FACTORS INFLUENCING TUBERCULOSIS CONTROL AMONG THE MAASAI OF NAROK DISTRICT, KENYA

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DECLARATION

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

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This thesis has been submitted for examination with our approval as the university supervisors.

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DEDICATION

This work is dedicated to the persons who gave me a meaning of life; my dear loving family, husband Fred Kirui and daughters Tracy Chero and Deborah Koko for their cherished support and understanding during difficult times especially while far away collecting data.

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ABBREVIATIONS AND ACRONYMS

AIDS	Acquired Immuno-Deficiency Syndrome
ART	Anti Retroviral Therapy
BCG	Bacillus Calmette-Guerin
CPT	Cotrimazole Preventive Therapy
DDP	District Development Plan
DLTP	District Leprosy and Tuberculosis Programme
DOTS	Directly Observed Therapy Short Course
DTLC	District TB/Leprosy control Coordinator
EPTB	Extra Pulmonary Tuberculosis
GTB	Global Tuberculosis Programme
HIV	Human Immuno-Deficiency Virus
IUATLD	International Union against Tuberculosis and Lung Diseases
KEMRI	Kenya Medical Research Institute
KNHDR	Kenya National Human Development Report
MDR-TB	Multi-Drug Resistant Tuberculosis
MOH	Medical Officer of Health
MPND	Ministry of Planning and National Development
NLTP	National Leprosy and Tuberculosis Programme
PTB	Pulmonary Tuberculosis
SM-	Smear Negative Pulmonary Tuberculosis

SM+	Smear Positive Pulmonary Tuberculosis
SS+	Sputum Smear Positive
STI	Sexually Transmitted Infections
STP	Stop Tuberculosis Partnership
TB	Tuberculosis
WHO	World Health Organization
XDR-T	Extensive Drug Resistant Tuberculosis
PTP	Pulmonary Tuberculosis
RAD	Return After Default
FGD	Focused Group Discussions
NLTP	National Leprosy and Tuberculosis Control Programme

DEFINITIONS

Types of Houses among the Maasai of Narok District, Kenya

Traditional Maasai Manyatta

These are loosely constructed huts built by the women using cow dung plastered over bent wood wands and sticks. They are loaf shaped and grouped in circular enclosures. They are usually small in size and can last for at most five years.

Temporary Structures

These are made of twigs and tree branches or covered with polythene papers or sheets. They are hardly a meter in height. They are meant to accommodate herdsmen who are likely to be away from their homes for a few days while looking for pasture and water for their livestock.

Semi-permanent

These are wooden houses roofed with iron sheets and are likely to last for at least ten or more years. Middle income earners are more likely to afford this type of houses.

Permanent

These are made of bricks or concrete blocks/stones, roofed with iron sheets and are likely to last for a long time probably fifty or more years. Those who are financially stable can afford to build these types of houses.

ABSTRACT

Tuberculosis, a deadly infectious disease caused mainly by *Mycobacterium tuberculosis*, is increasingly becoming one of the leading health concerns globally. Human Immuno-deficiency Virus has exacerbated the situation in developing countries and it has led to the resurgence of tuberculosis. Of more concern is the emergence of multidrug-resistant (MDR) and extensively drug resistant (XDR) TB which are much more difficult and costly to treat. Kenya has mounted a series of interventions with a view to sensitizing people about the disease. Despite those efforts, there remain hard-to reach regions or communities such as the Maasai whose coverage in the interventions have been minimal. A special TB treatment programme, "TB *Manyatta"* strategy was introduced to maximize treatment outcomes in the region. The main objective of the study was to establish the community perceptions, socio-cultural beliefs and practices and other factors influencing TB control among Maasai of Narok District. This was a survey which utilized quantitative and qualitative methods of data collection. A sample size total of 384 TB patients were recruited for the study as they went into the TB clinics, after obtaining prior informed consent. Quantitative data was analyzed using SPSS version 10 program. The level of significance was $P<0.05$. Qualitative data was analyzed thematically using NVIVO (version 8). To obtain secondary data, this study also utilized records that were kept at the district hospital. Bivariate analysis revealed several factors that had independent statistical significance when related with respondents' knowledge of TB. These included age of the respondent ($P<0.001$), marital status ($P=0.034$), religion ($P=0.032$), the level of education acquired ($P=0.022$), accessibility to TB education

(P=0.039) and overall patients attitude towards TB (P<0.001). Tuberculosis was perceived as a highly contagious, incurable and killer disease such that those suffering from it were reported to be stigmatized and isolated. Socio-cultural practices such as coughing without covering the mouth (92%), consumption of untreated milk (25%) and crowding in traditional huts with no or minimal ventilation predispose the Maasai to contracting TB. Regarding health seeking behavior, first health facility visited was significantly related to knowledge on TB (P=0.002). Patient delay before medical consultation was conspicuously observed. Major factors associated with delay before seeking medical consultation included use of traditional medicines (47.9%), inaccessibility of health facilities (29.2%) and poverty (21.1%). The Maasai community had a negative attitude towards TB *manyatta* strategy, as they considered it forced treatment. As a result records reviewed for year 2008/2009 revealed that treatment defaulting has always been around 13.5%. Knowledge of TB disease is inadequate and attitude towards TB is predominantly negative. Knowledge gap that exists should be bridged through continuous public health education that is tailored to suit the Maasai beliefs and practices. To improve access, health services should be decentralized nearer to the people.

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background Information

Tuberculosis (TB) is a common and often deadly infectious disease caused by mycobacterium, mainly *Mycobacterium tuberculosis* (Kumar *et al.,* 2007). Tuberculosis usually attacks the lungs (as pulmonary TB) but can also affect the central nervous system, the lymphatic system, the circulatory system, the genitourinary system, the gastrointestinal system, bones, joints, and even the skin. When it affects organs other than the lungs, it is termed as extra pulmonary TB. Tuberculosis is increasingly becoming one of the leading health concerns globally. Approximately two billion people have been exposed to the tuberculosis pathogen with eight million people becoming ill of tuberculosis and two million others dying from the disease (WHO (a), 2006). Tuberculosis is the world's greatest infectious killer of women of reproductive age and the leading cause of death among people with HIV/AIDS (STP, 2006).

Tuberculosis is spread through the air, when people who have the disease cough, sneeze, or spit. One third of the world's current population has been infected with *M. tuberculosis*, and new infections occur at a rate of one per second (WHO (a), 2006) However, most of these cases will not develop into the full-blown disease. Asymptomatic, latent infection is most common. About one in ten of these latent infections will eventually progress to active disease, which, if left untreated, kills more than half of its victims. In 2004, morbidity and

mortality statistics included 14.6 million chronic active cases, 8.9 million new cases, and 1.6 million deaths, mostly in developing countries (WHO (b), 2006). In addition, a rising number of people in the developed world are contracting tuberculosis because their immune systems are compromised by immunosuppressive drugs, substance abuse, or AIDS. The distribution of tuberculosis is not uniform across the globe, with about 80% of the population in many Asian and African countries testing positive in tuberculin tests, while only 5-10% of the US population test positive. It is estimated that the US has 25,000 new cases of tuberculosis each year, 40% of which occur in immigrants from countries where tuberculosis is endemic (Kumar *et al.*, 2007).

When people suffering from active pulmonary TB cough, sneeze, speak, or spit, they expel infectious aerosol droplets 0.5 to 5 μm in diameter. A single sneeze can release up to 40,000 droplets (WHO (b), 2006) Each one of these droplets may transmit the disease, since the infectious dose of tuberculosis is very low and the inhalation of just a single bacterium can cause a new infection (Martin, 2006). People with prolonged, frequent, or intense contact are at particularly high risk of becoming infected, with an estimated 22% infection rate. A person with active but untreated tuberculosis can infect 10–15 other people per year (WHO (b), 2006). Other persons at risk include people in areas where TB is common, people who inject drugs using unsanitary needles, residents and employees of high-risk congregate settings, medically under-served and low-income populations, high-risk racial or ethnic minority populations, children exposed to adults in high-risk categories, patients immuno-

compromised by conditions such as HIV/AIDS, people who take immunosuppressant drugs and health care workers serving these high-risk clients (WHO, 2001). Transmission can only occur from people with active — not latent — TB (Kumar *et. al.,* 2007). The probability of transmission from one person to another depends upon the number of infectious droplets expelled by a carrier, the effectiveness of ventilation, the duration of exposure, and the virulence of the *M. tuberculosis* strain (Reichman and Tanne, 2001). The chain of transmission can, therefore, be broken by isolating patients with active disease and starting effective anti-tuberculosis therapy. After two weeks of such treatment, people with non-resistant active TB generally cease to be contagious. If someone does become infected, then it will take at least 21 days, or three to four weeks, before the newly infected person can transmit the disease to others (Demissie *et al*., 2002). Tuberculosis can also be transmitted by eating beef or drinking untreated milk from cattle infected with *Mycobacterium bovis* that causes TB in cattle (Bonsu *et al*., 2000).

Tuberculosis, a public health threat for thousands of years, remains a top killer worldwide despite the discovery 50 years ago of drugs that can cure this infectious disease. In 2002, 8.5 million new TB cases developed and over two million men and women died, mostly 15-45 years old. Most of these cases (95%) and 98% of deaths occurred in the developing world (WHO, 2003). Africa faces the highest TB rates (per population), but Asia carries the greatest absolute burden and the epidemic is worsening in other regions as well. As seen in the former Soviet republics, economic and social crises can quickly exacerbate the TB

epidemic (WHO, 2003). As with HIV/AIDS and malaria, the social and economic burden from TB on ill people, and on their families and communities, is enormous. Poor people are especially vulnerable to TB because of their underlying health status, living conditions, and their limited access to treatment. People who suffer from malnutrition or diseases such as HIV/AIDS or diabetes are at greater risk given their impaired ability to fight off infection and illness. Over 12 million persons are co-infected with *M. tuberculosis* and HIV worldwide. More HIV-infected persons die due to TB than to any other opportunistic infection. Up to 60% of TB patients are HIV-positive in some sub-Saharan African countries and the proportion is rising in Asia (WHO, 2003).

More than 400 000 cases of multidrug-resistant TB (MDR-TB) emerge every year as a result of under investments in basic activities to control TB, poor adherence of anti-TB drugs and transmission of drug-resistant strains. The MDR-TB is much more difficult and costly to treat than drug-susceptible TB (WHO (b), 2006). In 2006, extensively drug-resistant TB (XDR-TB) was reported in all regions of the world and was rapidly classified by WHO as a serious emerging threat to global public health, especially, in countries with a high prevalence of the HIV. XDR-TB raises the possibility that the current TB epidemic of mostly drug-susceptible TB will be replaced with a form of TB with severely restricted treatment options (Reichman and Tanne, 2001). This phenomenon would jeopardize the progress made in recent years to control TB globally.

Before the discovery of antibiotics, TB used to claim many lives because the pathogens overwhelmed the body's natural defence. The discovery of chemotherapy in 1940 led to reduced morbidity and mortality (Clark, 1996). The aims of treatment, according to Webber (1997), are to treat individual cases, reduce infectiousness and provide a method of disease reduction as well as reducing morbidity from the disease. Long (2001) also concur that treatment aims to provide a lasting cure with few treatment failures and relapses as well as preventing drug resistance. If left undiagnosed or untreated, an individual with TB disease may infect between 10 and 15 people each year. The disease affects the most productive and economically active segment of the population; morbidity can result in 3-4 months of lost work time and a loss of 20% of annual household income (UNDP, 2006). Control of TB is a global endeavor but a national responsibility. Global Tuberculosis Programme (GTB), of the World Health Organization, co-ordinates the global effort, formulate strategies and provide guidelines to National Tuberculosis Programmes (NTP) worldwide (Surow, 2003). Control can be achieved through early active case detection and complete treatment, and detection and preventively treating persons with latent TB infection.

Current global efforts to control TB have three distinct but overlapping dimensions, namely, humanitarian, public health and economic. Alleviating illness, suffering and death, is the major humanitarian concern. The public health aspect is proper diagnosis and treatment to decrease transmission within communities, while reducing costs, alleviation of poverty and promotion of development makes the economic dimensions (Surow, 2003).

1.2 Problem Statement

Despite the joint efforts by the Kenyan government (through the National Tuberculosis and Leprosy division) and her development partners to intervene in the control of TB in terms of advocacy, communication and social mobilization (ACSM), there is still limited awareness and utilization of TB services in general and among pastoralist communities such as the Maasai of Narok District, in particular (MPND, 2005). There were a total of 834 TB cases reported in 2007 in Narok District as compared to 544 cases in 2006. The district covers a vast region with rough terrain. This restricts movement of people and limits their access particularly to essential services such as health facilities which are well distributed in the district but far apart and away from the people.

In Kenya, the overall TB case detection rate in 1992 was 61 per 100 000 population but 176 per 100 000 in 13 districts with nomadic or semi nomadic populations (van Cleeff *et al.***,** 1995). For new smear-positive cases these figures were 35/100 000 and 88/100,000, a ratio of 1–2.5. In absolute numbers the nomadic districts contributed 28% of all cases registered in Kenya in 1992 while making up only 11% of the total population. The high prevalence of tuberculosis among nomads is often attributed to the consumption of untreated milk (van Cleeff *et al.***,** 1995).

More serious, however, are the difficulties posed by nomadic lifestyle, poor health infrastructure and case treatment with less than one third completing treatment (Nortier, 1990). Environmental factors also increase the risk, and these include poor living standards like overcrowding and inadequate diet (WHO, 1998). The HIV/AIDS increases susceptibility to infection with TB (WHO, 1996). Human Immuno-deficiency Virus infection rates amongst the Maasai have reached alarming levels in recent years (ITDG, 2005).While cultural practices such as wife sharing have made the Maasai particularly susceptible to HIV, their nomadic lifestyle has hampered the delivery of life-prolonging HIV/AIDS treatment and TB chemotherapy.

Arising from the above, TB has not only been a serious public health problem in districts with predominantly nomadic population but treatment has also been difficult. This calls for studies to determine important factors including socio-cultural beliefs and practices that are key to eradicating TB. Though specific programmes for TB control, the "TB *Manyatta*", have been introduced in the District, there is little documented information about the effectiveness of the "TB *manyattas*" in addressing the TB problem in the District. There is also need to investigate other factors influencing control measures with a view to identify mitigating factors and recommending proactive interventions that are both community based and situation specific.

1.3 Justification of the study

The present study sought to highlight the various factors influencing the utilization of TB health services and will go a long way in supporting development of meaningful interventions to combat TB not only among the Maasai but also among similar groups. Health care seeking with regard to TB may differ among pastoralists. Treatment adherence is a complex behavioral issue and improving treatment outcomes for tuberculosis requires a full understanding of the factors that prevent people taking medicines correctly and those that help them complete their treatment. The Maasai community was purposively selected due to its high prevalence of TB compounded by HIV/AIDS despite being a rural population, availability of TB *manyattas* and duration and intensity of TB control programmes among the nomadic pastoralists. Although much is being written about socio-cultural factors towards TB treatment and its impact on control of TB in sub-Saharan Africa, no such studies have been conducted among the Maasai pastoralist community of Kenya. Further, nothing is known about the role of lay perceptions, attitudes, beliefs and health seeking behaviour of the Maasai with regard to TB. An insight into various factors influencing TB control is vital for incorporation into design of proactive and culturally sensitive approaches based on scientific facts.

1.4 Hypothesis

1.4.1 Null Hypothesis

- Tuberculosis control among the Maasai of Narok District is not influenced by any socio-cultural and other factors.

1.5 Objectives

1.5.1 General Objective

To establish community perceptions, socio-cultural beliefs and practices and other factors influencing TB control among Maasai of Narok District.

1.5.2 Specific Objectives

1. To determine community perceptions and beliefs about TB among the Maasai of Narok District.
2. To identify socio-cultural beliefs and practices influencing TB control programmes of Narok District.
3. To establish health seeking behavioral patterns on TB control among the Maasai of Narok District.
4. To determine the effectiveness of "TB *Manyatta*" in controlling TB among the Maasai of Narok District.

1.6 Research Questions

The following questions were asked with a view to realizing the objectives.

- What are the perceptions and beliefs about TB, TB transmission, symptoms and treatment among the Maasai community of Narok District?
- What are the socio cultural beliefs and practices that impact on TB control programmes among the Maasai community of Narok District?
- What are the health seeking behavioral patterns among the Maasai TB patients of Narok District?
- Are "TB *Manyattas*" effective in controlling TB among the Maasai?
- What factors hamper TB control efforts among the Maasai of Narok District?

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Epidemiology of TB

According to the World Health Organization (WHO), nearly 2 billion people — one third of the world's population — have been exposed to the tuberculosis pathogen (WHO (a), 2006). Annually, 8 million people become ill with tuberculosis, and 2 million people die from the disease worldwide (CDC, 2005). In 2004, around 14.6 million people had active TB disease with 9 million new cases. The annual incidence rate varies from 356 per 100,000 in Africa to 41 per 100,000 in the Americas (WHO (b), 2006). Tuberculosis is the world's greatest infectious killer of women of reproductive age and the leading cause of death among people with HIV/AIDS (STP, 2008).

The rise in HIV infections and the neglect of TB control programs have enabled a resurgence of tuberculosis (Iademarco and Castro, 2003). The emergence of drug-resistant strains has also contributed to this new epidemic with, from 2000 to 2004, 20% of TB cases being resistant to standard treatments and 2% resistant to second-line drugs**.** The rate at which new TB cases occur varies widely, even in neighboring countries, apparently because of differences in health care systems (Sobero and Peabody, 2006).

In 2005, the country with the highest estimated incidence of TB was Swaziland with 1262 cases per 100,000 people. India has the largest number of infections, with over 1.8 million cases (WHO (a), 2006). In developed countries, tuberculosis is less common and is mainly an urban disease. In the United Kingdom, TB incidences range from 40 per 100,000 in London to less than 5 per 100,000 in the rural South West of England. The national average is 13 per 100,000. The highest rates in Western Europe are in Portugal (31.1 per 100,000 in 2005) and Spain (20 per 100,000) (Spence *et al.*, 1993). These rates compare with 113 per 100,000 in China and 64 per 100,000 in Brazil. In the United States, the overall tuberculosis case rate was 4.9 per 100,000 persons in 2004. In Canada tuberculosis is still endemic in rural Manitoba (Spence *et al.,* 1993).

The incidence of TB varies with age. In Africa, TB primarily affects adolescents and young adults (WHO (a), 2006). However, in countries where TB has gone from high to low incidence, such as the United States, TB is mainly a disease of older people, or of the immuno-compromised (CDC, 2005).

There are a number of known factors that make people more susceptible to TB infection: worldwide the most important of these is HIV. Co-infection with HIV is a particular problem in sub-Saharan Africa, due to the high incidence of HIV in these countries (Chaisson and Martinson, 2008). Smoking more than 20 cigarettes a day also increases the risk of TB by two to four times (Jha *et al.*, 2008). Diabetes mellitus is also an important risk factor that is growing in importance in developing countries (Restrepo, 2007). Other disease

states that increase the risk of developing tuberculosis are Hodgkin lymphoma**,** end-stage renal disease, chronic lung disease, malnutrition, and alcoholism (Kumar *et al.*, 2007).

Diet may also modulate risk. For example, among immigrants in London from the Indian subcontinent, vegetarian Hindu Asians were found to have an 8.5 fold increased risk of tuberculosis, compared to Muslims who ate meat and fish daily (Strachan *et al.*, 2002). Although a causal link is not proved by these data, this increased risk could be caused by micronutrient deficiencies; possibly iron, vitamin B12 or vitamin D (Strachan *et al.*, 2002). Further studies have provided more evidence of a link between vitamin D deficiency and an increased risk of contracting tuberculosis (Ustianowski *et al.*, 2005). Globally, the severe malnutrition common in parts of the developing world causes a large increase in the risk of developing active tuberculosis, due to its damaging effects on the immune system (Schaible and Kaufmann, 2007). Along with overcrowding, poor nutrition may contribute to the strong link observed between tuberculosis and poverty (Davis, 2003).

2.2 TB and HIV/AIDS

In 2008, there were an estimated 8.9–9.9 million incident cases of TB, 9.6–13.3 million prevalent cases of TB, 1.1–1.7 million deaths from TB among HIV-negative people and an additional 0.45–0.62 million TB deaths among HIV-positive people, with best estimates of 9.4 million, 11.1 million, 1.3 million and 0.52 million, respectively (WHO, 2009).

Seventy percent of the co-infected live in sub-Saharan Africa (WHO (b), 2006). Human Immuno-deficiency Virus increases a person's susceptibility to infection with the TB tubercle. Human Immuno-deficiency Virus is also a potent cause of progression of TB infection to disease because of the suppressed immunity in these patients. The impact of HIV on TB control is quite substantial. There are usually high defaulter rates because these clients develop adverse anti-TB drug reactions and as a result, they stop taking TB treatment. The cure rates in HIV clients are low resulting in high mortality rates. There is also an increase in emergence of drug resistance, especially with defaulting treatment. However, provided TB is diagnosed early in these clients and effectively managed, TB can be cured even if they are HIV positive. This should be emphasized in health education.

The major reason for Kenya's increasing TB burden is the concurrent HIV epidemic. In the last half of 2005, the National Leprosy and Tuberculosis Program (NLTP) introduced an integrated TB-HIV/AIDS data collection system, and the government recently placed the NLTP and the national HIV/AIDS program in the same division in the Ministry of Health to better address TB-HIV co-infection. With increased funding for planned NLTP activities, including mechanisms to improve treatment outcomes, TB-HIV/AIDS management, community-based care, public-private mix Directly Observed Therapy, Short-Course (PPM-DOTS) and multidrug-resistant TB, a greater proportion of TB patients were expected to benefit from improved DOTS services (WHO (b), 2006).

Tuberculosis and HIV act on each other with fatal force—a combination made in hell, which must be expunged from the catalogue of communicable disease. In Tanzania, for example, the number of TB cases increased by almost six-fold between 1983 and 2003, from approximately 12,000 cases to 64,500, with 60 percent of the increase in TB incidence attributable to HIV (OSI, 2006). Human Immuno-deficiency Virus is also fuelling the TB epidemic in Nigeria, the nation with the largest number of new TB cases in Africa, with a 6 percent annual increase in TB prevalence, and a four-fold increase in HIV rates among people living with TB between 1991 and 2001. While Bangladesh, Brazil, Nigeria, Tanzania, and Thailand face varying rates of TB/HIV co-infection, the report points to the need for decisive governmental action to coordinate TB and HIV/AIDS policies and programs, both in countries with high co-infection rates such as Tanzania, as well as in countries at high risk for a burgeoning co-epidemic such as Bangladesh. In all five countries examined, people living with HIV/AIDS face serious obstacles to receiving prompt, effective treatment for TB, including lack of proper diagnostic tools (OSI, 2006).

Despite clear indications of a co-epidemic, basic knowledge about TB and the interaction of TB and HIV is lacking among the general population in most developing countries. In the absence of sufficient information about TB symptoms and the availability of free diagnostic and treatment services, people may be more likely to be swayed by superstition. The belief that TB patients have been bewitched is not uncommon, and TB patients are often automatically considered to be HIV-positive as well (John, 2009). This combination of low

awareness and stigmatization may be a factor in discouraging people from accessing TB services. One recent study revealed that the median period between onset of TB symptoms and the first visit to a health facility was approximately eight months. For many people living with HIV, failure to act promptly to receive treatment for TB is fatal (Ann, 2003). Tuberculosis awareness is low even among health policymakers, and some officials consider it politically risky to mention the disease due to its growing association with HIV/AIDS, which is still a sensitive issue.

2.3 Prevalence of TB in Kenya

Kenya ranks 10th among the world's 22 countries with a high TB burden. According to WHO (a) (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. In 2005, 108,401 cases of TB were reported. This stagnation in case notification may be the result of a slackening of TB case-finding efforts or the result of a stabilization of the epidemic due to previous TB control efforts. It could also be a result of Kenya's phenomenal uptake of antiretroviral HIV/AIDS treatment. In 2005, TB treatment results showed treatment success rates of 82 percent for new SS+ pulmonary TB cases; 75 percent for SS+ re-treatment cases; 77 percent for new smear-negative cases; and 76 percent for extra-pulmonary TB cases. The National Leprosy and Tuberculosis Program (NLTP) began implementing Directly Observed Therapy, Short-Course (DOTS) in 1993 and reported 100 percent DOTS coverage by 2001 (NLTP, 2005).

As in the rest of sub-Saharan Africa this large increase in TB is attributed primarily to the Human Immunodeficiency Virus (HIV). Other factors that may be contributing to the spiraling TB disease burden in Kenya include the high poverty levels with consequent socio-economic deprivation. This is most evident in urban areas where there has been a phenomenal growth of slums and a slum population. The large urban slum population has been followed closely by an increase in the proportion of TB cases notified from urban areas. For example in 2005, over 35% of all notified TB cases in Kenya were from five largest urban areas of Nairobi, Mombasa, Kisumu, Nakuru and Eldoret, reinforcing the known fact that poverty and TB are closely interrelated (NLTP, 2006). The implication of this observation is that a general improvement in socioeconomic conditions may be the answer to TB control in the long term.

2.4 Directly Observed Therapy Short Course Strategy

The World Health Organization declared TB a global health emergency in 1993 and the Stop TB Partnership developed a Global Plan to Stop Tuberculosis that aims to save 14 million lives between 2006 and 2015 (WHO, 2008). Since humans are the only host of *Mycobacterium tuberculosis*, eradication would be possible: a goal that would be helped greatly by an effective vaccine (Martin, 2006).

Directly Observed Treatment Short course entails that a health worker, volunteer, village health worker, home based caregiver, community member or family member takes the responsibility of observing the client take and swallow every dose of the drug. Akkslip (1999) studied family members supervising taking of TB treatment. They recorded a cure rate of 85% in the directly observed sputum positive clients compared to a cure rate of 70.9% in those who opted for self-administered treatment. The study further indicates that family members may contribute to effective implementation of DOTS leading to reduction of defaulter rates.

To ensure compliancy the MOH/NLTP in its treatment policy has recommended the DOTS strategy. The treatment can be administered in a wide range of clinical settings including at home, workplace or any convenient designated area. Missed doses of anti-TB treatment are immediately detected when clients are on DOTS as all tablets taken daily are recorded on a card. Great success on adherence due to DOTS has been reported in different countries such as Banglandesh, China, Peru and Tanzania (WHO, 1998). Directly Observed Treatment Short course is also a last line defence against MDR-TB. DOTS has a number of advantages, mainly that it is the only way to ensure clients receive complete treatment of TB and become TB free.

However, Burman *et al.,* (1997) assert that DOTS may make the client's situation worse and not better. They argue that negative perceptions regarding DOTS such as surveillance of pill swallowing can be alienating and authoritarian causing clients with TB to avoid health care and hence contribute to defaulting. The authors seem to assume that DOTS is less attractive to clients than self-administered therapy. Heyman *et al.,* (1998) in the American journal of public health points out that DOTS is more effective than self-administered therapy only for clients who have not adhered to previous treatment. Zwarenstein *et al.,* (1998) also carried out a study in South Africa at Khayelitsha and Elsies River and reported that self-supervision can produce better results than the use of DOTS. In the study, self-supervised clients achieved better outcomes, 74% as compared to 42 % of patients on DOTS.

Tuberculosis accounts for approximately two million deaths worldwide each year and is the second greatest contributor among infectious diseases to adult mortality (WHO, 2002). Several regions of the world are experiencing severe epidemics of multi-drug resistant TB that threaten TB control and translate into low cure rates. New estimates suggest that there are about half a million multi-drug resistant tuberculosis (MDR-TB) cases each year, including new and previously treated cases. According to WHO (2009) almost 30, 000 cases of MDR-TB were notified in 2008; this is 11% of the total number of cases of MDR-TB estimated to exist among cases notified in the same year.

Studies have also revealed that each year, 424,000 people worldwide develop MDR-TB, a form that does not respond to treatment (Singleton *et al.*, 1997). It emerges where there is mismanagement of drugs and underinvestment in quality control of TB. Poor adherence to the antimicrobial regimen has been cited as one of the most challenging problems for TB treatment. Multidrug-resistant TB develops when the TB bacterium develops resistance to several TB drugs as a result of low drug levels. If doses are missed or treatment interrupted, resistance can emerge rapidly (Singleton *et al.*, 1997). The bacterium adapts itself to reproduce in the presence of low drug levels, and gradually develops greater resistance to the drug. The MDR TB and XDR TB can also be transmitted from one person to another. Consequently and fanned by HIV/AIDS, there are more TB cases globally and nationally at present than any other time in history (WHO, 2002). In 2009, Kenya had 353 people with MDR-TB, of whom about 70 were on treatment (NLTP, 2009). Dropping out of treatment heightens the risk of MDR-TB developing, which is very expensive and difficult to treat.

2.5 Impact of TB

The prevalence of HIV/AIDS, tuberculosis and malaria in Kenya could destabilize the country's social and economic sectors, according to UNDP Report (2006). The limited amount of resources spent on HIV/AIDS, malaria and TB intervention programs constrain the quality and range of social services, including education, health care, law and order, water and sanitation which are often seen as basic rights and essentials for human

development. There were about 200,000 cases of active TB in Kenya in 2005, but only 50% of cases were covered by the TB control program, raising concern that the number of TB cases could be higher (UNDP, 2006).

Tuberculosis imposes a considerable economic and social cost on patients and their families. In India, a country that carries a third of the worlds TB burden, the estimated economic cost of TB is US $ 3 billion per year (Kumar *et al.*, 2007). Because more than three-quarters of people with active TB are in the economically active age group (15 to 54), the economic and social costs to them and society are huge (John, 2009). They are income providers of the family. They are the parents of young children who need their economic and emotional support in order to thrive. They have elderly parents and relatives who depend on them. They are the citizens whose productivity and talents are essential to their countries' development. The result of TB is that access to opportunities and choices- a key principle of human development –is blocked.

The poor bear a high burden of TB (Sachin and Nerges, 2005). Those in poverty also have poor access to information and are therefore more difficult to reach with TB messages. The symptom that is often identified with TB (a persistent cough) does not usually trigger an immediate search for help. In fact, studies have indicated that there is a significant delay in symptom onset and treatment seeking behavior (Sachin and Nerges, 2005). Further, this symptom usually disappears within a few weeks of starting treatment, which can lead a

person who did seek treatment to stopping treatment mid-course. Those living in poverty often experience numerous episodes of persistent cough during the course of a year, which more often than not is due to other respiratory diseases. A person may be unwilling to return for a sputum test each time there is a cough, especially if he/she had tested negative in the previous instance. Aside from the monetary costs, the social costs of stigma are high, and often act as a disincentive for seeking diagnosis and treatment (Farmer, 1996).

2.6 Delays in TB treatment among the Pastoralists

The most important component of TB control is prompt detection and treatment of patients with active TB. Prolonged delay of such patients to treatment may lead to more advanced disease, high mortality and enhance continual transmission in the community. Diagnostic delay of longer than two months have been indicated to spread the disease to domestic contacts (Riley and Moodie, 1974). Reduction of the time between onset of TB symptoms to diagnosis is therefore a prerequisite to bring TB epidemic under control (Uys *et al.,* 2007). Diagnostic delay reflects patient delays in seeking health care, health care providers delay in making prompt and correct diagnosis and initiation of treatment (Huong *et al.,* 2007). Identifying where delays occur and the reasons for the delay help TB control programs improve their control strategies. Long delay of TB patients in diagnosis pose a formidable challenge to TB control in Ethiopia (Yimer *et al.,* 2005). This has been attributed to a

number of factors, mainly long distance to health facilities (Demissie *et al.,* 2002), limited awareness of TB disease and prevalent use of traditional healers (Cambanis *et al.*, 2005).

Pastoralists are migratory people whose livelihood largely depends on livestock raising. An estimated 50–100 million live in the developing world, 60% of whom are in sub-Saharan Africa. In the Horn of Africa, pastoralists constitute 70% of general population in Somalia, 33% in Eritrea, 20% in Kenya and Djibouti, 12% in Ethiopia and 60% of rural populations in Sudan (USAID, 2005). In these countries, pastoralists often dwell in border areas; highly volatile and insecure environments that are often beyond the reach of health services. Accordingly, disease control activities including TB control programmes are often absent in those areas or are not well adapted to pastoralists' mobile lifestyle (Sheik-Mohamed and Velema, 1999). The study conducted in Ethiopian pastoralists revealed that patients' biomedical knowledge on TB had significant influence on their health seeking action. Higher proportion (93%) of those with low knowledge on TB sought traditional help first for their current illness. The corresponding percentage with high knowledge on TB who first sought traditional help was 76.5%. This difference was statistically significant- 64.2 % of the participants had low biomedical knowledge on TB (Abdi, 2009).

According to the Turkana of Lodwar Township, Kenya, HIV-1/AIDS and TB are largely contagious and are attributed to impersonal and natural causes. In addition, in line with biomedical knowledge, the Turkana's local knowledge emphasizes a conceptual link between TB and HIV-1/AIDS. The study conducted among the Turkanas also demonstrated

that factors of the ecosystem such as poverty, widow inheritance, migration and other socio-cultural practices played an influential role in the vulnerability of the Turkana to the contraction and transmission of both TB and HIV-1/AIDS (John, 2009).

2.7 Tuberculosis Knowledge and Health Education

Studies in different parts of the world have revealed misconceptions and limited knowledge about the disease and its treatment (Wandwalo and Morkve, 2004). Provision of intensive health education to the patients in an unsupervised intermittent treatment yielded results as good as those obtained by directly observed treatment (Prassad *et al*., 2001). Khan *et al.*, (2000) and Mukherjee *et al.*, (2004) emphasize that patients' lack of knowledge about the nature of their disease contributes significantly to defaulting. This anomaly rests with both doctors and nurses. In their study in Egypt, Tolba *et al.*, (1995) found that clients lacked knowledge of TB and factors associated with treatment compliance in Kuala Lumpur, Malysia. The same study found that a large proportion of TB clients did not understand the symptoms of TB and had limited knowledge and many misconceptions about the transmission and treatment of the disease.

The guidelines of the NLTP-Kenya put emphasis on health education as an integral part of the overall control process of TB. Health education targets different groups including the patients, healthcare providers and members of the community. The major objective of health

education at the level of the patient is to remove stigmatization associated with the disease and to motivate the patient to complete the treatment (Johansson *et al.*, 1996).

Health education is important in TB management so that clients can be empowered with information, make informed decisions and thus understand the cause of the disease and the treatment. Knowledge is a state of knowing and is essential if attitudes are to change. Tuberculosis Patients in Kenya obtain information about the disease from the healthcare workers, media (radio, television, newspapers) and pamphlets provided within the health facility. This is aimed at helping them understand their condition and hence comply with treatment. Core knowledge elements of relevance to interruption of disease transmission and adherence to therapy relate to: what is TB, what causes it, how is it transmitted, what measures can be taken to limit transmission, how is it treated, what is the importance of taking treatment regularly, what are the consequences of stopping treatment, what are the possible side effects and complications of TB drugs and whether TB considered a curable disease (Donald *et al.*, 2000). All these are important educational messages that patients should know.

CHAPTER THREE

3.0 MATERIALS AND METHODS

3.1 Study Design

A cross sectional descriptive study, with both quantitative and qualitative research methods of inquiry was conducted in Narok District between 1st to 31st of July, 2009. The measure of exposure factors to TB and TB disease treatment completion, adherence to treatment and health-seeking behaviors were made at the same time.

3.2 Study Area

This study was carried out in selected health care centers in Narok District of Rift Valley Province **(Figure 3-1)**. There are 50 health facilities in Narok Diatrict but only three were selected for the study. These included Narok District Hospital, Olulung'a and Suswa sub-district hospitals which were purposively selected because they are supported by TB clinics. These centres also act as district referral centers and they serve predominantly the Maasai community. Besides, they are accessible. For the purposes of this study, Narok District included both Narok North and Narok South districts which had just been formed by splitting the wider Narok into two.

Narok District is situated in the south western side of Kenya and lies in the southern part of Rift Valley Province. It borders the Republic of Tanzania to the south, Trans-Mara District to the west, Bomet and Nakuru Districts to the north and Kajiado District to the east. It lies

between latitudes 0°50’ and 2°05’ south and longitudes 35°58’ and 36°0’ east. The district occupies a total area of 15,087.8 km^2 and is divided into eight administrative divisions, fifty-four locations and one hundred and three sub-locations. The district has two constituencies, namely, Narok North and Narok South; there are two local authorities namely, Narok County Council and Narok Town Council, with fifty-eight electoral wards (MPND, 2005-2010).

According to National Population Census of 1999, Narok District has a population density of 24 persons per km^2. Mulot Division has the highest population density due to fertile soils and favourable climate, while Central Division has density of 44 persons per km^2 and Olokurto 37 persons per km^2. Loita and Mara divisions have least population densities due to unfavorable climate and unfertile soils. The low population densities of Mara and Loita Divisions are attributed to the fact that these divisions have unfavorable weather conditions and infertile soils, which do not attract agricultural activities. These areas have a higher concentration of poor people than the high potential areas (MPND, 2005).

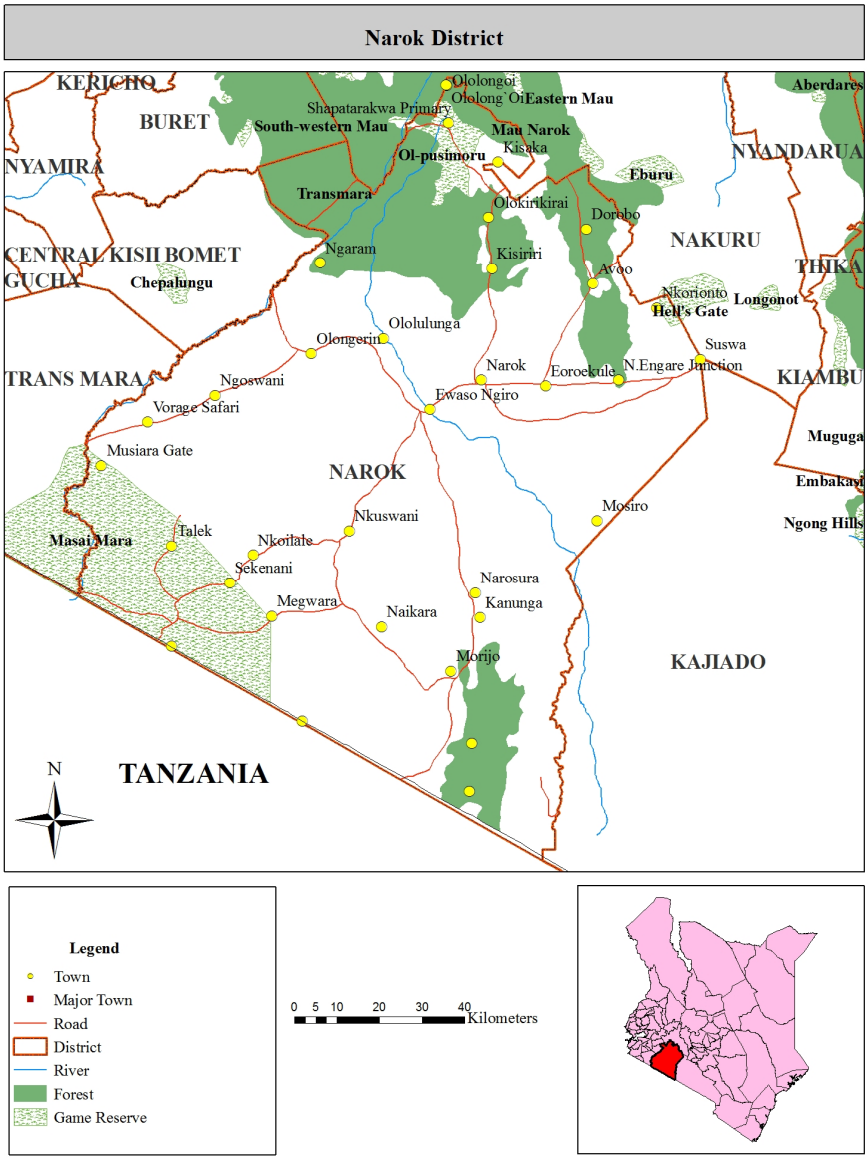

Figure 3-1: Location of the Study Area

Source: Survey of Kenya: 2009

3.3 Study Population

The study population included TB patients attending the selected healthcare centres. Health service providers working in the selected health facilities also took part in the study. For qualitative part of the study, those who were knowledgeable to pastoralists' way of life were selected. These included community leaders, health centre committees, civic leaders, church leaders and a few herbalists who consented to participate.

3.4 Sampling Procedure

Tuberculosis patients attending selected health care centres were recruited consecutively for the study as they went into the clinics until the desired sample size was attained. To obtain qualitative data that represented the Maasai community perceptions, purposive selection of homogenous groups to participate in Focused Group Discussions and in-depth interviews was done.

3.4.1 Inclusion Criteria

Adult TB patients who were 18 years and above, reside in the study district, are Maasai and gave consent were recruited for the study. Similarly, only selected civic leaders, religious leaders and recognized clan elders were included in the study. Health care personnel in-charge of DLTP, TB *manyatta* administration, public health staff and community health workers were also included in the study as key informants.

3.4 Sample Size Determination

Currently, no study has been conducted to determine adequate knowledge of TB among the Maasai of Narok District. Therefore, P value was assumed to be 0.5. By applying the formula that captures finite population correction factor according to Fisher (1960), the sample size was determined as follows:

$$n = \frac{(Z^2_{1-\alpha/2}\, P\,(1-P)}{d^2}$$

Where,

n = required sample size

$Z_{1-\alpha/2}$ =1.96 (confidence level at 95%)

P = estimated Tuberculosis knowledge in the country (0.52) (52%, among Ethiopian Nomads, Haile *et al.*, 2007)

d = Level of precision at 5% (standard value of 0.05)

$$n = \frac{(1.96)^2\,(0.5)\,(1-0.5)}{0.05^2}$$

n = 384

3.5 Ethical Considerations

Approval to conduct this study was sought from the Scientific Steering Committee and National Ethical Review Committee for scientific and ethical issues, respectively. Both

committees are under Kenya Medical Research Institute. Consent was obtained from the respondents through the attached consent form (Appendix 1). Tuberculosis, like HIV/AIDS becomes difficult to discuss in public. Looking at the sensitive nature of the study, all patients were assured of confidentiality and anonymity. Respondents were informed that information obtained from them would not be made available to persons outside the study team. Respondents were further assured that no person-identifiers would be used for publication.

3.7 Data collection methods

3.7.1 Questionnaire

Data were collected using structured questionnaires which were pre-tested before they were administered (Appendix II). The questionnaire forms were administered to participants after obtaining consent from them. Research assistants who were fluent in the local language and residents of Narok District read the questions to the respondents, one by one while recording the responses. The questionnaire consisted of four sections. Section one dealt with patient socio-demographic characteristics (age, sex, marital status, educational background and occupation.). Section two was about patients' knowledge about the disease and treatment (such as name of the disease, causative agent, signs and symptoms, disease infectivity (contagiousness), mode of transmission, curability and preventive measures taken by the patient. Section three was designed to bring out patients' attitude and practices regarding

stigma and discrimination by relatives, healthcare workers and others. The last section focused on health seeking behaviors, and access to TB education.

3.7.2 Focus Group Discussions

One session of Focus Group Discussions (FGD) was conducted at each of the three health facilities visited, namely Narok District Hospital and Suswa and Olulung'a sub-district hospitals. A guide for use in the discussions was developed, pre-tested and used (Appendix III). However, the main issues included traditional concept of health and disease, knowledge of TB disease and treatment and involvement and perception of TB Manyatta concept.

Overall, participants per group ranged from 8 - 12 participants and included a mixture of health care workers, local village elders, pastors, women group leaders, and a few previous TB patients. The community health workers and social workers helped in organizing for the meetings which were held in the waiting bay at the TB clinics or in the rural home of one of the participants while relaxing under the shade. The discussions were held in both Kiswahili and Maasai languages. All discussions were recorded by use of a voice activated system tape recorder and notes taken as backup. One of the research assistants who was fluent with the local language and a resident of Narok were chosen as the moderator.

3.7.3 Key Informant Interviews

Key informant interviews were used among specific personalities in the community who were knowledgeable with the study subject. That was where and when staff at the TB clinics, TB *Manyatta* management, public health officers, local elders, religious leaders and representatives of the committees' in-charge of health centers were interviewed. The community health workers and social workers also assisted in identifying persons who were familiar with the Maasai way of life. A guide was developed, pre-tested and used during the interviews (Appendix IV). This served to clarify issues that came up during focus group discussions. It also provided a more-in-depth understanding of how and why certain beliefs were held. Five of such discussions were held with the key informants either in their offices or their homes. This method was very useful because it provided an informal forum for discussion of relevant issues, while capitalizing on interaction between the participants, encouraging open conversation and analysis of common experiences. The method was particularly valuable for rapidly gaining hidden information.

3.7.4 Records Review

To obtain secondary data, this study also utilized records that were kept at the district hospital. Quarterly summaries of new case finding and cohort statistics were reviewed for the previous 18 months (from January 2008 to April 2009), in order to reveal the trends in case detection and whether there was any progress made in improving cure rates and reducing defaulting.

3.8 Data management and Analysis

Quantitative data from the questionnaires were entered into a computer using Statistical Package for Social Sciences, (SPSS). The data entry forms were designed in such a way that control checks were included to minimize entry errors. Data entry was done concurrently as the data collection continued in the field. Access to data was password protected and made accessible to project staff only. Descriptive statistics such as frequencies, cross tabulations and means were used. Inferential statistics such as Pearson's Chi square and backward logistic regression were also used. Qualitative data from focused group discussions and key informant interviews were tape recorded, translated and transcribed thematically, typed using Microsoft office word and exported for coding and analysis. This type of data were then analyzed thematically using NVIVO (version 8) package for qualitative data analysis.

3.8.1 Knowledge Determination

Knowledge was related to what TB patients knew about TB disease and treatment (local name of the disease, causative agent, signs and symptoms, disease infectivity (contagiousness), mode of transmission, curability and preventive measures taken by the patient (Appendix II). Sixteen knowledge related questions were administered to determine adequacy of knowledge. Each correct answer was awarded 1 mark. Knowledge scores were generated for each patient based on the correct answers given. Mean Knowledge score was 9.8 ± 2.3 ranging from 3 to 15. Those who scored above 50% were categorized as having adequate knowledge about TB, otherwise not.

3.8.2 Attitude Determination

Attitude towards TB was analyzed from three perspectives, namely, Patient's attitude, Family member's attitude, and Health provider's attitude. Overall patient's attitude towards TB was determined using four elements namely: Attitude towards TB disease, whether TB was a source of social stigma, attitude towards TB drugs and Patients reaction after discovery that they had TB. A score of 1 was awarded to a positive attitude in any of the four elements. Minimum score was 0 while the maximum was 4. An overall score of 1 to 4 was considered positive attitude, otherwise negative.

3.8.3 Good Practice Determination

Patients overall score on good practices was determined using all the four elements of practice, namely, cigarette smoking, alcohol consumption, animal treatment and milk boiling. A score of 1 was awarded to any form of good practice. The minimum score one could get was 0 while the maximum was 4. Mean overall score on good practice was approximately 3 ± 1.

3.8.4 Health Seeking Behavior Score

Patients overall health seeking behavior score was determined using ten elements: decision on seeking treatment, suspicion about TB, first treatment sought, referral to TB clinic, first health facility visited, knowledge on TB infected relative, advice on TB referral, diagnosis on TB, place where treatment was sought and place where TB drugs were normally picked. A score of 1 was awarded to any form of appropriate health seeking behavior. The minimum score one could get was 0 while the maximum was 10. Mean overall score was approximately 6 ± 2.

3.8.5 Multivariate Analysis of Factors Associated With Predisposition to TB

Binary logistic regression was used to model knowledge on TB (0=Inadequate knowledge, 1= Adequate knowledge) using candidate predictive factors that were significantly associated (independently) with knowledge on TB at bivariate analysis. Six successive

iterations were performed using backward elimination method. Four factors that were retained in the model were the true predisposing factors to knowledge on TB.

3.9 Expected Applications of Results

This study will be useful to programme managers and policy makers in providing further insight into identifying factors contributing to poor treatment coverage, non adherence to treatment regimen and possible hindrances to accessibility and utilization of Health services that target TB treatment among the nomadic Maasai. The findings of this study can also be used to empower clients with health education in order to make them active participants in the business of being healthy.

3.10 Scope and Limitations of the Study

The wider Narok District was covered during the study with first hand information collected from TB patients, community leaders and health care workers. Tuberculosis disease is highly stigmatized and closely associated with HIV/AIDS, witchcraft and even curses among the Maasai and it was not easy for the community to freely discuss issues surrounding it and indigenous treatments that were used. Relatives and other patients were also allowed to collect drugs for others which made if difficult to attain the appropriate sample size in time and therefore data collection period took a longer time than had been expected. The other limitation was that no gold standards exist for measuring a community

perception of TB. Knowledge of facts surrounding TB and attitudes towards it were used as the main indicators of how the Maasai community perceived TB. A standardized approach, involving quantitative analysis of a small number of questions was used. Nevertheless, statistically significant associations that are epidemiologically plausible were found.

CHAPTER FOUR

4.0 RESULTS

4.1 Social Demographic Characteristics of the Study Population

4.1.1 Distribution of TB patients by Age and Sex

A total of 384 TB patients from selected TB clinics in Narok District were enrolled for this study. Their ages ranged from 18 to 79 years with a peak at 18-25 years which represented 26.3% (**Figure 4-1**). The second most affected group was 26-33 years which accounted for 25% while 34-41 years category accounted for 19.3%, followed by 42-49 years with 12.2%. Most of the TB patients were concentrated between 18-44 years. There were 36 and 21 cases aged between 50-57 and 58-65 years respectively. A small proportion (4.6%) were from the 66 to 79 years age group.

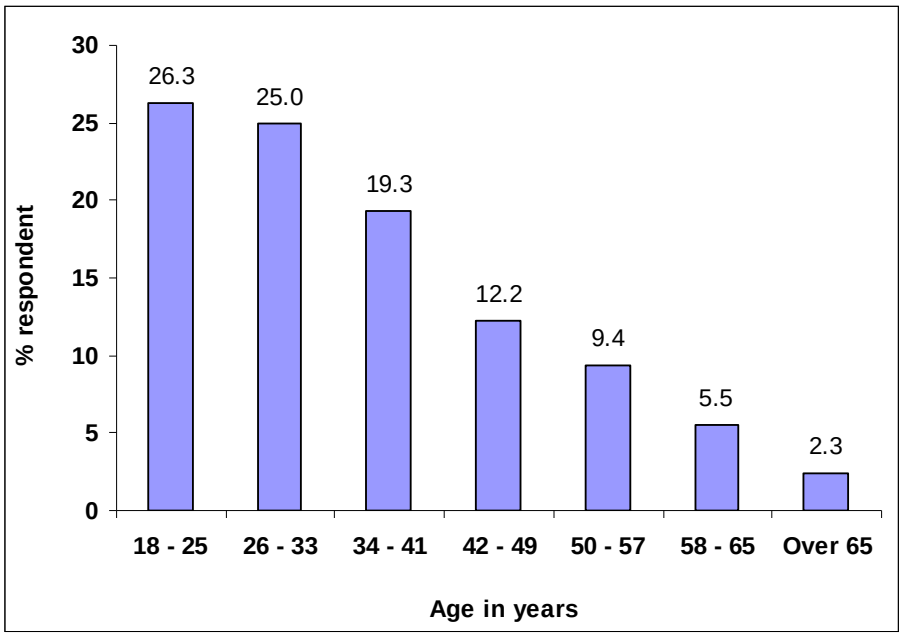

Figure 4-1: Distribution of TB Patients by age and sex in selected TB clinics in Narok District in July, 2009.

Considering the distribution by sex, 51% were females while 49% were males.

Age distribution was comparable between males and females. There was no association between age and sex (P=0.925).

4.1.2 Marital Status of TB patients

As illustrated in **Figure 4-2** below, 76% of the TB patients were married; 42% in polygamous marriages and 34% in monogamous marriages, respectively.

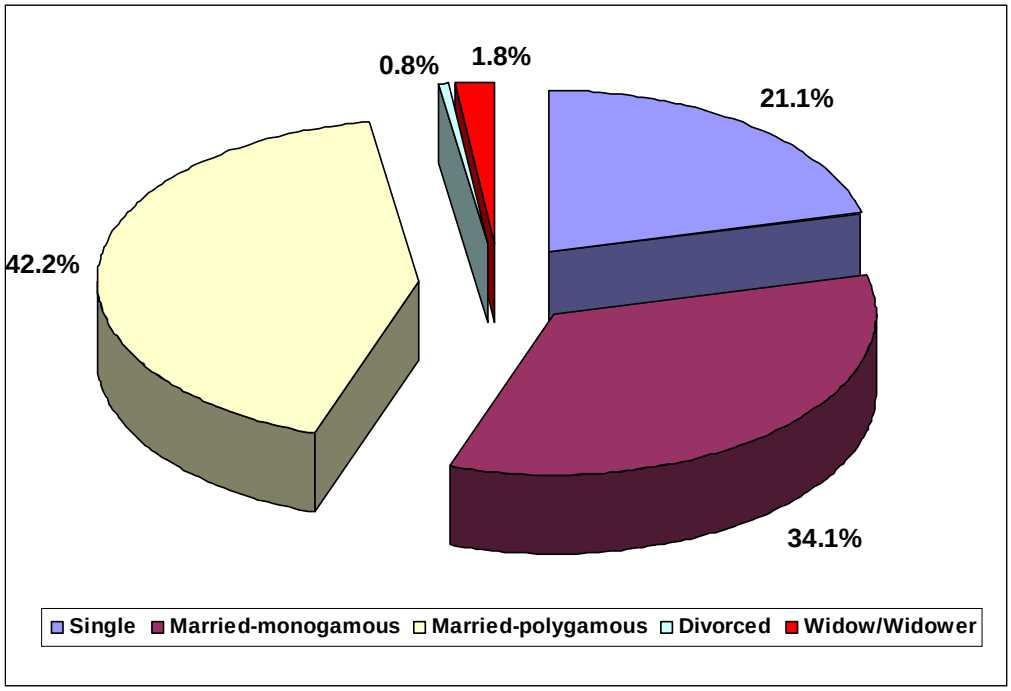

Figure 4-2: Marital Status of TB patients in selected TB clinics in Narok District in July, 2009.

4.1.3 Distribution of TB patients by Level of Education

Of the 384 patients interviewed, 53.4% (205) did not have any formal education (**Figure 4-3**). About one fifth (20.6%) had primary education as their highest level of formal education while 15.1% had secondary education as their highest level of education. A very small proportion, 10.3% and 0.8%, had tertiary colleges and university education, respectively.

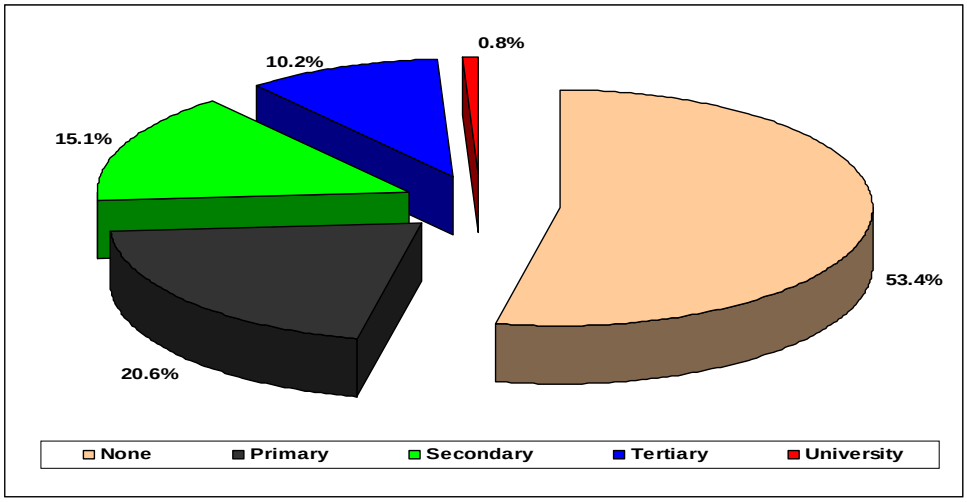

Figure 4-3: Distribution of TB patients by level of Education in selected TB clinics in Narok District in July, 2009.

4.1.4 Distribution of TB Patients by Religion

Of the 384 TB patients interviewed, 65.1% were Christians while 7.8% were Muslims (**Figure 4-4**). About a quarter (26.3%) believed in traditional African religions.

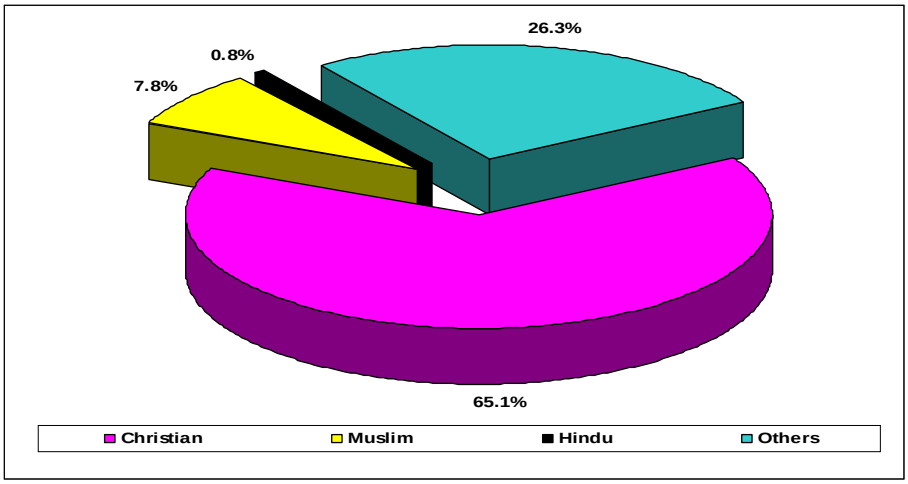

Figure 4-4: Religion of TB patients in selected TB clinics in Narok District in July, 2009.

4.1.5 Distribution of TB Patients by Main Occupation

Nomadic pastoralists formed 58.6% of the respondent TB patients while 6.0% were agriculturalist (**Table 4-1)**. Other main occupations included salaried workers (8.0%), business (6.3%), housewife (7.8%), students (8.6%) and prisoners (1%). Other occupations which totaled to 14 (3.6%) were casual laborers, self employed and the un-employed.

Table 4-1: Distribution of TB Patients by Main Occupation in selected TB clinics in Narok District in July, 2009.

TB patient main occupation	Number of respondents	Percent
Nomadic pastoralist	225	58.6
Agriculturalist	23	6.0
Salaried worker	31	8.0
Business	24	6.3
Housewife	30	7.8
Student	33	8.6
Prisoner	4	1.0
Others	14	3.6
Total	**384**	**100.0**

4.1.6 Distribution of TB patients by Distance to the Nearest Health Facility

Distance to the nearest health facility can be a useful indicator of accessibility of healthcare by TB patients. As **Figure 4-5** illustrates, 18.8% of the TB patients lived less than 2km while 21.1% and 36.5% had to travel for 2-5km and over 5km respectively, so as to reach the nearest health facility. Concerning the mode of transport to the nearest health facility, most of the TB patients (65.6%) had to walk by foot while 24.7% boarded a public service vehicle. The rest (9.6%) used their own vehicles.

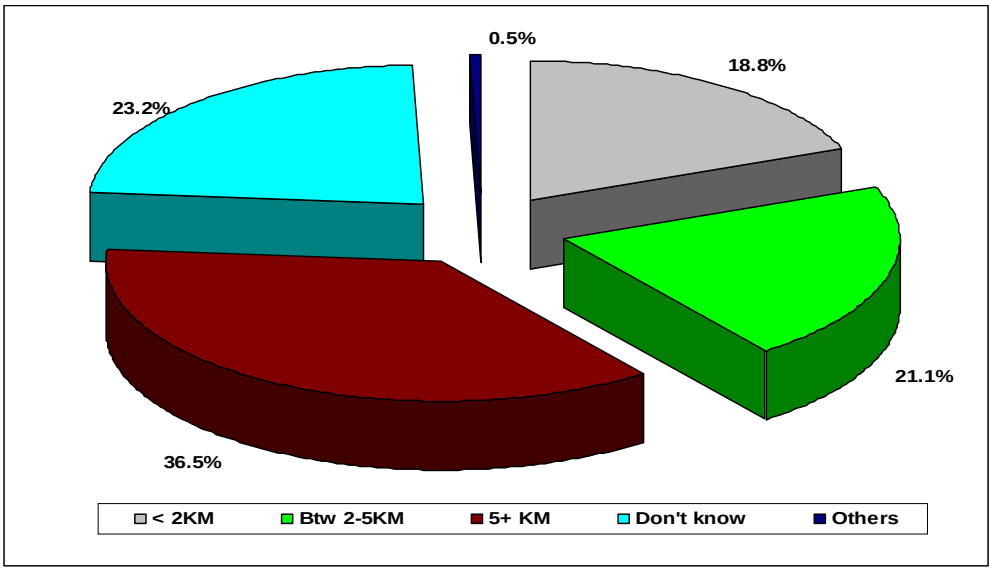

Figure 4-5: Distribution of TB patients by distance to the nearest health facility in selected TB clinics in Narok District in July, 2009.

4.1.7 Distribution of TB patients by Smoking Status

The majority of the respondents, 85.4%, were non smokers, while 14.6% of them were cigarette smokers (**Figure 4-6**).

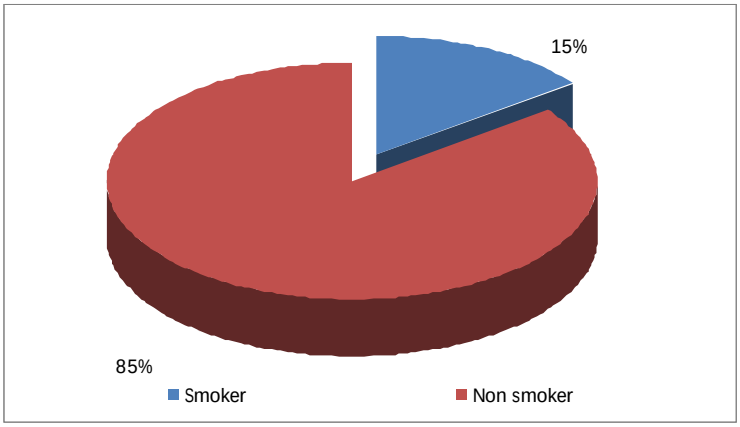

Figure 4-6: Distribution of TB patients by Smoking Status in selected TB clinics in Narok District in July, 2009.

4.1.8 Distribution of TB Patients by Alcohol Consumption

About one third (28.9%) of the respondents consumed alcohol while 71.1% did not **(Figure 4-7)**.

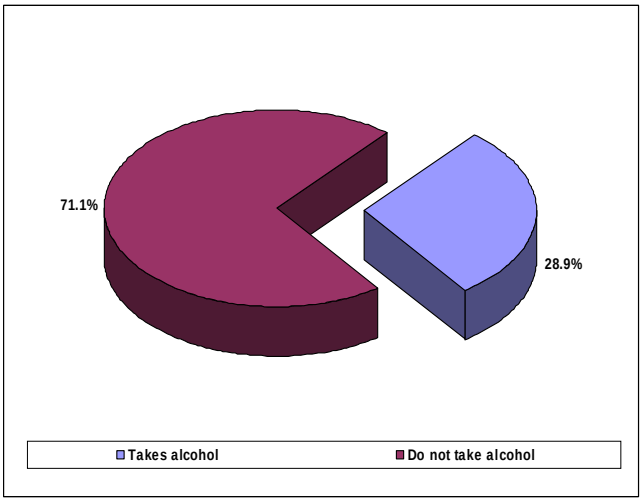

Figure 4-7: Distribution of TB patients by Alcohol Consumption in selected TB clinics in Narok District in July, 2009.

4.1.9 Distribution of TB Patients by Income

The ratio of those with a consistent source of income to those without was approximately 1:1 with a distribution of 51.0% and 49.0% respectively (**Figure 4-8**).

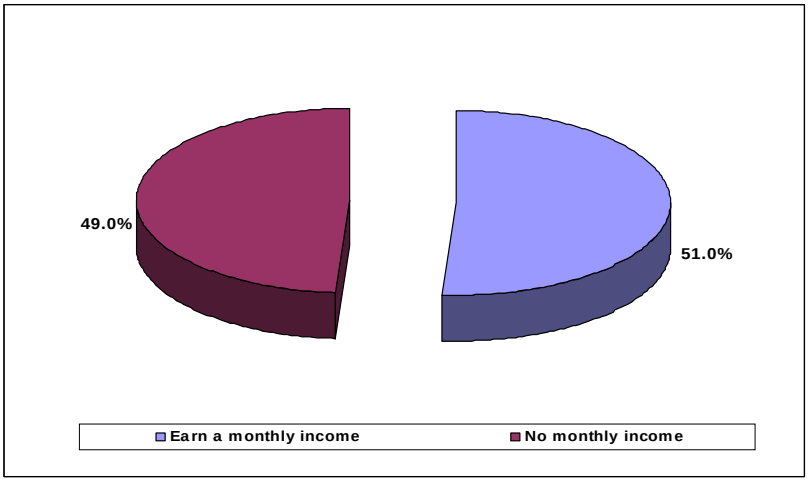

Figure 4-8: Distribution of TB patients by Income in selected TB clinics in Narok District in July, 2009.

4.2 Maasai Perceptions of TB

4.2.1 Patient Perception of TB

4.2.1.1 Patient Perceived Causes of TB

Out of the 384 TB patients interviewed, 27% reported that TB was caused by germs **(Table 4-2)**. Others attributed TB to causes such as hereditary (12.8%) and environmental conditions such as cold, dust and heat (14%). Over 10% did not know the cause of TB.

Table 4-2: Perceived causes of TB in selected TB clinics in Narok District in July, 2009.

Perceived causes	Number of respondents	Percent
Germs	104	27.0
Witchcraft	19	5.0
Heredity	49	12.8
Environmental conditions (cold, dust, heat)	54	14.0
Physical trauma (chest injuries, hard labor)	28	7.4
Curses	22	5.7
Other illnesses not cured (common cold pneumonia)	30	7.8
Smoking/ Tobacco snuff	10	2.6
Don't know	40	10.4
Others	28	7.3
Total	**384**	**100.0**

4.2.1.2 Patient Perceived Mode of TB Transmission

About half (51.3%) of the respondents believed that TB is transmitted through sharing of utensils with an infected person. Others thought that TB is transmitted through sexual intercourse (4.4%), from mother to child (2.9%), sleeping in the same room with a TB patient (16.4%) and patient coughing directly to others (23.2%). Only 1.8% believed that TB could be transmitted by other means which included contact and sharing of clothes.

4.2.1.3 Patient Perceived Mode of TB Transmission Prevention

Regarding whether TB transmission prevention is possible, 76%, believed that it can be prevented while 19.5% thought TB can not be prevented (**Figure 4-9)**. The others (4.4%) were not sure whether it was possible to prevent TB transmission.

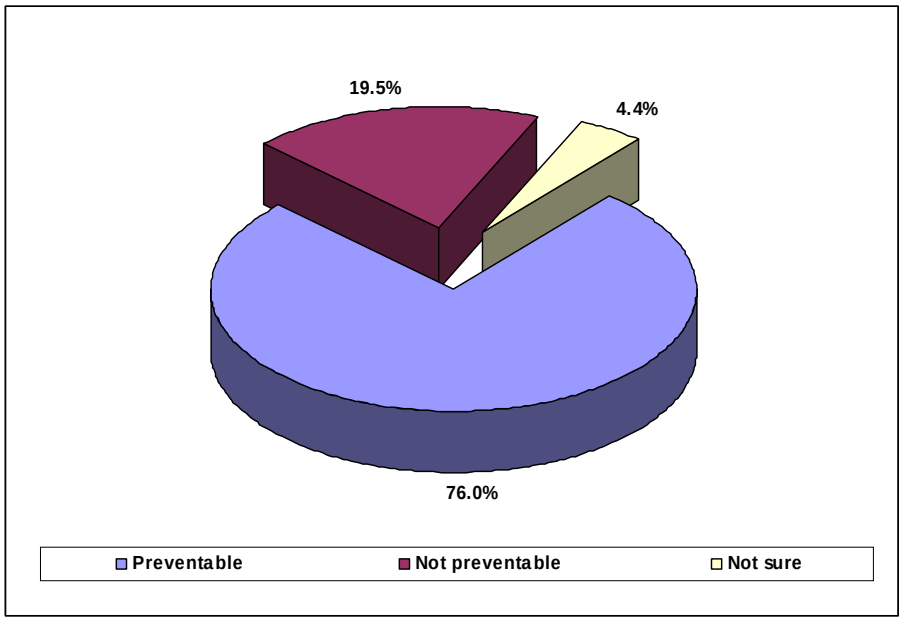

Figure 4-9: Perceived Preventability of TB in Selected TB clinics in Narok District in July, 2009.

Respondents who believed that there were ways of reducing transmission pointed out measures which they thought were the most effective in doing this. About one third (28.9%) of the respondents reported that covering the mouth while coughing reduced transmission, while 24.2%, 13.2% and 5.3% said that isolating TB patients completely, reducing overcrowding and using sputum cups with lids, respectively, would prevent transmission. Only 4.4% mentioned other ways such as seeking treatment immediately to make the patient non infectious.

4.2.1.4 Patient Perceived TB Curability

Concerning TB curability, 78.6% TB patients reported that TB is curable and thus can be successfully treated while 7.8% said TB is incurable (**Figure 4-10**)**.** The remaining (13.5%) were not sure whether there could be any successful TB treatment.

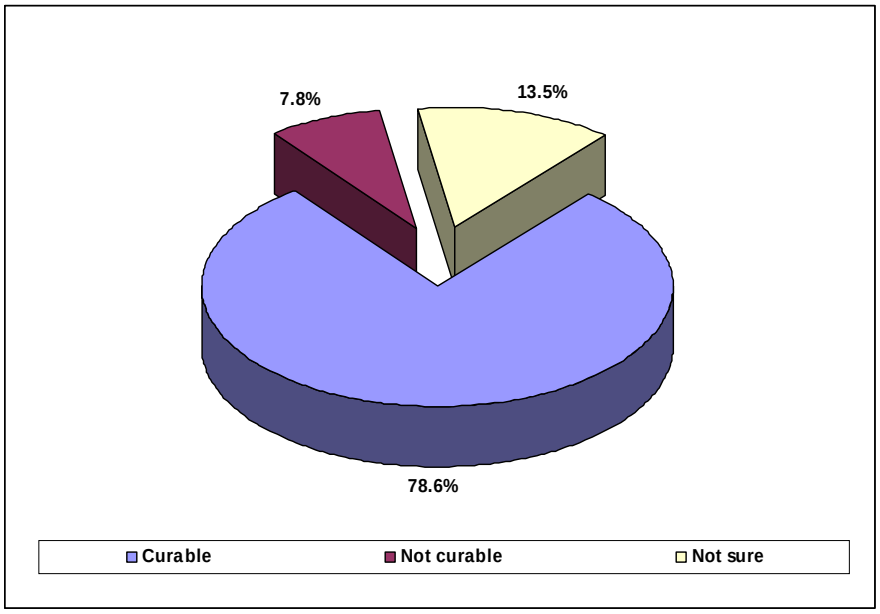

Figure 4-10: Perceived curability of TB in selected TB clinics in Narok District in July, 2009.

4.2.1.5 Patient Perceived Treatment of TB

Three quarters (75.0%) of the respondents believed that modern medicine is the best means of treating TB while 12.0% believed in traditional/herbal medicines (**Table 4-3**).

Table 4-3: Perceived mode of TB Treatment in selected TB clinics in Narok District in July, 2009.

TB treatment	Number of respondents	Percent
Traditional medicine	46	12.0
Taking enough rest	21	5.5
Modern medicine	288	75.0
Eating nutritious food	12	3.1
Others	17	4.4
Total	**384**	**100.0**

4.2.1.6 Perceived Duration of TB Treatment

Concerning the duration of treatment, 35.9% of TB patients reported that TB is treated for six months while 22.9%, 10.7%, 8.6% reported that the duration of treatment was eight months, two months, and four months, respectively (**Table 4-4**).

Table 4-4: Perceived Duration of TB treatment in selected TB clinics in Narok District in July, 2009.

Duration of TB treatment	Number of respondents	Percent
Six months	138	35.9
Two months	41	10.7
Four months	33	8.6
Eight months	88	22.9
Over eight months	84	21.9
Total	**384**	**100.0**

4.2.1.7 Perceived Importance of Treatment Completion

As to whether treatment completion was necessary, most respondents (86.5%) reported that it was important while 12.5% thought it was not necessary to take all the prescribed medication after symptoms have resolved. Only 1% was not sure of the importance of treatment completion. When asked to qualify their stand on the necessity for treatment completion, (83.1%) responded that treatment completion is meant to achieve full curability, while 15.4% believed it was to satisfy doctors' requirements. A small proportion (1.3%) believed it was to avoid TB transmission while the other 1% did not know the reason.

4.2.1.8 Consequences of Interrupted Treatment

About two thirds (63.8%) of the respondents reported that cure failure would be the major consequence of interrupted treatment, while 17.4% said death would be the consequence (**Table 4-5**). Some (11.7%) thought that interrupted treatment could lead to drug resistance. A small proportion (1.9%) thought that there was no effect on an individual while the rest did no know of any outcome of an interrupted treatment.

Table 4-5: Patient Perceived Consequences of interrupted treatment in selected TB clinics in Narok District in July, 2009.

Consequence of interrupted treatment	Number of Respondents	Percent
Cure failure	245	63.8
Death	67	17.4
Drug resistance	45	11.7
No effect	7	1.9
Don't know	20	5.2
Total	**384**	**100**

4.2.2 Lay community Perception of TB

Tuberculosis in Maasai language is referred to as *enkeiya orgoo* (cough deeply rooted in the chest) or *emoiyan orgoo* (disease of the chest). Tuberculosis was perceived as a highly contagious, incurable and a killer such that those suffering from it were reported to be stigmatized and separated from the rest of the household members.

Some respondents perceived TB to be hereditary because of the belief that it tends to occur more frequently in some families than in others. Most of the focused group participants reported knowing certain family lines and clans who are prone to TB.

Heavy physical tasks or injury to the chest or ribs during a fall, fight or animal kicks was also reported by focused groups to cause TB. Other causes were identified as malnutrition,

overwork, excess stress, alcohol, cigarettes, poor hygiene, unsanitary neighborhoods, polluted environments, untreated cough, exposing the chest to cold and supernatural causes. Very few expressed the view that TB could be caused by germs or bacteria that are transmitted from one person to another.

Witchcraft, especially when one suddenly becomes wealthy, was also mentioned as a cause of TB. Some associated TB with curses from the elderly especially to the next generation. One participant expressed the view that ever since they exchanged bitter words with his grandfather two years ago, his chest had been aching and was later informed by the doctor that the fluid in his lungs showed he had TB.

TB was always confused with a common cold or pneumonia and was thought to be caused by extreme cold.

> "…during cold seasons and rainy days like December and July, many people are coughing; kids experience shortness of breath and this TB really causes a lot of suffering".

However, like 10.4% of the TB patients who reported not knowing the cause of TB, lay Maasai did not also know what causes TB.

> "…I don't know. Well, it's sweating and cough and when the cough does not go away its TB. Other than that, *maiyolo*! (I don't know)".

Focus group participants identified symptoms of TB, as follows: coughing, weight loss, fever and fatigue. They also noted that people with TB cough thick sputum, muscle aches and pains, difficulty sleeping, lack of appetite, suffering and death. A doctor at the TB clinic noted that most patients often associate chest ache, upper-back pain and pain in the joints with TB. While some focus group participants maintained that TB is a silent disease which can't be detected early, others maintained that it can be found early and that the mild stages such as cough and fever could be treated. Focus group comments indicate that tuberculosis was not clearly differentiated from other respiratory conditions in the popular health belief system. Thus, it was believed that TB could become cancer and could cause other "lung diseases." It was also reported that the person with TB was a weakling and easily develops colds and flu.

4.2.2 Maasai community Knowledge of TB Disease

4.2.3.1 Knowledge on TB In relation to Demographic Characteristics

Relationship between age of the respondent and knowledge on TB was statistically significant (P<0.001). Majority (64.0%) of the respondents aged less than 40 years had adequate knowledge on TB compared to those aged 40 years and above (43.9%; **Table 4.6**). Younger people (< 40 years) were 2.27 times more likely to have adequate knowledge on TB compared to older people (40 years and above).

Sex of the respondents did not relate significantly with knowledge on TB (P=0.181). However, more females (60.9%) had adequate knowledge compared to their male counterparts (54.0%), although this difference was not statistically significant.

Marital status and knowledge on TB associated significantly, (P<0.05). Comparison of adequate knowledge between those who were in polygamous marriage (50.6%) to those that were single (70.4%) revealed that singleness predisposed a person 2.32 times to adequate knowledge on TB compared to being in a polygamous marriage. The odds of exposure reduced from 2.32 to 1.46 in case of being divorced or becoming a widow. It reduces further to 1.35 in case of being in a monogamous marriage.

Level of education acquired was a significant factor to knowledge on TB (P<0.05). Majority of the respondents with tertiary education (66.7%) were 1.98 times more likely to have adequate knowledge on TB compared to those without a formal education (50.2%). The odds of exposure reduced to 1.88 and 1.91 for those that acquired up to secondary and primary education, respectively.

Relationship between religion and knowledge on TB was statistically significant (P<0.05). Majority of the respondents (62.4%) with adequate knowledge on TB were Christians compared to other unclearly defined religions (48.5%). Christianity predisposed the respondents 1.76 times to adequate knowledge compared to other unclearly defined religions. Notable however, the proportion with adequate knowledge among the

Muslims/Hindus was similar to that of other unclearly defined religions with a similar odd of exposure to knowledge (**Table 4-6**).

Table 4-6: Relationship between Knowledge on TB and demographic characteristics in selected TB clinics in Narok District in July, 2009.

Variables/categories	Adequate (n=221)		Inadequate (n=163)		Odds ratio	95% C.I		P value
	n	%	n	%		Lower	Upper	
Age in years								
< 40	167	64.0	94	36.0	2.27	1.47	3.51	<0.001
40 and above	54	43.9	69	56.1	1.00			
Sex								
Female	120	60.9	77	39.1	1.33	0.88	1.99	0.181
Male	101	54.0	86	46.0	1.00			
Marital status								
Single	57	70.4	24	29.6	2.32	1.27	4.26	0.003
Divorced/widowed	6	60.0	4	40.0	1.46	0.35	6.45	0.747
Married-monogamous	76	58.0	55	42.0	1.35	0.83	2.20	0.207
Married-polygamous	82	50.6	80	49.4	1.00			
Level of education								
Tertiary	28	66.7	14	33.3	1.98	0.94	4.22	0.052
Secondary	38	65.5	20	34.5	1.88	0.99	3.61	0.040
Primary	52	65.8	27	34.2	1.91	1.08	3.39	0.018
None	103	50.2	102	49.8	1.00			
Religion								
Christian	156	62.4	94	37.6	1.76	1.08	2.89	0.017
Muslim/Hinduism	16	48.5	17	51.5	1.00	0.42	2.35	0.998
Others	49	48.5	52	51.5	1.00			

4.2.3.2 Lay Knowledge of TB

The Maasai have known TB for as long as they can remember. The traditional community knowledge of TB could be attributed to the fact that there is folklore and myths associated with it, traditional treatment and handling of patients. The Maasai elders who were the main

informants for this study often narrated a scene, either of themselves, someone they knew with TB or a story incorporating a local myth. This demonstrates the strong individual and social meanings associated with TB, as an illness and as a cause for alarm. Focused group participants and knowledge informants reported that the Maasai community did not understand many facts surrounding this illness.

> "…we do not completely know it, people only know the name, knowing there is something wrong in the lungs, but not knowing the consequence or its effects."

This lack of knowledge greatly jeopardizes TB control efforts among the Maasai as they do not know how to prevent further spread. There was obvious concern among the health care staff about the lack of understanding about tuberculosis, its spread and its treatment. A doctor at the TB *manyatta* observed that,

> "…If people recognize the symptoms of tuberculosis and understand how to counteract the disease's negative potential, they can take timely measures to cure the disease before they infect others. Tuberculosis actually could affect any other parts of your body; there is a lot of miscommunication within the community"

Most people were confusing TB with common cold, pneumonia, lung cancer, asthma, and therefore the formal term of TB is not very well understood. It was often lumped together with other lung conditions.

4.2.3 Maasai Attitudes Towards TB

4.2.4.1 Patients Attitude towards TB

Majority of the patients (57.6%) had negative feelings about TB. A small proportion (10.2%) of the patients could not explain how they felt about the disease (**Figure 4-11**).

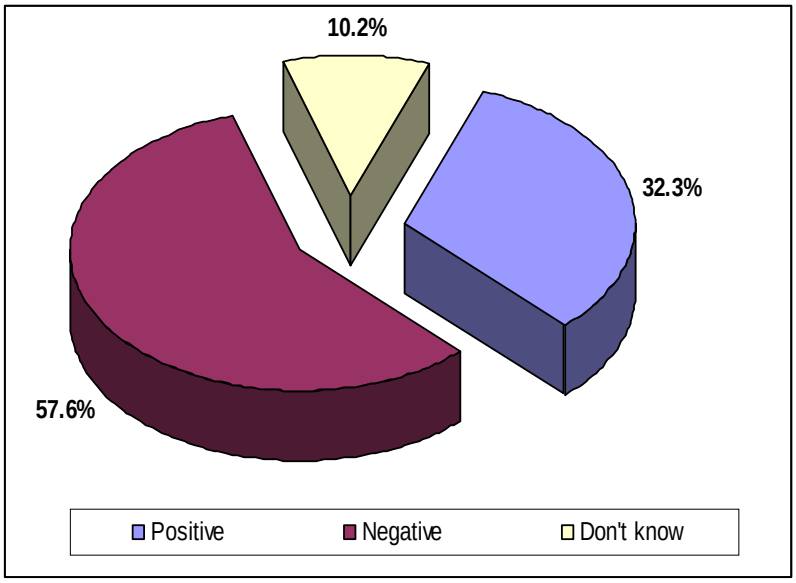

Figure 4-11: Patients attitude towards TB in selected TB clinics in Narok District in July, 2009.

Analysis of patient's attitude towards TB by patient's knowledge on TB revealed a significant relationship (P<0.001). About two thirds, (65.3%), of the patients with positive attitude toward TB had adequate knowledge compared to 57.5% of those with negative attitude and 33.3% of those that did not know what they felt (**Table 4-7)**. A patient with positive attitude was 1.65 times more likely to have adequate knowledge on TB compared to one that did not know how they felt. Similarly, a patient with negative attitude was 1.25

times more likely to have adequate knowledge on TB compared to one that did not know how they felt.

Majority of the patients (59.4%) felt that TB is a source of social stigma. However, there was no significant association between Knowledge on TB and feeling on whether TB was a source of social stigma. Over half (59.3%) of the patients who felt that TB was not a source of social stigma had adequate knowledge on TB compared to 58.4% of those that felt that it was a source of social stigma, and 52.7% of those that were not sure whether or not TB is a source of social stigma. Among other reasons given by those who felt that TB was a source of social stigma, 14.8% perceived a relationship between TB and HIV, while 41.4% belief that TB was acquired on contact. Nevertheless, there was no significant relationship between the reasons given with knowledge on TB (P=0.320).

Patient's reaction after discovery that they had TB was examined against knowledge on TB. There was a significant association between knowledge and patients reaction (P=0.030). Majority of the patients (65.2%) that were not worried had adequate knowledge compared to 53.6% of those that were worried.

Patients opinion towards TB drugs was not associated with knowledge on TB (P=0.124); 60.8% of the patients who said that the drugs were effective had adequate knowledge compared to 56.8% of those that said the drugs were not effective, and 47.1% of those that could not explain effectiveness of the drugs they used.

Table 4-7: Relationship between knowledge on TB and attitudes towards TB in selected TB clinics in Narok District in July, 2009.

Variables/ categories	Adequate knowledge (n=221) n	%	Inadequate knowledge (n=163) n	%	Odds ratio	95% C.I of odds ratio Lower	Upper	P value
Attitude towards TB								
Positive	81	65.3	43	34.7	3.77	1.65	8.68	<0.001
Negative	127	57.5	94	42.5	2.70	1.25	5.89	0.005
Don't know	13	33.3	26	66.7	1.00			
Is TB a source of social stigma?								
No	54	59.3	37	40.7	1.31	0.67	2.55	0.394
Yes	128	58.4	91	41.6	1.26	0.72	2.22	0.389
Not sure	39	52.7	35	47.3	1.00			
If yes give reason								
Perceived relationship with HIV	38	66.7	19	33.3	1.57	0.80	3.10	0.517
The belief that TB is acquired on contact	89	56.0	70	44.0	1.00	0.63	1.59	0.997
Others	94	56.0	74	44.0	1.00			
Treatment by family members								
Treated well	88	62.0	54	38.0	1.34	0.86	2.09	0.180
Treated badly	133	55.0	109	45.0	1.00			
Opinion towards TB drugs								
Effective	146	60.8	94	39.2	1.74	0.98	3.08	0.057
Not effective	42	56.8	32	43.2	1.47	0.72	3.00	0.250
Don't know	33	47.1	37	52.9	1.00			
Attitude of the health providers								
Special Care	96	61.5	60	38.5	1.32	0.85	2.04	0.192
Not caring	125	54.8	103	45.2	1.00			
Patients reaction after discovery that they had TB								
Not too worried	86	65.2	46	34.8	1.62	1.02	2.56	0.030
Worried	135	53.6	117	46.4	1.00			
Overall patients attitude towards TB								
Positive	206	60.8	133	39.2	3.10	1.54	6.30	<0.001
Negative	15	33.3	30	66.7				

4.2.4.2 Relatives Attitude towards TB Patients

Majority (63.0%) of the TB patients were treated badly by family members. There was no significant relationship between knowledge on TB and treatment by family members (P=0.180).

4.2.4.3 Health Provider's Attitude towards TB Patients

Provider's attitude was assessed based on how they treat patients on diagnosis of TB. There was a significant relationship between Patient's reaction after discovery that they had TB and attitude of the health providers (P<0.001). Majority of the patients (76.9%) that were worried after being diagnosed to be have TB said that the providers were caring compared to 57.9% of those that said the providers were not caring.

Relationship between knowledge on TB and attitude of the health providers was not statistically significant (0.192). Over half (61.5%) of the patients that received special care from the health providers had adequate knowledge compared to 54.8% of those that did not receive (**Table 4-7**).

There was a significant relationship between knowledge on TB and Overall patients attitude towards TB (P<0.001). Majority of patients (60.8%) that were positive towards TB had adequate knowledge on TB compared to 33.3% of those that were negative

Focused group participants observed that TB was a highly stigmatized and dreaded disease among the Maasai to the extent that no one would like to associate with a TB patient or with the family with the history of the disease.

> "…TB in the family is social humiliation, breaking marriage contracts and work and has highly adverse social consequences. There are stories told about families where planned marriages were called off due to a family history of TB".

Tuberculosis therefore strains social interactions between clans and families such that a proposed marriage into or from a known case family is always turned down. There was no clear cut line between social stigmatization and behavior that indicates people's desire not to catch TB. Due to the social stigma with which TB is associated among the Maasai, those diagnosed with TB may not reveal their diagnosis to other family members.

More than half, (53.1%) of the TB patients reported having lived in the same house before with someone who had TB and out of these 25% had recognized from symptoms that their colleagues had TB, 14.1% had been informed by the doctor while 13% had learned through village gossip (**Table 4-8)**. A small proportion, (1%) reported being told of the TB status by the then sick person**.** The fear of being discriminated makes the TB patients conceal their TB status and this could lead to more infections which only worsen the situation.

Table 4-8: How TB Patients in selected TB clinics in Narok District in July 2009, learnt that the persons they lived with had TB.

Mode of knowing that other people had TB	Number of respondents	Percent
Did not live with TB patient before	180	46.9
Identified from symptoms	96	25.0
Told by the doctor	54	14.1
Through village gossip	50	13.0
Informed by the sick person	4	1.0
Total	**384**	**100.0**

4.3 Socio-Cultural Practices Impacting TB Control among the Maasai of Narok District

4.3.1 Coughing Habits

Most of the TB patients (92.0 %) reported coughing without covering their mouths, as they described it as a normal, socially acceptable practice. Only 5 % reported covering their mouths while coughing while the other 3 % could not remember whether they coughed covering their mouths or not.

4.3.2 Spitting Habits

Nearly all (98.0 %) of the TB patients reported spitting anywhere indiscriminately on the earthen floors of traditional *manyattas* or in their compounds. They reported that this is a socially accepted cultural norm practiced by all regardless of whether they are sick or healthy. This fact was clearly shown by the presence of fresh sputum in the health care centres particularly the TB clinics, outpatient departments and in the markets, streets, eating

places, and anywhere they held discussions. Only 1% had ever used sputum cups with lids in the past while another 1% reported disposing sputum through other ways such as spitting on a piece of cloth which is later washed.

4.3.3 Milk Boiling Practices

Three quarters (75.0 %) of the TB patients boiled milk before consumption, while the other 25 % did not as they believed that raw milk is safe for drinking **(Figure 4-12).** This was more likely to occur among the herdsmen in the fields far from their homes who relied on milk as the only food until they returned the livestock home in the evening. Those who did boil milk before drinking had various reasons among them to kill germs (85.0%), and to improve palatability (14.0%). The other 1% reported that milk boiling is a practice that has been passed down through generations.

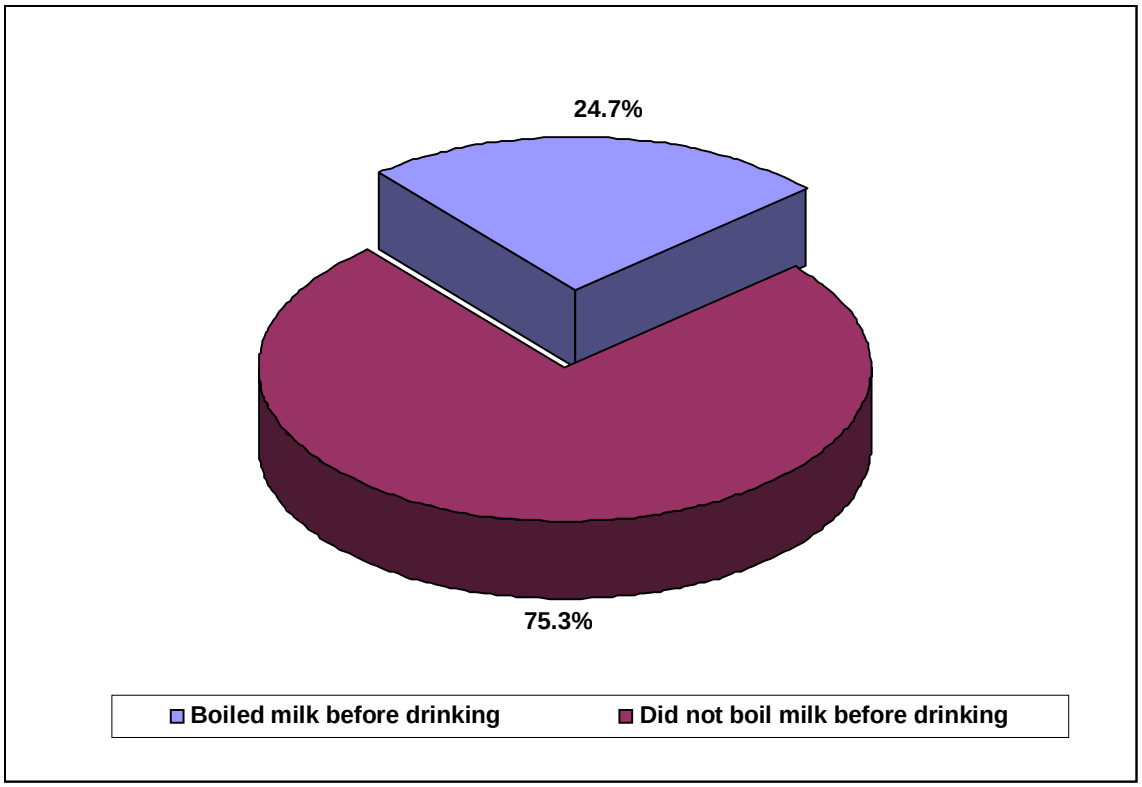

Figure 4-12: Milk boiling Practices of Patients in selected TB clinics in Narok District in July, 2009.

4.3.4 Type of Housing of TB Patients

Majority of TB patients interviewed, (69.3%), lived in traditional huts called Maasai *Manyattas* (**Figure 4-13**). About a quarter (25.5%) lived in temporary structures, and this included the herdsmen who stayed far from the rest of their families looking for pasture and water for their livestock.

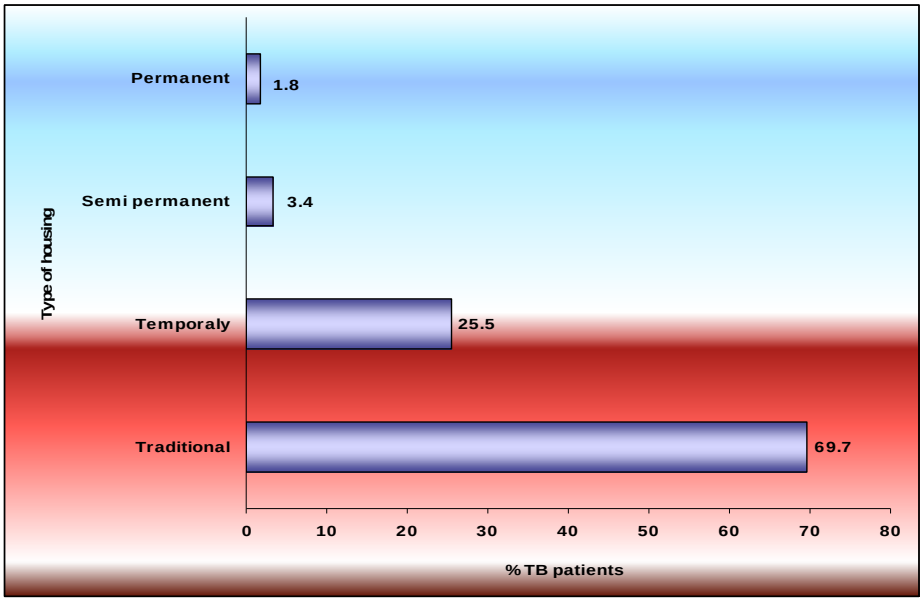

Figure 4-13: Type of housing of TB patients in selected TB clinics in Narok District in July, 2009.

4.3.5 Knowledge on TB in Relation to Socio-Cultural Practices

All the practice variables were significantly associated with knowledge on TB (P<0.001). Majority of non smokers (61.9%) had adequate knowledge compared to 32.1% of the smokers. Adequate knowledge on TB predisposed a person 3.43 times to non smoking compared to a person with inadequate knowledge.

Among patients that were not taking alcohol 64.5% had adequate knowledge compared to 40.5% of those that were taking alcohol. A person with adequate knowledge on TB is 2.66 times more likely to avoid taking alcohol.

Analysis of respondent experience with sick animals revealed a lot to be desired. The way animals were treated formed an important indication on whether they understood the nature of risk involved. Respondent patients were asked what they normally do in case an animal developed a coughing problem. Over two thirds, (70.6%) said they treat them from the condition using medicine, 16.7% (64) said they normally sell them, 12.0% (46) said they usually slaughter them while 0.8% (3) did not specify what procedures they use (**Table 4-9**). Those who treated the animals were considered to have good practice as opposed to all the rest.

Relationship between practice in the light of animal treatment and knowledge on TB was statistically significant. The majority (64.2%) of those who had good practice, (treated the animals), had adequate knowledge on TB compared to 41.6% of those who had bad practice. Milk consumption among the study population was a daily event almost in every homestead. Milk boiling was considered to be a good practice. About 70% of the respondents that had good practice in the light of milk boiling had adequate knowledge on TB compared to 20.0% of those with bad practice.

Table 4-9: Relationship between Knowledge on TB and practices in selected TB clinics in Narok District in July, 2009.

Variables/categories	Adequate (n=221)		Inadequate (n=163)		Odds ratio	95% C.I of odds ratio		P value
	N	%	n	%		Lower	Upper	
Cigarette smoking								
Non smokers	203	61.9	125	38.1	3.43	1.88	6.27	<0.001
Smokers	18	32.1	38	67.9	1.00			
Alcohol taking								
No	176	64.5	97	35.5	2.66	1.61	4.19	<0.001
Yes	45	40.5	66	59.5	1.00			
Animal treatment								
Good practice	174	64.2	97	35.8	2.52	1.61	3.95	<0.001
Bad practice	47	41.6	66	58.4	1.00			
Milk boiling								
Good practice	202	69.9	87	30.1	9.29	5.29	16.29	<0.001
Bad practice	19	20.0	76	80.0	1.00			
Overall score on good practices								
>= 3 (Above average)	190	70.1	81	29.9	6.20	3.71	10.43	<0.001
< 3 (Bellow average)	31	27.4	82	72.6	1.00			

Majority, (70.6%) of the patients scored 3 and above (above average) **(Figure 4-14)**. There was a significant relationship between knowledge on TB and overall score in good practice (P<0.001). Majority of patients (70.1%) that scored 3 and above (above average) had adequate knowledge compared to 27.4% of those who scored less than 3 (below average).

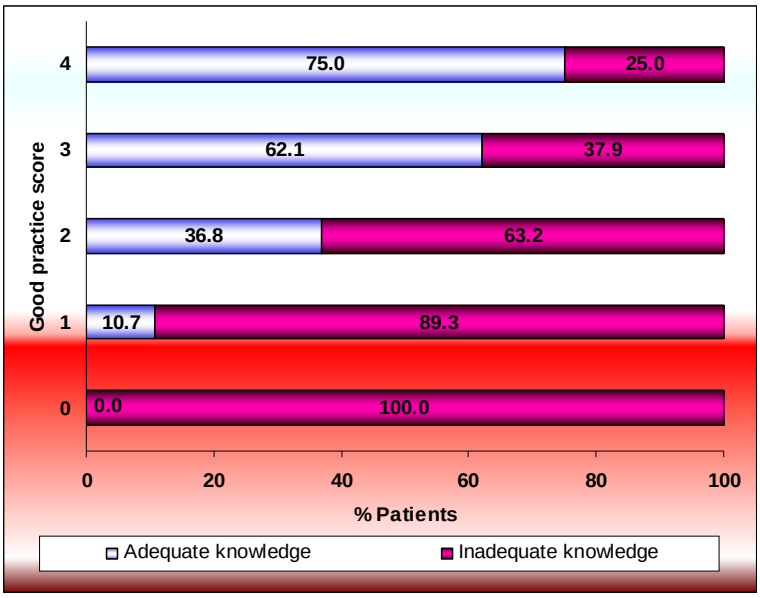

Figure 4-14: Distribution of Knowledge on TB by overall scores of good practice in selected TB clinics in Narok District in July, 2009.

4.4 Health Seeking Behaviour of the Maasai

4.4.1 Duration between Onset of Symptoms to Seeking Medical Care

Only 2.3% of the respondents had sought medical care immediately within a week of first symptoms appearance (**Table 4-10).** Of the others, 24.5% had delayed for between 1-4 weeks while 26.8% had delayed for 2-4 months before seeking consultation at the nearest health facility. Those who had delayed for between 4-6 months and for over six months constituted 22.7% and 23.7%, respectively.

Table 4-10: Duration taken from onset of TB symptoms to first visit to medical facility in selected TB clinics in Narok District in July, 2009.

Duration taken from onset of symptoms to first visit to the hospital	Number of respondents	Percent
Immediately/ within a week	9	2.3
Between 1-4 weeks	94	24.5
Between 2-4 months	103	26.8
Between 4-6 months	87	22.7
Over 6 months	91	23.7
Total	**384**	**100.0**

The main reasons given for the delay included use of traditional medicine which accounted for 47.9% of the delays, poverty and lack of basic resources (21.1%) remoteness of the area which makes health facilities inaccessible (29.2%) and lack of approval from family members on consulting a doctor (1.6%) (**Table 4-11**).

Table 4-11: Main Reasons for delay to seek treatment in selected TB clinics in Narok District in July, 2009.

Main reason for delay	Number of respondents	Percent
Use of traditional medicine	184	47.9
Lack of resources (bus fare, consultation fee).	81	21.1
Remoteness of the place/ inability to access nearby health facility	112	29.2
Lack of approval from spouse/family members	6	1.6
Others	1	0.3
Total	**384**	**100.0**

4.4.2 Decision Maker in Seeking Treatment

The decision to seek medical care was mainly taken by the spouse (43%), the sick individual (41.4%), and the parent/guardian (13.8%). Other decision makers (1.8%) included the community leaders and the herbalists.

4.4.3 Self- Treatment Using Alternative Methods before Medical Consultation

About half (46.9 %) of TB patients reported an initial attempt to treat the illness on their own before symptoms could persist compelling them to seek medical care. The rest (53.1%) said they did not try self treatment before seeking medical attention. **Table 4-12** below summarizes various interventions sought.

Table 4-12: Type of Alternative Treatments sought in selected TB clinics in Narok District in July, 2009.

Type of remedy sought	Number of respondents	percent
Traditional herbs	133	73.9
uvulectomy	25	13.9
Bought drugs from chemist	11	6.1
Butter/honey/raw egg mixture	7	3.9
Others -burning aching part of the body -praying to God for cure -taking enough rest -taking goat soup	 1 1 1 1	2.2
Total	180	100

4.4.4 Referral to the TB Clinic for Diagnosis

About a third (34.4%) of the TB patients were referred to the TB clinic for diagnosis by a public health care facility while 26.6% were referred by a private health facility. Of the remaining, 38% were self referred while the other 1% reported being referred by other people including the herbalists and community health workers they came across.

4.4.5 Distribution of TB Patients by Type of TB

4.4.5.1 New and Re-treatment Cases

Considering the type of cases, 68.7% were new TB cases while 17.8% were relapse cases and the other 13.5% had returned after defaulting. Relapse and Return after default constitutes re-treatment cases.

4.4.5.2 Types of TB

Majority (95.8%) of the cases were Pulmonary TB. The rest (4.2%) were Extra Pulmonary TB. Distribution of type of TB reported was not significantly associated with knowledge on TB (P=0.305). However majority of the patients (58.2%) reporting Pulmonary TB had adequate knowledge compared to 43.8% of those that reported ETB (**Figure 4-15**).

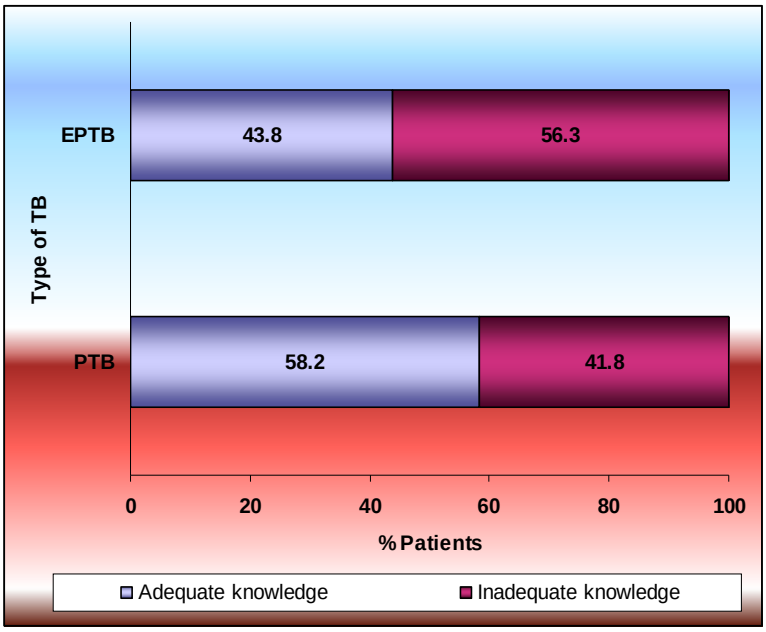

Figure 4-15: Distribution of Knowledge on TB by Type of TB in selected TB clinics in Narok District in July, 2009.

4.4.5.3 Distribution of Presented Complaints

All the 384 patients presented with different complaints (**Table 4-13**). Persistent cough constituted 44.0%, while haemoptysis constituted 15.1%. A very small proportion (0.3%) did not specify the complaints.

Table 4-13: Distribution of presented complaints in selected TB clinics in Narok District in July, 2009.

Complaint	Number of respondents	Percent
Persistent cough	169	44.0
Haemoptysis (bloody cough)	58	15.1
Fever	63	16.4
Chest pain	54	14.1
Weight loss	24	6.3
Swollen lymph nodes	11	2.9
Back pain	4	1.0
Others	1	0.3
Total	**384**	**100**

Health seeking behavior was examined based on what the patients did before visiting the TB clinic. Only one factor (The first health facility visited) was significantly related to knowledge on TB (P=0.002) (**Table 4-14**). Majority of the patients (70.8%) who sought first treatment at a private health facility had adequate knowledge on TB compared to 59.3% of those that sought from public and 45.4% of those that sorted from herbalists. A patient with adequate knowledge on TB was 2.92 times more likely to visit private health facility compared to one who had inadequate knowledge.

A similar trend was seen with respect to referrals to the TB clinic, where 63.7% of the patients referred from a private health facility had adequate knowledge on TB compared to 57.6% of those referred from public and 53.3% of those that were not referred by either of the facilities. However, there was no significant association between knowledge on TB and referral to TB clinic (P=0.261).

The rest of the health seeking behavior factors were not significantly related to knowledge on TB (P>0.05). Notably though, there were slight suggestions to the direction of association. Though knowledge of TB did not significantly affect the decision to seek treatment, 62.9% of those with adequate knowledge were 1.46 times more likely to decide on their own compared to 53.8% of those that were decided upon by other people.

About a quarter (26.8%) of the patients suspected that they might be suffering from TB. However, test of association revealed no significant outcome. Over half (61.2%) of those that suspected so had adequate knowledge on TB compared to 56.2% of those that were not suspicious at all.

More than half, (53.1%) of the patients reported to have sought their first treatment from a health facility while 46.9% treated themselves for the first time. There was no significant relationship between knowledge on TB and first treatment sought (0.354). However, measure of association revealed that 59.8% of the patients that started their first treatment from a health facility had adequate knowledge on TB compared to 55.0% of those that treated themselves for the first time.

Table 4-14: Relationship between Knowledge on TB and health seeking behavior in selected TB clinics in Narok District in July, 2009.

Variables/categories	Adequate (n=221)		Inadequate (n=163)		Odds ratio	95% C.I of odds ratio		P value
	n	%	n	%		Lower	Upper	
Decision on seeking treatment								
The sick individual	100	62.9	59	37.1	1.46	0.96	2.21	0.093
Other people	121	53.8	104	46.2	1			
Suspicion about TB								
Suspicious	63	61.2	40	38.8	1.23	0.77	1.94	0.416
Not suspicious	158	56.2	123	43.8	1			
First treatment sorted								
Not self	122	59.8	82	40.2	1.22	0.81	1.82	0.354
Self	99	55.0	81	45.0	1			
Referral to TB clinic								
Referred by a private facility	65	63.7	37	36.3	1.54	0.89	2.66	0.102
Referred by a public facility	76	57.6	56	42.4	1.19	0.72	1.96	0.475
Not referred by a facility	80	53.3	70	46.7	1			
The first health facility visited								
Private health center	51	70.8	21	29.2	2.92	1.48	5.80	0.001
Public health center	121	59.3	83	40.7	1.76	1.07	2.89	0.019
Herbalist	49	45.4	59	54.6	1			
Knowledge on TB infected relative								
Identified from symptoms	59	61.5	37	38.5	1.32	0.73	2.41	0.325
Informed by others	59	55.0	49	45.0	1.00			
Advice on TB referral								
Correct referral	158	62.7	94	37.3	1.84	1.18	2.89	0.005
Wrong referral	63	47.7	69	52.3	1.00			
Diagnosis on TB								
Went to the hospital	116	59.2	80	40.8	2.24	0.93	5.44	0.074
I was coughing	88	59.1	61	40.9	2.23	0.91	5.52	0.084
Others	6	54.5	5	45.5	1.85	0.37	9.53	0.482
Informed by a friend/relative	11	39.3	17	60.7	1.00			
Place where treatment was sorted								
GoK health facility	172	62.1	105	37.9	1.95	1.11	3.42	0.013
Mission/private	17	45.9	20	54.1	1.01	0.42	2.42	0.982
Herbalist	32	45.7	38	54.3	1.00			
Place where TB drugs normally picked								
Herbalist/ others	50	67.6	24	32.4	2.00	0.90	4.46	0.063
GoK health facility	145	56.0	114	44.0	1.22	0.64	2.33	0.512
Mission/private	26	51.0	25	49.0	1.00			
Overall health seeking behavior score								
>= 6 (Above average)	140	65.7	73	34.3	2.13	1.38	3.39	<0.001
< 6 (below average)	81	47.4	90	52.6	1.00			

When patients overall health seeking behavior score was determined, 55.5% of the patients scored 6 and above (Above average) **(Figure 4-16).** There was a significant relationship between knowledge on TB and overall score in health seeking behavior (P<0.001). Majority of patients (65.7%) that scored 6 and above (Above average) had adequate knowledge compared to 47.4% of those who scored less than 6 (below average).

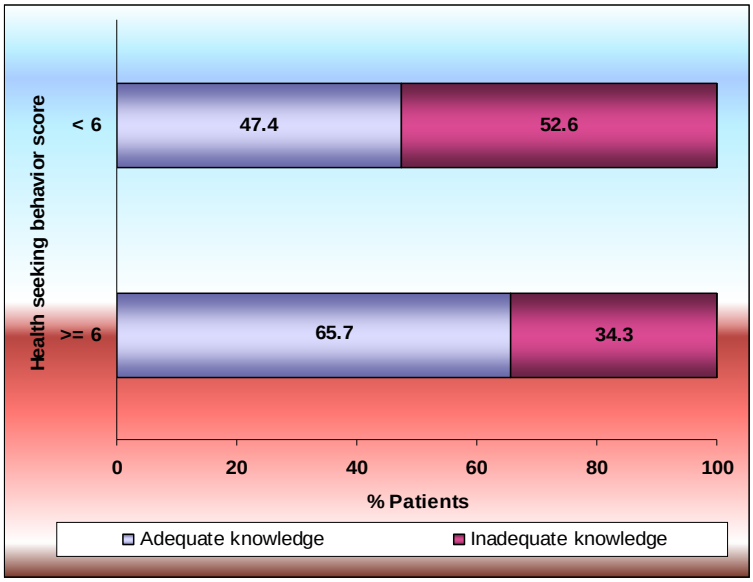

Figure 4-16: Distribution of Knowledge on TB by overall scores of appropriate health seeking behavior in selected TB clinics in Narok District in July, 2009.

4.4.6 Traditional Treatment for TB among the Maasai

Regarding the types of treatment used for TB by the Maasai, relatively few people gave affirmative answers to questions about traditional medicine or traditional healers. This may be because of the sacred nature of such information and treatment. Most focused group participants termed traditional herbs as *Osupukiai* and they named concoctions made from a number of herbs of which the main one was boiled "*Leleshwa*" and "*Olebarmonyo*" leaves;

> "…take fresh leaves, boil, then mix the soup with honey, fresh eggs and add a little milk butter and sip the concoction as many times as possible in a day".

Most focused group participants reported knowing herbalists who prescribed indigenous tree roots which may be cooked with meat for special diets or boiled for ritual bathing, or sewn on clothes.

One common folk remedy for coughing used by Maasai children and adults consists of a mixture of raw eggs, cream from boiled milk and honey. Milk mixed with blood was also mentioned by focused group participants as useful for TB cure. Young children with persistent cough could sometimes undergo uvulectomy (a procedure whereby a piece of the uvula - the little bit of flesh that hangs down from the rear portion of the soft palate- is cut). It was believed that too much sugary foods such as honey and some wild fruits fed to the kids lengthens the uvula which then touches the throat and irritates it making the children cough continuously. When an illness is identified as tuberculosis, the family may prepare an

especially nourishing diet, mainly goat soup, milk and blood. Such food was used to hasten the recovery.

4.4.7 Health Seeking Behavior In Relation to Access to TB Educational Activities

Access to TB education was investigated to see how exposed TB patients were to information about TB control and how this was likely to influence their health seeking behavior. About one third, (32.0%) of the patients agreed to have heard a talk/drama/meeting on TB (**Table 4-15**). Association between knowledge on TB and ever hearing of any talk/drama/meeting on TB was not statistically significant (P=0.352). About two thirds, (61.0%) of patients who had a chance to listen to talk/drama/meeting had adequate knowledge on TB and were more likely to consult a health facility compared to 55.9% of those that had never attended any TB education.

Venue where discussions on TB were held was not associated with the level of knowledge on TB (P=0.432). However, majority of the patients who attended public meetings to listen to the discussion about TB control had adequate knowledge compared to 57.7% of those who attended a similar discussion in school/college and 54.1% of those that listened in an open market or other unspecified locations.

Media advertisements on TB have been very proactive. Among those that have had a chance to listen to the advertisement, it emerged that the channel used was significantly associated with knowledge on TB. Majority of the patients (70.5%) with adequate knowledge watched TV adverts compared to 66.7% that viewed billboards, 63.3% that listened to radio, and 35.7% that read print media (newspapers and magazines)

Table 4-15: Relationship between Knowledge on TB and Access to TB educational activities in selected TB clinics in Narok District in July, 2009.

	Adequate knowledge		Inadequate knowledge			95% C.I of odds ratio		P
Variables/Categories	**n**	**%**	**n**	**%**	**Odds ratio**	**Lower**	**Upper**	**value**
	n	%	n	%				
Ever heard of any talk/drama/meeting on TB?								
Yes	75	61.0	48	39.0	1.23	0.78	1.95	0.352
No	146	55.9	115	44.1	1.00			
Venue where discussions on TB were held								
Public meeting	40	66.7	20	33.3	1.7	0.68	4.29	0.217
School/College	15	57.7	11	42.3	1.16	0.37	3.61	0.777
Open market/others	20	54.1	17	45.9	1.00			
Ever come across any advertisement on TB in the media?								
Yes	130	63.1	76	36.9	1.64	1.07	2.51	0.018
No	91	51.1	87	48.9	1.00			
Channel used								
TV	31	70.5	13	29.5	4.29	1.03	18.66	0.021
Billboard	6	66.7	3	33.3	3.60	0.46	31.62	0.214
Radio	88	63.3	51	36.7	3.11	0.89	11.37	0.084
Print media (newspapers and Magazines)	5	35.7	9	64.3	1.00			
Overall exposure to TB education								
Exposed	145	61.7	90	38.3	1.55	1.00	2.40	0.039
Not exposed	76	51.0	73	49.0	1.00			

Overall exposure to TB education was determined using two elements: media exposure and/or attendance to any other form of presentation. There was a significant relationship between knowledge on TB and accessibility to TB educational (P=0.039). Majority of patients (61.7%) that were exposed had adequate knowledge compared to 51.0% of those who were not exposed (**Figure 4-17**).

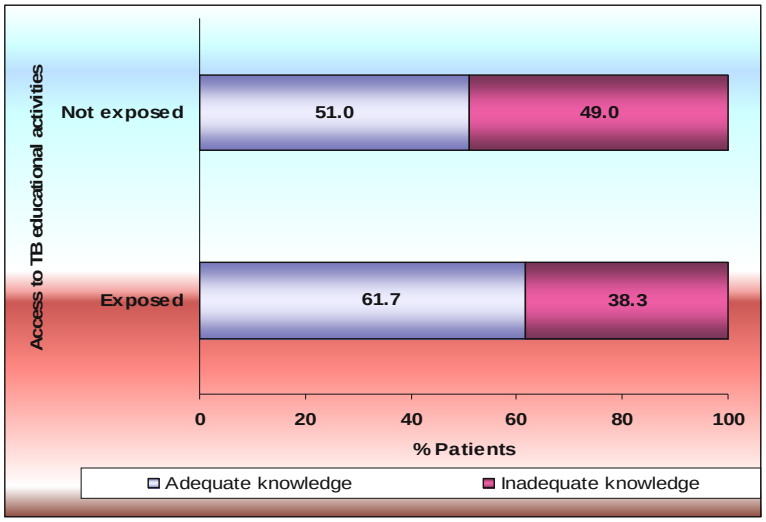

Figure 4-17: Distribution of Knowledge on TB by overall exposure to TB education in selected TB clinics in Narok District in July, 2009.

4.5 Effectiveness of TB *Manyatta* Strategy

4.5.1 TB Manyatta Concept

To maximize the chances that the Maasai TB patients complete their TB treatment, Narok District adapted a concept of TB *manyatta* that has been used successfully in northern Kenya. The central idea was the construction of a "patient village" consisting of both traditional and modern houses built in the vicinity of the health centre where TB patients could live a normal Maasai lifestyle while undergoing the intensive period of treatment for four months. Doctors in-charge of TB *manyata* village at the district hospital reported that this was a very effective and noble strategy;

"…nomads are willing to stay in one place for a length of time if effective treatment is available and food and housing that agree with their cultural beliefs are provided".

4.5.2 TB Manyatta Infrastructure

There was only one functional *manyatta* village in Narok District with seven housing units which have been improved overtime from traditional mud houses to permanent structures. The structures are arranged in a circular/clustered manner similar to the Maasai traditional homestead. The vicinity of the *manyatta* is tightly fenced with metallic poles and wired with mesh to discourage "escape" of TB patients out of the *manyatta.* The criteria of admission to the *manyatta* takes into account the degree of contagiousness. The TB patient village was furnished with the necessary administrative, consultation and a laboratory block with good diagnostic equipments. There was one four wheel drive vehicle, one motorcycle and one computer to aid in record keeping and drug inventories.

The TB *manyatta* can accommodate up to 20 TB patients at a time, with every structure being occupied by three patients. However, this also depends on the different stages of treatment and those who fall under the same stage can cohabit in the same *Manyatta*.

4.5.3 TB Manyatta Utilization

Only 1% of respondent TB patients were stationed in the *Manyatta* and one of them had even been allowed to stay with three family members for moral support as he was already elderly and non- contagious.

Focused group participants equated the TB *manyatta* to a detention camp, where one was imprisoned and left idle for several months and this they said was contrary to their nomadic lifestyle where a Maasai especially the *morans* (young men) were supposed to move long distances daily while herding. In one focused group TB *manyatta* was seen as a place where one would contract other infections as most participants said they would prefer trekking long distances daily to collect drugs than be enrolled to a *manyatta* system;

However, TB *manyatta* initiative was viewed by the health staff as a noble idea, a treatment center where TB patients who would otherwise default treatment due to inaccessibility of TB clinics or failure to understand the importance of treatment completion would receive adequate and standard care. The key informants were also satisfied with the role of this strategy. According to the TB *Manyatta* staff, TB *Manyatta* strategy has never been exploited fully and was always underutilized. Reasons given by staff include:

- The Maasai community has a negative attitude towards TB *manyatta* and even after a lengthy explanation of the importance of the role it plays in ensuring treatment completion; admission into the TB *manyatta* is still equated to being “imprisoned” or forced treatment. As a result cases of TB patients sneaking out of the *manyatta* were not uncommon.

- Since the introduction of TB *manyatta* concept in the district, there was a treatment regimen that was designed specifically for patients confined to the TB "patient village" different from the outpatient treatment regime. This included daily injection and oral tablets for the first two months and another two months of taking oral drugs while the remaining drugs were to be taken at home. The standard regime for TB patients not confined to TB *manyatta* included taking oral anti-TB drugs for the entire period. Both regimens have then been harmonized hence greatly reducing the need to confine patients within the hospital.
- Decentralization of TB treatment centres from one (the district hospital) to sixteen TB clinics incorporated into functional dispensaries greatly reduced the demand for TB *manyatta* use. Nomadic TB patients can now collect drugs from the nearest dispensaries. However, not all dispensaries are diagnostic and hence patients have to be referred from the district hospital after diagnosis.

4.5.4 Narok District Treatment Outcomes for the Year 2008 and First Quarter of 2009

Quarterly records reviewed for the year 2008 and the first quarter of 2009 revealed that TB treatment defaulting rates in Narok Disrtict has always been around 13.5% **(Table 4-16).**

Table 4-16: TB Treatment Outcomes in selected TB clinics in Narok District for 2008 and First Quarter of 2009

Period of 2008	1st quarter		2nd quarter		3rd quarter		4th quarter		1st quarter 2009	
NEW CASE FINDING										
Type of case	No.	%	No.	%	No.	%	No.	%	No.	%
Smear positive	44	42%	36	29%	45	36%	43	42%	43	42%
Smear negative	40	38%	43	34.7%	38	31%	25	24.5%	33	32%
Not tested	5	4.8%	9	7.3%	15	12.2%	20	19.6%	11	11%
EPTB	8	6.7%	15	12%	17	13.9%	8	7.8%	8	8%
Relapse PTB+	2	1.9%	8	6.4%	3	2.5%	2	2%	2	2%
Relapse EPTB	1	0.96%	3	2.4%	2	1.7%	3	2.9%	2	2%
RAD	4	3.8%	10	8.1%	2	1.7%	1	1%	2	2%
TOTAL	104	100	124	100	122	100	102	100	101	100
TREATMENT OUTCOMES										
Cure Rates	--	62%	--	62%	--	77%	--	85%	--	67%
Defaulter rate	--	13.5%	--	13.5%	--	3.1%	--	13.5%	--	13%
Treatment completion rare	--	77.1%	--	76%	--	76%	--	75.8%	--	80%
Death rate	--	4.2%	--	7.69%	--	7.7%	--	6.2%	--	3%
Transfer out	--	3.3%	--	4.27%	--	5.12%	--	--	--	6%
Out of control	--	13%	--	12%	--	--	--	17.8%	--	13%
TB/HIV CO-INFECTION										
HIV +	39	37.5%	37	29.8%	37	30.3%	36	35%	39	39%
HIV-	46	44.2%	80	64.5%	85	69.7%	46	45%	63	62.4 %
HIV test not done	19	18.3%	7	5.6%	--	--	--	--	--	--
HIV+TB on ART	4/39	3.8%	9	7.3%	10	8.2%	4	3.9%	10/39	26%
HIV+TB on CPT	14/39	37.5%	--	--	37	30%	36	35%	38/39	97%

Source: Narok District Hospital Records, 2008-09

4.6 Factors Associated with Predisposition to TB

Binary logistic regression was used to model knowledge on TB (0=Inadequate knowledge, 1= Adequate knowledge) using nine candidate predictive factors, namely;

- Age of the patient in years (0= ’40 or more’, 1= ‘< 40’)
- Level of education (1= None, 2= Primary, 3= Secondary, 4= Tertiary)
- Religion (0= Other, 1= Christianity)
- Good practice score (0= ‘< 3’ (Below average), 1= ‘3 or more (Above average)’)
- Health seeking behavior score (0= ‘< 6 (Below average)’, 1= ‘6 or more (Above average)’)
- Access to TB educational activities (0= Not exposed, 1= Exposed)
- Family members attitude towards TB patients (0= Treated bad, 1= Treated well)
- Health providers attitude towards TB patients (0= Treated bad, 1= Treated well)
- Patient's attitude towards TB (0= Negative, 1= Positive)

Four factors that were retained in the model are the true predisposing factors to knowledge on TB.

Table 4-17: Logistic Regression Predicting True factors related to knowledge on TB of patients in selected TB clinics in Narok District in July, 2009.

Predictor variables	β	S.E. (β)	df	P value	odds ratio	95.0% C.I. for odds ratio Lower	Upper
Level of education[1]			3	0.044*			
Tertiary	0.95	0.41	1	0.019	2.60	1.17	5.76
Secondary	0.46	0.46	1	0.318	1.58	0.64	3.87
Primary	0.38	0.49	1	0.431	1.47	0.56	3.82
Good practice score[2]							
'3 or more (Above average)'	1.69	0.26	1	<0.001*	5.42	3.24	9.09
Health seeking behavior score[3]							
'6 or more (Above average)'	0.74	0.23	1	0.002*	2.09	1.32	3.31
Patient's attitude towards TB[4]							
Positive	0.72	0.38	1	0.056*	2.06	0.98	4.32

[1] - Reference category used, **'None'**

[2] - Reference category used, **'<3 (Below average)'**

[3] - Reference category used, **'<6 (Below average)**'

[4] - Reference category used, **'Negative'**

*Significant at 0.05 level.

Table 4-17 shows beta coefficient (β), standard error of beta (S.E. (β)), adjusted odds ratio and P value for each of the factors significantly associated with knowledge on TB. Highest level of education attained was significantly associated with knowledge on TB (P<0.044). A patient with tertiary education was 2.60 times more likely to have adequate knowledge on TB compared to one without any form of education. The likelihood reduces to 1.58 for those with secondary and 1.47 for those with primary education.

Overall, good practice score was significantly associated with knowledge on TB (P<0.001). Patients who scored 3 or more (Above average) were 5.42 times more likely to have adequate knowledge on TB compared to those who scored less than 3 (Below average). Similarly, overall health seeking behavior score was significantly associated with knowledge on TB (P=0.002). Patients who scored 6 or more (Above average) were 2.09 times more likely to have adequate knowledge on TB compared to those who scored less than 6 (Below average). Those with positive attitude were 2.06 times more likely to have adequate knowledge and appropriate health seeking behavior compared to those with negative attitude.

CHAPTER FIVE

5.0 DISCUSSION

The Maasai contacted in this study perceived tuberculosis as a highly contagious, difficult to cure and fatal disease that is not equally distributed in the population but affects only particular individuals because of specific reasons such as bad deeds, family history, association with the already infected or a result of curses. In one interview conducted, a local village elder expressed the view that:

> "…utensils such as cups, plates or spoons used by a TB patient are normally identified, washed with ashes and kept aside from the rest. No one is allowed to eat with a TB patient from the same plate".

This makes TB to be highly stigmatized to the extent that no one would like to associate with a TB patient while those already infected might not reveal their status to friends and family for fear of being ostracized. No wonder the revelation that most focused group participants knew somebody who had TB in the past and they had obtained the news not from the victims but through village gossips which were said to spread like bushfire. This behavior of the Maasai community towards persons suspected to be sick from TB probably stems from wrong perceptions of the causes and transmission of TB disease. These include beliefs that TB is caused by witchcraft (5%), heredity (12.8%), or curses (5.7%). Only about a quarter (27%) of the TB patients believed that TB could be caused by germs.

Just like in many cultures, the Maasai community believes that TB is hereditary because it is not surprising to find several members of the same family developing TB. A father to a 5-year old child who had just been diagnosed with TB observed that:

> "…my grandfather died of TB, my father had it two years ago, two of my uncles are undergoing treatment and today my 5-yearold son has been diagnosed with TB. Only males suffer from it and I think there is a TB factor in our family"

None of the focused group participants who said that TB was hereditary made it completely clear what they meant. An argument has been put forward in the academic literature that genetics might affect one's susceptibility to TB. Clark (1996) observes that there is growing support for the role of Darwinian genetics in shaping a TB epidemic. Even within one extended family that lives in clustered *manyattas*, it is possible to find a number of persons infected with TB according to (Surow, 2003). It is still not clear whether the infections concentrated within a family line is a result of heredity or the close proximity and communal lifestyle of the Maasai such as drinking from the same cup/calabash/tin and living in huts with barely any ventilation and no lighting. According to WHO (a) (2006), a person with active but untreated tuberculosis can infect 10–15 other people per year, especially on prolonged, frequent, or intense contact.

Social relations within and between families were strained by occurrence of TB and its history in the family was one of the key determinants when accepting a proposed marriage to or from another clan. Other studies have revealed that TB patients experience psychological, social suffering and their basic rights may be negated (WHO, 2001). Amongst problems met by TB patients, social stigma is increasingly recognized, often in association with HIV (Sengupta, 2006). Social stigma is "an undesirable or discrediting attribute that an individual possesses, thus reducing that individual's status in the eyes of society". It is also "a social process to be understood in relation to the concept of power, domination and difference. It is a process worsening already existing inequalities and exclusions (Parker and Aggleton, 2003) " Two types are usually distinguished according to Eastwood and Hill (2004): (1) enacted stigma concerns discrimination due to social inferiority, highlighted through people 'running away' from TB patients; and (2) perceived or internalized stigma, is a sense of inferiority, resulting from fear of enacted stigma, shown by patients hiding their diagnosis from others, or feeling ashamed of having TB.

Although symptoms such as cough, weight loss and enlarged lymph nodes, as mentioned by key informants are consistent with the biomedical understanding of major symptoms of active TB, the associated cause, disease process, and needed treatment were understood differently. The different sounds of a cough were also identified as markers of various and changing phases, for which traditional herbal medicine also changed. Focus group participants indicated ways to prevent the spread of the illness;

"…separate active TB, severely coughing persons, to cure and prevent spread, and don't get too close or use their things"

This belief that TB is extremely contagious and deadly leads to isolation of the sufferers of TB and their families. There were reports of suspicions that an infected person could intentionally contaminate the food or water source of others to be vindictive, a mistrust that stemmed from fear and misunderstanding related to TB contagion;

"…if your fellow *oljore* has TB, they won't tell you that they have TB…they want that you also have TB…because they know that they will be isolated .They want everyone to have it. When the people usually drink from a pot of water or calabash/guard of milk and everyone has a cup, they all drink and finish or throw the remaining out. But the person with TB will drink, spit inside, and throw the remaining back in the calabash/pot."

Perceived link of TB with HIV/AIDS complicates the already heightened social stigma. Some (41.4%) of the TB patients thought that TB was stigmatized because of this perceived link with HIV/AIDS. Furthermore, focused group participants confirmed that the signs and symptoms associated with TB were similar to those of HIV/AIDS and therefore suspected cases of TB were rumoured to have HIV/AIDS making it even more difficult to relate with that person as a neighbour or as a friend. A study conducted among TB/HIV co-infected patients in Thailand revealed high TB stigma in 65% of the patients. About 34% of them reported that having TB would be an embarrassment in the community, and 23% agreed that having TB would be an embarrassment in the family (Jittimanee *et al.*, 2009). A similar study conducted among the Turkana of Lodwar Township, Kenya revealed that the Turkana's local knowledge emphasizes a conceptual link between TB and HIV/AIDS and that the two are largely contagious and are attributed to impersonal and natural causes (John, 2009).

Patient's attitude towards TB revealed a statistical association with patient's knowledge on TB; 65.3% of the patients with positive attitude towards TB had significantly higher rate of adequate knowledge compared to 57.5% of those with negative attitude. A patient with positive attitude was 1.65 times more likely to have appropriate health seeking behavior compared to one that did not know how they felt. Similarly, a patient with negative attitude was 1.25 times more likely to have adequate knowledge on TB compared to one that did not know how they felt. The findings of the current study agree with what was suggested in a study in Botswana that positive attitude would lead to appropriate health seeking behavior and perceptions which should be encouraged and improved among patients in order to improve compliance with TB treatment (Mazonde *et al*., 2008). Other studies conducted among the Ethiopian nomads found that TB was considered a "*dirty disease*" with social stigmatization leading to a delay in seeking medical advice and non-compliance (Haile *et al.*, 2007). Many respondents described feelings of depression, anger and apathy associated with the TB disease. These feelings appeared to contribute to a temptation to cease therapy once symptoms disappeared, implying that those with poor attitude or those who felt the strain of the disease were less likely to comply with treatment. The fact that most of the patients in the current study had positive attitude (65.3%) probably increased the compliance with TB treatment.

Most of the focused group participants reported having gone to the health facility only when their health deteriorated and therefore the first impressions from the healthcare staff was the most important for the entire treatment process. Although 75% of the TB patients believed in modern medicine as the best cure for TB, most of them sought help from a health facility when they were too weak and unable to contribute to the livelihoods of their families. This gives the impression that traditional cure is always given the priority, as reported by 47.9% TB patients. Modern medicine is yet to be fully accepted by the Maasai community. Some focused group participants reported that having to take the pills was a nuisance and making trips to the hospital regularly to be observed taking drugs made things worse. People who had taken TB medications in the past were asked what it was like for them. Participants reported having had trouble with making trips to the doctor or managing side effects;

> "…I would be frightened if I get TB again. I used to pass reddish urine. It's very troublesome to take the medicine every day. Why don't they give me the medicine to take at home? I don't understand why I need to go there for months when am already feeling well".

There are major socio-cultural practices which predispose the Maasai to spreading the TB causing bacteria to those around them. Majority (92%) coughed with open mouth regardless of whether they were in or outside the huts. A single sneeze can release up to 40,000 droplets of bacilli (WHO (a), 2006). Indiscriminate spitting (98%) on the earthen floors is done by both the sick and the healthy as it is a socially acceptable practice. If one has TB, fresh sputum bearing millions of Tubercle bacilli exposed on the floor is a risk factor and could mean more infections. A similar study conducted among the nomads of northern Kenya found out that 98% of the nomadic community coughed with their mouths open and spat the sputum on the earthen floors (Surow, 2003). This might be an indication that coughing and spitting habits are similar among the nomadic pastoralists.

Living in traditional huts called Maasai *manyatta* (69.3%) with no ventilation and no direct sunlight, yet housing a large family is also a risky cultural practice. The bacilli are known to survive in the soil for many years in the absence of direct sunlight (MDSTT, 2010). The Maasai are so attached to their livestock to the extent that human beings and animals share the same room. Sleeping in the same room with livestock such as calves and goats increases overcrowding within the *manyattas* and reduces fresh air circulation. Thus, daily sweeping will spark off millions of bacilli together with the dust from the earthen floors and this could lead to more infections.

Although bovine TB in human beings has yet to be described among Kenyan pastoralists, drinking un-boiled milk (25%) is a cultural practice which could predispose the Maasai to not only TB but also other zoonotic infections. Moreover, chewing of raw meat during slaughtering process, a practice described as normal by focused group participants, could be as risky as drinking raw milk because TB can also be transmitted by eating meat infected with *Mycobacterium bovis* which causes TB in cattle.

Living in clustered houses, too many people occupying the same hut brings about overcrowding and could mean more infections to members of the same family owing to constant close proximity rather than the famous belief that TB is hereditary. Prolonged, frequent, or intense contact leads to high risk of becoming infected, where one person with active but untreated tuberculosis can infect 10–15 other people per year (WHO (b), 2006). Besides, communal lifestyle of the Maasai where several people eat from the same plate, or biting and sipping in turns from a container before utensils are washed predispose them further to contracting TB if one of the family members has it. The quick exchange of utensils leaves fresh saliva on the container and this is also a risky behavior for TB spread.

Majority of non cigarette smokers (61.9%) had adequate knowledge on TB compared to 32.1% of the smokers. Adequate knowledge on TB predisposed a person 3.43 times to non smoking compared to a person with inadequate knowledge. In a study conducted to determine the association between smoking and TB among elderly persons in Hong Kong, both current smokers and ex-smokers were found to have a higher risk of TB than those who had never smoked (Chi *et al*., 2004). As smokers were more likely to have smoking-related symptoms, it could be argued that these symptoms might have motivated them to seek healthcare, thereby resulting in incidental diagnosis of TB.

Among patients that did not take alcohol 64.5% had adequate knowledge about TB compared to 40.5% of those that were taking alcohol. This measure of association revealed that a person with adequate knowledge on TB is 2.66 times more likely to avoid taking alcohol. According to Shetty *et al*. (2006), the risk of active tuberculosis is substantially elevated in people who drink more than 40 grams of alcohol per day, and/or have an alcohol use disorder. This may be due to both increased risk of infection related to specific social mixing patterns associated with alcohol use, as well as influence on the immune system of alcohol itself and of alcohol related conditions. Lack of adequate knowledge about TB among alcohol consumers probably predisposed them to contracting TB.

Tuberculosis affected all age groups in the study population but a majority of the respondents (70.6%) were aged between 18 and 41 years. The increase in incidence of tuberculosis is probably due to the HIV/AIDS pandemic, which makes people more prone to chronic illnesses such as TB (Iademarco and Castro, 2003). Relationship between age of the respondent and knowledge on TB was statistically significant ($P<0.001$). Majority of the respondents aged less than 40 years (64.0%) had adequate knowledge on TB compared to those aged 40 years and above (43.9%). Younger people (< 40 years) were 2.27 times more likely to have adequate knowledge on TB compared to older people (40 years and above). This gives the impression that younger people are receptive to new ideas and are likely to incorporate it into their daily lives as compared to older generation.

If the initial self treatment before medical consultation is used as a yardstick to measure health seeking behavior, then 46.9% could also be labeled as having a poor health seeking behavior considering the fact that they sought various alternatives to treat TB before medical consultation. Traditional herbs (73.9%) and uvulectomy (13.9%) were the most sought after remedies.

Delay in seeking medical care among the Maasai was conspicuously observed during this study. Factors associated with delay in seeking medical care included use of traditional medicine which delayed 47.9% of TB patients. This is consistent with studies conducted elsewhere. In Blantyre, Malawi, 40% of smear-positive TB patients consulted a traditional healer prior to diagnosis (Brouwer *et al.,* 1998), which has led to some attempts to involve traditional healers in the diagnostic process. It is recognized that in societies using both traditional and biomedical therapeutics, health-seeking decisions are subject to indigenous concepts of particular illnesses. This study also shows that some people consult pharmacies directly for drugs (6.1%) for cure, suggesting that informal care providers could play a useful role in the diagnostic process by referring appropriate patients for sputum screening.

Remoteness of the place which makes health facilities inaccessible delayed 29.2% TB patients, from seeking immediate medical attention. The District's only health facilities are mostly found in towns along main roads and very far from the Maasai pasture land and water sites. The harsh climatic conditions and poor infrastructure coupled with area remoteness makes it difficult for nomadic pastoralist Maasai to access treatment and adhere to the requirements of standard treatment. Over 65% of the TB patients had to walk for long distances to reach the nearest health facility. Among them, 18.8% had to travel for over 20km which clearly indicates that health facilities are out of reach for many. This finding was consistent with a report by MPND (2005) that only 50% of Narok residents have access to healthcare and that the average distance to the nearest health facility is 30km.

Lack of money for bus fare, and consultation fee due to poverty and dwindling resources caused delay for 21.1% of the TB patients from seeking health care. Patients who spent a lot of money for transport and those who sold personal belongings to cover the cost of the visit were also more likely to delay presentation. Other studies have revealed that the economic factors associated with patient delay can be captured as cost of transport, prolonged transport time, rural residence, and the need to sell personal belongings to be able to afford coming to the health centre (Haile *et al.*, 2007). Half of the respondents (49%) had steady source of income. There was a significant gender difference in income showing that more females (53.8%) had no monthly income compared to males (43.9%). Females among the Maasai are less empowered and most of them depend on their husbands for basic needs such as food and shelter. Focused group participants confirmed that in order to meet the costs of transport and medical care, many had to borrow money; while others sold personal belongings, including important possessions such as cattle and goats. These factors are indicators of financial stress and underline economic hardships that hamper TB control efforts in the district. Tuberculosis is associated with poverty. According to WHO report on Global TB control, TB is more common in poorer countries, but also within the individual countries, poorer living areas have been associated with TB in both industrialized and developing countries (WHO, 2001). Tuberculosis has always affected the most marginalised groups of society, which may explain why the disease has fallen off the public agenda.

Some TB patients (1.6%) delayed consulting a doctor because the spouse did no approve of it. This again reinforces reports from focused groups that men are the decision makers in the Maasai community and therefore women would need to seek approval in matters concerning health care. Recently, gender issues and TB control have generated much interest. In most countries notification rates are higher for men than for women, even in countries where equal access to health care for men and women is likely (WHO, 2001). Hence, it has been debated whether the difference is due to behavioural, socioeconomic, or true biological effects, or a combination thereof, or due to TB being under-diagnosed or under-reported in women (Holmes *et al.*, 1998). In the present study, about half (51%) of the patients interviewed were females which is slightly higher than the 49% males.

The level of education alone can influence health seeking of a people because it determines understanding of the diagnosis, understanding of treatment, treatment initiation, treatment adherence, and general interactions with health care providers. Literacy levels among the Maasai are still very low as seen from the TB patient level of education; 53.4% did not have any formal education while only 20.6% had attained basic education, 15.1% had secondary education and even fewer had gone beyond this. The highest level of education acquired was a significant factor to knowledge on TB. Majority of the respondents with tertiary education (66.7%) were 1.98 times more likely to have adequate knowledge on TB compared to those without a formal education (50.2%). If an individual lacks knowledge about self-care, he/she would also lack self-care practices (Orem, 1990); in this case, lack of TB knowledge would

lead to poor health seeking behavior and possibly non-compliance with TB treatment. This is the picture expected in a context where most of the respondents (53.4%) did not have any formal education as education is perceived to enhance receptivity of information given. In a study conducted among Ethiopian nomads, where 93% of them were illiterate, participants were asked directly if the Health workers taught them about disease control and prevention, to which 80% responded positively. Those participants were asked to name the three most common communicable diseases: HIV/AIDS, Malaria and tuberculosis were named by 53%, 57% and 68% respectively of the 48 respondents, although only 18% mentioned all three. As regards understanding of how these diseases could be spread, just over half (52%) knew that TB was an airborne disease (Haile *et al.*, 2007). Information obtained regarding personal knowledge about TB supported the view that one's knowledge about TB and attitude toward it are related. From the Focused Group Discussion topics, those who said they did not know enough about TB had a more negative attitude about it and a worse experience with the disease than those who said they had been able to learn enough about it. This information strongly reinforces the view concerning the importance of TB education. Higher education level, no doubt, helps the patients to understand the educational messages. Moreover such patients have better chances to come across considerable knowledge about the disease in the media.

In its Second Global Plan to Stop TB, World Health Organization emphasizes that case finding and treatment outcomes can be improved by community education and outreach to reduce TB-related stigma and discrimination (WHO (a), 2006). Multiple studies from the past 10 years have documented the importance of addressing community perceptions of TB, rather than simply individual patient or family members' attitudes (Hoa *et al.*, 2004; Heijnders and Van Der Meij, 2006). One study in Nicaragua revealed that TB-related stigma leads patients to conceal their TB diagnosis from others, reducing adherence and treatment completion rates (Macq *et al.*, 2006). Unfortunately, evidence-based strategies for reducing either patient or community-wide stigma are lacking. Self-help, advocacy, and support groups have been recommended, but their impact at a population-level and on TB control has not been firmly established (Demissie *et al.*, 2002).

Another finding in the present analysis was that family structure seemed to play a role. Marital status related significantly with adequate knowledge of facts about TB. Comparison of adequate knowledge between those who were in polygamous marriage (50.6%) to those that were single (70.4%) revealed that singleness predisposed a person 2.32 times to adequate knowledge on TB compared to being married. This observation could be attributed to the fact that single people are more likely to be younger and better educated. Previous studies have shown that marital status affects the risk of TB, with single men having a greater risk of TB than married men (Christensen *et al.*, 1978). A study conducted to determine the incidence and risk factors of TB in Bissau found that people living without

children, alone or with adults of their own sex only, had higher risks of developing TB than people living in households with children or/and adults of the opposite sex (Gustafson *et al.*, 2004). The increased risk of adults living without children or individuals of the opposite sex may have to do with differences in lifestyles. Some protection from contact with children, possibly through immune stimulation from exposure to childhood infections, could be one of the reasons for the high TB incidence among young adults and old people, neither of whom would have much contact with young children. Since there was no difference in incidence for adult men and women living alone or with adults of their own sex, closer contact with children might also be one of the reasons that women have less TB than men (Gustafson *et al.*, 2004).

Majority (62.4%) of the respondent with adequate knowledge on TB were Christians compared to other unclearly defined religions (48.5%). Christianity predisposed the respondents 1.76 times to adequate knowledge compared to other unclearly defined religions. This could be an indication that apart from preaching the gospel, a lot of public health education particularly concerning TB takes place in the churches. Furthermore, Faith Based Organizations (F.B.O), have been involved in health service provision for decades. They account for over 60% of quality health care delivery especially, in remote communities that are socio economically disadvantaged with limited government health infrastructure (John, 2009). This could explain the differences in the level of TB knowledge among different religions. Notable however, the proportion with adequate knowledge among the

Muslims/Hindus was similar to that of other unclearly defined religions with a similar odd of exposure to knowledge.

A significant relationship between knowledge on TB and accessibility to TB educational activities was established during this study. Majority of patients (61.7%) that were exposed had adequate knowledge compared to 51% of those who were not exposed. Tuberculosis education is most likely to be successful in helping people learn if the character of the education is consistent with the manner in which the people in the target audience prefer to learn. Several people noted the importance of the availability of the information in the local Maasai language other than English or Swahili. A number of them also felt that establishing a radio station that broadcasts in Maa language could be very useful in educating the hard to reach nomads who don't visit healthcare facilities. However, one person pointed out that some people would always be unwilling to learn, no matter how information is presented to them.

> "…Some are eager to learn; others are not and those are the ones that we have to fear for, not the ones who are sick".

In this study, a large number of focused group participants had known someone who had had TB. Knowing people who have, or have had, TB seems to ease people's own experience with it. Participants commonly suggested that a good way to learn about TB was to speak with someone who had previously had it. In one FGD, 75% of the participants could positively identify causes, transmission and TB treatment and they reported having learnt the

same from people who had TB previously. Indeed, knowing someone who had had TB, most often a close relative did seem to correspond positively with people's level of knowledge about TB. This supports the possible use of recovered TB patients and/or family members as community health educators.

Tuberculosis treatment in Kenya is free with the expansion of DOTS; however, defaulting is still a problem among the Maasai of Narok District, rated at 13.5%. This behaviour greatly jeopadises TB control efforts in the District considering the fact that not many TB patients easily seek medical attention and the few who start treatment still default. Failure to complete treatment could be attributed to poverty, poor acceptability of modern medicine and probably inaccessibility of health facilities. In Malawi, Kruyt *et al.* (1999) found that clients default because of ignorance of the duration of treatment. In Masvingo Province, Zimbabwe, Proudfoot *et al.* (1996) indicate that defaulting was a result of high travel cost for supply of drugs and reviews, inadequate support from relatives and employers and poor understanding of modern treatment. Mukherjee *et al.* (2004) indicate that in several states in India, the main reasons for defaulting were distance from the treatment centre, indifferences due to improvement in symptoms, and lack of motivation. Age is also an important factor that could influence compliance to TB treatment. In Saudi Arabia, Al-Hajjaj and Al-Khatim, (2000) found that older age groups (41-60 years) tend to be less compliant than younger adults possibly due to illiteracy among older adults. This observation was supported by the

fact that in the same study, defaulting was more common among clients with no or minimal education.

Poor treatment compliance among the Maasai TB patients is still a major obstacle yet to be overcome by health care providers. Relapse (17.8%) and Return After Default (13.5%) both of which form re-treatment cases are still high and indicate a poor compliance with the required treatment regime. Factors attributed to defaulting included, lack of knowledge on the importance of competing treatment even if symptoms have resolved, centralization of TB diagnosis and treatment to major health facilities, very far distances to the nearest health facilities where some patients would have to trek (65.6%) for days to access the nearest health facility (18.8%), migration in search of pasture and water for their livestock without notifying the TB clinic (58.6%) and socio-cultural beliefs and practices which hinder acceptability of modern TB treatment. All these hinderences to utilization of TB care among the Maasai could only be overcome by a treatment system that confined patients within a health care facility. TB *manyatta* has always remained the best alternative despite the fact that the Maasai community has a negative attitude towards this strategy. Surow (2003) found out that TB *manyatta* was regarded as a noble idea for TB control among the nomads of northern Kenya.

CHAPTER SIX

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

Knowledge of TB disease causes and transmission is inadequate, because of the perceived causes, ineffective traditional treatment and wrong management of Patients suspected to have TB.

Attitude towards TB is predominantly negative among the Maasai of Narok District. TB is highly stigmatized as a killer disease to the extent that those who suffer from it are isolated and discriminated. Tuberculosis occurrence also strains social relations between families.

Some socio-cultural beliefs and practices among the Maasai such as the communal lifestyle, belief in traditional cure, eating/sipping from the same container and drinking unboiled milk greatly predisposes them to contracting TB.

The Maasai community lack appropriate health seeking behavior with regard to modern medicine. They still relied on traditional herbal medicine and most only visited a health facility when symptoms persisted or were too advanced such that the individuals are unable to contribute to the livelihoods of their families. Factors strongly associated with these patterns include low literacy levels, poverty, strong attachment to cultural beliefs and lack of access to TB health education.

Health facilities in Narok District were inaccessible to many because of their uneven and vast distribution, rough terrain compounded by harsh climatic conditions and remoteness of the place which then greatly contribute to lengthy delay of patients before seeking medical consultation. Even where some can reach the health facilities, lack of capacity to provide quality care, long queues in diagnostic laboratories and shortage of healthcare personnel deter provision of standard care.

Ever since TB *manyatta* strategy was introduced in Narok District, it has never been effective in reducing treatment defaulting among the nomadic Maasai, mainly because it's acceptability to the local community is equated to forced treatment admission.

6.2 Recommendations

Knowledge gap that exists should be bridged through continuous public health education that is tailored to suit the Maasai community to provide facts on TB disease, clear misconceptions and wrong traditional beliefs. This will serve not only to reduce the social stigma and change socio-cultural beliefs and practices that predispose people to TB but also improve the general health seeking behavior of the Maasai.

Health care providers should treat the diagnosis of tuberculosis with the same sensitivity and confidentiality that they reserve for sexually transmitted diseases and HIV/AIDS. Quality case management should be tailored to the community and particularly to the patient, by making appropriate referrals to needed health and social services, and helping to remove barriers to treatment success. Health communications such as magazines, billboards, radio advertisements, and public gatherings should be used to share information on TB with the general public, local communities, patients and contacts, as well as providers.

Acceptability of modern medicine among the Maasai should be improved through on-going sensitization programmes. If a patient is dissatisfied with the type of treatment, the relationship with their provider or with the clinical setting, he or she is much less likely to be adherent to medications, keeping appointments, identifying contacts, and so forth.

Fully equipped and operational health facilities should be decentralized throughout the district to make them closer to the People. To support access for health care provision, mobile units that offer diagnostic and treatment services for both TB and HIV should be set up to cater for the hard to reach nomads.

Just like other marginalized groups, the Maasai community needs to be empowered both educationally and economically. The government should devise ways of increasing the literacy levels of the Maasai as education is perceived to enhance receptivity of information. Economic empowerment through opening up markets for pastoralist products such as milk, meat and hides and skin will ensure that the Maasai can afford healthcare services and other basic necessities.

Further research should be carried out in order to:

- Better understand informational needs, identify appropriate and effective media for channeling information, and testing health messages related to many aspects of TB for a variety of audiences, particularly the nomadic pastoralists.
- Describe the occurrence and extent of Bovine TB among the pastoralists of Kenya.

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APPENDICES

APPENDIX I: Informed Consent Explanation and Consent Form

Factors Influencing Tuberculosis Control among the Maasai of Narok District Kenya

Purpose of the study

The aim of this study is to understand what you know about TB, and anything that you perceive as hindrances to seeking medical care once you suspect to have TB. Some of the principal areas of inquiry will be:

- Common beliefs about TB and perception of symptoms
- Individual (social) and structural (system) barriers to TB care.
- Perception of TB contagiousness
- Trusted and popular sources of information
- How individual feel about TB

Procedure's to be followed

If you volunteer to participate in this study, we would ask you to do the following things:

- Fill a questionnaire
- Participate in the in-depth interviews as will be guided by the investigator

This will take approximately 30-40 minutes.

Risks

There are no known risks associated with participating in this research. But some of the questions may appear uncomfortable for you but it is necessary for you to answer them with honesty as this would help us come up with specific interventions that would improve healthcare in general

Benefits

You should not expect your condition to improve as a result of participating in this research. But a probable benefit of participating in this study is that you will be able to learn preventive measures that can help curb the spread of TB and treatment strategies that can improve the outcome of your condition. This would include; covering the mouth while sneezing, using sputum cups with lids, living in well ventilated houses, importance of completing treatment regime etc. the findings from this study might help the programme managers improve healthcare policies and health care provision.

Privacy and Confidentiality of the Records

The only people who will know that you are a research subject are the members of the research team and if appropriate, your physicians and nurses. No information about you or provided by you during this research will be disclosed to others without your written permission, except if necessary to protect your rights or welfare, or if required by law.

When the results of the research are published or discussed in conference, no information will be included that would reveal your identity. If photographs, or videos, are taken, they will be used purely for educational purposes and your identity will be protected or disguised.

Consequences of Withdrawal

Your participation in this study, which will be in form of an interview, is completely voluntary. Your refusal to participate in the study or revoke your consent will have no penalty or loss of benefits to which you are otherwise entitled.

Obtaining Additional Information

You are encouraged to ask any questions to clarify any issues at any time or ask questions at any time during your participation in the study. If you later think you need more information you may call 0710-988103 and ask for Joyce Chepkirui.

I have read the above information and have had the opportunity to ask questions and all of my questions have been answered satisfactorily. I consent to participate in the study as has been explained and as I have understood it.

Name of interviewee ……Signature.....

Name of interviewer ……..Signature ……

APPENDIX II: Questionnaire

Socio-demographic Characteristics

1. Name (optional): _____

2. Age (years) _____

3. Sex: 1. Male□ 2. Female□

4. Marital status 1: Single □ 2: Married-monogamous□

3. Married-polygamous□ 4. Divorced□

5. Widow/Widower□

5. Reliable source of income 1. Yes□ 2 No□

6. Level of education 1.None□ 2: Primary□ 3. Secondary□

4. University □ 5. Others, specify_____

7. Religion 1. Christian □ 2 Muslim □

3. Hindu □ 4. Others (specify) _____

8. Main Occupation 1. Farming □ 2. Business□ 3 Salaried worker□

4. Others (specify) _____

9. Do you smoke cigarettes? 1. Yes□ 2. No□

10. Do you take alcohol? 1. Yes□ 2. No□

11. What is the distance from your place of residence to the nearest public health facility?

1 < 2KM□ 2 Btw 2-5KM□ 3 5+ KM□ 4 Don't know□

12. Mode of transport to the health facility

1. By foot□ 3. By Bus/*Matatu*□ 2 By own vehicle □

4. Others (specify) _____

13. Type of housing 1.Manyatta□ 2 Temporary structure□ 3. Permanent□

14. Type of cases: 1.New□ 2.Relapse□ 3.Fail□ 4.R.A.D□

Knowledge of TB disease, transmission and treatment

13. Do you know the disease you are suffering from?

1. Yes □ 2. No □

14. If yes, what is it called in Maasai?

_____

15. What do you think is the cause of this disease?

1. Germs □ 2. Witchcraft □

3. Heredity □ 4. Don't know□

5. Others (specify) _____

16. Do you think the disease you are suffering from has any link with HIV/AIDS?

1. Yes □ 2. No □ 3. Not sure □

17. What was the major sign that you experienced in order to seek treatment?

1. Fever □ 2 Cough for more than two weeks□ 3 Drenching night sweats □

4. Loss of weight □ 5 Chest pain and shortness of breath□

6. Others (specify) _____

18. How is tuberculosis transmitted?

1. Through sexual intercourse□ 2. From mother to child□

3. Sleeping in the same room with TB patient □ 4. Sharing cups □

5. Patient coughing directly to others (infectious droplet spread) □

6. Others (specify) _____

19. Can tuberculosis be prevented?

1. Yes □ 2 No □

20. Which preventive measures do you know that reduce transmission?

1. Covering the mouth when coughing □ 2. Reduction of overcrowding □

3. Using sputum cups with lids □ 4. Using a face mask when possible□

5. Other (specify)_____

21. Do you think the disease is curable?

1. Yes □ 2.No □ 3.Not sure □

22. What duration of treatment is sufficient for curability?

1. Four weeks □ 2.Two months □ 3.Four months □ 4.Eight months □

4 Others (specify)_____

23. Do you think it is necessary to complete treatment even when symptoms have resolved, though the prescribed treatment duration has not been reached?

1. Yes □ 2.No □

24. What is the major reason for this?

1. For curability to be achieved □ 2.To satisfy doctors requirement □

3. Others (specify) _____

25. What do you think is the consequence of interrupted treatment (incompletion)?

1. Cure failure □ 2.Death □ 3. Drug resistance □

4. No effect □ 5. Don't know □

6. Others (specify) _____

26. How do you think TB can be treated?

1. Burning on the aching part of the body □ 2.Avoiding sex □

3. Modern medicine □ 4 Taking rest □

5. Other, explain □_____

27. Did you know that the TB treatment was available free of charge?

1. Yes □ 2. No □

28. If yes where?

1. GoK hospitals□ 2 Herbalists □ 3 Mission/Private hospitals □

4. Others (specify) _____

29. If TB patient is treated, can it be cured?

1. Yes □ 2. No □ 3. Don't know □

30. Do you know of a TB patient who has been treated successfully?

1. Yes □ 2. No□

31. If symptoms fully disappear before you finish treatment, what would you do?

1. Stop treatment and go back to my daily work □

2. Stop treatment and begin taking nutritious food □

3. Continue treatment until I finish treatment course □

4. Others (specify) _____

32. What do you do to your livestock when they are coughing?

1. Treat□ 2. Sell□ 3 Slaughter□

4. Others, explain_____

33. Do you boil milk before you drink?

1. Yes □ 2. No □ (proceed)

34. If Yes why?

1. To kill germs that causes diseases □ 2. To make it palatable□
2. Boiling has been passed through generations□
3. Others (specify) _____

35. What is your everyday practice when coughing or sneezing?

1. Covering the mouth with hands or handkerchief

2. cough/sneeze withour covering the mouth 3. Do not remember

36. How do you dispose off sputum after coughing?

1. Spit on the floor/indiscriminately 2. Use sputum cups

2. Spit on a handkerchief/piece of cloth 4. Others

Access to TB educational activities

37. In the last three months, have you heard of any talk/ drama or any meeting on TB disease in Kenya/or your district?

1. Yes□ 2.No□

38. If yes where?

1. Open Market □ 2 School/ College □ 3.Public meeting□

4. Others (specify) _____

39. Did you attend?

1. Yes□ 2. No□

40. Have you come across any advertisement(s) on TB in the media?

1. Yes□ 2. No□ (Proceed to Q38)

41. If yes, state the channel.

1. Radio (specify)_____
2. TV (specify) _____
3. Print-newspapers and Magazines (specify)_____
4. Billboard (specify)_____
5. Other (specify)_____

Attitudes towards TB

42. What is your attitude towards TB?

1. Its related to HIV□ 2. Any other disease □

3. Inherited□ 5 Witchcraft □ 4 Don't know□

43. Is TB a source of social stigma?

1. Yes □ 2. No□ (skip to Q 41) 3 Don't know□ (skip to Q 41)

44. If yes in Q 40, give reasons?

1. Perceived relationship with HIV. □
2. The belief that TB is acquired on contact□
3. Others (specify)_____

45. How have you been treated by your family members?

1. Discriminated□ 2. Separated□ 3 Divorced□ 4 Cared for□

5. Others, specify _____

45. Have you ever lived or stayed with someone who has TB?

1. Yes□ 2. No□ (skip to Q 44)

46. If Yes to Q 43 how did you know he/she has TB?

_____

47. If you suspect that someone has TB, what advice would you give them?

1. Refer to medical clinic/hospital □ 2. Refer to chemist to buy medicine □

3. Refer to herbalist □ 4. Others (specify) _____

48. How did you know that you have TB?

1. I was coughing□ 2.Went to the hospital□ 3 Informed by a friend/relative□

4. Others (specify) _____

49. Where did you seek treatment?

1. Herbalist□ 2. GoK health facility □ 3 Mission/private□

4. Others, specify_____

50. Where do you normally pick your TB drugs?

1. Herbalist□ 2. GoK health facility□ 3 Mission/private□

4. Others, specify _____

51. What is your attitude towards TB drugs?

1. Effective□ 2. Not effective□ 3. Don't know□

52. What was the attitude of the health providers?

1. Mistreated □ 2. Discriminated□ 3 Isolated□ 4 Special Care □

5. Others, specify_____

53. What was your reaction when you discovered that you had TB?

1. Not too worried □ 2.Fear of spreading to others □ 3.Fear of dying □

4. Worried about incurability □ 5.Shocked//disbelief □ 6.Fear of loosing job □

7. Concerned about social stigma □ 8.Disliked taking medication □

9. Others (specify)_____

54. What do you think of the service you receive at where you go for TB treatment?

- Do you feel listened to? 1. Yes □ 2. No □
- Are you given a chance to state your problems and ask questions? Yes □ no□
- Are you treated with respect? 1. Yes□ 2. No□
- Do you feel you can trust the health workers? 1. Yes□ 2. No□
- Did you have privacy during consultation and counseling? 1.Yes□ 2.No□
- How do you find the environment near the clinic?

  1. Good □ 2. Bad□ 3 Not sure□

Health seeking Behavior

55. What makes you seek care for your current illness?

1. Persistent cough□ 2. Haemoptysis □ 3 Fever 4.□Chest pain

5 Weight loss □ 6 Swollen lymph nodes □ 7.Back pain □

8. Others (Specify) _____

56. Did you take decisions on seeking treatment on your own?

1. Yes □ 2. No □

57. Did you suspect that you may have TB?

1. Yes □ 2. No □

58. Did you first try to treat the illness (symptoms) by your own?

1. Yes □ 2. No □

59. How did you come to this TB clinic?

1. Referred by public facility □ 2. Referred by private facility □ 3 self referred □

60. Which of the following health care facilities did you visit first for this illness?

1. Herbalist□ 2 Private health center□ 3 Public health center □

APPENDIX III: Focused Group Discussion Guide

- Traditional concept of health and disease
- knowledge of TB: local name, recognition, handling and care of patients
- Knowledge of TB treatment: comparison between old and new treatment care
- Attitude towards TB disease/treatment
- Involvement and perception of TB *Manyatta* concept
- Recommendations on the appropriate interventions: culturally and socially acceptable.

1. **What does your family and friends know and think about TB?**
2. **Was there anything about your visit to the health department that you did not like or did not understand? (**⇒PROBE :)

   Was there anything about the examination/ TB skin test/ Chest x ray you did not like or did not understand?

   Were you concerned that your friends and family may be at risk for TB?

   Did you understand the difference between TB infection and TB disease?

3. **How do you feel about coming to the health department?**

⇒PROBE; How did the staff at the health department treat you?

Did the staff at the health department try to help you with other concerns (transportation, financial issues, other medical care issues, substance abuse)? If not, would you have liked assistance for these issues?

⇒PROBE Was the health departments available/open at convenient times for you?

4. **What are your thoughts about the taking medicines to treat TB infection?**

5. **What convinced you of the importance of taking TB medicines?**

⇒PROBE: What explanations/instructions did you receive about why it is important to take your medicine?

What are your thoughts about having someone watch you take your medicine/taking your TB medicine when you are not feeling sick/length of TB treatment?

What do you think are some reasons people may not complete taking their TB medicines?

6. **Do you feel that taking TB medicines prevents you from doing things in your life that you normally do? Say smoking/drinking?**

Okay, we want to thank you for sharing your opinions with us today. This information is very valuable for us.

APPENDIX IV: In-Depth Interview Guide

Good Morning……Afternoon or …….evening Thank you for taking time to be with me today. My name is Joyce Chepkirui Kirui, a student with JKUAT (ITROMID program), undertaking a Masters degree in Public health. You have been requested to come to this desk because I would like to talk with you a little about some of your experiences about TB. The following are the guiding questions for the discussions;

1. What were your reactions/thoughts when you first heard that you were sick?
2. That first week or so who did you tell about your TB?
3. Was there anyone you wanted to keep information from…? Anyone you really didn't want to know you had TB? (Probe: what are the reasons people would not want to tell others about their TB status?)
4. What do you believe caused your TB?
5. What comes into your mind when you discover that someone has TB? Why?
6. How do you think it will affect your life? Future?
7. Do you think it is serious? Do you think people can die from it?
8. Can anyone get TB or are some people more likely to get TB than others?
9. What are the common beliefs about TB in your society?
10. How would you describe your feelings about the disease that you are suffering from the time of your diagnosis? What are the reasons for this?

11. Was there anything that the healthcare worker said that made you uncomfortable when you visited the clinic? If so, what did the healthcare worker say?
12. Are you aware of being treated differently because of your status……at home, workplace and at the clinic? What do people do or say that makes you say this?
13. What is your opinion concerning TB *manyatta?* Do you like it/ think is effective?
14. Before we close, is there anything I did not ask you about that you think is important for me to know? Is there anything you would like to add?

Okay, we want to thank you for sharing your opinions with us today. This information is very valuable for us.