International Journal of Infectious Diseases 30 (2015) 135–141

Contents lists available at ScienceDirect

International Journal of Infectious Diseases

journal homepage: www.elsevier.com/locate/ijid

Battling tuberculosis in an island context with a high burden of communicable and non-communicable diseases: epidemiology, progress, and lessons learned in Kiribati, 2000 to 2012☆

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ARTICLE INFO

Article history:
Received 27 August 2014
Received in revised form 14 November 2014
Accepted 25 November 2014

Corresponding Editor: Eskild Petersen, Aarhus, Denmark

Keywords:
Tuberculosis
Kiribati
Pacific
Island
Epidemiology
Lessons learned

SUMMARY

Objectives: To examine the epidemiology of tuberculosis (TB) in Kiribati from 2000 to 2012, document lessons learned, and recommend ways to mitigate the burden of TB in Kiribati.
Methods: A descriptive study was performed using data on TB case notifications, prevalence, incidence, mortality, and treatment outcomes from global reports and data files. Progress towards meeting the Millennium Development Goal TB target (to reduce TB incidence by 2015) and the Regional Strategy to Stop Tuberculosis in the Western Pacific 2011–2015 targets (to reduce TB prevalence and mortality by half by 2015 relative to the level in 2000) was examined.
Results: TB case notifications and the estimated incidence and prevalence have increased in Kiribati since 2000. From 2000 to 2012, Kiribati reported a total of 3863 TB notifications; in 2012, the case notification rate was 343/100 000 population. The majority (89%) of TB patients complete treatment and/or are cured, and the estimated TB mortality rate has remained relatively stable at around 16/100 000 population. HIV testing of TB patients has increased over recent years from 8% of notifications tested in 2003 to 43% tested in 2012. Of all 818 tests, only four (0.5%) patients were confirmed HIV-positive. Drug-resistant TB has been detected in a small number of cases.
Conclusions: TB rates continue to increase in Kiribati and the 2015 goals for TB control are unlikely to be met. This is probably due to the complex mix of risk factors present in Kiribati, including smoking, diabetes, alcohol use, crowded living, and poverty. A comprehensive approach to address these risk factors is needed to mitigate the burden of TB in Kiribati.

1. Introduction

Kiribati is an independent republic in the central Pacific Ocean. It is spread across 3.5 million square kilometres of ocean and consists of 32 low-lying coral atolls, of which 24 are inhabited.[1] The population of Kiribati is 103 058, and the inhabitants are of Micronesian descent. There has been a significant amount of urbanization over recent years,[2] and the majority of people live in Tarawa Atoll, with 49% of the national population located in the capital, South Tarawa.[1,3] Kiribati is classified as a lower-middle-income country and has a GDP per capita of USD 5700/year (2011). The estimated life-expectancy at birth for males is 58 years and for females is 66 years (2010).[4] The infant mortality rate is 45 deaths/1000 live-births.[2]

Kiribati has a national TB programme (NTP) which has adopted the internationally recommended TB strategy – directly observed treatment, short course (DOTS) – and provides free and equitable access to treatment.[5] The World Health Organization (WHO) has a 'Stop TB' regional strategy for the Western Pacific Region (2011–2015), which is aligned to the Global Plan to Stop TB 2006–2015 and the Millennium Development Goals (MDGs).[6]

The TB case notification rate in Kiribati is among the highest in the WHO-designated Western Pacific region, and concerted efforts

☆ Dedicated to the memory to Dr Kenneth Tabutoa (recently deceased).

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http://dx.doi.org/10.1016/j.ijid.2014.11.025

are under way to reduce its TB burden. This paper is a part of those efforts and examines the epidemiology of TB, progress towards global and regional targets, lessons learned, and ways forward for mitigating the burden of TB in Kiribati.

1.1. The national TB programme in Kiribati

The Kiribati NTP uses both passive and active case-finding to identify persons with TB. Active case-finding in Kiribati includes TB contact tracing of household members and immediate neighbouring households of patients found to be smear-positive. It also screens people living with HIV, prisoners, and people with diabetes. In addition, there is a community TB screening programme in villages with a higher than average case notification of TB. The NTP has a dedicated TB laboratory, co-located with the TB Control Centre.

Pulmonary TB (PTB) is diagnosed primarily using sputum smear microscopy, which involves the collection of three sputum specimens. Patients who return a positive smear are registered and enrolled on TB treatment, and those with a negative smear have a chest X-ray and are reviewed by a clinician.

The TB laboratory has recently introduced TB culture, which is requested for (1) patients who have multiple negative sputum smears but clinical and radiological support for a diagnosis of TB, (2) patients with concomitant HIV, (3) patients with a moderate to strong clinical suspicion of HIV/AIDS, but for whom confirmation has not been obtained and there is a moderate to strong suspicion of TB, (4) patients who are still smear-positive at 2 months, (5) paediatric cases where respiratory secretions can be collected, and (6) symptomatic contacts of a known drug-resistant TB case. Respiratory samples from all symptomatic previously treated cases and those with PTB who are smear-positive after 3 months of treatment are sent to the Supranational TB Reference Laboratory in Adelaide, South Australia for culture and drug susceptibility testing (DST). Patients with suspected extrapulmonary TB (EPTB) are diagnosed on the basis of X-ray findings and clinical examination; samples from lymph node and ascitic fluid are occasionally examined for acid-fast bacilli (AFB).

Most TB cases are referred to South Tarawa for diagnosis, as the outer islands do not have laboratory capacity. However, if a patient cannot travel to South Tarawa, and if sputum is able to be collected, the sputum specimens are sent to South Tarawa for analysis. When diagnosed, TB patients receive treatment in South Tarawa for the initial phase of treatment (2 months). The hospital in South Tarawa has a dedicated TB ward, and patients are only hospitalized if clinically indicated. Most TB treatment in Kiribati is through community-based treatment and care. This is for the duration of the initial phase of treatment. Community-based treatment and care involves daily visits by a nurse or community DOT worker (CDW) to supervise TB treatment and monitor for clinical response to treatment and side effects. In South Tarawa, community-based treatment and care involves patients being treated at home, or, if they are in South Tarawa from the outer islands, living temporarily with family members in the South Tarawa community, or in a TB 'maneaba' (a traditional i-Kiribati meeting house).

2. Methods

2.1. Source of data

The WHO Global Tuberculosis Report 2013 was the data source for this analysis. The Kiribati NTP uses all WHO definitions and uses structured recording and reporting mechanisms to capture data from the TB laboratory and the NTP. The Programme reports case notifications (including drug-resistant and HIV-related TB) and treatment outcomes to the WHO on an annual basis and these data are published in the annual WHO global TB reports and as data files on the WHO website.[7,8] This is actual measured data.

On the other hand, actual measured data on prevalence, incidence, mortality, and case detection are unavailable, and thus estimates are made by the WHO. The details on how these are derived can be found in the global TB reports, scientific publications, and on the WHO website.[7,9] In brief, incidence is estimated through an expert opinion process facilitated by the WHO and decisions are based on the analysis of TB notification and programmatic data.[7] Prevalence is estimated using incidence and duration estimates.[7] The case detection ratio (CDR) is estimated by dividing the number of TB case notifications by the estimated number of incident cases of TB. Mortality also needs to be estimated by the WHO as Kiribati does not have a national vital registration system with adequate coverage and completeness to provide an accurate estimate.[7]

2.2. Analysis

Data (2000–2012) on case notifications, including drug-resistant and HIV-related TB, prevalence, incidence, mortality, and treatment outcomes (2000–2011) were extracted from the WHO global TB reports and data files.[7,8] For the purpose of better informing the NTP planning and policy, we worked with key members of the NTP to undertake an in-depth analysis and interpretation of these tabulated data. The case notifications included all new and relapse cases. Age-specific case notification rates per 100 000 population were calculated using the age-specific number of pulmonary smear-positive case notifications divided by the age-specific average population for the same period.[10] Prevalence, incidence, mortality, and case detection estimates were compiled from the WHO Global Tuberculosis Report 2013.

Treatment outcomes were defined by the WHO as follows: (1) cured: a patient who was initially sputum smear-positive and who was sputum smear-negative in the last month of treatment and on at least one previous occasion; (2) completed treatment: a patient who completed treatment but did not meet the criteria for cure or failure; (3) died: a patient who died from any cause during treatment; (4) failed: a patient who was initially sputum smear-positive and who remained sputum smear-positive at month 5 or later during treatment; and (5) lost to follow-up: a TB patient who did not start treatment or whose treatment was interrupted for two consecutive months or more.[7]

The progress made in Kiribati was then assessed against the MDG for TB and the Regional Strategy to Stop Tuberculosis in the Western Pacific 2011–2015 goals.[11,12]

3. Results

3.1. Case notifications

Over the 13-year period, Kiribati reported a total of 3863 TB notifications; 3797 (98%) were newly diagnosed and 66 (2%) were relapse cases.[13] The number of notifications increased slightly from 2000 to 2012, with some fluctuations in-between (Table 1; Figure 1). The case notification rate followed a similar pattern and increased from 304 per 100 000 population in 2000 to 343 in 2012.

Of all new TB notifications, 1481 (38%) were pulmonary sputum smear-positive, 948 (25%) were pulmonary sputum smear-negative, and 1268 (33%) were classified as extrapulmonary; the remaining 4% were classified as smear unknown/not done, other new cases, or relapse cases. The number of new sputum smear-positive cases increased from 54 in 2000 to 134 in 2012, as did the new sputum smear-negative cases (from 30 in 2000 to 122 in 2012). The number of EPTB cases decreased from 106 in 2000 to 73 in 2012 (Table 2; Figure 2).