

Epidemiology of tuberculosis among Afghan immigrants in Fars province, southern Islamic Republic of Iran

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وبائيات السل بين المهاجرين الأفغان في محافظة فارس الإيرانية الجنوبية
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الخلاصة: ترتفع معدلات الإصابة بالسل بين المهاجرين من بلدان يكثر فيها وقوع المرض. وقد تناولت هذه الدراسة وبائيات السل بين المهاجرين الأفغان في محافظة فارس، في جنوب جمهورية إيران الإسلامية. فقد أُجري فحص للسجلات، بين نيسان/إبريل 2000 ونيسان/إبريل 2002، لاستكشاف المرضى بالسل من ذوي الأصول الأفغانية المسجلين بجامعة شيراز للعلوم الطبية. وقد كشفت الدراسة عن وجود 371 مريضاً بالسل (208 من الذكور و163 من الإناث)، وكانت نسبة 74.9٪ منهم مصابين بسل رئوي، و25.1٪ بسل خارج الرئة. ومن بين الحالات الجديدة بالسل الرئوي، البالغ عددها 278 حالة، كان 157 مريضاً منهم (أي نسبة 56.5٪) إيجابياً لطاخة البلغم، و121 مريضاً (أي نسبة 43.5٪) سلبياً لطاخة البلغم. وكان معدل وقوع السل لكل 100 000 من السكان الأفغان في محافظة فارس هو 96.2 في عام 2000، و88.2 في عام 2001، و63.5 في عام 2002.

ABSTRACT Rates of tuberculosis are high among migrants from high-incidence countries. This study determined the epidemiology of tuberculosis among Afghan immigrants in Fars province, southern Islamic Republic of Iran. From April 2000 to April 2002, all records were examined for new tuberculosis patients of Afghan origin registered at Shiraz University of Medical Sciences. A total of 371 patients (208 males, 163 females) were found: 74.9% pulmonary and 25.1% extrapulmonary cases. Of the 278 new cases of pulmonary tuberculosis, 157 (56.5%) were sputum smear-positive and 121 (43.5%) were sputum smear-negative. The incidence of tuberculosis per 100 000 Afghan population in Fars province was estimated at 96.2, 88.2 and 63.5 in 2000, 2001 and 2002 respectively.

Épidémiologie de la tuberculose chez les immigrants afghans de la province de Fars, au sud de la République islamique d'Iran

RÉSUMÉ Le taux de tuberculose est particulièrement élevé parmi les migrants originaires de pays où l'incidence de cette maladie est forte. Cette étude s'est proposé de déterminer l'épidémiologie de la tuberculose chez les immigrants afghans dans la province de Fars, au sud de la République islamique d'Iran. Entre avril 2000 et avril 2002, tous les dossiers médicaux ont été analysés afin d'identifier les nouveaux cas de tuberculose chez les patients d'origine afghane enregistrés auprès de l'Université des Sciences médicales de Shiraz. Cette recherche a abouti à l'identification de 371 cas (208 hommes et 163 femmes), à savoir 74,9 % de tuberculose pulmonaire et 25,1 % de tuberculose extrapulmonaire. Sur les 278 nouveaux cas de tuberculose pulmonaire, 157 (56,5 %) présentaient des cultures d'expectorations positives et 121 (43,5 %) des cultures négatives. Parmi la population afghane de la province de Fars, l'incidence de la tuberculose pour 100 000 habitants a été estimée respectivement à 96,2, 88,2 et 63,5 pour les années 2000, 2001 et 2002.

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Introduction

Since 1980, the world has experienced 3 major epidemics of tuberculosis (TB). One reason for this may be an increase in population movements from endemic to non-endemic areas. Studies in developed countries have shown that two thirds of TB cases were among racial and ethnic minorities [1]. The incidence of pulmonary TB among migrants from high-incidence countries remains high for at least a decade after immigration [2], perhaps due to reactivation of old infections and transmission of infections after immigration. Migrants also suffer disproportionately from poverty and malnutrition which are important factors in vulnerability to TB.

The increase in morbidity and mortality of TB in high-burden countries has become a major health problem in the Eastern Mediterranean Region. In 2002, the number of affected patients per annum in the Region was reported to be 630 000, with 136 000 annual deaths. Among them, 43% were from Pakistan, 12% from Afghanistan and 6% from the Islamic Republic of Iran [3]. In the latest World Health Organization (WHO) report, the incidence of TB in Afghanistan was estimated to be 314 per 100 000 population [3].

In the past decade, poor progress has been noticed in implementing the WHO recommended treatment strategy—directly observed treatment, short-course (DOTS)—in the 22 high-burden countries [3]. Afghanistan, Pakistan, India, Brazil and South Africa are among the countries still facing challenges in implementation and expansion of DOTS [4]. In Afghanistan, the situation has worsened due to cessation of disease control activities during the war. Compliance of patients with DOTS and access to treatment have become very difficult and TB is still considered a major public health problem both inside Afghanistan and

in neighbouring countries such as Pakistan and the Islamic Republic of Iran [5].

In previous studies in the Islamic Republic of Iran during 1992 to 1994, the incidence of TB was 86 per 100 000 among Afghan migrants, who formed 4% of the total population of Fars province [6]. In spite of the rise in the Afghan population in 1995 and 1996 (to 13% of the total Iranian population) [7], no further study was made on the incidence of TB. However, in 1998, 17% of TB patients were Afghan, an incidence of 38 per 100 000, which was lower than the expected rate [8].

In 2000, a census, the Foreign Citizen's Identification Programme, was carried out in Fars province, and the number of non-Iranians was determined to be 154 620 (149 654 Afghan) out of a population of 3.5 million. Due to the high incidence of TB in Afghanistan and high rate of illegal migration to the Islamic Republic of Iran and especially to Fars province, we conducted this study to evaluate the epidemiology of TB in Afghans in southern Islamic Republic of Iran.

Methods

In a descriptive epidemiological study, from April 2000 to April 2002, all new Afghan patients registered to receive care for TB at the public health centres of Shiraz University of Medical Sciences were entered into our study. The information source for the Afghan population was the Foreign Citizen Identification Programme in Fars province which identified illegal immigrants for security reasons. The patients were invited for interview by trained assessors using a standardized tool. Information was recorded in a questionnaire that covered demographic data, type of TB, method of diagnosis, X-ray data, clinical signs and symptoms, start of symptoms, history of TB medication,

previous contact with the disease and dates of referral.

Every patient underwent chest X-ray by a skilled radiographer and the diagnosis of TB was confirmed by clinical evaluations, and sputum smears (Ziehl–Nielsen acid-fast stain) and culture were performed by a laboratory technologist.

The data were statistically analysed by SPSS, version 11.0, and Microsoft Excel software. Cross tabulation, chi-squared test, Student *t*-test, one-way analysis of variance, and one-way Kolmogorov–Smirnov tests were used for statistical analysis and *P* < 0.05 was considered significant.

Results

Among 1026 new cases of TB at the public health centres of Shiraz University of Medical Sciences, 371 (36.2%) were among patients of Afghan nationality. More than half of the Afghan patients (56.1%, *n* = 208) were males; 213 (57.5%) were married and 158 (42.5%) were single; 308 (83.0%) lived in urban areas and 63 (17.0%) in rural areas of the province.

The mean (standard deviation) age of the patients was 27.6 (3.1) years. Table 1 shows new cases of TB among Afghans in different years in relation to age. The greatest proportion of cases (30.7%) were aged 15–24 years and two-thirds of cases (66.8%) were aged 15–44 years.

Table 2 shows the new cases in relation to place of residence. The total number of cases decreased between 2000 and 2002 while the majority of cases were in Shiraz, the capital of Fars province and Larestan. The numbers of new cases were 144, 132 and 95 in years 2000, 2001 and 2002 respectively. Using population data from the year 2000, the incidence of TB among Afghan immigrants in Fars province was estimated at 96.2%, 88.2% and 63.5% in years 2000, 2001 and 2002. Table 2 also shows that the number of TB cases among Afghans in Fars province were lower than the expected rate for Afghanistan residents of 314 per 100 000 according to WHO [3].

Pulmonary TB was more common than extrapulmonary TB: 74.9% of cases versus 25.1%. Of the 278 new cases of pulmonary TB, 157 (56.5%) cases were sputum smear-

Table 1 Age and sex distribution of 371 Afghans with tuberculosis in Fars province of Islamic Republic of Iran

Age (years)	Year 2000			Year 2001			Year 2002			Total	
	No.	M/F	%	No.	M/F	%	No.	M/F	%	No.	%
0–4	5	2/3	3.5	5	4/1	3.8	6	3/3	6.3	16	4.3
5–9	9	4/5	6.3	1	0/1	0.8	8	5/3	8.4	18	4.9
10–14	11	6/5	7.6	4	2/2	3.0	5	3/2	5.3	20	5.4
15–24	39	22/17	27.1	44	27/17	33.3	31	16/15	32.6	114	30.7
25–34	32	19/13	22.2	37	25/12	28.0	21	11/10	22.1	90	24.3
35–44	17	9/8	11.8	20	14/6	15.2	6	4/2	6.3	43	11.6
45–54	14	8/6	9.7	5	3/2	3.8	6	4/2	6.3	25	6.7
55–64	9	5/4	6.3	9	5/4	6.8	8	3/5	8.4	26	7.0
> 65	8	4/4	5.6	7	3/4	5.3	4	1/3	4.2	19	5.1
Total	144	79/65	100.0	132	83/49	100.0	95	50/45	100.0	371	100.0

M/F = No. of males/No. of females.

Table 2 Incidence of tuberculosis per 100 000 Afghan population in different cities of Fars province in years 2000–02

City	Afghan population ^a No.	Year 2000		Year 2001		Year 2002		Expected ^b No.
		No.	/100 000	No.	/100 000	No.	/100 000	
Shiraz	95 551	90	94.2	61	63.9	61	63.9	300
Larestan	14 527	17	117.0	12	82.6	8	55.2	45
Marvdasht	6 118	9	147.6	7	114.8	3	49.2	19
Jahrom	5 810	6	103.3	8	137.7	7	120.5	18
Darab	4 529	4	88.3	8	176.6	2	44.1	14
Lamerd	4 647	1	21.5	4	86.1	1	21.5	13
Neyreez	3 624	3	82.7	4	110.0	3	82.7	11
Fassa	2 337	0	–	0	–	2	85.6	7
Eghleed	2 115	1	47.3	4	189.1	3	141.8	6
Kazeroun	2 288	0	–	3	131.1	1	131.1	6
Arsanjan	2 066	4	193.6	3	145.2	0	–	5
Mamassani	1 300	1	77.0	2	153.8	0	–	4
Firouz-Abaad	823	6	729.0	8	972.1	2	243.0	3
Estahban	930	0	–	1	107.5	0	0.0	3
Abadeh	1 164	2	171.8	5	429.5	1	85.9	3
Khorambeed	667	0	–	0	–	1	149.9	2
Sepidan	784	0	–	2	255.1	0	–	2
Bovanat	372	0	–	0	–	0	–	1
Total	149 654	144	96.2	132	88.2	95	63.5	462

^aReport of Foreign Citizen's Identification Programme, Fars Province, 2000.

^bWHO estimates [3].

positive and 121 (43.5%) were sputum smear-negative. Of the 93 cases of extrapulmonary TB, the most common type was lymphoid TB ($n = 25$, 26.9%) (Table 3). The rates of extrapulmonary TB decreased over the 3 years 2000, 2001 and 2002 (30%, 24% and 19% respectively), and correspondingly the rate of pulmonary TB increased over 2000–02.

In year 2000, pulmonary TB was significantly more common in males than females, while extrapulmonary TB was significantly higher in females ($P = 0.002$). These results were similar for years 2001 ($P = 0.031$)

as well as the total for years 2000–02 ($P = 0.001$).

Discussion

In this study the average incidence of TB in Afghan immigrants of Fars province over the 3 years was 82.6 per 100 000 population. According to Ministry of Health data, the incidence of TB among the Iranian population of Fars Province from 2000–02 was 5.2 per 100 000, 16 times less than among Afghans [3].

Table 3 Frequency of pulmonary and extrapulmonary tuberculosis among the Afghan population of Fars province in years 2000–02

Type of tuberculosis	Year 2000		Year 2001		Year 2002		Total			
	Males No.	Females No.	Males No.	Females No.	Males No.	Females No.	Males No.	Females %		
<i>Pulmonary, smear-positive</i>	39	18	37	23	25	15	101	47.2	56	35.6
<i>Pulmonary, smear-negative</i>	25	19	31	9	17	20	73	34.1	48	30.6
<i>Extrapulmonary</i>	15	28	15	17	8	10	40	18.7	53	33.7
Lymphoid system	3	5	4	5	4	4	11		14	
Miliary system	4	7	2	3	1	0	6		11	
Pleurisies	2	3	3	3	2	1	6		8	
Bone	2	5	3	2	1	2	7		8	
Gastrointestinal tract	1	3	1	1	0	0	2		4	
Central/peripheral nervous system	1	2	0	1	0	1	2		3	
Reproductive system	1	2	1	1	0	1	3		3	
Urinary system	0	1	1	0	0	0	1		1	
Soft tissue	1	0	0	1	0	1	0		1	
<i>Total</i>	79	65	83	49	50	45	214	100.0	157	100.0

The incidence of TB in this group appeared to decrease from 93.4 per 100 000 in year 2000 to 61.4 per 100 000 in year 2002. In view of an expected incidence of 314 per 100 000 population in Fars province based on WHO data [3], the low incidence rate may be explained by deficiencies in case-finding or by the return of Afghans to their home country. In Afghanistan there is inadequate case-finding in the health system, insufficient personnel, poor education of the community, low levels of cooperation with national TB programmes and involvement of the private sector without sufficient education about TB control programmes in the treatment of patients [5]. However, the total rate of case-finding among Afghans in Fars province was much higher than programmes performed in Afghanistan [3].

The difference in case-finding in various cities of Fars province may be due to differ-

ent distributions of Afghans in these cities. In 2001, for example, a rate of 972.1 per 100 000 Afghans in Firouz-Abad may be explained by a low Afghan population with a large number of patients. The corresponding rate in Shiraz was 63.9 per 100 000 where the Afghan population of the city is much larger.

Two thirds of patients were aged 15 to 44 years. Similarly, the Iranian Centre for Disease Control reported that the age of most TB cases was above 15 years in other parts of the Islamic Republic of Iran [9]. WHO reports from Afghanistan found that most male TB patients were older than 25 years and the incidence rate increased with age [3]. However, in females, most TB patients were between 25 and 55 years old and after 55 years, the incidence decreased [3]. As the age-sex distribution of the Afghan population was unavailable, an age-sex

comparison between Afghan immigrants in the Islamic Republic of Iran and Afghanistan was not possible.

In our study, smear-positive lung TB was more common in male Afghans (56%) than females (44%). In Afghanistan, the situation appears to be the reverse, with three quarters of smear-positive TB patients being female [5]. This is unlikely to be due to a greater incidence of TB in women, but is probably due to cultural and economic factors. Men in Afghanistan usually control the household income, and therefore when they become ill, they tend to refer themselves to the private sector, where they believe a higher standard of treatment is provided. Unfortunately, since private centres do not report their cases, a lower incidence of TB is reported among men [5]. However, most Afghans who migrate to Islamic Republic of Iran are men who come to search for a job and leave their families in Afghanistan. Additionally, in Fars province, public health services are responsible for the treatment of these patients, and they provide more accurate data through regular reporting systems.

Pulmonary TB in Afghans, in both females and males, was more prevalent than extrapulmonary TB: 74.9% versus 25.1%. In all years, pulmonary TB was significantly more common in males than females, while extrapulmonary TB was significantly higher in females. However, during the 3 years of our study, the average proportion of pulmonary TB cases that were smear-positive was 56.5% which is lower than the expected rate (70%) [3]. This rate varied between 61.0% and 64.5% in all other parts of Islamic Republic of Iran [7–9]. The high rate of smear-negative pulmonary TB compared with smear-positive pulmonary cases (43.5% versus 56.5%) was likely due to delays in diagnosis and treatment of

patients, which results in the progression of the disease to later stages with complications and pulmonary manifestations [2].

The percentage of extrapulmonary TB was 30%, 24% and 19% in the years 2000, 2001 and 2002, respectively. However, the expected rate was 15% [10]. The cause of this high rate, which was also observed in Afghanistan [5], may be due to a weaker system of case-finding of pulmonary TB patients. Lymph node TB was observed more often than other types. This finding was similar to other reports in other parts of the world [1, 4, 5, 11].

In conclusion, since age–sex distribution and accurate number of Afghans resident in Islamic Republic of Iran were not available, the incidence in relation to age and sex could not be compared with data from Afghanistan. Therefore, we recommend the collection of data about the Afghan population in terms of age and sex separately, in order to help accurate calculation of the incidence of disease. Additionally, because new cases of TB were reported even in children below age 14 years, case-finding in these years is recommended. Finally, we recommend organizing specific health centres for Afghan immigrants in south Shiraz, the area in which most Afghan immigrants live. Employing Afghan personnel at Shiraz health centres could improve case-finding and earlier diagnosis of TB patients.

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