

Knowledge, Attitudes, and Practice of Tuberculosis among Maasai in Simanjiro District, Tanzania

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Abstract. The objectives of this study are to determine knowledge, attitudes, and practice among Maasai concerning tuberculosis (TB), and to gain insight into the role of traditional healers in diagnosis and treatment. We conducted a descriptive-explorative study using questionnaires, semi-structured interviews collating information to assess and compare TB knowledge, attitudes, and practice. The study population consisted of the Maasai population. The Maasai have insufficient understanding concerning TB. Schooling has a significant positive effect on knowledge. The Maasai believe TB is manifest as a punishment from god and is treatable with herbs, roots, and bark. The Maasai have numerous other erroneous health assumptions and beliefs concerning TB. Traditional healers act as family doctors and play a key role in TB treatment initiation and adherence. Traditional healers have substantial influence over primary diagnosis and treatment of TB. Education could positively affect initiation of diagnosis and treatment, resulting in better TB control.

INTRODUCTION

Worldwide every second a person is infected with tuberculosis (TB) and every 10 seconds someone dies as a consequence.^{1,2} One patient has the ability to infect 10 to 15 people, mainly by coughing. In 2006, 1.7 million deaths resulted from TB: the majority situated in sub-Saharan Africa. The incidence of TB has been rising in Africa since 1983, when human immunodeficiency (HIV)/acquired immunodeficiency syndrome (AIDS) emerged. Mortality from TB is 10 times higher in Africa than in Europe. The combination of HIV-TB is lethal; however, the issue becomes further compounded with the rise of multidrug-resistant TB (MDR-TB).³ These strains of the bacterium are resistant to at least isoniazid and rifampicin, two powerful anti-TB drugs. Under the DOTS (*directly observed treatment, short-course*)⁴ regimen, therapy reaches a cure rate of 60–69%. However, only 60% of smear-positive cases are treated under DOTS. This is below the targets stated under Millennium Development Goal 6C (proportion of tuberculosis cases detected and cured under directly observed treatment short-course). The treatment success rate nowadays is 84%, although sub-Saharan Africa lags behind at 76%. The World Health Organization (WHO) has reacted with the “Stop TB Strategy” program, where strict implementation and improvement of DOTS treatment is paramount.

Poor adherence is a major factor contributing to both the emergence of MDR-TB and to the failure of DOTS treatment.⁵ This comes as no surprise because the implementation of DOTS evolved from the need to improve adherence. Inadequately treated TB gives rise to MDR-TB and thus threatens the population as a whole. An HIV patient who defaults also has a greater chance of contracting AIDS and consequently TB.^{6–8} Multiple studies in sub-Saharan Africa indicate that 25–44% of patients default from treatment.^{9–11} Multiple reasons for defaulting are given. The rationale is often based on misconception or lack of financial means.

People have a general idea of what TB is and know that it is treatable. Gaps in knowledge, however, surround transmis-

sion, prevention, and the relationship between HIV/AIDS and TB. Such poor understanding is further augmented by erroneous beliefs.^{12,13} These beliefs often have a religious or tribal origin and have proven hard to correct through seminars. The hierarchy within Tanzanian tribes is held with reverence where they dictate that infectious diseases like TB and HIV/AIDS are taboo.

A large part of the Maasai population use traditional healers, health facilities are often far away and public transport nonexistent.¹⁴ The use of traditional medicine is influenced by the symptoms of illnesses and positive ideas and beliefs about traditional practice and medicine.¹⁵ This not only delays health-seeking behavior and, therefore, compromises the health of patients but it also presents ample time for the infection to spread to the healthy population.^{16,17} Although it has proven difficult, it is of great importance to collaborate with traditional healers to tackle this problem.^{18,19} There are currently no Tanzanian studies published on traditional TB treatment but other East African studies show that treatment varies greatly.²⁰ It is shown that local healers often accurately recognize the symptoms of TB but fail to acknowledge the biological cause. Appreciating such a fact is of paramount importance to this study, as rural Tanzanians are likely to consult traditional healers primarily as they are easily accessible and inexpensive.

This study primarily aims to gain insight into the health assumptions and beliefs surrounding TB. Further concurrent aims include assessing basic TB knowledge of the Maasai population in Simanjiro district and the practice of traditional healers in the process of diagnosis and treatment of TB.

MATERIALS AND METHODS

Study area and population. The research population consists of the Maasai population in the villages of Kambiyaachoka, Lengasiti, and Loibor-siret in Simanjiro district: 23,000 inhabitants speaking the Kimaasai language. The Maasai in Simanjiro district no longer live a nomadic lifestyle. Most of the inhabitants live in small villages called Bomas consisting of multiple homes or “Ngajis.” Livestock is their main means of income. When boys come of age they are sent into the steppe, with or without livestock to survive for months at a time. In this period they prove their manhood surviving solely

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by living off the land. They also practice hunting and fighting among themselves. When they return from the bush they are considered mature men, able to support a family. Wealth for the Maasai is not solely measured through financial means. The number of livestock owned by a man and his wives play a major role in tribal status. Maasai men have numerous children, because contraception is not used, therefore almost half the population consists of children. Men play a dominant role over women, make decisions concerning the family, and may speak to strangers. This study aimed to interview equal numbers of men and women; however, this was complicated by the aforementioned dominant male role.

DATA COLLECTION

Multiple choice questionnaires. To assess basic TB knowledge a structured multiple choice questionnaire was formulated (Appendix A). Questions aimed at knowledge, spreading, prevention, adherence to treatment, and HIV/AIDS. An aim was also to bring assumptions and beliefs to light. To be able to accurately collate the correct assumptions and beliefs of the Maasai, semi-structured interviews were held before formulating the multiple choice questionnaires. These interviews were held with two medical doctors and two people with leading positions among the population. Ten pilot questionnaires were then completed using a translator to assess whether the questionnaires were easily understood. Formal informed consent for the study was acquired traditionally through the chief. Further consent from the population was acquired through the translator and signed on the questionnaire. The population is mainly illiterate so most of the time the consent was acquired orally. One hundred five (105) multiple choice questionnaires were held (school children *N* = 36, adult population *N* = 69) anonymously. Inclusion criteria were adults without education and school children in secondary education.

Semi-structured and structured interviews. The research goals concerning health assumptions and beliefs were met through semi-structured and structured interviews. Semi-structured interviews with medical doctors and people in leading positions were conducted. In total, 14 structured interviews were conducted to add objectives to the information collated from the multiple choice questionnaires. All interviews were recorded digitally with informed consent acquired at the beginning. Two interviews, with traditional healers, were held anonymously.

Type of study. The objectives, concerning the practices of traditional healers and their use, were reached through semi-structured and structured interviews. The research goal of gaining insight into health assumptions and beliefs was also reached in this manner. Percentages and significant differences were calculated using Pearson’s χ^2 (χ^2) test; *P* < 0.05 was considered significant.

RESULTS

Knowledge. The Maasai population is aware of the danger TB poses. Sixty-seven percent (*N* = 46; 95% confidence interval [CI] = 0.56–0.78) of the population knows about TB, 80% (*N* = 55; 95% CI = 0.71–0.89) knows the symptoms, and 67% (*N* = 46; 95% CI = 0.57–0.77) knows it is treatable. The multiple-choice questionnaire, however, outlined major gaps in their knowledge. Areas concerning prevention, causality, treatment, adherence, and the relationship to HIV were poorly answered. Often less than half of the population answered questions in the aforementioned categories correctly. Results are summarized in Table 1. Education has a significant positive effect on knowledge. School children are more aware of TB and its etiology. Consequently, the role between HIV/AIDS and TB is clearer to school children than it is to adult Maasai, with no primary education. The results of the structured interviews indicate the same gaps in knowledge.

Assumptions. Multiple health assumptions and beliefs were found. Thirty-two percent (*N* = 22) thought TB was caused by a punishment from god. Smaller fractions thought TB is caused by long periods of strong sun, excessive exercise, smoking, promiscuity, and breathing in dust. Others believe TB is caused by white people and global changes. Some Maasai believe boiling milk and blood or cooking meat will ruin the taste and nutritional value of food. Some said changing hair color, skin infections, and joint pain were symptoms of TB. Although the greater part of the population understood TB to be treatable in clinics, some of the assumptions we found of the traditional healers were also noted in the population. Although school children had a good idea of the effects of HIV, the adult population had different views. Some said HIV and TB were the same disease; others indicated that TB and HIV were caused by eating infected food. Most Maasai believe TB is a hereditary disease. Health-seeking behavior is complicated by the fact that a large part of the Maasai believe traditional medicine will cure TB.

TABLE 1
Knowledge, attitudes, beliefs of TB, and effect of education in Simanjiro district*

Question	Percentage of correctly answered questions with 95% CI	School children (<i>N</i> = 36)	Population (<i>N</i> = 69)	<i>P</i> value
1. What is TB?	100%	(<i>N</i> = 36; 95% CI = 0.94, 1)	90% (<i>N</i> = 62; 95% CI = 0.83, 0.97)	<i>P</i> < 0.05
2. What are the signs of TB?	94%	(<i>N</i> = 34; 95% CI = 0.86, 1)	89% (<i>N</i> = 61; 95% CI = 0.82, 0.96)	<i>P</i> = n.s.
3. What is the cause of TB?	56%	(<i>N</i> = 20; 95% CI = 0.40, 0.72)	19% (<i>N</i> = 13; 95% CI = 0.10, 0.28)	<i>P</i> < 0.0001
4. What parts does TB affect?	28%	(<i>N</i> = 10; 95% CI = 0.13, 0.43)	33% (<i>N</i> = 23; 95% CI = 0.22, 0.44)	<i>P</i> = n.s.
5. How does TB spread?	47%	(<i>N</i> = 17; 95% CI = 0.31, 0.63)	54% (<i>N</i> = 37; 95% CI = 0.43, 0.65)	<i>P</i> = n.s.
6. Is TB treatable?	72%	(<i>N</i> = 26; 95% CI = 0.57, 0.87)	67% (<i>N</i> = 46; 95% CI = 0.56, 0.78)	<i>P</i> = n.s.
7. When is TB cured?	6%	(<i>N</i> = 2; 95% CI = 0, 0.14)	52% (<i>N</i> = 36; 95% CI = 0.40, 0.64)	<i>P</i> < 0.0001
8. How can TB be prevented?	47%	(<i>N</i> = 17; 95% CI = 0.31–0.63)	45% (<i>N</i> = 31; 95% CI = 0.33, 0.57)	<i>P</i> = n.s.
9. Should all pills be taken?	86%	(<i>N</i> = 31; 95% CI = 0.75–0.97)	55% (<i>N</i> = 38; 95% CI = 0.43–0.67)	<i>P</i> < 0.01
10. Is there a relation between HIV-TB?	78%	(<i>N</i> = 28; 95% CI = 0.64, 0.92)	22% (<i>N</i> = 15; 95% CI = 0.12, 0.32)	<i>P</i> < 0.0001

*TB = tuberculosis; CI = confidence interval; n.s. = not significant; HIV = human immunodeficiency virus.

Traditional healers. The majority of the Maasai use traditional healers. Often the decision is made out of necessity as medical clinics are few and far for the Maasai living spread out on the steppe; a medical clinic or dispensary can be days walking and public transportation nonexistent. Traditional healers are often located in a nearby boma. The position of a traditional healer in the tribe is one of great respect and importance. Traditional medicine is a profession passed down from father to son. Such knowledge and practice of herbs, roots, and other medicine has passed down through generations. The interviews helped establish information concerning therapy: no modern medicine is used. Traditional healers generally use roots, bark from trees, and oil from meat, blood, and fat. Meat is considered a great source of power for the Maasai. Thus, all liquid derived from meat is considered healthy and medicinal. Blood is used raw because it is considered to hold the most power when fresh. Meat is derived from cows, goats, sheep, and zebras. Traditional healers also use "traditional marks": cuts made by sharp objects on the patient, specifically, on the part of the body that is perceived to be sick. For example, a patient with angina pectoris would have multiple cuts made to the chest. In a western paradigm these practices are considered erroneous and potentially harmful. Although their therapy has no scientific basis, their process of diagnosis is often correct and most traditional healers are able to diagnose numerous tropical illnesses including TB. Some actually indicate their inability to treat TB; however, others claim their therapy for TB has always been successful. Knowledge concerning TB, therefore, varies greatly among traditional healers, resulting in some referring patients whom they believe to suffer from TB to medical clinics while others treat them in a traditional manner.

DISCUSSION

Our study has brought both interesting and worrisome information to light. Knowledge is poor, especially in fields that influence patient adherence and thus spread of disease. Not only is knowledge poor, but multiple health assumptions have been found. Some of these beliefs have a negative effect on the patient's health and the spread of TB. The most notable gap in knowledge was found in the relationship between HIV/AIDS and TB. This poses a great threat to the community for TB strides in the shadow of HIV/AIDS as one of the leading causes of death in AIDS patients. It is of note that school children had far superior knowledge concerning the relationship of HIV/AIDS and TB. Schooling proved to have a significant positive effect on knowledge. A significant part of the school children, however, did not know when TB is cured (question 7). This is remarkable and could indicate a flaw in educational material.

Traditional healers play a very important role in the Maasai community. Their position is one of great respect and influence: they are the first to be consulted when disease strikes a community. They can either refer patients to western clinics or treat them in their own way. This choice had a major effect on the patient's health and thus on the entire community. Such power could be harnessed in favor of patients. Educating the traditional healers could significantly improve their knowledge of TB. Through their role as family doctors they could reach out to the whole community, thus improving the process of diagnosis and referral, which may lead to prevention or spread of disease.

Difficulties lie in penetrating cultural paradigm. Although some Maasai are correctly informed they often refuse to act accordingly. A way to counteract this problem could be to implement changes enlisting help from chiefs and traditional healers in leading positions. The hierarchy of the Maasai makes this achievable. The HIV/AIDS infection rate in the Maasai community is currently low because of their relatively reclusive and rural way of life. The HIV/AIDS infection rate is likely to increase, however, because of integration of the Maasai people into urban communities. Subsequently, TB will pose more of a threat to the health of the population. Therefore, a large-scale health education program, targeted at traditional healers could positively affect TB treatment, adherence, and spread. Existing literature indicates that health education programs for TB are generally well received and improve TB control.^{18,19,21} It should be noted that these studies either originate from Asia or were aimed at HIV/AIDS. It is, therefore, hard to compare these findings to Maasai in Tanzania.

Limitations of this study include the small number of interviews and questionnaires and the necessity of a translator. The answers to questions in the questionnaire were kept simple to make translation easier; however, this could have resulted in some information bias. Multiple choice questionnaires *per se* have some inherent information bias caused by limited options: allowing the ability to make a wild guess. Although such limitations could bias our results, we consider our findings secure because of the significant differences.

The Maasai are very humble people and could be dishonest to please the interviewer. This could result in information bias. It should be noted that only 58 have access to secondary schooling in a population of 23,000 for there is only one secondary school. These children are, therefore, a strongly selected group, not only by age but possibly also by intelligence. This could have resulted in selection bias. The results of this study justify further research into the effectiveness of a health education program aimed at traditional healers. The suggested positive effect on TB control could be assessed in a prospective cohort study in the area.

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- (C) *Coughing of blood, weight loss, fever, tiredness*
 - (D) Diarrhea, fever, weight loss
 - (E) I don't know
3. What is the cause of tuberculosis?
 - (A) A dry period with strong sun
 - (B) The cause is god's punishment
 - (C) A very long coughing period
 - (D) *A bacterium*
 - (E) I don't know
 4. What parts of the body can tuberculosis affect?
 - (A) Eyes, skin, bones
 - (B) *Lungs, liver, brain, eye, spleen*
 - (C) Lungs, heart, muscles
 - (D) Lungs
 - (E) I don't know
 5. How does tuberculosis spread?
 - (A) By air
 - (B) *By air and by milk from infected cattle*
 - (C) By water and milk
 - (D) It does not spread
 - (E) I don't know
 6. Is tuberculosis treatable?
 - (A) Yes, at medical clinics with injections
 - (B) Yes, the local healer can treat it
 - (C) *Yes, at a medical clinic with pills for a long time*
 - (D) No
 - (E) I don't know
 7. When is tuberculosis cured?
 - (A) When all coughing and fever are gone
 - (B) *When therapy is completed (all pills taken)*
 - (C) When the person feels good again
 - (D) When the person regains his weight
 - (E) I don't know
 8. How can tuberculosis be prevented?
 - (A) *Good ventilation and boiling of milk*
 - (B) By eating well
 - (C) By having a strong health
 - (D) By vaccination
 - (E) I don't know
 9. Should all pills be taken?
 - (A) No, this is useless
 - (B) No, this is harmful
 - (C) *Yes, this is important*
 - (D) Yes, but only if the patient is sick
 - (E) I don't know
 10. Is there a relation between HIV/AIDS and tuberculosis?
 - (A) No, there is no relation
 - (B) *Yes, HIV/AIDS makes you MORE vulnerable to tuberculosis*
 - (C) Yes, with tuberculosis you are LESS vulnerable to HIV/AIDS
 - (D) I don't know what HIV/AIDS is
 - (E) I don't know

APPENDIX A

Multiple choice questionnaire (italic indicates the correct answer).

Sex: m/f Age: Town/Area:

1. What is Tuberculosis?
 - (A) A terrible headache with dizziness
 - (B) A harmless cough
 - (C) A passing diarrhea
 - (D) *A dangerous lung disease*
 - (E) I don't know
2. What are signs of tuberculosis?
 - (A) Coughing and difficulty breathing
 - (B) Tiredness, fever