Diagnostic Delay among Adults with Pulmonary Tuberculosis in a High Gross Domestic Product Per Capita Country: Reasons and Magnitude of the Problem

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Introduction

In addition to increasing morbidity and mortality of the source case, delay in pulmonary TB (PTB) diagnosis can lead to multiple secondary cases. It is estimated that a single untreated smear-positive case can lead to more than ten secondary cases annually. Early diagnosis of PTB is thus of paramount importance. Although the delay in PTB diagnosis is common to both high- and low-income countries, the magnitude of the problem seems more in the latter and can reach up to 185 days or higher. Qatar has the highest gross domestic product (GDP) per capita in the world (2014 estimates) and the highest per capita health expenditure in the Gulf Cooperation Council. TB remains a common health problem in the state of Qatar with an incidence of 40/100,000 populations per year. About 97% of TB patients are expatriates (mostly from Asian countries with high TB prevalence). The objectives of this study were to determine the mean and median delays in the diagnosis of PTB and identify patient and health-system reasons for these delays in this wealthy nation.

Methods and Materials

Study design and participants

This was a cross-sectional prospective study of randomly selected adult subjects (defined as ≥15 years old by Qatari health system) with confirmed PTB who were admitted to Hamad General Hospital or TB Unit in Qatar from January 2007 to December 2015. Inclusion criteria included; adult subjects with confirmed diagnosis of PTB by positive acid fast Bacilli smear from sputum or bronchoalveolar lavage (BAL) or a positive sputum mycobacterial TB culture at the time of admission to the hospital, in addition to the presence of symptoms and signs suggestive of PTB. Patients in whom PTB diagnosis was assumed on basis of symptom or radiological findings alone without microbiologic confirmation were excluded from the study. In addition, cases of extra-pulmonary TB and mentally ill patients were also excluded from the study.

Procedures

One hundred patients who fulfilled the inclusion criteria were interviewed face-to-face by one of the investigators to determine the time interval from symptom onset to the confirmation of the diagnosis of PTB. For quality assurance, all investigators received a prior training on how to conduct the interview and fill a structured questionnaire. We defined the total delay in diagnosis of PTB as the time interval from symptom onset to the microbiologic confirmation of PTB. We defined patient-related delay as the time interval from PTB symptom onset to the first visit to any health-care facility in Qatar. Health system-related delay was defined as the time interval from the first care-seeking visit (at any health facility) to the microbiologic confirmation of PTB. Estimation of delay and near PTB symptom onset as well as exposure to questioners using a structured questionnaire. Health system-related reasons were confirmed by direct questioning of patients about details of their prior visits to health-care facilities for their PTB symptoms as well as from patient electronic progress notes. Health system-related reasons were confirmed by direct questioning of patients about details of their prior visits to health-care facilities for their PTB symptoms as well as from patient electronic progress notes.

Results

The mean and median total diagnostic delays of PTB were 53 (95% confidence interval [CI] 42.61–63.59) and 30 (interquartile range; Q1–Q3, 15–60) days, respectively. The mean patient factor delay was 45.7 (95% CI 29.1–63.4) days, and the median was 30 (interquartile range; Q1–Q3, 15–60) days. The mean health system factor delay was 46.3 (95% CI 35.46–57.06) days, and the median was 30 (interquartile range; Q1–Q3, 15–60) days. The mean health system factor delay was neglect of TB symptoms by patients (in 39% of cases), and for health-care system factor delay was a failure (mostly at general and private care levels) to suspect PTB by doctors (in 57% of cases). There were no significant associations between the presence of language barrier, patient occupation or nationality, and diagnostic delay.

Discussion

There was a substantial delay in diagnosing PTB in this wealthy country with a median total delay of 30 days. Interestingly, despite this substantial delay, Qatar seems to compare favorably with both developed and developing countries with regard to the median total diagnostic delay. For example, the median total delays of PTB diagnosis in New York (USA), France, Norway, and Turkey are 57, 68, 63, and 49 days, respectively, while in Ethiopia, Nepal, and Ghana are 80, 60, and 104, respectively with the highest median delay of 126 days reported in Tanzania. Nevertheless, data from each of these countries may not necessarily represent the entire country, and the significant delay in PTB diagnosis in Qatar (despite the highly effective National TB Program and the free high standard public health system) remains striking. In agreement with other studies, health-care system delay in this county was significantly observed at the primary and private health-care sectors and the significant delay in PTB diagnosis in Qatar (despite the highly effective National TB Program and the free high standard public health system) remains striking. In agreement with other studies, health-care system delay in this country was significantly observed at the primary and private health-care sectors levels.

Conclusions

Despite a favorable comparison to other countries, there is a substantial delay in the diagnosis of PTB in Qatar. Delay in PTB diagnosis is more due to health-care system factors than patient factors. General and private practices are the most common doctor practices to be associated with delay in PTB diagnosis. There is a range of relevant actions that can be considered to reduce diagnostic delay of PTB in Qatar. Health education on TB, particularly for labor workers) in form of mass campaigns, maintaining appropriate TB awareness in health-care professionals (particularly those in general/private practice) through staff training and workshops, and improving the partnership between general/private practice and National TB Program are examples of such actions.