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ORIGINAL ARTICLE

# Risk factors for atypical mycobacterial disease in patients with smear positive pulmonary TB



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## KEYWORDS

Pulmonary TB;  
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**Abstract** Non Tuberculous Mycobacteria (NTM) can cause severe infection in selected groups of patients and is very difficult to be differentiated from TB infection clinically or radiologically leading to miss diagnosis and wrong treatment in these cases, the *Aim of the present study* is to study risk factors associated with NTM disease in patients with Acid Fast Bacilli (AFB) smear positive, *Subjects and methods*: 1402 patients with AFB smear positive were included in the study, only 47 patients from the study group proved to have NTM disease (diagnosis was done according to ATS/IDSA criteria). *Results*: the mean age of the NTM patients was  $61.8 \pm 23.2$  years, NTM was more common in older age groups and more common in white race patients, on using logistic regression analysis NTM disease was more commonly associated with old TB infection (42.6%) and with bed ridden patients on tracheostomy (31.9%). The most common organisms isolated were the MAC complex (55.3%) followed by M. Kansasii (34.04%). *Conclusion*: NTM disease should be put into consideration in patients with AFB smear positive and suffering from old TB infection or in bed ridden patients who are on tracheostomy, also if smear is positive for AFB and PCR is negative NTM should be suspected.

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## Introduction

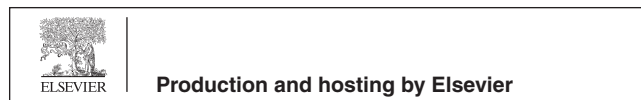
Pulmonary tuberculosis (TB) remains an important public health problem with an estimated 9.27 million new cases worldwide in 2007 [1]. According to the current treatment guidelines, isolation of *Mycobacterium tuberculosis* from a sputum culture is still recommended to confirm the diagnosis of pulmonary TB [2]. Non-tuberculous mycobacteria (also called atypical mycobacteria, mycobacteria other than tuberculosis, environmental mycobacteria, opportunistic mycobacteria) are ubiquitous pathogens and have been found in soil, domestic tap water, and in animals [3,4]. Although exposure to non-

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**Table 1** Clinical and microbiologic criteria for diagnosing nontuberculous mycobacterial (NTM) lung disease.

## Clinical (both required)

1. Pulmonary symptoms, nodular or cavitary opacities on chest radiograph, or a high-resolution computed tomography scan that shows multifocal bronchiectasis with multiple small nodules
2. Appropriate exclusion of other diagnoses

And

## Microbiologic

1. Positive culture results from at least two separate expectorated sputum samples. If the results from [1] are nondiagnostic, consider repeat sputum AFB smears and cultures
- Or
2. Positive culture results from at least one bronchial wash or lavage
- Or
3. Transbronchial or other lung biopsy with mycobacterial histopathologic features (granulomatous inflammation or AFB) and positive culture for NTM or biopsy showing mycobacterial histopathologic features (granulomatous inflammation or AFB) and one or more sputum or bronchial washings that are culture positive for NTM
4. Expert consultation should be obtained when NTM are recovered that are either infrequently encountered or that usually represent environmental contamination
5. Patients who are suspected of having NTM lung disease but do not meet the diagnostic criteria should be followed until the diagnosis is firmly established or excluded
6. Making the diagnosis of NTM lung disease does not, per se, necessitate the institution of therapy, which is a decision based on potential risks and benefits of therapy for individual patients

tuberculous mycobacteria often occurs without any clinical manifestations, there are differences in the virulence of these mycobacteria and clinical manifestations may range from no symptoms or signs to destructive or even fatal disease [5]. Also with advances in the recognition of Nontuberculous mycobacterium (NTM), prior studies have addressed the difficulty in distinguishing TB from NTM by using either clinical symptoms or imaging [5,6]. The decision to initiate TB treatment should be based on epidemiology, clinical/radiographic findings, and the results of acid-fast bacilli (AFB)-stained sputum. In endemic areas, it is not uncommon to administer anti-TB treatment empirically pending culture results, given the clinical features suggesting pulmonary TB [3,4]. Although this strategy aims at better disease transmission control, it comes with a price: it is possible to inappropriately treat patients without pulmonary TB with anti-TB drugs, leading to adverse effects and unnecessary costs. In addition the isolation prevalence of NTM has also increased gradually, further complicating the problem [7]. Sputum AFB staining is one of the most readily accessible tools for evaluating patients suspected of having pulmonary TB; however, it is not specific for pulmonary TB [4,8]. Pulmonary non-tuberculous mycobacteria (NTM) infection can cause severe progressive illness which may be preceded by a period of colonization [9,10]. Treatment of pulmonary NTM is complicated, requiring multiple antimycobacterial drugs for >12 months [9,10]. Patients are treated based on sputum smear exams using standard first and second line TB therapy depending on clinical criteria in conjunction with the World Health Organization (WHO) guidelines [11]. As NTM are often resistant to first-line anti-TB medication, presumably many of these cases would be considered treatment failures, and subsequently treated for multi-drug resistant (MDR) disease [12]. Colonization, on the other hand, may be defined by the absence of one or more diagnostic criteria [12]. In the setting of colonization, treatment is often withheld owing to its potential toxicities and the uncertain rate of progression. Ideally, treatment should be initiated before irreversible lung damage occurs or progresses [13].

**Aim of the work**

The aim of the present study is to study the risk factors associated with Non-Tuberculous (NTM) mycobacterial disease in patients with smear positive pulmonary TB.

*Subjects*

The study was done in the pulmonary rehabilitation center, ministry of health, state of Kuwait. Pulmonary rehabilitation center is the main center in the state of Kuwait that is specified to diagnose and treat Tuberculosis and all cases of TB whether pulmonary or extra-pulmonary are referred to the center for evaluation and putting the plane of treatment, also pulmonary rehabilitation center is the supervisor of the central TB laboratories specified for microbiological diagnosis of TB. 1402 patients with AFB smear positive sputum or BAL admitted to the center were included in the present study, cases were admitted for isolation and more assessment to confirm the diagnosis of pulmonary TB and to start specific treatment, the study was done in the period from 1/1/2010 to 30/6/2013, from these patients 47 patients were confirmed to have NTM disease (according to ATS criteria Table1).

*Methods*

All patients were subjected to the following:

- 1- History taking.
- 2- Physical examination.
- 3- Three successive samples of Sputum for AFB were collected in the early morning for 3 successive days. If the patient was not able to give sputum spontaneously induction of sputum using a hypertonic saline nebulizer in the early morning preceded by salbutamol inhalation or bronchoscopy and broncho-alveolar lavage was used to get the sample for bacteriological analysis, all sputum

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