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ORIGINAL ARTICLE

Changing trend of tuberculosis indicators in Ardabil province, 2005–2012: a province in north-west of Iran

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ABSTRACT

Background: Since 1993, the Directly Observed Treatment, Short Course program was done for registry the Tuberculosis (TB) cases in all the countries to prevent the widespread of disease in society. Annually, 9 million persons are infected by TB, and it was estimated that at future 10 years more than 30 million people will die due to TB. TB is the reason of 26% of preventable death at development countries and reports showed that Multi Drug Resistant (MDR) is increased in Iran. The aim of this study was evaluated the changing trend of TB indicators in Ardabil province during 2005–2012.

Methodology: This is a cross-sectional study that has been done on 1,098 registered cases of TB during 2005–2012 years. Information was collected by a checklist from recorded data by provincial health department and the analyzed by statistical methods in *Statistical Package for the Social Sciences* version 16.

Results: 61.6% of cases were pulmonary TB cases and 38.5% were extra-pulmonary TB cases. The total incidence of TB during study years was 9.42 per 100,000.

Conclusion: The results showed that the rate of TB relapse and MDR in Ardabil province has been increased in compared to previous years. Therefore, doing more exact studies in this topic is essential in future.

Keywords: Tuberculosis, pulmonary TB, extra-pulmonary TB, MDR.

Introduction

Tuberculosis (TB) was introduced by the World Health Organization in 1993 as a global emergency and all TB cases were reported from different countries under the reporting system and in order to cope with the spread of this disease. Directly Observed Treatment, Short guideline has been notified to all the countries. TB is a chronic bacterial disease caused by mycobacterium TB [1]. TB presents in both pulmonary and extra-pulmonary forms. Pulmonary TB accounts for about 85% of cases and type of extra-pulmonary disease in about 15% of the cases [2]. In the type of extra-pulmonary, almost all the organs are at risk of infection but the most common involved areas are: lymph nodes, pleura, genitourinary system, bones, intestines, and meninges. Although the principles of TB treatment have been known since 50 years ago and short-term treatment has been used for more than 20 years, TB patients are not yet diagnosed and treated in many parts of the country. So far, one third of the world's population has been infected with TB and yearly 10 million new cases of TB occurred and added to the previous cases. More than 20 million people are now infected with TB. One person gets infected with TB Bacillus every second. Every 4 seconds, someone gets TB and one person dies every 10 seconds [3,4].

Inappropriate treatment methods, the creation of drug resistant basil and the role of pandemic HIV infection as an important factor in the spread of TB increasing the problems and burden of disease due to TB. TB in the order of the global burden of diseases in the 1990s was seventh, and it is predicted to be in this rank at year 2020 according to the Disability-Adjusted Life Year (DALY) index which most of infectious diseases have fallen below these levels [5]. Neighborhood of Iran with both Afghanistan and Pakistan as well as Iraq with its recent years of tension and the newly independent states of the north of the

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country [with the high prevalence of multi drug resistant (MDR) TB] the need to pay more attention to this disease is mentioned [3]. Important risk factors that may increase the risk of TB included age, HIV infection, and the cycle of poverty. In the cycle of poverty, malnutrition, and population congestion in an environment are probably the most important factors. Some predisposing factors, such as infection, opiate use, diabetes mellitus, and silicosis, increase the risk of becoming infected. These factors increase the risk of disease to varying degrees (from 3 times in diabetes to 10 times for HIV infection) [6].

Methods

This is a retrospective cross-sectional study that has been done on 1,098 patients with TB which registered in Ardabil province health centers from 2004 to 2012. For estimation of incidence rate, we estimated the population of each year and calculated the incidence rate based on population per 100,000. Data collected by a checklist and then analyzed by statistical methods in *Statistical Package for the Social Sciences* version 16. The significant level was considered as $p < 0.05$.

Results

Of all patients, 53.1% were women and the rest were men. Most of the male cases of TB were registered in year 2007 (55.8%) and most of female were in the year 2005 (58%) (Figure 1).

The lowest average age was in the year 2005 (38.6 years) and the highest were in 2010 (44.4 years). The average age of all TB cases was 41.78 years with a standard deviation of 9.58. The lowest of TB cases was in the year 2008 (10.9%) and the highest rate in 2012 (14.8%) (Figure 2).

Of all the cases, 657 (59.8%) were from the urban area. During the studied years, TB has risen trend in the urban area and in the rural areas there has been a downward trend (Figure 3).

The average weight of all the patients was 57.06 kg. The lowest was for the 2010 with 50.1 kg and the highest for the 2011 with 62.13 kg. Of all the patients, 676 (61.6%) cases had pulmonary TB and 422 (38.4%) cases had extra pulmonary TB. The prevalence of people with pulmonary TB was first downtrend with a gradual upward trend (Figure 4).

Among extra-pulmonary TB cases, lymph node TB with (10.3%) was the highest rate and Central nervous system (CNS) (0.2%) was the lowest rate (Figure 5).

94.9% of the TB patients were in the treatment group 1 and 3.7% in the treatment group 2. Almost 0.4% of people with TB died before the treatment, 0.5% had MDR and 0.3% resistant to isoniazid. The highest relapse rate of disease was in years 2006 and 2011 with 3.8% and 4.9%, respectively. The relapse of disease has declined from

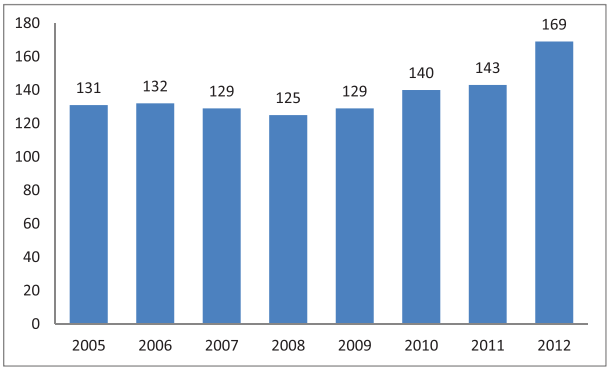

Figure 2. *The frequency of TB cases by year.*

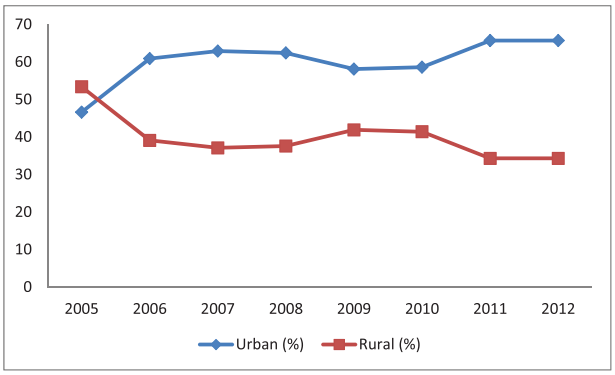

Figure 3. *Frequency of TB cases by years and residence place.*

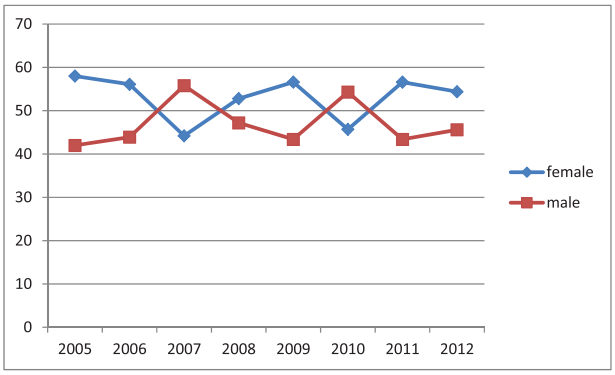

Figure 1. *The frequency of TB cases by gender.*

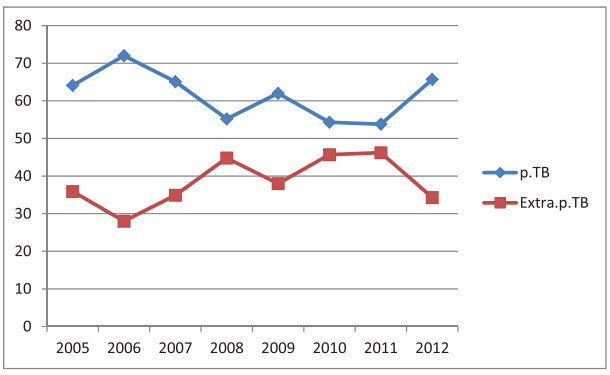

Figure 4. *The frequency type of TB by years.*

2006 to 2009 that from the 2009 onwards the relapse of the disease increased again (Figure 6).

In this study, the overall incidence of TB during the studied years was 9.42 per 100,000 people. The highest occurrence was in 2012 and the lowest was in 2005 (Figure 7).

Discussion

In this study, 53.1% of patients were female and 46.9% were male that the more frequency of women than men can be due to more domestic contact in women. In studies in other places, the proportion of female patients to male is similar to that of the present study [7–13].

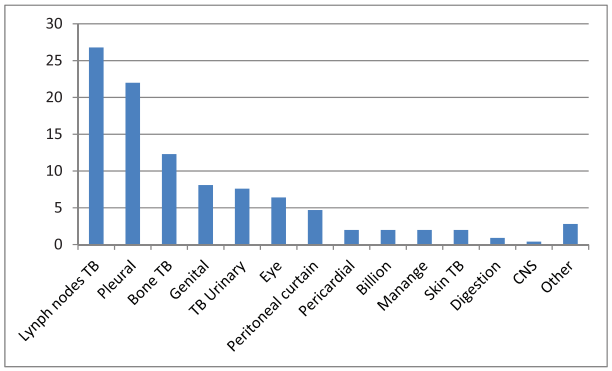

Figure 5. *The type of extra-pulmonary TB among patients with Extra-PTB.*

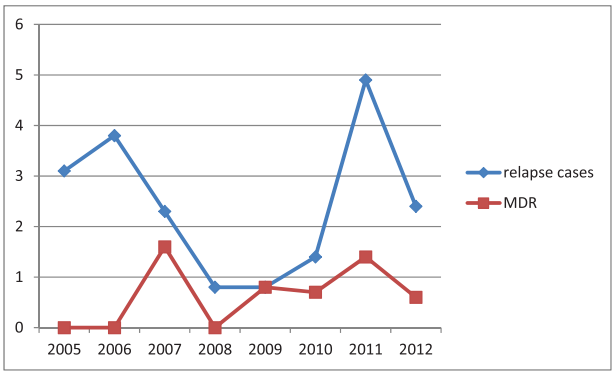

Figure 6. *The frequency of MDR and relapse by years.*

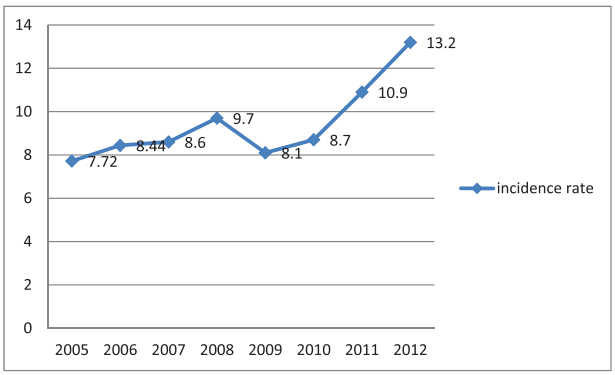

Figure 7. *The incidence rate of TB by years.*

The high prevalence of TB in women of Ardabil despite the distribution of national and global is not significant, to some extent it can be seen as a bad situation and social, economic, and cultural discrimination. At present in the country, this proportion is close to one and a little higher in men. Hence, the need for further research in this field seems necessary [11]. The average age of patients with TB was 41.7 ± 19 with a range of 1 to 90. In the study of Bashiri et al. [7] (years 2002–2005), the average age of TB was 42 ± 19.45 with a range of 2–86 years [7]. The average age of patients in this study was consistent with the average age of Saghafipour et al. study in Mazandaran and Ahmadi in Qom [8,14]. In general, the average age of patients in the study of Amani et al. [7] with the rest of the country is not significant. The lower average age indicating low control measures and higher average age indicates a better status of TB control in the region. The mean weight of patients in this study was 57.25 ± 14.52 (range of 6–115 kg). In this study, 59.8% of TB cases were from the urban area and 40.2% in the rural. The overall incidence of TB was 9.42 per 100,000 which has upward trend during the studied years and was similar to the results of Hazrati et al. [11] in Ardabil province [7]. In the Bam study in 1995–2001, 46.6% of all the patients were in urban and 53.4% were in the rural areas [9]. The higher prevalence of TB in the rural areas were not similar to reference books because TB is a disease specific to urban areas [7]. Basically, in the areas with high population density and poorer people expect a higher incidence of TB. In this study, the prevalence of TB in different cities of Ardabil province was investigated and Ardabil with 40% and Sarein with 0.4% have the lowest of TB patients. Between 2005 and 2008, abundance of TB has been declining, and it has again increased since the 2008 and finally in the 2012, the highest number of cases were reported with 169 (14.8%) and in the 2008, the lowest number of TB cases was found with 125 (10.9%). Because of the direct relation between the prevalence of TB and economic poverty, this could be due to the country's low economic situation in the recent years, and the favorable economic situation in the 2005. In fact, the incidence of TB is different due to country income, so that the prevalence of TB in 2008 in low-income countries with 410 cases, with middle-income countries with 180 cases and moderate-to-high income countries with 73 cases, and in high-income countries it was 8 per 100,000 people. Overall, the prevalence of TB has been declining since 1990, and in 2008, 7.5 million cases of TB (new and recurrence) were reported [7]. Determining the trend of the disease and its changes over time and comparing it with global regional and national indicators can be very important in assessing the extent and the way of achieving to strategies for disease control, extend of health indicators, and health planning. In the present study, the pulmonary TB with 61.4% was found to be higher than extra-pulmonary TB. According to Najafi et al. [15] study, 68.7% of cases were pulmonary TB and the rest were extra-pulmonary TB and in compared to the present study, the incidence of pulmonary TB was higher. According to Hazrati et al. [11] study, the incidence of extra pulmonary TB increased in the years

2005–2010 and the highest incidence with 4.7 occurred in 2008. Increasing the number of extra-pulmonary TB is associated with an increase in HIV incidence, immune deficiency, and diagnostic enhancements. Among extra-pulmonary TB types, lymph node TB was the highest with 10.3% and CNS was the lowest with 0.2%. Also, the study revealed that pulmonary and extra-pulmonary TB had been declining trend over the 2010–2012 years and extra-pulmonary increased again in the 2012, and its recurrence was about 2.5% during the studied years in compared with the study conducted by Amani et al. [7], the rate of relapse has been increased. In this study, the rate of MDR was estimated about 0.4% which compared with the study of Bashiri et al. [7] in years 2002–2005, MDR was increased in Ardabil province during study years [7].

Conclusion

The results of this study showed that the relapse rate of TB and MDR in the studied years was higher than in previous years that the need for increased screening through the involvement of all healthcare providers, especially the private sector and social welfare by improving the implementing widespread training to raise awareness among the publics is felt to improve the implementation of direct supervision treatment to achieve the expected goals.

List of Abbreviation

MDR Multi drug resistant
DOTS Directly observed treatment, short-course

Conflict of interest

The authors declare that there is no conflict of interest regarding the publication of this article.

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Consent for publication

Written consent was obtained from all the participants.

Ethical approval

The results of this study financially and ethically supported and approved by Ardabil University of Medical Science.

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