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# Clinical and social characteristics of the patients with tuberculosis in Eastern Anatolia

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## ÖZET

### *Doğu Anadolu'daki tüberküloz hastalarının klinik ve sosyal özellikleri*

Tüberküloz (Tbc) önemli bir halk sağlığı problemi olup, Tbc'ye yol açan risk faktörleri iyi bilinmektedir. Ancak risk faktörleri açısından bölgesel farklılıklar olabilir. Bu çalışmada, bölgemizdeki Tbc hastalarının demografik özelliklerini ve risk faktörlerini belirlemeyi ve olası nedenlerini tartışmayı amaçladık. Çalışmaya, 1997-2004 yılları arasında hastanemizde tanı konulan, ortalama yaşları  $38 \pm 18$  yıl olan, 145'i erkek 108'i kadın olmak üzere toplam 253 hasta (117'si pulmoner, 136'sı ekstrapulmoner) alındı. Demografik ve klinik özellikleri gözden geçirildi. Tbc en sık şehir merkezinde ve özellikle ev hanımlarında görülmekteydi (%38.3). Kırsal alanda ise çiftçilikle uğraşan erkeklerde daha sık görülmekteydi (%19.8). Yine Tbc sıklığı okullarda (öğrenci, öğretmen veya memur) fazla idi (%14.6). İnşaat işçilerinde de diğer iş kollarına göre daha fazla görülmekteydi. Olguların %10.3'ünde geçirilmiş Tbc, %14.2'sinde temas (çoğunlukla aile bireylerinden) ve %17.4'ünde ek hastalık öyküsü vardı. En sık rastlanan ek hastalık, diyabet idi. Sonuç olarak; Tbc şehir merkezlerinde kadınlarda, kırsal alanlarda ise erkeklerde daha sık görülmekteydi. Okullar Tbc gelişimi açısından önemli bir kaynak olarak görülüyordu. Bölgemizde Tbc'nin önlenmesi için olguların etkin bir şekilde tedavi edilmesi (doğrudan gözetimli tedavi gibi) ve özellikle koruyucu önlemleri içeren etkin bir kontrol programına gereksinim olduğu görülmektedir.

**Anahtar Kelimeler:** Tüberküloz, epidemiyoloji, ev hanımları, diyabet.

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## SUMMARY

### *Clinical and social characteristics of the patients with tuberculosis in Eastern Anatolia*

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*Tuberculosis (TB) is an important public-health problem. The risk factors for TB are well-known. However, there may be some regional differences. In this study, we aimed to investigate the demographic characteristics and regional risk factors for TB and to discuss possible explanations for the difference. The study included totally 253 hospitalized patients (145 male and 108 female, with an average age 38 ± 18) with TB (117 pulmonary and 136 extrapulmonary) between 1997 and 2004. Their demographic and clinical characteristics were reviewed. TB frequency was higher among the non-working females in urban area (38.3%). TB was also common in farmers which are male (19.8%). TB frequency was higher in the school persons including students, the teachers and the school officials (14.6%) and in the building workers compared with the other workers. There were a history of previous TB, TB exposure (mostly from family members) and associated disease in 10.3%, 14.2% and 17.4% of cases, respectively. The most encountered associated disease was diabetes. The results indicate that TB was most common among non-working females and was also increased among the men in rural areas, and schools seem to be an important source of TB transmission. Thus, an effective control program covering the treatment of cases with active disease, such as directly observed treatment, and especially preventive measures should be considered to control the disease transmission in our region.*

**Key Words:** Tuberculosis, epidemiology, non-working females, diabetes.

Tuberculosis (TB) is still one of the leading causes of death in adults, and it is the largest killer as a single infectious agent in the world (1). Although TB affects mainly people in the developing countries, it also affects people in the developed world. It remains a common infectious and contagious disease worldwide, endemic in most of the developing countries and resurgent in those developed and developing countries with high rates of human immunodeficiency virus (HIV) infection (2). There are some reports declaring a trend to decrease in the number of cases with TB in our country (3,4). But, it still continues to be an important public health problem in the country.

There are many reported risk factors, such as close contact, HIV infection, drug addiction, concomitant disease or working in healthcare facilitating TB development (5). The risk factors are well-known; however, they may show some regional differences and may change by time. In

this study we aimed to investigate the demographic characteristics of the cases with TB in our region and to find out regional risk factors special to our region (Eastern Turkey).

## MATERIALS and METHODS

### Study Population and Method

Patients, who had TB, either pulmonary TB (PTB) or extrapulmonary TB (EPTB), were identified using our hospital, a tertiary-care hospital, registry between January 1997 and November 2004. The medical records of those patients were reviewed. The data including age, sex, occupation, living area (rural or urban), the site of disease (pulmonary or extrapulmonary), medical history (including TB exposure and previous TB history), associated diseases and clinical characteristics were collected by chart review.

### Statistical Analysis

Data were analyzed using SPSS for Windows 11.0 software. Pearson's Chi-Square test and

Mann Whitney U-test were used for analysis of categorical variables and continuous variables, respectively. Data expressed as the mean ± SD and a probability test less than 0.05 was considered to indicate significance.

### RESULTS

The study included a total of 253 cases with TB, including 145 (57.3%) males and 108 (42.7%) females, which consisted of 117 (46.2%) pulmonary and 136 (53.8%) extrapulmonary cases. The mean age of the cases was 38 ± 18 years (range 14-80). The cases with EPTB were as follows: TB pleurisy (n= 48, 19.0%), TB meningitis (n= 34, 13.4%), urinary TB (n= 27, 10.8%), miliary TB (n= 12, 4.7%), TB lymphadenitis (n= 7, 2.8%), intestinal TB (n= 2, 0.8%), TB peritonitis (n= 2, 0.8%) and TB arthritis (n= 2, 0.8%).

Of the cases, 68% were living in the urban areas, 31.7% were in the rural areas and the files of remaining (n= 4) had no such information. There was a male dominance, especially in rural areas. The mean age of male cases was significantly lower than those of females. In cases with PTB, the duration between onset the symptoms and admission was longer and the proportion of associated disease was greater than those of EPTB (Table 1).

There were an increased number of cases with TB among non-working females (38.3%). TB was also common in farmers (19.8%) and in whom working as an official or worker who is confronting

many people. Schools were found to be an important source of TB (14.6%), and TB was higher among the building workers (36.8%) when compared with the other workers (63.2%). The other occupations were summarized in Table 2.

**Table 2. Occupations of the cases.**

Occupation	Number of patients	%
Non-working female	97	38.3
Housewife	80	82.5
Girl	17	17.5
Farmer	50	19.8
School area	37	14.6
Student	26	70.3
Teacher	10	27.0
School official	1	2.7
Official	20	8.0
Police	4	20.0
Bank official	3	15.0
Mosque official	2	10.0
Others	11	55.0
Worker	19	7.5
Building worker	7	36.8
Others	12	63.2
Health-care worker	4	1.6
Physician	2	50.0
Nurse	1	25.0
Pharmacy	1	25.0
Soldier	2	0.8
Prisoner	2	0.8
Others	22	8.7

**Table 1. Comparison of the characteristics of the cases according to gender, living area, and disease site.**

	Gender (n= 253)		Living area (n= 249)		Site of disease (n= 253)	
	Male	Female	Urban (n= 170)	Rural (n= 79)	PTB (n= 117)	EPTB (n= 136)
Gender (male/female)	145	108	<b>90/80</b>	<b>53/26*</b>	72/45	73/63
Mean age	<b>36 ± 17</b>	<b>40 ± 19*</b>	39 ± 18	37 ± 18	40 ± 18	37 ± 17
The duration between symptom onset and admission (month)	2.9 ± 4.0	4.5 ± 14.2	3.6 ± 4.5	3.6 ± 11.8	<b>4.9 ± 13.0</b>	<b>2.2 ± 3.0*</b>
Previous TB history	13 (11%)	13 (14%)	19 (14%)	7 (10%)	15 (16%)	11 (11%)
TB exposure history	17 (16%)	19 (22%)	<b>29 (24%)</b>	<b>7 (11%)*</b>	19 (20%)	17 (18%)
Associated disease	22 (15%)	22 (20%)	34 (20%)	10 (13%)	<b>29 (25%)</b>	<b>15 (11%)**</b>

\* p< 0.05, \*\* p< 0.01.

PTB: Pulmonary tuberculosis, EPTB: Extrapulmonary tuberculosis.

There were a history of TB disease, TB exposure and associated disease in 10.3%, 14.2% and 17.4% of cases, respectively. The known and reported exposure was mostly resulting from family members (n= 32) and the remaining (n= 4) was from a friend in the workplace or school. In addition, an exposure reporting was higher in urban areas (Table 1). The most encountered associated diseases were diabetes (n= 20), chronic obstructive pulmonary disease (COPD) (n= 8) and malignancy (n= 4) (Table 3).

### DISCUSSION

There is no report showing exact incidence and prevalence of TB in our region. The present study also could give no information about the exact TB incidence or prevalence of this region because it was conducted in a tertiary-care hospital. It is highly possible that most of the patients who had positive sputum smear for acid-fast bacilli easily diagnosed in primary and secondary care units. Thus, it is highly possible that some of the cases with smear positive PTB was not be included in this study. In addition, a small part of the cases with EPTB, for example Pott's disease and larynx TB, were not included in the study because their records were unavailable in the study period. However, we believe

that the results of this study may reflect the patient profile for this region.

In our study, the results indicated that TB was common in the urban area and in males. The male predominance was consistent with those reported by other studies inside and outside Turkey (3,6,7-10). The male cases consisted of 57.3% of general population and 67.1% of rural population of patients. The male predominance in the rural area may be explained by the increased possibility to contact with a person who had an active disease, because they usually work outside and have more confrontation with other people than females. In addition, they usually leave home at their twentieth age for military task and sometimes for working in one of more crowded western cities. So, it is not wrong to expect that their exposure with a TB patient will be increased. The mean age of men in our study was significantly smaller than those of women in contrary to other studies (11). This may also be a result of an early and high TB exposure of men.

The most interesting and unexpected result of the study was an increased frequency of TB among non-working females (38.3%), who are mostly housewives. Although previous TB history, an associated disease and an exposure history were higher in females, none of them had a statistical significance when evaluated separately (Table 1). The proportion of female cases shows a correlation with general population more or less; however, the increased frequency is still worth to be taken into consideration. The most reasonable way of to be infected for the non-working females was close-contact by an infected family member or a neighbor, because the females of our region usually leave their school after primary school (approximately about their 13 ages) and live usually their lives with only family members mostly indoor even after the marriage. When we reviewed our data again, we saw that 43.8% (n= 12) of those having an exposure history from a family member were non-working females (18.4% of non-working females). Some other factors, such as a long period of winter season (approximately six months)

**Table 3. Associated diseases.**

Associated disease	Number of patients	%
Diabetes	20	7.9
Oral antidiabetic user	9	45
Insulin user	7	35
No previous diagnosis or treatment	4	20
COPD	8	3.2
Malignancy	4	1.6
Hematologic malignancy	3	75.0
Lung cancer	1	25.0
Other diseases	12	3.6
Congestive heart failure	3	
Cerebrovascular disease	3	
Liver disease	2	
Gastrectomy	1	
Hypertiroidism	1	
Hypertension	1	
Long-term steroid use	1	

COPD: Chronic obstructive pulmonary disease.

without enough sun exposure and ventilation in a closed area or the increased burden of the home works, may play an additional role in the high frequency.

PTB is the most encountered form of the disease in our country (3,6). Although the proportion of the cases with EPTB was higher in our study, we considered that PTB was more common than EPTB due to the study setting above mentioned. It is known that co-morbidities, especially HIV infection can lead to great variation on TB forms in favor of EPTB (10). However, in contrary to two recent studies including HIV positive cases, in our study PTB was highly associated with concomitant diseases (9,10). The most encountered associated disease was diabetes in our study. The association of diabetes with TB has been shown clearly (12). As similar to the result of that study, the proportion of oral antidiabetic users was higher than those of insulin users. Additionally, we had some cases who had no previously diagnosed diabetes and determined during routine evaluation of the cases. The increased number of COPD patients was also remarkable. Easy access of COPD patients to our outpatient clinic or their increased steroid use may be responsible from the high frequency.

The number of patients among some occupations confronting with many people, such as police and bank officer, the people in the school and building workers was also increased. Although TB was common among prisoners, soldiers and healthcare workers, their number was low in our study population due to the reasons mentioned above (13-17). The increased number of TB in building workers, which are mostly immigrants from the rural areas, in our region may be associated with their poor live conditions which they usually stay in a room, which is not constructed completely, together with other workmates without a balanced nutrition.

The cases in urban area were reported to have more previous TB (14% vs. 10%), TB exposure (24% vs. 11%) and associated disease (20% vs. 13%) than those in rural area. The higher report may result from the higher education and conscience of the people in urban area.

There are some efforts to diagnose TB as truly and early as possible even in the cases with sputum smear negative cases (18,19). However, the objective of TB control is the elimination of TB by stopping the transmission of the disease, and includes the measures for close contact family member, households or the others sharing another place (20). To strengthen the decreasing trend of TB in Turkey, the measures are also important. Widely implementation of directly observed treatment (DOT), which is recommended for the treatment of PTB, implemented as pilot studies in some regions of the country may have important contributions for the decreasing trend (4,21).

As a conclusion, the results indicate that TB was most common among non-working females, it was also increased among the men in rural areas, and schools are the important source of TB transmission. An effective TB control program including the treatment of the cases with active disease and the prevention of their household and workmates should be considered to control the disease.

## REFERENCES

1. Kochi A. *The global tuberculosis situation and the new control strategy of the World Health Organisation. Tubercle* 1991; 72: 1-6.
2. Walford D, Noah N. *Emerging infectious diseases-United Kingdom. Emerg Infect Dis* 1999; 5: 189-94.
3. Ozkara S, Kulcaslan Z, Ozturk F ve ark. *Tuberculosis in Turkey with Regional Data. Toraks Dergisi* 2002; 3: 178-87.
4. Kart L, Akduman D, Altin R, et al. *Fourteen-year trend of tuberculosis dynamics in the Northwest of Turkey. Respiration* 2003; 70: 468-74.
5. Bloch AB. *Screening for tuberculosis and tuberculosis infection in high-risk populations. In: Fishman AP, et al. (eds). Fishman's Pulmonary Diseases and Disorders. 3<sup>rd</sup> ed. USA: McGraw-Hill, 1998: 2473-81.*
6. Aktogu S, Yorgancioglu A, Cirak K, et al. *Clinical spectrum of pulmonary and pleural tuberculosis: A report of 5.480 cases. Eur Respir J* 1996; 9: 2031-5.
7. Calpe JL, Chiner E, Marin J, et al. *Tuberculosis epidemiology in area 15 of the Spanish autonomous community of Valencia: Evolution from 1987 through 2001. Arch Bronconeumol* 2005; 41: 118-24.
8. Tekkel M, Rahu M, Loit HM, Baburin A. *Risk factors for pulmonary tuberculosis in Estonia. Int J Tuberc Lung Dis* 1994; 12: 71-8.

9. Diez M, Huerta C, Moreno T, et al. Multicentre Project for Tuberculosis Research (MPTR) Study Group. Tuberculosis in Spain: Epidemiological pattern and clinical practice. *Int J Tuberc Lung Dis* 2002; 6: 295-300.
10. Bonadio M, Carpi A, Gigli C, et al. Epidemiological and clinical features of 139 patients with tuberculosis at a teaching hospital in Italy (Pisa, 1996-2000). *Biomed Pharmacother* 2005; 59: 127-31.
11. Crampin AC, Glynn JR, Floyd S, et al. Tuberculosis and gender: Exploring the patterns in a case control study in Malawi. *Int J Tuberc Lung Dis* 2004; 8: 194-203.
12. Bacakoglu F, Basoglu OK, Cok G, et al. Pulmonary tuberculosis in patients with diabetes mellitus. *Respiration* 2001; 68: 595-600.
13. Hussain H, Akhtar S, Nanan D. Prevalence of and risk factors associated with *Mycobacterium tuberculosis* infection in prisoners, North West Frontier Province, Pakistan. *Int J Epidemiol* 2003; 32: 794-9.
14. Camarca MM, Krauss MR. Active tuberculosis among U.S. Army personnel, 1980 to 1996. *Mil Med* 2001; 166: 452-6.
15. Raitio M, Tala E. Tuberculosis among health care workers during three recent decades. *Eur Respir J* 2000; 15:304-7.
16. Alonso-Echanove J, Granich RM, Laszlo A, et al. Occupational transmission of *Mycobacterium tuberculosis* to health care workers in a university hospital in Lima, Peru. *Clin Infect Dis* 2001; 33: 589-96.
17. Cuhadaroglu C, Erelel M, Tabak L, Kilicaslan Z. Increased risk of tuberculosis in health care workers: A retrospective survey at a teaching hospital in Istanbul, Turkey. *BMC Infect Dis* 2002; 2: 1471-2334.
18. Saglam L, Akgun M, Aktas E. Induced sputum and bronchoscopy specimens in the diagnosis of tuberculosis. *J Int Med Res* 2005; 33: 260-5.
19. Akgun M, Saglam L, Kaynar H, et al. Serum IL-18 levels in tuberculosis: Comparison with pneumonia, lung cancer and healthy controls. *Respirology* 2005; 10: 295-9.
20. Migliori GB, Raviglione MC, Schaberg T, et al. Tuberculosis management in Europe. Task Force of the European Respiratory Society (ERS), the World Health Organisation (WHO) and the International Union against Tuberculosis and Lung Disease (IUATLD) Europe Region. *Eur Respir J* 1999; 14: 978-92.
21. Jasmer RM, Seaman CB, Gonzalez LC, et al. Tuberculosis treatment outcomes: Directly observed therapy compared with self-administered therapy. *Am J Respir Crit Care Med* 2004; 170: 561-6.