# Factors associated with late presentation of suspected pulmonary tuberculosis cases to health facilities in Dagoretti District, Nairobi, Kenya

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**A thesis submitted in partial fulfillment for the degree of Master of Science in Epidemiology in the Jomo Kenyatta University of Agriculture and Technology**

**2012**

## DECLARATION

This thesis is my original work and has not been presented for a degree in any other university.

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## DEDICATION

I dedicate this thesis to my late grandmother Esther Kabura Mbiyu for her love of education, my parents Mr. Michael Njau Kenda and Mrs. Jane Wanjiku Njau, my sister Sarah, my brothers Kelvin and Martin and my niece Yvonne for their love, support and encouragement during this study.

## ACKNOWLEDGEMENTS

This work has been accomplished with the assistance of many people who deserve special mention for their support. Firstly, glory to God for all was made possible by Him. My deep appreciation goes to my supervisors Dr.S.M.Karanja, Dr. Jared.O. Omolo and Dr. P. Wanzala for their invaluable support throughout the entire study. I would also want to sincerely thank Dr. J. Sitienei, the head Division of Leprosy, Tuberculosis and Lung Diseases (DLTLD) for his constant support and encouragement. I am grateful for all the staff from all the clinics that were covered who assisted me in one way or the other. Special thanks to the study participants for taking their time to be interviewed.

Special thanks go to my friends, who have been of great encouragement to me and have constructively critiqued this study to make it better. I would also like to appreciate the timely support and encouragement from staff of Jomo Kenyatta University of Agriculture and Technology (JKUAT), Kenya Medical Research Institute (KEMRI) and DLTLD.

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## LIST OF ABBREVIATIONS AND ACRONYMS

| | |
|---|---|
| **AIDS** | Acquired Immunodeficiency Syndrome |
| **AFB** | Acid Fast Bacilli |
| **CDC** | Center for Disease Control |
| **DOTS** | Directly Observed Therapy- Short Course |
| **DLTLD** | Division of Leprosy, Tuberculosis and Lung Diseases |
| **DTLC** | District Tuberculosis and Leprosy Coordinator |
| **GOK** | Government of Kenya |
| **HIV** | Human Immunodeficiency Virus |
| **MDR** | Multi Drug Resistance |
| **MOH** | Ministry of Health |
| **NLTP** | National Leprosy and Tuberculosis Programme |
| **SS+** | Sputum smear positive |
| **SS-** | Sputum smear negative |
| **TB** | Tuberculosis |
| **USAID** | United States Aid |
| **WHO** | World Health Organization |

## ABSTRACT

Tuberculosis is a highly contagious disease accounting for a high number of deaths in the developing countries; it is caused by *Mycobacterium tuberculosis*. Tuberculosis control can be effectively achieved if individuals with the disease receive adequate and timely treatment. The duration in which a tuberculosis case remains infectious is of crucial importance with regard to the risk of exposure to the general population. The objective of this study was to investigate factors that contribute to late presentation of patients to TB management facilities. A cross sectional study was conducted on patients aged 18 years and above attending TB clinics in Dagoretti District, Nairobi Kenya. A total of 426 TB suspects were interviewed. Seeking medical care three weeks after onset of symptoms was considered as late presentation. Eight facilities were included in the study, which were those facilities with a well-functioning laboratory for performing acid fast microscopy. Out of the 426 tuberculosis suspects, 248 (58.2%) suspects had delayed in seeking medical care. After multivariate logistic regression, male gender (P=0,019, OR=1.6), level of education (Primary 5 to 8) (P=0.029, OR=1.26) and seeking over the counter drugs as a first resort after onset of symptoms (P= 0.01 OR=1.27), were found to be significantly associated with delay. The study concluded that male gender, having a level of education of primary 5 to 8 and the first place of medical care after onset of symptoms being over the counter drugs were all significantly associated with late presentation. Findings from this study should be used by policy makers in order to come up with ways to educate the public on the effects of delayed diagnosis on disease prognosis and course of treatment.

# CHAPTER ONE

## 1.0 INTRODUCTION

### 1.1 Background

Tuberculosis (TB) is a contagious and airborne disease (WHO, 2010). It is caused by *Mycobacterium tuberculosis* which is typically slightly curved or straight rod-shaped. The bacillus is 2–5 μm long and its generation time ranges from 12–24 hours. The bacterium is aerobic and non-spore forming (Manissero *et al*., 2008).

The estimates of the global burden of disease caused by TB in 2009 show that there were 9.4 million incident cases, 14 million prevalent cases, 1.3 million deaths among HIV-negative people and 0.38 million deaths among HIV-positive people. Most cases were in the South-East Asia, African and Western Pacific regions (35%, 30% and 20%, respectively). An estimated 11–13% of incident cases were HIV-positive; the African region accounted for approximately 80% of these cases (WHO, 2010). Tuberculosis mostly affects young adults and it is among the three greatest causes of death among women aged 15-44 years (WHO, 2010).

Kenya is one of the 22 high TB burden countries in the world which collectively contribute 80% of the global TB disease burden. The country is experiencing a generalized TB epidemic affecting the young economically productive age groups. In Kenya more women than men are notified as TB cases. In 2008, a total of 110,251 cases of TB were notified to the Division of Leprosy, Tuberculosis and Lung Disease, which represents a TB notification rate of 288 per 100,000 people (DLTLD, 2009).

Early diagnosis and prompt effective therapy form the key elements of TB control. Delay in diagnosis results in increased infectivity in the community and it is estimated that an untreated smear positive patient can infect on average 10 contacts annually and 20 during the natural history of the disease until death (Styblo, 1991). Patient's alertness to the symptoms of tuberculosis combined with health workers' readiness to diagnose the disease and understanding which factors influence this delay is crucial for controlling the spread of the infection within a community (WHO, 2004). It is therefore important to identify factors that cause patient delay as this will enable policy makers to come up with effective interventions to reduce the delay.

A study in Western Kenya attributed a substantial part of the total delay (95%) to late presentation of patients in seeking medical care after onset of symptoms. The study recommended that any intervention to control tuberculosis among patients should be aimed at reducing patient delay (Ayuo *et al*., 2008).

**1.2 Statement of the problem**

Despite intensified global efforts the numbers of cases of tuberculosis are increasing worldwide. The World Health Organization estimates that in 1999, there were 8.4 million new cases, up from 8.0 million in 1997 (WHO, 2001). The WHO estimates that there are nearly 2 million deaths from tuberculosis annually; thus the disease ranks second only to Human Immunodeficiency Virus (HIV) infection as an infectious cause of death (Dye et al., 1999). Delayed presentation is a major problem contributing to the high burden and transmission of tuberculosis (TB) in most developing countries (WHO, 2006). Late diagnosis of pulmonary tuberculosis is likely to be associated with a worse prognosis owing to the presence of extensive disease and poor clinical

condition. Furthermore, of particular importance from epidemiologic perspective, delay in treatment for active tuberculosis is likely to be associated with a greater number of secondary cases per index case (WHO, 2003). Intervention to control tuberculosis among patients should be aimed at reducing patient delay. Published data about factors causing late presentation of patients to TB management facilities in Nairobi is scanty. Effective control of TB can only be achieved if factors causing delay are established and ways of eliminating such factors ascertained.

### 1.3 Justification

Delayed presentation is a major problem contributing to the high burden and transmission of tuberculosis (TB) in most developing countries where fewer than half the estimated sputum smear positive pulmonary tuberculosis (WHO, 2006). Late presentation of patients in seeking medical care is likely to affect the disease prognosis and the course of treatment. Current data indicates that TB cases occur mostly among slum dwellers (DLTLD, 2009). Dagoretti district has a high notification rate of TB according to DLTLD. Since patient delay affects effective control of tuberculosis, it is very important to identify factors that contribute to the delay so as to enhance effective control of tuberculosis. Reduction of the time between onsets of TB symptoms to diagnosis is therefore a prerequisite to bring TB epidemic under control (Warren *et al.*, 2007).

## 1.4 Objectives

### 1.4.1 General objective

To determine potential exposure factors associated with late presentation of TB suspects to TB management facilities in Dagoretti district, Nairobi.

### 1.4.2 Specific objectives

1. To determine the proportion of TB suspects presenting late to the TB management facilities.
2. To determine the association between the exposure factors and late presentation of patients to TB management facilities.

# CHAPTER TWO

## 2.0 LITERATURE REVIEW

### 2.1 Historical background

The bacillus causing tuberculosis, *Mycobacterium tuberculosis*, was identified and described in 1882 by Robert Koch. He received the Nobel Prize in medicine in 1905 for this discovery (Nobel Foundation, 2006). Koch did not believe that bovine and human tuberculosis was similar, which delayed the recognition of infected milk as a source of infection. Later, this source was eliminated by the pasteurization process. Koch announced a glycerine extract of the tubercle bacilli as a remedy for tuberculosis in 1890, calling it "tuberculin". It was not effective, but was later adapted as a test for pre-symptomatic tuberculosis (Waddington, 2004).

It was not until 1946 with the development of the antibiotic streptomycin that effective treatment and cure became possible. Prior to the introduction of this drug, the only treatment besides sanatoria were surgical interventions, including bronchoscopy and suction as well as the pneumothorax orplomage technique collapsing an infected lung to "rest" it and allow lesions to heal a technique that was of little benefit and was mostly discontinued by the 1950s (Wolfart, 1990). The emergence of multidrug-resistant TB has again introduced surgery as part of the treatment for these infections. Here, surgical removal of infected nodules will reduce the number of bacteria in the lungs, as well as increasing the exposure of the remaining bacteria to drugs in the bloodstream. It is therefore thought to increase the effectiveness of the chemotherapy (Lalloo *et al.*, 2006). The resurgence of tuberculosis resulted in the declaration of a global health emergency by the WHO in 1993. Every year, nearly half a million new

cases of multidrug-resistant tuberculosis (MDR-TB) are estimated to occur worldwide (WHO, 2007).

**2.2 Epidemiology of tuberculosis**

Roughly a third of the world's population has been infected with *M. tuberculosis*, and new infections occur at a rate of one per second (WHO, 2007). However, not all infections with *M. tuberculosis* cause TB disease and many infections are asymptomatic (CDC, 2007). In 2007, an estimated 13.7 million people had active TB disease, with 9.3 million new cases and 1.8 million deaths; the annual incidence rate varied from 363 per 100,000 in Africa to 32 per 100,000 in the Americas (WHO 2009). Tuberculosis is the world's greatest infectious killer affecting women of reproductive age and the leading cause of death among people with HIV/AIDS (CDC, 2010).

The rise in HIV infections and the neglect of TB control programs have caused a resurgence of tuberculosis (Iademarco. M. and Casro. K, 2003). The emergence of drug-resistant strains has also contributed to this new epidemic with 20% of TB cases being resistant to standard treatments and 2% resistant to second-line drugs (CDC, 2006). The rate at which new TB cases occur varies widely, even in neighboring countries, apparently because of differences in health care systems (Sobero. R. and Peabody. J, 2006).

The incidence of TB varies with age. In Africa, TB primarily affects adolescents and young adults (WHO, 2006). However, in countries where TB has gone from high to low incidence, such as the United States, TB is mainly a disease of older people, or of

the immuno-compromised (Kumar *et al*., 2007). There are a number of known factors that make people more susceptible to TB infection: worldwide the most important of these is HIV. Co-infection with HIV is a particular problem in Sub-Saharan Africa, due to the high incidence of HIV in these countries (Chaisson and Martinson, 2008). Smoking more than 20 cigarettes a day also increases the risk of TB by two to four times (Davies *et al*., 2006). Diabetes mellitus is also an important risk factor that is growing in importance in developing countries (DLTLD, 2009). Other disease states that increase the risk of developing tuberculosis are Hodgkins lymphoma, end-stage renal disease, chronic lung disease, malnutrition, and alcoholism (Kumar *et al*., 2007).

Research indicates that the magnitude and importance of the problem of tuberculosis, especially in developing countries is a top priority for action (Murray *et al.,* 1990; Sudre *et al.,* 1992; Nunn and Enarson, 1994). Studies have shown that early passive case detection and treatment compliance are the pillars of success in TB control programs. This passive case detection relies on self-presentation to a health worker by persons with symptoms indicative of TB. To achieve good control, adequate resources and health infrastructures, including a functional bacteriological network capable of investigating all TB suspects, are essential prerequisites (Fox, 1988).

### 2.3 Tuberculosis in Kenya

Tuberculosis is a major health problem in Kenya. The reported case detection for all forms of tuberculosis reached 57 per 100 000 in 1991. Since then, case detection rates have increased by 20% for all forms of TB and by 10% for smear-positive cases, which is partly explained by the rising HIV and AIDS epidemic. In 1993, 20,451 TB cases were reported by the National Leprosy and Tuberculosis Programme (NLTP),

not counting an unknown number detected and treated in private institutions (MOH, 1993). Kenya has a functioning National Tuberculosis Programme with clearly defined norms and strategies (NLTP, 1993). Its policy is to integrate TB control in the Primary Health Care Strategy. The majority of TB patients, mainly pulmonary, are seen by a clinical officer specially trained in TB and Leprosy management.

Kenya ranks 13th on the list of 22 high-burden tuberculosis (TB) countries in the world and has the fifth highest burden in Africa (WHO, 2009). According to the World Health Organization's global TB Report 2009, Kenya had more than 132,000 new TB cases and an incidence rate of 142 new sputum smear-positive (SS+) cases per 100,000 people. Kenya's National Division of Leprosy, TB and Lung Disease (DLTLD) began to implement the WHO-recommended DOTS (the internationally recommended strategy for TB control) strategy in 1993 and reported 100 percent DOTS coverage by 1996. In 2005, the DOTS case detection rate reached WHO's target of 70 percent and rose to 72 percent in 2007 (USAID, 2009).

The DOTS treatment success rate also met WHO's target of 85 percent in 2007. Data from the national program show that Kenya had met the target for the treatment success rate in 2007. World Health Organization estimates there were around 2,000 cases of multidrug-resistant (MDR) TB in Kenya in 2007, although only 4.1% of these cases were diagnosed and notified. There is a policy supporting MDR-TB diagnosis and treatment and a laboratory testing facility, and in 2008, USAID continued to support routine MDR-TB surveillance (USAID, 2009).

Kenya continues to treat more and more TB patients each year. However, widespread co-infection with HIV (close to 48 percent of new TB patients) makes TB treatment

difficult (USAID, 2009). While the number of new cases appears to be declining, the number of patients requiring re-treatment has increased (WHO, 2009). The government placed the National Leprosy and Tuberculosis Program (NLTP) (now DLTLD) and the national HIV/AIDS program in the same division in the Ministry of Health (MOH) to better address TB and HIV/AIDS co-infection. This resulted in increased collaborative TB-HIV/AIDS activities across the country. In 2007, the government demonstrated increased political commitment by upgrading the then-NLTP to a division within the MOH (DLTLD**)** and increased funding for TB control. With donor support, a greater proportion of TB patients benefited from improved DOTS services. The DLTLD implements TB and HIV/AIDS treatment services, community-based DOTS (C-DOTS), and public-private mix (PPM) DOTS, as well as activities to address MDR-TB (USAID, 2009). The WHO global report 2009 contains the following data on TB as shown in Table 2.1:

**Table 2.1: WHO data on tuberculosis burden in Kenya in 2009**

| | |
|---|---|
| Kenya population | 37,538,000 |
| Estimated TB incidence (per 100,000) | 353 |
| DOTS population coverage | 100 per 100,000 |
| Rate of new smear positive cases | 142 per 100,000 |
| DOTS case detection rate | 72% |
| Estimated new adult TB cases who are HIV+ve | 47.9% |
| MDR-TB cases among all TB cases | 1.9% |
| DOTS case detection rate | 72% |

**Source: WHO Global TB report 2009**

### 2.3.1 Case definition of pulmonary TB in Kenya

According to DLTLD 2009 Kenya, the case definition for a confirmed pulmonary Tuberculosis case includes the following: (DLTLD, 2009)

- **Pulmonary Tuberculosis sputum smear positive**

-This is a patient with two or more initial smear examinations positive for acid fast bacilli or

-One sputum smear examination positive for AFB plus radiographic abnormalities consistent with active pulmonary TB as determined by a clinician, or

-One sputum smear positive for acid fast bacilli plus sputum culture positive for *Mycobacteria tuberculosis.*

- **Pulmonary TB, sputum smear negative**

A diagnosis of smear negative TB should be made in patients presenting with;

-A cough longer than two weeks.

-At least two sputum specimen are negative for acid fast bacilli

-Radiographic abnormalities are consistent with active pulmonary TB and

-The patient has not responded to a course of broad-spectrum antibiotics excluding fluoroquinolones

## 2.4 Transmission of Tuberculosis

When people suffering from active pulmonary TB cough, sneeze, speak, or spit, they expel infectious aerosol droplets, 0.5 to 5 μm in diameter. A single sneeze can release up to 40,000 droplets. Each one of these droplets may transmit the disease, since the infectious dose of tuberculosis is very low and inhaling less than ten bacteria may cause an infection. People with prolonged, frequent, or intense contact are at particularly high risk of becoming infected, with an estimated 22% infection rate. A person with active but untreated tuberculosis can infect 10–15 other people per year (WHO, 2007). Transmission can only occur from people with active not latent TB (Kumar *et al.*, 2007). The probability of transmission from one person to another depends upon the number of infectious droplets expelled by a carrier, the effectiveness of ventilation, the duration of exposure, and the virulence of the *M. tuberculosis* strain (CDC, 2003). The chain of transmission can, therefore, be broken by isolating patients with active disease and starting effective anti-tuberculosis therapy. After two weeks of such treatment, people with non-resistant active TB generally cease to be contagious.

## 2.5 Signs and symptoms of tuberculosis

When the disease becomes active, 75% of the cases are pulmonary TB. Symptoms include chest pain, coughing up blood (haemoptysis), and a productive, prolonged cough for more than three weeks and breathlessness. Systemic symptoms include fever, chills, night sweats, appetite loss, weight loss, pallor, and often a tendency to fatigue easily (WHO, 2007). In the other 25% of active cases, the infection moves from the lungs, causing other kinds of TB, collectively denoted as extra-pulmonary

tuberculosis (CDC, 2003). This occurs more commonly in immunosuppressed persons and young children. Extra pulmonary infection sites include the pleura in tuberculosis pleurisy, the central nervous system in meningitis, the lymphatic system in scrofula of the neck, the urinogenital system in urogenital tuberculosis, and bones and joints in Pott's disease of the spine. An especially serious form is disseminated TB, more commonly known as miliary tuberculosis. Extra pulmonary TB may co-exist with pulmonary TB as well (CDC, 2003).

### 2.6 Diagnosis of Tuberculosis

To confirm diagnosis of tuberculosis, every effort must be made to identify the causative agent of the disease. A microbiological diagnosis can only be confirmed by culturing *M. tuberculosis* complex from any suspected site of the disease. In practice however, there are many resource settings in which culture is not feasible currently. However, microscopic examination of sputum is feasible in nearly all settings and the diagnosis of tuberculosis can be strongly inferred from identification of the acid fast bacilli through microscopy (DLTLD, 2009). Most TB clinics use sputum microscopy coupled with clinical signs and symptoms for diagnosis. This is because sputum culture takes a longer time for the diagnosis to be confirmed. Once a patient is confirmed to have TB through diagnosis using microscopy, anti-TB treatment is administered immediately (DLTLD, 2009). X-ray is only done on smear negative patients who the physician highly suspects have TB.

## 2.7 Treatment of Tuberculosis

Four drugs are mostly used and they include: Isoniazid, Rifampicin, Streptomycin and Ethambutol or Pyrazinamide. Two systematic reviews of regimens of less than six months have found that shorter duration of treatment have an unacceptably high rate of relapse (Gelband, 2000). Thus the current international standard for smear or culture-positive tuberculosis is a regimen administered for a minimum duration of six months (WHO, 2003). However some regions in Kenya still use the eight months regimen. A different regimen is used for Multi-drug resistant tuberculosis (MDR) which includes; Capreomycin, Prothionamide, Ofloxacin, Cycloserine and Ethambutal (DLTLD, 2009).

## 2.8 Prevention of tuberculosis

TB prevention and control takes two parallel approaches. In the first, people with TB and their contacts are identified and then treated. Identification of infections often involves testing high-risk groups for TB. In the second approach, children are vaccinated to protect them from TB. No vaccine is available that provides reliable protection for adults. However, in tropical areas where the levels of other species of mycobacteria are high, exposure to non-tuberculosis mycobacteria gives some protection against TB (Fine *et al*., 2001)

The World Health Organization declared TB a global health emergency in 1993, and the Stop TB Partnership developed a Global Plan to Stop Tuberculosis that aims to save 14 million lives between 2006 and 2015 (WHO, 2006). Since humans are the

only host of *Mycobacterium tuberculosis*, eradication would be possible. This goal would be helped greatly by an effective vaccine (Martin, 2006)

### 2.9 Delay in TB diagnosis

Delay in diagnosis is composed of the following;

- **Diagnostic delay**

  Time interval between the onset of symptoms and labeling of the patient as a tuberculosis patient (tuberculosis diagnosis).

- **Total delay**

The sum of patient and healthcare system delay since it can be attributed to these types of delay which are defined as follows:

- **Patient delay:** Time interval between onset of symptom and presentation to a health care provider
- **Health care system delay**: Time interval between the date of health-seeking behavior at a health care provider and the initiation of anti-tuberculosis treatment.

Below is a summary of delay in diagnosis of tuberculosis (Figure 2.1):

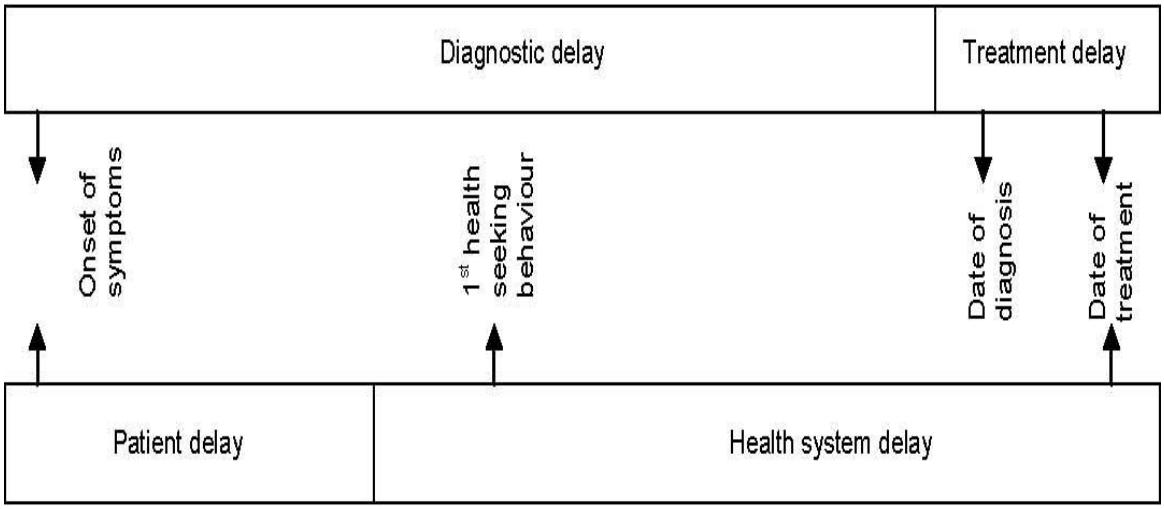


**Figure 2.1: Flow-chart showing different delay durations contributing to the total delay**

The World Health Organization recommends a criterion of tuberculosis case definition for TB suspects as less or equal to 3 weeks from the time the symptoms associated with TB start to the time the patients seek proper medical care (WHO, 1997). Therefore a period exceeding three weeks is referred to as patient delay.

Early diagnosis and prompt effective therapy form the key elements of the tuberculosis control program. Delay in diagnosis results in increased infectivity in the community, and it is estimated that an untreated smear-positive patient can infect, on average, 10 contacts annually and more than 20 during the natural history of the disease until death (Styblo, 1991). Delay in tuberculosis diagnosis may also lead to a more advanced disease state at presentation, which contributes to late sequelae and overall mortality. Smear-positive cases are more likely to infect other individuals. Several factors have been identified as influencing delay in diagnosis and start of treatment, including the individual‘s perception of disease, socioeconomic level, stigma, extent of awareness

about the disease, the severity of the disease, distance between the patient‘s residence and health services, and expertise of the health personnel (WHO, 2007).

Nearly 10% of TB patients on treatment die each year from complications arising partly from delayed presentation and/or Human Immunodeficiency Virus (HIV) co-infection (WHO, 2005). Patient delay (time from onset of symptoms to first consultation to modern health care) is alarmingly prolonged with studies from Ethiopia reporting from 2 to 4 months (Demissie *et al*., 2002). Patient delay represents 77% of the total delay period from onset of symptoms to initiation of treatment (Mesfin *et al*., 2005). In many African countries, modern health services are consulted only after symptoms persist for some time and/or health deteriorates (Liefooghe *et al.*, 1997). Symptoms in the early stage of the disease are not very specific and often confounded by common infections like a cold or malaria, and only if symptoms become worse or persist will the suspect consult a health service.

The HIV epidemic is counteracting TB control efforts by increasing TB incidence and contributing to delays in treatment seeking because of the stigma associated with HIV, and by association with TB (Gelaw *et al*., 2001). Very little is known regarding the pattern of TB patients' health seeking behavior from onset of symptoms to first consultation at a formal health facility.

During a study carried out in Uasin Gishu in Kenya on community perception on TB, the disease was perceived as a dangerous disease that affects the lungs, chest or air passage. It was seen as ‘sensitive’ because it is considered to be highly contagious. Contact with people who have contracted TB is avoided and people themselves take preventive measures to limit the danger of infection. This study involved a focus group discussion that revealed that several TB patients’ appropriate treatment was delayed

because they believed that they were suffering from something other than tuberculosis. Prolonged self-medication also delayed correct treatment. Only after symptoms persisted for a period of time did patients feel the need to seek medical attention. A few patients mentioned that they were incorrectly diagnosed at their first place of consultation (dispensary, health center or hospital), which caused further delay. Female community members felt that the delay was due to patients concealing their health status for fear of isolation, which was mentioned as another inhibiting factor (Liefooghe *et al.*, .1997).

In a study conducted at the Moi Teaching and referral hospital in Rift valley Kenya, on delayed diagnosis of TB, it was found that persons older than 45 years and having low household income were significantly associated with patient delay longer than the median for the whole group whereas, marital status, individuals knowledge and awareness about TB, distance from home to clinic and where help is sought first had significant effect on patient delay. In this study, it was found that health services delay contributed to 5% of total median delay (Ayuo *et al*., 2008). This study was similar to the findings of Demissie *et al.*, 2002 which was a cross sectional study in Ethiopia involving all public hospitals and it reported that median system delay contributed only 9% to the median total delay. Another study in a different region in Ethiopia reported that those who stay far from facility take long to present (Yimmer *et al.*, 2005). It is true that with rampant poverty many patients cannot travel to health facility promptly. Lack of awareness of tuberculosis has also been cited to cause patient delay to seek care (Enwuru *et al.*, 2002). Kiwuwa *et al.,* 2005 in Uganda found that health services delay contributed substantially (74%) to the total median delay.

## 2.10: Quality assurance in Tuberculosis

This is a system for continuously improving reliability, efficiency and use of services. In Kenya, a quality assurance system has been rolled out to all provinces and districts. Individual diagnostic centers undertake internal quality control using known positive and negative microscopic slides. External quality assurance (EQA) is undertaken through blinded slide rechecking. This means that the controllers do not know the original result of the microscopy. Sampling is used to collect the slides from the various health facilities, the District TB and Leprosy coordinator is responsible for sampling and collection of slides from the various facilities. Sampled slides are examined by the first controller and results are recorded. Discordant slides are passed to the second controller for re-checking. A report on errors and other characteristics including reliability and efficiency is then prepared by the Provincial and the District TB and Leprosy coordinators for feedback to the respective laboratories (DLTLD, 2009).

Analysis of the reliability and efficiency of the various facilities is determined using analysis of the false positive and false negative slides. These errors are analyzed as in the Table 2.2 next page:

**Table 2.2: World Health Organization recommended grading of sputum smear microscopy results**

| **Results of technician** | **Results of controller** | | | | |
|---|---|---|---|---|---|
| | **Negative** | **1-9 AFB/100 F** | **1+** | **2+** | **3+** |
| **Negative** | Correct | LFN | HFN | HFN | HFN |
| **1-9 AFB/100 F** | LFP | Correct | Correct | QE | QE |
| **1+** | HFP | Correct | Correct | Correct | QE |
| **2+** | HFP | QE | Correct | Correct | Correct |
| **3+** | HFP | QE | QE | Correct | Correct |

**Source: WHO, 2001**

**Key**

Correct - no errors

QE - Quantification error

LFN - low false negative

LFP -Low false positive

# CHAPTER THREE

## 3.0 MATERIALS AND METHODS

### 3.1 Study site

This study was carried out in Dagoretti District in Nairobi North region which is a health District under the TB control programme. Nairobi North region has had the highest case notification in the region over the years. Dagoretti district is one of the districts in Nairobi North with a high case notification. TB control activities in the district are headed by District TB and Leprosy coordinator (DTLC). It has a population of 240,081. It consists six divisions as indicated in Table 3.1

**Table 3.1: Divisions in Dagoretti District**

| **Division** | **Population** |
|---|---|
| Kawangware | 86,824 |
| Kenyatta/ Golf course | 30,253 |
| Mutuini | 14,521 |
| Riruta | 65,958 |
| Uthiru/Ruthimitu | 23,016 |
| Waithaka | 19,937 |
| **Total** | **240,081** |

**Source: 1999 census GOK**

According to data by the Division of Leprosy, Tuberculosis and Lung Diseases, this district has one of the highest numbers of patients seen in the TB facilities in Nairobi with a case notification rate of 585.2 per 100,000 populations. In this district, there are a total of 26 health facilities which are registered with DLTLD (both public and private). The district had a total of 26 facilities and only 9 facilities had a functional laboratory for performing AFB microscopy. The Nine facilities were selected for this study and included; Riruta Health Center, Waithaka Health Center, Mbagathi District Hospital, Kenyatta National Hospital, Forces Memorial Hospital, Chandaria Health Center, Mary Mission Hospital, Mid hill Health Center and Mutuini Sub District Hospital. Inclusion of the nine facilities helped in reducing the number of referral cases. However, Forces Memorial was excluded from the study because permission to collect data was not given by the management.

### 3.2 Study design

A cross-sectional descriptive study was carried out between the months of February and July 2011.

### 3.3 Study population

The study population included all suspected TB cases attending the TB management facilities.

#### 3.3.1 Inclusion criteria

1. Pulmonary TB suspects who attended the study sites.
2. TB suspects above 18 years who consented to the study (written consent).

### 3.3.2 Exclusion criteria

1. Refusal to consent.
2. Extra pulmonary TB suspects.
3. TB suspects who were below 18 years of age.

## 3.4 Research variables

Data on the following variables was obtained:

### 3.4.1 Dependent variables

- Late presentation of patients to TB management facilities defined as presenting three weeks after onset of symptoms.

### 3.4.2 Independent variables

- Age
- Sex
- Level of education
- Knowledge of TB
- Occupation/Employment status.
- Cost of travel to facility.
- Residence and distance to clinics.
- Marital status
- Income
- Socio economic status: Household size, Number of rooms, Income
- Alcohol consumption and Smoking habits
- Alternative medical care for example herbalists

### 3.5 Sampling procedures

#### 3.5.1 Sample size determination

Going by the proportion of TB suspects referred to TB facilities the sample size was determined as described by (Fisher *et al*., 1998)

$$N=\frac{Z^2\alpha/2 \text{ X } P\ (1-P)}{d^2}$$

Whereby;

N is the minimum sample size

$d^2$ is the degree of precision, which is 5%

α is the level of significance (95%)

Z is the standard normal deviate that corresponds to 95% confidence interval

P = Proportion of TB patient delay in reference to a study in Kenya by Ayuo *et al.,* 2008

In reference to a study conducted in Kenya on delay in tuberculosis by Ayuo *et al.,* 2008 where 64% of the patients had delayed in seeking medical care; using the same estimates for the proportion of patients who had delayed to seek care (p=64%), the calculated sample size was;

$$=\frac{1.96^2 * 0.64*(1-0.64)}{0.05^2}$$

=355

Assuming a 20% non-response rate, the adjusted sample size was;

$$\frac{120*355}{100}$$

=426

### 3.5.2 Sampling

The sample size per facility was obtained by calculating the average number of suspected TB cases seen in that facility over a period of 6 months which was then allocated proportionately based on the total sample size. In systematic sampling technique, the interval was obtained by dividing the average number of suspected cases seen in each facility monthly (N) by the sample size obtained in each facility (n). The numbers are shown below in Table 3.2

**Table 3.2: Number of respondents per facility**

| **Facility** | **Average cases seen monthly (N)** | **Sample size (n)** | **Interval K=N/n** |
|---|---|---|---|
| Chandaria Community Hospital | 25 | 15 | 2 |
| Kenyatta National Hospital | 239 | 140 | 2 |
| Mary Mission Hospital | 5 | 3 | 2 |
| Mbagathi District Hospital | 300 | 176 | 2 |
| Mid Hill Hospital | 5 | 3 | 2 |
| Mutuini Sub District Hospital | 15 | 9 | 2 |
| Riruta Health Center | 105 | 62 | 2 |
| Waithaka Health Center | 30 | 18 | 2 |

### 3.6 Data collection procedures

Questionnaires were pretested in order to establish if they captured all the variables in this study. The pre-tested questionnaires were administered to capture information from the TB suspects on all the variables measured. These patients were identified at the outpatient deparments; clinicians in these facilities assisted in identifying these suspects based on DLTLD guidelines. They were only being interviewed after informed consent was obtained. Information on the signs and symptoms was obtained from the patients and double checked from their records. These TB suspects were captured after the clinician had seen them and referred them to the laboratory for AFB microscopy. Hospital records were reviewed in order to know the final diagnosis of the suspects.

### 3.7 Data collection instruments

Pre-tested structured questionnaires (Appendix 2) were administered in English or Swahili to the pulmonary TB suspects in order to capture the variables investigated in this study.

### 3.8 Statistical Analysis

Data was entered using Microsoft Access software by the principal investigator. Error was minimized by cleaning and rechecking all data entries with the original data forms. The data was then imported to MS Excel which was used for coding and validation. Data was then transferred to both SPSS software package (Version 16.0) and Epi Info version 6 for analysis. MS Excel was used for graphical representation. Fisher's exact test was applied to determine the significance of differences of relative frequencies. Bivariate analysis was performed using Chi square to determine the

association between the dependent variable and independent variables. Multivariate logistic regression using backward method was then performed, to calculate adjusted odds ratio for the independent association between late presentation and the independent variables. Only variables with a $P<0.05$ were entered into the initial model, to remain in the model, a significance of $P<0.05$ was required. The variables that remained in the final model are presented and Odds ratios were adjusted for all other variables in this model.

### 3.9 Ethical considerations

The study was performed according to good clinical practices and to the modified Declaration of Helsinki (WHO, 2001). Permission to perform the study was obtained from the Division of Leprosy, Tuberculosis and Lung Diseases so as to access the facilities (Appendix 7). Clearance was also obtained from; Jomo Kenyatta University of Agriculture and Technology-Institute of Tropical Medicine and Infectious Diseases, Kenya Medical Research Institute Scientific Steering Committee (SSC) (Appendix 4) and KEMRI Ethical Research Committee (ERC) (Appendix 5). Permission to conduct the study in Kenyatta National Hospital (KNH) was obtained from the KNH ethical clearance committee (Appendix 6). Patients were enrolled into the study only after voluntary informed written consent. The patients were free to withdraw from the study at any time. Consent was given by the patients after they were referred to the laboratory by the clinician for AFB smear microscopy. There were rooms in the various facilities that were identified for the interviews to take place so that all the information was confidential. There were no known harms associated with participating in the study. There were no monetary benefits associated with

participation in the study. Prior to the study sensitization meetings with TB facilities health workers were held and the objectives were explained. All information about the patients were handled with utmost confidentiality and only used for intended purposes. Informed written consent was obtained from all the participants. The database containing patient's information was only accessible to the investigators only. The data was stored in electronic formats and hard copies were kept in lockable cabinets that had restricted authorized access.

# CHAPTER FOUR

## 4.0 RESULTS

### 4.1 Distribution of the characteristics analyzed in the respondents

#### 4.1.1 Gender

Majority of the respondents interviewed were male; 245 (57.5%, 95% C.I: 52.7- 62.3) **(**Figure 4.1**).**

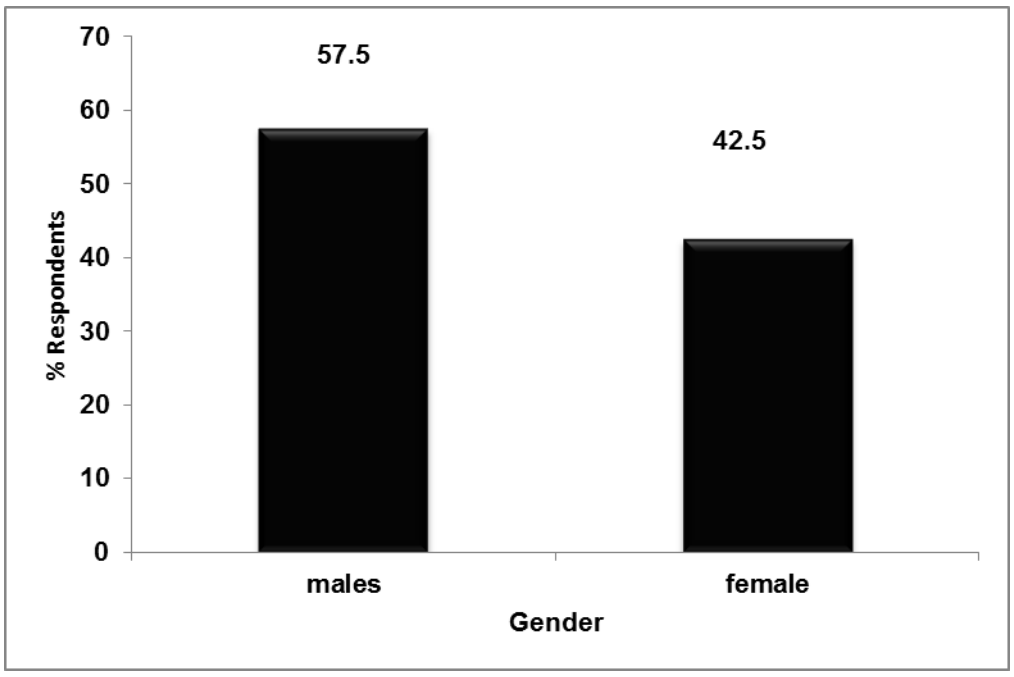


**Figure 4.1: Distribution of the study participants by gender in Dagoretti District, Nairobi Kenya**

### 4.1.2 Age distribution

Analysis of the ages of the respondents showed that 40.8% of the respondents were between the ages of 30-39 years and this group had the highest number of participants (Figure 4.2 next page).

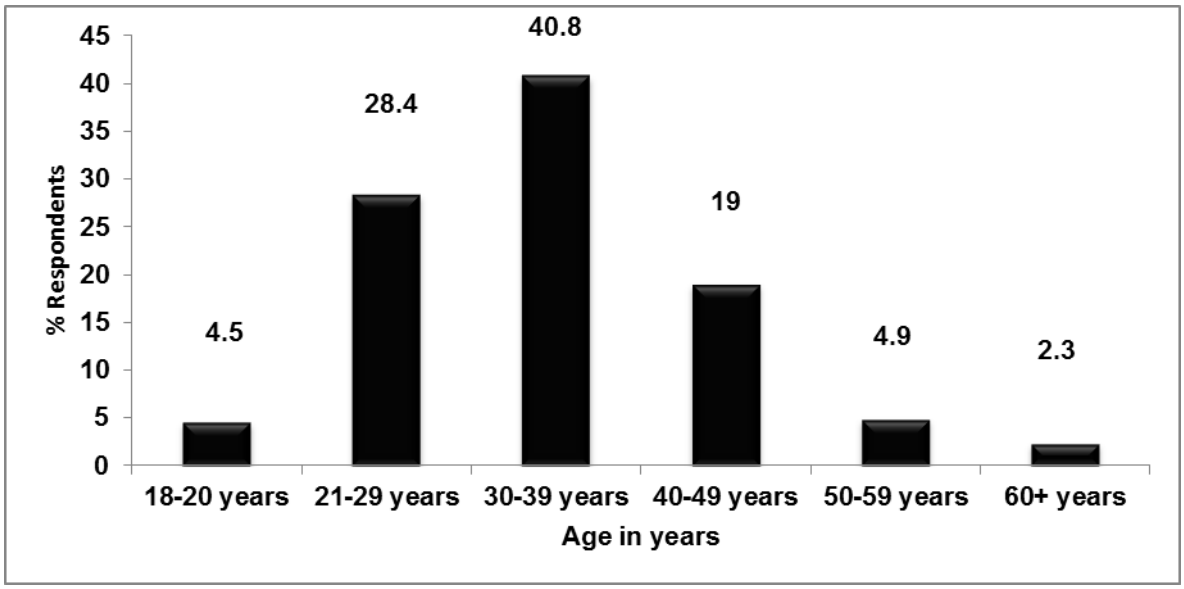


**Figure 4.2: Age of the TB suspects in Dagoretti District, Nairobi Kenya**

### 4.1.3 Marital status

Majority of the respondents were married (64.6%, 95% C.I: 59.8-69.1) (Figure 4.3 next page).

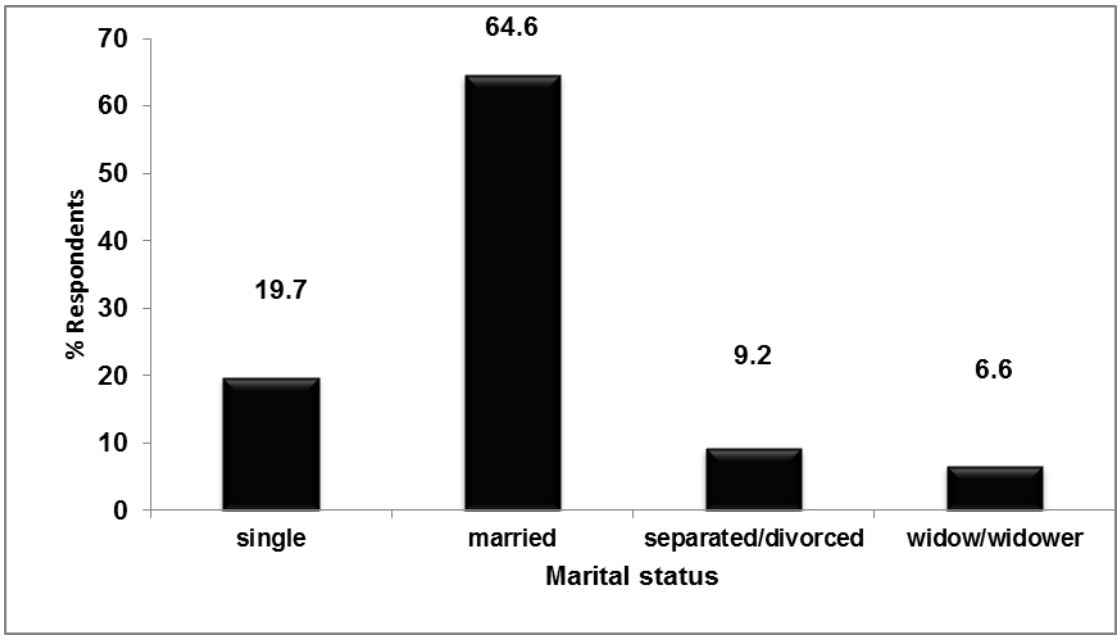


**Figure 4.3: Marital status of TB suspects in Dagoretti District, Nairobi Kenya**

### 4.1.4 Employment status

With regard to employment status of the respondents, 45 were permanently employed (10.6%, 95% C.I: 7.8- 13.9), 197 were casually employed (46.2%, 95% C.I: 41.4-51.1), 32 were unemployed (7.5%, 95% C.I: 5.2-10.4), 125 had businesses (29.3%, 95% C.I: 25.1- 33.9) and 27 were none of the above (6.3%, 95% C.I: 4.2-9.1). There were higher numbers of casual workers compared to the other forms of employments.

### 4.1.5 Level of education

The levels of education varied among the respondents. However, majority of the participants had attended up to primary 5 to 8 (37.1%, 95% C.I: 32.5-41.9) (Figure 4.4).

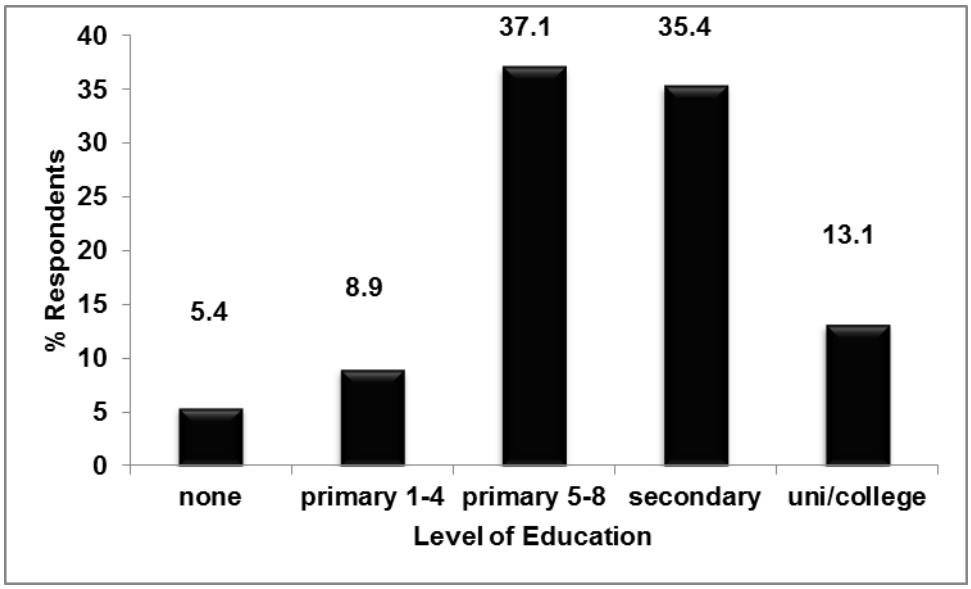


**Figure 4.4: Level of education of TB suspects in Dagoretti District, Nairobi Kenya**

### 4.1.6 Level of income

The study showed that the respondents had different levels of income with majority of them having a monthly income of above 9000 shillings (31%) while 9.2% had no means of income (Figure 4.5).

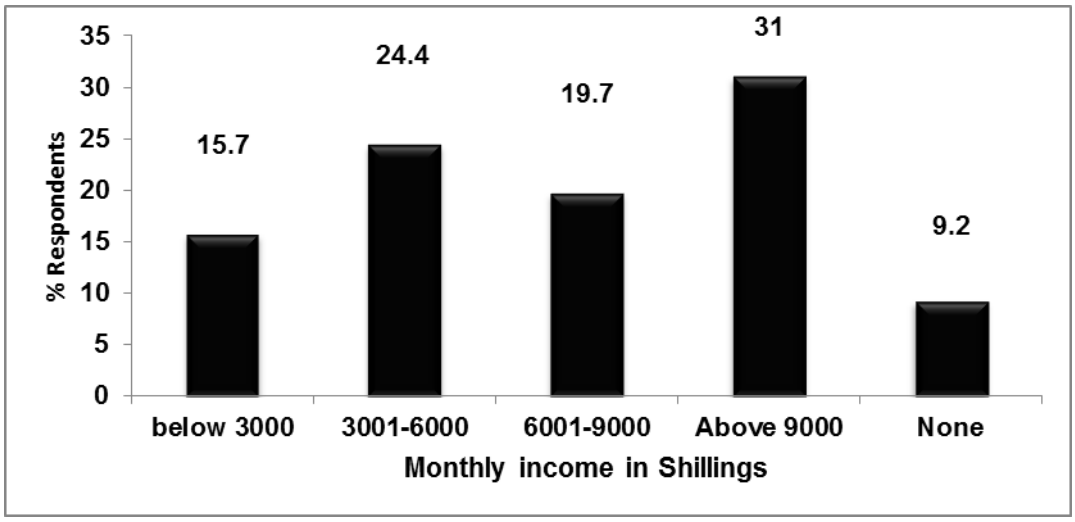


**Figure 4.5: Monthly income of TB suspects in Dagoretti District, Nairobi Kenya**

### 4.1.7 Household size and number of rooms in a house

Analysis of the findings of this study showed that, 227 respondents had a household size of 1-3 (53.3%, 95% C.I: 48.4-58.1), 161 had a household size of 4-6 (37.8%, 95% C.I: 33.1- 42.6) and 38 had a household size of more than 6 (8.9%, 95% C.I: 6.4-12). Out of the 426 respondents, 247 had one roomed houses (58%, 95% C.I: 53.1%-62.7%), 142 had 2 to 3 rooms (33.3%, 95% C.I: 28.9%- 38%) while 37 had more than 3 rooms (8.7%, 95% C.I: 6.2%-11.8%).

### 4.1.8 Availability of formal health facilities

In order to know the availability of formal health facilities in this region, facilities that the respondents thought were accessible to them were established. Seventy five respondents had Dispensaries as their nearest facilities (17.6%, 95% C.I: 14.1- 21.6), 235 had Health Centers (55.2%, 95% C.I: 50.3-60), 74 had District Hospitals (17.4%, 95% C.I: 13.9-21.3), 2 had Provincial Hospitals (0.5%, 95% C.I: 0.06-1.7) and 40 responded as others which mainly included Private hospitals (9.4%, 95% C.I: 6.8-12.6).

### 4.1.9 Mode of transport and distance to health facilities

The mode of transport to health facilities was assessed in which the study found that, 151 walked to the nearest health facility (35.4%, 95% C.I: 30.9-40.2), 262 took a bus/matatu to the nearest health facility (61.5%, 95% C.I: 56.7-66.1) and those that used their own vehicle were 13 (3.1%, 95% C.I: 1.6-5.2). It was important to establish the distance covered by the respondents so as to reach to the health facilities. The findings were that, 194 travelled less than a kilometer to the nearest health facility

(45.5%, 95% C.I: 40.7-50.4), 161 travelled 1-2 km (37.8%, 95% C.I: 33.2-42.6) and 71 had to travel more than 2 km (16.7%, 95% C.I: 13.3-20.6).

### 4.1.10 Cost of visit to health facilities

Although TB treatment is free in Kenya, there are consultation fees set in the different facilities that the patients are required to pay. Findings on the average cost of visit to the health facilities for any ailment showed that, majority of the respondents paid less than 100 shillings for a visit in the health facilities (84.3%, 95% C.I: 80.5-87.6) (Figure 4.6).

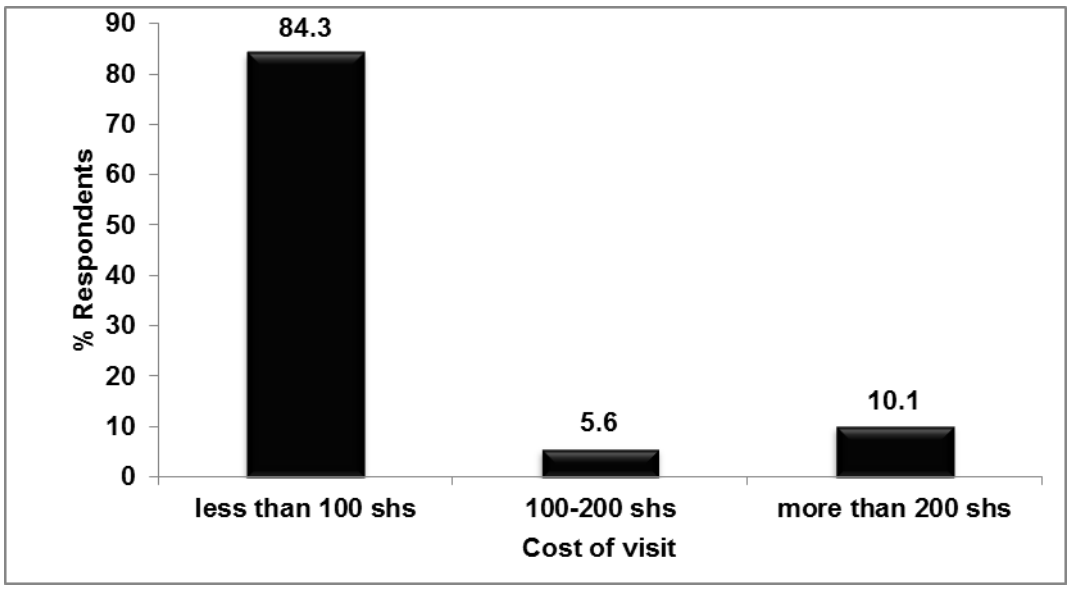


**Figure 4.6: Cost of visit to health facilities in Dagoretti District, Nairobi**

### 4.1.11 Respondents view on transmission of tuberculosis

The study sought to know if the respondents knew how TB is transmitted and found out that 231 participants knew that transmission was through TB patients coughing directly to others (54.2%, 95% C.I: 49.4-59) while 27.7% of the respondents thought it was due to reasons other than the listed which included through dust, cold weather, fumes from vehicles among others (Figure 4.7)

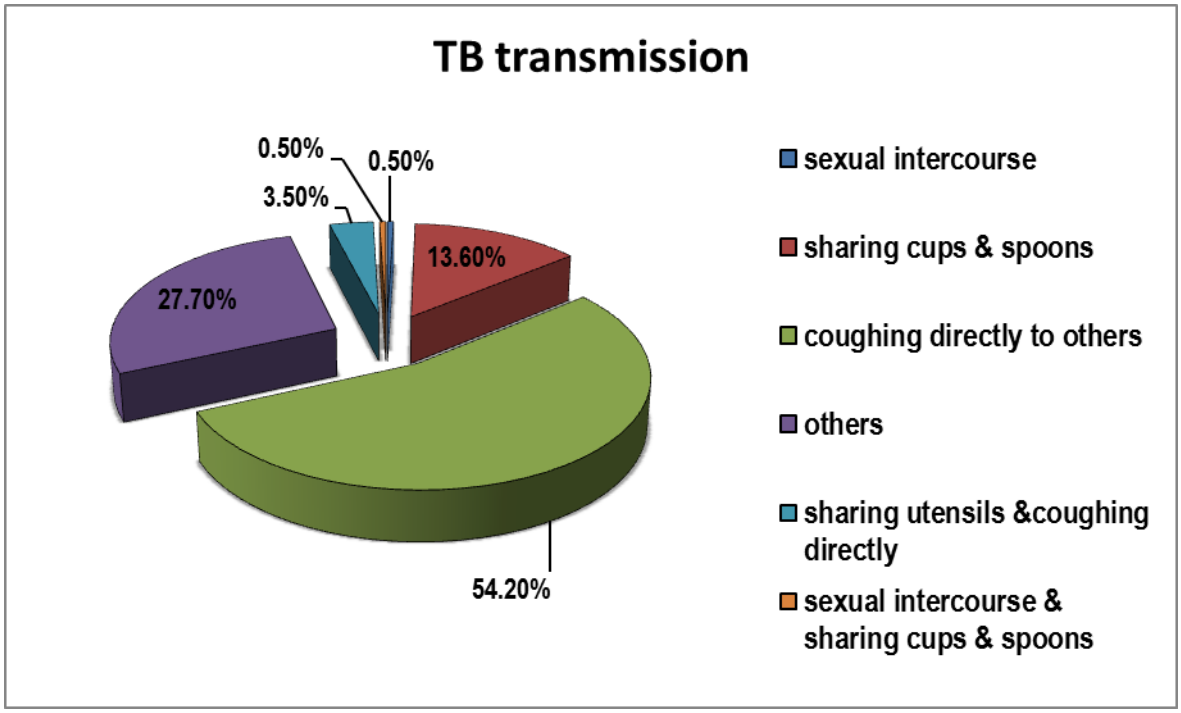


**Figure 4.7: Respondents view on TB transmission in Dagoretti District Nairobi Kenya**

### 4.1.12 Responses regarding TB cure and relationship between HIV and TB

Analysis of the respondents knowledge on cure of TB revealed that, 354 respondents thought TB has a cure (83.1%, 95% C.I: 79.2-86.4) while 72 thought it has no cure (16.9%, 95% C.I: 13.5-20.8). Knowledge on the relationship between TB and HIV was assessed in this study and it was found that, 175 thought that TB is related to HIV (41.1%, 95% C.I: 36.4-45.9), 85 thought there was no relationship (20%, 95% C.I: 16.3-24.1) while 166 did not know if there was any relationship (39%, 95% C.I: 34.3-43.8).

### 4.1.13 Previous TB treatment and referral of respondents

The study sought to know if the respondents had had TB treatment before. This revealed that, 54 respondents had had previous TB treatment (12.7%, 95% C.I: 9.7-16.2) while 354 had never had TB (87.3%, 95% C.I: 83.8-90). The number of referral cases in this study were few, 72 respondents were referral cases (16.9%, 95% C.I: 13.5-20.8) while 354 were not referred from other facilities (83.1%, 95% C.I: 79.2-86.5).

### 4.1.14 Place of first medical care after onset of symptoms

It was important to establish where the respondents sought medical attention first after the symptoms started. The study showed that 217 respondents used over the counter drugs as their first medical care after onset of symptoms. (50.9%, 95% C.I: 46.1-55.8 (Figure 4.8 next page).

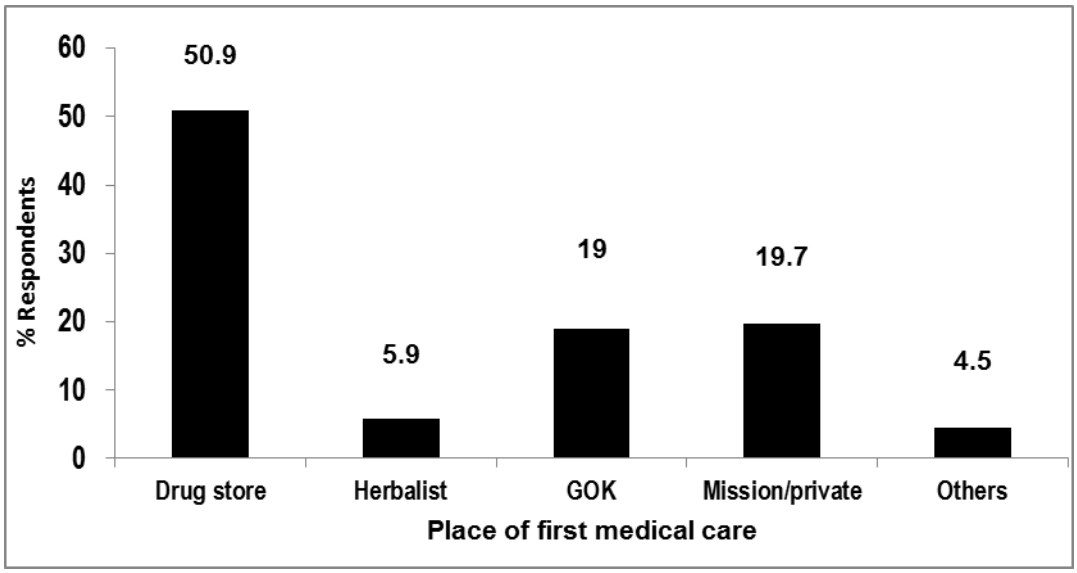


**Figure 4.8: First place of seeking care by TB suspects in Dagoretti District, Nairobi**

### 4.1.15 Respondents reason for delay

The study showed that 248 respondents delayed to seek medical care. The study sought to establish the reasons why these respondents presented late in the health facilities. It was found that, 165 respondents delayed because they thought that symptoms were not serious (66.5%, 95% C.I: 60.3-72.4). The category under others included responses such as busy at work, employer refused among others (Figure 4.9 next page).

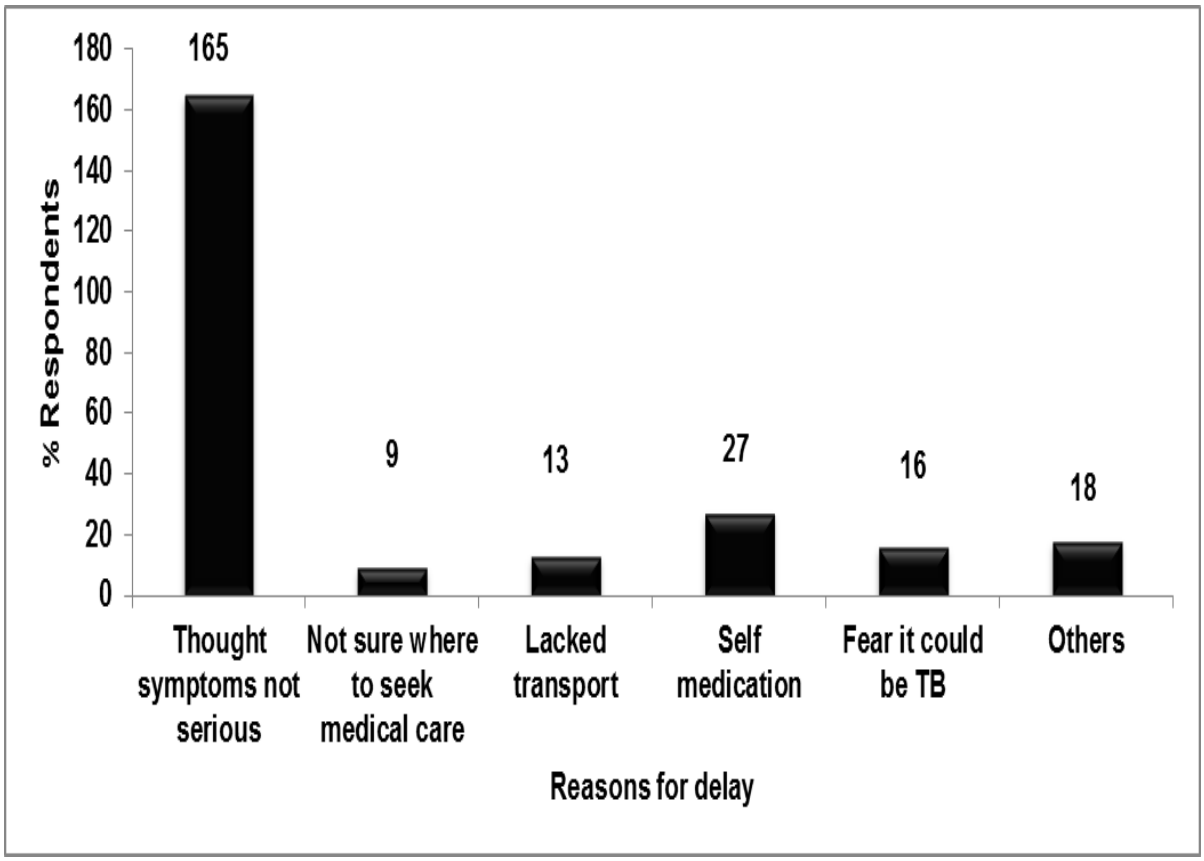


**Figure 4.9: Respondents reasons for delay in Dagoretti District, Nairobi**

### 4.1.16 Smoking and alcohol intake of the respondents

Analysis of the smoking and alcohol intake of the respondents was done. 93 respondents were smokers (21.8%, 95% C.I: 18-26.1) while 333 were nonsmokers (78.2%, 95% C.I: 72-82). Out of 426 respondents 124 were alcoholics (29.1%, 95% C.I: 24.8-33.7) while 302 did not take alcohol (70.9%, 95% C.I: 66.3-75.2).

### 4.1.17 Final Diagnosis of the TB suspects

Out of 426 respondents 141 were confirmed to have TB (33.1%: 95% C.I: 28.6-37.8) while 285 did not have Tuberculosis (66.9%, 95% C.I: 62.2-71.4) (Figure 4.10).

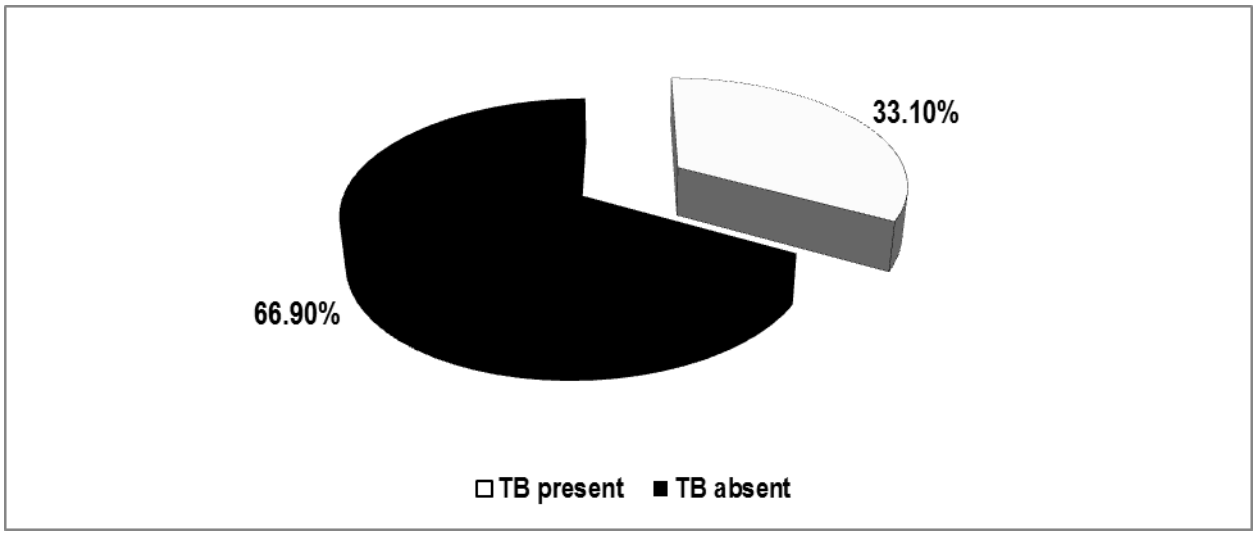


**Figure 4.10: Final diagnosis of the TB suspects in Dagoretti District, Nairobi Kenya**

### 4.1.18 Proportion of the TB suspects who presented late

A total of 248 respondents (58.2%, 95% C.I: 53.4-62.9) had delayed in presenting to health facilities after onset of symptoms, while 178 (41.8%, 95% C.I: 37.1- 46.6) had sought medical care within three weeks after onset of symptoms (Figure 4.11).

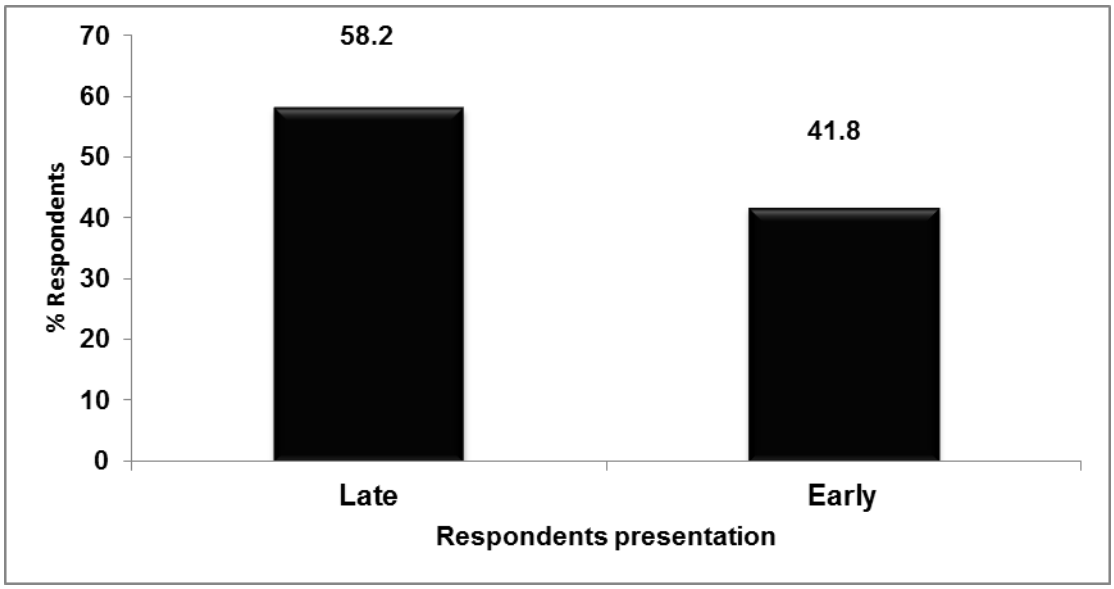


**Figure 4.11: Proportion of TB suspects presenting late in Dagoretti district, Nairobi Kenya**

### 4.1.19 Symptoms reported in the respondents

Cough was the most prevalent symptom and it occurred in 93.9% of the patients, cough with blood occurred in the least number of respondents (27.9%) (Table 4.3).

**Table 4.1: Symptoms reported in the respondents**

| Symptom | n | % | 95% C.I |
|---|---|---|---|
| Cough | 400 | 93.9 | (91.2-96.0) |
| Cough with blood | 119 | 27.9 | (23.7-32.5) |
| Difficulty in breathing | 211 | 49.5 | (44.7-54.4) |
| Chest pains | 260 | 61 | (56.2-65.7) |
| Fever and Night sweats | 243 | 57 | (52.2-61.8) |
| Loss of weight | 166 | 39 | (34.3-43.8) |

## 4.2 Bivariate Analysis of the factors Associated with Late Presentation of Patients to Tuberculosis Management Facilities.

### 4.2.1 Gender and Age

This analysis was done to determine the association between the response variable and the risk factors using chi square. Level of significance was set at P< 0.05. Male gender was significantly associated with late presentation ($\chi^2$=4.248 df =1, **P= 0.039**). Age was not significantly associated with late presentation ($\chi^2$ =6.837, df= 5 P= 0.233), however age group 30-39 years apparently had the highest number of late presentation (46%). Considering age group 30-39 years as the risk factor category, there was significant association between age group 30-39 years with late presentation (**P=0.028**) compared to age 21-29 years.

### 4.2.2 Marital Status and Level of Education

Marital status was not significantly associated with late presentation ($\chi^2$ =0.733, df =3 P =0.865). However majority of those who were married were seen to present late (63.7%) as compared to the other categories. Considering married status as the reference category, there was no significant association between the different marital status groups with late presentation. Generally the level of education was significantly associated with late presentation ($\chi^2$ =19.460, df =4, **P=0.001**). Individuals who had attended primary school class 5-8 apparently had the highest number of delays (44%, 95 C.I: 37.7-50.4). Considering Primary 5 to 8 as the reference category, individuals who had gone up to primary class 1to 4 were significantly associated with late

presentation (P=0.04, O.R=3.06). Those who had gone up to secondary level were also significantly associated with late presentation (P= 0.01, O.R= 1.92).

### 4.2.3 Level of Employment

The level of employment was not significantly associated with late presentation ($\chi^2$ = 2.954 df =4 P =0.566). However those who were casually employed apparently had the highest numbers of individuals presenting late (47.6%). Considering the casually employed as the reference category, there was no significant association between the different categories with late presentation (Table 4.2 next page).

**Table 4.2: Demographic factors in relation to late presentation**

| Variable/category | Late | | Early | | O. R | 95% C.I for O. R | | P value |
|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | | Lower | Upper | |
| **Demographic characteristics** | | | | | | | | |
| **Age in years** | | | | | | | | |
| 30-39 | 114 | 46 | 60 | 33.7 | 1 | | | |
| 18-20 | 10 | 4 | 9 | 5.1 | 1.71 | 0.6 | 4.87 | 0.389 |
| 21-29 | 63 | 25.4 | 58 | 32.6 | 1.75 | 1.06 | 2.89 | **0.028** |
| 40-49 | 43 | 17.3 | 38 | 21.3 | 1.68 | 0.95 | 2.98 | 0.078 |
| 50-59 | 12 | 4.8 | 9 | 5.1 | 1.42 | 0.52 | 3.89 | 0.605 |
| 60+ | 6 | 2.4 | 4 | 2.2 | 1.27 | 0.29 | 5.33 | 0.741 |
| **Marital Status** | | | | | | | | |
| Married | 158 | 63.7 | 117 | 65.7 | 1 | | | |
| Single | 48 | 19.4 | 36 | 20.2 | 1.01 | 0.6 | 1.71 | 0.94 |
| Divorced | 25 | 10.1 | 14 | 7.9 | 0.76 | 0.36 | 1.59 | 0.539 |
| Widowed | 17 | 6.9 | 11 | 6.2 | 0.87 | 0.37 | 2.06 | 0.895 |
| **Employment status** | | | | | | | | |
| Casual | 118 | 47.6 | 79 | 44.4 | 1 | | | |
| Permanent | 23 | 9.3 | 22 | 12.4 | 1.43 | 0.71 | 2.87 | 0.362 |
| Unemployed | 22 | 8.9 | 10 | 5.6 | 0.68 | 0.28 | 1.61 | 0.449 |
| Business | 70 | 28.2 | 55 | 30.9 | 1.17 | 0.73 | 1.9 | 0.564 |
| Other | 15 | 6 | 12 | 6.7 | 1.19 | 0.49 | 2.88 | 0.824 |
| **Education Level** | | | | | | | | |
| Primary (5-8) | 109 | 44 | 49 | 27.5 | 1 | | | |
| None | 17 | 6.9 | 6 | 3.4 | 0.79 | 0.26 | 2.29 | 0.812 |
| Primary (1-4) | 16 | 6.5 | 22 | 12.4 | 3.06 | 1.4 | 6.74 | **0.004** |
| Secondary | 81 | 32.7 | 70 | 39.3 | 1.92 | 1.18 | 3.14 | **0.008** |
| College/Uni | 25 | 10.1 | 31 | 17.4 | 2.76 | 1.41 | 5.41 | **0.002** |

### 4.2.4 Level of income and Household size

Household income was not significantly associated with late presentation to health facilities ($\chi^2$= 4.148, df= 3, P=0.192). However, those with an income above 9000 shillings apparently had the highest number of delays (27%). Considering an income of above 9000 shillings to be the reference category, there was no significant association between the different levels of income and late presentation. The household size had no significant association with late presentation ($\chi^2$ =3.301, df =2, P=0.192), however a household size with 1-3 individuals apparently had the highest number of late presenters (50.8%). The number of rooms in each household had no significant association with late presentation (($\chi^2$=1.049, df=2, P =0.592), however individuals staying in a one room house apparently had the highest number of late presenters.

### 4.2.5 Availability, distance and cost of visit to formal health facilities

There was no significant association between the type of facilities that were near where the respondents lived and late presentation ($\chi^2$=2.950, df=4, P=0.566). However individuals whose nearest facility was a health center apparently had the most delays (56%). There was no significant association between the different modes of transport and late presentation ($\chi^2$=1.584, df=3, P=0.663), however individuals whose mode of transport to health facilities was by foot had the highest delays (62.1%). Distance to health facilities was not significantly associated with late presentation ($\chi^2$=2.050, df=2, P=0.359), however individuals who had to travel less than a kilometer to the health facility apparently had high number of delays (43.1%). Cost of visit was not significantly associated with late presentation ($\chi^2$=4.181, df=2, P=0.124), however

individuals who paid less than a 100 shillings apparently had the highest number of delays (81.5%) (Table 4.3).

**Table 4.3: Factors associated with late presentation**

| Variable/category | Late | | Early | | O. R | 95% C.I for O. R | | P value |
|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | | Lower | Upper | |
| **Monthly income** | | | | | | | | |
| Above 9000 Shs | 69 | 27.8 | 63 | 35.4 | 1 | | | |
| 0-3000 Shs | 60 | 24.2 | 46 | 25.8 | 0.84 | 0.49 | 1.45 | 0.592 |
| 3001-6000 Shs | 67 | 27 | 37 | 20.8 | 0.6 | 0.34 | 1.06 | 0.081 |
| 6001-9000 Shs | 52 | 21 | 32 | 18 | 0.67 | 0.37 | 1.22 | 0.211 |
| **Household size** | | | | | | | | |
| 1 to 3 | 126 | 50.8 | 101 | 56.7 | 1 | | | |
| 4 to 6 | 95 | 38.3 | 66 | 37.1 | 0.87 | 0.56 | 1.33 | 0.561 |
| > 6 | 27 | 10.9 | 11 | 6.2 | 0.51 | 0.22 | 1.13 | 0.106 |
| **Number of rooms** | | | | | | | | |
| 1 | 143 | 57.7 | 104 | 58.4 | 1 | | | |
| 2 to 3 | 86 | 34.7 | 56 | 31.5 | 0.9 | 0.57 | 1.37 | 0.683 |
| >3 | 19 | 7.7 | 18 | 10.1 | 1.3 | 0.62 | 2.75 | 0.567 |
| **Mode of transport** | | | | | | | | |
| By foot | 154 | 62.1 | 107 | 60.1 | 1 | | | |
| Bus/Matatu | 87 | 35.1 | 64 | 36 | 1.06 | 0.69 | 1.62 | 0.864 |
| Own vehicle | 6 | 2.4 | 7 | 3.9 | 1.68 | 0.49 | 5.82 | 0.529 |
| Others | 1 | 0.4 | 0 | 0 | 0 | 0 | 25.26 | 1 |
| **Distance** | | | | | | | | |
| < 1km | 107 | 43.1 | 87 | 48.9 | 1 | | | |
| 1-2 km | 95 | 38.3 | 66 | 37.1 | 0.85 | 0.55 | 1.33 | 0.534 |
| >2km | 46 | 18.5 | 25 | 14 | 0.67 | 0.37 | 1.22 | 0.206 |
| **Cost of visit** | | | | | | | | |
| <100 shs | 202 | 81.5 | 157 | 88.2 | 1 | | | |
| 100-200 shs | 18 | 7.3 | 6 | 3.4 | 0.43 | 0.15 | 1.18 | 0.113 |
| >200 shs | 28 | 11.3 | 15 | 8.4 | 0.69 | 0.34 | 1.39 | 0.345 |
| **Nearest facilities** | | | | | | | | |
| Health center | 139 | 56 | 96 | 53.9 | 1 | | | |
| Dispensary | 44 | 17.7 | 31 | 17.4 | 1.02 | 0.58 | 1.79 | 0.951 |
| District hospital | 42 | 16.9 | 32 | 18 | 1.1 | 0.63 | 1.93 | 0.819 |
| Provincial hospital | 0 | 0 | 2 | 1.1 | Undefined | | | 0.169 |
| Others | 23 | 9.3 | 17 | 9.6 | 1.07 | 0.51 | 2.22 | 0.982 |

### 4.2.6 Respondents view on TB transmission and cure

There was no significant association between respondents view on TB transmission ($\chi^2$=6.921, df=5, P=0.227) and cure ($\chi^2$=0.584, df=1, P=0.4009) in regard to late presentation of the respondents to TB management facilities. However, those who thought TB is transmitted through a TB patient coughing directly to others apparently had more delays (50.8%). Considering those who thought TB is transmitted through TB patients coughing directly to others as the reference category there was significant association between those who thought TB was transmitted by both TB patients coughing directly to others and sharing of cups and spoons compared to those who thought it was only transmitted by TB patients coughing directly to others, in relation to late presentation to management facilities (**P=0.031**). Those who thought TB has a cure apparently had a higher number of late presenters (84.3%). Considering those who thought TB has a cure as the reference category, there was no significant association between knowledge on TB cure and late presentation. Having had previous TB treatment had no significant association with late presentation ($\chi^2$=0.017, df=1, P=0.897). Considering those who had never had TB as the reference category, there was no significant association in relation to late presentation. There was no significant association between knowledge on relation of TB and HIV association in relation to late presentation ($\chi^2$=1.247, df=2, P=0.536) (Table 4.4 next page).

**Table 4.4: Respondents view on TB transmission and other behavioral factors in relation to late presentation**

| Variable/category | Late | | Early | | O. R | 95% C.I for O. R | | P value |
|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | | Lower | Upper | |
| **Respondents view on TB transmission** | | | | | | | | |
| TB patients Coughing directly | 126 | 50.8 | 105 | 59 | 1 | | | |
| Sexual intercourse | 1 | 0.4 | 1 | 0.6 | 1.2 | 0 | 44.5 | 1 |
| Sharing cups and spoons | 36 | 14.5 | 22 | 12.4 | 0.73 | 0.39 | 1.38 | 0.377 |
| Others | 71 | 28.6 | 47 | 26.4 | 0.79 | 0.49 | 1.28 | 0.734 |
| Sharing cups and spoons & coughing directly | 13 | 5.2 | 2 | 1.1 | 0.18 | 0.03 | 0.89 | **0.031** |
| Sexual intercourse &Sharing cups and spoons | 1 | 0.4 | 1 | 0.6 | 1.2 | 0 | 44.46 | 1 |
| **Respondents view on TB cure** | | | | | | | | |
| Yes | 209 | 84.3 | 145 | 81.5 | 1 | | | |
| No | 39 | 15.7 | 33 | 18.7 | 1.22 | 0.71 | 2.09 | 0.527 |
| **Previous TB treatment** | | | | | | | | |
| No | 217 | 87.5 | 155 | 87.1 | 1 | | | |
| Yes | 31 | 12.5 | 31 | 12.9 | 1.04 | 0.56 | 1.92 | 0.985 |
| **TB/HIV Relationship** | | | | | | | | |
| Yes | 105 | 42.3 | 70 | 39.3 | 1 | | | |
| No | 45 | 18.1 | 40 | 22.5 | 1.33 | 0.76 | 2.32 | 0.344 |
| Don’t know | 98 | 39.5 | 68 | 38.2 | 1.04 | 0.66 | 1.64 | 0.943 |
| **Alcohol intake** | | | | | | | | |
| No | 173 | 69.8 | 129 | 72.5 | 1 | | | |
| Yes | 75 | 30.2 | 49 | 27.5 | 0.88 | 0.56 | 1.37 | 0.617 |
| **Smoking** | | | | | | | | |
| No | 187 | 75.4 | 146 | 82 | 1 | | | |
| Yes | 61 | 24.6 | 32 | 18 | 0.67 | 0.4 | 1.11 | 0.13 |

### 4.2.7 Respondents reasons for delay and place of first medical care in relation to late presentation of patients to Tuberculosis management facilities

The place where medical care was sought first after onset of symptoms was significantly associated with late presentation ($\chi^2$=18.531, df=4, **P=0.001**). Most patients, who sought over the counter drugs after the symptoms started, apparently had the highest number of late presenters (56%). Considering over the counter drugs as the first place of medical care as the risk factor category, there was significant association between over the counter drugs as the place of first medical care compared to a visit to a mission/private hospital in relation to late presentation (**P=0.001**). Referral from a primary facility was not significantly associated with late presentation ($\chi^2$=0.156, df=1, P=0.074). When asked about the reasons for delayed presentation, most respondents who had delayed thought that the symptoms were mild and therefore did not see the need for any medical attention (66.5%).

### 4.2.8 TB diagnosis of the respondents

Presence or absence of TB was not significantly associated with late presentation of patients to Tuberculosis management facilities ($\chi^2$=7.727, df=1, P=0.394). However those who did not have TB after diagnosis apparently had the highest number of delays (68.5%). Other selected factors are shown below (Table 4.5 next page).

**Table 4.5: Selected risk factors with regard to late presentation**

| Variable/category | Late | | Early | | O. R | 95% C.I for O. R | | P value |
|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | | Lower | Upper | |
| **First place of medical care** | | | | | | | | |
| Over the counter drugs | 139 | 56 | 78 | 43.8 | 1 | | | |
| Herbalist | 20 | 8.1 | 5 | 2.8 | 0.45 | 0.14 | 1.32 | 0.171 |
| GOK facility | 45 | 18.1 | 36 | 20.2 | 1.43 | 0.82 | 2.47 | 0.227 |
| Mission/Private facility | 35 | 14.1 | 49 | 27.5 | 2.49 | 1.45 | 4.32 | **0.001** |
| Others | 9 | 3.6 | 10 | 5.6 | 1.98 | 0.71 | 5.58 | 0.232 |
| **Referral from another facility** | | | | | | | | |
| No | 212 | 85.5 | 142 | 79.8 | 1 | | | |
| Yes | 36 | 14.5 | 36 | 20.2 | 1.49 | 0.87 | 2.56 | 0.156 |
| **HIV Status** | | | | | | | | |
| No | 145 | 58.5 | 109 | 61.2 | 1 | | | |
| Yes | 37 | 14.9 | 34 | 19.1 | 1.22 | 0.7 | 2.14 | 0.541 |
| Don't know | 66 | 26.6 | 35 | 19.7 | 0.71 | 0.42 | 1.17 | 1.9 |
| **Presence/ Absence of TB** | | | | | | | | |
| No | 170 | 68.5 | 115 | 64.6 | 1 | | | |
| Yes | 78 | 31.5 | 63 | 35.4 | 1.19 | 0.78 | 1.83 | 0.454 |

### 4.3 Multivariate logistic regression analysis

Logistic regression was used to model factors associated with late presentation of TB suspects to Tuberculosis management facilities using three candidate predictive factors which had significant contribution at bivariate level namely;

- Level of education (1= None, 2=Primary class 1-4, 3=Primary class 5-8, 4=Secondary Form 1-4, 5=College/University)
- Gender (1=Male, 2=Female)
- Place of first medical care (1= Over the counter drugs, 2=Herbalist, 3=GOK facility, 4=Mission/Private facility, 5= Others)

Age was included as a confounding factor. Successive iterations were performed. The following factors were associated with/ predictive of late presentation of patients to tuberculosis management facilities:

Gender was statistically significant to late presentation to tuberculosis management facilities (P= 0.019, Adjusted O.R= 1.62). Male respondents were 1.62 times more likely to present late as compared to female respondents.

The level of education was statistically significant to late presentation to Tuberculosis management facilities (P= 0.029, Adjusted O.R 1.26), Respondents who had a level of education of up to Primary class 5-8) were 1.26 times more likely to present late to tuberculosis management facilities.

The place of first medical care was statistically significant to late presentation to tuberculosis management facilities (P= 0.001, Adjusted O.R= 1,27), Respondents whose first place of medical care was over the counter drugs were 1.27 times more likely to present late compared to the others (Table 4.6 next page)

**Table 4.6: Logistic Regression Predicting the factors associated with late presentation of suspects to health facilities**

| Predictor variables | β | S.E. (β) | df | P value | Adjusted odds ratio | 95.0% C.I. for odds ratio | |
|---|---|---|---|---|---|---|---|
| | | | | | | Lower | Upper |
| **Age in years** | 0.018 | 0.1 | 1 | 0.855 | 1.019 | 0.837 | 1.24 |
| **Gender** | 0.487 | 0.208 | 1 | **0.019** | 1.628 | 1.083 | 2.448 |
| **Level of education** | 0.231 | 0.106 | 1 | **0.03** | 1.259 | 1.023 | 1.55 |
| **Place of first medical care** | 0.239 | 0.074 | 1 | **0.001** | 1.27 | 1.098 | 1.469 |

# CHAPTER FIVE

## 5.0 DISCUSSION

The period before diagnosis and start of treatment for tuberculosis is important since most of the disease transmission occurs during this time. The proportion of contacts found to be infected by the time a smear positive index case is being diagnosed is around 30-40% (Rieder, 1999). In an effort to understand the factors associated with patient's delay in Kenya, the socio-demographic and other factors associated with late presentation were determined.

The results of this cross-sectional study showed that 58.2% of the respondents delayed to seek medical care. A similar study in Western Kenya showed that 64% of the respondents delayed in seeking medical care (Ayuo *et al*., 2008). This delay is likely to have adverse effects on tuberculosis control initiatives.

In Dagoretti district, this study showed that male gender was significantly associated (OR=1.63) with late presentation with 61.7% having presented late to TB management facilities. Previous studies in South Africa (Graeme *et al*., 2008) and Uganda (Kiwuwa *et al*., 2005) reported that male gender was associated with high number of patient delay. However a study in Western Kenya found no significant difference between male and female gender with regard to late presentation (Ayuo *et al*., 2008). Another study in Western Ethiopia reported that females have longer delays (female patients were 37% less likely to report earlier) than men (Tatek *et al*., 2007) and that

this was attributed to the socio economic and cultural position of women in the region and the men's ability to afford treatment. This was not observed in the current study.

Although age was not significantly associated with late presentation in this study; age category 30-39 years apparently had the highest number of late presenters (46%). However, on using age 30 to 39 years as the risk factor category, there was significant association with regard to age group 30-39 years and late presentation compared to age 20- 29 years. In a study in Pwani region in Tanzania, the age category 18-40 was associated with patient delay (62.03%) which had the highest number of late presenters compared to other age groups (Ngadaya *et al*., 2009). The findings of this study are similar to a study in Western Kenya which also showed that age in general was not a significant factor to patient delay; however age older than 45 years was associated with patient delay (Ayuo *et al*., 2008).

Marital status was not a contributing factor in this study, however, the respondents who were married apparently presented late compared to the other groups (63.7%). This finding was similar to a study of ten DOTS district in Ethiopia (Mesfin *et al*., 2005).

The level of education in this study was low with majority of the respondents having attained education up to primary school. This category had the highest number of respondents who had presented late (57.4%). However, the level of education of primary 5 to 8 was significantly associated with late presentation to health facilities. A previous study in Western Ethiopia found out that the level of education was a significant factor with regard to (P=0.074) delayed presentation (Tatek *et al*., 2007).

Illiteracy was significantly associated with late presentation as observed in previous studies. In Ethiopia for example, it was a major contributing factor (P=0.0001) to delay (Mesfin *et al*., 2005) while in Nepal, this contributed to 62.2% of the total delay (Rajendra *et al*., 2009).

Patients were required to pay a consultation fee of as little as twenty shillings in some of the public facilities in Dagoretti District. However this was not the case for Kenyatta National hospital which received patients both low and high income regions all over Nairobi and beyond. The level of income of the respondents was not significantly associated with late presentation. However individuals with a monthly income of above 9000 shillings apparently delayed more in seeking care (27.8%). Findings in this study were similar to a previous study in Ethiopia which found out that the level of income had no significant association to delay in seeking care (Mesfin *et al*., 2005).

The household size and number of rooms in a house were both not significantly associated with delay in seeking health care in this study. Most of the respondents who presented late had a household size of 1 to 3 persons (50.8%). In a study in Western Kenya, majority of the patients interviewed had a household size of 4-6 persons (46.57%) while those with 1 to 3 roomed houses were the majority (83.48%). The number of rooms in a house was also not a significant factor for late presentation; apparently most of those respondents who were late had a one roomed house (57.7%). However, both factors were also not significantly associated with delayed presentation in western Kenya (Ayuo *et al*., 2008).

The mode of transport and distance to facilities were not significantly associated with late presentation of the respondents. In establishing the mode of transport to health facilities, those respondents who walked to the facilities had the highest number of late presenter (62.1%). Distance to the health facilities was not a significant factor in this study. However, those patients who travelled less than one kilometer to the facilities apparently had the majority of late presenters (43.1%). However, in a study done in Ethiopia (Yimer *et al*., 2005) distance of more than 10 kilometers to health a facility was significantly associated with late presentation. A similar study in Mwanza Tanzania also found that distance to health facilities was a contributing factor (Wandwalo and Morkre, 1999). However, both studies were undertaken in rural areas as compared to this study which was conducted in an urban area.

The cost of visit/consultation for any ailment was low, with majority of the respondents paying less than 100 shillings (84.3%). Although the cost of visit was not a contributing factor to late presentation in this study, most of delays were noted in those respondents who paid less than 100 shillings in a visit to a facility for any ailment. In most of the facilities covered, the cost of consultation ranged from 20 to 200 shillings. Though TB diagnosis and treatment in Kenya is free in all facilities registered with the Division of Leprosy, Tuberculosis and Lung diseases, the patients have to pay consultation fees in the facilities. Most of the respondents who had dispensaries as the nearest facility presented late to the health facilities (56%). However this was not significantly associated with late presentation.

The first place of medical care was a significant factor with regard to late presentation in this study. Majority of the respondents bought over the counter drugs at onset of

symptoms (56%). This finding was similar to that of a study in Kampala (Kiwuwa *et al.*, 2005) where 76% of the respondents first sought care in a pharmacy/drug shop after the symptoms started. These findings were also similar to a study in Western Kenya which found that the place of first medical care was significantly associated with patient delay (P=0.0001) (Ayuo *et al.*, 2008). In another study in Ethiopia, 89% of the respondents reported that the decision for the first place of medical care after the symptoms started was influenced by close family members (Yimer *et al*., 2005). Visiting traditional healers/ herbalist as the first resort was observed in few respondents in this study and out of those who sought medical help from herbalists only 8.1% had delayed in seeking medical care.

Respondents view on TB transmission was not significantly associated with patient delay in presenting to health facilities. However majority of patients who thought that TB is transmitted through a TB patient coughing directly had the highest delay (50.8%). Majority of the respondents knew that TB has a cure (83.1%). It was noted that although most patients were aware that TB has a cure they were not aware of how TB is transmitted. A previous study in South Africa (Graeme *et al*., 2008) found that knowledge of TB and HIV was a significant factor in delayed presentation. However, the findings in this study were similar to a study in Ethiopia that found no significant difference between patients' knowledge on TB and patient delay (Mesfin *et al*., 2009). In addition, another study in Tanzania found that lack of information on TB was significantly associated with late presentation (Wandwalo and Morkre, 1999).

Having had previous TB treatment was not statistically associated with late presentation. Most of the patients who had delayed in seeking health care had never

had TB before (87.5%). A study in South India found that patient delay was associated with individuals who had been previously treated with TB (Niruparani *et al*., 2010). Respondents view on presence of association between TB and HIV was not a contributing factor in this study. Majority of the respondents who delayed in seeking health care thought that there was a relationship between HIV and TB (42.3%). Referral from a primary facility was not associated with late presentation in this study; most of the respondents had not been referred from other facilities for diagnosis (83.1%). Out of the patients who had been referred from a primary facility, only 14.5% had delayed in seeking care. In a study in Ethiopia (Yimer *et al*., 2005) 70.6% of the patients were referral cases. However the differences can be attributed to the choice of study facilities because the study in Ethiopia dealt with referral centers.

Smoking and alcohol intake were not statistically significant to late presentation in this study. Most of the respondents who presented late were nonsmokers (75.4%) and non-alcoholics (69.8%). However a study in Nepal (Rajendra *et al*., 2009) found that although smoking was not a contributing factor, smokers using more than 5 cigarettes per day had a significantly higher risk of delay and the association seemed to be dependent on dose. The study explained that smokers may have a cough every day and may not realize that it is a symptom of TB and therefore delay in seeking care.

When asked about the reasons why the respondents delayed to present at the facilities, majority stated that they thought the symptoms were mild and would subside. Most of the delays were noted in those who thought the symptoms were mild (66.5%). In a study in South India majority of the respondents thought their symptoms were not severe enough to warrant medical care (Niruparani *et al*., 2010). In another study in

Ethiopia, 70% of the patients believed that the symptoms will disappear by themselves (Demissie *et al*., 2002).

Cough was the most frequent symptom which occurred in 93.9% of the suspects, followed by fever and night sweats (57%). Similar studies in Nepal (Rajendra *et al*., 2009) and Western Ethiopia (Tatek *et al*., 2007) reported cough as the most frequent symptom in 83% and 82.2% of the respondents respectively.

## 5.1 Limitations of the study

One major limitation was identified in this study:

- Financial limitation

  If there had been enough finances, the study would have covered more districts within Nairobi, in order to enhance the generalizability of the findings to the entire Nairobi Province.

  The sample size would also have been increased if there was more money available to conduct this study.

# CHAPTER SIX

## 6.0 CONCLUSIONS AND RECOMMENDATIONS

### 6.1 CONCLUSIONS

Tuberculosis is an important public health problem in Dagoretti District and it's associated with considerable morbidity. Patient delay in seeking medical care in Dagoretti is associated to an extent with a few socio demographic factors and behavioral factors including; gender, level of education and place of first medical care.

Male gender, low level of education and the place of first medical care after onset of symptoms were found to be major contributing factors for delay in seeking medical care.

The study found out that 58.2% of the respondents interviewed had presented late to the health facilities.

## 6.2 RECOMMENDATIONS

Control of tuberculosis is only possible if a multi-disciplinary approach is implemented, including the sufferers themselves, community leaders, educationist, health professionals, Ministry of public Health and sanitation, non-governmental institutions and policy makers. Reduction of the duration between onset of symptoms and visit to a health facility reduces the rate of transmission One area of vital importance is aiming to reduce delay in diagnosis among TB suspects is by improving TB investigation services and referral of patients presenting with symptoms at the referral level for sustainable and effective control of tuberculosis, continuous efforts are proposed, including:

- The policy makers in TB control should embark on nationwide campaigns to educate the public on patient awareness and alertness to TB symptoms and the importance of seeking timely medical care after onset of symptoms.
- The government should ensure incorporation of comprehensive topics on tuberculosis in primary school curriculum so that people are more aware of the disease from tender ages and therefore understand the importance of timely medical care.
- Legislation and enforcement of the Kenya Pharmacy and Poisons Board Act that prohibits dispensing of antibiotics over the counter without prescriptions from registered clinicians.

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# APPENDICES

## APPENDIX 1: INFORMED CONSENT FORM

## PROJECT TITLE: FACTORS ASSOCIATED WITH LATE PRESENTATION OF PATIENTS TO TUBERCULOSIS MANAGEMENT FACILITIES.

### Introduction

My name is Irene Wambui Njau, an MSC student in Epidemiology at Jomo Kenyatta University of Agriculture and Technology (JKUAT). I am working with my research assistant on the project named above. You are kindly requested to participate in this study because you meet the basic inclusion criteria for the study. We would like to collect information on the factors associated with late presentation of patients to TB clinics.

### Purpose of the study

The main aim of the study is to establish the reasons why TB suspects present late to TB management facilities.

### Procedure

If you volunteer to participate in this study either verbally or by signing the section at the end of this form, you will be interviewed and we would ask you to fill in the questionnaire

### Potential risks and discomfort

There are no known harms associated with your participation in this research. Some of the questions may appear uncomfortable for you but it's necessary for you to answer with honesty as this would help us gather accurate information that would improve your general healthcare.

### Benefits of the study to the TB suspects

There will be no monetary benefits associated with participating in this study except gathering information on the factors that are associated with late presentation of patients to TB health facilities.

**Benefits of study to the principal investigator**

This study is expected to yield results on factors that are associated with late presentation of patients to TB clinics by the use of administered questionnaires to the patients suspected of having TB.

**Confidentiality of the records**

Any record relating to the patients will be treated with the utmost confidentiality. Your names will not appear in any of the reports from this study. No identity of any specific individual will be disclosed in any public reports or publications.

**Obtaining additional information**

You are encouraged to ask any questions to clarify any issues at any time or ask questions at any time during your participation in the study. If you later think you need more information you may call

IRENE WAMBUI NJAU.

0720-236 183

P.O BOX 11326-00100

NAIROBI

Any concerns or questions regarding the study and you would like to talk to any other person other than the researcher, you are encouraged to contact:

DIRECTOR ITROMID

P.O. Box 62000-00200

itromid@nairobi.mincom.net

OR

THE CHAIRMAN,

KEMRI, NATIONAL ETHICAL REVIEW COMMITTEE

P.O. Box 54840-00200

**Basic of Participation**

- You are being requested to participate in this study.
- Participation is entirely voluntary.
- You are free to withdraw the consent to participate in this study at any time.
- You are free to ask any questions pertaining the study which may not be clear to you after the consent has been explained to you.

**Signatures**

I, the undersigned have understood the above information which has been read and explained to me by the researcher and I voluntarily consent to participate. I have had the opportunity to ask questions and all of my questions have been answered satisfactorily.

**Name of Respondent …….. Date…….**

**Signature…….**

I, the researcher declare that the above has agreed to voluntarily participate in the study.

**Name of the researcher ……..**

**Date……. Signature ……**

## APPENDIX 2: QUESTIONNAIRE

**FACTORS ASSOCIATED WITH LATE PRESENTATION OF PATIENTS TO TUBERCULOSIS MANAGEMENT FACILITIES: A CASE STUDY IN DAGORETI DISTRICT, NAIROBI KENYA**

**Structured interview guide for Tuberculosis suspects at the Tuberculosis management facilities**

**A. Basic information**

**1.** Interview date [dd] [mm] [yr] _____

2. Patient's name _____ patient ID _____

3. Facility's name _____

4. Questionnaire number _____

**B. Socio-Demographic information**

5. Gender of participant

1. Male [ ] 2. Female [ ]

6. Age in years

1. 18-20 years [ ] 4. 40-49 years [ ]
2. 21-29 years [ ] 5. 50-59 years [ ]
3. 30-39 years [ ] f) 60+ years [ ]

7. Where is your place of residence? _____

8. What is your current marital status?

1. Single [ ] 2. Married [ ]
3. Separated/ Divorced [ ] 4. Widowed/ widower [ ]
5. Other (Specify)……

**C. Socio-Economic status**

9. What is your current employment status?

1. Permanently employed [ ] 2. Casually employed [ ] 3. Unemployed [ ]
4. Business [ ] 5. Other (Specify)……..

10. What is your household monthly income?

1. Below 3000 [ ] 2. 3001-6000 [ ] 3. 6000-9000 [ ] 4. Above 9000 [ ]

11. How many rooms does your house have?

1. 1 room [ ] 2. 2-3 rooms [ ] 3. More than 3 rooms [ ]

12. What is your household size?

1. 1-3 [ ] 2. 4-6 [ ] 3. More than 6 [ ]

**D. Level of education and knowledge on Tuberculosis**

13. What is the highest level of formal education reached?

1. None [ ] 2. Primary (class 1 to 4) [ ] 3. Primary (class 5 to 8) [ ]
4. Secondary (form I to IV) [ ] 5. University/ college education and above [ ]

14. How is TB transmitted?

1. Through sexual intercourse [ ] 2. From mother to child [ ]
3. Sharing cups and spoons [ ] 4. TB patients coughing directly to others [ ]

4.Others……
15. Can tuberculosis be cured?
1. Yes [ ] 2.No [ ]

16. a).Have you ever been treated with TB before?

1. Yes [ ] 2.No [ ]

b) If yes please indicate the Date/ month/ year ----/----/---
17. Do you think TB has any link with HIVand AIDS?
1. Yes [ ] 2. No [ ] 3. Don't know [ ]

**E. Health seeking behavior**

18. What health facilities exist in your area?
1. Dispensary [ ] 2. Health center [ ] 3. District hospital [ ]
4. Provincial hospital [ ] 5. Others (Specify)……
19. What is the mode of transport to the nearest health facility?
1. By foot [ ] 2. By bus/matatu [ ] 3. By own vehicle [ ]
4. Other (Specify) ……..
20. What is the approximate distance from your home to the hospital?
1. Less than a kilometer [ ] 2. 1-2 km [ ] 3. More than 2 km [ ]
21. What is the average cost of a visit to the health facility for any ailment?
1. Less than 100 shilling [ ] 2. 100- 200 shs [ ] 3.More than 200 shs [ ]
22. When did you start feeling unwell? Date/ month/ year ----/----/---
23. What symptoms did you experience and for how long?

| **Symptom** | **Yes** | **No** | **If yes, indicate the date of onset of symptoms [dd ] [mm] [ yy]** |
|---|---|---|---|
| Cough | | | [ ] [ ] [ ] |
| Cough with blood | | | [ ] [ ] [ ] |
| Difficulty in breathing | | | [ ] [ ] [ ] |
| Chest pains | | | [ ] [ ] [ ] |
| Fever and night sweats | | | [ ] [ ] [ ] |
| Loss of weight | | | [ ] [ ] [ ] |

24. What did you suspect you were suffering from?

……
……

25. When did you first seek medical attention after the symptoms started?

Date/ Month/ Year ----/----/-----

26. Where did you first seek medical care after the symptoms started?
    1. Over the counter drugs at a chemist [ ] 2. Herbalist [ ]
    3. GoK facility [ ] 4. Mission/ Private Facility [ ]
    5. Others (specify)
……

27. Did the symptoms go away?

    1. Yes [ ] 2.No [ ]

28. a) Were you referred here from another facility?
    1. Yes [ ] 2.No [ ]

    b) If yes, please indicate the name of the facility
……
…….

29 How long did it take you to be referred to this facility?
……
……

30. What are the reasons that made you not seek medical care immediately?
    a) Thought that the symptoms were not serious and could go away [ ]
    b) Was not sure where to seek medical care [ ]
    c) Lacked transport [ ]
    d) Self-medication [ ]
    e) Fear that it could be Tuberculosis [ ]
    f) Others (specify)
    ……
    ……

31. Do you smoke cigarettes?

    1. Yes [ ] 2.No [ ]

32. Do you take alcohol?

    1. Yes [ ] 2.No [ ]

**(F) Information on the diagnosis of the Tuberculosis patient**

(*To be filled by the interviewer based on clinician findings*)

33. What is the patients HIV status
    1. Positive [ ] 2. Negative [ ] 3. Not done [ ]

34. What is the patient's final diagnosis?
    1. Tuberculosis present [ ]
    2. Tuberculosis absent [ ]

## APPENDIX 3: ORODHA YA MASWALI

**MAMBO YANAYOHUSIANA NA KUCHELEWA KUJIWASILISHA KWA WAGONJWA KWENYE VITUO VYA USIMAMIZI WA KIFUA KIKUU: KESI KATIKA WILAYA YA DAGORETTI, NAIROBI KENYA.**

**Muundo wa kuongoza katika mahojiano ya watuhumiwa wa kifua kikuu katika vituo vya usimamizi wa kifua kikuu**

**A. Habari ya msingi**

1.Tarehe ya mahojiano _____

2. Jina ya mgonjwa _____ kitambulisho cha mgonjwa _____

3. Jina la kituo _____

4. Nambari ya fomu _____

**B. Habari ya Kijamii na Idadi ya Watu**

5. Jinsia ya mshiriki

1. Kiume [ ] 2. Kike [ ]

6. Umri wa miaka

1. miaka 18-20 [ ]
2. miaka 21-29 [ ]
3. miaka 30-39 [ ]
4. miaka 40-49 [ ]
5. miaka 50-59 [ ]
6. miaka 60 [ ]

7. Je, nafasi yako ya makazi ni wapi?

8. Je, hali yako ya ndoa kwa sasa ni gani?

1. Kutoolewa [ ]
2. Kufunga ndoa [ ]
3. Kutengwa / achwa [ ]
4. Mjane / mwanaume [ ]
5. Nyingine (taja) _____

.....

**C. Hali ya kijamii na kiuchumi kwa sasa**

9. Je, hali yako ya ajira kwa sasa ni gani?

1. mfanyakazi wa kudumu [ ] 2. mfanyakazi wa kawaida [ ] 3. Kutokuwa na kazi [ ]
4. Biashara [ ] 5. Nyingine (taja)

.....

10. Je, mapato ya kaya yako ya kila mwezi ni pesa ngapi?

1. Chini ya 3,000 [ ] 2. 3001-6000 [ ] 3. 6000-9000 [ ] 4. zaidi ya 9,000 [ ]

11. Nyumba yako ina vyumba vingapi?

1. chumba kimoja [ ] 2. vyumba 2-3 [ ] 3. Zaidi ya vyumba 3 [ ]

12. Je, nyumba yako inaishi watu wangapi?

1. 1-3 [ ] 2. 4-6 [ ] 3. Zaidi ya 6 [ ]

**D. Kiwango cha elimu na maarifa juu ya kifua kikuu**

13. Je, ngazi ya juu ya elimu rasmi kufikiwa ni gani?

1. Hakuna [ ] 2. Shule ya Msingi (darasa 1 na 4) [ ] 3. Shule ya msingi (darasa 5 hadi 8) [ ]
4. Shule ya Sekondari (kidato cha I hadi IV) [ ] 5. Chuo kikuu / chuo elimu na juu ya [ ]

14. Je, kifua kikuu huenezwa kwa njia gani?
1. Kwa njia ya ngono [ ] 2. Kutoka kwa mama mja mzito kwenda kwa mtoto [ ]
3. Kugawana vikombe na miiko [ ] 4. Wagonjwa wa TB kukohoa moja kwa moja kwa wengine [ ] 4. Jinsi zingine (taja)
.....

15. Je, unaweza kutibu kifua kikuu?
1. Ndiyo [] 2.No []
16. a) Je, umewahi kutibiwa kifua kikuu hapo awali.?
1. Ndiyo [] 2.No []
b) Kama ndiyo tafadhali ainisha ya Tarehe / mwezi / mwaka ----/----/---
17. Je, unafikiri kifua kikuu ina uhusiano wowote na ukimwi?
1. Ndiyo [ ] 2. Hakuna [ ] 3. Sijui [ ]

**E. Tabia ya kutafuta afya**

18. Je,huduma za afya ambazo ziko katika eneo lako ni gani?
1. Zahanati [ ] 2. Kituo cha afya [ ] 3. Hospitali ya wilaya [ ]
4. Hospitali ya Mkoa [ ] 5. Zingine (taja)
.....

19. Je, mfumo wa usafiri wa kwenda kwenye kituo cha afya ni mgani?
1. Kwa miguu [ ] 2. Kwa basi / matatu [ ] 3. Kwa gari yako binafsi [ ]
4. mwingine(taja)
.....
20. Je, ni takriban umbali gani kutoka nyumbani kwako mpaka hospitali?
1. Chini ya kilomita [ ] 2. Kilomita 1-2 [ ] 3. Zaidi ya kilomita 2 [ ]
21. Je, kwa wastani, gharama za ziara ya kituo cha afya kwa ajili ya maradhi yoyote ni ngapi?
1. Chini ya shilingi 100 [ ] 2. Shilingi 100-200 [ ] 3.zaidi ya shilingi 200 [ ]
22. Ulianza kuhisia vibaya wakati gani? Tarehe / mwezi / mwaka ----/----/---
23.Je, ulihisi dalili gani na kwa muda mgani?

| **Dalili** | **Ndiyo** | **Hapana** | **Kama ndiyo, onyesha tarehe ya kuanza kwa dalili [dd] [mm] [yy]** |
|---|---|---|---|
| Kukohoa | | | [ ] [ ] [ ] |
| Kikohozi kwa damu | | | [ ] [ ] [ ] |
| Ugumu katika kinga | | | [ ] [ ] [ ] |
| Maumivu ya kifua | | | [ ] [ ] [ ] |
| homa | | | [ ] [ ] [ ] |
| Kupoteza uzito | | | [ ] [ ] [ ] |

24. Je, ulikuwa unafikiri anaumwa na nini?

.....
.....

25.Wakati wa kwanza kutafuta matibabu baada ya dalili kuanza ulikuwa lini?

Tarehe / Mwezi / Mwaka ----/----/-----

26. Mahali pa kwanza kutafuta huduma ya matibabu baada ya dalili kuanza ilikuwa wapi?

1. Kununua dawa za katika duka la dawa a [ ] 2. Waganga [ ]
3. Kituo cha Serikali [ ] 4. Kituo cha mtu binafsi [ ]
5. kwingine (taja)

.....

27. Je, dalili ziliisha?

1. Ndiyo [ ] 2.No [ ]

28. a) Je, ulitumwa hapa kutoka hospitali nyingine?

1. Ndiyo [ ] 2.No [ ]

b) Kama ndiyo, tafadhali ainisha jina la kituo hicho

.....
.....

29 Je, ilichukuwa muda mgani kutumwa kwa hii hospitali?

.....

30. Je, ni sababu gani ilikufanya wewe kukosa kutafuta huduma ya afya, mara moja?

a ) Kufikiri kwamba dalili zliikuwa si mbaya na zinaweza kwenda mbali [ ]
b) Kukosa uhakika mahali pa kutafuta huduma za afya [ ]
c) kukosa pesa za kusafiri [ ]
d) Kuchukuwa dawa binafsi bila maagizo ya daktari [ ]
e) Hofu kuwa inaweza kuwa kifua kikuu [ ]
f)Sababu zingine (taja).....

31. Je, unavuta sigara?

1. Ndiyo [ ] 2.hapana [ ]

32. Je unakunywa pombe?

1. Ndiyo [ ] 2.hapana [ ]

**(F) Taarifa juu ya utambuzi wa mgonjwa wa Kifua Kikuu**

(Itajazwa na anayehojiana kulingana na matokeo ya daktari)

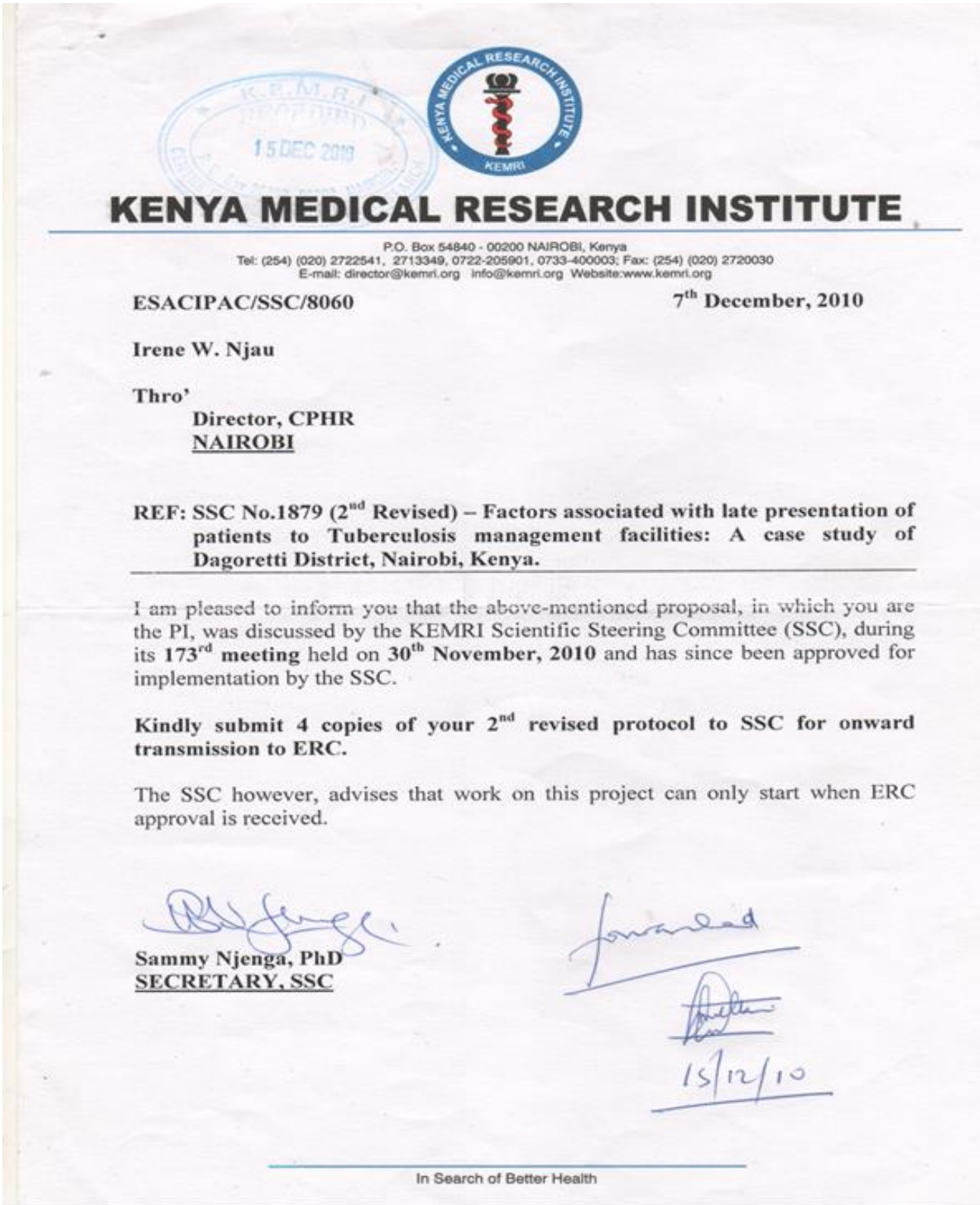
33. Je mgonjwa ana ukimwi?

1. Chanya [ ] 2. Hasi [ ] 3. haijafanywa [ ]

34. Utambuzi wa mwisho wa mchuguzi

1. Mgonjwa ana Kifua kikuu [ ]
2. Mgonjwa hana Kifua kikuu [ ]

**APPENDIX 4: SCIENTIFIC STEERING COMMITTEE CLEARANCE LETTER**



KENYA MEDICAL RESEARCH INSTITUTE

P.O. Box 54840 - 00200 NAIROBI, Kenya
Tel: (254) (020) 2722541, 2713349, 0722-205901, 0733-400003; Fax: (254) (020) 2720030
E-mail: director@kemri.org info@kemri.org Website:www.kemri.org

**ESACIPAC/SSC/8060** **7th December, 2010**

**Irene W. Njau**

**Thro'**
**Director, CPHR**
**NAIROBI**

**REF: SSC No.1879 (2nd Revised) – Factors associated with late presentation of patients to Tuberculosis management facilities: A case study of Dagoretti District, Nairobi, Kenya.**

I am pleased to inform you that the above-mentioned proposal, in which you are the PI, was discussed by the KEMRI Scientific Steering Committee (SSC), during its **173rd meeting** held on **30th November, 2010** and has since been approved for implementation by the SSC.

**Kindly submit 4 copies of your 2nd revised protocol to SSC for onward transmission to ERC.**

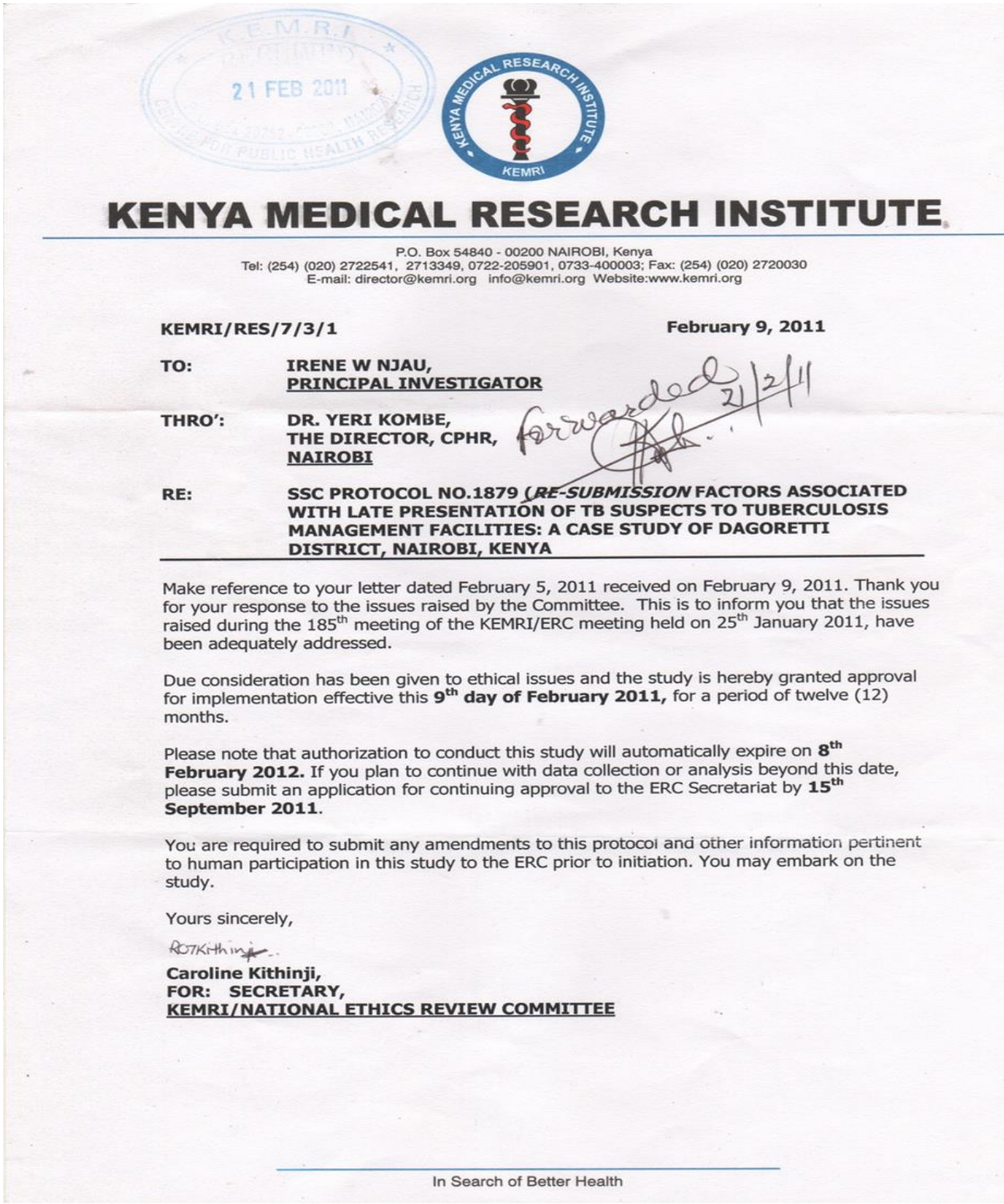
The SSC however, advises that work on this project can only start when ERC approval is received.

**Sammy Njenga, PhD**
**SECRETARY, SSC**

15/12/10

In Search of Better Health

## APPENDIX 5: KEMRI ETHICAL CLEARANCE LETTER



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**KEMRI/RES/7/3/1** **February 9, 2011**

**TO:** **IRENE W NJAU,**
**PRINCIPAL INVESTIGATOR**

**THRO':** **DR. YERI KOMBE,**
**THE DIRECTOR, CPHR,**
**NAIROBI**

forwarded 21/2/11

**RE:** **SSC PROTOCOL NO.1879 (*RE-SUBMISSION* FACTORS ASSOCIATED WITH LATE PRESENTATION OF TB SUSPECTS TO TUBERCULOSIS MANAGEMENT FACILITIES: A CASE STUDY OF DAGORETTI DISTRICT, NAIROBI, KENYA**

Make reference to your letter dated February 5, 2011 received on February 9, 2011. Thank you for your response to the issues raised by the Committee. This is to inform you that the issues raised during the 185th meeting of the KEMRI/ERC meeting held on 25th January 2011, have been adequately addressed.

Due consideration has been given to ethical issues and the study is hereby granted approval for implementation effective this **9th day of February 2011,** for a period of twelve (12) months.

Please note that authorization to conduct this study will automatically expire on **8th February 2012.** If you plan to continue with data collection or analysis beyond this date, please submit an application for continuing approval to the ERC Secretariat by **15th September 2011**.

You are required to submit any amendments to this protocol and other information pertinent to human participation in this study to the ERC prior to initiation. You may embark on the study.

Yours sincerely,

**Caroline Kithinji,**
**FOR: SECRETARY,**
**KEMRI/NATIONAL ETHICS REVIEW COMMITTEE**

In Search of Better Health

## APPENDIX 6: KENYATTA NATIONAL HOSPITAL ETHICAL CLEARANCE

## APPENDIX 7: TUBERCULOSIS PROGRAM CLEARANCE LETTER

The Republic of Kenya
Ministry of Public Health and Sanitation
**Division of Leprosy, Tuberculosis and Lung Disease**
**New NASCOP Building – Kenyatta National Hospital**
Tel (254) 2-713198/721890 Fax (+254) 2-713198
Email – info@nltp.co.ke

NLTP/HR/4/11 Vol. II (9) Tuesday, June 08, 2010

**To whom it may concern,**

RE: IRENE WAMBUI NJAU-REGISTRATION NUMBER TM-306-0539/2009

The above is a student at the Jomo Kenyatta University of Agriculture and Technology pursuing a Masters degree in Epidemiology. She is also a volunteer at the Tuberculosis Central Reference Laboratory.

As part of her degree fulfillment, she is undertaking a research study on '***Factors associated with late presentation of patients to Tuberculosis management facilities in Dagoretti district***'. This study has been approved by the university ethics committee. She will interview TB suspects in Riruta Health Center, Waithaka Health Center, Mbagathi District Hospital, Kenyatta National Hospital, Forces Memorial Hospital, Chandaria Health Center, Mary Mission Hospital, Mid hill Health Center and Mutuini Sub District Hospital in order to obtain information on this study.

Please accord her all the necessary support that she may need.

Dr. Joseph Sitienei

Head DLTLD

24/06/10
- APPROVED
TO SHARE WITH THE DISTRICT THE FINDINGS OF THE STUDY.

DR KADIVANE

DISTRICT MEDICAL OFFICER OF HEALTH
NAIROBI HEALTH BOARD
P.O. BOX 49845 00100 NAIROBI