

## Epidemiologic and Clinical Aspects of Tuberculosis in Hamadan, Iran, from 2002 to 2008

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### Abstract

**Background:** One-third of the world's population is currently infected by tubercle bacillus. This study was performed to evaluate epidemiological and clinical aspects of confirmed cases of tuberculosis infections in a seven-year time period, between years of 2002 to 2008, in the city of Hamadan, west of Iran. **Materials and Methods:** In this descriptive retrospective study, medical records of 375 patients from the year of 2002 to 2008 were evaluated and analyzed. Required data were obtained from medical records of all the patients and inserted into a detailed checklist. Obtained data were analyzed by using SPSS statistical software (version 11.0).

**Results:** The mean age of the patients was  $53.69 \pm 20.37$ . Most patients were female (58.7%). 78.1% of the cases were from urban areas. 58.7% of the patients were diagnosed by pulmonary tuberculosis. The mean age of the patients with extra-pulmonary tuberculosis was significantly younger than patients suffering from pulmonary tuberculosis. 29.1% of males and 47% of females had extra-pulmonary tuberculosis. 72.2% of the patients with pulmonary tuberculosis had a positive-sputum smear. Most patients with positive-smear for pulmonary tuberculosis were diagnosed (53%). Sputum culture was the most frequent diagnostic technique used in patients with negative-sputum smear. In patients suffering from extra-pulmonary tuberculosis, lymph node involvement was the most frequent (34.2%). 44 patients (11.7%) were expired.

**Conclusion:** Due to the increasing number of tuberculosis infections from 2005 to 2008, it is important for the health care providers and department of public health to monitor and pursue screening and prevention guidelines closely. [GMJ. 2013;2(4):152-6]

**Keywords:** Pulmonary tuberculosis; extra-pulmonary tuberculosis; clinical manifestation; epidemiology

### Introduction

Tuberculosis (TB) is an infectious disease that usually affects the lungs, although in one-third of cases other organs are involved and they are typically associated with granuloma formation [1,2]. With the discovery of mycobacterium tuberculosis by Robert Koch in

1882, there was a new beginning for treatment and preventive measures to fight this disease [3].

Currently, one-third of the world's population is infected by TB. According to the World Health Organization, in 2012, 8.6 million people fell ill with TB and 1.3 million died from TB that over 95% of TB-caused deaths occur in low in-

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come and middle income countries, and it is among the top three causes of death in women aged 15 to 44 [4]. Due to the re-emergence of TB in many industrialized countries, in 1993 the World Health Organization introduced TB as a global public health emergency [2]. Route of TB infection is airborne; a healthy individual can be infected by inhalation of aerosol particles from an infected patient with TB bacilli (a smear-positive pulmonary TB) [5]. A Smear-positive patient with no treatment can infect 5 to 10 people per annum and 20 people in the entire course of the disease [6].

In the early stage of the disease, signs and symptoms are often nonspecific, including fever, night sweats, weight loss, anorexia, malaise, and weakness [7]. In most cases, coughing is nonproductive at the beginning, but later patients will experience productive coughs. Lymph nodes, pleura, genitourinary system, bones and joints, meninges, peritoneum and pericardium are the most common sites of extra pulmonary TB. However, any organ system could be affected. In HIV-positive patients, hematogenous seeding is more common, therefore extra-pulmonary TB is seen more often in HIV-Positive patients [1].

TB has been known to be an endemic infectious disease in Iran. In 1992, 34.5 cases, and in 1998, 19.3 cases per hundred thousand people have been reported in the country. In 1997-98, the highest incidence of the infection was reported from Sistan & Baluchestan province [8].

TB infection is a serious threat for global public health, therefore, treating infected individuals, monitoring and enforcing quality assurance in prevention guidelines should be a worldwide priority for any public health system. Due to the high prevalence of TB infection in Iran, need for comprehensive studies seems to be necessary and important in monitoring and management of prevention guidelines. This study was performed to determine various forms of TB infections in a seven-year time period, between years of 2002 to 2008, in the city of Hamadan, west of Iran.

### Materials and Methods

In this cross-sectional descriptive study, all identified TB patients who were referred to the

city of Hamadan, department of public health, as cases of TB infections from the year of 2002 to 2008 were evaluated and analyzed. 375 patients were enrolled in this study. Required information according to the types of TB infections (pulmonary or extra pulmonary), age, sex, residential location, involved organ system in extra-pulmonary TB, laboratory techniques and diagnostic methods used in patients with a smear-positive pulmonary TB and smear negative ones, management and treatment methods were extracted from their medical records. All data were entered to a checklist form. The protocol was approved by the ethical committee of Hamadan University of medical sciences; for ethical proposes, each patient was given an identification number. Collected information was analyzed by SPSS software (version 11.0) using  $\chi^2$ , Spearman, and T-Test and results with  $P < 0.05$  were considered to be significant.

### Results

The annual average frequency of TB in the city of Hamadan was 9.8 in a hundred thousand people. Majorities of patients were women (217 cases, equivalent to 57.9%). Minimum age was 8 years old and the maximum age was 86 years (mean age  $53.69 \pm 20.37$  years). Most of the patients were above 65 years old (140 cases equivalent to 37.3%). The least numbers of patients were younger than 20 years old, which were accounted for about 5% of the cases (Table-1).

The mean age of male patients was  $53.32 \pm 19.38$  years old and for the female patients it was  $53.97 \pm 21.1$  years old. Based on the statistical tests performed (t-test), there was no

**Table 1.** Distribution of Tuberculosis Infected Patients in Hamadan According to Age Groups.

Age groups	Female	Male	Total
<20y	15(83.3%)	3(16.7%)	18(100%)
21-35y	40(52.6%)	36(47.4%)	76(100%)
36-50y	33(47.1%)	37(52.9%)	70(100%)
51-65y	44(62%)	27(38%)	71(100%)
>65y	85(60.7%)	55(39.3%)	140(100%)
Total	217(57.9%)	158(42.1%)	375(100%)

significant difference between the mean age of male and female patients ( $P=0.761$ ).

In this study, prevalence of TB among age groups was different according to gender, and based on the chi-square test. This difference was statistically significant ( $P=0.042$ ). Most patients were identified in 2003 and 2004, 19.5 percent (73 patients) and 17.3% (65 patients) of the cases, respectively.

In patients with extra-pulmonary TB, 15.5% of the cases were identified in 2002, 18.9% in 2003, 16.9% in 2004, 9.5% in 2005, 14.2% in 2006, 12.8% in 2007 and the remaining were diagnosed in 2008.

The Majority of the patients (293 patients, equivalent to 78.1%) were living in urban areas and the rest of them were in rural areas. The mean age of both groups was about 53.5 years old and there was no statistically significant difference ( $P=0.848$ ).

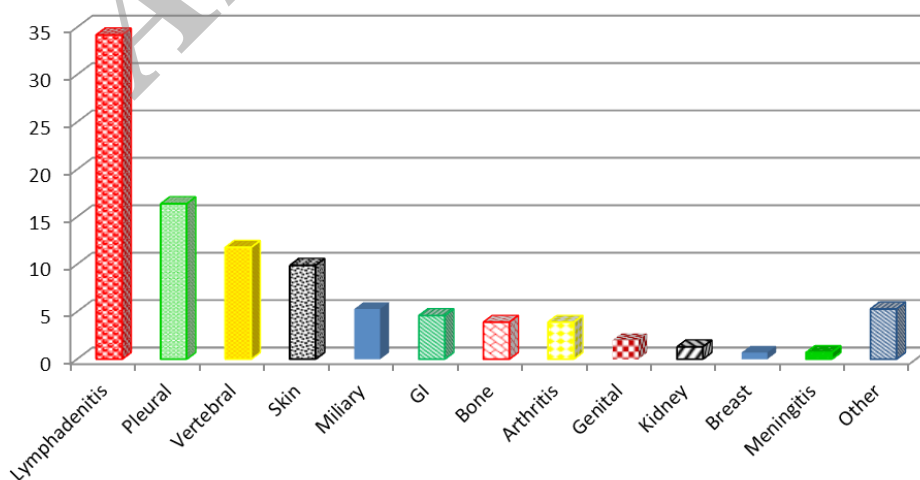
Two hundred and twenty patients (58.7%) were diagnosed with pulmonary TB, 148 patients (39.5%) with extra-pulmonary TB and 1.8% (seven patients) with both. The mean age of patients with pulmonary TB was  $59.7 \pm 19.35$  years old, and in patients with extra-pulmonary TB was  $46.61 \pm 19.43$  years old. There was a significant difference between them statistically ( $P < 0.001$ ). As the age of patients increased, the prevalence of TB increased. By using Spearman statistical test this relationship was significant ( $P < 0.001$ ,  $r=0.32$ ). One hundred and eight male patients (68.4%) and 112 (51.6%) female patients had been diagnosed with pulmonary TB, the difference was statis-

tically important ( $P=0.002$ ). There was no significant difference between the residential area and the type of TB infection among patients ( $P=0.379$ ).

In this study, patients with smear-positive pulmonary TB were 164 (72.2%). Between age, gender, residential location and results of sputum culture and smear, statistically significant differences were not found ( $P > 0.1$ ). 87 smear-positive pulmonary TB patients (53%) were diagnosed after hospitalization. In outpatient setting and private offices, by Infectious disease specialists 36 (22%) and by general practitioners, 27 patients (16.5%) were diagnosed and identified as smear-positive cases. The laboratory's facilities and equipment used in diagnosis of the patients with smear-positive pulmonary TB in 78% of the cases (128 patients) was the department of health's laboratory. In smear-negative patients, various diagnostic methods were used such as, sputum culture in 36.5% of cases (23 patients), BAL smear in 21 cases (33.3%) and BAL cultures in nine cases (14.3%).

In patients with extra-pulmonary TB, lymph nodes were the most involved organ in 34.2% (52 patients). Other involved organs including pleura in 16.4% (25 patients), vertebrae column in 11.8% (18 patients) and skin in 9.9% (15 patients) (Figure-1).

Appropriate response to treatment in smear-positive patients with pulmonary TB was 81.1% (133 cases). Incomplete treatments and failure in treatments were 1.2% and 3.1%, respectively. Furthermore, 53 cases (84.1%)



**Figure 1.** The Frequency of extra-pulmonary tuberculosis in tuberculosis patients in Hamadan, Iran

of smear negative patients with pulmonary TB and 128 patients (86.5%) with extra-pulmonary TB completed the course of treatment successfully. A total number of 44 patients (11.7%) were expired.

## Discussion

From 375 patients, 140 cases (37.3%) were over 65 years old. The mean age of patients was  $53.69 \pm 20.37$  years old, and this mean was more than the study which was conducted in the city of Birjand ( $48.9 \pm 21.6$ ). Similar to our study, most patients in the city of Birjand were above 65 years old and the second place belonged to patients between 20-35 years old [9]. In the study which was conducted in the Arak, west of Iran, the mean age of patients was 52.91 years old, which was almost similar to the mean age of patients in our study [10].

In our study, 57.9% of cases were women. In a study which was conducted in Fars province, 55% of the patients [11], in Birjand city 57.4% of cases [9], in Ardebil province 65.5% of patients [12], in Hashtrud city 58.1% of the cases [13] and in Arak city 61.9% of the patients were females [10].

In our study, 78.1% of the patients were living in urban areas. 59% of the patients in Birjand and 59.5% of patients in Damghan city were living in urban areas [14]. In the present study, 58.7% of the patients were diagnosed with pulmonary TB, 39.5% extra-pulmonary TB and 1.8% with both. In a study which was conducted in the Hashtrud, East of Azerbaijan province, 51.6% of the patients were diagnosed with extra-pulmonary TB [13]. In most parts of Iran, the number of patients diagnosed with pulmonary TB was significantly higher than those with extra-pulmonary TB. For example, in Damghan 88.67% of the patients and in Bam city 80.8% of the patients were diagnosed with pulmonary TB [14, 8]. In patients with pulmonary TB, the majority of them (72.2%) had a positive sputum smear. This rate in Kurdistan province was 58.1%, [15], in Bam city was 77.5% [8], in Golestan province was 62.7% [16], in Gonabad city was 72.4% [17] and in Ardabil province 59.3% was reported [12].

In this study, the mean age of patients with extra-pulmonary TB was significantly lower than patients with pulmonary TB. 47% of wom-

en were diagnosed with extra-pulmonary TB while only 29.1% of men were included, and this difference was statistically significant. In the study of Mardani et al. from 146 patients diagnosed with extra-pulmonary TB, women were affected twice as men [18]. In Zahedan city, the number of female patients was 1.5 times higher than male patients suffering from extra-pulmonary TB [19].

In Mashhad city, the prevalence of extra-pulmonary TB was higher in females, which indicated the possibility of greater prevalence of extra-pulmonary TB among women living in this part of Iran [20]. In the present study, in patients with extra-pulmonary TB, lymph nodes were the most involved organs (34.2%), in Tehran city 35.8%, in Babol city 54.87%, in Birjand city 22.6%, and in Chaharmahal Bakh-tiari province 42% were reported. In studies which were performed in other countries, about 34% of the patients with extra-pulmonary TB had lymphadenitis as well [21, 22, 9, 18, 23].

In our study, the annual incidence average of TB in Hamadan (9.8/100000) was not as much as the incidence average in the whole country of Iran (13/100000) [24]. Although the number of TB cases in 2005 was less than the cases between years of 2002 to 2004, but there was an increase in the number of cases from years of 2005 to 2008.

## Conclusion

The number of patients diagnosed with TB was increased from 2005 to 2008 in the city of Hamadan, Iran. Using appropriate diagnostic techniques and treating patients, play an important role in stopping and preventing the transmission of the disease. Therefore, developments in diagnosis, treatment, and follow up guidelines should be considered accordingly.

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## Conflict of Interest

There was no conflict of interest to be stated.

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