Delay in the diagnosis of tuberculosis

Dear Editor,

Tuberculosis (TB) remains a major global public health problem and is the second leading cause of death from infectious disease worldwide.[1]

Delays in diagnosis may worsen the disease, increase the risk of death and enhance TB transmission within the community. These delays may be attributed to both patients and the health care system.[3]

This study was designed to assess risk factors associated with an increased time between symptoms and diagnosis.

A cross-sectional study involved 68 patients identified by passive screening and being treated for TB at a TB outpatient clinic, in Gaia, Portugal between November 2013 and April 2014. Each patient answered a semi-structured questionnaire on the day of clinical appointment. The questionnaire was designed to assess patient progress from initial symptoms until diagnosis.

Of the 68 patients, 40 (58.8%) were male, with mean age 47.1 years. Twenty patients (29.4%) presented with respiratory symptoms, 31 (45.6%) with systemic symptoms and 17 (25%), with both. Of these 68 patients, 23 (33.8%) were unemployed. The first health unit identified was: for 36 patients (52.9%) the hospital emergency room, for 32 patients (47.1%) the primary care physician, a private clinic or TB outpatient clinic. Thirty-seven (54.4%) required 1–2 visits to health facilities before diagnosis, and 31 (45.6%) required more than 2 visits (Table 1).

The median time from onset of symptoms to diagnosis was 36 days.

Being a woman (waiting time for women 76.1 days vs 42.5 days for men), employed (67.0 vs 35.3 days), native (60.1 vs 28.1 days), having an university degree (90.1 vs 46.9 days) and having used private transportation (73.4 vs 36.0 days) to arrive to clinical appointment was associated with a longer waiting time until diagnosis (Table 1).

In the multivariate analysis just being a woman ($p = 0.006$), and visiting the health unit after 18:00 h ($p = 0.035$) was significantly associated to a longer waiting period (Table 1).

Table 1 Risk factors associated with increased waiting time for TB diagnosis.

Variable	*n* (%)	Univariate analysis	Multivariate analysis		Waiting time
		p-Value	IC 95%	Exp(Coef) (*p*-value)	Mean (dp)
Age, years					
<=45	37 (54.4%)	0.853			53.6 (59.0)
>45	31 (45.6%)				59.5 (90.3)
Sex					
Female	28 (41.2%)	0.008	(0.31–0.82)	0.499 (0.006)	76.1 (92.5)
Male	40 (58.8%)				42.5 (55.6)
Work					
Unemployed	23 (33.8%)	0.104			35.3 (36.8)
Employed	45 (66.2%)				67.0 (86.0)
Immigrant					
No	60 (88.2%)	0.198			60.1 (78.1)
Yes	8 (11.8%)				28.1 (21.7)
Transport					
Private	37 (54.4%)	0.083			73.4 (94.4)
Public	31 (45.6%)				36.0 (29.6)
Health service sought					
Emergency department + hospital network	36 (52.9%)	0.047			53.4 (85.4)
Private clinic + primary care	32 (47.1%)				59.6 (60.7)
Visits to the health facility					
1 or 2	37 (54.4%)	0.001	(1.43–3.77)	2.324 (0.001)	38.9 (58.4)
More than 2	31 (45.6%)				77.2 (86.2)
Health facility opened					
No	47 (69.1%)	0.900			63.0 (85.9)
Yes	21 (30.9%)				41.4 (34.8)
Health unit open evenings					
No	23 (33.8%)	0.173	(1.04–2.89)	1.736 (0.035)	47.9 (52.6)
Yes	45 (66.2%)				60.6 (83.5)

Table 1 (*Continued*)

Variable	*n* (%)	Univariate analysis	Multivariate analysis		Waiting time
		p-Value	IC 95%	Exp(Coef) (*p*-value)	Mean (dp)
Missing work					
No	54 (79.4%)	0.146			45.9 (55.3)
Yes	14 (20.6%)				96.5 (117.7)
Contact with tuberculosis					
No	38 (55.9%)	0.985			52.2 (59.2)
Yes	30 (44.1%)				61.6 (90.8)
Discriminated					
No	47 (69.1%)	0.132			66 (84.6)
Yes	21 (30.9%)				34.7 (36.8)
Spent money					
No	30 (44.1%)	0.886			45.1 (41.4)
Yes	38 (55.9%)				65.2 (92.1)
Symptoms					
Respiratory	20 (29.4%)				57.7 (85.5)
Systemic	31 (45.6%)	0.779			66.0 (83.3)
Both	17(25%)	0.694			37.2 (29.8)
Qualifications					
Primary school	27 (39.7%)				46.9 (68.0)
Secondary/tertiary school	34(50%)	0.448			56.9 (60.6)
University	7 (10.3%)	0.910			90.1 (140.7)

The median waiting time from symptoms to diagnosis in our population was shorter than in other studies. A previous study in Portugal reported a median waiting time of 92 days[4] while among low and median income countries, median total delay ranged from 25 days in China to 185 days in Tanzania, with an average of 67.8 days.[3] Among high income countries, delays ranged from 42 days in Japan to 89 days in USA, with an average of 61.3 days.[3]

The waiting time from symptom detection to diagnosis was twice as long for women than for men. As there is a greater proportion of the disease in men,[2] this may cause lower degree of suspicion in women.

Ability to attend health facilities after 18 h was associated with longer period to diagnosis. This was unexpected, as we hypothesized that increased hours of operation would be associated with easier access to health care and a more rapid diagnosis. During evening hours, however, these units function as emergency units, with no scheduled appointments, and with patients being seen by different medical doctors at each visit. Moreover, these units may lack appropriate diagnostic resources and may be limited in terms of scheduling appropriate patient follow up. In fact, 45.6% of the patients required more than 2 clinical appointments before diagnosis.

Access to care can depend on a complex interaction of multiple factors including awareness even in unknown risk groups; the responsiveness of units to the needs of users, including availability, accessibility, affordability, appropriateness and acceptability; and patient behavior seeking health care, which may be influenced by socio-cultural, behavioral, financial and organizational factors.[5]

Although there are some known risk factors associated with TB, still the great majority does not have any. In our population, patients with a characteristic usually associated with a better social status were the ones with a longer waiting period until diagnosis.

Being a woman was the only significant characteristic associated to the patient; attending health facilities without any follow up was associated with longer period to diagnosis.

Awareness of TB should be enhanced.

Authors' contribution

Raquel Duarte and Marta Guimarães devised the study. Marta Guimarães worked up the draft manuscript. Marta Guimarães and Olena Oliveira collected the data. Raquel Duarte revised the draft.

Conflicts of interest

The authors have no conflicts of interest to declare.

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Management of pediatric primary spontaneous pneumothorax in a tertiary hospital

Management of pediatric primary spontaneous pneumothorax (PSP) is based on adult literature and the best therapeutic algorithm for PSP is still debatable.[1] The aim of this work was to review the approach to pediatric PSP in a tertiary care hospital.

Clinical charts of patients admitted with first episode of PSP at Hospital São João (Porto, Portugal) between January 2006 and January 2012 were reviewed and analyzed for demographic, diagnosis, treatment and follow-up.

The management of PSP followed the institution protocol: small (<20%) pneumothoraxes are treated with high output oxygen therapy; moderate to large pneumothoraxes (>20–25%) are treated with chest tube drainage or needle aspiration. Surgical indications are: second ipsilateral pneumothorax; first contralateral pneumothorax; bilateral pneumothorax or persistent air leakage (>4 days). All patients proposed for elective surgery had a computerized tomography scan (CT).

Twenty-five patients with a first episode of PSP were included, with a male predominance (80%) as described in the literature. Chest pain was the most frequent presentation (>80%) followed by dyspnea and cough. Five patients had asthma, three were active smokers and one had a family history of PSP. With a follow-up range from one to six years, there were seven recurrences.

The results of the therapeutic algorithm are summarized in Fig. 1. Eight of the initial episodes and 1 recurrence were successfully treated with oxygen therapy; success rate was 43% for first episodes. Chest tube was the next step and was used in 12 initial episodes with a success rate of 75%; however, chest tubes failed in all recurrent episodes. A total of 11 patients underwent thoracoscopy: 5 during the first episode and 6 during recurrence. Thoracoscopy proved to be successful in all cases, with no recurrences. In the presence of blebs, mechanical pleurodesis with bleb resection was performed, whereas in absence of blebs a mechanical pleurodesis was performed.

The overall length of stay was longer for patients treated with thoracoscopy compared to patients treated with oxygen therapy or chest tube (respectively 13.4 ± 4.3, 3.8 ± 1.2, 6.2 ± 3 days, $p < 0.001$). However, patients were hospitalized with a mean of 8 days before surgery and if this is taken into account, there is no significant difference between treatments.

In case of oxygen therapy failure, symptomatic or large PSP, American College of Chest Physicians favors chest tube, while British Thoracic Society (BTS) prefers needle aspiration; both have similar efficiency and recurrence rates.[2,3] Robinson et al. have recently reported the implementation of the BTS guidelines in Australia and New Zealand with a large multicenter series, addressing the efficacy of needle aspiration. Although they do not separate the recurrent from the initial episodes of PSP, they report an identical success rate (46%) for expectant treatment independently of oxygen use. As in our study, when intervention was needed, chest tube was still the first-line (used in 79%); needle aspiration was used in only 21% of patients, with a success rate of 52%.[4] In recurrent episodes, the efficiency falls after non-operative treatment, with described success rates as low as 52% in the second episode and 15% in the third.[5] Thoracoscopy may be more aggressive, but it has the lowest reported recurrence rate (5–75%); in our study, thoracoscopy was always successful and there were no recurrences.[4,6,7] In adult population, thoracoscopic surgery is being proposed as an alternative to chest tube even in first episodes, with lower recurrence rate and shorter hospital stay. However, randomized studies in pediatric population still advocate conservative management for initial PSP episodes, since several patients will never need surgical intervention.[6,7]

Finally, the presence of blebs in the CT scan has been suggested as an independent risk factor for recurrence, but its usefulness remains controversial. Some studies indicate that blebs may not predict recurrence and CT scan findings should not be used as a basis for prophylactic surgery.[1,6,8] In our study, more than a half of the patients had no blebs