# Trends of Leprosy Notification from 2007 to 2012 in Msambweni District, Coastal Kenya

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*Abstract:*
*Background: Leprosy is a chronic disease caused by Mycobacterium leprae, and can result in permanent disability.  In Africa the prevalence is 0.8 per 10,000 persons. Msambweni district in coastal Kenya noted an increase in leprosy cases during recent years. We conducted an investigation to characterize the cases and establish the case detection rate and prevalence.*
*Methods: We retrospectively reviewed the leprosy cases from Msambweni District in Kenya from 2007-2012. A case of leprosy was defined clinically as a patient who had skin patches and enlarged peripheral nerves. Demographic and clinical data were extracted from the register.*
*Results: We captured 111 cases, resulting in a case detection rate of 7.4 per 100,000 persons. The median age was 42 years (range: 5-80 years); 73 (66%) were males. Multi-bacillary leprosy was reported in 103 (95%) patients while 6 (5%) had pauci-bacillary leprosy. Two cases were not classified. Majority of the cases reported lacked information on laboratory diagnosis. In terms of treatment, 87 (78%) were new patients, 15 (14%) were relapses, 8 (7%) had resumed treatment, and 1 (1%) was a transfer. Forty-four (41%) had grade two disability at the start of treatment, 31 (29%) had grade one, and 32 (30%) had no disability. Sixty-one (68%) recovered, 20 (22%) were lost to follow-up, 7 (8%) were transferred out, and 2 died (case fatality rate of 2%).*
*Conclusion: The burden of leprosy in Msambweni is exceedingly high, reflecting that leprosy continues to be a problem in Kenya. Majority of patients sought treatment after developing disabilities, and many are lost to follow-up. Public health efforts should increase community and healthcare worker knowledge of the disease to improve timely detection and treatment. Defaulter tracing efforts should be enhanced to minimize patients lost to follow-up.*

*Keywords: Leprosy, epidemiology*

## 1. Introduction

Leprosy is a chronic infectious disease caused by bacteria, *Mycobacterium leprae*. The bacillus multiplies very slowly leading to the long incubation period of 5 to 8 years (1). The bacillus causes inflammatory reactions damaging the skin and peripheral nerves. Untreated, leprosy can cause progressive damage to the skin, nerves, limbs and eyes. Early diagnosis and treatment with multidrug therapy remain the key elements in controlling the disease (2). Leprosy prevalence at the beginning of 2012, new cases detected were 219,075 with a case detection rate of 4.06 per 100,000 persons and prevalence of 0.34 per 10,000 persons.

In Africa 12,673 cases were diagnosed in 2011 with a case detection rate of 3.14 per 100,000 persons. In Kenya, just like other countries, the true prevalence and incidence of leprosy is not known, however, the number of new cases has been on the decline from 630 cases reported in 1986 to 126 reported in 2010 (3) . The prevalence in Kenya as at 2010 was 0.04 per 10,000 persons while the case detection rate was 0.3 per 100,000 persons. There are some notable areas where the cases have remained high despite the decline in number of cases in other parts of the country. Msambweni sub-county  is one of those areas.

The purpose of this study was to establish the case detection rate of leprosy in the sub-county within  a four year period  from 2007 to 2011 and to characterize the patients.

## 2. Methods

### 2.1. Study Site
Msambweni sub-county is found in Kwale, a county in south coast Kenya. It has a population of about 323,330 (ref). The indigenous population is mainly the Digo of the Mijikenda community. The main economic activities are fishing farming and tourism. The sub county has 20 government facilities and 12 private health facilities.

### 2.2. Study Population
The study population was the leprosy patients attending the leprosy clinics within Msambweni District from January 2007 and December 2012. The study included all the patients that were seen at the clinics during the study period. Patients not residing in Msambweni district were excluded from the study.

### 2.3. Case Definitions
Leprosy -. A case was defined as a patient who had skin patches and enlarged peripheral nerves. Paucibacillary (PB) was defined as less than 5 leprous lesions whereas multibacillary (MB) was defined as more than 5 lesions.
The grade of disability was done using the WHO disability grading scale:

#### 2.3.1. Hands and Feet
- Grade 0: no anaesthesia, no visible deformity or damage
- Grade 1: anaesthesia present, but no visible deformity or damage
- Grade 2: Visible deformity or damage present

#### 2.3.2. Eyes
- Grade 0: no eye problem due to leprosy, no evidence of visual loss
- Grade 1: eye problems due to leprosy present but vision not severely affected (can count fingers at 6 meters)
- Grade 2: severe visual impairment (inability to count fingers at 6 meters), lagophthalmos, irrido cyclitis and corneal opacities.

#### 2.3.3. Patient Categories
The patients were classified into 4 categories. New patients were patients who have never been treated before, Relapsed patients were patients who have received treatment and were declared cured but have a re-infection. Transfer in were patients who registered in another sub-county and reported to another sub-county for continuation of treatment. Treatment resumed were patients who interrupted their treatment and were declared out of control but resumed treatment. Out of control patients were patients who had missed taking their leprosy drugs for 12 months.

#### 2.3.4. Outcome of Treatment
The outcome of treatment were categorized into 4. Released from treatment refered to a patient who had completed the treatment as required. Out of control was patient who had not attended twelve consecutive clinics and all efforts to motivate him/her to attend the clinic have failed. Transfer out was a patient who was transferred to continue treatment in another region. Died referred to a patient who died during treatment irrespective of the cause of death (1).

### 2.4. Study Design and Measurements
We did a retrospective descriptive record review of the Msambweni District leprosy register. We included all cases registered from 2007 to 2012. Data was collected using a standard abstraction form
Data on demographic variables such as age, sex, the clinic attended and address, clinical information such as date of inititation of multidrug treatment, category of patient treatment, disability grade at the start of treatment, disability grade at the end of treatment and outcome of treatment was collected.

### 2.5. Data Analysis
The data was entered, cleaned and analyzed using Epi Info version 3.5.3 and Microsoft excel 2007. We calculated proportions for categorical variables and means and medians for continuous variables.

### 2.6. Ethical considerations
The analysis presented in this report consists only of secondary unlinked data hence no contact with human subjects occurred. Prior to the commencement of the study, clearance to conduct the study was obtained from the district tuberculosis and leprosy coordinator Msambweni District and the provincial director of public health and sanitation, Coast Province.

## 3. Results
One hundred and eleven cases of leprosy were notified from 2007 to 2012. There were 73 (66%) males. The median age was 42 years (range: 5-80 years). Age 31 to 40 years was the commonest with 28 (26 %) followed by 41 to 50 years with 23 (21%). One hundred

and three (93%) had multi-bacillary leprosy and 6(6%) had pauci-bacillary type. Eighty seven (79%) were new patients while 15(14%) were patients who had relapsed and one was transferred. All the cases lacked information on laboratory confirmation. Out of the 107 patients who had their disability graded at the point of diagnosis 32(30%) had grade 0 disability while 31(29%) had grade 1 disability and 44(41%) had grade 2 disability. Two patients died representing a case fatality rate of 2%, 20(22%) went out of control, 61(68%) recovered from treatment and 7(8%) were transferred out of the district to seek treatment elsewhere (Table 1).

The prevalence of leprosy in 2007 with 29 cases was 10.3 per 100,000 persons. In 2008 it declined to 6.3 per 100,000 population then rose again in 2009 to 7.9 per 100,000 persons. It declined further in 2010 to 7.7 per 100,000 persons. The rate once again declined in 2011 to 5.1 per 100,000 persons (Table 2).

In terms of age and early or late presentation the lower age groups presented to the facility before disability set in while the higher age groups presented to the facility when the disability was at either grade 1 or 2. The distribution between early and late presentation in both sexes was about 1:2 for the early to late ratio. Multi bacillary leprosy had the majority of grade 1 or 2 at 74% while paucibacillary leprosy had the greater proportion of grade 0 presentation at 83%. New patients presented more in the late stages at 71% presenting at grade 1 or 2. Relapsed were also seen more in grade 1 or 2 at 93%. The transferred in-patient was at grade 0. Of the 8 patients who resumed treatment 7 (87%) were at grade 1 or 2 disability level. On outcome, the 2 patients who died were at disability grade 1 or 2. Thirteen (65%) of the patients who went out of control were at grade 1 or 2 of disability. Majority (75%) of the patients who recovered were in grade 1 or 2 (Table 3).

## 4. Discussion
We found that the case detection rate of leprosy in Msambweni district is high at 7.4 per 100,000 as compared to 0.3 per 100,000 persons for the rest of the country (3). This denotes a higher chance of transmission of leprosy in Msambweni than the rest of the country. This is more than double the rate found in Sohag governorate in Egypt which was at 3.1 per 100,000 persons (4). In a study done in China the case detection rate was found to be 0.477 per 100, 000 in the southern western provinces (5). The yearly prevalence rate has been on the decline which is in line with the trends in other parts of the world as shown in Japan (6). The trend worldwide has been a gradual decline in the case detection rate (7)

We also found a high proportion of the patients presented at the clinics late when they already had the disability grade 1(29%) or 2(41%). The proportion of patients with grade 2 disability has been used to show the delays in detection of the cases. Globally this rate has been about 21% (4). In Kenya this rate has been at 21% as at 2010 (3).Twenty two percent of patients were lost to follow up and declared out of control. The high number could be due to poor follow up of patients at the clinics. This is higher than the national average which was at 9 percent in 2008 (7). This may explain the high prevalence of leprosy in the district as the patients lost to follow up may be sustaining the transmission of the disease within the community. The percentage of patients with multibacillary leprosy was also high at 94% which compares with the national average at 89% (2). There are varying figures globally. This may have an impact on the transmission of the disease as multibacillary has a higher chance of transmission.

Limitations noted in this study were that the study was a retrospective record review and that some data fields were missing in some records leading to incomplete records that could not be obtained.

## 5. Conclusions and Recommendations
The burden of leprosy in Msambweni is high, reflecting that leprosy continues to be a problem in Kenya. Majority of patients sought treatment after developing disabilities, and many are lost to follow-up. Public health efforts should increase community and healthcare worker knowledge of the disease to improve detection and timely treatment. Defaulter tracing efforts should be enhanced to minimize patients lost to follow-up.

## 6. Acknowledgments
We acknowledge the District Health Management Team, Msambweni

## 7. Competing Interests
We declare that we have no competing interests

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**Annexure**

| Age | Categories | Count | Percentage |
|---|---|---|---|
| | 1-10 | 2 | 2 |
| | 11-20 | 5 | 5 |
| | 21-30 | 17 | 16 |
| | 31-40 | 28 | 26 |
| | 41-50 | 23 | 21 |
| | 51-60 | 15 | 14 |
| | 61-70 | 12 | 11 |
| | 71-80 | 7 | 6 |
| **Sex** | | | |
| | Female | 38 | 34 |
| | Male | 73 | 66 |
| **Type of leprosy** | | | |
| | Multibacillary | 103 | 94 |
| | Paucibacillary | 6 | 6 |
| **Type of patient** | | | |
| | New | 87 | 78 |
| | Relapse | 15 | 14 |
| | Transfer in | 1 | 1 |
| | Resumed treatment | 8 | 7 |
| **Disability** | | | |
| | Grade 0 | 32 | 30 |
| | Grade 1 | 31 | 29 |
| | Grade 2 | 44 | 41 |
| | | | |
| **Outcome** | | | |
| | Died | 2 | 2 |
| | Out of control | 20 | 22 |
| | Recovered from treatment | 61 | 68 |
| | Transfer out | 7 | 8 |

*Table 1: Characteristics of the leprosy patients in Msambweni 2007 to 2011*

| Age | Grade 0=n(%) | Grade 1 or 2 |
|---|---|---|
| 1-10 | 2(100) | 0(0%) |
| 11-20 | 4(80) | 1(20%) |
| 21-30 | 10(59) | 7(41%) |
| 31-40 | 8(29%) | 20(71%) |
| 41-50 | 3(13%) | 20(84%) |
| 51-60 | 1(7%) | 14(93%) |
| 61-70 | 1(8%) | 11(92%) |
| 71-80 | 1(13%) | 6(83%) |
| | | |
| **Sex** | | |
| Female | 12(32%) | 26(68%) |
| Male | 20(29%) | 49(71%) |
| | | |
| **Type of leprosy** | | |
| Multibacillary | 27(26%) | 76(74%) |
| Paucybacillary | 5(83%) | 1(17%) |
| | | |
| **Type of patient** | | |
| New | 28(29%) | 59(71%) |
| Relapse | 1(7%) | 13(93%) |
| Transfer in | 1(100%) | 0(0%) |
| Resumed treatment | 1(13) | 7(87%) |
| | | |
| **Outcome** | | |
| Died | 0(0%) | 2(100%) |
| OOC | 7(35%) | 13(65%) |
| RFT | 15(25%) | 46(75%) |
| Transfer out | 4(57%) | 3(43%) |

*Table 2: Comparison of characteristics of the population and grade of disability at the start of treatment of leprosy cases in Msambweni district 2007 to 2011*
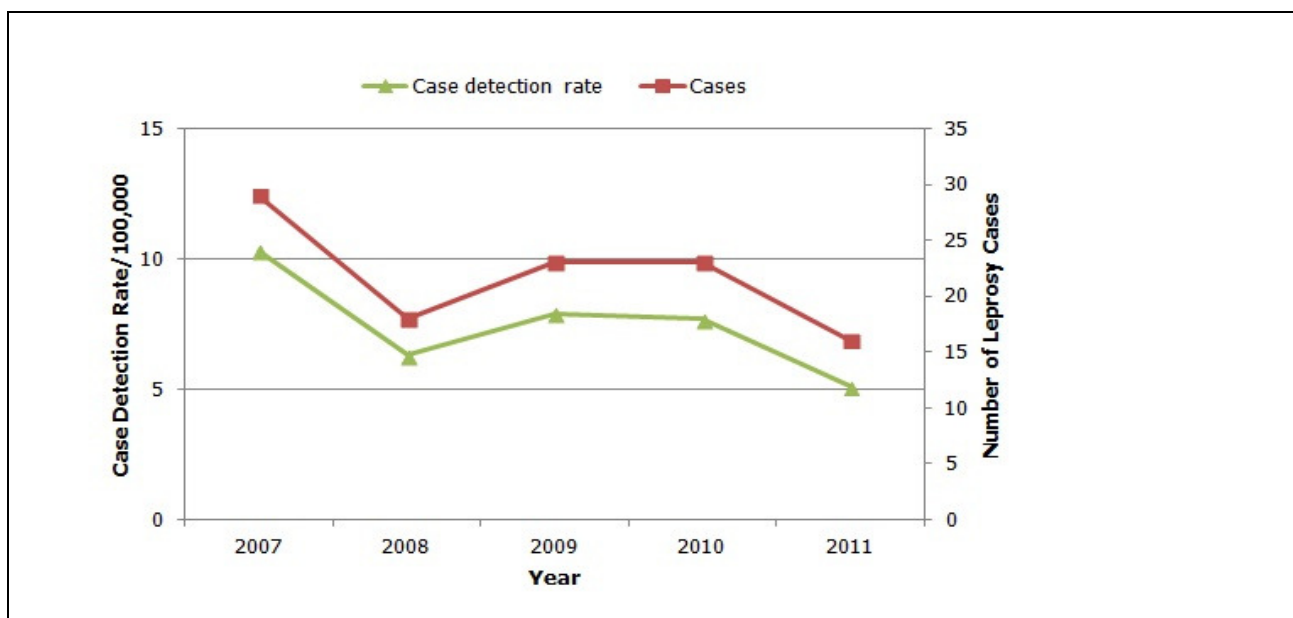


*Figure 1: case detection rate for Msambweni District 2007 to 2012*