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Original Research

Duration of treatment in pulmonary tuberculosis: are international guidelines on the management of tuberculosis missing something?

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ABSTRACT

Background: Despite evidence of an association between tuberculosis (TB) treatment outcomes and the performance of national tuberculosis programmes (NTP), no study to date has rigorously documented the duration of treatment among TB patients. As such, this study was conducted to report the durations of the intensive and continuation phases of TB treatment and their predictors among new smear-positive pulmonary tuberculosis (PTB) patients in Malaysia.
Study design: Descriptive, non-experimental, follow-up cohort study.
Methods: This study was conducted at the Chest Clinic of Penang General Hospital between March 2010 and February 2011. The medical records and TB notification forms of all new smear-positive PTB patients, diagnosed during the study period, were reviewed to obtain sociodemographic and clinical data. Based on standard guidelines, the normal benchmarks for the durations of the intensive and continuation phases of PTB treatment were taken as two and four months, respectively. A patient in whom the clinicians decided to extend the intensive phase of treatment by ≥2 weeks was categorized as a case with a prolonged intensive phase. The same criterion applied for the continuation phase. Multiple logistic regression analysis was performed to find independent factors associated with the duration of TB treatment. Data were analyzed using Predictive Analysis Software Version 19.0.
Results: Of the 336 patients included in this study, 261 completed the intensive phase of treatment, and 226 completed the continuation phase of treatment. The mean duration of TB treatment ($n = 226$) was 8.19 (standard deviation 1.65) months. Half (49.4%, 129/261) of the patients completed the intensive phase of treatment in two months, whereas only 37.6% (85/226) of the patients completed the continuation phase of treatment in four months. On multiple logistic regression analysis, being a smoker, being underweight and having a history of cough for ≥4 weeks at TB diagnosis were found to be predictive of a prolonged intensive phase of treatment. Diabetes mellitus and the presence of lung cavities at the start of treatment were the only predictors found for a prolonged continuation phase of treatment.

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Conclusions: The average durations of the intensive and continuation phases of treatment among PTB patients were longer than the targets recommended by the World Health Organization. As there are no internationally agreed criteria, it was not possible to judge how well the Malaysian NTP performed in terms of managing treatment duration among PTB patients.

Introduction

Tuberculosis (TB) is a public health challenge. In 2012, approximately 8.6 million people developed TB. With an estimated 1.3 million deaths every year, TB is the second highest cause of adult mortality from an infectious disease, after human immunodeficiency virus (HIV).[1] Malaysia is situated in the Western Pacific region of the World Health Organization (WHO), and is considered to have an intermediate burden of TB.[1] According to a recent report, over the past few years, the incidence of TB in Malaysia has been 80–82 cases per 100,000. However, the absolute number of new cases increased from 15,057 in 2000 to 21,851 in 2012.[1] These pointers reflect a slowly increasing burden of TB in Malaysia.

Provision of standardized treatment regimens, under supervision, is one of the five components of directly observed therapy (DOT). According to the current TB management guidelines, the treatment regimen for new smear-positive pulmonary tuberculosis (PTB) patients should be six months. Standardized TB treatment is divided into two phases: the intensive phase (IP) and the continuation phase (CP). For the IP of treatment, patients are prescribed isoniazid, rifampicin, pyrazinamide and ethambutol for two months, while during the CP of treatment, isoniazid and rifampicin are prescribed for four months. Patients living in isoniazid-resistant areas or diagnosed with isoniazid-resistant TB are prescribed isoniazid, rifampicin and ethambutol for four months during the CP of treatment.[2,3] In some situations [e.g. if a TB patient is immunocompromised (e.g. HIV, diabetes mellitus), a smoker and/or exhibits extensive lung involvement (e.g. lung cavities) at the start of the treatment], clinicians may decide to treat patients for a longer duration.

In spite of the evidence of an association between TB treatment outcomes and the performance of national tuberculosis programmes (NTP),[4–6] no studies to date have rigorously and extensively documented the durations of the IP and CP of treatment among PTB patients. As such, this study was conducted to determine the duration of TB treatment and its predictors among new smear-positive PTB patients.

Methods

Study setting

This study was conducted at the Chest Clinic of Penang General Hospital. In addition to the committed paramedic staff, the Chest Clinic has a minimum of five to six medical officers and three chest consultants. A fully equipped quality assured TB laboratory, situated adjacent to the Chest Clinic, provides routine TB-specific investigation services to patients and suspected TB cases. The Radiology and Pathology Departments of Penang General Hospital also provide routine investigation services to TB patients. A detailed description of the study setting is available in the authors' other published papers which differ in terms of their objectives and outcomes.[7,8]

Study design and data collection

This descriptive, non-experimental, follow-up cohort study involved all new smear-positive PTB patients who received WHO-recommended standard TB treatment[2] at the study site between March 2010 and February 2011. Each patient was followed-up until his/her final treatment outcome was available (i.e. mid December 2011). The medical records and TB notification forms of the patients were reviewed to obtain sociodemographic, clinical and treatment-related data.[4,5,8,9]

The normal benchmarks for the duration of the IP and CP of treatment are two and four months, respectively.[2] A patient in whom the clinicians decided to extend the IP of treatment by $\geq$ two weeks was categorized as a case with a prolonged IP. The same criterion applied for classifying prolonged duration of the CP of treatment. Unfortunately, the current international guidelines on the management of TB[2] do not explain the target proportion of new PTB patients in whom the treatment should be completed in a stipulated time period (i.e. two months for the IP of treatment and four months for the CP of treatment).

Statistical analysis

Data were analyzed using Predictive Analysis Software Version 19.0. (IBM Corp., Armonk, NY, USA). Simple logistic regression analysis was used to examine possible associations between the dependent variables (i.e. durations of the IP and CP of treatment) and selected sociodemographic and clinical variables. To predict the final independent factors, the variables that were statistically significant on univariate analysis were entered into a multiple logistic regression analysis. Adjusted odd ratio (AOR), 95% confidence interval (CI), beta, standard error and *P*-value were reported for each predictor. The model fit was assessed using Chi-squared test, degrees of freedom and *P*-value. Pseudo R^2 (Nagelkerke R^2) was included to provide information about the percentage of variance explained by the model. $P< 0.05$ was considered to indicate significance.[6,10,11]