Determination of related factors about diagnostic and treatment delays in patients with smear - positive pulmonary tuberculosis in Turkey

**Background/aim:** To analyse delays in diagnosis and treatment by defining the related demographic and clinical factors, to reveal obstacles, and to develop essential attempts to help reduce treatment delays.

**Materials and methods:** We created a questionnaire on the subject of “Delays in Diagnosis and Treatment in TB Control” to be administered to patients. Forms were distributed to dispensaries across the country via the General Directorate of Public Health, with an official paper.

**Results:** Eight hundred fifty-three new patients with smear - positive pulmonary TB contributed to our study. The mean patient delay was 18.06 ± 22.27 days, the mean diagnosis delay was 35.63 ± 34.86 days, and the mean treatment delay was 0.90 ± 2.39 days. We found no association between sex, age, literacy, residential location, and presence of chronic respiratory diseases, and patient delay. It was determined that patient delay was shorter for patients with haemoptysis, fever, dyspnoea, and chest pain. In women, the diagnosis delay was longer than in men.

**Conclusion:** In the diagnosis process of patients with tuberculosis, it was determined that there was an improvement in the patient delay; however, the improvement in diagnosis delay was still not acceptable as an ideal duration.

**Keywords:** Health policy, tuberculosis control, patient delay, diagnosis delay
Determination of related factors about diagnostic and treatment delays in patients with smear-positive pulmonary tuberculosis in Turkey

1. Introduction

Early diagnosis, administering treatment with a standard regimen, and starting treatment immediately are some of the primary targets for the elimination of tuberculosis (TB) [1-3]. End TB Strategy, within the context of prevention, suggests patient-centred care to focus on early diagnosis, treatment, and prevention [4]. Delays in the diagnosis and treatment of pulmonary TB are a great obstacle in the elimination of TB globally [5].

Delays in diagnosis and treatment increase the rate of contamination [6]. Contamination, most probably, happens before the effective treatment of the index cases [7]. With treatment, the frequency of coughing of the patient with TB and the number of bacteria in their sputum decreases rapidly, which indicates both symptomatic relief and decreased contamination [8,9]. With effective treatment, the contamination feature of TB is diminished practically within 2-3 weeks [2].

Increasing complications are delays in diagnosis and treatment and long time periods of contagiousness in public; these cause higher amounts of debts and increase in mortality [10]. The evaluation of delays in diagnosis is important for interpreting the control activity of TB and defining obstacles [11]. Delays between the onset TB symptoms and the initiation of treatment are caused either by the patient, healthcare system or a combination of both. Delays in diagnosis are usually attributed to healthcare systems [12].
Turkey has passed through a health transformation [13] and this transformation had positive effects on the control of TB [14]. This will be the first study, which consists of almost Turkish database. We aimed to analyse delays in diagnosis and treatment by defining the related demographic and clinical factors, to reveal obstacles, and to develop essential attempts to help reduce treatment delays.

2. Methods

2.1 National TB Control

The planning and the running of the TB control program in Turkey are performed by the TB Department affiliated with the Turkish Republic Ministry of Health General Directorate of Public Health. These departments are currently planning and running TB control studies within tuberculosis dispensaries with the coordination of Provincial Health Directorates, family physicians, hospitals, and all institutions of health.

In Turkey, as a healthcare service, all diagnostic and treatment procedures of TB are maintained without charge. Including cases that are multi drug-resistant, all medications used in patients with TB and individuals with a history of contact with TB bacilli are provided by institutions the Ministry of Health without charge, also without consideration of the social insurance of the patient.

In Turkey’s TB control program, the endpoint units are the TB dispensaries. Patients who are diagnosed as having TB are referred to the dispensaries, which are responsible for duties including diagnosis, treatment, patient follow-ups, notifying patients, registration, statistics, immunization, scanning, supplying medication, education, information activities, coordination, and consultation services.
2.2. Study design

We planned this study for the notification of patients with TB based on the delay in diagnosis and treatment and defining obstacles. We created a questionnaire on the subject of “Delays in Diagnosis and Treatment in TB Control” to be administered to patients. The form questions the patients’ information and the delays in their diagnosis and treatment. The questions included the general demographic characteristics of patients, major symptoms, the date of therapy initiation, the date of presentation to a health institute, the first admission medical department, the date of presentation when the TB diagnosis was made, the medical department of the physician who first diagnosed TB, and the date of the initiation of treatment. We received the written consent of the General Directorate of Public Health in order to provide and use the data.

2.3. Data Collection

Questionnaires were distributed to dispensaries across the country via the General Directorate of Public Health, with an official paper. Data were collected from 157 dispensaries and 81 provinces. The questionnaires were administered by the physicians of the dispensaries to patients with smear-positive pulmonary TB who volunteered to complete the questionnaire. Patients were diagnosed between January 1st and December 31st, 2018, and were registered to the dispensaries. Before completing the questionnaire, all the patients provided written informed and consent. Patients were enlightened regarding any further questions by the physicians of the dispensaries. The smear-negative pulmonary TB cases, extrapulmonary TB cases, retreatment TB cases, and the patients under 18 years were not included in the study.

2.4. Definitions

Patient delay: The delay between symptom onset and the admission of the patient to a healthcare institution (time unit = days);
Diagnosis delay: The delay between the admission to a healthcare institution and receiving a diagnosis (time unit = days);

Treatment delay: The delay between the diagnosis and the initiation of treatment (time unit = days);

Total delay: The delay between symptom onset and treatment administration (time unit = days).

2.5. Statistics

Statistical analyses were performed using the SPSS (Chicago, IL, USA) version 18 software. The normality of distribution of the variables was evaluated using visual (histograms and probability graphics) and analytical methods (Kolmogorov-Smirnov / Shapiro - Wilk tests). The time frames of first examination admission and diagnosis were compared within the various groups of symptoms, institution, and diagnosing physician using the Kruskal - Wallis test because these parameters were not normally distributed. Comparisons between the two variables were performed using the Mann - Whitney U test and evaluated using Bonferroni correction. For variables in which at least one of as not normally distributed or ordinal, their correlation coefficient and statistical significance were calculated using the Spearman test. In the analysis, for possible statistically significant factors, the error rate was used as type - 1, 5%.

3. Results

Eight hundred fifty-three new patients with smear-positive pulmonary TB contributed to our study, which was performed nationwide. The age range of the patients was 58.05 ± 17.85 [median = 60 (range, 21 - 96)] years. Five hundred eighty-one (68.1%) of the participants were male, 31.9% (n = 272) were female. One hundred seventy (20%) of the patients were living in villages. The literacy rate was 85.2% (n = 727) among the participants; 14.8% (n = 126) were illiterate. One hundred fifty-eight (18.5%) patients had a history of chronic pulmonary disease.
Four hundred thirteen (48.4%) patients were current smokers, 38.3% (n = 327) were never smokers, and the remaining 13.3% (n = 113) were former smokers. The most common initial symptom was cough (n = 509, 59.7%). The physicians who initially admitted the patients were from chest diseases (n = 340, 39.9%), internal medicine (n = 175, 20.5%), and family physicians (n = 139, 16.3%). We detected patient delay as 18.06 ± 22.27 [median = 10 (range, 0 - 113)] days, diagnosis delay as 35.63 ± 34.86 [median = 23 (range, 0 - 151)] days, and treatment delay as 0.90 ± 2.39 [median = 0 (range, 0 - 14) days]. The majority (88.4%, n = 754) of the patients were diagnosed by a chest disease physician. The three institution types that had the highest diagnostic rates were university hospitals and education and research hospitals (32.8%, n = 280), chest disease hospitals (29.3%, n = 250) and government hospitals (22.0%, n = 187), respectively (Table 1).

There was no significant correlation between age and patient delay (r = -0.048, p > 0.05). Patient delay showed no association (p > 0.05) between the sex. No association was found between literacy levels and patient delay (p > 0.05). However, an association was found between smoking and patient delay (p < 0.001). In current smokers, patient delay (median = 16 days, n = 413) was longer than in never smokers (median = 11 days, n = 440). No association was found between the presence of chronic respiratory disease (CRD) and patient delay (p > 0.05). Also, patient delay showed no association according to the residence of the patients (p > 0.05) (Table 2).

According to the initial symptoms of the patients, patient delay showed statistical significance (p < 0.001). Within the multiple comparisons performed using the Mann - Whitney U test, it was determined that this difference was caused by patients who had dyspnoea, fever, haemoptysis, and chest pain. The patient delay of patients with haemoptysis (median = 1 day), fever (median = 4 days), dyspnoea (median = 5 days), and chest pain (median = 6 days) was significantly shorter
compared with the other symptom types (p < 0.001). On the other hand, there was no statistically significance between the patients’ first symptoms and diagnosis delay (p > 0.05) (Figure 1 and 2).

Between the factors of age and diagnosis delay, a low degree of correlation was present (r = 0.102, p = 0.003). Diagnosis delay in women (median = 27 days, n = 272) was found to be longer than in men (median = 19 days, n = 581) (p < 0.001). No significance was found between diagnosis delay and CRD status (p > 0.05). In current smokers (median = 19 days, n = 413), diagnosis delay was found to be shorter than in never smokers (median = 26 days, n = 440) (p < 0.001). There was a moderate degree of correlation between the total number of consulted physicians and diagnosis delay (r = 0.460, p = 0.001). There was a statistically significant correlation between the total number of examinations and diagnosis delay (r = 0.515, p = 0.001) (Table 3).

There was a significant difference between the patients’ initial admission status for a physician and diagnosis delay (p < 0.001). According to the Mann - Whitney U test used on multiple comparisons, it was found that this difference was caused by the patient group that was admitted to by physicians from dispensaries, chest diseases departments, and emergency room (ER) wards. Diagnosis delay was significantly shorter in patients who were admitted by dispensary physicians (median = 4.5 days), chest diseases specialists (median = 11 days), and ER ward physicians (median = 16 days) than from other specialists (Table 4).

After admission to healthcare institutions, statistically significant differences were found between diagnosis periods (p < 0.001). As a result of multiple comparisons made using the Mann - Whitney U test, the diagnosis period after admission to university training and research
hospitals were found to be significantly longer (median = 6 days) when compared with other institutions (p < 0.001) (Table 5).

4. Discussion

Our study, which was performed regarding the delays in diagnosis and treatment of TB, is the first study to include the major data of Turkey. In our study, patient delay was 18.06 ± 22.27 days, diagnosis delay was 35.63 ± 34.86 days, and treatment delay was 0.90 ± 2.39 days. We found no associations between patient delay and sex, age, literacy, residential location, presence of CRD. However, there was an association between smoking status and patient delay. It was determined that patient delay was shorter in patients with haemoptysis, fever, dyspnoea, and chest pain. Also, patient delay was longer in women than in men.

In our country, studies concerning delays of diagnosis and treatment are usually based on hospitals or clinics. In a university hospital in Ankara, in a retrospective study conducted between 1994 - 1997, which was based on the time period between symptom onset and treatment in patients with TB, it was determined that the median days was 62, based on 28 patients who were smear-positive for TB [15]. In an education and research hospital in Ankara, which is a reference centre for TB, out of 81 patients who were TB smear-positive and hospitalized in 1998 and had started their treatment, it was determined that the days of patient delay was 82.6 ± 70.7, physician delay was 41.4 ± 55.8, and the total delay was 124.0 ± 113.7 days [16]. In 1999, in a study performed in the chest disease department of a military hospital in Istanbul, it was determined that the total delay in diagnosis in all patients was found to be a mean 16.3 days, (median 21 days) [17]. In 1999, in an education and research hospital in Istanbul, which was a reference centre for TB, out of 134 patients hospitalized for smear-positive pulmonary TB, their mean days of admission was 26.9, referral was 9.2, time period for diagnosis was 3.9, the
initiation of the treatment was 1.3 days. The median time periods were 17.5, 3.5, and 3.1 days, respectively [18]. In the same hospital in 2001, out of 204 hospitalized patients with smear-positive pulmonary TB, it was determined that the mean days of admission were 31.4, the referral was 22.1 days, diagnosis was 3.3 days, and initiation of the treatment was 1.4 days. The median time periods were 17.5, 11.0, 1.5, and 1.0 days, respectively [19]. Later, in the same hospital in 2010, the mean and median days between the initiation of symptoms and initiation of treatment in 136 new patients hospitalized with pulmonary TB were 64.7 and 48 in smear-positive cases (n = 71), and 99.8 and 61 days in smear-negative cases (n = 65) [20]. In another reference hospital for TB in Istanbul, in a study performed in 2004, out of 151 new patients with smear-positive pulmonary TB, the mean days between symptom onset and the first visit to a physician was 46.4, delay of referral was 28.9 days, delay of diagnosis was 2.4 days, and the delay of treatment initiation was 0.8 days [21]. Based on national parameters, it was determined that in Turkey, patient delay, diagnosis delay, and treatment delay had decreased. However, diagnosis delay, which was found as 35 days cannot be accepted as an ideal duration. Among all disciplines, the knowledge and awareness of TB diagnosis could be an underestimated issue. Therefore, patients admitted with pulmonary symptoms are nearly always evaluated with a suspicion of TB.

In a review study in which studies from 78 countries were evaluated and systematically compiled, patient delay was found as 81 days, physician delay was 29.5 days, and treatment delay was 7.9 days [5]. Diagnosis delay was still an obstacle in TB prevention and control programs in low and medium-income levels [11]. Health illiteracy, poverty, and other personal reasons cause the delays of admission to health institutions, and consequently, cause delays of diagnosing TB. Inadequate health systems also cause delays in diagnosis and treatment. The health system in
Turkey has been through a transformation [13] and one of the positive outcomes of these transformations in TB control is shortening the time delay in diagnosis and treatment.

The most frequent reason for patient delay is that patients with TB tend to neglect the symptoms [22]. In a previous study performed in Italy, one of the most frequent reasons for delays in treatment was the light nature of the symptoms (82%) and the feeling healthy (76%) [23]. In our study, we found that patients whose first symptoms were cough, weight loss, night sweats, exhaustion, and hoarseness tended to neglect these symptoms and present to a physician much later. We found an association between the first symptoms of patients and patient delay. However, we found no association between the first symptoms and diagnosis delay.

In our study, we found no association between patient delay and sex. We found that diagnosis delay was longer in women (median = 27 days) than in men (median = 19 days). In a study performed in England, the diagnostic delay in women was found to be associated [24]. In China, female sex was related with a risk of diagnostic delay [25,26].

Unlike most studies, we found no relation between patient delay and age, literacy, and place of residence. Patient delay was longer in smokers (median = 16 days) than in non-smokers (median = 11 days). Thus, in current smokers, diagnosis delay was shorter (median=19 days) than in non-smokers (median = 26 days). In a study conducted in Serbia, a medium, positive and statistically significant correlation was found between the number of cigarettes smoked and the patient delay [27].

We determined that there was a medium correlation between the total number of consultant physicians and the delay in the diagnosis, but there was a higher correlation between the number of examinations and diagnosis delay. In a study performed in India, it was found that an
increased number of consultations and diagnostic delay was statistically correlated [28]. In a report from Ethiopia, it was emphasized that systems of initial admission to practitioners were independent indicators of delays of health systems [29]. In a study from Switzerland, one of the main indicators of delays of the health system was being evaluated by at least three or four physicians before initiating treatment [30].

We found an association between the patients’ first visit to a physician and diagnosis delay. We determined that the diagnosis delay was significantly shorter in patients who were consulted by chest physicians, dispensary physicians, and ER ward physicians, than by other physicians. In a study performed in Italy, it was observed that the delay was longer when patients were first evaluated by family physicians [23]. In the study performed in Ethiopia, it was indicated that seeing a family physician first was one of the independent indicators of the health system [29].

Efforts should be focused on finding patients using existing systems and developing new strategies to improve patient care-seeking behaviors [11]. We think that strategies regarding the delays of patients are vital for the success of TB control programs. We care about raising the awareness of TB, both in the public and among physicians. We conducted the first study to analyse the delays in diagnosis and treatment around Turkey and determined that the Turkish health system has improved its status in these regards. We advise improving processes in order to improve the awareness of patients about the symptoms of TB and to increase health literacy.

The limitation of our study can be considered as the volunteer-based completion of questionnaires by the participants. Thus, this situation does not cover all patients who were smear-positive in 2018.

Conclusions
In this study covering new patients with smear-positive TB, no significant relation was found between patient delay and age, sex, education, residential location, and the presence of CRD. However, patient delay was longer in current smokers than in never smokers. Also, patient delay was less in patients with symptoms of haemoptysis, fever, and dyspnea, and chest pain. Diagnosis delay was significantly shorter in patients who were admitted by dispensary physicians, chest diseases specialists, and ER ward physicians than by the other specialists. Diagnosis delay was longer in women than in men. In the diagnostic process of patients with TB, it was determined that there was an improvement in patient delay; however, diagnosis delay was still not acceptable as an ideal duration.
References:


2. Turkish Republic Ministry of Health. The Guideline of Tuberculosis Diagnosis and Treatment. Ankara: Turkish Republic Ministry of Health; 2011. (in Turkish)


Table 1. General characteristics of the study groups

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<th>Male</th>
<th>Female</th>
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<tbody>
<tr>
<td>Sex n, (%)</td>
<td>581 (68.1)</td>
<td>272 (31.9)</td>
</tr>
<tr>
<td>Residence n, (%)</td>
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<tr>
<td>City Center</td>
<td>333 (39)</td>
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<tr>
<td>Town Center</td>
<td>350 (41)</td>
<td></td>
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<tr>
<td>Village</td>
<td>170 (20)</td>
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<tr>
<td>Education n, (%)</td>
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<tr>
<td>Illiterate</td>
<td>126 (14.8)</td>
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<tr>
<td>Literate</td>
<td>727 (85.2)</td>
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<td>Previous Chronic Pulmonary Disease n, (%)</td>
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<tr>
<td>No</td>
<td>695 (81.5)</td>
<td></td>
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<tr>
<td>Yes</td>
<td>158 (18.5)</td>
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<tr>
<td>Smoking Status n, (%)</td>
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<tr>
<td>Never</td>
<td>327 (38.3)</td>
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<tr>
<td>Current</td>
<td>413 (48.4)</td>
<td></td>
</tr>
<tr>
<td>Former</td>
<td>113 (13.3)</td>
<td></td>
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<tr>
<td>Initial Symptom n, (%)</td>
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<tr>
<td>Cough</td>
<td>509 (59.7)</td>
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<tr>
<td>Fever</td>
<td>84 (9.8)</td>
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<td>Loss of Weight</td>
<td>75 (8.8)</td>
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<tr>
<td>Night Sweating</td>
<td>59 (6.9)</td>
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<tr>
<td>Chest Pain</td>
<td>35 (4.1)</td>
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<tr>
<td>Fatigue</td>
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<td>Haemoptisis</td>
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<td>Dyspnœa</td>
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<tr>
<td>Hoarseness</td>
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<tr>
<td>Loss of Appetite</td>
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<tr>
<td>Initial Physician on Admission n, (%)</td>
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<tr>
<td>Chest Diseases</td>
<td>340 (39.9)</td>
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<tr>
<td>Internal Medicine</td>
<td>175 (20.5)</td>
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<td>Family Physician</td>
<td>139 (16.3)</td>
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<td>ER Physician</td>
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<td>Otorhinolaryngology</td>
<td>36 (4.2)</td>
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<td>22 (2.6)</td>
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<tr>
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<td>19 (2.2)</td>
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<td>Other</td>
<td>15 (1.8)</td>
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<td>Diagnosing Physician n, (%)</td>
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<td>16 (1.9)</td>
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<tr>
<td>Other</td>
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<td>Institution of Diagnosis n, (%)</td>
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<tr>
<td>University- Education &amp;Research Hospital</td>
<td>280 (32.8)</td>
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<tr>
<td>Chest Diseases Hospital</td>
<td>250 (29.3)</td>
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<tr>
<td>Government Hospital</td>
<td>187 (22.0)</td>
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<tr>
<td>Dispensary</td>
<td>78 (9.1)</td>
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<tr>
<td>Private Hospital</td>
<td>58 (6.8)</td>
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<td>Time Period of Delay, mean days ± SD</td>
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<td>Delay of the patient</td>
<td>18.06±22.27</td>
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<td>Delay in the diagnosis</td>
<td>35.63±34.86</td>
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<td>Delay in the treatment</td>
<td>0.90±2.39</td>
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SD: Standard deviation; ER: Emergency room
Table 2. The analysis of parameters that could affect the time period of admission

<table>
<thead>
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<th>Parameter</th>
<th>Female</th>
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<tr>
<td></td>
<td>Mean ± SD  Med (Min-Max)</td>
<td>Mean ± SD  Med (Min - Max)</td>
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<td><strong>Sex</strong></td>
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<td>Patient Delay</td>
<td>23.47 ± 25.38  14 (0 - 114)</td>
<td>23.34 ± 24.60  14 (0 - 120)</td>
<td>0.745m</td>
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<td>(days)</td>
<td><strong>Education</strong></td>
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<td>Patient Delay</td>
<td>22.99 ± 24.43  14 (0 - 120)</td>
<td>25.63 ± 27.06  14 (0 - 117)</td>
<td>0.475m</td>
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<td>(days)</td>
<td><strong>Smoking</strong></td>
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<td>Patient Delay</td>
<td>26.31 ± 25.88  16 (0 - 114)</td>
<td>20.63 ± 23.52  11 (0 - 120)</td>
<td>0.001m</td>
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<td>(days)</td>
<td><strong>CRD</strong></td>
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<tr>
<td>Patient Delay</td>
<td>23.34 ± 25.36  11.5 (0 - 114)</td>
<td>23.39 ± 24.74  14 (0 - 120)</td>
<td>0.959m</td>
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<td>(days)</td>
<td><strong>Residence</strong></td>
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<td>Patient Delay</td>
<td>23.59 ± 23.91  (14 - 120)</td>
<td>24.38 ± 25.77  (14 - 113)</td>
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<td>(days)</td>
<td><strong>CRD</strong></td>
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<td>Patient Delay</td>
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<tr>
<td>(days)</td>
<td><strong>Residence</strong></td>
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CRD: Chronic respiratory disease; SD: Standard deviation; Med: Median; Min: Minimum; Max: Maximum
Table 3. The analysis of the parameters that could affect the time period of diagnosis

<table>
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<td><strong>Sex</strong></td>
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<td>&lt; 0.001&lt;sup&gt;m&lt;/sup&gt;</td>
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<td><strong>Diagnosis Delay</strong></td>
<td><strong>Mean ± SD</strong></td>
<td><strong>Med (Min - Max)</strong></td>
<td><strong>Mean ± SD</strong></td>
<td><strong>Med (Min - Max)</strong></td>
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<td><strong>Male</strong></td>
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<tr>
<td><strong>Sex</strong></td>
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<td><strong>Mean ± SD</strong></td>
<td><strong>Med (Min - Max)</strong></td>
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<tr>
<td><strong>Female</strong></td>
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<tr>
<td><strong>Smoking</strong></td>
<td><strong>Current Smoker</strong></td>
<td></td>
<td><strong>Non-Smoker</strong></td>
<td></td>
<td>0.001&lt;sup&gt;m&lt;/sup&gt;</td>
</tr>
<tr>
<td><strong>Diagnosis Delay</strong></td>
<td><strong>Mean ± SD</strong></td>
<td><strong>Med (Min - Max)</strong></td>
<td><strong>Mean ± SD</strong></td>
<td><strong>Med (Min-Max)</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Male</strong></td>
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<td><strong>Female</strong></td>
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<tr>
<td><strong>CRD</strong></td>
<td><strong>CRD Present</strong></td>
<td></td>
<td><strong>CRD Absent</strong></td>
<td></td>
<td>0.205&lt;sup&gt;m&lt;/sup&gt;</td>
</tr>
<tr>
<td><strong>Diagnosis Delay</strong></td>
<td><strong>Mean ± SD</strong></td>
<td><strong>Med (Min - Max)</strong></td>
<td><strong>Mean ± SD</strong></td>
<td><strong>Med (Min-Max)</strong></td>
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<tr>
<td><strong>Male</strong></td>
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<td><strong>Female</strong></td>
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</tr>
</tbody>
</table>

CRD: Chronic respiratory disease; SD: Standard deviation; Med: Median; Min: Minimum; Max: Maximum
Table 4. Analysis of the relationship between the first physician and diagnosis delay.

<table>
<thead>
<tr>
<th>Physician for Diagnosis</th>
<th>n</th>
<th>Avg ± SD (days)</th>
<th>Med (days)</th>
<th>(Min - Max) (days)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dispensary Physician</td>
<td>22</td>
<td>10.05 ± 19.11</td>
<td>4.5</td>
<td>0 - 92</td>
<td>&lt; 0.001*</td>
</tr>
<tr>
<td>Chest Diseases</td>
<td>340</td>
<td>36.10 ± 27.24</td>
<td>11</td>
<td>0 - 200</td>
<td></td>
</tr>
<tr>
<td>ER Physician</td>
<td>107</td>
<td>30.41 ± 28.17</td>
<td>16</td>
<td>0 - 155</td>
<td></td>
</tr>
<tr>
<td>Infectious Diseases</td>
<td>19</td>
<td>30.63 ± 33.38</td>
<td>22</td>
<td>5 - 150</td>
<td></td>
</tr>
<tr>
<td>Internal Medicine</td>
<td>175</td>
<td>42.91 ± 39.26</td>
<td>30</td>
<td>1 - 195</td>
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</tr>
<tr>
<td>Primary Care Physician</td>
<td>139</td>
<td>44.60 ± 37.73</td>
<td>31</td>
<td>2 - 176</td>
<td></td>
</tr>
<tr>
<td>Otorhinolaryngology</td>
<td>36</td>
<td>58.48 ± 49.70</td>
<td>41</td>
<td>1 - 184</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>15</td>
<td>50.47 ± 38.56</td>
<td>41</td>
<td>10 - 157</td>
<td></td>
</tr>
</tbody>
</table>

SD: Standard deviation; ER: Emergency room; Med: Median; Min: Minimum; Max: Maximum

*Dispensary, chest, and ER physician were found to have statistically significant difference in means of diagnosis time when compared with other physicians (p < 0.001).
Table 5. The comparison of the time period of diagnosis between the institutions that performed accurate diagnosis of TB

<table>
<thead>
<tr>
<th>Institution of Diagnosis</th>
<th>n</th>
<th>Mean ± SD (days)</th>
<th>Med (days)</th>
<th>(Min - Max) (days)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>University - Education and Research Hospital</td>
<td>280</td>
<td>14.46 ± 21.59</td>
<td>6</td>
<td>0 - 161</td>
<td>&lt; 0.001*</td>
</tr>
<tr>
<td>Chest Diseases Hospital</td>
<td>250</td>
<td>9.19 ± 16.30</td>
<td>3</td>
<td>0 - 117</td>
<td></td>
</tr>
<tr>
<td>Government Hospital</td>
<td>187</td>
<td>10.79 ± 18.83</td>
<td>4</td>
<td>0 - 128</td>
<td></td>
</tr>
<tr>
<td>Dispensary</td>
<td>78</td>
<td>5.41 ± 10.99</td>
<td>3</td>
<td>0 - 92</td>
<td></td>
</tr>
<tr>
<td>Private Hospital</td>
<td>58</td>
<td>9.86 ± 13.01</td>
<td>4,5</td>
<td>0 - 64</td>
<td></td>
</tr>
</tbody>
</table>

SD: Standard deviation; Med: Median; Min: Minimum; Max: Maximum

* University-Education and Research Hospital were found to have statistically significant difference in means of diagnosis period when compared with other hospitals (p < 0.00)
Figure 1. The relationship between the initial symptoms and patient delay: According to the initial symptoms of the patients, patient delay has shown a statistical significance (p<0.001). It was determined that this difference was caused by patients who had dyspnoea, fever, haemoptysis and chest pain.
Figure 2. The relationship between the initial symptoms and diagnosis delay: There was no statistically significance (p>0.05) between the patients’ first symptoms and diagnosis delay.