

# Tuberculosis in Abadan, Iran (2012-2016): An Epidemiological Study

Ali-Asghar ValiPour  
Azimeh Karimyan  
Mahmood Banarimehr  
Marzieh Ghassemi  
Maryam Robeyhavi  
Rahil Hojjati  
Parvin Gholizadeh

Student Research Committee, Abadan School of Medical Sciences, Abadan, Iran

## Corresponding author:

Marzieh Ghassemi  
Student Research Committee,  
Abadan School of Medical Sciences,  
Abadan, Iran

## Abstract

Determining the course of the disease and its changes over time can be of great importance in assessing the rate and manner of access to the strategies used to control illnesses.

This retrospective descriptive-analytic study was carried out with a survey of patients with tuberculosis in the affiliated cities of the Abadan School of Medical Sciences during a period of 5 years. The required data were collected from the "TB Register" software as well as information registered by TB health experts. The Kolmogorov Smirnov, Independent-T, Mann Whitney U and Wilcoxon tests were used for analysis of data using SPSS 22- software.

In this study, 720 patients with tuberculosis were studied, of whom 62.9% were male. 73.6% of patients lived in urban areas. The prevalence of tuberculosis is 22.34 per 100,000 population, of which 15.36 per 100,000 is pulmonary tuberculosis. Mean age of patients was 41.39 (SD±17.69) years with a range of 4-92 years.

Considering the fact that tuberculosis is a life-limiting disease and is most prevalent in the young age group of society, who are considered as the main capital and workforce, educating people who are at risk can significantly contribute to the prevention of disease.

**Key words:** Epidemiology, Tuberculosis, Abadan

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## Introduction

Today, tuberculosis is one of the biggest health problems in the world. The disease burden of Tuberculosis (TB), the major cause of death from single-agent infectious diseases in the world (even more than AIDS, malaria and measles), ranks tenth in terms of the global burden of disease (1, 2). One in three people in the world is suspected to have been infected with TB, and one person is added every second (1, 3). In 2015, 10.4 million people worldwide have been infected with TB, with an estimated 1.8 million deaths. Also, more than 95% of deaths from TB occur in low-to-middle-income countries where 75% of the cases are seen in the economically active age group (15-54 years) (3-5).

In the last few decades, TB prevalence has decreased sharply in Iran; that is to say the prevalence rate decreased from 142 cases per 100,000 populations in 1964 to 12.59 per 100,000 populations in 2015, which indicates a decrease of more than tenfold. Further, the highest TB incidence rate belonged to the population aged 65 and above (3, 6). Since Iran is a neighbor of Afghanistan and Pakistan, which are among the countries with the highest burden, as well as Iraq (due to its crisis in recent years) and the newly independent countries of northern Iran, which suffer from a high prevalence of multi-drug resistant TB, there is need to pay more attention to the disease (1, 3, 7).

Considering the emphasis of the national program of TB control of case finding and treatment of patients, it seems necessary to identify the distribution pattern of the disease and determine its associated factors; thus considering this necessity and considering that the city of Abadan is adjacent to Iraq, the need for this study is highlighted more than before.

## Material and Methods

The present study is a retrospective descriptive-analytic study that was carried out with a survey of people with tuberculosis in the affiliated cities of the Abadan Faculty of Medical Sciences during a period of 5 years from 2012 to 2016. The study was conducted in the cities of Abadan (30° 20'21"N 48°18'15" E), Shadegan and Khorramshahr respectively with a population of 298,090, 138,480 and 170,976 that are located in Khuzestan province, southwest of Iran. In this study, patients' information was collected by referring to the health department of Abadan Faculty of Medical Sciences and using special software for registering patients with TB (TB Register) as well as information registered by TB health experts. Individuals included in the study were all patients with TB who were identified and treated according to the Ministry of Health's protocol. Data collected including age, gender, place of residence, type of TB, successful or unsuccessful treatment, death etc. were analyzed using SPSS ver. 22. Statistical analysis was performed using descriptive statistics (frequency, mean, minimum and maximum, number of data and standard deviation) to obtain preliminary information. With regard to

inferential statistics, Kolmogorov Smirnov test was used to determine the normality of variables and the Independent-T, Mann Whitney U and Wilcoxon tests were used for further analysis. To reject or accept the assumptions, P-value = 0.05 was used and the results were considered significant at (P < 0.05).

## Results and Discussion

Over a 5-year period of research, a total of 720 TB patients were identified in 3 of the surveyed cities, of which 18.9%, 25.3%, 17.5%, 18.1% and 20.3% of TB cases related to 2012, 2013, 2014, 2015 and 2016 (Figure 1). Figure 2 shows the number of TB cases in the selected cities. Of these, 89.7%, 4.2%, 4.3%, 1.3% and 0.4% included, respectively, new TB cases, relapsed TB cases, other cases, transmitted cases and treatment after absenteeism cases, and there was a significant difference between them.

The mean age of patients with TB was 41.39±17.69 with an age range of 4 to 92 years, of which 453 (62.9%) and 267 (37.1%) were male and female respectively, which shows a statistically significant difference. The mean age of men and women is 40.31 ± 16.29 and 43.21±19.73 respectively, which is not statistically significant. The results are calculated separately for urban and rural areas that show 530 (73.6%) and 190 (26.4%) of them lived in the urban and rural areas respectively, which shows a statistically significant difference. Table 1 provides a summary of the demographic data of TB patients based on information obtained from the Department of Health of Abadan Faculty of Medical Sciences.

The results of data analysis show that 33.9%, 17.6%, 3.9% and 0.7% of the patients were married, single, divorced and patients with deceased spouses, and there was a significant difference among them pairwise from this point of view; i.e. the number of married people is more than single, more than divorced and more than a patient with a dead spouse. The data show that the literacy level of TB patients is significantly different, with 16.3% of illiterate patients, 17.4% of elementary education, 14.3% of secondary education, 6.1% of secondary education and diploma and 2.1% university degree. The following results were obtained with regard to the total number of individuals identified: completed the treatment period: 39.4%, recovery rate: 34.2%, death rate: 7.5%, wrong diagnosis: 3.2%, absence from the treatment period: 4.2%, were treatment failure: 2.8%, transmitted cases: 0.8% and ongoing treatment process: 7.9%. The results of TB treatment shows a significant difference. Of the total population, 54 deaths were reported from TB patients, of which 70.4%, 20.4%, 9.3% and 9.3% died due to other causes, unknown reasons and tuberculosis. There death causes differ significantly (Figure 3). In this study, a total of 720 TB cases were investigated in Abadan city over the past 5 years. The prevalence of TB and pulmonary TB was 22.34 and 36.15 per 100,000 people, respectively. The same prevalence rate was 22.34 and 17.52 per 100,000 inhabitants in the urban and rural areas, respectively.

Figure 1: Frequency of TB Patients Referred to Abadan Health Center (2012-2016)

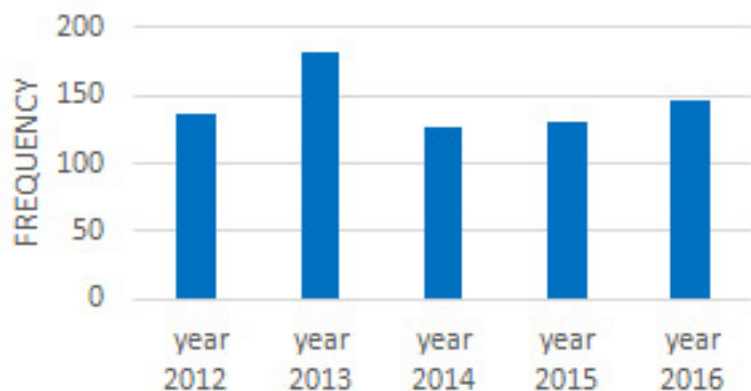


Figure 2: Frequency of TB Patients according to Cities

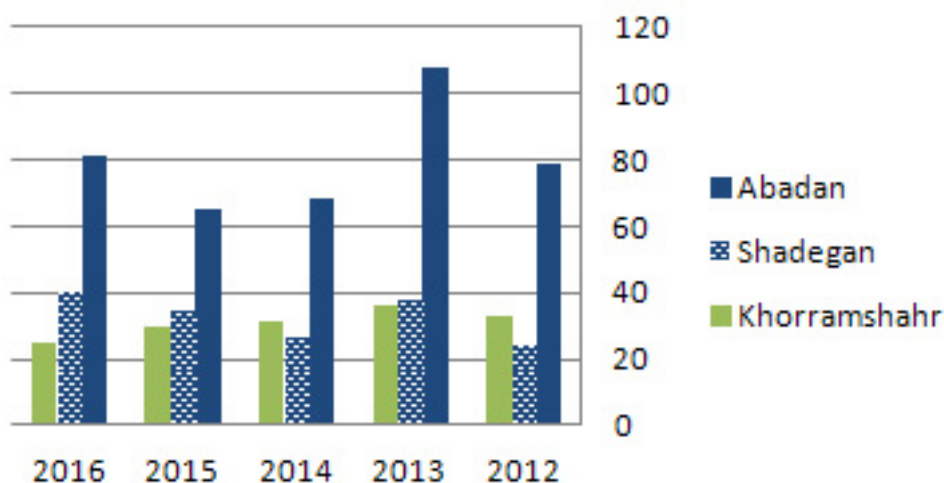
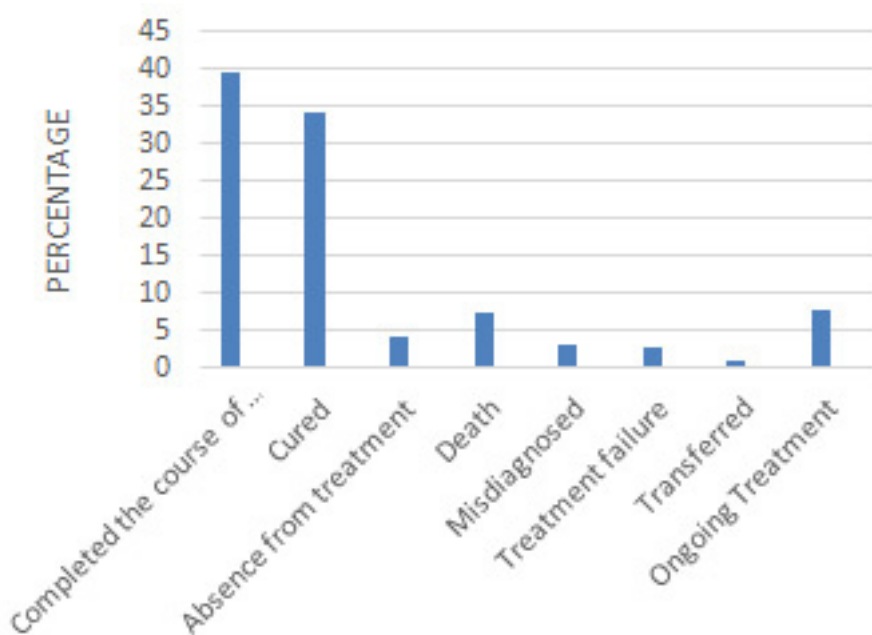


Figure 3: Percentage of Treatment results in TB Patients Referred to Abadan Health Centers (2012-2016)



		Frequency	Percent	Significance level
Gender	Male	453	62.9	P-Value=0.000
	Female	267	37.1	
Living place	Urban	530	73.6	P-Value=0.000
	Rural	190	26.4	
Marital status	Married	244	33.9	P-Value=0.000
	Single	127	17.6	
	Divorced	28	3.9	
	Others	5	.7	
	Total	404	56.1	
Prison	Yes	18	2.5	P-Value=0.000
	No	702	97.5	
Age groups	<9	11	1.5	P-Value=0.000
	10-19	39	5.4	
	20-29	143	19.9	
	30-39	192	26.7	
	40-49	113	15.7	
	50-59	103	14.3	
	60-69	59	8.2	
	70-79	36	5.0	
+80	24	3.3		
Education	Illiterate	117	16.3	P-Value=0.000
	Primary school	125	17.4	
	Under high school	103	14.3	
	High school	44	6.1	
	Academic	15	2.1	
	Total	404	56.1	
TB type	Extra-pulmonary TB	189	26.3	P-Value=0.000
	Pulmonary TB	531	73.8	
Type	New	646	89.7	P-Value=0.000
	Relapse	31	4.3	
	Others	31	4.3	
	Imported	9	1.3	
	Treating after absence	3	.4	

Figure 4 shows that the prevalence of tuberculosis in men and women living in the urban and rural areas was 27.11, 17.28 and 22.23 12.69 per 100,000 people, respectively. The prevalence of pulmonary tuberculosis was 15.36 per 100,000 people during the last 5 years. The same prevalence rate was 22.34 and 17.52 per 100,000 people, respectively. Figure 5 shows the frequency of TB patients per 100,000 people based on their place of residence for different age groups.

The findings of this study revealed that the highest number of TB patients is seen in the age group of 30-39 years, which is true in both the urban and rural groups, and then the age group of 20-29 years is placed in the next ranking. Nikbakht et al. in their study in Babol city reported the age group of 18-38 years as the group with highest number of

tuberculosis patients (7). Gholami et al. in a study in Urmia found that the highest number of people with tuberculosis was seen in the age group of 40 -31 years (8). Noeske et al. also reported that most of the TB patients belonged to the age group of 25-34 years in Cameroon(5). In a study in Hamedan province, Khazaei et al. (6) reported that the largest TB cases occur in the age group over 60 years old, which is more consistent with the TB pattern of the whole country (7). It seems that the high number of affected people in the age group of 20-39 years old is due to the high population of this age group and the high prevalence of addiction among them. In the present study, the mean age of the patients studied was  $41.39 \pm 17.79$  years with an age range of 4 to 92 years. Also, men accounted for the largest number of patients. In a study in northern Iran (9), Babamahmoodi et al. reported that the mean age

Figure 4: Tuberculosis incidence rate in Abadan Health Centers (2012-2016)

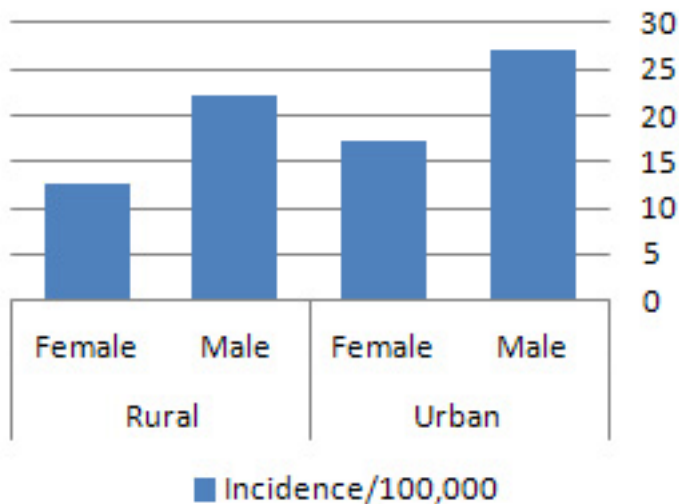
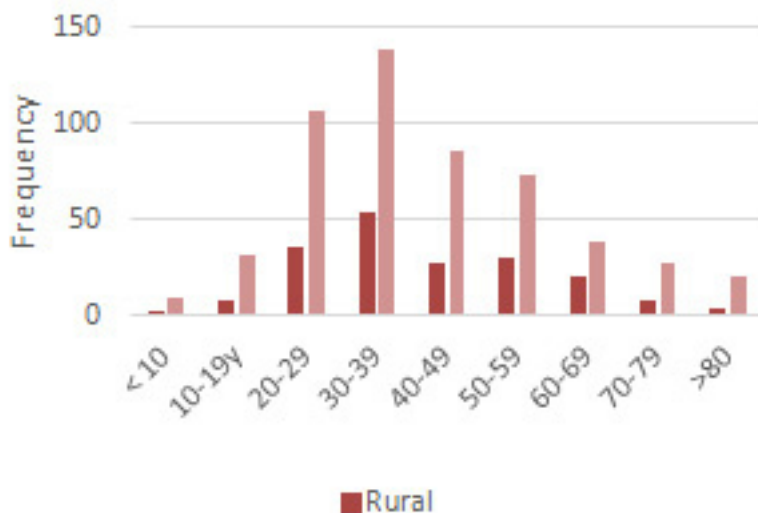


Figure 5: Tuberculosis incidence rate in Abadan Health Centers (2012-2016) according to living place



for women and men was 50.57 and 51.14 respectively, and the majority of patients were male. Fronti and Hoa have also reported a higher incidence of the disease among men in their studies (10, 11). In a study in France, Cavalli reported a mean age of 40 years for patients (12). According to World Health Statistics, men were affected by the disease more than women (4). In a study, the most patients were affected by new cases of disease (89.8%). Hoa et al. (11) also reported the highest incidence of new cases. In general, the prevalence of the disease and pulmonary tuberculosis in this study was 22.34 and 15.36 per 100,000 people respectively, which was higher than the average prevalence of tuberculosis in the whole of Iran (3), which is 12.6 per 100,000 people for all TB cases and 8.57 per 100,000 for pulmonary tuberculosis. The prevalence rate reported in Cavalli et al.'s study (France) (12) and Fronti's study (Italy) is 8.7 and 7.42 per 100,000 people, respectively.

## Conclusions

Considering the fact that tuberculosis is a life-limiting disease and is most prevalent in the younger age group of society that is considered as the main capital and workforce, educating people who at risk can significantly contribute to the prevention and spread of disease.

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