Thank you.

Appendix 5: A list of KCCA TB diagnostic and treatment units included in the study

Serial number	KCCA TB diagnostic and treatment unit	Location
1	Kawaala	Lubaga division
2	Kiswa.	Nakawa division
3	Kisenyi	Central division
4	Komamboga	Kawempe division
5	Kisugu	Makindye division
6	Kitebi	Lubaga division
7	Mulago hospital	Kawempe division

Appendix 6: Budget

S/N0	Description	Unit cost (UGX)	Quantity	Frequency	Total (Ugx)
1	Venue for training research assistants	50,000	1	1	50,000
2	Meals and tea/coffee	30,000	7	1	210,000
3	Stationary	100,000	1	1	100,000
4	Printing & photocopying	150,000	1	1	150,000
5	Payment of research assistants	50,000	7	1	350,000
6	Transportation costs	10,000	1	30	300,000
7	Air time for coordination	5000	7	1	35000
	GRAND TOTAL				**1.650.000/=**

Appendix 7: Work Plan

2014							
Activity	Person responsible	June 1-2 weeks	June 1Week	July 4 Weeks	August 4 weeks	September 2 weeks	October
Proposal writing	Principle researcher	**X**					
Training of research assistants	Principle researcher		**X**				
Pre-testing of tools	Principle researcher & research assistants		**X**				
Data collection	Principle researcher & research assistants			**X**	**X**		
Data analysis	Principle researcher					**X**	
Report writing	Principle researcher					**X**	
Dissemination of the findings	Principle researcher						**X**

Appendix 8: Introductory letter

IHSU INTERNATIONAL HEALTH SCIENCES UNIVERSITY
PART OF INTERNATIONAL MEDICAL GROUP

Office of the Dean, Institute of Health Policy & Management

Kampala, 18th June 2014

To THE DIRECTOR PUBLIC HEALTH
AND ENVIRONMENT

Dear Sir/ Madam,

Re: Assistance for Research

Greetings from International Health Sciences University.

This is to introduce to you **Komuhangi Alimah, Reg. No. 2013-MPH-FT-001** who is a student of our University. As part of the requirements for the award of a Masters Degree of Public Health of our University, the student is required to carry out field research for the submission of a Research Dissertation

Komuhangi would like to carry out research on issues related to: **Delayed TB Diagnosis among Patients attending Kampala Capital City Authority Health care Facilities in Uganda**

I therefore request you to render the student such assistance as may be necessary for her research

I, and indeed the entire University are thanking you in anticipation for the assistance you will render to the student

INSTITUTE OF HEALTH POLICY AND MANAGEMENT

Sincerely Yours,

Prof. David Ndungutse Majwejwe
Dean, Institute of Health Policy & Management

MAKING A DIFFERENCE IN HEALTH CARE
International Health Sciences University
P.O. Box 7782 Kampala | Uganda | East Africa
Tel: (+256) 0312 307 400 | E-mail: info@ihsu.ac.ug | web: www.ihsu.ac.ug

Appendix 9: Requisition letter

KOMUHANGI ALIMAH,
INTERNATIONAL HEALTH SCIENCES
UNIVERSITY,
P.O. BOX 7782, KLA.

19th/06/2014.

Moses
Please draft
a no objection
letter

To
THE DIRECTOR PUBLIC HEALTH & ENVIRONMENT.

RE: PERMISSION TO CONDUCT A STUDY IN KCCA HEALTH CENTERS

TOPIC: Delayed TB Diagnosis among Patients attending KCCA Health Care facilities in Uganda.

Dear Sir,

I, Komuhangi Alimah, a student at International Health Sciences University, Kindly request you to grant me Permission to access the following health Centers: Kawaal Kiswa, Kisenyi, Komamboga, Kisugu and Kitebi from Mulago TB diagnostic units July to September 2014.

This is part of the requirements for me to attain the award of a Masters Degree of Public Health However, the findings of my research will enable TB Managers to design a strategy to reduce the burden of TB in the County through early detection and early treatment of TB Cases.

I will be Very glad to hear from you.

Yours Sincerely

KOMUHANGI ALIMAH
0782241238.

KCCA
RECEIVED
19 JUN 2014
DIRECTORATE OF PUBLIC HEALTH & ENVIRONMENT

Appendix 10: Acceptance letter

KCCA
KAMPALA CAPITAL CITY AUTHORITY
For a better City

DIRECTORATE PUBLIC HEALTH AND ENVIRONMENT

Ref: 600/KCCA/210/08

27th June, 2014

Ms. Komuhangi Alimah,
International Health Services,
University,
P.O Box 7782,
Kampala.

RE: PERMISSION TO CARRY OUT RESEARCH IN MULAGO TB DIAGNOSTIC UNITS, KISWA, KISENYI, KOMAMBOGA, KISUGU AND KITEBI HEALTH CENTRES ON ISSUES RELATED TO: *DELAYED TB DIAGNOSIS AMONG PATIENTS ATTENDING KAMPALA CAPITAL CITY AUTHORITY HEALTH CARE FACILITIES IN UGANDA*

Reference is made to your letter dated 19th June, 2014 requesting for permission to conduct a study in KCCA health units.

This is to inform you that permission has been granted to you to collect data from Mulago TB diagnostic units, Kiswa, Kisenyi, Komamboga, Kisugu and Kitebi Health Centers from July to September 2014.

The above permission is granted to you on the following conditions:-

1) Participation in your research is voluntary and the informed consent process should be observed at all times.
2) Provision of a report to the office of the Director of Public Health and Environment

By copy of this letter, the In-Charges of the Health centers are requested to render you all the necessary support.

Dr. Okello Ayen Daniel
AG. DIRECTOR PUBLIC HEALTH AND ENVIRONMENT

c.c. In-Charge, Kaweala Health Centre
c.c. In-Charge, Kiswa Health Centre
c.c. In-Charge, Kisenyi Health Centre
c.c. In-Charge, Komamboga Health Centre
c.c. In-Charge, Kisugu Health Centre
c.c. In-Charge, Kitebi, Health Centre
c.c. Mulago TB Diagnostic Units

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