Original Article

Epidemiological characteristics of tuberculosis patients under followed by Nevsehir community health center

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Abstract

Aim: The aim of the study is to contribute to epidemiological data related to tuberculosis in Turkey by analyzing the epidemiological characteristics of patients registered in the Nevşehir Community Health Center Tuberculosis Unit.

Material and Methods: In this study which is descriptively typed, the data of the registered patients between January 2011 and December 2017 in the Tuberculosis Control Unit of the Public Health Center of Nevsehir were retrospectively analyzed. The demographic characteristics and tuberculosis-related characteristics of the patients and the distribution of Tuberculosis patients by years were scanned through Electronic Tuberculosis Management System and related documents and the results were evaluated electronically.

Results: 53,6% of the patients were diagnosed with pulmonary tuberculosis. Nurse, dental technician, soldier, prisoner, student, and masseur were among the occupations that had the risk of spreading tuberculosis. It was determined that 18.6% of them actively smoked. In this study, the number of asylum seekers having Tuberculosis disease was found as 6,4%. and pulmonary tuberculosis rate was found significantly higher in men. Additionally, the disease was found to be significantly more common in the rural districts.

Conclusion: At the end of the study, it was determined that the patients with tuberculosis lived in low income and crowded families and in unfavorable locations. It was recommended that primary precautions should be taken according to the risk of the disease spreading at the rural district where the number of cases was the highest.

Keywords: Community health; epidemiology; tuberculosis

INTRODUCTION

Tuberculosis (TB) is an old disease that has been affecting people for thousands of years and it still remains a major public health problem, although it is very treatable today (1). TB is a poverty-related disease that excessively affects the poorest, the most vulnerable population and disregarded groups. Enhancing access to diagnosis and care, the fundamental requirements in overcoming TB, are principally challenging in those persons. Furthermore, TB control cannot be carried out without setting up an effective investigation system to define (2). Globally, TB control principles should emphasis on fast diagnosing and treating individuals with lively TB (3).

In the year of 2018, 10 million people were afflicted and 1.2 million people who caught the disease lost their lives (1). The estimated incidence rate in the world is 142 per hundred thousand, and the estimated mortality rate is 24 per hundred thousand. In Global Tuberculosis Report of 2019, Turkey's estimated incidence rate for 2018 was given as 13 per hundred thousand and estimated

mortality rate was given 0.4 per hundred thousand (1,4). The problem of tuberculosis can be compounded due to HIV, migration, poverty and wars. TB incidence in Turkey can be higher due to the increase in the number of asylum seekers. There are currently more than 3.611.961 Syrians in Turkey (5). For the year of 2015, the Tuberculosis Unit registered 489 patients (56.1%) born in Syria and 383 patients (43.9%) born in other foreign countries, totaling to 872 cases. The number of registered asylum seekers in Nevşehir was 7,745. Those asylum seekers lived in the crowded single rooms and in poor conditions. Since tuberculosis is a disease closely related to social life, it is necessary to regulate environmental factors that facilitate the emergence of the disease (4,6). It is important to know the epidemiological characteristics of tuberculosis patients such as their personal characteristics, the most common locations, socioeconomic characteristics and risk factors (7,8). Findings from these types of researches can contribute to the development of policies to fight against TB and to provide resource for the fight against TB.

In order to determine some epidemiological features of tuberculosis patients in Nevsehir, all cases registered between 2011 and 2017 at the Tuberculosis Control Unit of Nevsehir Central Community Health Center were examined retrospectively. Additionally, it was aimed to attract attention for the increase in the number of TB phenomena due to the fact that there was an increase in tourism activities and the number of asylum seekers.

In Nevşehir, which is a risky place for tourism and asylum seekers, no studies on TB have been performed until now. The aim of this study is to contribute to epidemiological data related to tuberculosis in Turkey by analyzing the epidemiological characteristics of patients registered in the Nevşehir Central Community Health Center Tuberculosis Fighting Unit.

MATERIALS AND METHODS

Study design

In Nevşehir Community Health Center Tuberculosis Fighting Unit, there are 4 nurses, a physician and 2 officers. All tuberculosis (TB) patients in health care institutions in the center and county districts of Nevsehir are reported to the Tuberculosis Control Unit of the Community Health Center in Nevsehir and their treatment is carried out by this institution. In this study, the data of the registered patients between January 2011 and December 2017 in the Tuberculosis Control Unit of the Public Health Center of Nevsehir were retrospectively analyzed.

Setting and sample

A total of 224 patients were diagnosed TB in the Tuberculosis Unit archive. The files were tried to be found in the archive by the researcher. The files of the patients were found by checking individually by years. In order to conduct the study, formal permission from T.C. Ministry of Health Public Health Agency were obtained. At the same time, the data were gathered by entering the Electronic Tuberculosis Management System. The data were collected between April and December 2018. Data on age, gender, education, occupation, income, marital status, and number of people in the family, presence of tuberculosis in family, contact conditions, home, and place of residence, substance use, risk factors and distribution of TB patients by years were scanned through Electronic Tuberculosis Management System and related documents and the results were evaluated electronically.

Cappadocia is the area covered by Nevşehir, Aksaray, Niğde, Kayseri and Kırşehir. It is located in the middle of Cappadocia Region. The narrow and deep valleys were formed as a result of the erosion of the volcano tuffs and the interesting shapes that have emerged on the sloping slopes of these valleys cause many tourists' to visit the region (9). In 2017, the population of Nevşehir is 292,365 (10).

Ethical consideration

For this study, approvals were received from Ethics Committee of Nevsehir Haci Bektas Veli University and Turkey Ministry of Health Public Health Agency (Approval number 05.02.2018/02).

Statistical Analysis

The statistical analyses were conducted using the SPSS Statistics 23.0 package software. Descriptive statistics were used to determine the distribution of data. Ongoing data were given as mean and standard deviation (SD), and categorical data as numbers and percentages. Pearson chi-square and Fisher's Exact Test were used to understand the relationship between categorical data and significance was evaluated as $p < 0.05$. The Bonferroni test was used to determine which categorical group the difference obtained from the data originated from.

RESULTS

According to the findings found in our study; 55.4% of the patients were male and 44.6% were female, and 41.5% were in the 40-64 age group, 29.9% were in the 19-39 age group, 18.3% were in the 65 and above age group and 10.3% were in the 0-18 age group. The mean age of the patients was 46.71 ± 17.50 (range 15-81), the mean of treatment period was 1.8 ± 0.87 years (range 1-5). Educational status records of 71% (159 people) of the patients were accessed. 35.2% of those who had records on education were primary school graduates and 16.4% high school, 15.1% secondary school and 8.8% university graduates, and 24.5% had never attended a school. Marital status records of 83.9% of the patients were accessed. 60.3% of those with marital status records were found to be married. It was found that 93.6% of TB patients were Turkish citizens and 6.4% were asylum seekers (Table 1).

Table 2 shows that 57.3% of the patients lived in families with 4 or more people, 14.2% of them had an incidence of TB in the family, 5.4% of them had familial contact, 97.4% of them applied individually to the health care institutions and 51.9% lived in single houses. 58.9% of the patients lived in high risk places for the spread of tuberculosis (51.9% in a house, 0.6% in a construction site, 0.6% in a dormitory, 3.9% in a jail, 1.9% in a military unit).

53.6% of the patients were diagnosed with pulmonary TB, 42.9% were diagnosed with non-pulmonary TB, and 3.6% were diagnosed with both lung and non-pulmonary TB. In Table 3, the group that was different in Lung Tb was men, while in non-Lung Tb was women. (X^2 (2, N=224) 25,875, p<0.00). No significant difference was found between the groups in which both types of TB appeared together.

In Table 4, 34.3% of the patients were housewives, 16.4% retired, 12.4% workers, 11.9% unemployed, 10% students and 34.5% had an income between 501-1000 TL and 33.8% had income between 500 TL. Also in Table 2, there were nurses, dental technicians, soldiers, prisoners, students and masseurs, which were among the occupations that had the risk of spreading tuberculosis.

Table 1. Demographic and clinic carecteristic data of the patients		
Age	**N**	**%**
0-18	23	10.3
19-39	67	29.9
40-64	93	41.5
65 and above	41	18.3
Sex		
Women	100	44.6
Men	124	55.4
Education Status		
Illiterate	15	9.4
Literate	22	13.8
Primary school graduate	56	35.2
Middle school graduate	24	15.1
High school graduate	26	16.4
Graduated from a university	14	8.8
Baby little child	2	1.3
Marital status		
Married	135	60.3
Single	53	23.6
Not found registered	36	16.1
Nationality		
Turkish citizen	210	93.6
Asylum seeker	14	6.4
Total	224	100

Table 2. The Distribution according to some characteristics of patients: 224		
Number of people in the family	**N**	**%**
Single	18	8.0
2-3	72	32.1
4 and upper	121	54.0
Not found registered	13	5.8
Family with tuberculosis		
Yes	31	13.8
No	182	81.3
Not found registered	11	4.9
Contact status in domestic and external		
Domestic	12	5.4
External	3	1.3
Not found registered	209	93.3
Screen control - individual reference		
Identification during screen control	5	2.2
Individual reference	188	83.9
Not found registered	31	13.8
Place of residence		
Building site	1	.4
Dorm	1	.4
Garrison	3	1.3
Prison	6	2.7
Apartment	63	28.1
Self-contained	80	35.7
Not found registered	70	31.3
Total	224	100.0

Table 3. Distribution of patients according to their gender and tuberculosis region involvement						
TB localization	**Pulmonary TB***	**Non-pulmonary TB****	**Pulmonary and Non-pulmonary TB**	**Total**	**X²**	**P**
Sex	n (%)	n (%)	n (%)	n	25.875	0.00
Women	35 (35.0)	61 (61.0)	4 (4.0)	100		
Men	85 (68.5)	35 (28.2)	4 (3.2)	124		
Total	120 (53.6)	96 (42.9)	8 (3.6)	224		

*The difference between groups was determined by Bonferroni correction
** Fisher's Exact Test, P<0.05

Table 4. Distribution according to the work and income of the patients: 224		
Occupation	n	%
Soldier	3	1.3
Child	1	.4
Housewife	69	30.8
Civil servant (Police. teacher. nurse. dental technician. guardian)	7	3.1
Retired	33	14.7
Worker (Industry-construction worker. masseur. servant)	25	11.2
Farmer	12	5.4
Student	20	8.9
Prisoner	6	2.7
Driver	1	.4
Unemployed	24	10.7
Not found registered	23	10.3
Income		
0-500	47	21.0
501-1000	48	21.4
1001-2000	30	13.4
2001-3000 and upper	14	6.3
Not found registered	85	37.9
Total	224	100.0

Table 5 shows the substance usage and TB risk of the patients. According to this table, 18.6% of the patients were smokers. 50.7% of the patients had a risk factor. It was found that 25.3% of the patients lived in slums and 13.4% had two or more risk factors.

Table 5. Distribution of patients according to substance usage and tuberculosis: 224		
Situation of substance uses	n	%
Yes (Smoke)	38	17.0
No	166	74.1
Not found registered	20	8.9
Total	224	100.0

Table 7 shows the distribution of patients according to their residential areas. According to this table, patients lived mostly in the county areas (46.4%), followed by the provincial center (42.6%), towns (7.7%) and villages (3.3%). 93.8% of the patients were from within the province and 6.2% from outside the province.

Table 7. Distribution of patients according to their residential, provincial and extra provincial status: 224		
Places of residence of them	n	%
Village	7	3.1
Town	16	7.1
Province	89	39.7
District	97	43.3
Not found registered	15	6.7
Internal province or external province status of them		
Internal province	196	87.5
External province	13	5.8
Not found registered	15	6.7
Total	224	100.0

Table 6. Distribution of the number of patients according to the years of diagnosis and location: 224										
Years of diagnosis	2011	2012	2013	2014	2015	2016	2017*	Total	X^2	P
Distribution of patients according to where they live	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	17.217	0.005
Rural	32 (65.3)	17 (50.0)	16 (47.1)	16 (61.5)	22 (61.1)	21 (80.8)	5 (26.3)	129 (57.6)		
Urban	17 (34.7)	17 (50.0)	18 (52.9)	10 (38.5)	14 (38.9)	5 (19.2)	14 (73.7)	95 (42.4)		
Total	49 (100)	34 (100)	34 (100)	26 (100)	36 (100)	26 (100)	19 (100)	224 (100)		

*The difference between groups was determined by Bonferroni correction

DISCUSSION

In this section, the epidemiological characteristics of the TB problem in Nevsehir, where different cultures and continuous population mobility are experienced, will be discussed.

More than half of the patients within the study were male and more than 2/3 were in the young-active age group. In the study by Fernandez et al., the patients' age average was 35.7 years. In the same study, 66.9% of the patients were male (7). It was reported that the disease was more prevalent in younger age groups and in the male gender.

In this study, it was determined that 35.2% of the patients attended only to the primary school and 24.5% did not attend any schools. The study of Kigozi et al. reported that 30.2% of the patients attended primary or no school (8). Tulu et al. reported that 50% of the patients were illiterate (11). As the studies indicated, the education level of TB patients was low.

In this study, it was found that 53.6% of the patients were diagnosed with pulmonary TB while 42.9% were diagnosed with non-pulmonary tuberculosis. Pulmonary TB is significantly more common in male patients than in women. In the study by Ateş et al. 54.8% of patients were diagnosed with pulmonary TB and 45.1% non-pulmonary TB (12). The most common of all possible TB types was pulmonary TB (PTB), which was of great epidemiological importance due to its highly contagious nature. While PTB rate was significantly higher in men, non-pulmonary TB rate was found significantly higher in women (13). The reason for this may be the prevalence of smoking among men and the risk factors they were exposed to in their working environment.

In collective dwelling or working places, contacts occurred more often than in normal society. As the number of contacts per patient was high, the controls were become important (13). As TB was a disease that could be transmitted through the air, the patient primarily infected those who were in close contact with him/her (13). In this study, 71.8% of the patients were married and they shared the same house with their family members.

There are many risks that facilitate the emergence and progression of tuberculosis (14). In this study, it was determined that 57.3% of the patients lived in families with 4 or more people, 14.2% had TB incidences in their family, 5.4% had familial contact 1.3% had non-family contact and 51.9% lived in single houses. 58.9% of the patients (51.9% single house, 0.6% construction site, 0.6% dormitory, 3.9% prison, 1.9% military unit) lived in crowded dwellings, which had a high risk for the spread of tuberculosis. Looking at other studies; Nair et al. (2016) reported that the contact of index cases with a family history of tuberculosis carried a 2.5-fold higher risk of TB disease than those without a family history of tuberculosis (15). The 6.6% gave of new TB among the household contacts of the TB patients (16). In other study, it was demonstrated significant mediation effect of household crowding on the associations between socioeconomic determinants and tuberculosis incidence (17). Longer contact duration and sharing the same airspace with the TB patient are well-known risk factors for TB. The relation between household crowding and tuberculosis incidence was significant.

In this study, it was determined that 3.9% of the patients were in prison. TB is a major concern for people imprisoned people because of overcrowding, malnutrition and inappropriate medical services. However, recognition of TB rate in prison remains a challenge because of the weakness of the information system in the prison (2).

In this study 18.6% of the patients smoked. The initial relationship was between smoking and TB, which was one of the important risk factors (18). In a study in Iran in 2012 also demonstrated that there was a relation between TB and smoking (19). A prospective study conducted in rural China in 2017 indicated that smoking was an independent risk factor for tuberculosis infection, particularly in older smokers, and that there was a direct correlation between the history of smoking and the risk of latent tuberculosis (20). Accordingly, the greatest effect of smoking in terms of infection-related public health problems was possibly the increase in the risk of tuberculosis (18).

One of the other important risk factors in Tuberculosis is low socioeconomic status. This is especially true when it comes to poverty, as it can lead to living in unhealthy dwellings, living in crowded locales such as jails by causing increases in criminal activity and even causing homelessness, which are all factors that can lead to the emergence of diseases such as TB (21, 22). The study by Pelissari et al. determined that household crowding was strongly correlated with both the mean per capita household income (17). In this study, it was determined that 34.5% of household incomes were between 501-1000 TL and 33.8% between 0-500 TL and very low (Table 4). The study of Noppert et al. determined that 39% of the TB patients reported some difficulty making monthly bill payments. Over a quarter (26%) of participants reported some difficulty in buying food (23). In a study by Arcoverde et al., it was determined that the socio-economic conditions were associated with TB mortality and TB mortality was associated with income (low income I: − 0.0611, p = 0.002) (18). Low incomes, which makes them more vulnerable, may explain these results.

In this study, among those professions that were risky in terms of transmitting TB, the patients were employed/ and or lived as nurses, dental technicians, soldiers, prisoners, students and masseurs. Most studies reflect higher incidence and prevalence of active TB disease among healthcare workers, including drug-resistant TB, compared to the nearby community or general population. The systematic review of Grobler et al. found that most studies reflected higher incidence and prevalence of active TB disease in healthcare workers, including drug-resistant TB, than the nearby community or general population (24).

Knowing the geographical distribution of tuberculosis

is important in fighting it on a regional level. Increased migration from developing countries to developed countries, spread of global tourism and wars perpetuate the threat of TB (3,25,26). In a study conducted on tuberculosis by Asadi et al., it was found that tuberculosis affected the foreign-born population disproportionately and was 23 times more than Canadian-born, non-indigenous population. In Alberta province, tuberculosis cases among the foreign population in 2015 caused approximately 90% of the cases (27).

One of the major risk factors in Nevsehir is the presence of the asylum seekers. According to the 2017 data of the Directorate General of Migration Management of the Ministry of Internal Affairs of the Republic of Turkey, the number of registered asylum seekers living in Nevşehir was 7,745. It was reported that there were serious problems related to the living conditions of asylum seekers living in Nevsehir (including education of children of school age, child care, child labor and early marriage, shelter, legal rights and humanitarian support) (5). In this study, it was determined that the number of TB afflicted asylum seekers is 14 (6.4%). While TB phenomena number was 1 in 2011, it increased to 5 in 2017. While the number of the asylum seekers diagnosed with TB was fewer before 2017, the number increased more in 2017.

Pareek et al. (2016) mentioned that the increase in number was regarded as a risk for the spread of TB (3). Tuberculosis in high-income countries continues to be a cause of morbidity and mortality - particularly among people who were born abroad under conditions of high tuberculosis load, in low-income countries and migrated to high-income countries. They also mentioned the best way to improve tuberculosis control through coordinated screening of migrants for tuberculosis (3). In a review, it was pointed out that, like many other airborne infections, TB has no boundaries and can be easily spread out from one site to another. This is especially in the fragile group (2).

If the patients were evaluated according their distribution in terms of residential areas. It could be noted that most patients (46.4%) lived in county areas. 93.8% of the patients lived in areas bound to the province of Nevsehir. In addition, when we looked at the distribution by years, it was seen that the patients were significantly more common in the rural area compared to the urban area.

Phetlhu et al. reported that significantly high incident rates of TB were recorded in rural areas in comparison to the urban areas in the Western Cape (28). The study by Rao et al., reported that TB prevalence was also significantly higher in rural areas as compared to the urban (29). In an Ethiopian study, the prevalence of TB was also confirmed that TB was higher among rural as compared to urban residents (30). The reason for this may be due to poor performance of services for TB treatment due to various reasons, such as poor awareness of the disease and available services in the countryside, irregular drug supply and inadequate control.

The results of the study indicated higher rates of prevalence in provincial centers, which could be explained by the fact that provincial centers were more crowded and had higher rates of population movement in comparison to towns and villages. Nevsehir, where the asylum seekers diagnosed with TB increased day by day, is an important region for tourism. As most of the patients were found the city center and the townships of Avanos and Urgup, intense amount of social mobility caused by tourism can be a factor in this matter. Another matter to consider here was the fresher air in towns and villages in comparison to counties and province centers.

CONCLUSION

As a result, it was determined that TB patients generally had lower levels of education, were in young age groups, had low income levels, lived in crowded families and dwelled in areas where touristic movements were common and rural district.

In the fight against Tuberculosis, policies for accurately establishing the current status of the disease, enabling early diagnoses, ensuring familial cooperation, increasing the public knowledge on Tuberculosis (regular medicine usage, ways of transmission and symptoms) and improving the socioeconomic status of the society are of utmost importance.

This study also has implications for public health because research emphasizes the importance of TB infections on the distribution and pathway in patients. So far, only a few studies have examined the profiles of infectious diseases TB patients in Turkey, but the problem of TB infection requires further investigation. It can be stated that this is a valuable study in terms of covering a long period of 7 years. The number of patients was found to be low in a period of 7 years (Total 224). The low number of patients can be an indicator of the success of health workers working in this field. However, the fact that the province of Nevşehir is a tourism destination and the presence of asylum seekers may be an indication that the risk persists in terms of the spread of the disease. Thus, health professionals need to be more careful about this risk.

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