Duration and determinants of delayed diagnosis of pulmonary tuberculosis in Algeria

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Abstract

Background: Delay in the diagnosis and treatment of pulmonary tuberculosis contributes to its transmission and undermines control efforts, however, these delays have not been systematically assessed in Algeria.

Aim: To assess the duration and determinants of delay in the diagnosis of pulmonary tuberculosis in Algeria.

Methods: Between June and December 2019, we reviewed paper-based medical records of, and interviewed, 323 adult patients aged ≥ 15 years at 4 tuberculosis facilities in Blida District of Algeria. The participants were newly diagnosed pulmonary TB patients registered under the revised National Tuberculosis Control Programme. The data were analysed using Epi Info version 7.2.1, and univariable and multivariable logistic regression analyses were performed to identify factors associated with delays at the patient and health system levels.

Results: The median patient delay was 15 days (interquartile range 7–35), median health system delay was 28 days (interquartile range 14–55), and median total delay was 52 days (interquartile range 33–88). Longer patient delays were observed among patients who initially sought care at a pharmacy, while health system delays were longer among those with delayed chest X-ray examination, comorbidities and sputum culture-based diagnosis.

Conclusion: Diagnosis delays among patients with pulmonary tuberculosis in Algeria remains substantial and largely attributable to health system delays. Targeted programmes to minimise or eliminate self-medication and reduce the time spent for pre-diagnosis examinations, including chest X-ray services, are needed to reduce diagnosis delays.

Keywords: tuberculosis, diagnosis delay, patient delay, health system delay, Algeria

Background

The End TB strategy launched by WHO identifies early diagnosis and prompt treatment as central to tuberculosis (TB) control (1). However, this strategy may be undermined when the diagnosis and treatment of TB are delayed. An individual's risk of infection with *Tubercle bacilli* is influenced by the number of active pulmonary TB cases in the community, the duration of their infectiousness and the frequency of contact with active cases. Reducing the period of infectiousness through early diagnosis and prompt treatment is therefore essential for limiting transmission. Thus, early diagnosis and prompt treatment are the most effective control strategy. Delays in TB diagnosis and treatment increase transmission, contribute to the development of drug resistance and are associated with increased mortality (2).

Despite the availability of a national TB control programme in Algeria since the 1960s, TB remains a major public health problem. Substantial gains in reducing TB morbidity and mortality were achieved during the 1970s and 1980s. During this period, TB incidence decreased markedly, from 150 cases per 100 000 population in the early 1960s to 47 per 100 000 in 1990. Thereafter, progress slowed and incidence increased slightly, reaching 61 cases

per 100 000 in 2006. In response, TB control efforts were reinforced through new directives, including nationwide expansion of the directly observed therapy short-course (DOTS) strategy, which achieved full coverage (3). These measures contributed to a subsequent reduction in TB incidence, which declined to 47 cases per 100 000 population in 2019, the same level observed in 1990 (4).

Despite these gains, current trends remain insufficient to ensure sustained and effective TB control, highlighting persistent limitations in the national TB control programme. Diagnosis and treatment delays remain major obstacles to effective TB management in the Middle East and North Africa (MENA) Region (5). The determinants of such delays are multifactorial and commonly classified as patient-related and health system delays, with substantial variation across countries (6). Although diagnosis delay in TB has been widely studied internationally, definitions vary; however, most studies distinguish between patient delay and health system delay. To date, delays in TB diagnosis and initiation of anti-TB treatment have not been systematically assessed in Algeria. This study aimed to assess the duration and determinants of delay in the diagnosis of TB in Algeria.

Methods

Study design

A community-based cross-sectional study was conducted in the 4 TB facilities of Blida District among newly diagnosed pulmonary TB patients registered under the revised National TB Control Programme between June and December 2019.

Under this programme, patients with suspected TB based on clinical, pathological and radiological findings were referred by public or private health care providers for diagnostic confirmation and initiation of anti-TB treatment.

Paper-based medical records of adult patients aged ≥ 15 years were reviewed. To minimise recall bias, only patients registered within 2 months before data collection were included. Patients were excluded if they had recurrent TB, could not be contacted after 2 attempts, were absent during the data collection period, or had cognitive impairments.

The patients were interviewed using a predefined questionnaire adapted from the WHO tool for the assessment of TB diagnosis delay (7). The questionnaire was validated by the scientific committee of the Faculty of Medicine of Blida 1 University and pre-tested to ensure clarity, relevance and reliability. Data were collected by trained physicians using the final questionnaire, and interviews were conducted in Arabic. Verbal informed consent was obtained from all participants prior to inclusion, and the study was approved by the ethics committee of the Faculty of Medicine of Blida 1 University.

The sample size was calculated using a single population proportion formula [$n = (Z\alpha/2)^2 \times p(1-p) / d^2$] assuming that 72% of TB patients experience a total delay of ≥ 30 days, based on data from a previous study from Morocco (9). A type I error probability (α) of 0.05, a 95% confidence level, and a margin of error (d) of 5% were applied. The minimum required sample size was 310, which was increased to 341 to account for a potential non-response rate of 10%.

Definitions

Patients were considered to have pulmonary TB on the basis of clinical, pathological and radiological findings, with bacteriological confirmation where available. The interval between the onset of respiratory symptoms and confirmation of TB diagnosis was assessed. The diagnosis of pulmonary TB was defined by a positive acid-fast bacillus (AFB) sputum smear, a positive sputum culture, and/or the clinical judgement of a TB specialist in the presence of compatible symptoms and radiographic findings.

Under the revised National TB Control Programme, sputum smear microscopy was conducted in the local laboratories of the selected TB facilities. For patients with at least 2 sputum specimens negative for AFB, sputum culture was conducted at the national reference laboratory in Algiers.

All sputum analyses were conducted in accordance with international guidelines (8). Molecular testing, such as the Xpert MTB/RIF assay, was not available at the time of the study.

Delays were divided into 3 types. Patient delay was defined as the number of days from the onset of TB-related symptoms to first presentation to a health care provider (not necessarily a TB facility). Healthcare system delay was defined as the number of days from first presentation to a health care provider to initiation of TB treatment. Total delay was calculated as the sum of patient delay and healthcare system delay.

Comorbidity was defined as the presence of underlying cardiovascular, gastrointestinal, pulmonary, immunologic or malignant disease. Antibiotics and other medications were available over the counter in Algeria. Under the revised National TB Control Programme, anti-TB treatment was initiated promptly after diagnosis.

Data collection and analysis

The questionnaire captured sociodemographic characteristics, TB risk factors, comorbidities and TB knowledge. Follow-up data included the diagnostic investigation process, initial symptoms perceived by the patient, and health-seeking actions. Medical records were reviewed to extract diagnostic dates and laboratory results.

Data were entered into Microsoft Excel and analysed using Epi Info™ version 7.2.1. Univariable and multivariable logistic regression analyses were performed to identify factors associated with delays at the patient and healthcare system levels. Delays were dichotomised into delay versus no-delay categories using the median values observed in the study. Variables with $P < 0.2$ in univariate analysis were included in multivariable models using a backward conditional approach. Results were presented as adjusted odds ratios (aORs) with 95% confidence intervals. Statistical significance was assessed using Wald tests, with $P < 0.05$ considered significant.

TB knowledge was assessed using 7 questions addressing contagiousness, curability and modes of transmission. Each correct response was scored as 1 and each incorrect response as 0. Patients with a total score ≥ 5 were classified as having adequate core knowledge of TB.

Results

Baseline patient characteristics

We assessed 350 newly diagnosed pulmonary TB cases. Ten patients had recurrent TB and 17 declined participation. None of the patients had cognitive impairments. The final sample comprised 323 patients, of whom 184 (57.0%) resided in rural areas.

The mean age was 40 years. There was no statistically significant difference in TB notification by sex. However, the number of cases was slightly higher among men, with the highest prevalence observed in those aged 15–49 years. Married individuals accounted for 46.8% (*n*

= 151) of participants and 15.8% (*n* = 51) had a low level of education. Almost half of the patients (48.9%) reported a monthly income of less than US$150 and were classified as having low socioeconomic level.

Most of the patients (77.1%, *n* = 249) consulted a pharmacist at the onset of respiratory symptoms, and 181 of these patients (72.7%) reported self-treatment with antibiotics. At the first medical visit, 72.4% of the participants (*n* = 234) did not undergo chest X-ray examination. In addition, 56.0% of patients (*n* = 181) had inadequate TB knowledge and were unaware that their symptoms could be related to TB.

All included patients had bacteriologically confirmed TB. The proportion of patients with AFB sputum smear-positive results was 93.5% (*n* = 302), while 6.5% (*n* = 21) were AFB smear-negative and culture-positive. The baseline characteristics are summarised in Table 1.

Patient and health system delays

The median total diagnostic delay was 52 days (interquartile range [IQR] 33–88 days), and 79 of 323 patients (24.5%) experienced a delay of at least 3 months. The median patient delay was 15 days (IQR: 7–35 days), while the median healthcare system delay was 28 days (IQR: 14–55 days). Patient delay (> 30 days) and healthcare system delay (> 30 days) were observed in 34.7% of patients (*n* = 112) and 49.2% (*n* = 159), respectively. Results of univariable analyses identifying factors associated with patient delay and healthcare system delay are presented in Table 2.

Multivariable logistic regression analysis showed that initial consultation at a pharmacy was independently associated with patient delay. Healthcare system delay was associated with delayed chest X-ray examination, the presence of one or more underlying comorbidities, and bacteriological diagnosis based on AFB sputum culture rather than smear microscopy (Table 3).

Discussion

WHO has identified TB as a major global public health priority. One of the key contributors to the persistent global TB burden is inadequate case detection, diagnosis and treatment (*10*). In this study, the median total delay from symptom onset to diagnosis and initiation of anti-TB treatment was 52 days, largely attributable to a healthcare system delay of 28 days. The median patient delay of 15 days was significantly shorter than the median healthcare system delay.

These findings are similar to those reported in several studies from Sub-Saharan countries, Turkey and India (*8*). However, most published studies have reported shorter healthcare system delays than patient delays. A systematic review of 40 studies from low- and middle-income countries showed interquartile ranges of 44–77.8 days for patient delay and 12–34 days for healthcare system delay (*6*).

Compared with neighbouring countries, the median diagnostic delay observed in this study was similar to those reported in Tunisia and Morocco. However, in those studies, healthcare system delay was either comparable to or shorter than patient delay (*11,9*).

The main factors associated with healthcare system delay after multivariable adjustment were delayed chest X-ray examination, the presence of at least one underlying disease, and bacteriological diagnosis based on AFB sputum culture. In contrast to findings from other settings, female sex was not associated with healthcare delay in this study. A systematic review including 20 studies from MENA countries found that being female was significantly associated with longer delays (*5*).

Patients diagnosed by sputum culture experienced longer healthcare system delays. This is explained by the diagnostic pathway in Algeria, whereby sputum specimens from patients with 2 negative smear results are referred to the national reference laboratory in Algiers for culture, a process that may take several weeks. However, this applied to only 21 of the 323 patients included in the study.

The presence of at least one underlying disease was also associated with prolonged healthcare system delay. This may reflect the nonspecific nature of TB symptoms, which may be attributed by patients to pre-existing chronic conditions, such as chronic lung disease. Few studies have reported a similar association between comorbidities and healthcare system delay (*6*).

Chest X-ray examination is an important screening tool for TB among patients with respiratory symptoms, and timely access to chest X-ray has been associated with shorter diagnosis delays (*12*). In Algeria, many private healthcare providers lack access to chest X-ray equipment. Although the national TB control programme has improved the availability of chest X-ray equipment in public healthcare facilities, many units remain non-functional for long periods due to poor maintenance.

Several studies have reported an association between delayed chest X-ray examination and prolonged healthcare system delay. In a cross-sectional study from China, cough and availability of chest X-ray were identified as protective factors, and the median healthcare system delay (7 days) was shorter than the median patient delay (23 days) (*13*). In another study from a high-income country, delayed chest X-ray examination was associated with medical delay exceeding 30 days (*14*).

Some private and public practitioners may have limited awareness of TB symptoms. When managing patients with respiratory symptoms, viral or bacterial infections may be prioritised, leading to antibiotic prescription. Such practices may contribute to delays in TB diagnosis. In this study, patients who initially sought treatment from a pharmacy had higher odds of experiencing patient delay (aOR = 3.32; 95% CI: 1.70–6.47). Similar findings have been reported elsewhere, with initial consultation at pharmacies identified as a major independent predictor of the patient delay (*15*). In a study from Georgia, self-medication was associated with prolonged patient delay, whereas antibiotic use before

Table 1 Demographic and clinical characteristics of pulmonary TB patients, Algeria

Characteristics	Patients (N = 323)	
	n	%
Gender		
Male	167	57.9
Female	136	42.1
Age (years)		
≥ 50	80	24.8
< 50	243	75.2
Marital status		
Currently married	151	46.8
Not currently married	172	53.2
Level of education		
Illiterate and primary	51	15.8
Lower than primary	272	84.2
Occupation		
Unskilled	126	39.0
Other occupations and unemployed	197	61.0
Socioeconomic class		
Lower	158	48.9
Middle and upper	165	51.1
Residence		
Rural	184	57.0
Urban	139	43.0
Core knowledge of tuberculosis[a]		
No	181	56.0
Yes	142	44.0
Primary symptoms		
Cough or fever	261	80.8
Other symptoms[b]	62	19.2
Comorbidity		
Yes	145	44.9
No	178	55.1
First treatment preference		
Pharmacy	249	77.1
Doctor	74	22.9
Distance from the nearest health care facility (km)		
≥1	112	34.7
<1	212	65.3
First health care provider		
Public sector	133	41.2
Private sector	190	58.8
Chest X-ray at the first health care provider		
No	234	72.4
Yes	89	27.6
Inpatient admission before diagnosis		
Yes	70	21.7
No	253	78.3
Sputum bacteriological results		
Culture-positive	21	6.5
Smear-positive	302	93.5

[a]*Correct response to at least 5 out of 7 knowledge questions.*
[b]*Included weight loss, night sweats, shortness of breath and haemoptysis.*

Table 2 Univariable analysis of factors associated with patient and health system delays, Algeria

Factors	Patient delay (≥ 15 days)			Healthcare system delay (≥ 28 days)		
	Yes n (%)	No n (%)	P	Yes n (%)	No n (%)	P
Sex						
Male	96 (51.3)	91 (48.7)	0.50	87 (46.5)	100 (53.5)	0.03
Female	75 (55.2)	61 (44.8)		80 (58.8)	56 (41.2)	
Age (years)						
≥ 50	52 (65.0)	28 (35.0)	0.09	48 (60.0)	32 (10.0)	0.09
< 50	119 (49.0)	124 (51.0)		119 (49.0)	124 (51.0)	
Marital status						
Currently married	73 (48.3)	78 (51.7)	0.12	74 (49.0)	77 (51.0)	0.36
Not currently married	98 (57.0)	74 (43.0)		93 (54.1)	79 (45.9)	
Level of education						
Illiterate and primary	35 (68.6)	16 (31.4)	0.01	27 (52.9)	24 (47.1)	0.85
> primary	136 (50.0)	136 (50.0)		140 (51.5)	132 (48.5)	
Occupation						
Unskilled	68 (54.0)	58 (46.0)	0.77	56 (44.4)	70 (55.6)	0.03
Others and unemployed	103 (52.3)	94 (47.7)		111 (56.4)	86 (44.7)	
Socioeconomic class						
Lower	83 (52.5)	75 (47.5)	0.89	75 (47.5)	83 (52.5)	0.13
Middle and upper	88 (53.3)	77 (46.7)		92 (55.8)	73 (44.2)	
Residence						
Rural	98 (53.3)	86 (46.7)	0.89	98 (53.3)	86 (46.7)	0.52
Urban	73 (52.5)	66 (47.5)		69 (49.6)	70 (50.4)	
Core knowledge of tuberculosis[a]						
No	99 (54.7)	82 (45.3)	0.48	92 (50.8)	89 (49.2)	0.72
Yes	72 (50.7)	70 (49.3)		75 (52.8)	67 (47.2)	
Primary symptoms						
Cough or fever	142 (54.4)	119 (45.6)	0.28	140 (53.6)	121 (46.4)	0.15
Other symptoms[b]	29 (46.8)	33 (53.2)		27 (43.6)	35 (56.5)	
Comorbidity						
Yes	76 (52.4)	69 (47.6)	0.86	88 (60.7)	57 (39.3)	< 0.01
No	95 (53.4)	83 (46.6)		79 (44.4)	99 (55.6)	
First treatment preference						
Pharmacy	151 (60.6)	98 (39.4)	< 0.01	124 (49.8)	125 (50.2)	0.21
Doctor	20 (27.0)	54 (73.0)		43 (58.1)	31 (41.9)	
Distance from the nearest healthcare facility (km)						
≥ 1	63 (56.3)	49 (43.7)	0.39	63 (56.3)	49 (43.7)	0.23
< 1	108 (51.2)	103 (48.8)		104 (49.3)	107 (50.7)	
First healthcare provider						
Public sector	73 (54.9)	60 (45.1)	0.56	72 (54.1)	61 (45.9)	0.46
Private sector	98 (51.6)	92 (48.4)		95 (50.0)	95 (50.0)	
Chest X-ray at the first health care provider						
No	N/A	N/A		142 (60.7)	92 (39.3)	< 0.01
Yes	N/A	N/A		25 (28.1)	64 (71.9)	
Inpatient admission before diagnosis						
Yes	N/A	N/A		42 (60.0)	28 (40.0)	0.12
No	N/A	N/A		125 (49.4)	128 (50.6)	
Sputum bacteriological results						
Culture-positive	N/A	N/A		16 (76.2)	5 (23.8)	0.02
Smear-positive	N/A	N/A		151 (50.0)	151 (50.0)	

N/A: not applicable
Significant at P < 0.05
[a] Correct response to at least 5 out of 7 knowledge questions.
[b] Included weight loss, night sweats, shortness of breath and haemoptysis.

Table 3 Multivariable logistic regression of factors associated with patient and health system delays, Algeria

Factors	Category	Patient delay; ᵃOR (95% CI)	Healthcare system delay; ᵃOR (95% CI)
First treatment preference	Pharmacy	4.68 (2.58–8.50)	
	Doctor	1	
Comorbidities	Yes		1.81 (1.08–3.03)
	No		1
X-ray chest at the first health provider	No		4.33 (2.47–7.61)
	Yes		1
Sputum bacteriological results	Culture-positive		4.15 (1.35–12.80)
	Smear-positive		1

aOR = adjusted odds ratio, CI = confidence interval

TB diagnosis was related to prolonged healthcare system delay but not to patient delay (*16*). Comparable findings were reported in a study from Uzbekistan, where self-medication was the first health-seeking action for 43% of patients and a significant predictor of patient delay. Antibiotic self-medication was also linked to healthcare system delay in that study (*17*).

Almost half of the patients in our study used unprescribed antimicrobials before TB diagnosis and treatment. Antibiotic use is known to delay or mask the diagnosis of infectious diseases (*18*). Several studies have shown that prior antibiotic exposure can delay TB diagnosis and initiation of treatment. One study reported a patient-delay of 34 days among patients with TB who received a fluoroquinolone before diagnosis (*19*).

To our knowledge, no published studies from Algeria have assessed pharmacy medical advice and drug dispensing practices. Available evidence suggests that only 14% of pharmacies appropriately refer patients with suspected TB to healthcare facilities without dispensing medicine.

Study limitations

This study has several limitations. First, participants were recruited exclusively from the Blida area, which may limit the generalisability of the findings. The results are therefore more likely to reflect the situation in large Algerian cities rather than the entire country. Second, the sample size may not have been sufficient to identify all factors associated with patient delay and healthcare system delay, and some potential confounders could not be fully addressed. Third, unmeasured variables may have influenced the observed delays.

Conclusion

This study is the first to investigate delays in TB diagnosis and treatment in Algeria. Despite recent progress in TB control efforts in the country, diagnostic delays remain common, consistent with reports from other low- and middle-income countries. These delays were largely attributable to healthcare system delay, highlighting the need for targeted interventions to improve the timely diagnosis of TB.

Self-medication and delayed chest X-ray examination were associated with an increased risk of diagnostic delay. To reduce these delays and limit ongoing TB transmission, policies should regulate access to over-the-counter medications, including antibiotics, and strengthen the education of health care practitioners and pharmacy staff regarding the risks of inappropriate medication use. Improving the availability and functionality of chest X-ray equipment in primary health care centres, including private facilities, can reduce diagnostic delay. Decentralising sputum culture testing to TB facilities could substantially shorten diagnostic delay among patients with smear-negative disease.

These findings highlight the importance of strengthening awareness of TB among public and private primary health care providers and promoting early referral to specialised TB services. Such measures are critical to improving timely diagnosis and reducing the burden of TB in Algeria.

Durée et déterminants du retard dans le diagnostic de la tuberculose pulmonaire en Algérie

Résumé

Contexte : Les retards dans le diagnostic et le traitement de la tuberculose pulmonaire contribuent à sa transmission et sapent les efforts de lutte. Toutefois, ces retards n'ont pas fait l'objet d'une évaluation systématique en Algérie.

Objectif : Évaluer la durée et les déterminants du retard dans le diagnostic de la tuberculose pulmonaire en Algérie.

Méthodes : Entre juin et décembre 2019, nous avons examiné les dossiers médicaux papier de 323 patients adultes âgés de 15 ans et plus dans quatre centres de lutte contre la tuberculose du district de Blida, et nous les avons interrogés. Les participants étaient des patients atteints de tuberculose pulmonaire nouvellement diagnostiqués enregistrés dans le cadre du Programme national révisé de lutte contre la tuberculose. Les données ont été analysées à l'aide du logiciel Epi Info version 7.2.1 et des analyses de régression logistique univariable et multivariable ont été réalisées pour identifier les facteurs associés aux retards au niveau des patients et du système de santé.

Résultats : Le retard médian était de 15 jours pour les patients (intervalle interquartile : 7-35) et de 28 jours pour les systèmes de santé (intervalle interquartile : 14-55) ; le retard médian total s'élevait à 52 jours (intervalle interquartile ; 33-88). Des retards plus longs ont été observés parmi les patients qui consultaient initialement dans une pharmacie, tandis que les retards liés au système de santé étaient plus longs chez ceux ayant subi un examen radiographique thoracique tardif, présentant des comorbidités ou dont le diagnostic reposait sur la mise en culture des expectorations.

Conclusion : En Algérie, les retards de diagnostic chez les patients atteints de tuberculose pulmonaire restent importants et sont en grande partie dus à des retards liés au système de santé. Des programmes ciblés visant à réduire au minimum ou à éliminer l'automédication et le temps consacré aux examens réalisés avant le diagnostic, y compris les services de radiographie thoracique, sont nécessaires pour raccourcir les retards de diagnostic.

مدة ومحددات التشخيص المتأخر بالسل الرئوي في الجزائر

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الخلاصة

الخلفية: يسهم التأخير في تشخيص وعلاج السل الرئوي في سريانه وتقويض جهود مكافحته، غير أن هذا التأخير لم يُقيَّم على نحو منهجي في الجزائر.

الأهداف: هدفت هذه الدراسة الى تقييم مدة التأخير في تشخيص السل في الجزائر ومحدداته.

طرق البحث: في المدة ما بين يونيو/ حزيران وديسمبر/ كانون الأول 2019، استعرضنا السجلات الطبية الورقية لعدد من المرضى بلغ 323 مريضًا بالغًا، تتراوح أعمارهم بين 15 عامًا أو أكثر في أربعة مرافق لعلاج السل في منطقة البليدة بالجزائر، وأجرينا مقابلات معهم. وكان المشاركون قد شُخِّصوا حديثًا بالسل الرئوي وسُجلوا في إطار "البرنامج الوطني المنقح لمكافحة السل". وجرى تحليل البيانات باستخدام الإصدار 7.2.1 من برنامج Epi Info، وأجريت تحليلات الانحدار اللوجستي الأحادي المتغيرات والمتعدد المتغيرات لتحديد العوامل المرتبطة بالتأخير على مستوى المرضى ومستوى النظام الصحي.

النتائج: بلغ متوسط التأخير في تشخيص السل على مستوى مرضاه 15 يومًا (المدى بين الرُّبعين الأعلى والأدنى 7−35)، وعلى مستوى النظام الصحي 28 يومًا (المدى بين الرُّبعين الأعلى والأدنى 14−55)، ومتوسط التأخير الكلي 52 يومًا (المدى بين الرُّبعين الأعلى والأدنى 33−88). كما لوحظت تأخيرات أطول للمرضى الذين التمسوا الرعاية في البداية من احدى الصيدليات، في حين كانت تأخيرات النظام الصحي أطول للمرضى الذين تأخر فحصهم بالأشعة السينية، والذين كانت لديهم أمراض مصاحِبة، والذين شُخِّصوا اعتمادًا على مزرعة البلغم.

الاستنتاجات: لا يزال هناك تأخير ملحوظ في تشخيص حالات المرضى المصابين بالسل الرئوي في الجزائر، وهو ما يعزى إلى حد كبير إلى حالات التأخير على مستوى النظام الصحي. وثمة حاجة إلى وضع برامج تستهدف خفض الاعتماد على التطبيب الذاتي إلى أدنى حد أو إنهاءه تمامًا، وتقليل الوقت الذي تستغرقه الفحوص السابقة على التشخيص، لا سيها خدمات تصوير الصدر بالأشعة السينية، للحد من التأخير في التشخيص.

References

1. World Health Organization. Gear up to end TB: introducing the End TB strategy. Geneva: WHO; 2015. https://www.who.int/publications/i/item/WHO-HTM-GTB-2015.09.

2. Melsew YA, Doan TN, Gambhir M, Cheng AC, McBryde E, Trauer JM. Risk factors for infectiousness of patients with tuberculosis: a systematic review and meta-analysis. Epidemiol Infect. 2018;146(3):345–353. doi:10.1017/S0950268817003041.

3. Ministère de la santé, Algérie. Programme national de lutte contre la tuberculose : manuel de lutte antituberculeuse. Alger : ministère de la santé; 2011. https://epspmesra.dz/pdf/manuel_tuber_2011.pdf.

4. Institut national de santé publique. Relevés épidémiologiques mensuels : rapport annuel 2019. Alger: INSP;2019. https://www.insp.dz/images/PDF/Epidemio/REM_2019.pdf.

5. Eltayeb D, Pietersen E, Engel M, Abdullahi L. Factors associated with tuberculosis diagnosis and treatment delays in Middle East and North Africa: a systematic review. East Mediterr Health J. 2020;26(4):477–486. doi:10.26719/2020.26.4.477.

6. Getnet F, Demissie M, Assefa N, Mengistie B, Worku A. Delay in diagnosis of pulmonary tuberculosis in low- and middle-income settings: systematic review and meta-analysis. BMC Pulm Med. 2017;17:202. doi:10.1186/s12890-017-0551-y.

7. World Health Organization. Diagnostic and treatment delay in tuberculosis: an in-depth analysis of the health-seeking behaviour of patients and health system response in seven countries of the Eastern Mediterranean Region. Geneva: WHO; 2006. https://applications.emro.who.int/dsaf/dsa710.pdf.

8. World Health Organization. Laboratory services in tuberculosis control. Part II: Microscopy. Geneva: WHO; 1998. https://apps.who.int/iris/handle/10665/65942.

9. Akrim M, Bennani K, Essolbi A, Sghiar M, Likos A, Benmamoun A, et al. Determinants of consultation, diagnosis and treatment delays among new smear-positive pulmonary tuberculosis patients in Morocco: a cross-sectional study. East Mediterr Health J. 2014;20(11):707–716. https://pubmed.ncbi.nlm.nih.gov/25601809/.

10. World Health Organization. Global tuberculosis report 2016. Geneva: WHO; 2016. https://apps.who.int/iris/handle/10665/250441.

11. Ben Amar J, Hassairi M, Ben Salah N, Charfi R, Tritar F, Fourati R, et al. Pulmonary tuberculosis: diagnostic delay in Tunisia. Med Mal Infect. 2016;46(2):79–86. doi:10.1016/j.medmal.2015.11.012.

12. Auer C, Kiefer S, Zuske M, Schindler C, Wyss K, Blim J, et al. Health-seeking behaviour and treatment delay in patients with pulmonary tuberculosis in Switzerland: some slip through the net. Swiss Med Wkly. 2018;148:w14659. doi:10.4414/smw.2018.14659.

13. Jiang Y, Luo L, Gui M, Liu L, Lin Y, Deng G, et al. Duration and determinants of delayed diagnosis with tuberculosis in Shenzhen, China: a cross-sectional study. Risk Manag Healthc Policy. 2022;15:1473–1481. doi:10.2147/RMHP.S367998.

14. Gatey C, Tattevin P, Rioux C, Ducot B, Meyer L, Bouvet E. Impact of early chest radiography and empirical antibiotherapy on delay in the diagnosis of pulmonary tuberculosis. Med Mal Infect. 2012;42(3):110–113. doi:10.1016/j.medmal.2011.12.003.

15. Balasubramnian A, Francis PT, Leelamoni K, Rakesh PS, Lalu JS. Diagnosis and treatment delay among new pulmonary tuberculosis patients in southern India: a cross-sectional study. Indian J Public Health. 2022;66(Suppl 1):S60–S65. doi:10.4103/ijph.ijph_1079_22.

16. Rabin AS, Kuchukhidze G, Sanikidze E, Kempker RR, Blumberg HM. Prescribed and self-medication use increase delays in diagnosis of tuberculosis in the country of Georgia. Int J Tuberc Lung Dis. 2013;17(2):214–220. doi:10.5588/ijtld.12.0395.

17. Belkina TV, Khojiejiev DS, Tillyashaykhov MN, Tigay ZN, Kudenov MU, Tebbens JD, et al. Delay in the diagnosis and treatment of pulmonary tuberculosis in Uzbekistan: a cross-sectional study. BMC Infect Dis. 2014;14:624. doi:10.1186/s12879-014-0624-y.

18. Liu YC, Huang WK, Huang TS, Kunin CM. Inappropriate use of antibiotics and the risk for delayed admission and masked diagnosis of infectious diseases: a lesson from Taiwan. Arch Intern Med. 2001;161(19):2366–2370. doi:10.1001/archinte.161.19.2366.

19. Wang JY, Hsueh PR, Jan IS, Lee LN, Liaw YS, Yang PC, Luh KT. Empirical treatment with a fluoroquinolone delays the treatment for tuberculosis and is associated with a poor prognosis in endemic areas. Thorax. 2006;61(10):903–908. doi:10.1136/thx.2005.056887.