ASSESSMENT OF KNOWLEDGE, ATTITUDE AND PRACTICES REGARDING TUBERCULOSIS AMONG ADOLESCENTS IN KISAUNI-MOMBASA DISTRICT, KENYA.

SHADRACK A. YONGE
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DECLARATION

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

Signature _____ **Date** 5.6.2009
Yonge Shadrack Ayieko

SUPERVISORS

We confirm that the work reported in this thesis was carried out by the candidate under our supervision.

1. **Signature** _____ **Date** 05.06.2009
   Dr. F.M Otieno
   Department of Pre-Clinical Sciences
   Kenyatta University.

2. **Signature** _____ **Date** 5.6.2009
   Dr Rekha R. Sharma
   Department of Zoological Sciences
   Kenyatta University

DEDICATION

This is dedicated to my lovely wife Eunice Yonge and our sons Ian, Sidney and Chris for their inspiration.

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I am grateful to God for the grace and opportunity to complete this study, and give him thanks and praise. Am also greatly indebted to the following people for their contribution and support that they have accorded me in writing this thesis.

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TABLE OF CONTENTS

LIST OF TABLE

LIST OF FIGURES

LIST OF APPENDICES

LIST OF APPENDICES

ABBREVIATIONS AND ACRONYMS

AIDS – Acquired Immune Deficiency Syndrome

ANOVA – Analysis of Variance

BCG – Bacillus of Calmette and Guerine

CD4+ --Cell Differentiation no. 4 (Helper T- cells)

CDA – Coast Development Authority

CDC – Center for Disease Control and Prevention

COMBDOT- Community based DOT provider

DOT—Directly Observed Treatment

FBDOT- Facility based DOT provider

HIV—Human Immuno-deficiency Virus

INH – Isoniazid Antibiotic

KANCO—Kenya Aids NGOs Consortium

MDR-TB—Multi-Drug Resistant TB

MOEST – Ministry of Education, Science and Technology

MTB – *Mycobacterium tubercle bacilli*

NASCOP—National Aids and STDs Control Program

NLTP – National Leprosy and Tuberculosis Program

PLWHAs- People Living With HIV/AIDS

ROK – Republic of Kenya

SPSS – Statistical Package for Social Sciences

TB – Tuberculosis

UNAIDS – Joint United Nations Program on AIDS

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SPSS – Statistical Package for Social Sciences

TB – Tuberculosis

UNAIDS – Joint United Nations Program on AIDS

VCT – Voluntary Counseling and Testing

WHO – World Health Organization

XDR-TB- Extra drug resistant Tuberculosis

ABSTRACT

Tuberculosis is a chronic infectious disease which is still a global health hazard. With the emergence of new more effective drugs, tuberculosis was expected to be completely eradicated; but global reports show results to the contrary. It seems that, in addition to drug regimens, individual health and social factors should be taken into consideration. This is not achievable except by increasing the knowledge and creating a positive attitude towards the disease. The aim of this study was to evaluate the level of knowledge, attitude and preventive practices of adolescents' in high school regarding tuberculosis. A cross-sectional study design was carried out in Kisauni Division, Mombasa District among the urban and sub-urban secondary schools. Qualitative data was obtained from key informant interviews while quantitative data was obtained from pre-tested structured questionnaires. A stratified of 384 respondents were used for the study. Descriptive statistics were used to summarize and analyze the data using the statistical package for social sciences (SPSS). Differences between independent and dependent variables were compared using Pearson's Chi-square and regression coefficient with the level of significance of p-values less than 0.05 ($p<0.05$ considered statistically significant. Some results were presented inform of tables, bar charts and pie charts. This study showed that 93.3% of the respondents had heard about T.B and medical workers were an important source of information. Knowledge about symptoms and transmission of T.B was 63.3%. Age was significantly associated with knowledge of T.B ($\chi^2=18.07$; $p<0.05$; $df=4$). Knowledge of TB did not vary significantly by education level or gender ($\chi^2=0.4087$; $p>0.05$; $df=1$). Tendency to discriminate TB patients was evident as 72.6% of the respondents opined to isolate TB patients from the family. Attitude towards TB patients did not vary significantly by age and gender. There was a positive relationship between the attitude and knowledge of adolescents towards TB. 50.3% of the respondents were on the opinion that TB can treated through directly observed treatments (DOTS). Mode of DOT delivery was significantly associated with knowledge ($\chi^2=9$; $p<0.05$). Attitude towards DOT providers did not vary significantly by age or gender ($\chi^2=6.553$; $p>0.05$; $df=5$). Knowledge of tuberculosis (TB) had positive correlation with confidence in preventive practices ($r=0.226$, $p<0.05$) and behaviour change ($r=0.274$, $p<0.05$). Attitude had a positive correlation with beliefs of susceptibility to T.B ($r=0.141$; $p<0.05$) but negative correlations with preventive practices ($r=-0.124$; $p<0.05$) and behavioural change ($r=-0.153$, $p<0.05$). Considering the direct correlation of attitude and knowledge and also the important role of attitude in preventive behaviours, increasing the knowledge of adolescents about tuberculosis seems to be essential. This aim can be achieved by scheduling programs for general education of all students of the country in this regard. Establishing adolescents committees in the district by the Kenya government to prevent and control tuberculosis and other infectious diseases is of paramount. A national survey on the Kenyan adolescents who are in secondary schools knowledge of and attitudes towards tuberculosis should be conducted. More research is also needed on older adolescents to investigate their knowledge of TB changes as they mature and gain more exposure and knowledge.

CHAPTER ONE: INTRODUCTION

1.1 Tuberculosis Epidemiology

1.1.1 Cause and Transmission

Tuberculosis is a communicable disease resulting from infection with *Mycobacterium tuberculosis* whose principal reservoir is man and also, but frequently with other mycobacterium belonging to the *Mycobacterium tuberculosis* complex (Dye *et al.*, 2000).

The infection is acquired by inhalation of droplets nuclei that contain *tubercle bacilli* from an infected person. An individual's risk of infection depends on the exposure to droplet nuclei and his susceptibility to infection. Once infected with *Mycobacterium tuberculosis,* only a small proportion of individuals (about 10%) will develop the disease (Kirk *et al.,* 2000). The risk of developing the disease declines steeply with time after infection. Primary tuberculosis appears within a short period of time after infection (usually within 5 years) and disease due to reactivation or re-infection normally appears after 5 years (Davies *et al.,* 2006)

1.1.2 Risk factors for disease

The probability that a person will develop tuberculosis depends on the individual risk of exposure, risk of infection, given exposure and risk of progression from tuberculosis infection to disease (Wandwalo *et a*l., 2004). Some of the important risk factors are: age, sex, socioeconomic status and other accompanying diseases (Cauthen *et al.,* 1996). Exposure to tuberculosis depends on social mixing patterns and therefore on the ages of the source cases and their contacts. Progression from T.B infection to pulmonary T.B disease is strongly age dependent, as in the proportion of

pulmonary tuberculosis patients with smear-positive disease (Kirk *et al.*, 2000). Smear-positive pulmonary tuberculosis is observed almost exclusively in patients aged 15years and above. Tuberculosis is diagnosed more often in women than in men in most countries. This may be related to the physiological changes associated with reproduction as TB affects women mainly in their economically and reproductively active years. Women also face obstacles to gaining access to diagnostic facilities, investigation of the disease and completing treatment. The difference may result from difference in exposure, risk of infection, rate of progression from infection to disease or may be due to social-cultural factors (Kirk *et al.*, 2000). Socio- economic status is known to be associated with tuberculosis. Poverty is a risk factor for tuberculosis not only when comparing countries but also within countries. Factors such as over crowding, malnutrition and limited access to health services are associated with increased risk of T.B among people with low socio-Economic status (Corbet *et al.*, 2003).

Human immunodeficiency virus (HIV) infection is the strongest known risk factor for progression from tuberculosis infection to disease (Corbet *et al.*, 2003). With HIV infection, the lifetime of 10% to progress from TB infection to active disease in immuno-competent persons has become an annual risk in persons with dual TB /HIV infections. Furthermore, patients infected with HIV/AIDS are at increased risk to progress directly from recent infection and even from re- infection with *Mycobacterium tuberculosis* to clinical tuberculosis (Cook and Zumla 2003). The strongest association between HIV and TB has been recorded in Sub-Saharan Africa where HIV sero-positive rates among adults and youths with TB range from 20% to 70% (Harris *et al.*, 2001). The treatment of smear-positive tuberculosis using DOTs

strategy has the highest rate of impact while BCG immunization reduces childhood tuberculosis mortality (Blower *et al.*, 1996).

It seems that lack of proper attitude and knowledge about tuberculosis is one of the important causes of unsuccessful control programs. Thus, the mainstay for eradication of TB is to increase the general knowledge about the nature, transmission and prevention of this disease (Wandwalo *et al.,* 2004).

1.2 Statement of the problem

Tuberculosis (TB) is a chronic infectious disease which is still a global health hazard. With the emergence of new more drugs, tuberculosis was expected to be completely eradicated, but global reports show results to the contrary. Two million people die from TB every year in the world and 1.5 million are in sub-Saharan Africa. (Wright *et al.*, 2004).

In Kenya there were 10,000 cases a year the early 1980s and a close 106,000 cases in 2004. It is estimated that over 74,000 people per year die of TB and thus TB is an emergence in Kenya (Wandwalo *et al.*, 2004). In Kenya, more than half of TB patients are also HIV positive. Tuberculosis is there perceived as synonymous with AIDS. Most of TB patients are adolescents who are in the age group between 15-25 years. Available data shows that eight thousand TB patients are treated in Mombasa District every month and majority are adolescents' below 25 years of age. Among the risk factors exposing youth to TB are HIV/AIDS, substance abuse and poverty. The presence of TB has greatly reduced the quality of life and ability to live in those who are HIV positive especially the youth. If their TB is not effectively treated, they have

likelihood of dying within a few months (KANCO, 2006). Majority of adolescents' die when investment in their education is beginning to pay off. Tuberculosis prevalence among adolescents is in the order of fifty percent and deaths will continue due misinformation and lack of knowledge concerning TB. There thus a need to ensure that policy and programmes are introduced and implemented by all stakeholders in fight against tuberculosis. Adolescents' (Students') have a major role in this fight.

1.3 Justification

Young people comprise the majority of tuberculosis cases as reported from various hospitals (WHO 2006). About 60% of all new tuberculosis cases in Sub Saharan Africa occur among adolescents between ages 15 and 24 years who are exposed to smoking, alcoholism and risky sexual behaviour (Odhiambo, 1999). It is estimated that 20% of the youths who have AIDS in their twenties probably became infected during their adolescence and are at high risk of developing tuberculosis (KANCO, 1998). Public health education programs in Kenya have raised awareness of Kenyans about nature and modes of HIV and tuberculosis to over 90% of the population. However, this high level of awareness has not been successful in bringing about behavior change (KANCO, 2006). Most surveys show no significant success in lowering incidence of tuberculosis infection in the youth population. This study is one the first in Mombasa district to provide abroad description and valuable insight into adolescents' knowledge of tuberculosis. It would form the basic of the preparation of students as capable disseminators of information on tuberculosis preventive measures. The findings from this study have been given as recommendations to the Kenya government and other interested stake-holders involved in the control of Tuberculosis.

It will go further in coming up with strategies in improving information dissemination to the adolescents concerning tuberculosis.

1.4 Research questions

1.4.1 What is the level of knowledge of tuberculosis among the Adolescents in Kisauni, Mombasa?

1.4.2 What is the attitude of the adolescents towards tuberculosis, TB patients and Direct observation treatment (DOTs) providers in Kisauni, Mombasa?

1.4.3 What is relationship between behaviour change, knowledge, attitude and Preventive Practices among adolescents in Kisauni, Mombasa?

1.5 Hypothesis

1. Adolescents lack knowledge about tuberculosis
2. Attitude towards tuberculosis, TB patients and treatment (DOT providers) does not vary significantly by socio-demographic factors, stigma and discrimination.

1.6 General Objective

To determine the adolescents knowledge, attitudes and practices toward TB.

1.6.1 Specific Objectives

1.6.1.1 To determine the level of knowledge of tuberculosis in adolescents.

1.6.1.2 To determine adolescents attitudes and beliefs towards tuberculosis disease and TB patients

1.6.1.3 To assess the response of the adolescents towards community and health facility based direct observation treatment (DOTs) providers.

1.7 Theoretical and Conceptual Framework

1.7.1 Theoretical Framework

In addition to knowledge and attitude about Tuberculosis (TB), this study has focused on the role of individual's perceived susceptibility to tuberculosis (TB) as motivator of behavioral change. The Health Belief Model (HBM; Becker and Maiman, 1975; Rosenstock, 1966), an extensively studied model of health behaviour change, posists that individuals must perceive themselves to be at risk of the health threat before they will take actions to reduce risky behaviours or to engage in healthy alternative behaviours (Aiken *et al*; 2001). Research focusing on the effects of beliefs of susceptibility to tuberculosis indicates that adolescents' who report high perceived risk for tuberculosis practice safer behaviours, where as those who perceive low risk for contracting tuberculosis report practicing unsafe behaviours (Aiken *et al*., 2001). In this way, it seems that perceived susceptibility must be coupled with accurate knowledge in order to bring about behavioural change. Adolescents must have some minimal health knowledge and motivation towards staying health.

An additional factor of the health belief model addressed in this study is the role of self-efficiency in predicting individual's implementation of safer preventive practices. According to HBM even when individuals perceive themselves to be susceptible to health threat, such as tuberculosis (TB), they will not change their behaviour unless they feel confident in their ability to change their risky behaviours (Rosentock, Strecher and Becker, 1994). In this way, an assessment of individuals in this way an assessment of individual's confidence in performing safe preventative practices is critical element in determining whether or not individuals will actually change their behaviour.

1.7.2 Conceptual frame work

The conceptual frame work presented in figure 1.1 below was derived from the objectives of this study. The model shows that a change in knowledge leads to a behaviour change. The knowledge of signs and symptoms of tuberculosis empowers people to make informed decisions about their preventive practices thus reducing Tuberculosis (TB) infections (MOH, 2002). It is conceptualized that knowledge will bring about behaviour change which involves safe preventive practices and reduce tuberculosis (TB) rates. Thus it has a significant positive impact on behavioural change. On the other hand the infected persons will protect their partners from becoming infected and get early treatment of tuberculosis (TB).

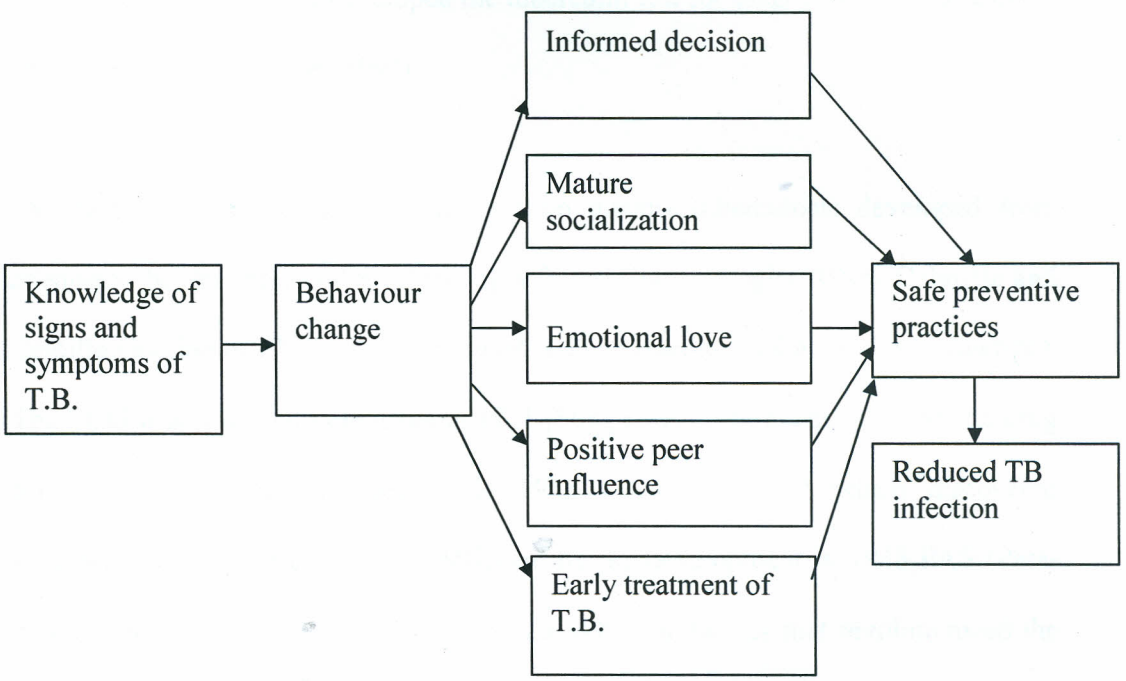

Figure 1.1: The Health Belief Model by Sheeran & Abraham 1995

CHAPTER TWO: LITERATURE REVIEW

2.1 Historical background

Tuberculosis has been present in human history since antiquity. The origins of the disease are in the first domestication of cattle. Skeletal remains show that pre-historic humans had TB (Sandral and Bertman 2003). Gaspard Laurent and Rene Laennec established the forms and stages of tuberculosis as a disease entity. The American doctor Edward Livingstone Trudeau, who was afflicted with tuberculosis, established the Trudeau laboratory in 1874 (Thomas, 1999). It became a modern sanatorium, the kind that for many years was the mainstay of tuberculosis treatment. The bacillus-causing tuberculosis, *Mycobacterium tuberculosis* was identified and described by Robert Koch in 1882 and developed the tuberculin test for diagnosis of the disease in 1890 (Vynnycky and Fine, 1997).

The first genuine success in immunization against tuberculosis developed from attenuated bovine strain tuberculosis by a French bacteriologist Albert Calmette and Camille-Guerine in 1906 and it was called 'BCG' (Bacillus of Calmette and Guerine). The BCG was just used in humans in 1921 (Sung *et al.,* 2005). The first specific drug for tuberculosis became available in 1946 when Selman Abraham discovered streptomycin. This discovery was followed by the development in 1948 PAS (Para-amino salicylic acid) and later isoniazid and other antibiotics that revolutionized the treatment of tuberculosis (Volmink *et al.,* 2000).

Beginning in 1986, an expected resurgence of tuberculosis occurred in most parts of the world due to HIV/AIDS (Girardi *et al.,* 2000). Infection with HIV appears to be

the high risk factor for reactivation of tuberculosis in populations who were infected with *Mycobacterium tuberculosis* and HIV (Espinal *et al.*, 2000).

2.1.1 Evidence of association between HIV – infections and Tuberculosis.

Five lines of evidence suggest that infection with HIV is a risk factor for the development of TB (Bernard, 1992). They are clinical observations, epidemiological data on trends of TB case rates, HIV sero-prevalence rates in patients with tuberculosis and results of observational and intervention studies among people with HIV and TB infections (Braun et al., 1999). Clinical reports in early 1980s documented high rates of TB in-patients with AIDS from Haiti in Central America. Results in Cote d' Ivoire showed that 35% of deaths among HIV-positive patients were due to TB (WHO, 2006) and that TB was the commonest overall cause of death and frequent cause of pulmonary morbidity on HIV patients (Harris et al., 1998). A recent review describes HIV sero-prevalence rates of 20-67% among TB cases in different Sub- Saharan African countries. Numerous studies show high rates of infection in patients with TB than in healthy comparison groups (Whalen *et al.,* 1997)

A cohort study among infecting drugs users in New York showed that persons with HIV infection and previous positive tuberculin skin test had incidence of TB of 7.9 cases per100 persons (Selwyn *et al.,* 1990). Prospective studies of the use of TB chemoprophylaxis among HIV positive persons have shown that intervention can reduce incidence of TB (Bell and Rose 1999).

2.1.2 Pathogenesis of Tuberculosis.

Tuberculosis infection begins when *Mycobacterium bacilli* reach the pulmonary alveoli, infecting alveolar macrophages, where it replicates exponentially. The primary site of infection in the lungs is called the Ghon focus (Nimery *et al.,* 2003). Tuberculosis is classified as one of the granularmatous inflammatory conditions. Macrophages, T-lymphocytes and fibroblasts are among the cells that aggregate to form a granuloma with lymphocytes surrounding infected macrophages (Cook and Zumla, 2003). The granuloma functions not only to vent dissemination of the mycobacteria, but also provide a local environment for communication of cells in the immune system (Blumberg *et al.,* 2005). Within the granuloma T-lymphocytes (CD4+) secrete cytokine such as interferon gamma which destroy the bacteria with which they are infected, making them better able to fight infection- Lymphocytes (CD8+) can also directly kill infected cells. Importantly, Bacteria are not eliminated with the granuloma, but can become dormant, resulting in a latent infection (Nimery *et al.,* 2003).

2.1.3 Progression of Tuberculosis

In those people in whom TB *Bacilli* overcome the immune system, the pathogen begins to multiply and there is progression from TB infection to TB disease (Corbet *et al.,* 2003). The risk of re-activation increases with the immune compromise by infection with HIV (Elliot *et al.,* 1993). In-patients co-infected with *M. tuberculosis* and HIV, the risk of reactivation increases to 10% per year, while in immune competent individuals, the risk is between 5 and 10% in a lifetime. About five percent of infected persons will develop TB disease in the first two years and another five percent will develop disease later in life (Nimery *et al.,* 2003).

(Corbet *et al.,* 2003). Some drugs including rheumatoid arthritis drugs that work by blocking tumor necrosis factor (an inflammation causing cytokine) raise the risk of causing a latent infection to become active due to importance of this cytokine in the immune defense against TB (Odhiambo, 1999).

2.1.4 Effects of Tuberculosis on HIV- infection

It is recognized that HIV infection increases the risk and clinical course of TB. Similarly, co-infection with Mycobacterium tuberculosis accelerates progression of disease by HIV-1 infection (Corbet *et al.*, 2003). Tuberculosis infection enhances local HIV-1 replication in-vitro (Harris *et al.*, 2001). Cytokines produced during TB infection may result in activation of lately HIV infected cells with virus. Expression and induction of virus replication, increased IL-2, IL-6 and TNF- & (TH-2 type cytokine) generated by infection with TB may be responsible for the increase in the viral load (Girardi *et al.,* 2000).

2.1.5 Symptoms of Tuberculosis

Tuberculosis most commonly affects the lungs (75% or more), where it is called pulmonary TB (Raviglione *et al.*, 1992). Symptoms include a productive prolonged cough of more than three weeks duration, chest pain and hemoptysis. Systematic symptoms include fever, chills, night sweats, appetite loss, weight loss and easy fatigability (Blumberg *et al.*, 2005). Frequent manifestations of extra pulmonary TB seen in HIV- infected persons are: pleural disease, lymphadenopathy, miliary disease, pericardial disease, bones and joints diseases (Behr *et al.,* 1999).

2. I.6 Global picture of TB and HIV/AIDS

The importance of TB to the global HIV is enormous (WHO, 2005). Globally, the highly infectious but curable disease kills about two million people each year and is spread through coughing and sneezing (WHO, 2006). Tuberculosis is a serious health problem in its own right but it is also the cause of death for HIV positive people. In endemic areas it primarily affects the adolescents and young adults (Williams *et al.*, 2000). In some parts of the world, TB is increasing after almost 40 years of decline (WHO, 2006). Escalating TB rates over the past decades in many countries in sub-Saharan Africa and parts of South Asia are mainly due to HIV epidemic (Corbet *et al.*, 2000). Between 1990 and 2005, TB incidence rates tripled in African countries with high HIV prevalence. Rates of TB are now rising in the worse affected African countries by around 3 percent annually (WHO, 2006).

In 2003, Africa accounted for 81% of the estimated 741,000 cases of TB among HIV positive people worldwide (Narain *et al.*, 2004). The largest number of TB cases occurs in the South East Asia region which in 2004 accounted for an estimated 3,000,000 new cases (1/3 of the Global total) (Bell *et.al.*, 1999). The estimated incidences per capita in sub-Saharan Africa are nearly twice that of South East Asia at 356 cases per 100,000 populations in 2004 (WHO, 2005). Tuberculosis is not only a problem in low and middle income countries. There are 14,517 new cases reported in the U.S in 2004 and 7,167 new cases reported in England, Wales and Northern Ireland in the same year. About 10 percent of people with TB in London are likely to infect with co-infected with HIV (USAID/WHO 2005). It is estimated that at least 1/3 0f the world's population (2.6 billion people) are infected with TB (Narain *et al.*, 2004). Every year, nine million people become sick with TB (Wright *et al.*, 2004). TB case

notification rates have risen up to fourfold in many African countries, since the mid 1980s. An estimated 674,000 (11/100,000) TB patients were co-infected with HIV/AIDS in the year 2003 (Narain *et al.,* 2004).

2.1.7 Tuberculosis in Africa

Tuberculosis epidemic was declared a regional emergency in the year 2005 (WHO, 2006). Current TB control measures are failing, largely as a result of the human immuno – deficiency virus (HIV) epidemic (Bernard, 2006). Globally TB is second only to HIV/AIDS as a cause of illness and death of adults accounting to nearly nine million cases of active disease and two million deaths every year (Stephen *et al.,* 2006). Although it has only 11% of the world's population Africa accounts today for more than a quarter of this global burden and 540,000 TB deaths annually (Wright *et al.,* 2004).

In the late 1970's and early 1980's African countries like Tanzania, Mozambique and Malawi were among the first to apply what became the global TB control strategy known as DOTs (Blumberg *et al.*, 2005). But in the past 15 years, TB incidence rates have soared in the region to as high as four –fold in Malawi and five-fold in Kenya (WHO, 2006). In 2004, at least 50% of children aged 1-9 years who developed TB were HIV- infected (Stephen *et al.*, 2006). In South Africa annual TB notification rates among adolescents increased from 104 cases in 1996- 1997 to 436 cases per 100,000 persons in 2003-2004, and this increase were pre-dominantly among female (De Cook *et al.*, 2006).

2.1.8 Tuberculosis in Kenya

Kenya is ranked 10th among the world's 22 countries with high Tuberculosis burden (WHO 2006). Kenya had more than 200,000 new TB cases in 2004 and an incidence rate of 123 new sputum smear-positive (ss+) cases per 100,000 people (NLTP, 2005). In 2005, 108,401 new cases of TB were reported (KANCO, 2006). In 2005, TB treatment results showed treatment success rates of 82% for new ss+ re-treatment cases and 76% for extra pulmonary TB cases (USAID, 2006). The major reason for Kenya's increasing TB burden is due to the concurrent HIV epidemic.

The Kenya demographic survey and health estimated that 50% of adolescents in Kenya are infected with tuberculosis (ROK, 2006). The average annual increase in the number of TB cases in the last 10 years has been about 18% (KANCO, 2006). These statistics shows more males are affected than females in the ratio of 1.6:1 (WHO, 2006). Locally, the disease causes an estimated 74,000 deaths each year which translates to an average of 200 deaths a day. Following the increasing cases of the disease, Kenya government declared T.B a national emergency in 2006 and blamed it on rapid urban population growth, over crowding in slums and prisons and malnutrition. Most of TB patients are in the 15-35 years corresponding to the age group most affected by HIV/AIDS (Wandwalo *et al.*, 2004). In a study of health behaviour in Kenya, perceived susceptibility to AIDS was not a significant predictor of condom use (KANCO, 1998). The failure of perceived susceptibility to predict behaviour most likely resulted from participants' misconceptions about the origins and transmission of AIDS. Lack of accurate knowledge about AIDS, resulted in inaccurate assessments of susceptibility (KANCO, 2006).

2.1.9 Treatment of Tuberculosis

Active TB disease can almost be cured with combinations of antibiotics. The treatment and drug options depend on the country's treatment policy (Zwarenstein *et al.,* 1998). Effective treatments quickly make a person with TB non-contagious and therefore prevent further spread of the disease. Achieving a cure takes about eight months of daily treatment (WHO, 2005). To ensure thorough treatment, it is often recommended that the patient takes his/ her pills in the presence of someone who can supervise the therapy. This approach is called Direct Observed Treatment, short course (DOTs) and it cures 95 percent of TB cases (Volmink *et al.*, 2000).

2.1.9.1 Treatment of Tuberculosis and HIV/AIDS co-infection

It is virtually important for people with HIV to have treatment if they have active TB. This will cure them and prevent transmission to others even in setting where antiretroviral drugs are unavailable (Bell *et al.*, 1999). It is crucial that health system is able to offer HIV- positive people the simple antibiotics needed for DOTs (Rose *et al.*, 1998). The risk of active tuberculosis among individuals with dual tuberculosis and HIV infections can be reduced by treatment for 6 to 12 months with isoniazid for two months with rifampicin and pyrazinamide (Williams *et al.,* 2003). This treatment is also administered to prevent recurrence in HIV-infected tuberculosis patients who have completed tuberculosis therapy (Fitzgerald et *al.*, 2000). For some people it can be difficult to take drugs for both TB and HIV at the same time. Some HIV drugs can interact with some TB drugs making the treatment to more difficult (Aisu *et al.*, 1995). Antiretroviral therapy shows the development of immuno-deficiency in HIV-infected persons, may restore immuno-competence, and delays the onset of TB (Girardi *et al.*, 2000).

2.2 Tuberculosis control

2.2.1 Evolution of TB control strategies

Global Tuberculosis control strategies have evolved through different phases over the last 15 years (WHO, 2005). The first approach to TB control was adopted after the Second World War (1948-63). This was a vertical approach which emphasized on the treatment of TB patients in specialized tuberculosis hospitals and clinics (Wright *et al.*, 2004). This approach was successful in industrial countries, where the annual risk of tuberculosis infection was significantly reduced (Wandwalo *et al.,* 2004). The second phase of global control efforts promoted integration of TB services into general health services (Harris *et al.,* 2001). This policy was adopted after series of studies in India which showed efficacy of home treatment (Raviglione *et al.*, 1992). This provided a rational basis for promoting the concept of a national tuberculosis program. The term Directly Observed Treatment (DOT) emerged after the Indian studies (Jeon *et al.*, 2005). Originally, the concept of DOT was used by other health interventions such as administration of sulphones for leprosy patients. The third phase (1977-88) was marked by integration of managerial functions. This phase was generally driven by public health experts and primary health care promoters (Murray and Solomon, 1998).

The fourth phase saw the return of specialized managerial approach. This was prompted by the sharp increase in tuberculosis notification in many parts of the world due to emergence of HIV/AIDS (Netto *et al.,* 1999).

2.2.2 Deadly strain of drug resistant T.B

About 289 cases of multi-drug resistant T.B had been detected since the year 2000. This T.B does not respond to the standard treatment using first line drugs like Rifampicin and isoniazid (Wright *et al.*, 2006). The emergence of new, drug resistant strains tuberculosis is a particular concern. There 3 million new cases of T.B in 2006, of which 500,000 were of the deadly strain. Treatment of MDR-TB requires the so called 'second line drugs, which can take years to effectively treat TB and are more expensive than the first line drugs (Shin *et al.*, 2006). Multi-Drug resistant Tuberculosis is on the rise globally and this increase could be due to weakness in health systems. Many programmes still follow the discredited old policy of using regime 2, which is adding just one drug (Streptomycin) to the failed standard regimen. This leads to more drug resistance and allows transmission to other patients of MDR-TB (WHO, 2008). The prevalence of MDR-TB is likely to be high because of poor health care infrastructure and presence of HIV/AIDS. There were 9.2 million new T.B cases in 2006 and 700,000 were among people living with HIV. In the same year, 200,000 people died from HIV-associated T.B (Wright et al., 2006). Already cases of extensively drug resistant TB (XDR-TB) have been reported and there has been at least one confirmed case of tuberculosis that was resistant to all existing treatment

2.2.3 Understanding care-seeking behaviour

Studies examining how a local culture interprets T.B causes and symptoms help providers to understand why people delay seeking treatment. In Thailand, research indicates that some people associating their T.B symptoms with HIV/AIDS (Antonucci *et al.*, 1999). In Kenya, patients attributed T.B to causes such as hereditary predisposition, consumption of alcohol, smoking, or witchcraft which resulted in

delayed care seeking (Wandwalo *et al.,* 2000). Similarly, in a study of the Igbo of Nigeria, T.B patients who had rigidly traditional views that T.B can be spread by eating beef and high protein foods reportedly delayed seeking treatment, often waiting until after they were malnourished (Wright *et al.,* 2004). Gender, culture and personal experience are generally said to influence health-seeking behaviour (WHO, 2006). In Botswana, tuberculosis symptoms are often attributed to hard work in mines or to drinking and smoking (Steen and Mazonde, 1999). In Malawi, patients believed tuberculosis was caused by adultery, germs, alcohol abuse, 'wrong' food, stagnant worker, dust and witchcraft *(*Brouwer *et al.,* 1998*)*. Etiologic beliefs may influence how people choose how to treat or be treated for their symptoms. A study in Malawi showed that patients thought tuberculosis (TB) resulted from bewitchment or breaking sexual taboos believed they only be treated by traditional healers, while tuberculosis (TB) from other causes could be treated with western medicine (Banerjee, 2000). In contrast other groups express strong preferences for treatment from biomedical trained physicians, with little or no interest in traditional remedies (Carey *et al.*, 1997).

In Tanzania, Wandwalo and Morkve (2000) found no connection between no connection between knowledge about tuberculosis (TB) and completion of treatment of treatment. In Chiapas and Mexico, religious movements have increased the acceptance of germ theory and of western medicine reducing the attribution of disease to witchcraft (Menegoni, 1996). Ailinger and Dear (1997, 1998), working with latino immigrants in united states found that concern family motivated care seeking behaviour and adherence to treatment. Similarly, social support contributed to

adherence and completion of therapy, and thus to a reduction of tuberculosis (TB) incidence among foreign-born persons.

2.3 The impact of stigma

Few would disagree that there is universal social stigma attached to TB (Farmer, 1997). Besides contributing to a worsening of the quality of life for people with TB (Hudelson, 1996; Jaramilo, 1999), stigma plays a role in most stages of the disease- from acknowledging symptoms and seeking care to being labeled as cured (Rangan and Uplekar, 1999).

Numerous studies have shown patients' denial or hesitation to disclose their TB status to family or friends owing to the overwhelming fear of being socially ostracized (Chakraborty, Rangan and Uplekar, 1995; Johanson *et al.*, 1996; Liefooghe *et al.*, 1995; Naire *et al.*, 1995). Researchers reported that 77% of the Vietnamese persons studied in New York believed the community would fear and avoid persons with TB, and over 90% stated that having the disease would adversely affect TB patients relationships with their families (Carey *et al.*, 1997). In Hondras, Mata (1985) found strong stigma associated with TB, and fear of family rejection and loss of friends led some patients to report preferring death to social rejection

Other studies have demonstrated that the shock of being diagnosed with TB frequently sends patients and their families in search of a different diagnosis elsewhere (Dick and Schoeman, 1996; Liefooghe *et al.*, 1995). Strong stigma was similarly noted among South African Zulus who, even after attending a clinic for years, stopped attending after receiving a diagnosis of TB (Rubel and Garro, 1992. In

Turkey, even relatives of TB patients avoided contact with TB dispensaries (Gokce *et al.*, 1991). Stigma can also result in loss of employment, or fear of such, thus delaying care seeking, diagnosis and effective treatment (Carey *et al.*, 1997; Jaramillo, 1998).

CHAPTER THREE: MATERIALS AND METHODS

3.1 Study Area

The study was carried out in Kisauni, Mombasa District. Mombasa District lies between latitudes 3^0 80' and 4^0 10' S and longitudes 39^0 60^0 and 39^0 80' E, with a total land mass of 229.6 Km^2 and Waters covering $65Km^2$. The administrative boundaries comprise the island Divisions Changamwe in the West, Kisauni in the North and Likoni Division in the South. The Island Division is the smallest and the most developed, while the three other sub-urban divisions are predominantly rural.

Kisauni is the most populated Division with a population of about 296,000 people. It covers an area of $109Km^2$. Residents are of mixed ethnicity and are engaged in low-income generating activities, mainly informal sector and petty trading. The Division has rapid population growth and is characterized by low socio-economic indicator. This creates huge demands on health facilities and inability to keep pace with the environment, continued economic prosperity, public health and quality of life of residents (CDA, 1999).

The area is faced with social problems such as alcoholism and sexual promiscuity. There are beach hotels which attracts tourists from different parts of the world making the area to be associated with drug abuse. Tuberculosis and HIVAIDS are the leading causes of deaths in the area representing 36.5% of life lost for adolescents.

3.2 Study Population

The study group included high school students of both sexes aged 13-21 years. Four secondary schools' were included in the study.

3.3 Inclusion Criteria

All students in secondary schools who were above 14years within the Kisauni Division who consented participated in the study and all health personnel in TB units within the Division. Teachers in the selected schools were also involved.

3.4 Exclusion Criteria

All students who were not in form III and IV and from schools those were not in sample population.

3.5 Study Design

This was a cross-sectional descriptive study which aimed to describe the respondents' knowledge of, attitudes and practices regarding tuberculosis. Numerical data from the design was to obtain information about tuberculosis. It was also used to describe variables, examine relationships among variables and determine cause-effect interactions between variables. More ever, rigor helped to identify and limit the effects of extraneous variables not under study.

3.6 Sampling Procedure

Kisauni in Mombasa distinct was selected purposively because it has the most number of adolescents suffering from tuberculosis. There were six secondary schools, but only four of the schools gave consent for the study. In order to ensure that all students had an equal chance of selection, probability sampling by means of stratified random sampling was used. Students were stratified by schools and the sample was selected by simple random sampling. The population was divided into two strata according to gender and each group was given 50% of the sample to acquire sufficient

representation from each strata. Systemic random sampling was used to select the first respondents from each group. Subsequent respondents were selected according to certain intervals namely every tenth name on the list of males and every twentieth name for females since there were 265 males and 119 females. Table of random numbers was used to select the students

3.7 Sample Size Determination

The sample size was arrived at by calculation using Fisher, *et al.:* standard formula which is shown below.

$$N = \frac{Z^2 pqD}{d^2}$$

Where N = minimum required sample size when target population is greater than 10,000)

Z = standard normal deviate (1.96) which corresponds to 95% confidence level.

p = proportion of the target population estimated to have required characteristics being measured = 0.5

q = $1 - p$ (proportion in the target population that do not have Characteristics being measured).

d = degree of accuracy = 0.05

D = design effect = 1

Thus,

$$N = \frac{(1.96)^2 x0.5x0.5}{(0.05)^2}$$

But since the target population was less than 10,000 the formula below by Fisher *et al.*, (1998) was used to calculate the required sample size

$$n_f = \frac{n}{1+\left(n/N\right)}$$

nf = desired sample size (N< 10,000)

nf = N

n = the desired sample size when (N>10,000)

N = the estimated students population = 2,000

$$n_f = \frac{n}{1+\left(n/N\right)} = \frac{1250}{1+\left(1250/2000\right)} = 384$$

Table 3.1: Summary of sample size

No	School	Target Population	Total Number of students
1	Allidina Visram H.S.	541	104
2	Coast Girls' H.S	490	94
3	Sinogal Sec. School	479	92
4	Lwanga High School	490	94
	Total	**2,000**	**384**

Sampling fraction = $\frac{n}{N} = \frac{\text{size of sample}}{\text{size of population}}$

$$f = \frac{n}{N} = \frac{384}{2000} = 0.192$$

For single random sample, the sampling fraction equals the probability of any member of the population being selected for the sample.

Each category of the targeted population was multiplied by this fraction to obtain the corresponding category of the sample as shown in table 3.1

3.8 Study Limitations and their implications

Over 90% of those selected in the sample, co-operated fully in filling the questionnaires. However a small percentage was shy and did not respond to some questions. This can be attributed to some of the questions being personal and sensitive. There was also recall bias on part of respondents, which regard to the type of symptoms and timeless of care seeking and type of health providers consulted.

There were financial constraints as collection of data required travelling and expensive analysis.

The generalisability of my findings is limited. Although my study sample is reasonably representative of the socio-demographic and socioeconomic groups of the larger adolescents (students) population from which the sample was taken, I do not have additional demographic, sociologic, economic and TB experience information about the adolescents who are not in secondary schools. Furthermore, our sample is limited to students aged 15 to 21 years; hence our findings should be interpreted with caution because it is conceivable that they include two age extremes with relatively different levels TB experience and knowledge. More research is needed on older adolescents to investigate their knowledge of TB changes as they mature and gain more exposure and knowledge. This study was not a cohort and therefore it could not address the extent to which adolescents (students) knowledge, perceptions and attitudes were motivating their behaviour to reduce TB infection. Despite this some limited speculation based on other studies has been advanced in discussion and while these speculative comments are clearly not entirely valid, they do aid in providing some plausible explanations for various opinions and levels of knowledge. Despite these limitations, this study is one of the first in Kisauni division Mombasa district to

provide a broad description and limited, though valuable insight, into adolescents knowledge of tuberculosis.

3.9 Pilot Study

A pre-test or pilot study is a small scale trial of the data collection instrument to determine clarity of the questions and whether the questionnaire elicits the desired information. This was done to determine clarity of questions and whether the instruments elicited the desired information. To ensure reliability, validity, clarity of the items and consistency of the responses, a pilot study with ten students was conducted in the district who did not participate in the main study. The participants found the questions satisfactory and had no difficulty in completing the questionnaire.

3.9.1 Validity

Internal and external validity refers to the degree to which the observed findings lead to correct inferences about phenomena taking place in the study sample and people outside the study population. Careful planning and execution of the study was applied to improve the validity of the study. To ensure content validity, pre-tested questionnaire was used.

3.9.2 Reliability

Reliability is concerned with consistency, accuracy, dependability and comparability of a measuring technique and refers to how consistent or stable the data collection is. If a study and results are reliable, other researchers using the same method will obtain the same results. In this study, the test-retest assessed the stability and Spearman-

Brown's prophecy formula tested the internal consistency or reliability of the questionnaire

3.10 Data collection techniques and research instruments

Pre-tested and appropriately modified and structured questionnaires were used to obtain information from adolescents. Pre-testing was done by piloting questionnaires with small representative sample from the group who did not participate in the study. An observation check list was also used. Focus group discussions were held with health personnel in TB treatment units to collect information about the prevalence of tuberculosis in the area.

3.1.1 Data Management and Analysis

The data was coded, entered, sorted out and analyzed using a statistical package for social sciences (SPSS) 11.5 for windows. Descriptive statistics were used to analyze, organize and describe relationships between dependent (knowledge, attitude and practice) and independent variables (sex, age, gender, religion and residence. The data was subjected to two factors; analysis of variance (ANOVA) with replication. Categorical variables were compared using the Chi-square test and students' t-test for continuous variables. The level of statistical significance was defined as P-values less than 0.05. Some results were presented inform of tables, bar charts and pie charts.

3.1.2 Ethical consideration

Clearance for the study was sought from Kenyatta University, provincial administration, secondary schools and the Ministry of Education, Science and Technology (MOEST). Informed consent was sought from all who were selected for the study. Confidentiality was maintained on all data and information collected. No youth was exposed to any harm during the course of the study. The members were free to withdraw from the study at any time without penalty.

CHAPTER FOUR: RESULTS

4.1 INTRODUCTION

4.1.1 Data analysis and interpretation

This chapter represents the data analysis and interpretation. The questionnaire had four sections: Demographic information, Knowledge about tuberculosis (TB), Attitudes towards tuberculosis, DOT providers and Preventive practices against tuberculosis (TB). A total of 384 questionnaires were distributed to respondents and 100% respondent rate was obtained.

4.2 RESPONDENTS' DEMOGRAPHIC PROFILE

A total of 384 key respondents participated in the study. Their demographic characteristics are shown in the table below.

Table 4.1: Respondents' demographic profiles

		GENDER				
VARIABLES	**RESPONSE CATEGORY**	**FEMALES**		**MALES**		**TOTAL**
		Freq (N)	Perct (%)	Freq (N)	Perct.	
		119	30.9%	265	69.1%	100%
	Total	**119**	**30.9%**	**265**	**69.1%**	**100%**
EDUCATION LEVEL	Form three	75	63%	155	58.3%	60.1%
	Form four	44	37%	110	41.7%	39.9%
	Total	**119**	**100%**	**265**	**100%**	**100%**
RELIGION	Christian	100	84.4%	206	77.7%	80.3%
	Islam	19	15.6%	59	22.3%	19.7%
	Total	**119**	**100**	**265**	**100**	**100%**
PARENT LIFE STATUS	Parents a live	101	84.8%	238	90%	88%
	Parents dead	18	15.2%	27	10%	12%
	Total	**119**	**100%**	**265**	**100%**	**100%**

A result presented in table 4.1 indicates that 30.9% of the respondents were female while 69.1% were male. Further, 60.1% of the respondents were in form three and 39.9% in form four. A total of 63% of the participating females were in form three and 37% were in form four. 58.3% of the males were in form three while 41.7% were in form four. In addition 84.8% of the females had both parents a live as compared to 90% of their male counterparts. 15.2% of the females had their parents deceased as compared to 10% males. Overall, 88% of the respondents had their parents alive while 12% did not.

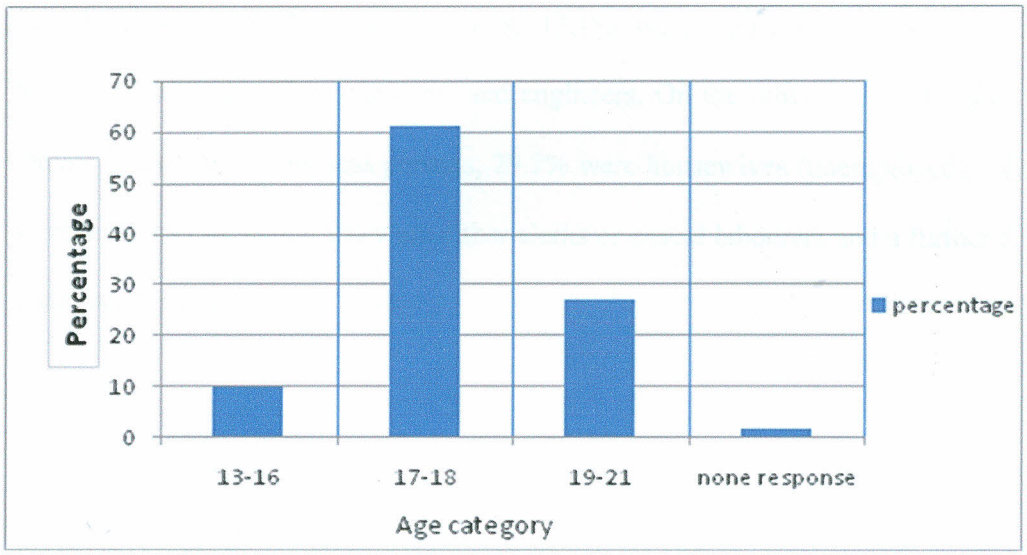

Figure 4.1: Distribution of respondents' ages

Figure 4.1 shows three different age groups ranging from 13-21 years. About 10% of the respondents were aged between 13-16 years and 61% were aged between 17-18 years. This shows majority of the respondents were in the late adolescent stage.

About 27.0% were aged between 19-21 years and 2% of the respondents did not respond because age has an influence over behaviour and more so when dealing with

the adolescents. This could have been the factor which made these three not to respond to this question.

Table 4.2: Occupation of parents/guardians

Parent	Freg/Perc.	Business	Casual laborer	Clerk	Farmer	Manager	Housewife	Nurse	Teacher
Father	Frequency	31	14	6	11	6	-	-	13
	Percent	34.1%	15.4%	6.6%	12.1%	6.6%	-	-	14.3%
Mother	Frequency	35	2	2	7	-	30	7	15
	Percent	34.7%	2%	2%	6.9%	-	29.7%	6.9%	14.9%

A majority of the fathers who were alive were business men (34.1%), 15.4% were casual labourers, 14.3% were teachers, 12.1% were farmers, 6.6% were clerks, another 6.6% were either managers and engineers. On the other hand, 34.7% of the female parents were business persons, 29.7% were housewives (unemployed), 14.9% were teachers (14.9%), 6.9% were either clerks or casual labourers and a further 6.9% were farmers or nurses.

4.3 ADOLESCENTS' KNOWLEDGE ABOUT TUBERCULOSIS

One of the objectives of this study was to evaluate the respondents' knowledge about T.B, to achieve this, some aptitude questions about the disease were asked. First, they were to state whether they had heard about T.B before.

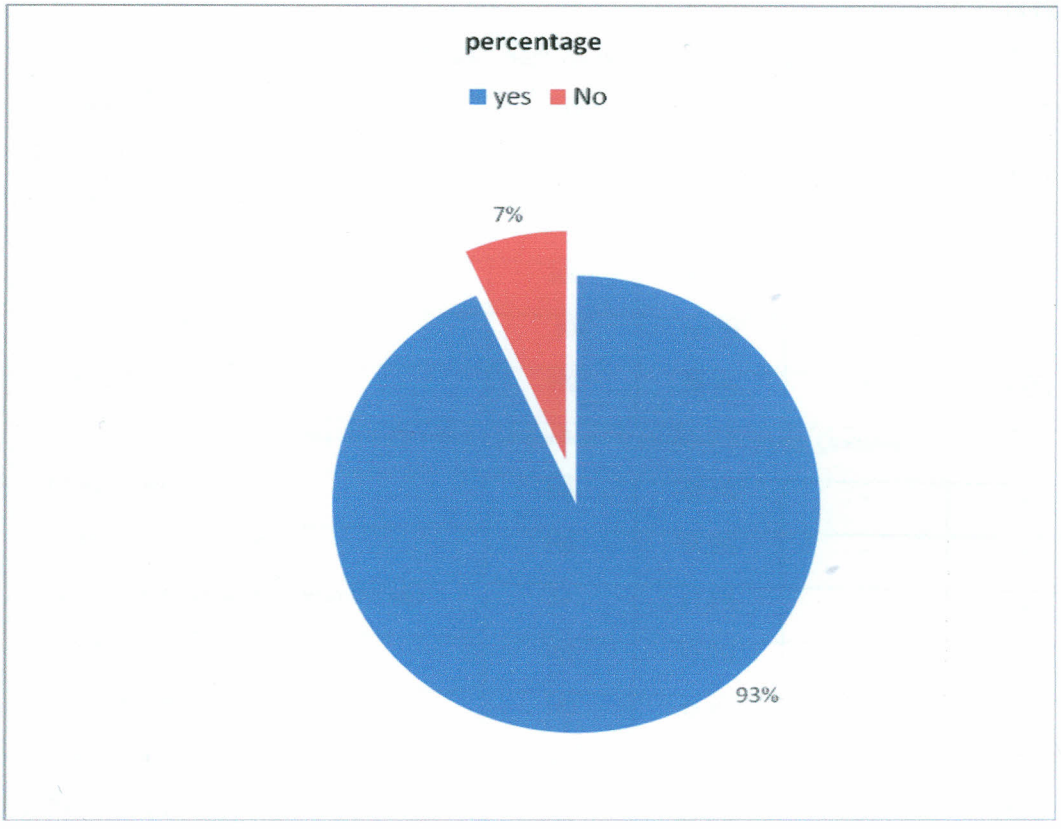

Figure 4.2: Proportion of respondents who have heard about T.B

The figure 4.2 above shows that 93% of the respondents had heard about T.B. However, 7% did not answer the question or said they had not heard about it, (χ^2=6.62 $p<0.05$). The study could not conclusively reach a verdict about knowledge and awareness of T.B at this stage. Therefore, further questions were asked to establish the level of knowledge on T.B amongst the respondents. In this regard, they were asked to state other facts about the disease such as curability, transmission, and symptoms (Table 4.3).

Table 4.3: Respondents aptitude knowledge of TB

Question	Correct Response		False Response or "I don't Know/ No"	
	Frequency	Percent	Frequency	Percent
1. Have you heard about T.B?	285	93.2%	21	6.8%
2. Do you think T.B is curable?	293	95.9%	13	4.1%
3. Is T.B contagious	256	83.8%	50	16.4%
4. How is T.B transmitted? *(multiple Response Question)*				
a) Through the air when coughing	240	78.4	-	-
b) Through blood	-	-	12	4.7%
c) Through hand shake	306	100%	-	-
d) sexually	306	100%	-	-
e) You are born with it	304	99.2%	2	0.8%
f) Sharing food	302	98.4%	4	1.6%
5. What symptoms show that a person has T.B *(multiple Response Question)*				
a) Coughing with sputum	176	57.5%	-	-
b) Coughing for over 3 weeks	168	54.9%	-	-
c) Periodic increases in temperatures>3 wks	54	17.6%	-	-
d) Blood in sputum	102	33.3%	-	-
e) Loss of appetite	142	46.4%	-	-
f) Night sweating	140	45.8%	-	-
g) Pain in the chest	206	67.3%	-	-
h) Total weaknesses, inertia	100	32.7%	-	-
i) Weight loss	180	58.8%	-	-
j) Breathlessness	-	-	26	8.5%
Mean score (%)	**69.3%**		**6.2%**	

Cumulatively, the table above (4.6) indicates that 69.3% of the respondents who correctly knew the T.B symptoms, mode of transmission and curability. The other cumulative 6.2% picked on wrong responses. The remaining 24.5% correct responses

were not selected by a section of the respondents. These findings therefore revealed a high level of knowledge amongst the youth participating in the study.

The study went further to test the relationship between age, gender, education and knowledge of T.B. At a Chi-square value of 18.07, probability of 0.0343 and degree of freedom, df, 9 (9.49), the study found that age vary significantly by knowledge of T.B. ($p<0.05$). One way analysis (ANOVA) was also done. The results are shown in the table below (Table 4.4).

Table 4.4: ANOVA findings for age and knowledge of T.B

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.168	9	.130	2.137	.030
Within Groups	8.138	134	.061		
Total	9.306	143			

The critical value of *F* at 95% significance level for 9 df numerator and 134 df denominator is 1.88. These results showed that the means from the two groups (age and knowledge) are different i.e. significant relationship existed ($p<0.05$)

The study went further to test the relationship between gender, education level and knowledge of T.B. Knowledge of tuberculosis infection by gender showed that mean level of knowledge among the males was slightly higher than that of females. However, the small difference between the two groups was not significant ($\chi^2=0.408$; $p>0.05$). The knowledge of tuberculosis infection did not vary significantly by education level ($\chi^2=0.991$; $p>0.05$).

4.4 ATTITUDES AND PRACTICES TOWARDS T.B

This study sought to establish T.B awareness and perception of prevalence, health seeking behavior and attitudes towards T.B, T.B patients and DOTs. The results for these are presented in the discussion that follows.

4.4.1 T.B Awareness and Prevalence

As already mentioned, the study sought to establish awareness and create initiatives for the youths and how they perceived the prevalence of T.B to be.

4.4.1.1 Awareness creation initiatives

One way to asses the awareness of T.B amongst the respondents was to ask them to state whether they had received any information on T.B in the last 12 or 6 months. The results were presented in the discussion as shown in figure 4.3.

Heard about T.B in the last 6 or 12 months

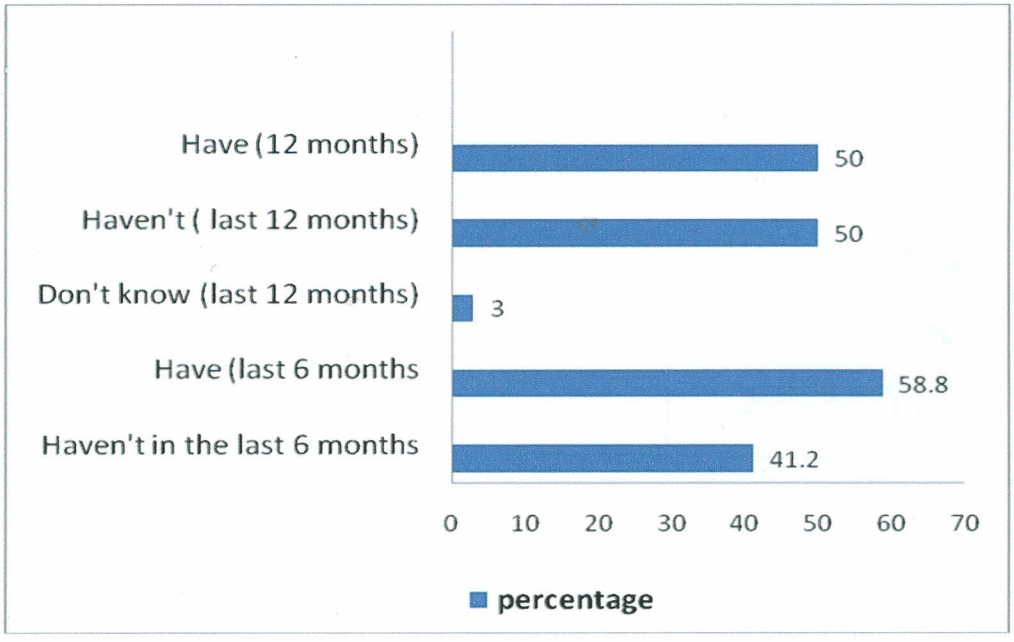

Figure 4.3: Proportion of respondents who had heard about T.B in 6 months

The figure 4.3 shows that 50% of the respondents had received information about T.B in the last 12 months while a further 50% hadn't. In the recent (6 months), 58.8% said they had heard about T.B while 41.2% hadn't.

Those who answered in the affirmative were further asked to state the source(s) of such information (Table 4.5).

Table 4.5: Dissemination of information on Tuberculosis (TB)

Months before	Source	Frequency	Percent
12 months	Family doctor	18	5.9%
	Nurse	40	13.1%
	Father, mother, relatives	40	13.1%
	Friend	34	11.1%
	Colleagues (in school, office)	44	24.4%
Last 6 Months	Friends, acquaintances, relatives	24	13.3%
	Other medical workers	44	24.4%
	Newspapers	32	17.8%
	Radios	38	21.1%
	Booklets, leaflets	32	17.8%
	T.V	8	4.4%
	Lectures	2	1.1%

The results presented in the table 4.5 revealed that in the period of 6 months preceding the study, medical workers (24.4%) had been the greatest source of information about T.B to the respondents. Medical workers were closely followed by radio (21.1%), newspapers (17.8%) and booklets/leaflets (17.8%) as the other common sources of information and creation awareness on T.B. When stretched further to cover 12 months preceding the study, colleagues (14.4%), parents or relatives (13.1%) and nurses (13.1%) respectively, were the greatest providers of information on T.B to the respondents. This study therefore concludes that medical workers, colleagues in school, parents and relatives and radios were the greatest sources of information about T.B for the youths. The cross tabulations and Chi-square results showed that sources of information about TB vary significantly by knowledge level (χ^2 =6.51; $p<0.05$; df=2). This is due to adequate sources of T.B information.

The research sought to establish the respondents' personal perception and assessment on youths' knowledge on causes, signs and symptoms based on acquired information about T.B discussed above. The findings are shown in the figure 4.4.

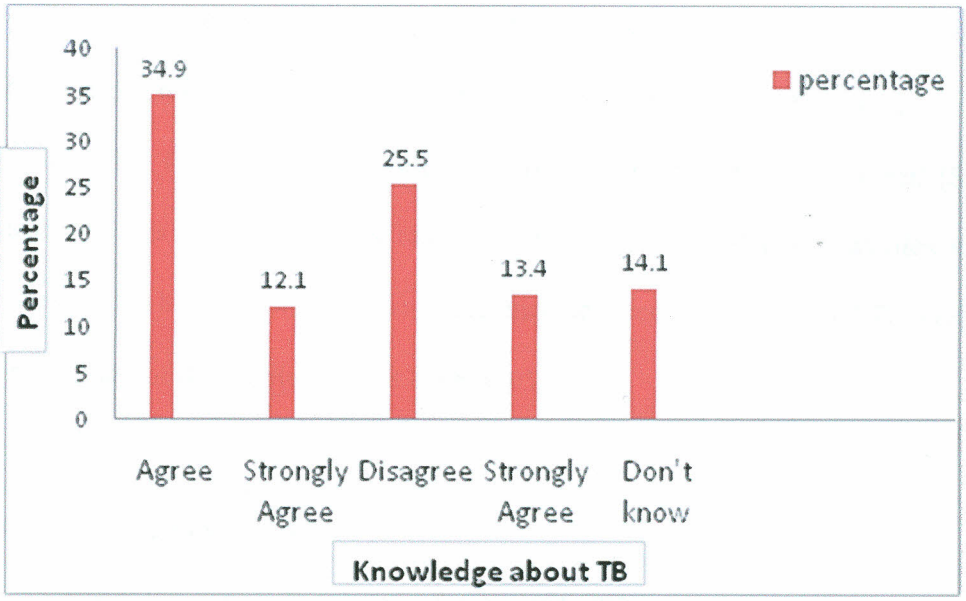

Figure 4.4: Respondents' evaluation of knowledge of T.B

Figure 4.4 above showed that majority of the respondents (34.9%) "Agreed" that youths are generally knowledgeable on the causes, signs, and symptoms of TB. 12.1% "strongly agreed" to the same assertion. However, 25.5% and "disagreed" or strongly disagreed (13.4%). Males (53.3%) showed better knowledge compared to females (46.7%). (χ^2=7.38; p<0.05).

4.4.1.2 Respondents' Perception TB Prevalence

The study sought to establish respondents' perception of the prevalence and problem of T.B in their area, family and colleagues. First, they were asked whether they considered the problem of T.B to be high in their area. Majority (28.3%) "agreed' that T.B was a problem in the area, 15.1% also "strongly agreed". Conversely, an equally high percentage 24.3% and 10.5% "disagreed" and "strongly disagreed", respectively.

The respondents were asked to state whether they had a friend, neighbour, or schoolmate with T.B. A total of 54.1% of the respondents agreed that they have had a

friend, neighbor or schoolmate with T.B, 40.4% hadn't, 5.5% could not tell. Further, 39.5% of the respondents asserted that they have themselves or their relatives been infected with T.B while 51.7% answered to the contrary or could not tell (8.8%). These findings revealed a high rate of T.B in the area affecting families of the respondents. There was a significant difference between knowledge of T.B in relation to perception of the problem ($\chi 2=8.86$; $p<0.05$).

4.4.2 Attitudes towards T.B

To ascertain the respondents' attitudes towards TB, the study dichotomized such attitudes into attitude towards the disease itself, T.B patients, treatment and health-seeking behaviour. Each of these was discussed separately.

4.4.2.1 Attitudes towards T.B as a disease

The respondents were asked to state whether they thought it was shameful to have T.B and further asked to validate their response to this question. The results for the first questions were presented in the figure 4.5

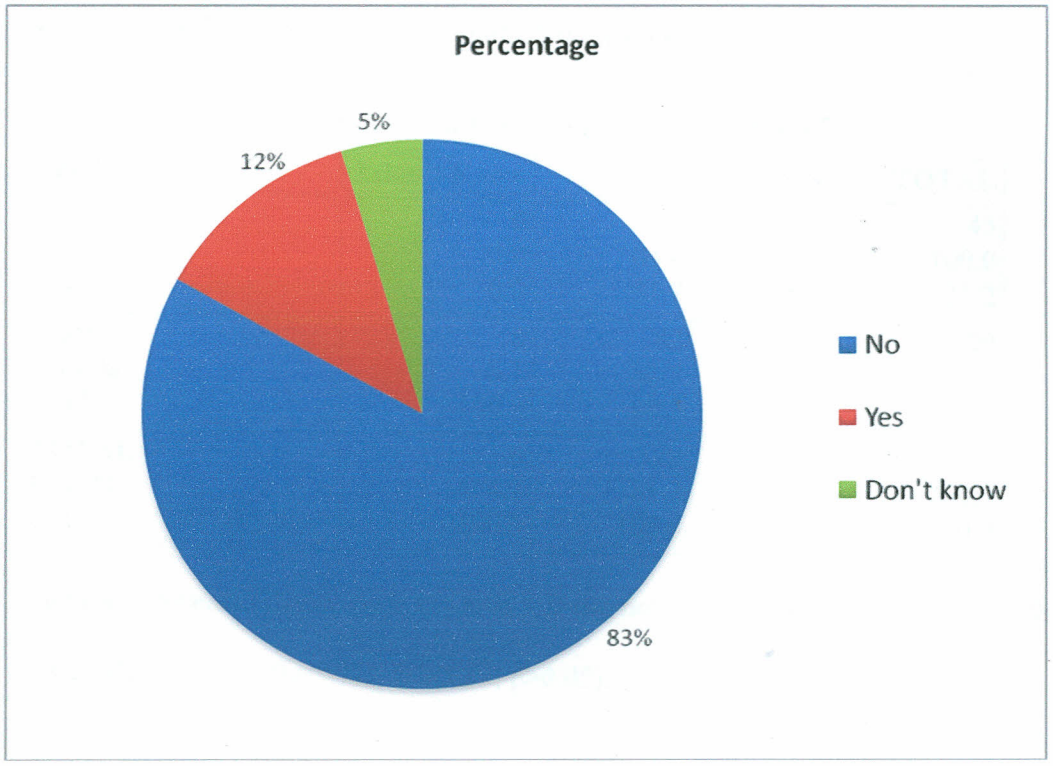

Figure 4.5: Attitudes towards T.B

A large proportion of the respondents (83%) agreed that it was not shameful to have TB. 12% said it was shameful because it was associated with poor people (5%), due to stigmatization (10.5%) and the possibility of losing jobs (7.2%). Majority of the respondents have taken the challenge of T.B positively. The few who still found T.B to be shameful do so because of stigmatization associated with the disease.

The study further sought to establish whether there existed any relationship between gender and perception of T.B as a disease (Table 4.6).

Table 4.6: Relationship between gender and perception of T.B

	Do you think it is shameful to have T.B?			
Gender	**I don't Know**	**No**	**Yes**	**TOTAL**
Female	0	38	7	45
Row %	0.0	84.4	15.6	100.0
Col %	0.0	31.7	38.9	31.2
Male	6	82	11	99
Row %	6.1	82.8	11.1	100.0
Col %	100.0	68.3	61.1	68.8
TOTAL	6	120	18	144
Row %	4.2	83.3	12.5	100.0
Col %	100.0	100.0	100.0	100.0

The study revealed that attitude towards T.B did not vary significantly by gender (that it was shameful or otherwise) (χ^2=3.22; p>0.05).

Other than gender and attitudes toward T.B, the study also sought to establish the relationship between age and attitudes towards T.B. A parametric test for inequality of population of means (ANOVA) between age and the respondents' level of education (class/grade) was conducted (table 4.7)

Table 4.7: ANOVA findings for age and attitudes towards T.B

Variation	SS	df	MS	F statistic
Between	0.0204	2	0.0102	0.0048
Within	302.5313	142	2.1305	
Total	302.5517	144		

The above table (4.7) shows that the difference between the of scores among different groups was not statistically significant (F=0.0048; p=3.00). Further statistical analysis using Chi-square was performed. At a Chi-square value of 12.3912, probability of

0.8264 and df of 18 (28.87). Attitude towards tuberculosis did not vary significantly by age (χ^2=3.22; p<0.05).

Further more, the difference between the mean scores among the different education levels was not significant. This means that attitude towards TB did not vary significantly by education level (F=0.372; p>0.05).

4.4.2.2 History of tuberculosis in respondents' families

The respondents were asked whether they had friends or relatives infected with T.B. 54.1% of the respondents affirmed to this fact. These respondents were further asked whether they would visit their sick relatives/friends and if not, why. A total of 73.7% said they did actually visit while 26.3% did not. This latter group was asked why they never contemplated visiting their sick friends or relatives. A majority (95%) said it was due to the deadly of the disease while 5% said it was due to discouragement from family/peers. In conclusion therefore, the study established that majority of the youth did not mind visiting T.B patients. In fact 81.8% of the respondents said they would not mind taking home a T.B patient for care or supervise them for medication (60.3%). The few, who did mind, did so due to fear of the disease and discouragement form family/peers.

The study went further to test the relationship between age, gender and attitude towards T.B patients. Attitude towards tuberculosis infection did not vary significantly by age (χ^2=6.40; p> 0.05 but varied significantly by gender (χ^2=4.86; p<0.05).

Table 4.8: Respondents attitude towards TB patients

Statement		Strongly agree	Agree	Neutral	Disagree	Strongly Disagreed
Isolated from family	P-value	81(21%) 0.323	192(51%) 0.625	42(11%) 0.374	61(16%) 0.05	0(0%)
Avoid sharing food	P-value	60(16 %/) 0.03	243(65%) 0.978	36(9.6%) 0.015	37(9.4%) 0.002	0(0%)
Quit the job	P-value	6(1.6%) 0.102	116(31%) 0.035	53(14.0%) 0.396	182(48.4%) 0.947	19(5%) <0.001
Avoid marriage	P-value	12(3.2%) < 0.001	90(23.9%) 0.766	72(19.2%) 0.009	170(45.2%) 0.344	32(8.5%) 0.872
Separate baby from infected mother	P-value	14(3.7%) 0.360	140(37.2%) 0.80	97(25.9%) 0.408	119(31.6%) 0.936	6(1.6%) 0.850
Avoid visiting Public places	P-value	14(3.7%) <0.001	81(21.5) <0.001	102(27.2%) <0.001	153(40.7%) <0.001	26(6.9%) 0.192
Affected mother should not breastfeed baby	P-value	14(7.5%) 0.360	73(38.5)% 0.936	56(28.3)% 0.853	49(24%) 0.408	5(1.7%) 0.850
TB patients should not attend social functions	P-value	15(6.9%) 0.218	25(22.5%) 0.010	27(21.3%) 0.055	112(42.1%) 0.045	16(7.2%) 0.166

Majority of respondents said that TB patients should be isolated from family and they should not share food with others. 53.%% said the patients should quit their jobs and shunning them from attending social functions (27.6%) were indicators of deep rooted social stigma.

To underscore the intensity of stigmatization associated with T.B, the respondents were asked if T.B patients should be treated differently. A large proportion of respondents said (53%) while 39.1% disagreed. The remaining 4.1% could not tell. However, 42.9% said they will not be avoided. Due to this high level of

stigmatization, 34.7% of the respondents thought that patients with T.B will automatically hide their condition for fear of stigmatization.

4.4.2.2.1 Respondents' demographic details and stigma and discrimination.

Table 4.9 Respondents' gender and stigma

Gender	Mean	N	SD	SE
Female	14.46	100	2.540	0.387
Male	14.20	170	2.638	0.402
Total	14.38	270	2.580	0.275

The difference between the two groups was not statistically significant

(F= 0.409; p=0.524).

Table 4.10 Respondents' age and stigma

Gender	Mean	N	SD	SE
13-16	15.80	80	2.320	0.457
17-18	15.30	70	2.443	0.431
19-21	14.60	45	2.613	0.675
Total	15.23	195	2.580	0.285

The difference was not statistically significant among the different age groups

(F=0.734; p=0.56)

4.4.2.3: Health-seeking behaviour of the respondents' relatives/guardians

Health seeking behaviour by T.B patients is crucial toward control of the disease. The respondents were therefore asked to state whether their infected family members sought medical care or not. They were also asked to state whether themselves would seek medical care in case they acquired the infection. Among the respondents who said their relatives or family members had suffered from T.B, 73.1% said they (patients) saw a doctor for treatment while 26.9% did not, a significant difference ($\chi 2=5.08$: $p<0.05$). A total of 80% of the 26.7% who did not see a doctor sighted lack of money as a major reason while 20% said they felt better. This study therefore concludes that most of the T.B patients do actually visit doctors for medication and treatment. However, a relatively high proportion still could not access such services due to cost of treatment.

In addition to health seeking behaviour by close members of the respondents' family, the study also sought to establish the respondents' own initiative in seeking treatment and care incase they acquire tuberculosis. First, they were asked what symptoms would prompt them to go to a health facility to have a T.B test.

Table 4.11: Respondents' knowledge about symptoms of tuberculosis

Symptom	*Frequency*	*Percent*	*P-value*
Coughing with sputum	194	63.4%	0.002
Night sweating	128	41.8%	0.001
Coughing for over 3 wks	204	66.7%	0.797
Pain in the chest	214	69.9%	0.008
Periodic increases of temperatures for >3 wks	62	20.3%	0.001
Total weakness, inertia	112	36.6%	0.001
Blood in sputum	140	45.8%	0.120
Weight loss	142	46.4%	0.267
Loss of appetite	152	49.7%	<0.001

NB: Multiple response questions

Table 4.11 shows that chest pains (69.8%), incessant coughing for a period of more than 3 weeks (66.7%) and coughing with sputum (63.4%) were some of the symptoms that would necessitate the youths to go for medical tests incase they had TB. Prolonged fever was cited by 20.3% and weight loss 46.4%. Results indicated that knowledge of tuberculosis varied significantly by gender regarding symptoms of T.B (χ^2 =3.583; $p<0.05$; df=2).

No association was found between duration of cough and choice of provider (χ^2 =4.138; $p>0.05$; df=3) .When further asked where they would prefer to go for these medical services if they contract tuberculosis; the respondents gave varied choices (figure 4.6).

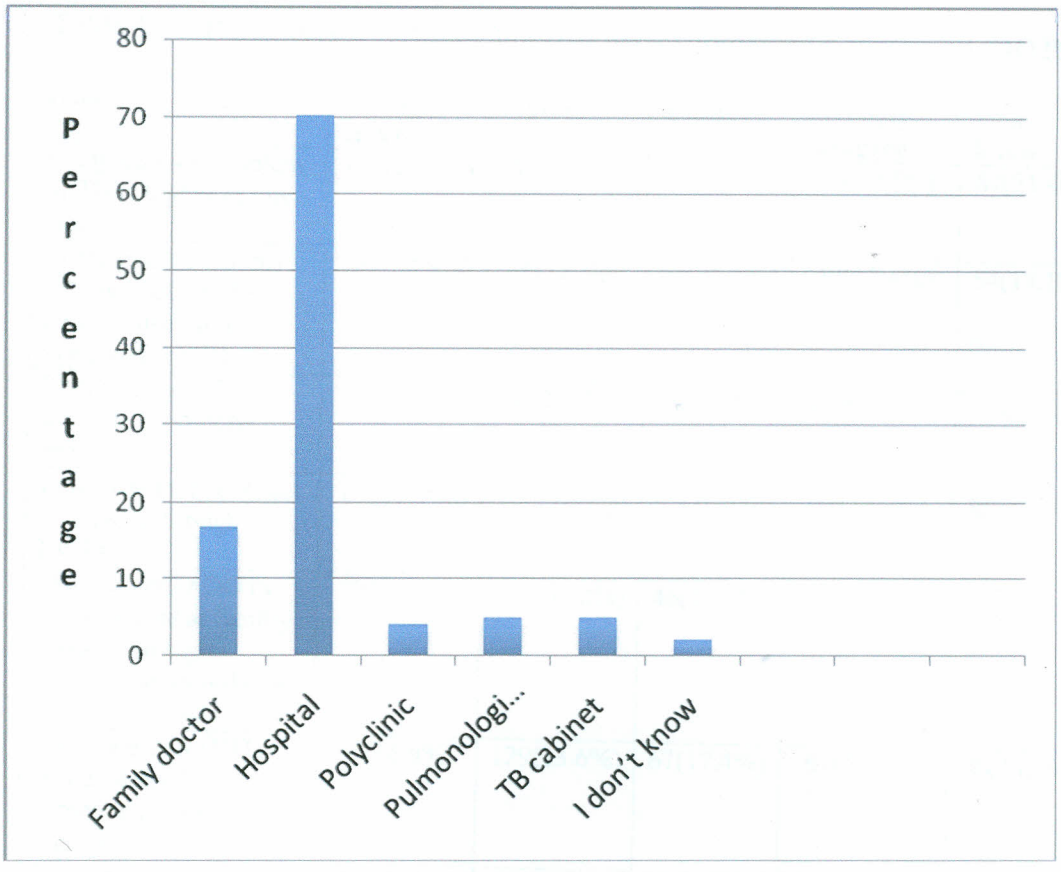

Figure 4.6: Sources of medical attention

Majority of the respondents (70.3%) would prefer hospital for their medical attention incase they acquire TB disease. 16.9% preferred family doctor, TB cabinet (4%) Pulmonologist (4%) and polyclinic (4%). Knowledge of TB varied significantly by source of medical services (χ^2=272.01; p<0.0001; df=6).

4.5 Respondents' attitudes towards direct observation treatment

To evaluate the attitudes towards DOTs, respondents were given items on a Likert format where they indicated "strongly agree", "agree", "strongly disagree" or "don't know" on any of such items. The following are the items and their assessment from the respondents according to a five-point likert scale.

Table 4.12: Respondents' attitude towards direct observation treatment (DOTs)

Item	Strongly agree	Agree	Disagree	Strongly disagree	Don't know
In my opinion problem of TB is higher in this area	109(28.3%)	59(15.5%)	93(24.3%)	40(10.5%)	83(21.4%)
In my opinion youths are knowledgeable about causes and symptoms of TB	134(34.9%)	46(12.1%)	98(25.5%)	52(13.4%)	54(14.1%)
In my opinion T.B problem can not be prevented	38(9.9%)	61(15.9%)	99(25.8%)	150(39.1%)	36(9.3%)
In my opinion, T.B can be treated through DOTs	67(17.4%)	126(32.9%)	62(16.1%)	44(11.2%)	85(22.1%)
I would prefer DOTs administered at facility level given high confidence accorded to public services	77(20.1%)	131(34.2%)	46(12.1%)	71(18.2%)	59(15.4%)
I would prefer DOTs administered by someone I know from this area	65(16.8%)	129(33.6%)	67(17.4%)	67(17.4%)	86(14.8%)
In my opinion Community based distribution is better and reduces cost of fare and time	74(19.3%)	92(24.0%)	82(21.3%)	77(20.1%)	59(15.3%)
In my opinion I would not prefer facility based system given overall low quality care	95(24.7%)	92(24.0%)	64(16.7%)	71(18.6%)	62(16.0%)

The results presented above (Table 12) revealed varied attitudes attached to treatment tuberculosis by respondents. (25.8%) disagree or strongly disagreed (39.1%) to the assertion that T.B can not be prevented. On the other hand, (17.4%) strongly agreed and agreed (32.9%) that T.B can be treated through DOTs. Similarly, the respondents strongly agreed (20.1%) and agreed (34.2%) to the statement that they would prefer DOTs administered at facility level given the high confidence accorded to public services in their area. cumulatively, 50.4% of the respondents agreed or strongly agreed that they would prefer DOTs administered by someone they knew. However,

34.8% of the respondents disagreed/strongly disagreed to this statement, while 14.8% were not sure. Therefore, it was deduced that most of the respondents preferred DOTs administered by someone they knew from the area. Further, a total of 43.3% of the respondents agreed that community based distribution is better and can reduce cost of fare and time as compared to facility based distribution while 41.3% disagreed. This variation in percentage between those who agreed and those who disagreed was marginal. Lastly, majority of the respondents agreed (48.7%) that they would not prefer facility based system given overall low quality care from public facilities

In a nutshell, the respondents were certain that tuberculosis problem can be treated with DOTs and they would prefer DOTs administered at facility level given the high confidence accorded to the public services. However, no strong consensus was reached about community based versus facility based distribution.

4.5.1 Analysis of respondents' attitudes using demographic details

Eight items measured the respondents' attitude towards direct observation treatment (DOTs). For the sake of analysis, "strongly agree" and "agree" were grouped as "agree" while "strongly disagree" and "disagree" were grouped as "disagree". The total scores measured the respondents' attitudes towards DOTs. Four items were negative statements while the other four were positive.

Table 4.13: Respondents' attitudes towards DOT providers according to gender

Gender	Mean	N	SD	SE
Female	9.56	42	1.950	0.305
Male	8.85	40	2.007	0.303
Total	9.21	82	1.998	0.221

Table 4.13 shows a better attitude towards DOTs among the females. The difference between the mean score among the males and females was not statistically significant at the 0.05 level ($t = -1.618$, $df = 80$, $p = 0.109$).

Table: 4.14 Respondents' attitude according to level of education

Education	Mean	N	SD	SE
Form III	9. 79	43	1.842	0.358
Form IV	8.81	34	2.09	0.281
Total	9.28	77	1.998	0.221

Table 4.14 shows a better attitude a better attitude towards DOTs provider among form four. The difference between the mean scores among the different education levels was not significant at the 0.05 level ($F = 1.976$, $p = 0.124$)

Table: 4.15 Respondents' attitude according to age

Age	Mean	N	SD	SE
13-16	9.46	28	2.186	0.413
17-18	9.49	35	1.597	0.270
19-21	8.60	15	2.131	0.550
Total	9.19	78	1.978	0.211

The age group between 19-21 had a better attitude towards DOTs. The difference between the mean of scores among the different age groups was not significant at the 0.05 level (F=2.217; p=0.093)

4.5.2 Respondents' attitudes towards Mode of tuberculosis treatment

Respondents were asked to state their opinion whether they would prefer to change mode of DOT delivery (from COMDOT to FBDOT and vice Versa) in case they were TB patients. 52% said they would prefer to change while 48% said they wouldn't. The difference was not statistically significant (χ^2 =3; p>0.05). Those who would prefer to change to FBDOT postulated the need to avoid stigmatization (2%), for accurate diagnosis and treatment (13.1%). Community DOTs were preferred to FBDOT because it could help the patients to monitor their progress (2%), to save time (3.9%) and to help create awareness in the community (0.7%).

Secondly, respondents were asked to state whether they would prefer to change DOT observer incase they contract the disease and were to be treated in the community. Majority said they would not (71.9%) while 28.1% said they would. Those who

would change DOT observer would do so in order to get accurate diagnosis and treatment (6.5%), better care (3.9%) and to avoid stigmatization (1.3%). Attitude towards community DOT providers varied significantly by age and gender (χ^2 =9; p<0.05; df=2).

In addition to mode of delivery and DOT observer, the respondents were also required to state who they would choose to provide treatment in case they acquire TB disease. The results are shown in (figure 4.7).

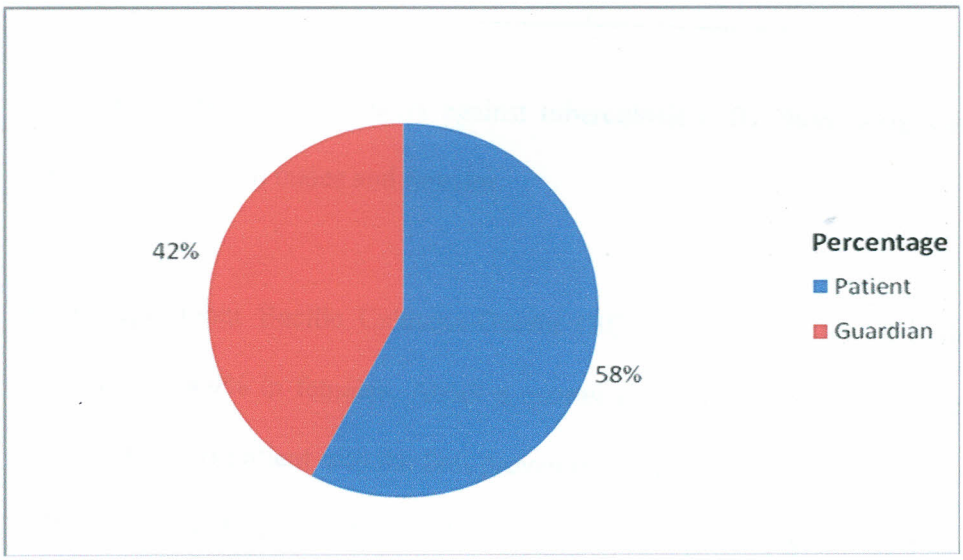

Figure 4.7: Reasons for choosing a DOT provider

The results presented in the figure above (4.7) revealed that 58% of the respondents would prefer DOT administered by former T.B patient and 42% wanted a guardian who should either be a parent (75%) or a doctor (25%) if they contract the disease. Former T.B patients were preferred because of their understanding and past experience as sufferers.

Table 4.16: Respondents' perceptions on preventive measures against TB

Preventive measures against TB	Male %	Female%	P- Value
stay away from patient	27.9	23.9	0.002
complete treatment at home	14.4	7.1	0.0001
Use anti-TB drugs	6.1	10.6	<0.0001
Have separate utensils from TB patients	6.7	13.7	<0.0001
Use boiled water	3-5	3.5	<0.0001
Bacille Calmette –Guerin (BCG)	1.7	4.9	<0.0001

Regarding preventive measurers against tuberculosis (TB), there were significance differences between males and females.

Knowledge about Bacille Calmette-Guerin (BCG) was negligible in males, 1.7% compared to 4.9% in females. About a quarter of the respondents said that staying away from a TB patient was the best preventive measure ($p<0.05$). Only 7.1% of the females said that completion of the treatment at home was the best preventive measure. This figure was 14.4 % for male (table 4.11)

Table 4.17: Respondents' perceptions on how tuberculosis (TB) is spread

Spread of TB	Male %	Female%	P- Value
Droplet	38.9	28.8	0.001
Handshake	20.8	17.2	0.002
Sexual relations	3.1	14.2	0.102
Sharing food	0.9	0.9	0.003
Blood	2.6	4.9	0.008
Spiting	9.2	11.5	0.020

Knowledge of the participants regarding spread of TB indicated that droplet is the main method (38.9% for males and 28.8% for females). Only 9.2% of males and 11.5% of females said that TB was spread by spitting. More females (14.2%) than males (3.1%) said that sexual relations are also a means of transmission. Other reasons for the spread of TB included: sharing food and through blood.

Knowledge of tuberculosis did not vary significantly by perceptions on how TB is spread ($\chi^2 = 0.989$; $p > 0.05$; $df = 2$).

Table 4.18: Respondents perceptions regarding which part of the body TB affects

Body part affected	Male %	Female %	P-value
Chest	59.8	41.2	0.003
Lungs	39.9	47.8	0.002
Kidney	10.5	12.8	0.080
Digestive system	2.6	8.8	0.126
Any where	2.6	31.7	0.228
Neck	1.3	0	0.01
Bones	0.4	3.1	0.019
Skin	0.4	0	0.24
Ribs	0.4	2.1	0.001

Disparity was evident in gauging knowledge as to which part of the body TB affects (table 4.12). More females (47.8%) than males (39.9%) said the lungs were involved ($p<0.05$). Some males (59.8%) said that TB affects he chest compared to females (41.2%). In both cases, males (10%) and females (12.8%) were aware that kidney could also be affected. There was significant relationship between male and female perceptions of body parts which TB affects ($\chi^2 = 6.551$; $p<0.05$); df=2).

4.5.3 Relationship between knowledge, attitude and practice in care-seeking Behaviour

Cross tabulation were done between knowledge, attitude and practice in seeking health care. The knowledge and attitude index were correlated against each other. Results revealed that knowledge of tuberculosis did not vary significantly by attitude in care seeking behaviour of tuberculosis using DOTs. ($\chi^2 = 2.132$; $p>0.05$; df=1)

Practice was then correlated against knowledge index. There was a significant relationship between knowledge of TB and ways of spreading tuberculosis infection ($\chi^2 = 3.853$; $p<0.05$; $df=1$)

Table 4.19: Respondents' perceptions on when to stop anti- Tuberculosis Treatment

When to stop treatment	Male %	Female %	p-value
When symptoms end	65.5	66.8	0.002
When doctor advices	23.0	23.0	<0.0001
Cannot afford it	0	1.3	<0.05

When asked when to stop anti-treatment, the majority of the respondents (>65%) said that they would stop treatment when the symptoms ended if they acquire tuberculosis. 23.0% said they would follow the advice of the doctor on when to stop the treatment. Avery small percentage of the female respondents said that they would stop treatment if they could not afford.

There was a significant relationship between male and female perceptions on when to stop anti-TB treatment ($\chi^2= 5.08$; $p<0.05$; $df=2$)

Table 4.20: Reasons why respondents' relatives did not seek medical care

Reasons	Frequency	Percentage	P-value
Felt better	18	20	0.51
No money to see doctor	152	80	0.05
Too busy	47	25	0.03
Far from hospital	16	8	0.04
Fear of doctor	48	25	0.93
Trying to treat symptoms at home	94	50	0.02
Others	37	19	0.89

The results presented in table 4.20 above significantly revealed that 80% of the respondents relatives did not seek medical advice due to lack of money while 50% tried to treat symptoms at home. Work pressures 25%, fear of doctor 25% and lack of severity of symptoms 20% were other reasons of failing to seek medical care.

Table 4.21: Correlation between behavioural change, knowledge, attitude, Preventive practices, beliefs and demographic characteristics

	2	3	4	5	6	7	8
1. Knowledge	0.015	0.070	0.226**	0.274***	0.140	-0.001	
2. Attitude		0.141**	-0.124*	-0.153**	-0.087*	0.069	
3. Beliefs			-0.077	-0.028	0.031	-0.011	
4. Preventive practices				0.380***	-0.138**	0.193***	
5. Behavior change					-0.047	0.129**	
6. Age						0.107**	0.166***
7. Sex							0.197***

Results as depicted in table 4.21 shows some meaningful correlations among the variables used in the current analysis.). Suggesting that those who have liberal attitudes towards tuberculosis patients have higher beliefs that they will not contact the disease. Confidence in safe preventive practices has a positive correlation with behavioural change ($r=0.380$, $p<0.001$) suggesting that good practices among the adolescents will make them change their behaviour to safer practices. Although the magnitudes of these correlations were moderate, the findings provided some meaningful implications in order to develop preventive measures.

CHAPTER FIVE: DISCUSSION

5.1 Knowledge about Tuberculosis

This study revealed some important lacunae in knowledge and attitudes of adolescents about tuberculosis. Overall knowledge regarding TB has been found to be moderate among the adolescents in this study. The respondents' perception about the disease indicated the socio cultural- trends prevalent in society as well as correct information on the disease. The perceived causes of TB varied from shaking hands to sexual contact, many respondents, however, also associated TB with hereditary, which is an interesting observation (Table 4.3). Smoking and alcohol consumption have also been cited in several other studies conducted in Kenya, Philippines and Bombay. Most respondents were aware that TB is contagious disease and 'sharing food with a TB' patient was considered a major factor in its spread. This finding is supported in studies from India and Kenya. (Narain *et al.*, 2004). In this study, medical doctors (24.4%) followed by mass media (21.1%) and news papers were major sources of T.B information as shown in Table 4.5. Colvin *et al.,* 2000 indicated the role of media, especially radio and television in obtaining information about infectious diseases.

Having accurate knowledge about T.B is important "to counter myths", to reduce associated fear and anxiety, to change behavior that puts them at risk and create a more humane and compassionate response to individuals with the disease (WHO 2006). Tuberculosis related knowledge, beliefs, about susceptibility and concerns of adolescents would provide valuable information for assessing the level Tuberculosis in relation to HIV/AIDS risk in the school age population in targeting particular behaviour for prevention. This is important because, in spite of the dawn western education, many Kenyans in general cannot shake off the cultural belief of disease causation as an act of a higher being angry at them for what they have done wrong. If

it is not a higher being, it is a neighbour who has gone to a witch to poison them. The results indicate baseline information regarding tuberculosis among high school students in Mombasa Kisauni. Although the respondents in this study have high knowledge about T.B, they do not demonstrate a perfect knowledge about its transmission. Similar findings have been reported by other studies in the past decade (AI-owaish et *al.*, 1999, Konde Lule *et al.*, 1989) which calls for attention to provide accurate knowledge to adolescents. Knowledge about BCG vaccination as a preventive measure was very limited as shown in Table 4.16. Again 22% of the respondents said that completing treatment helped in preventing others from developing T.B.

This study revealed that the level of knowledge about TB had an inverse relationship with education level. More ever, a positive history of TB in students family correlated with an increased level of knowledge.

A study in India showed that T.B knowledge among the literates was 83.3% and 16.7% in illiterates (Bell *et al.*, 1999). The literates were more aware of some signs and symptoms of Tuberculosis i.e. breathless ($p<0.05$), loss of appetite ($p<0.05$) and fever ($p<0.05$). Other studies have also shown low levels of T.B knowledge among the youths, reporting large proportion of their samples do not have accurate knowledge of the causes and prevention (Jeon *et al.*, 2005). Educational campaign could help improve Tuberculosis knowledge and acceptance of control efforts in the adolescents.

It is meaningful that knowledge, a key theoretical factor in factor in behaviour, has a significant positive impact on behavioural change. However, knowledge, in this regard is not enough. Larger societal contexts, which would include such factors as

inequities in gender role and cultural contexts of disease causation should be taken into account. Also perceived susceptibility seems to have a negative impact on behavioural change, although the coefficient was not significant

There is a pressing need for accessible, available and sustained TB screening and intervention programs to address multiple risk factors and knowledge deficits with respect to T.B infection in Adolescents.

5.2 Attitudes and practices towards tuberculosis

The respondents in this study had moderate attitudes towards T.B infection, T.B patients and beliefs of low susceptibility of getting tuberculosis as shown in Figure 4.5. Attitude towards T.B and those persons with the disease may help in predicting behavior change. However, this study showed no correlation between attitude and knowledge, suggesting that having accurate knowledge influences neither people's attitude towards T.B and T.B patient's. However, the lack of a significant correlation between knowledge, beliefs and attitude of Tuberculosis was not surprising since the literature in this area has been mixed. It could be that people are aware of T.B epidemic, but not care about T.B patients (Behr *et al.,* 1999).

A positive attitude and moral support from the family members can help in diagnosis and sustaining drug intake for TB which otherwise is usually stopped once symptoms disappear after initiating drug therapy for a short period. This study showed that 58% respondents knew that drugs should not be discontinued even for a single day. Misconceptions and stigma associated with the dreaded nature of the disease are cultural barriers leading to undesirable behaviour towards TB patients there by

stopping them from attending social functions and segregating from the family. Tendency to discriminate the patients was evident from the findings of this study as shown in table 4.8. In this study, 72.6% respondents either strongly agreed or agreed to isolate the TB patients from the family. Such discriminating act was also evident from the attitude of the respondents on certain situations, such as avoidance in sharing food with the patient (80.6%), agreement on quitting his job (53.5%), prohibition of the patient from getting married (27,6%) and shunning from attending social functions (24.3%). This indicated that lack of awareness about TB wrong beliefs have resulted in such a negative attitude. On the other hand, adolescents with positive attitude towards tuberculosis had higher levels of knowledge. Similar results were obtained in Rodier *et al.*, 1993 and Chakayo *et al.*, 2005 studies. Such deep rooted –rooted negative attitude needs to be dispelled through intensive health education campaigns so that social acceptability of the persons suffering from TB improves and people come forward to support these patients. Such a change is desirable for controlling tuberculosis (TB).

A study in Dehli India showed that 71% responds agreed upon isolating T.B patients from family, 5% avoid patient's food and 24% prohibiting marriage of the patient (Narain *et al.*, 2004). In Vietnam, more than 50% of T.B patients expressed fear of being known as T.B patients in the community (Corbet *et al.*, 2000). Stigma is a major problem for T.B patients and health care providers. Stigma may prevent patients with symptoms from coming forward for diagnosis and comply with treatment (Behr *et al.*, 1999). In this study, the respondents had taken T.B challenge positively. Extensive health education directing towards attitudinal change by adolescents involvement is needed to create awareness and remove myths about T.B.

An insight into the stigma-related problems faced by patients will help health planners to develop appropriate information, education and communication (IEC) materials for the adolescents, patients and the community to address this issue.

5.3 Health-seeking Behaviour

This study indicated that 73.1% of the respondent's family or relatives who had tuberculosis (TB) infection sought medical advice while 26.9% did not. The patients did not seek medical attention because of lack of money, felt well, fear of doctor and lack of transport. Participants' perception that hospital (70.3%) would provide "good care" and easy accessibility were the main reasons why they preferred hospital (Figure 4.6). In this study, significantly chest pains (69.8%) and coughing for over three weeks (66.7%) would prompt respondents to seek medical advice ($p<0.05$) as shown in Table 4.11. The positive attitude is likely to lead into appropriate practice in management and control of tuberculosis.

The study revealed that hospital (70.3%) and family doctor (16.9%) would be the major sources for medical attention for the respondents in case they had tuberculosis. Knowledge was significantly associated with preferred sources. Even if qualified, private practitioners do not participate in continuing medical education programmers and are unaware of the recent trends in disease and they do not have time to give health education messages to their patient. Since public health programmers such as directly observed treatment short-course (DOTS) are not implemented through private system, many private practitioners are not even aware of these strategies. Patients who visit public health facilities tend to have a better perception of the disease and were more knowledgeable about various issues pertaining to T.B co-infected with

HIV/AIDS. The DOTs strategy is the recommended treatment for T.B in Kenya. This strategy involves supervised administration of T.B drugs and may require daily visits of the T.B patient to a health facility for administration of the drug supervised or supervised drug administration at home in the presence of health worker or a guardian. Agreement between the parent and adolescent regarding who is responsible for care is associated with adherence.

Younger patients tend to live with both parents and must be reminded to take their medication (Volmink *et al.*, 2000). Parental support in medication taking can positively influence adolescents' adherence. In this study, 58% of the respondents preferred former T.B patients as their treatment supporters while 42% guardians as shown in Figure 4.7. Studies conducted in India and south Africa showed that family members were effective DOT providers (Raviglione *et al.*, 1999). A study done in Australia however, showed no benefit in using family members as DOT treatment supporters (Asiu *et al.,* 1995). Family members are the main care givers for diseases such as HIV/AIDS and there is no reason to believe this should be different incase of Tuberculosis.

A study from some rural areas of Karnataka in India reported that 48% of the symptomatic (defined as patients with cough for days or more) sought care from one or more care health facilities, while 46% approach government facilities (Zwarenstein *et al.*, 1998). A study in Tanzania by wandwalo *et al.*, 2004 showed that chest symptomatic (defined as patients with cough) did not seek medical advice due to lack of severity of symptoms (51%) and un-affordability (46%). Rural patients were facing transportation problems while urban patients were reporting pressure from work as

reasons for failing to seek care. Despite high risk of the disease, many adolescents (47%) who were prescribed therapy for latent T.B infection failed to complete full treatment/medication.

This study found that knowledge did not vary significantly by attitude in care-seeking behaviour in managing tuberculosis using DOTS. A possible explanation is that people's attitude and behaviour can not be easily changed despite their level of knowledge. Adolescents' knowledge on care-seeking behaviour does not necessarily influence their attitude. Thus knowledge is not contingent upon attitude. A better understanding of health-seeking is needed to identify barriers, to timely T.B diagnosis in HIV/AIDS. Findings of this study also suggest that health services should increase awareness about chest symptoms so that chest symptomatic contacts health facility soon after the onset of the chest symptoms. More emphasis needs to be given to younger persons since they are more likely to ignore the symptoms. The public must be aware of the availability of quality diagnosis and free treatment for T.B in governmental health facilities.

5.4 Mode of DOT delivery

The respondents in this study reported positive attitudes towards DOTs and DOT-providers. The study indicated that 50.3% of the respondents agreed that T.B can be treated through Direct observed treatment-short course (Table 4.12). Participants perception that health facilities would provide high "confidence" and good care" were the main reasons why they preferred health facility. 43.3% of the respondents preferred community based-DOTs because it reduces cost of fare and time. In both systems, cure takes about eight months of daily treatment (WHO, 2005). The health

system must be able to offer HIV-positive people the simple antibiotics needed for DOTs (Rose *et al.*, 1998).

A study in Pakistan showed that more than 70% of tuberculosis (TB) patients with cough for seven days or more) make efforts to seek care and that private practitioners are consulted more often than governmental health care providers (Wright *et al.*,2004). Participant perception that private care facilities would provide "good care" and easy accessibility were the reasons. Patients who opted for governmental care did so mainly because treatment and diagnostic services were free of charge. A world Bank report also has estimated that more than three- quarters of sick people consulted private health providers in most parts of the world (Hawken and Muhindi, 1999). A study by Khan *et al.*, 2000 from Korea reported that for chronic respiratory symptoms 51% of the patients chose community based- DOTs and 27% chose private clinics and hospitals.

This study also observed general participants dissatisfaction with the mode of delivery as evidenced by the fact that 53% would prefer to shift from the facility they approached initially while 47% wouldn't as shown in Table 4.9. The switch from community based-DOT to Health facility-based- DOT was mainly prompted by stigmatization, accurate diagnosis and treatment. The reasons stated for switching from Health facility based- DOT to community based- DOT were to monitor their progress, save time, and create awareness in the community. It is clear that besides expanding the governmental health care network, they must be made more accessible, communicative and convenient. This study highlights the need to involve the community in T.B control and to make governmental Health facilities user friendly.

Health facility based- DOT for all tuberculosis patients is not practical due to high case load and often requires patients to travel long distances every day. An alternative method is to involve community members in tuberculosis treatment delivery in HIV-infected persons. Health-related beliefs and practices play an important role in the success of any health intervention strategy. For the success of DOTs in Kenya, it is important to ascertain the willingness of the patients to take the TB medicines in the presence of health personnel or supervised drug administration at home in the presence of a guardian. Concerted efforts in educating the adolescents for attitudinal change, active measures for early identification, sustaining treatment, minimizing defaulters through community participation are the need of the hour for controlling TB problem in high risk group population in the community.

5.5 CONCLUSIONS

From the findings of the study above, the following conclusions were made:

1. The respondents had accurate knowledge about TB. There was significant difference between age and knowledge of TB. Knowledge of TB did not vary significantly by gender or education level
2. Medical workers, colleagues in school, parents and relatives and media were the greatest sources of information about T.B for the students.
3. Most respondents conceive of tuberculosis as a big problem in the area affecting their colleagues and relatives.
4. Tendency to discriminate TB patients was evident some respondents opined to isolate TB patients from the family and avoid sharing food with these patients.

5. Some of the respondents' relatives who had tuberculosis went for treatment. However, a relatively high proportion still could not access such services due to high cost of treatment.
6. Respondents were certain that the T.B problem can be prevented through direct observation treatment (DOTs). They preferred DOTS administered by someone they knew preferably parents.
7. Direct observation treatment at community level was preferred to facility based DOTs because reduces cost of fare and time.

5.6 RECOMMENDATIONS

From the conclusions of this study, the following recommendations were made for practice and further research.

1. Considering the direct correlation of attitude and knowledge and also the important role of attitude in preventive behaviours, increasing the knowledge of adolescents about tuberculosis seems to be essential. This aim can be achieved by scheduling programs for general education of all students of the country in this regard.
2. Health facilities should be actively involved in disseminating tuberculosis information to all patients attending them.
3. Extensive health education directed towards bringing a change in attitude among adolescents in secondary schools in is needed to create awareness and remove myths about tuberculosis in such age group in the community.

4. The community- DOT providers in management of Tuberculosis treatment in HIV-infected persons must be trained on how to prescribe anti-TB drugs and handle T.B patients in the community.
5. Establishing adolescents committees in the District to prevent and control tuberculosis and other infectious diseases is of paramount

5.61: Recommendations for Further study

1. A national survey on the Kenyan adolescents who are in secondary schools knowledge of and attitudes towards tuberculosis
2. More research is needed on older adolescents to investigate their knowledge of TB changes as they mature and gain more exposure and knowledge.
3. Where possible, research should focus on gender differences in knowledge and attitude towards Tuberculosis (TB) in persons co-infected with HIV in urban and rural communities.

REFERENCES

Aiken L.,General M. and Jackson K. (2001). Subjective risk and health protective behaviour: Cancer screaming and Cancer prevention. In a Baum, T.A. Revenson and J.E (Eds.). Hand book of health psychology (pp. 727-746). Mahwah, N.J Lawrence Erlbaum Associates, Inc.

Aisu T. Raviglione M., Van Praag E., Ericki P., Narain J. and Barugahare L. (1995). Preventative chemotherapy for HIV-associated tuberculosis in Uganda; an operational assessment at voluntary counseling and testing centre. *AIDS*, **9**; 267- 73.

Ajzen, (1991): The theory of planned behaviours, organizational behaviours, Human decision processes **50**; 179-211

Antonucci G., Girardi E. and Raviglione M. (1999). Risk factors for tuberculosis in HIV-infected persons. A prospective co-hort study. Gruppo Italiano di studio Tuberculosie (GISTA). *Journal of the American medical association*, **274**; 143-8.

Barnejee, Harris, A.D., Nyirende (2000). Local perceptions of Tuberculosis in rural districts in Malawi. *International Journal of Tuberculosis and lung disease* **4(11)**, 1047-1051

Brouwer, J.A., Boree M., Kager P., Varkenvisser C.M. and Harris AID,(1998); traditional healers and pulmonary Tuberculosis in Malawi. *International Journal of Tuberculosis and lung disease* **2(3),** 231-234

Becker, M.H., & Maimam, L.A. (1975). Sociobehavioral determinants of compliance with health and medical care recommendations. *Medical Care*, 8, 10-24.

Behr M.A., Ware S.A., Salamon H., Hopewell P.C., Ponce de Leon A. and Daley C. L. (1999). Transmission of mycobacterium tuberculosis from patient's smear-negative for acid-fast bacilli. *Lancet* **353**; 444-9.

Bell J. C., Rose D.N and Sacks H.S. (1999). Tuberculosis preventive therapy for HIV-infected people in sub-Saharan Africa is cost-effective. *AIDS*, **13**; 1549-56.

Benard F. (2006). MRC national tuberculosis Research Programme; South Africa.

Blower S.M., small P.M and Hopewell P.C. (1996). Controlled strategies for tuberculosis epidemics; new models for old problems. *Science*, **273**; 497-500.

Blumberg H.M., Leonard M.K., Leonard M.K. and Jasmer R.M. (2005). Update on the treatment of tuberculosis and latent tuberculosis infection. *JAMA*, **293;** 2776-84.

Braun M.M., Badi N., Ryder R.W., Baende E. and Nsuami M. (1999). A retrospective cohort study of tuberculosis among women of child -bearing age with HIV infection in Zaire. *American review of respiratory disease*, **143**; 501-4.

Carey, J.W., Oxtoby M.J., Nguyen, L.P., Huynh, V., Morgan (1997); Tuberculosis beliefs among recent Vietnamese refugees in New York State. *Public health reports.* **112(1),** 66-72

Cates W., and McPheeters M., (1997). "Adolescents and STDs: Current risks and Future Consequences": Prepared in a Workshop on Adolescent

Cauthen G.M., Dooly S.W., Burr J.M. and Bigler W.J. (1996). Transmission of *Mycobacterium tuberculosis from tuberculosis* patients with HIV-infection or AIDS. *American journal of epidemiology*, **44**; 69-77.

Carey, J.W., Oxtoby M.J., Nguyen, L.P., Huynh, V., Morgan M., & Jeffery, M.(1997). Tuberculosis beliefs among recent Vietnamese refugees in New York State. *Public Health Report*. **112(1),** 66-72.

Chakaya JM., Meme H., Kwamenga D., Githui W., Onyango Ouma W., Gichecha C., *et al.*, planning for PPM-DOTs. Implementation in urban slums in Kenya: knowledge, attitude and practices of private health care providers in Kibera slum Nairobi. *Int J. Tubercle* lung Dis 2005; **9(4):** 403-8.

Chakraborty, A.K., Rangan S., &Uplekar, M. W. (Eds). (1995). Urban Tuberculosis control: Problems and prospects. Bombay, India. The foundation for Research in *Community Health*

Colvin M., Sharp B., sexually transmitted infections and HIV in rural community in the Lesotho highlands. *Sex transm infect* 2000; **76(1):**39-42

Cook. C.G. and Zumla A. (2003). Manson's *Tropical Diseases*, 21st edition ELST, China

Corbet. E.L., Watt C.J and Walter N. (2003). The growing burden of tuberculosis: *global trends and interculations with HIV-epidemic. Arch international*, **163**; 1009-21.

Davies P.D., Yew W. and Ganguly D. (2006)."Smoking and tuberculosis: the epidemiological association and pathogenesis" *Trans R soc Trop med Hyg*, **100**: 291-8.

De Cock K.M., Soro B., Coulibaly I. and Lucas S.B. (2006). Tuberculosis and HIV infection in sub-saharan Africa. *Journal of the American medical association,* **268**; 1581-7

Dick J., & Schoeman, J. H., (1996). Tuberculosis in the community: 2. The perceptions of members of a Tuberculosis a voluntary health worker programme. *Tubercle and Lung Disease*, **77(4),** 380-383.

Diwan, V.K., & Thorson, A (1999). Sex, Gender and Tuberculosis. *The Lancet* **353**(9157), 1000-1001.

Dye C., Scheele S. and Pathania V. (2000). Tuberculosis 2000-2010: control but not elimination. *International journal of tuberculosis* and learn disease, **4**; 146-52.

Elliot A.M., Hayes R.J., Halwindii B., Luo N. and Pobee J. (1993). The impact of HIV in infectiousness of pulmonary tuberculosis; a community study in Zambia. *AIDS*, **7**; 981-7.

Espinal M., Perez E., Baez J., Fernadez K. and Lopez M. (2000). Infectiousness of mycobacterium tuberculosis in HIV-1 infected patients with tuberculosis; a prospective study. *Lancet*; **355**: 275-80.

Farmer, P., (1997). Social Scientists and the new Tuberculosis. *Social Science & Medicine*, **44**(3), 347-358.

Ferguson A. (1988). School girl pregnancies in Kenya. Report of a study of discontinuation rates and associated factors. MOH/ Division of Family Health GTZ support Unit, Nairobi

Fisher *et al.*,(1998): Designing Clinical Trials. *Start. Med.* **17**:1551-1562

Fitzagerald D., Desvarieuxm and Severe P. (2000). Effects of post-treatment isoniazid on prevention 0f recurrent tuberculosis in HIV-1 infected individuals: a randomized trial. *Lancet*, **356**; 1470-4.

Girardi Antonucii G., Vanacore P., Libanore M. and Mettali A. (2000). Impact of combination antiretroviral therapy on the risk of tuberculosis amng persons with HIV infections. *AIDS*, **14;** 1985-91.

Girardi E. Ravigalione M., Antonucci G., Godfrey P. and Ippolito G. (2000). Impact of the HIV epidemic on the spread of other diseases; the case of tuberculosis. *AIDS,* **144**; 547-56

Glanz K., Rimer B. and Levis, (2002). Health behavioral and health education theory research and practice. 3rd edition. Jenn Fransisco: Jofrey – Base Books

Gokce, C., Gokce O., Erdogmus, Z., Arisoy, E., Arisoy S., Koldas O. *et al.*, (1991). Problems in running a tuberculosis dispensary in a developing country: Turkey. Tubercle **72(4),** 268-276.

Harris A., Maher D. and Nuun P. (1998). An approach to the problems of diagnosing and treating adult smear- negative pulmonary tuberculosis in high- HIV prevalence settings in sub- Saharan Africa. A bulleting of the *World Health Organization*, **76;** 651-62.

Harris A., Hargreaves N., Kemp J. and Maher J. (2001). Deaths from tuberculosis in sub-saharan African countries with high prevalence of HIV-1.*Lancet*, **357**; 1519-23.

Hudelson, P. (1996). Gender differentials in Tuberculosis: the role of social-economic and cultural factors. *Tubercle & Lung Disease*, **77(5)**391-400.

Hawken M.P. and Muhindi D.W. (1999). Tuberculosis preventive therapy in HIV-infected persons: feasibility issues in developing countries. *International journal of tuberculosis and lung disease* **3**; 646-50.

Heise L.L. (1994). "Gender based violence and women's reproductive health." *International Journal on Gynaecology and Obsterics* **46**: 221-229.

Jaramillo, E., (1998). Tuberculosis control in less developed countries. *Can culture explain the whole picture?* Tropical Doctor **28(4),** 196-560.

Jeon B., youn J., Kim S. and Sung Y. (2005). Prospective effect of DNA vaccine during chemotherapy on reactivation and re-infection of *mycobacterium tuberculosis.* Gene Ther (E Pub a head of print) *PIMD.*

Johansson, E., Diwan. V.K., Huong, N. D., & Ahlberg, B.M. (1996). Staff and patient attitudes to tuberculosis and compliance with treatment: An explanatory study in a district in Vietnam. *Tubercle and Lung Disease* **77(2),** *173-183*

KANCO (1998). Information package No. 4 on HIV/ AIDS and adolescents.

KANCO (2006). Information package for people living with HIV/AIDS.

Kirk O., Gatell J. and Microft A. (2000). Infections with *mycobacterium tuberculosis* and *mycobacterium avium* among HIV-infected patients after the introduction of highly active antiretroviral therapy. *American journal of respiratory and critical care medicine*, **162**:865-72.

Liefooghe, R., Michiels , N., Habib, S., Moran M.B. & De Muynck, A.(1995). Perception and social consequences of Tuberculosis: A focus group study of patients in Sialkot, Pakistan. *Social Science & Medicine* **41(12)** 1685-1692

Mata, J.I., (1985). Integrating the clients' perspective in planning a tuberculosis education and treatment programme in Honduras. *Medical Anthropology* **9(1),** 57-64. Reports, Series J, No.41

Menegoni L. (1996). Conceptions of Tuberculosis and therapeutic choices in highland Chiapas Mexico. Medical Anthropology Quarterly **10(3),** 381-401

Murray C. and Solomon J.A. (1998). Modeling the impact of global tuberculosis control strategies. Proceedings *of the national academy of Sciences of the united states of America*; **95**: 13881-6

Nair, D.M., George, A.,& Chacko K.T. (1997). Tuberculosis in Bombay: New insites from poor urban patients. *Health policy and Planning*, **12(1),** 77-85.

Narain J., Leon R. and Kim S. (2004). Epidemiology of HIV- TB in Asia. *Indian Journal of Medical Research.*

Netto E.M., Dye C. and Raviglione M. (1999). Global monitoring and surveillance project. Progrsess in global tuberculosis control 1995 – 1996, with emphasis on 22 high incidence countries *international journal of tuberculosis and lung disease* **3**: 310-20.

Nimery B., Albert C. and Macnee (2003). Tuberculosis, non-tuberculosis lung infection, pulmonary infection and social issues. *AM J. Repir Critcare med. American journal of epidemiology,* **44;** 69-77.

Odhiambo J.A. (1999). Tuberculosis and the HIV epidemic; increasing risk of tuberculosis infection in Kenya. *Am J Public Health*, **89;** 1078-82.

Raviglione M.C., Marian J.P. and Kochia A. (1992). HIV- associated tuberculosis in developing countries: clinical features, diagnosis and treatment. *Bulletin of World Health Organization*, **70**:515-26.

Rodier A., Marand J., Olson J., Wahs D., Said-Salah. HIV infection among secondary students in Djibouti, horn of Africa., knowledge exposure and prevalence. *East Africa Med J.* 1993; **70(7):**414-7

Rose D.N. (1998). Short course prophylaxis against in HIV-infected persons. a decision and cost- effectiveness analysis. *Annals of internal medicine*, **129;** 779-86.

Rosenstock, I.M., Strecher, V.J., & Becker, M.H.(1994). The health belief model and HIV risk behaviour change. In R.J. DiClemente & J.L. Peterson (Eds.) preventing AIDS: *Theories and Methods of Behavioral Intervention* (pp.5-24). New York: Plenum Press.

Rubel, A. J., & Moore, C.C.(1995). Recommended socialbehavioral research for more successful tuberculosis control. Improving tuberculosis treatment and control: An Agenda for behavioral, social, and health services research. Proceedings of *Tuberculosis and Behaviour: National Workshop on research for the 21st Century, August 28-30, 1994, Bethesda,* MD(pp.47-52), Atlanta, GA: U.S. Department of Health and Human Services, Center for Disease Control and Prevention.

Sandral L and Bertman (2003). Art *Annotation: Munch, Edward – The sick child.* Literature and medicine database.

Scheeles S., Dolin P. and Panthania V. (1999). Consensus statement.

Selwyn P.A., Hartel D. and Lewis V.A. (1990). A prospective study of the risk of tuberculosis among intravenanous drug users with immuno-deficiency virus infection. *New England journal* of medicine, **320;** 545- 50.

Sheeran, P.& Funglada, Abraham, C. (1995). The Health Belief Model in *Predicting Health Behaviour* (Conner, M. & Norman, P.eds.) Buckingham: Open University Press.

Shins S., Furin J., Bayona J., Mate K. and Farmer P. (2004). Community based treatment of multi drug resistance tuberculosis in Lima, pern: *Social sciences and medicine 59, 1529-1539.*

Steen T and Mazonde G.N. (1999) health seeking behaviour in Botswana with Pulmonary Tuberculosis; *Social Service and Medicine* 48(2). 163-172.

Stephene D.L., Linda G. B., Keren M., London M. and Robin W. (2006). *Clinical infectious Diseases*, **42**; 1040-1047.

Sung Y.C., Ha S.J., KIM S.C. and Cho S.N. (2005). Prospective effect of DNA vaccine during chemotherapy on reactivation and re-infection of *mycobacterium tuberculosis*. Gene Ther (E Pub a head of print) *PIMD*

Thomas D. (1999). The White Death: A history of tuberculosis. *ISBN.*

Uplekar, M.W., & Rangan , S. (1996). Tackling TB: The search for solutions. Bombay, India: *Foundation for Research Community Health*

USAID (2006). Infectious Tuberculosis, countries- Kenya

Volmink J., Matchaba P. and Garner P. (2000). Directly Observed Therapy and treatment adherence. *Lancet,* **355**; 1345-50

Vynnycky E. and Fine P.E. (1997). The natural history of tuberculosis: the implications of age – dependent risks of disease and the role of re-infection: *epidemiology and infection*, **119**; 183-201.

Wandwalo E., Kapalata N., Egwaga S. and Morkve O. (2004). Effectiveness of community based directly treatment for tuberculosis in an urban setting in Tanzania: Randomized Controlled Trial. *International journal of tubercle lung disease*, **8**; 1248 – 54

Whalen C.C., Johnson J L., Okwera A., Huebner R. and Mgyenyi P. (1997). A trial of three regiments to prevent tuberculosis in Ugandan adults infected with the human immuno- deficiency virus. New *England Journal of medicine*, **337**; 801-8

WHO (2005). Global tuberculosis control, surveillance, planning and financing: WHO report, WHO/HTM/TB. **349**; Geneva; *World Health Organization.*

WHO (2006). Global tuberculosis control, surveylance, planning, is financing Report.

WHO (2004). TB and HIV co-infection, CDC NCHSTP division of tuberculosis elimination. Scaling up prevention and treatment for TB and HIV.

Williams B.G., Dye C. and Scheele S. (2003). Antiretroviral drugs for tuberculosis control in the era of HIV/AIDS. *Science.* **301**; 1535-7.

Wright *et al.*, (2006): emergence of mycobacterium tuberculosis with extensive resistance to second second-line, drugs-world, 2000-2004: Mobility and Motality weekly report **5(11):**301-305.

Wright J., Walley J. and Philip A. (2004). Direct Observation of Treatment for tuberculosis: a randomized controlled trial of community health workers verses family members. *Tropical medicine and international health*, **9**; 559-65.

Zwarenstein M., Schoeman J.H., Vundule C. and Tatley M. (1998). Randomized control trial of self supervised and directly treatment of tuberculosis. *Lancet,* **352;** 1340-3

APPENDIX I : QUESTIONNAIRES

Quantitative and Qualitative Data Collection tool

Questionnaire form for adolescents in secondary schools

Assessment of knowledge, attitude and practices among adolescents towards tuberculosis in Kisauni Mombasa District..

Introduction

My name is Yonge Shadrack. I am a postgraduate student at the Kenyatta University, Nairobi.

I am here to carry out a study on the attitudes and knowledge of adolescents towards tuberculosis (TB).

I want to ask you some questions on your sexuality behaviour, knowledge and your attitudes towards tuberculosis. Your responses will be used for academic and research purposes only. They will be treated with utmost confidentiality.

Your responses will help us to make recommendations on promoting behaviour modification and adolescents perceptions as one of the TB prevention measures.

QUESTIONNAIRE

SECTION A: Tuberculosis Knowledge, Attitudes & Practices Survey

Notice for interviewers:
If the answer to the first question is "no", do not continue - go to the next respondent.

1. Have you heard about the disease called Tuberculosis?

Yes No

2. What symptoms can show that a person has TB? (Multiple answers)
Coughing with sputum
Coughing for over 3 weeks
Periodical increases of temperature for over 3 weeks
Blood in sputum

Loss of appetite
Night sweating
Pain in the chest
Total weakness, inertia
Weight loss
Other (specify)_____
I do not know

3. Have you or anyone in your family ever had any of these symptoms? (If answer "no" – go to question 6)

Yes No Don't know/don't remember

4. If yes, did they see a doctor?

Yes No Don't know/don't remember

5. If no doctor was seen, why not?

Felt better
No money to see doctor
Too busy
Was far from medical institutions
Fear of doctor
Fear of TB
Trying to treat symptoms at home
Other
(specify):_____

6. Is TB contagious? (If answers "no"/ "don't know" – go to question 8)

Yes No Don't know

7. If "yes", how is TB transmitted? (Multiple answers are possible)

Through the air when coughing
Through blood
Through handshake with an infected person
Sexually transmitted
Sharing food with infected person
You're born with it
Other (specify) _____
I don't know

8. Do you think TB is curable?

Yes No Don't know

9. Which symptoms would make you go to a health facility to have a TB test? (Multiple answers)

Coughing with sputum
Coughing for over 3 weeks
Periodical increases of temperature for over 3 weeks
Blood in sputum
Loss of appetite
Night sweating
Pain in the chest
Total weakness, inertia
Weight loss
Other (specify)_____
I do not know

10. If you had TB signs where would you go to get medical service? (Multiple answers is possible)

Your family doctor
Pulmonologist
Hospital
Polyclinic
TB cabinet
Other
I do not know

11. Have you or your relatives ever had TB?

Yes No Don't know

12. Have you ever had a friend, neighbor, or schoolmate with TB?

Yes No Don't know

13. If "yes", do you/would you visit them in their home?

Yes No Don't know

14. If "no", why not?

Fear of disease
Other (specify)_____

15. If someone has TB will they try to hide the disease from others? (If answer "no" – go to question 17)

Yes No Don't know

16. If "yes", why? (Multiple answers)
Because they will lose job
Because they will lose friends

Because people will avoid them
Because no-one will marry them
Other (specify) _____

17. Do you think it is shameful to have TB? (If answer "no" – go to question 19)

Yes No Don't know

18. If "yes", why? (Multiple answers)

This is a disease of asocial people
Because the person with TB can lose job
Because everybody will avoid person with TB
Other (specify) _____

19. A sick relative has completed TB treatment in a hospital. Would you take him to your home for aftercare?

Yes No I do not know

20. If someone has TB will others treat them differently? (If answer "no" – go to question 22)

Yes No I do not know

21. If "yes", how?

Will support them and feel for them
Will avoid them
Other (specify)_____

22. Have you been told about TB last 12 months? (If answer "no" – go to question 24)

Yes No Don't know

23. If yes, who?

Family doctor
Nurse
Father, mother, relatives
Friend
Colleague (in school, on the office)
Other (specify)
_____

24. Have you received any information about TB in the last 6 months? (If answer "no" – go to question 26)

Yes No

25. If "yes", from which sources?
Friends, acquaintances, relatives
Other medical workers
Newspapers
Radios
TV
Booklets, leaflets
Lectures
Other_____

26. Which part of the body does TB affect

Chest
Lungs
Kidney
Digestive system
Any where
Neck
Bones

Attitudes towards TB patients

For questions below circle one statement that you agree with most

1. Strongly agree
2. Agree
3. Neutral
4. Disagree
5. Strongly disagree

27. Patients should be isolated from family
1 2 3 4 5

28. Avoid sharing food
1 2 3 4 5

29. Quit their jobs
1 2 3 4 5

30. Baby separated from mother
1 2 3 4 5

31. They should avoid marriage
1 2 3 4 5

32. Should be prohibited from visiting public utilizing places
1 2 3 4 5

33. Which of the following are preventive measures against TB?
Staying away from the patients
Complete treatment at home
Use anti-TB drugs
Have separate utensils from TB patients
Use boiled water
Bacilli Calmette-Guerin

34. Which part of the body does TB affects.
Chest
Lungs
Digestive system
Any where
Neck
Bones
Skin
Ribs

35. When is it advisable to stop anti-TB treatment if you were to be treated for TB?
When symptoms end
When doctor advices
Cannot afford

of attitude towards community and facility-based DOTs

For questions blow circle ONE statement that you agree with most

1. Strongly agree
2. Agree
3. Discharged
4. Strongly disagree
5. Don't know

36 In my opinion I consider the problem of TB in this area to be very high.
1 2 3 4 5

37. In my opinion youths are knowledgeable on the causes and symptoms of TB.

1 2 3 4 5

38. In my opinion TB can be treated through DOTs

1 2 3 4 5

39. TB problems cannot be prevented.

1 2 3 4 5

40. I would prefer DOTs to be administered at the facility level given high confidence people in this

41. In my opinion DOTs should be administered by someone I know from this area

1 2 3 4 5

42. In my opinion Community based distribution is better because it reduces cost of fare and time compared to facility based distribution.

1 2 3 4 5

43. I would not prefer facility based system given the overall low quality of care from public facilities (long waiting time, bad language from health workers)

1 2 3 4 5

Open questions

44. If you have to be treated for TB, would you prefer to change mode of DOT delivery (from COMDOT to FBDOT and vice versa)?

Yes No

Explain why (for answer in question above) _____

45. If you were to be treated for TB in the community, would you prefer to change DOT observer?

Yes No

If yes in question above explain why _____

If yes in question above, whom would you prefer to provide DOT?

Former TB patient __ 1, Guardian__ 2, Mention the type of guardian _____

Others explain _____

46. what you consider as the most important strong point of DOTs system one is allocated (Community vs Health facility)?

_____

47. In your opinion what would you consider as the weakest point of DOTs system (Community versus Health Facility?)

48. What would you recommend to improve the weaknesses you identified?

_____

_____

49. If you were chosen to supervise patients for TB medication, would you agree?

Yes No

Explain why

_____

_____

Thank you for your co-operation. Take care and lead a tuberculosis free life.

MAP OF KISAUNI – MOMBASA KENYA

REPUBLIC OF KENYA

MINISTRY OF SCIENCE & TECHNOLOGY

Telegrams: "SCIENCE TEC", Nairobi
Telephone: 02-318581
E-Mail:ps@scienceandtechnology.go.ke

JOGOO HOUSE "B"
HARAMBEE AVENUE,
P.O. Box 9583-00200
NAIROBI

When Replying please quote
Ref. MOST 13/001/ 38C 110/2

31st March 2008

Shadrack A. Yonge
Kenyatta University
P.O. Box 43844
NAIROBI

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on, ***'Assessment of Knowledge, Attitude and Practices regarding Tuberculosis among Adolescents in Kisauni Mombasa Kenya'***

I am pleased to inform you that you have been authorized to carry out research in Mombasa District for a period ending 30th August, 2008.

You are advised to report to the District Commissioner, the District Education Officer and the Medical Officer Health, Mombasa District before embarking on your research project.

On completion of your research, you are expected to submit two copies of your research report to this office.

M. O. ONDIEKI
FOR: PERMANENT SECRETARY

Copy to:

The District Commissioner
Mombasa District

The District Education Officer
Mombasa District

The Medical Officer of Health
Mombasa District
Mombasa