Investigating the Tuberculosis condition in Khuzestan province during 2005-2012

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Abstract

Introduction: Nowadays, despite socio-economic development of communities and controlling majority of communicable diseases, tuberculosis is still one of the main causes of mortality and disability in developing countries. With respect to importance and high incidence of tuberculosis in marginal provinces, the present study aimed to assess the epidemiology of Tuberculosis in Khuzestan province during 2005-2012.
Materials and methods: This is a retrospective descriptive-analytical study. Documents of 6363 patients were assessed using the census sampling method. Demographic variables and other necessary data were recorded by TB-Register software and then these data were analyzed through SPSS-16 software. Chi-square and Independent T tests with a significance level of less than 5% were used for the statistical analysis. Poisson test was used to compare TB incidence in consecutive years.
Results: The mean age of participants was 39.3 ± 18 years old. The women's mean age was 2.1 years older than men and there was a significant relationship between age of males and females (P = 0.0001). Cumulative incidence was 148.84/100,000 in the province. More than three quarters (75.7%) were diagnosed as pulmonary tuberculosis, HIV infected (2.7%) and 91.2% were new cases in total. Lymph nodes were the most prevalent in Non-pulmonary TB. Poisson test showed that changing trends of TB incidence was statistically significant in study years ($p<0.05$).
Conclusion: Increasing HIV infection occurrence and TB in southwest of Iran is of the great concerns for public health. Screening, training and preventive activities for controlling of disease is highly recommended for the whole country and in margin provinces in particular.

Keywords: Epidemiology, Khuzestan, Tuberculosis

Introduction

Tuberculosis is a life-threatening infectious disease and represents a wide spectrum of clinical diseases mainly caused by Mycobacterium tuberculosis (1). Tuberculosis can infect the whole body but the most common form of the disease (more than 80% cases), is pulmonary tuberculosis which has two kinds of positive sputum smear and negative sputum smear. TB infection is usually transmitted through inhalation. After entrance into lung, TB germ makes the primary lesion and can spear to other parts of body through bloodstream, lymphatic vessels, and bronchi (2). Nearly 1/3 of the world's people are infected by

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Tuberculosis and 8 million new cases are added to their number per year and almost 3 million die because of this disease (3, 5). Problems that increase the burden of TB are wrong treatment, creating bacilli resistant to existing drugs and pandemic HIV. In 1993, the World Health Organization declared TB as a global emergency development (6).

Based on the sequence of the global burden of disease based on DALY, Tuberculosis was 7th in 1990. It is expected to remain in this category until 2020, whereas other infectious diseases have fallen to lower ranks (7).

It is necessary to pay more attention than before to Tuberculosis since Iran is neighboring with Pakistan and Afghanistan and Iraq with Political crises in recent years (8). In a study conducted by Farchi and partners in Ilatzio in Italy, most cases were in the age group of 10-14 years (9). Moeini in TB patient's assessment in Valiasr hospital in Arak found that 65% were pulmonary Tuberculosis and Afghan refugees constituted 7% of pulmonary tuberculosis cases (10). From 840 TB patients in Birjand during 1996-2006, 57.4% were female among whom 30% had pulmonary TB (11).

Conducting extensive research regarding the prevalence and effective factors on TB in all areas of Iran can help scholars to conduct applied research. Since Iran is a vast land with different weather, TB prevalence will be certainly different in the country. The migration from neighboring countries has added number of people with TB and its transmission to other individuals. One of TB assessment benefits is to identify the area with high prevalence that helps Health care planners to apply effective strategies. So, the aim of this study was the assessment of TB and determination of epidemiologic aspect in Khuzestan province during 2005-2012.

Materials and methods

This was a retrospective analytical-descriptive study conducted in Khuzestan province. Data was gathered from TB patients' document from 2005 until the end of shahrivar 2012. The available sampling method was used.

Demographic variables included age, gender, residence place (urban or rural), city and epidemiological and clinical data including pulmonary and non-pulmonary TB, treatment result, HIV infection, drug complications, drug group (5 diet drug or 4 diet drug) and result of chest radiography logged by TB-Register software, and data analyzed in SPSS-16 software and chi-Square test, independent T-test in Significant level below 5%. To calculate the annual incidence, mid-year population was used to calculate the cumulative incidence in 2005.

Because of the negligible population changes during two consecutive years, the low probability of TB in the community (p is low), and high population (n is large), new cases is n = Np, is Poisson distribution and mean and variance is n.

For comparing two Poisson distributions, we can use the following formula:

$$w = \frac{n_1 - n_2}{\sqrt{n_1 + n_2}^2}$$

Where n_1 is new TB cases in second year and n_2 is new TB cases in first year. The above method was used for incidence rate comparing of TB during two consecutive years in Khuzestan province.

Results

In this study, 6363 TB patients with the mean age of 39.3 ± 18 years, age median 35 ± 6.5 years were assessment that 56.6% (3603 cases) were male with the mean age of 38.4 ± 16.6 years, and 43.4% (2760 cases) were female with the mean age of 40.6 ± 20.3. The average female's mean age was 2.1 years more than male's mean age that was statistically significant by independent t-test (P = 0.0001) (Table 1). The most common age range was 25-34 years 26.6 % (1690 cases) then 15-24 years 19.5 % (1242 cases) and 46.1% of total TB patients were 15-34 years. The

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minimal cases were 0-4 years 0.5% (30 cases) (Table 2).

Table1. Male and female mean age of TB patients in Khuzestan during 2005-2012.

Gender	Number	Age mean	Standard deviation	Freedom degree	P-value*
Male	3603	38.44	16.65	6361	0.0001
Female	2760	40.60	20.36		

* In depended T test

Table 2. Distribution of TB patients in Khuzestan province according to age groups during 2005-2012.

Age group	Frequency	Frequency Percentage
0-4	30	0.5
5-9	39	0.6
10-14	139	2.2
15-24	1242	19.5
25-34	1690	26.6
35-44	1041	16.4
45-54	785	12.3
55-64	562	8.8
65 &more	835	13.1
Total	6363	100

The cumulative incidence rate in Khuzestan province was 148.84 in 100000. Andimeshk with 205.3 in 100000 and Ramshir with 199.6 in 100000 had the most cumulative incidence rates, whereas Ahvaz and Dezfol were the most crowded cities in Khuzestan province having 187.94 and 153.4 cumulative incidence rates in 100000, respectively.

Cumulative incidence rate was different in three medical universities of Khuzestan. Abadan medical university with 155.5 in 100000 had the highest rate and Dezful medical university with 142.14 in 100000 had the lowest rate and the cumulative incidence rate of Ahvaz medical university was 148.45 in 100000. Nearly more than 3.4 of patients (75.7%) were pulmonary TB and less than 1.4 (24.3%) were non-pulmonary TB. So, 83% (29.9 cases) of males were pulmonary TB and 33.9% (935 cases) of females were non-pulmonary TB (Table 3). There was a statistical significant relationship between the type of TB and gender (OR=2.50; 95% CI= 2.23-2.82; P=0.0001).

Table3. Gender distribution of TB patients of Khuzestan province according to type of TB.

Gender	Number	Percentage	P-value*
Male	**3603**	**56.6**	0.0001
Pulmonary	29.92	83	
Non-pulmonary	611	17	
Female	**2760**	**43.4**	
Pulmonary	1825	66.1	
Non-pulmonary	935	33.9	

*P-value computed using Chi-square test

Nearly 92.8% (5905) persons had 4 diet drugs, 6.7% (428 cases) had 5 diet drugs and 0.1% had the other drug groups, and nearly 0.3% had unknown drug group. Cumulative incidence rate in urban areas and in rural areas was 176.81 and 89.82, respectively. Among people who were traveling life was 216.79 in 100000. Totally, 8.4% (534 cases) of patients had prison history. Among patients, 11.7%

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(745 cases) were considered. 23.35% (174 persons) of them were HIV infected and 76.65% (571 cases) were HIV negative while 88.3% (5618 cases) were not considering for HIV. Results showed that 22.2% (1414 cases) of patients had a history of hospitalization due to TB. Among cases, 91.2% (5800 cases) were new cases, 1.7% (107 cases) was incoming cases and 4% (257 cases) had recurrence of TB.In non-pulmonary TB cases, lymphatic glands had the most frequency with 35.1% (542 cases) and central nerves system had the lowest frequency with 1.8% (16 cases) (Diagram 1). Chest radiographic results showed that 28.4% had high syndromes of TB, 8% had low syndromes of TB and 2.8% had negative result and results were unknown for 60.9% of them. There was a statistical significant relationship between chest radiography and treatment result by chi-square test (p=0.0001). The annual incidence of TB during the period was variable so that the highest rate was in 2011 with 20.39 in 100000 and the lowest rate was in 2009 with 17.04 in 100000(Table 4). Changes in the incidence of TB were significant during 2007-2008, 2008-2009, 2009-2010 by poison distribution ($p < 0.05$).

Table 4. Annual incidence rate of TB in Khuzestan province during 2005-2012.

Year	Number of reported cases	Mid-year population	Incidence rate per 100000
2005	850	4274979	19.88
2006	826	4274979	19.32
2007	876	4324996	20.25
2008	846	4375598	17.04
2009	826	4426792	18.65
2010	910	4478585	20.31
2011	924	4531720	20.39
2012	405	2292370	17.66

Discussion

According to the 1390 census, Khuzestan province was the 5th populated province in Iran. Since the present study evaluated a large number of people with tuberculosis, the results of the study can be generalized to other populations and can help health planners to control Tuberculosis.

Cases of this study were more in the age group of 25-34 (26.6%), while in a study conducted by Mohammadpour et al. in Gonabad (12) most cases of diseases were 60-80 years and in study of Alaie et al. in Kermanshah (13) most number of cases were 61-70 years. In a study done by Farchi et al in Italy a large number of patients were in 10-24 years (9). According to results of this study and since most cases were in economically active age groups, TB disease can damage family economy ultimately to economic cycles of country. The patients mean age was 39/3 years, while in the study of Amany et al. in Ardebil (14) the mean age was 42 years. In the study of Ebrahim zadeh et al in Birjand (11) the mean age was 48.9 years while in the study conducted by Kiyani et al in Zahedan (15) the mean age was 49 years. In the study of Mohammadpour et al in Gonabad (12) the mean age was 45.4 years, while in a study conducted by Charaty et al in Mazandaran (16) the male's mean age was 47.5 years while female's mean age was 46.3 years.

Considering TB type in this study, 75.7% were pulmonary TB and 24.3% were non-pulmonary TB, while in a study conducted by Mohammady Azani et al in Damqhan, 88.76% were pulmonary TB and 11.24% were non-pulmonary TB (17). In the study of Metanat et al in southeastern Iran, 72% were pulmonary and 28% were reported as non-pulmonary cases (18).

HIV infection weakens the immune system and plays a decisive role in susceptibility

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to certain infectious diseases such as Tuberculosis. In this study, 2.7% of TB patients were HIV infected and 9% were free from HIV and situation of 88.3% were unknown while in the study conducted by Sufiyan et al in Arak only 0.4% of cases were HIV infected (19).

In non-pulmonary TB, the most involved organs were lymphatic glands following pleural involvement and bone. This result corresponded with the study of Ebrahimzadeh et al (lymphatic glands, Spinal and pleural) (11), Sufiyan et al (lymphatic glands, bone and joint)(19) and Mohammadi Azeni et al (lymphatic glands, bone and GI system) (17).

In this study, 56.6% were male and 43.4% were female while in Sufiyan et al study, 38.1% were male and 61.9% were female (19). In a study conducted by Gholami et al in Orumiyeh, 66.1% were male and 33.9% were female (20), while in Mohammadi Azeni et al study, 50.5% were male and 49.5% were female (17).

Limitations of the study

This study was retrospective and data was collected from existing health records. For this reason, it was not possible to assess some variables such as smoking, taking corticosteroids, sanitary lodging, etc. It is recommended that health center forms be completed with the above variables. Now, HIV experiments are performed only for those suspected and at risk people. Due to having the greatest impact of concurrent TB/HIV on treatment trend, it is expected that HIV test is implemented for TB patients before starting treatment and it is in health documents so that it will be a valuable data sources for future researches.

Conclusion

Considering the percentage of people who are infected with HIV and TB simultaneously, (23.35%) were high. A high percentage of TB patients (88.3%) were unaware about HIV infection situation and since HIV infection Predispose TB infection is a public health concern, screening and early diagnosis of infections, training and protective measures to prevent the occurrence of Tuberculosis is recommended. Also, due to the high incidence of tuberculosis in province, the low mean age (39.3±18) and age median (35±6.5) and high percentage of pulmonary tuberculosis (75.7%), measures of prognosis, treatment and prevention of tuberculosis in health care systems is necessary to follow up seriously.

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