

The re-emergence of tuberculosis among the economically productive age group in Kenya: the case of Mombasa district

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ABSTRACT

In this investigation 43 cases of smear positive patients undergoing TB treatment at satellite treatment centres situated within Mombasa municipality were observed and interviewed retrospectively. The span of the study was five months commencing from April 1997. The study was carried out in collaboration with the National Leprosy and Tuberculosis Programme at Port Reitz, Coast General and Ganjoni centres of infectious and contagious diseases in Mombasa district. The data seem to indicate that the highest number (97%) of persons affected by TB come from the economically productive age (15–50 years). The possible cause of recurrence of TB in Mombasa district is lifestyle. The majority of the people with sputum smear positive earn below the poverty line. They live in rented or overcrowded houses with inadequate ventilation, insufficient sanitary and transport facilities and poor health systems. In addition, there is a general lack of awareness of dangers of infection, spread and prevention of TB. Areas warranting closer attention by future research are highlighted in the study.

KEYWORDS

education, health, life style, poverty, Mombasa, TB

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Introduction

The re-emergence of infectious and communicable diseases such as tuberculosis in Africa has been blamed on various problems such as poor epidemic surveillance; lack of medicine and medical services; weak health systems and poor health conditions and hazards (Bobbin 1984, Pratt 1995). Tuberculosis (TB) is a disease caused by the *Mycobacterium tuberculosis*. It has been a misery of mankind for centuries, as accounts in the earliest surviving literature show (Barnes and Barrows 1993, Evans 1994). A review of the literature shows that estimated cumulative tuberculosis deaths stood at 30 million during the period 1990–1999, of which about six million occurred in sub-Saharan Africa (Kochi, 1991). TB is perhaps the most important contagious disease in the world that causes millions of avoidable deaths worldwide (Pratt 1995, WHO/TB 1997).

A global survey reveals that generally, TB has affected about half of the world's population and kills seven million people per year (Evans 1994, Kochi, 1991). This comprises 25 per cent of avoidable deaths occurring in developing countries and the highest percentage of TB cases (95%) and TB-related deaths (98%) occur in developing countries. Of those severely affected, 75% are in the economically productive age of 15–50 years old (WHO/TB 1997). In addition, the recent WHO estimation indicates that one-third of the world's population, over 1.72 billion people, are currently infected by *M. tuberculosis*.

According to the National Leprosy and Tuberculosis Programme (NLTP 1996), there were then 43,860 TB cases in Kenya (with the patients' statuses categorized as either chronic, relapse, sputum smear positive or sputum smear negative and with Mombasa district alone having 5,661 TB cases. The survey showed that the incidence of new patients with sputum smear positive tuberculosis (patients diagnosed as severely ill) in Kenya was about 18,909 cases. The leading district was Mombasa with approximately 2,459 (13%) of the TB cases reported nationally. Of all the 360 newly diagnosed TB cases reported (with all the four categories mentioned above) in Mombasa district, 52.4% (187) were sputum smear positive, 39% (141) were sputum smear negative and relapses and chronic cases were 8% and 0.6% respectively. This is an

increase of 25.39 % compared with previous TB cases reported in Mombasa district. Considering this, Mombasa district appears to be a TB epidemic area in Kenya.

Causes and spread of TB

In essence, *M. tuberculosis* is transmitted from an infected person (a carrier) to a non-infected person (non-carrier) by means of the inhalation of the tubercle bacilli released from a carrier as droplet nuclei during coughing, sneezing and talking. In addition to the infectiousness of the source patient, the risk of infection is related to the closeness and intensity of exposure. In other words, anyone sharing the same air space for a prolonged period such as a family member, a fellow patient and a healthcare worker, is at more risk of contracting the infection than those individuals who are only briefly exposed to the source patient (such as one-time hospital visitors). Also, exposure of any length, especially in small, confined, poorly ventilated environments, is dangerous. This may include facilities in hospitals used for cough-inducing procedures such as physiotherapy, sputum induction and administration of aerosol therapy. The likelihood that an exposed person will become infected and develop TB is related to that person's susceptibility.

Another factor that may increase an individual's susceptibility to primary infection is immunodeficiency, which includes immunodeficiency secondary to HIV/AIDS infection (Barnes et al. 1991). This poses a potential threat to susceptible non-carriers who can easily become infected when they breathe these droplet nuclei. The literature shows the following as the possible potential causes of the re-emergence of the TB epidemic:

- Inappropriate diagnosis due to limited diagnostic knowledge and skill;
- Improper treatment due to lack of sufficient diagnosis;
- Negligence of private practitioners;
- Lack of a guiding policy regarding the role of private practitioners on the eradication, prevention and control of TB;
- A debilitating disease such as HIV or diabetes which reduces the patient's immune system;

- Lack of community awareness of the dangers of TB and its spread (Bobbin 1984, Emokor and Tukei 1982, Evans 1994, Pratt 1995, WHO/TB 1997).

Causes related to HIV/AIDS and diabetes

Debilitating diseases such as the HIV/AIDS and diabetes reduce the patient's immune system. Individuals infected with HIV/AIDS are at significantly greater risk of a progression to active disease than those who are not infected with HIV/AIDS. HIV-infected individuals who have not been infected with *M. tuberculosis* in the past commonly develop TB within a few months of exposure to a source patient (Barnes et al. 1991). Moreover, they are more likely to have a rapid and more severely progressive form of TB than non-HIV/AIDS infected persons (Centre for Disease Control 1992). However, the *M. bovis* type of TB often re-emerges in HIV/AIDS infected persons (Darbon and Grange 1993).

TB is often the initial manifestation of the HIV/AIDS disease. This is often seen within the first six months following HIV/AIDS infection and may be the result of earlier infection by the tubercle bacilli or recent exposure (Festenstein and Grange 1991). In addition, extra-pulmonary tuberculosis is much more common in individuals who are infected with HIV/AIDS. This is particularly because of the associative immunodeficiency which facilitates the blood-borne spread of tubercle bacilli from the primary site of infection in the lungs (Barnes and Barrows 1993).

Although these indicators of crowded and unsanitary conditions have been reported to be prevalent in Kenya, especially among the economically-depressed population (Kibitok 1997), there is a need to ascertain whether or not there is a relationship between these prevalent conditions and the re-emergence of TB among the economically productive age group in Mombasa district. The purpose of this descriptive study, therefore, was to contribute in this regard.

Data and methods

Study design

The paucity of literature on the re-emergence of TB, particularly in Kenya, has led to the selection of a descriptive research study in which

the concepts and their interrelationships are used to describe the emerging social process or phenomenon in question (Diers 1979, Fawcett and Downs 1986, Glaser 1978).

Sampling of cases

The sampling technique used in this study is purposive sampling. Purposive sampling allows the collection of data from identified respondents (Glaser and Strauss 1967). This process was undertaken in the present study, based on the sampled cases from a list of in- and outpatients who reported to the centralized medical centre between April and June, 1997. The cases comprised ten new cases, ten relapses, ten in-patients, ten children aged between 0–14 and three defaulters and treatment failures. Consequently, a total of 43 cases who had been identified to receive treatment at satellite centres within Mombasa municipality participated in this study. However, the focus of the study was not limited to issues related to the cases sampled but included some professionals and laboratory personnel, namely, the NLTP co-ordinator, clinicians, radiographers and laboratory personnel.

Instrumentation

Three instruments were used collect data from the primary cases; an open-ended interview guide, a survey questionnaire and an observation form. The fourth instrument was an interview guide for professionals used to garner additional information from secondary sources (the NLTP co-ordinator, clinicians, radiographers and laboratory personnel). The interview guide for the cases focused on the following:

- demographic data,
- activities and factors that predispose them to TB infection,
- their own awareness of TB infection and spread,
- their knowledge of the government's free intensive treatment service and
- their understanding of the importance of taking the full course of treatment.

Data collection procedure and analysis

The data collected were both qualitative and quantitative. The qualitative data emerged from observation spanning five months. During this period, the cases, professionals and laboratory personnel were interviewed. Quantitative data were collected from all outpatients, including all defaulters or patients who had absconded and all cases of relapses and newly-diagnosed cases that had tested positive and were advised to go to the satellite treatment centres in their vicinity.

The respondents included males and females ranging from 0 years to over 55 years of age. The target population included persons mainly working and living in Mombasa district who had visited any of the TB satellite centres for screening and treatment of TB between the months of April and August 1997.

In this study, each incoming datum was analysed to understand the emerging theme. For instance, data on all new patients who reported to the centre for clinical screening appeared to support the notion that the highest number of persons severely infected by the TB disease came from the economically productive age group. Furthermore, problems of defaulters and relapse are common among persons age 20–50 years. The observational notes were analysed in conjunction with the data collected from interviews. The characteristics of interest noted during interviews included occupation, income, number of TB-infected persons in the family, nature of living conditions, culture and religious beliefs, type of socialization and access to primary TB-awareness campaigns. These empirical indicators of the possible causes of the re-emergence of the TB disease were recorded and analysed to provide an insight into why this disease is endemic in Mombasa district.

Results and discussion

The purpose of the study was to ascertain the possible causes of the re-emergence of TB and to highlight indicators of possible TB infections in Mombasa district. In this study, all age groups of both male and female TB cases are included to help deduce any possible correlation in the mode of TB transmission. Table I gives a quarterly breakdown of all TB patients in accordance with their gender and age categories. An

Table I: A breakdown of a quarterly report of new TB cases in Mombasa

Gender	Age categories (percentages in brackets)					Total
	0-14	15-24	35-44	45-54	55+	
Male	4 (1)	80 (22)	107 (30)	59 (16)	4 (1)	254 (70)
Female	4 (1)	42 (12)	45 (13)	10 (3)	4 (1)	105 (30)
TOTAL	8 (2)	123 (34)	151 (43)	69 (19)	8 (2)	359 (100)

examination of Table I shows that the age group 0-14 years and 55+ years had an equal number of reported TB cases. In Kenya the 0-14 years group are school-going children while the 55+ group are mostly retired persons and the elderly. This is perhaps the reason why there is a low number of new TB cases within this age group.

One finding from the data is that the trend of reported TB cases from highest to least is in the following order: 1. 35-44 (41%); 2. 15-24 (34%); 3. 45-54 (19%), 4. 0-14 (%), and 5. 55+ (2%). Considering the economically productive age (15-50), a combination of the results of 1. 2. and 3. gives a percentage of over 90 per cent of all TB reported cases, the majority (70%) being male. It is interesting to note that in Kenya TB is prevalent among adult men, unlike in Europe and America where it is more common in adult women (Pratt 1995). In America and Europe most adult women are employed. In Kenya most adult men are employed in urban areas and most of what they earn is not enough to maintain two homes. Consequently they are forced to share overcrowded, low-cost houses with friends and relatives while their wives, who are mostly farmworkers and homemakers, live with the children and older siblings in rural areas. Although there are no data to explain why TB is more common among adult men in Mombasa district, the same situation of overcrowded housing in urban settings is true for Mombasa town. This is supported by the data presented in Table II.

Table II shows that at least one in every two male patients was engaged in one kind of business, and skilled/unskilled public or private work. The women patients constituted a smaller percentage (8%) of those working. Most are involved as food-vendors. This implies that a

Table II: Occupation and housing of cases by gender

Category	Number of cases (% in brackets)					
	Men		Women		Total	
Occupation						
Working/employed	24	(38)	5	(8)	29	(45)
Farmer	3	(5)	0	(0)	3	(5)
Business/vendor	6	(9)	11	(17)	17	(27)
At school	10	(16)	5	(8)	15	(23)
TOTAL	43	(67)	21	(33)	64	(100)
Type of housing						
Permanent	4	(8)	1	(2)	5	(10)
Semi-permanent	18	(35)	7	(13)	25	(48)
Mud	14	(27)	8	(15)	22	(42)
TOTAL	36	(70)	16	(30)	52	(100)

majority of women not only earn a very low monthly income but also work in less crowded places. Moreover, they live in rural areas (away from their husbands) and care for the children and older relatives in more spacious houses. Also, their husbands' visit is usually of short duration of one month's leave or short public holidays. Perhaps the reason why more men than women get TB is because they work and live in crowded and unsanitary conditions (Bobbin 1984).

As Table III shows, most patients are aware that TB is a disease rather than an act of God or the result of witchcraft. A closer look at the data presented in Table II indicates that the majority of cases lived in poor conditions. For instance, 48 per cent and 42 per cent of the cases respectively lived in (rented) semi-permanent and mud houses compared with 10 per cent who lived in permanent houses. More often, water, housing and sanitation conditions in the areas where the cases lived are inadequate because repairs and maintenance depend largely on irresponsible landlords and the poor housing policies. These poor conditions tend to predispose the inhabitants to a high rate of TB

Table III Percentage of categories of cultural practices and religious beliefs held by cases

Category	N of cases	Percentage
1. Cause of TB		
TB germs (Viini vya Kifua Kikuu)	30	70
act of God	3	7
witchcraft	7	16
it is inherited	3	7
2. Acceptance of customs and cultural practices		
family sleeping in one room	8	18
family eating together from one plate	11	26
food remains go to children	12	28
mother sleeps together with child	12	28

infection (Bobbin 1984). The literature is replete with studies indicating that poverty, poor living conditions, overcrowding and lack of medical care leads to a high incidence and endemic pockets of TB. In other words, the re-emergence of TB is closely related to conditions that support the spread of TB from carrier patients to the non-carrier.

In tropical Africa conditions that help the spread of TB have been identified as: a rapid population growth rate; limited housing and recreation facilities and inadequate transport facilities (Holmes 1964, Hughes and Marshall 1974). The high incidence of TB among the economically-productive age group in Mombasa district is not unrelated to the poverty of the victims, that is, those who live below the poverty line and are subjected to overcrowding, malnourishment, poor living conditions and lack of adequate medical care (Evans 1994, Pratt 1995).

The results shown in Table IV suggest that most of the patients are not fully aware of the dangers of the spread of TB and the free services offered by the National Leprosy and Tuberculosis Programme. For instance the data in this table show that most of the cases (62 per cent) sought treatment in private health institutions compared to 38 per cent who went to public health institutions. But it is worth noting that most private practitioners referred them to the appropriate treatment centres.

Table IV: The cases' awareness of TB treatment centres and medical services

Category	N of cases	Percentage
1. Did you seek help in private institutions?		
Yes	27	62
2. How did you learn about Port Reitz/ Coast General/Ganjoni treatment centres?		
through the NLTP campaign	5	12
from a private practitioner	20	47
from a friend	8	19
from a TB patient attending treatment	6	14
from a leaflet	4	8

The results show that the NLTP awareness campaigns have been less effective, although studies indicate that the successful prevention of the recurrence and control of TB is related to effective awareness campaigns aimed at educating the public on the prevention of the spread of TB. This finding corroborates the NLTP co-ordinator's concern that their TB campaign effort through a community-based primary health education was, in fact, inadequate in that they only managed to reach a small population of primary and secondary school children and hold local meetings where leaflets about TB were distributed. Unless the NLTP makes a more concerted effort to reach more people with community-based primary health education, the re-emergence of TB among the economically depressed people in Kenya might escalate rather than decline.

Conclusion

For a number of reasons this study was restricted to the re-emergence of TB among the economically productive age-group in Mombasa. The quarterly report of TB infections in Kenya showed that the disease in this age bracket is rampant (Kibitok 1997) and mobility and social interaction is greater among persons aged 15–50 years who must work to earn the income necessary to support and care for the family (Kibitok

1997). The possibility of infected people transmitting the disease to other members of the family and fellow workmates is very high. This is another potential danger that might exacerbate the re-emergence of TB.

The literature indicates that M. tuberculosis is usually transmitted from one person to another by the respiratory route. Considering that the majority of people in Mombasa not only sleep in the same room but also eat from the same plate, the potential threat of this airborne disease to uninfected susceptible persons is very high.

It is clear, therefore, that a more concerted effort by the NLTP is needed to inform the public. In particular, the role of NLTP in offering effective and free medical services should be prioritized through the mass media such as posters, radio and television, audio-visual programmes and films shows. These efforts will boost public awareness not only of the dangers of the infection and spread of TB but also of the appropriate treatment centres and free medical services.

There are many unanswered questions that await further research. These include the reasons for occurrences of relapses, defaulters and treatment failures (such as the human factor, chronic TB and counter-infection of a disease other than TB) as well as their repercussions. Such studies should also investigate the problems related to drug administration such as the use of too many drugs for a long period of time and multi-drug resistance, to see whether or not there is a link. Also, there is a need to look into the possibility of producing a single dosage that is more patient-friendly to lessen the long time the patient must take to complete the prescribed dosage or treatment regime (Kibitok 1997).

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