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Study of Tuberculous Infection Rate in Townships in a Centeral Province of Iran

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Abstract

Tuberculosis is a continuous threat for health in all parts of the world. An estimated one-third of the world, s population is infected with the *Mycobacterium tuberculosis* and 7 to 8 million people develop TB disease each year. The purpose of this study was to investigate the rate of tuberculosis in the townships of Yazd province, Iran. During the study period (1997-1999), 3885 suspected tuberculosis patients (1820 males and 2065 females; aged 8-85 years) who had been referred to the Yazd referral polyclinic were investigated by Ziehl Neelsen staining and culture method and questionnaire was completed for each subject. Then, Collected data were analyzed by statistical package for social science (SPSS) and chi-square program. The results show that, of the total suspected tuberculosis, 604 cases were found to be positive for tuberculosis. The average annual rate of tuberculosis was 26.8 cases per 100000 population (23.1/100000 males and 31/100000 females). The highest and lowest rates of tuberculosis were observed among Sadough (78.1/100000) and Abarkouh townships population (19.8/100000) and also among age group ≥ 50 years old (111/100000) and < 10 years old (7/100000), respectively. The average annual rates of pulmonary and extra-pulmonary tuberculosis in Yazd province were 152 cases (20.2%) and 48 cases (6.4%), respectively. It seems that, despite the efforts, which have been done for prevention, diagnosis and treatment of patients with tuberculosis, it is still considered as a threat for health in the Yazd province, Iran.

Keywords: *Rate, Tuberculosis, Townships, Yazd province, Iran*

Introduction

Tuberculosis is a disease of significant public health importance worldwide. During the 1980s there was a gradual resurgence of tuberculosis, most notably in industrialized countries where it was thought the disease had been conquered, but also in developing ones (1, 2). In 1990, the number of people with tubercle bacilli infection was estimated to be 1.7 billion or approximately one-third of the world's population (3). The world Health Organization (WHO) estimated that in 1999 there were about 8 million new cases of tuberculosis and 2 million deaths worldwide; the vast majority (95%) of these cases and 98% of deaths were in developing countries (4, 5). In the early 1990s, it was estimated that by 2000, the annual global number of new cases would have increased to over 10 million (163 per 100000 population), and the annual expected number of deaths to 3.5 million per year (nearly 46 per 100000 population) (6). Globally, the targets set for tuberculosis control were that by 2000 the programme should have achieved successful treatment of 85% of smear-positive cases of pulmonary tuberculosis detected, and detection of 70% of existing cases of sputum smear-positive pulmonary tuberculosis (7, 8). The incidence of tuberculosis has recently started to rise again due to increased migration, a higher rate of direct transmission of *Mycobacterium tuberculosis*, and co-infection with HIV (9). The highest and lowest tuberculosis rates provinces of Iran were reported 137/100000 (Systan and Baluchestan) and 10/100000, (Sabzevar), respectively (10).The main goal of

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this study was to determine the rate of tuberculosis in the townships of Yazd province, Iran.

Materials and Methods

Yazd province, central Iran, covers an area of 74214 square kilometers and has an estimated population of 750769 (385936 males and 364833 females) with almost 75% living in urban areas. In this retrospective study during 2 years (1997-1999), 3885 suspected tuberculosis patients; 3238 pulmonary and 647 extra pulmonary (1820 males and 2065 females; aged 8-85 years) had been referred to the Nicopour polyclinic. This was the only unit in the Yazd province, which suspected tuberculosis patients were referred by Yazd health centers, and physicians. In the Nicopour polyclinic a questionnaire was completed and pulmonary sample (sputum) or extra-pulmonary sample (tissue or body fluids) was collected from each subject. Then, the samples were directly injected under aseptic conditions into broth media (Becton Dickinson) and processed on the same day if possible, and if delay was inevitable, the samples were stored at 4°C over night before processing. Upon arrival at the laboratory, presence of visible fibrinous clots was noted and they were then processed by Ziehl-Neelsen staining. Then, the samples were inoculated into a pair of conventional solid Lowenstein-Jensen media (Difco) and were incubated at 37°C under 5% CO_2. The cultured media were investigated twice a week for the first 3 weeks and thereafter weekly for the next weeks, for a total of 6 weeks incubation. All isolates were initially confirmed by Ziehl-Neelsen staining and subsequently identified by standard biochemical tests (1). The collected data and results of laboratory tests were analyzed by SPSS and chi-square test.

Results

In this study, of the total suspected tuberculosis patients, 604 cases was found to be positive for tuberculosis. The average annual rate of tuberculosis patients was 26.8 cases per /100000 population (23.1/ 100000 males and 31/100000 females) (Table 1). Table 2 presents tuberculosis patients notification rates by age. The highest and lowest average annual rates of tuberculosis was observed among Sadough (78.1/100000) and Abarkouh (19.8/100000) townships population and also among age groups of ≥ 50 years old (111/100000) and <10 years old (7/100000), respectively. There were significant differences between sexes (df=1, $\chi^2 = 4.67$, $P < 0.05$) and age group of patients (df =5, $\chi^2 = 301.16$, $P < 0.001$). The average annual rate of extra-pulmonary tuberculosis (6.4/100000) was much lower than pulmonary tuberculosis (202/100000) (Table 3). Our findings show that, out of 604 tuberculosis patients, 382 cases (63.2%) were Iranian, 218 Afghanian refugees (36.1%) and 4 cases (0.7%) had other nationalities.

Table 1: The rate of tuberculosis patients on the basis of age (cases / 100000 population)

Age (years)	Yazd province population	Years			Total	Average Annual rate
		1997	1998	1999		
< 10	171738	22 (12.8)	10 (5.8)	4 (2.3)	36 (20.9)	12 (7)
10 – 19	210309	18 (8.6)	25 (11.9)	20 (9.5)	63 (30)	21 (10)
20 – 29	120355	19 (15.8)	35 (29.1)	23 (19.1)	77 (64)	26 (21.6)
30 – 39	94622	14 (14.8)	23 (24.3)	13 (13.7)	50 (52.8)	17 (18)
40 – 49	58922	25 (42.4)	21 (35.6)	16 (27.2)	62 (105.2)	21 (35.6)
> 50	94823	101 (106.5)	115 (121.3)	100 (105.5)	316 (333.3)	105(111)
Total	750769	199 (26.5)	229 (30.5)	176 (23.4)	604 (80.5)	201(26.8)

Table 2: The rate of tuberculosis patients in the townships of Yazd province on the basis of sex (cases/100000 population)

Townships	Yazd province Population		Years						Total		Average Annual rate	
			1997		1998		1999					
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Yazd	201194	186977	61(30.3)	66 (35.3)	55(27.3)	82 (43.9)	51(25.3)	70 (37.4)	167(83)	218 (117.1)	56 (27.8)	73(39)
Ardakan	32321	29396	1(3.1)	3 (10.2)	7 (21.7)	8 (27.2)	3 (9.3)	10 (34)	11 (34)	21 (71.4)	4 (12.4)	7 (23.8)
Maybod	31396	28304	4 (12.7)	10 (35.3)	15 (47.8)	8 (28.3)	2 (6.4)	2 (7.1)	21 (66.9)	20 (70.7)	7 (22.3)	7 (24.7)
Sadough	14451	13473	5 (34.6)	9 (66.8)	11 (76.1)	3 (22.3)	4 (27.7)	1 (7.4)	20 (138.4)	13 (96.5)	7 (48.4)	4 (29.7)
Mehriz	37284	36918	4 (10.7)	4 (10.8)	2 (5.4)	4 (10.8)	3 (8)	6 (16.3)	9 (24.1)	14 (37.9)	3 (8)	5 (13.5)
Bafgh	20738	21097	4 (19.3)	11(52.1)	8 (38.6)	8 (37.9)	4 (19.3)	13 (61.6)	16 (77.2)	32 (151.7)	5 (24.1)	11(52.1)
Taft	28077	28526	7 (24.9)	7 (24.5)	8 (28.5)	6 (21)	4 (14.2)	2 (7.1)	19 (67.7)	15 (52.6)	6 (21.4)	5 (17.5)
Abarkouh	20475	20142	1 (4.9)	2 (9.9)	1 (4.9)	3 (14.9)	0 (0)	1(5)	2 (9.8)	6 (29.8)	1 (4.9)	3 (14.9)
Total	385936	364833	87(22.5)	112(30.7)	107(27.7)	22(33.4)	71(18.4)	105(28.8)	265(68.7)	339(92.9)	89 (23.1)	113 (31)

Table 3: The rate of tuberculosis patients in the townships of Yazd province on the basis of their pulmonary and extra-pulmonary tuberculosis (Cases/100000 population)

Townships	Yazd province Population	Years						Total		Average Annual rate	
		1997		1998		1999					
		Pul	Extra-Pul	Pul	Extra-Pul	Pul	Extra-Pul	Pul	Extra-Pul	Pul	Extra-Pul
Yazd	388171	97 (25)	30 (7.7)	103 (26.5)	34 (8.8)	80 (20.6)	41 (10.6)	280 (72.1)	105 (27)	93 (24)	35(9)
Ardakan	61717	2 (3.2)	2 (3.2)	15 (24.3)	0 (0)	9 (14.6)	4 (6.5)	26 (42.1)	6 (9.7)	9 (14.6)	2 (3.2)
Maybod	59700	12 (21.2)	2 (3.4)	21(51.9)	2 (3.4)	4 (6.7)	0 (0)	37 (62)	4 (6.7)	12 (21.2)	1 (1.7)
Sadough	27924	8 (28.6)	6 (21.5)	11 (39.4)	3 (10.7)	4 (14.3)	1 (3.6)	23 (82.4)	10 (35.8)	8 (28.6)	3 (10.7)
Mehriz	74202	6 (8.1)	2 (2.7)	5 (6.7)	1 (1.3)	8 (10.8)	1 (1.3)	19 (25.6)	4 (4.5)	6 (8.1)	1 (1.3)
Bafgh	41835	12 (28.7)	3 (7.2)	16 (28.2)	0 (0)	15 (35.9)	2 (4.8)	43 (102.8)	5 (11.9)	14 (33.5)	2 (4.8)
Taft	56603	10 (17.7)	4 (7.1)	12 (21.2)	2 (3.5)	4 (7.1)	2 (3.5)	26 (45.9)	8 (14.1)	9 (15.9)	3 (5.3)
Abarkouh	40617	0 (0)	3 (7.4)	3 (7.4)	1(2.5)	1 (2.5)	0 (0)	4 (9.8)	4 (9.8)	1 (2.5)	1(2.5)
Total	750769	147 (19.6)	62 (8.3)	186 (24.8)	43 (5.7)	25 (16.6)	51(6.8)	458 (61)	146 (19.4)	152(20.2)	48(6.4)

Pulmonary = Pul
Extra - Pulmonary = Extra - Pul

Discussion

The technologically developed countries also have a share of the world's tuberculosis burden. Although, the disease is not uniformly distributed, some countries show a continuing increase in tuberculous infection rate, whereas others show declining infection rates (11, 12). In industrialized centers an emerging increase of tuberculosis is observed due to low health standards, poor health education and control, increasing migration and the HIV epidemic. Tuberculosis is a continuous threat for health in all parts the world (13). The present study was carried out in order to monitor the rate of *Mycobacterium tuberculosis* disease in the townships of Yazd province, Iran. The average annual rate of tuberculosis in Yazd province was 26.8/100000 population.

The rate of tuberculosis in Yazd province is lower than the estimated rate (32/-) and also some other areas of Iran, and also other countries including Gilan (44/-), Babol (86/-), Kermanshah (38/-), Khuzestan (47/-), Kerman (39/-), Khorasan (54/-), Kordestan (32/-) Lorestan (89/-), BandarAbas (62/-), Systan and Baluchestan (137/-) (10,14), and also Russian federation (95/-), Poland (40/-),Thailand (54/-), Bangladesh (55/-), India (111/-), Afghanistan (33/-), and Ethiopia (145/-) (15-18).

Tuberculous infection of Yazd province is nearly equal the lowest rate for developing countries (25/-), and one-ninth the highest rate for developing countries (240/-) (19, 20).

Comprative analysis of studies conducted in Iran, including ours, and others abroad, shows a higher rate of patients infected with tuberclosis in age group of ≥50 years old (14, 17, 18).

Today's worldwide tuberculosis epidemic and the movement of a growing number of refugees overlap geographically and have made tuberculosis control in refugee populations an issue of increasing importance.

However, in developing countries, where both of these problems are concentrated, tuberculosis control in refugee populations remains a largely unmet need. Experience shows that despite difficult field conditions, tuberculosis control programs can be managed successfully in this setting. Unfortunately it seems that despite the efforts in prevention, diagnosis and treatment of patients and refugees with tuberculosis it is still considered as an important problem throughout the world, especially in countries with insufficient health facilities.

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