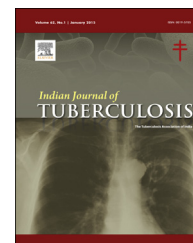


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Original Article

Isolation of *Mycobacterium tuberculosis* from sputum of tribal, non-tribal pulmonary tuberculosis patients of Andaman & Nicobar islands by conventional culture method and assessment of first line anti-tuberculosis drug susceptibility patterns

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ABSTRACT

Background: Drug resistance surveys have not yet conducted in these Islands and as such no data exists on drug resistance currently.

Aims: the present study was initiated with the objective of isolation and assessment of Drug resistance patterns of *Mycobacterium tuberculosis* isolates from sputum specimens collected from different categories of Tribal, Non-Tribal pulmonary tuberculosis patients treated under DOTS and Non-DOTS program by conventional culture and Proportion sensitivity (PST) method to detect patients with Multidrug resistant strains.

Methods: The investigation was hospital based laboratory surveillance study carried out for a period of 3 years at the selected hospitals of Andaman district (TB ward GB Pant Hospital at Port Blair, CHC Bamboflat at Port Blair and CHC Rangat at Rangat) and Nicobar district (CHC Nancowry at Nancowry groups of Islands), among the new cases and re-treatment cases of tuberculosis patient under DOTS program and Non-DOTS patients attended selected hospitals of Andaman & Nicobar districts chosen for the study.

Results: 83 culture positive isolates obtained (74 identified as *M. tuberculosis*) from the sputum specimen of 162 cases of tuberculosis patient by conventional culture method. 60

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M. tuberculosis isolates subjected to drug susceptibility test using PST method, 7 patients (11.67%) found to be Multidrug resistant tuberculosis (MDR-TB), resistant patterns were $S + H + R + E = 1$ (Cat II-DOTS), $H + r = 3$ (Cat-I DOTS = 1, Cat II-DOTS-1, Non-DOTS = 1), Rifampicin resistant alone = 2 (Non-DOTS = 1, Cat II-DOTS = 1) and $R + E = 1$ (Cat I-DOTS). Conclusions: Laboratory finding suggested that nine MDR-TB strains detected in DOTS and Non-DOTS among 60 *M. tuberculosis* isolates were selected for drug susceptibility testing but two isolates detected as MDR-TB from patients was already on Second line drugs treatment were not included in the MDR-TB detection criteria. Hence 7 patients (11.67%) declared to be Multidrug resistant tuberculosis (MDR-TB). 2 MDR-TB strains with resistant patterns $H + r = 1$ (Cat II-DOTS), Rifampicin resistant alone = 1 (Non-DOTS) detected from 12 isolates of Tribal patients from Nicobar district and 5 MDR-TB strains with resistant patterns $S + H + R + E = 1$ (Cat II-DOTS), $H + r = 2$ (Cat I-DOTS = 1, Non-DOTS = 1), Rifampicin resistant alone = 1 (Cat II-DOTS) and $R + E = 1$ (Cat I-DOTS) detected from 48 isolates of Non-Tribal patients from Andaman district. To assess the MDR-TB burden in the islands, systematic drug resistant surveillance study needs to be conducted.

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1. Introduction

Tuberculosis (TB) is one of the serious global public health problems that mainly affect people in the economically active age groups resulting in an immense loss to communities and countries. *Mycobacterium tuberculosis* (MTB) infects over one third of the world's population.¹ The global report on tuberculosis (TB) estimates that in 2010, there are 8.8 (8.5–9.2) million incident cases of TB resulting in 1.1 (0.9–1.2) million deaths among HIV- negative people and an additional 0.35 (0.32–0.39) million deaths from HIV-associated TB. In 2010, there were 5.7 million notifications of new and recurrent cases of TB, equivalent to 65% (63%–68%) of the estimated number of incident cases in 2010. India and China accounted 40% of the world's notified cases of TB in 2010, Africa for a further 24% and the 22 high-TB burden countries (HBCs) for 82%. Between 1995 and 2010, 55 million TB patients were treated in programmes that had adopted the DOTS stop TB strategy, and in 46 million cases the treatment was successful. This successful treatment saved almost seven million lives.²

Alongside these achievements, diagnosis and appropriate treatment of multidrug-resistant tuberculosis (MDR-TB) remains major challenges. Less than 5% of new and previously treated TB patients were tested for MDR-TB in most countries in 2010. The reported number of patients enrolled on treatment has increased, reaching 46,000 in 2010. However, this was equivalent to only 16% of the 290,000 cases of MDR-TB estimated to exist among notified TB patients in 2010.²

India is a developing country and ranked 17th among 22 high burden countries in terms of TB incidence rate. India has adapted and tested the DOTS strategy in various parts of the country since 1993. Since 1999, drug resistance surveys were initiated in different parts of the country. At present India has the highest MDR-TB burden in the world contributing approximately 30% to the global burden. The prevalence of Multi-drug resistant tuberculosis (MDR-TB) defined as resistance to Isoniazid and Rifampicin with or without resistance to other drugs, is found to be at a low level in most of the

regions. Data from studies conducted by Tuberculosis Research Centre (TRC) and National Tuberculosis Institute (NTI), have found MDR-TB levels of less than 1%–3% in new cases and around 12% in re-treatment cases.^{3,4}

The Andaman & Nicobar Islands, an archipelago of 527 islands in the Bay of Bengal, is administratively a Union Territory of India. The population of the territory is about 3,79,944 (2011 census) that includes six indigenous tribal groups. The Union Territory of Andaman and Nicobar Islands is divided into three districts viz. North and Middle Andaman, South Andaman and Nicobar. More than 98% of the population of Nicobar district is constituted by the Mongoloid tribe Nicobarese.

An intensified TB control programme was carried out among the Nicobarese of Car Nicobar Island in the year 1986. All identified cases were treated and INH chemoprophylaxis was administered to children aged 5–14 years. Prevalence of sputum positive cases was 4.1 per 1000 and prevalence of infection among children was 9.3%. Later anti-tuberculosis activities were carried out as per District tuberculosis program (DTP). The centre assessed the impact of the intensified TB control programme started in 1986 and DTP that followed on tuberculosis situation in 2001–02. The observed prevalence of infection among children was 16.4%. The estimated annual risk of TB infection (ARTI) was 2.4% and prevalence of sputum positive cases was 7.28 per 1000. These findings showed that annual risk of tuberculosis infection and prevalence of tuberculosis had increased almost two-fold during the intervening period of nearly 15 years. The Revised National TB control programme (RNTCP) based on the internationally recommended Directly Observed treatment Short-course (DOTS) strategy was introduced in the islands in the year 2005.⁵ Drug resistance surveys have not yet conducted in these Islands and as such no data exists on drug resistance currently. Therefore, the present study was initiated with the objective of isolation of *M. tuberculosis* from clinical specimens collected from tribal and Non-tribal pulmonary tuberculosis patients treated under different categories of DOTS and Non-DOTS program by conventional culture and Proportion

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