

## Occurrence of Nontuberculous Mycobacteria in Different Aquatic Sources of Sri Lanka

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Nontuberculous mycobacteria (NTM) have been reported to cause opportunistic infections with increasing frequency, especially in immunocompromised patients. Water plays a major role in the epidemiology of NTM infection in humans, as it is one of the natural sources and routes for transmission of this group of organisms. The present study focused on determining the distribution of NTM in different aquatic sources from all 25 districts of Sri Lanka by using phenotypic tests and polymerase chain reaction – restriction fragment length polymorphism (PCR – RFLP) analysis of the RNA polymerase beta subunit (*rpoβ*) gene.

The number of samples collected from the districts varied from 3 – 27 and water samples from 18 districts yielded positive results for NTM. Of the total 255 water samples tested, 41 (16%) were positive for NTM on culture. The frequency of isolation of mycobacteria varied with the water sources tested and the values for aquarium water, surface water, ground water and chlorinated water were 30% (17/57), 22% (19/87), 6% (4/63) and 2% (1/48), respectively. The low mycobacterial load in chlorinated water observed in the study may be related to the lethal effect of chlorine on mycobacteria. The percentage of mycobacteria identified at species level by phenotypic tests and PCR – RFLP of the *rpoB* gene were 49% (20/41) and 93% (38/41), respectively. The PCR – RFLP of the *rpoB* gene proved to be simple, rapid and accurate in identifying NTM species, when compared to phenotypic tests. Furthermore, the routine phenotypic tests were unable to differentiate subtypes of *M. fortuitum* and *M. gordonae*. Fifty three percent (20/38) of the phenotypic test results were in agreement with PCR – RFLP results. The RFLP profiles of three NTM isolates did not match any known mycobacterium species and these might represent mutants or hitherto undescribed NTM species. Thirteen species of NTM were identified by PCR-RFLP, namely *M. fortuitum* type I (n=9), *M. fortuitum* type II (n=4), *M. phlei* (n=6), *M. scrofulaceum* (n=5), *M. gordonae* type I (n=2), *M. gordonae* type II (n=2), *M. marinum* (n=2), *M. malmoense* (n=2), *M. terrae* (n=2), *M. avium* (n=1), *M. szulgai* (n=1), *M. gallinarum* (n=1) and *M. celatum* type II (n=1). Of the positive isolates, potentially human pathogenic mycobacteria (*M. fortuitum*, *M. marinum*, *M. malmoense*, *M. avium*, *M. scrofulaceum*, *M. szulgai* and *M. celatum*) accounted for 61% (25/41) while the non-pathogenic species (*M. phlei*, *M. gordonae*, *M. terrae* and *M. gallinarum*) accounted for 32% (13/41).

This study confirms that water is an important environmental source harbouring NTM and that NTM are widely present in many aquatic sources throughout Sri Lanka, which can be a potential public health hazard especially for immunodeficient individuals.

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