

East African Medical Journal Vol. 94 No.9. September 2017

TUBERCULOSIS PREVALENCE IN MBAGATHI DISTRICT HOSPITAL, KENYA

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ABSTRACT

Background: Although health is a fundamental human right, there is a growing concern that this right is not being realized in Africa. This is vindicated by the current preventable disease burdens caused by viral, bacterial, fungal and other infectious agents, especially among the poor. Among these etiological agents, *Mycobacterium tuberculosis*, a bacterium that causes tuberculosis, is the most prevalent. The increase in HIV infections in Kenya has led to continued mortality and morbidity. Moreover, the emergence of drug resistant TB has vastly complicated its management and treatment.

Objective: To determine the prevalence of *tuberculosis* among patients attending Mbagathi District Hospital in Nairobi County in Kenya.

Study design: Examination of patients' record books at a TB laboratory.

Setting: Mbagathi District Hospital, a government hospital located next to Kibera, the largest slum in the city.

Subjects: All patients who attend the hospital's TB clinic from 2009 to 2011, and whose names appeared in the Laboratory *Tuberculosis* record books.

Results: TB is prevalent at Mbagathi Hospital over the period studied was 22.2%. The most affected age group is 21-30 years. Most of the infected patients were males (63%). Most of the highly infected patients were from the Kibera, Mathare and Lang'ata slums.

Conclusion: Tuberculosis is highly prevalent among patients attending Mbagathi district. In this regard, there is high risk of service providers and service users being infected by TB at the hospital. The risk of transmission of this disease especially to the young children and to HIV patients is particularly worrying. There is need for early detection and timely diagnosis of TB which can be achieved by improving diagnostic equipment and training laboratory personnel and by creating awareness about symptoms of TB in communities so that people can visit the hospital for treatment before the disease becomes serious.

INTRODUCTION

Tuberculosis is an infectious disease caused by *Mycobacterium tuberculosis*. It remains a major global health problem (1). It is a disease of global importance with 8.6 million estimated incident cases and 1.3 million estimated deaths (2). According to (3), One-third of world population is estimated to have been infected with *Mycobacterium tuberculosis* and eight million new cases arise each year. Transmission of tuberculosis is virtually entirely nucleus created through

coughing by untreated persons suffering from pulmonary tuberculosis which is the most frequent form of tuberculosis. Infected droplets remain in air for a considerable time and may be inhaled by susceptible hosts (4).

Mycobacterium species is among the major causes of global mortality (1). The disease is a serious problem in many African countries. This is contributed by poor living conditions such as poor housing with inadequate ventilation, malnutrition, civil wars, natural disaster, and

abuse of alcohol, refugees and HIV/AIDS pandemic (6). Since the international organization such as World Health Organization adapted the directly observed treatment, short (DOTS) course strategy in 1994 (5), which is based on the passive detection of cases of smear-positive tuberculosis, this policy has been the foundation of global tuberculosis control. This policy could be one of the major contributors to the decline of TB burden in developed countries such as Cambodia (1). The high increase in MTB infection in Kenya is mostly due to HIV/AIDS pandemic, poverty with social-economic decline including a high slum population in urban areas, malnutrition and inadequate general health services (6). *Tuberculosis* pandemic is increased through delayed diagnosis and some traditional beliefs and practices by some Kenyans (7). In Kenya, the prevalence of TB in the year 2001 and 2002 were 73,071 and 82,114 respectively. This may be due to poor or delayed treatment, failure to acquire the right medication and the problem that TB is asymptomatic at early stage (6). Tuberculosis is a contagious airborne infection, an infected patient can spread bacilli when sneezing, coughing, talking or spitting (8). The risk of becoming infected with this organism is determined by the number of organisms coughed into the air as fine spray of droplets and the time that such aerosols remain in a room where other people are. *Tuberculosis* bacilli can be dormant for four years in the body without causing the disease (8). Laboratory diagnosis of tuberculosis is direct microscopic examination of appropriately stained sputum specimens for tubercle bacilli. 500 to 1000 tubercle bacilli per milliliter of sputum are required for direct microscopy to be positive and

only a portion of tuberculosis patients harbor large enough number of organisms to be detected this way. Pulmonary Tuberculosis usually occurs in apex of the lungs. These develop cavities which contains large population of tubercle bacilli that can be detected in sputum specimen. Pulmonary tuberculosis is suggestive by persistent productive cough for three weeks or longer, weight loss, night sweats and chest pain.

MATERIALS AND METHODS

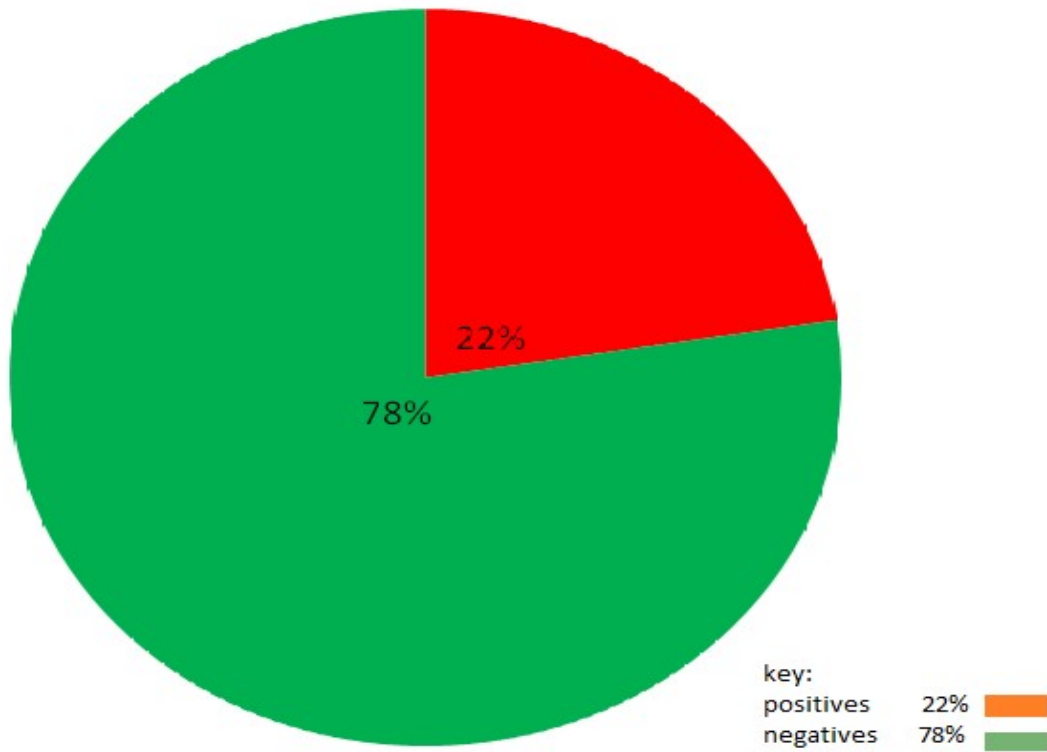
Mbagathi District hospital is located on the western side of the city center near the Memorial Forces in Lang'ata constituency. It is situated 500 meters from Kibera with an altitude of 1661m above the sea level 76°s, 36048'E. It is a district level hospital that not only serves people within the district but also in the entire city. Moreover, it serves as a referral base to Kenyatta National Hospital. The facility treats all manner of conditions especially chest infections. A cross-sectional and time series data collection design was used to obtain administrative or record data to determine the prevalence of *Mycobacterium tuberculosis* among patients attending Mbagathi District Hospital. The hospital's TB laboratory records for 200 patients were examined for the period 2009-2011.

RESULTS

General prevalence of tuberculosis in Mbagathi District Hospital. Prevalence of TB in Mbagathi was 22.5% (45/200) positive and 77.5% (155/200) negative as shown in figure 1 below.

Figure 4.1

General prevalence of tuberculosis in Mbagathi District Hospital.



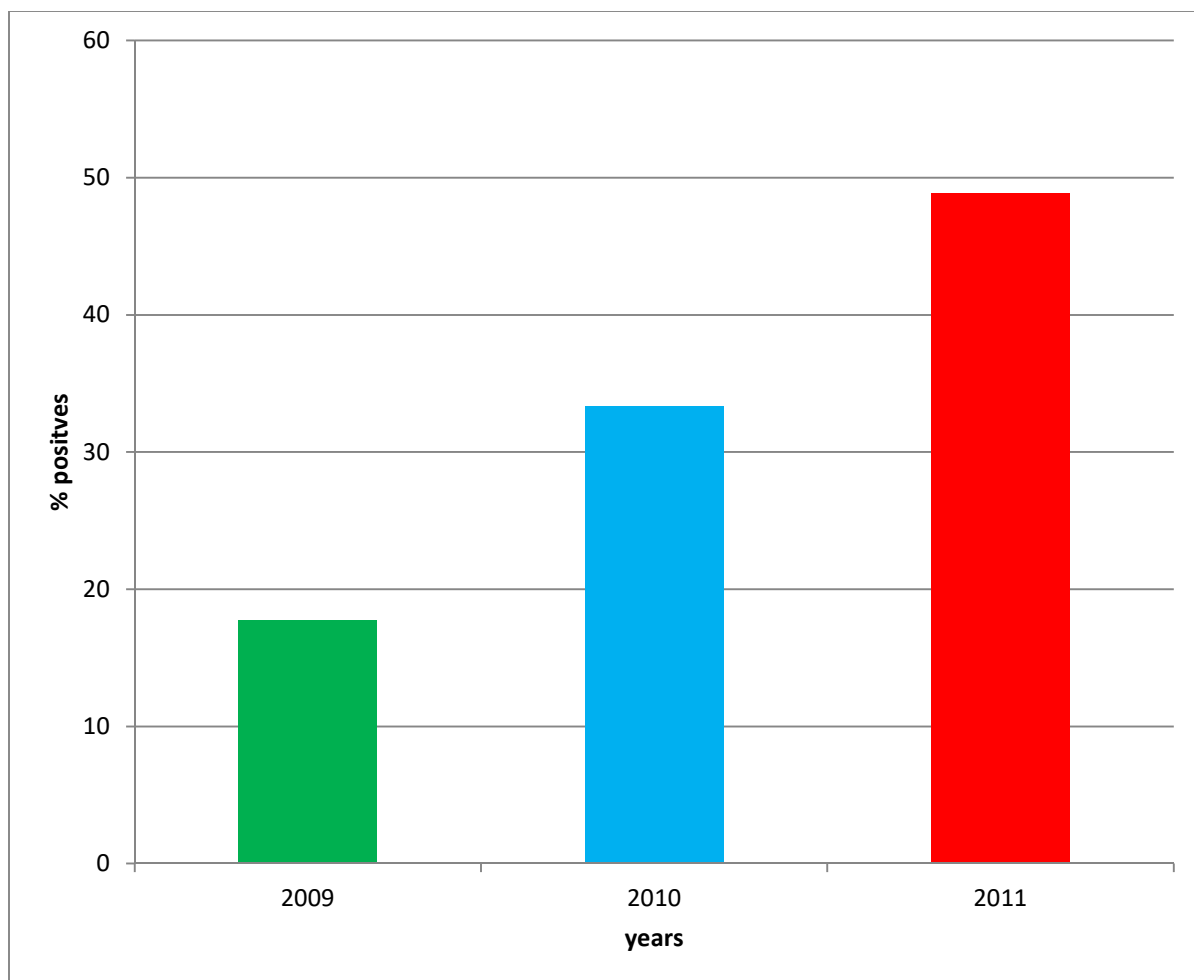
4.2

Prevalence of tuberculosis, 2009-2011

The prevalence of TB was 17.77% in year 2009, 33.33% in year 2010, 48.88% in year 2011 respectively as shown in figure 2 below.

Figure 2

Prevalence of tuberculosis, 2009-2011.



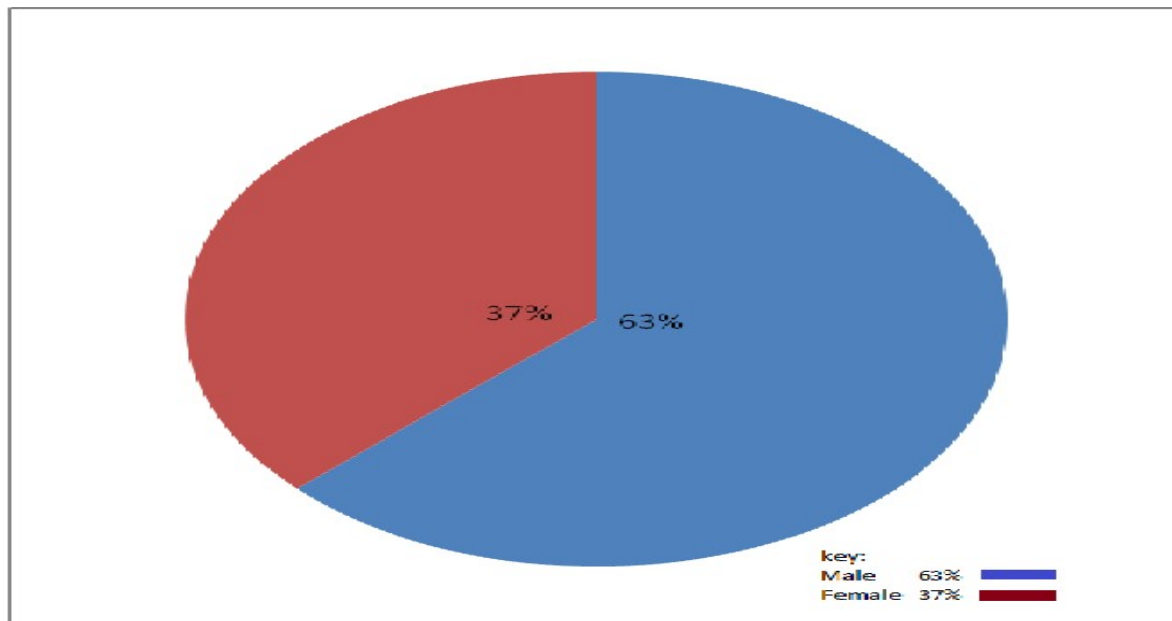
4.3

Tuberculosis distribution according to gender

The percentage prevalence of TB according to gender was 63% (34\54) male and 37% (20\54) females as shown in figure 3 below.

Figure 3

Tuberculosis distribution according to gender



4.4

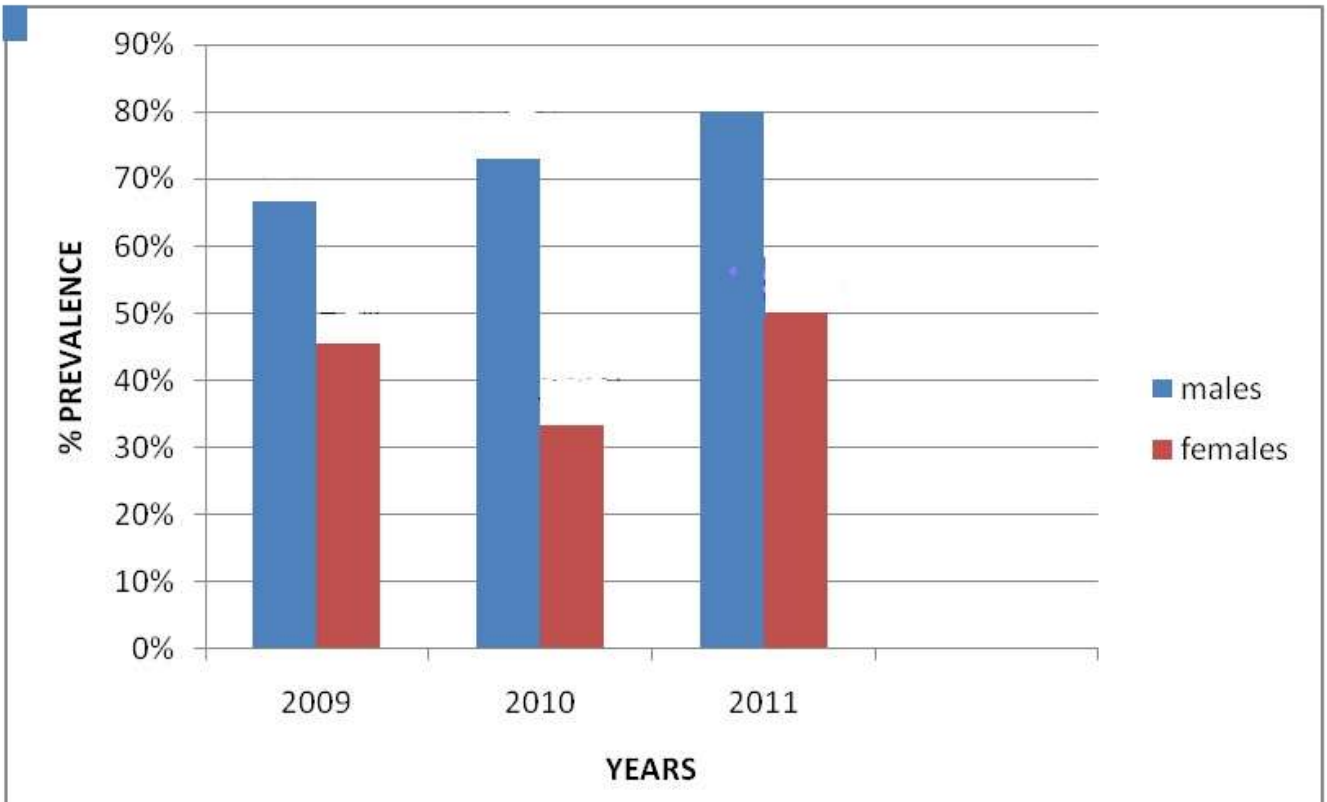
Comparison of TB prevalence by gender from 2009 to 2011

Comparison of prevalence according to gender in the three consecutive years indicated that 66% of the males and 45.45% of the females were infected in the year 2009, 73.07% male and 33.33%

females were infected in year 2010, 80% males and 50% females were infected in the year 2011 as shown in figure 4 below.

Figure 4

Comparison of TB prevalence by gender and year

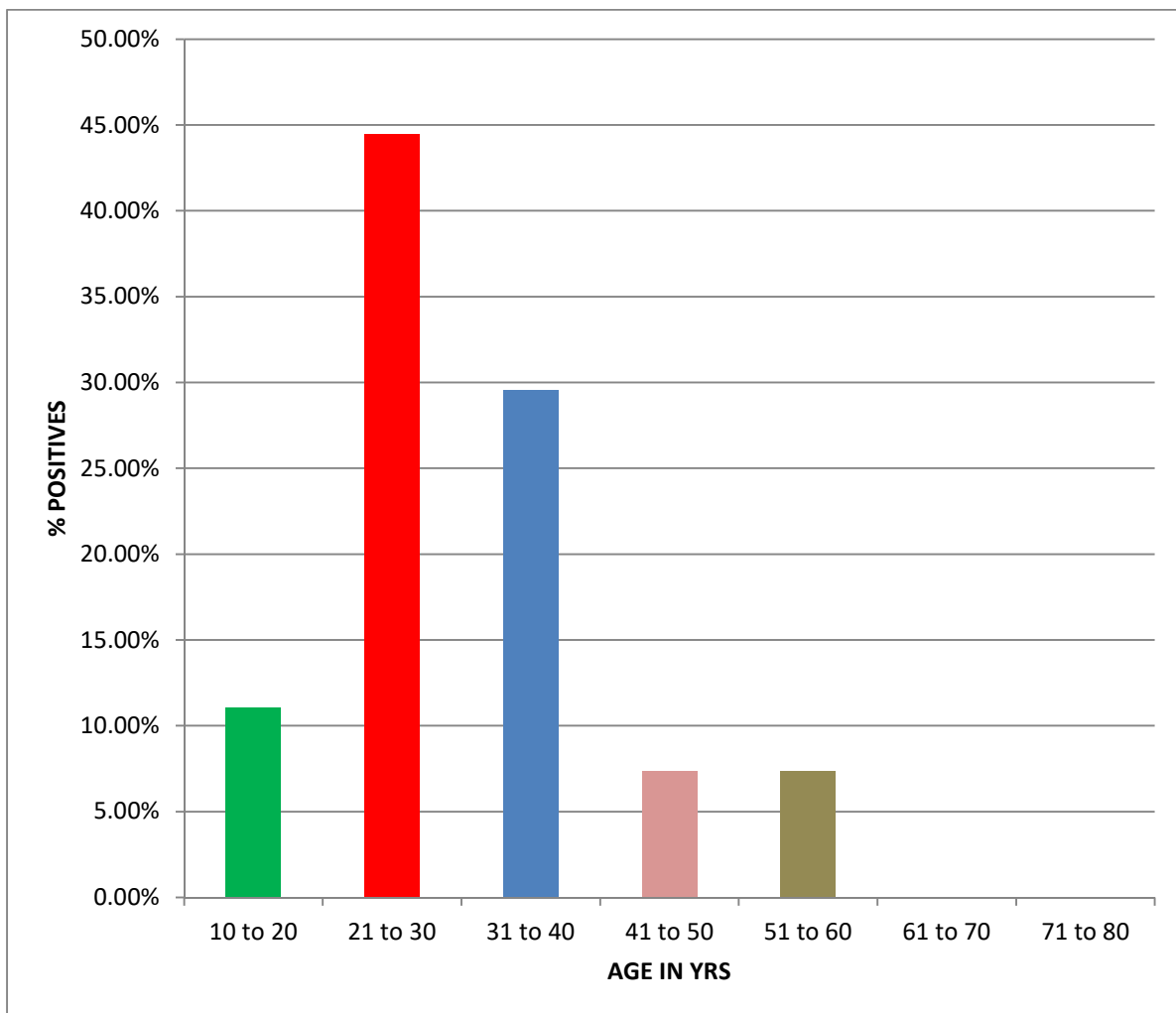


4.5

Tuberculosis distribution according to age

Tuberculosis distribution according to age indicated that (11.1%) of the infections affected ages between 10-20, (44.5%) of the infections affected ages between 21-30, (29.6%) of the ages

affected ages between 31-40, (7.4%) between ages 41-50, (7.4%) between ages 51-60 as shown in figure 5 below.

Figure 5*Tuberculosis distribution according to age*

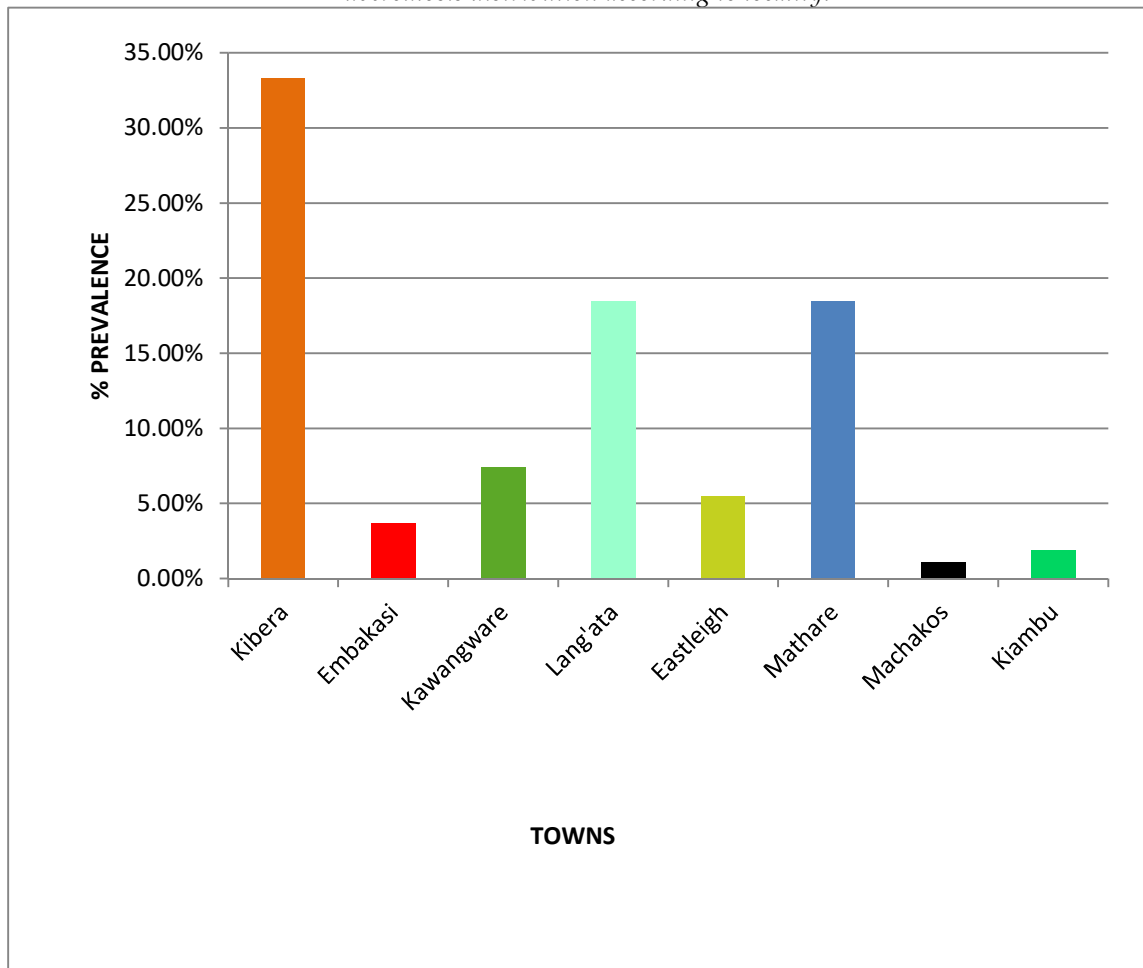
4.6 Tuberculosis distribution according to locality

The results obtained indicate that 33.3% of infected respondents come from Kibera, 3.7% came from Embakasi, 7.4% came from Kawangware, 18.5% came from Lang'ata, 5.5%

came from Eastleigh, 18.5% came from Mathare, 1.11% came from Machakos, and 1.9% came from Kiambu as shown in figure 6 below.

Figure 6

Tuberculosis distribution according to locality.



DISCUSSION

From this study, the prevalence of tuberculosis is 22 %. This is a clear justification that even after putting in place guidelines on how to curb this burden it is still not satisfactory. According to (10), the prevalence of tuberculosis burden in Kenya among the twenty-seven counties is at 40% which agrees with the findings of reported here. However, the distribution of tuberculosis is not uniform across the globe; about 80% of the population in many Asian and African countries test positive in tuberculin tests, while only 5–10% of the US population test positive.

This shows that the prevalence of TB is higher in developing countries and Kenya being one of the countries is in this bracket as compared to developed countries (11). Globally the prevalence of tuberculosis has reduced to 18% (11) as compared to 2000 but even with these reduction, TB remains one of the world's biggest threats. This also possible due to HIV infections and the neglect of TB control programs that have enabled the disease to thrive for long. The emergence of drug-resistant strains has also contributed to this new epidemic (11). According to this study, there was a steady increase in prevalence of TB from 2009-2011 and this concurs with the study done by Kenya country team of tuberculosis that showed the number of TB cases among all people attending the hospital increased from 8% to 11% over the last five year period between 2007-2012 (12). Due to this prevalence of TB, the proportion in HIV-infected patients with active TB infection rose from 18% to 27% over the same period which also concurs with the findings of this study.

This agrees with the research done in the last four-year period by Division of Leprosy Tuberculosis and Lung Diseases (DLTLD) which found out that TB case notification has been increasing at an average of 16% annually. Factors such as poverty and social deprivation that has led

to mushrooming of peri-urban slums, congestion and limited access to general health services might have contributed to this large TB disease burden. Recently, there have been increasing concerns about the emergence of drug resistant TB, a threat that would pose major challenges in the fight against TB in a resource limited country like Kenya (13).

It is also suggested that patients come for diagnosis in the late stages of the disease as a result of ignorant or lack of information (13). This is because during the early stages of tuberculosis the symptoms are not fully developed and in most cases it's taken as normal cold or flu. Elsewhere (14) had a similar view that major factors responsible for the large TB disease burden in Kenya is the concurrent HIV epidemic among other factors such as poverty and social deprivation that has led to a mushrooming of urban slums, congestion in prisons and limited access to general health care services.

Data from this study revealed that tuberculosis affects both genders with males being more prone to tuberculosis than females. This agrees with studies done by National Leprosy Tuberculosis Program which found out that out of 200 people 150 males will test positive (10). The reasons behind this rate among men has been associated with factors such as smoking, alcoholism, male sex, silicosis among other factors (20). Elsewhere, (15) had a similar view and according to the survey findings in Tanzania male were found to be affected by tuberculosis than women. According to (15) malnutrition, overcrowding, diabetes and other risk factors might have contributed to this rate.

In agreement, (11) reported a similar trend in the year 2010 where males were more prone to TB than females because of their lifestyle that exposes them to the risks of infection.

The big difference between the males and females is due to the fact that males have a migratory lifestyle to urban areas in search of employment and for better business opportunities in the process, most of them end up living in poor housing conditions in slum areas which have poor ventilated houses that are overcrowded hence making them more vulnerable to get tuberculosis infection. According to the study done by (16) in west Africa, males' lifestyle such as smoking, abuse of drugs such as khat consumption, alcohol and even poor nutrition and needles using among intravenous drug users put them at high risk of develop the infection more than females.

A similar view was held by (17) that males have for long been involved in risk behaviors that expose them to contacting tuberculosis as compared to women which leads to this trend. The most affected age group according to this study fell between 21-30 years of age with a mean age of 33 years and a mode age of 30 years. The reason behind this trend has been attributed to the fact that this is the most sexually active age and the most economically productive age (18). As a result of sexual activity, this age group is more prone to acquire HIV infection thus making them more vulnerable to co-infection with TB. This results concurred with what is reported by (16) who found out that TB in Kenya affects all age groups but with a peak age of 20-30 years.

According to the study done by (19), Tuberculosis remains a major cause of morbidity and mortality in Kenya and it affects all age groups, but has its greatest toll in the most

productive age group of 15 to 44 years which articulates with the results obtained. National Leprosy and Tuberculosis Program (NLTP) found out that household contacts, especially of the productive age-groups, were infected five to ten times more frequently and experienced a prevalence of active pulmonary tuberculosis five to ten times greater than did the general population from which they were derived (13).

The information from this study shows that the most affected people came from localities such as Kibera, Mathare and Kawangware. These localities are slums and harbor large number of both low and middle level income status. As a result of this, these slums become congested and the unconducive for leaving. Moreover, sanitation in these localities and poor disposal of wastes as well as water contamination expose these residents to communicable diseases such as tuberculosis (21). Kibera had a higher prevalence because it the largest slum in the country and it is overcrowded with people and as a result, the disease spreads easily (21).

Other factors such as poverty which modulate the risk of infection because of lack of finances to purchase the required balanced diet food stuffs may lead to high TB prevalence. The study done by (8) found out that among immigrants in South Africa, were found to have an 8.5 fold increased risk of tuberculosis, compared to Muslims who ate meat and fish daily. According to Elliot, this increased risk could be caused by micronutrient deficiencies possibly from iron, vitamin B12 or

vitamin D. Localities such Lang'ata recorded a high TB prevalence because it borders Kibera slum and `since TB is an airborne disease, it could be spread easily to the neighborhood thus infecting the other people who live near Kibera slums. This concurs with (22) reported that when people suffering from active pulmonary TB cough, sneeze, speak, sing, or spit, they expel infectious aerosol droplets which are transmitted in air. CDC reports show that the infectious dose of tuberculosis is very low and inhaling fewer than ten bacteria may cause an infection which also indicate that TB spreads easily through the air (23). The TB prevalence in these other localities of Embakasi, Eastleigh, Machakos, and Kiambu may be due to poverty, medically under-served patients due inadequate health facilities that offer TB diagnosis and treatment. Distance from the hospital facility for diagnosis may also be a contributing factor to this prevalence. It may also be as a result of coming for diagnosis in the late stages of the disease as a result of ignorance and lack of information about the disease. Since these towns experience congestion at times it may also have contributed to this prevalence. This agrees with the research done by (23) who reported that the contributing factors to the prevalence of TB in Kenya were lack of health facilities, lack of information about the disease, combined with high rates of poverty in some communities.

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