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Epidemiology of tuberculosis in Morocco: diagnosis, treatment, quality of life, and associated factors

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ABSTRACT

Tuberculosis remains a major public health challenge worldwide, despite significant advances in treatment and prevention. In Morocco, 30,000 cases of tuberculosis are recorded each year. In the Marrakech-Safi region, the incidence reaches 50 cases per 100,000 inhabitants. The aim of this research was to assess the effectiveness of current diagnostic and treatment, and to measure the impact of tuberculosis on patients' quality of life. A cross-sectional study was carried out on a sample of 480 tuberculosis patients. The results showed that low education levels (53.86%) and high unemployment (40.8%) were prevalent. More than 51% of patients do not have health insurance. High housing density was correlated with increased prevalence, and diabetes was frequent (40.19%). 27.50% used medicinal plants, and 13.11% interrupted medication due to long treatment duration. Males were more symptom-free ($p<0.000$). Males had more severe symptoms than females such as sputum (163 vs. 58 cases), weight loss (224 vs. 131 cases), cough (184 vs. 86 cases), and hemoptysis (70 vs. 27 cases). Urban residents showed significant differences in tuberculosis types ($p = 0.034$). Occupation and prior treatment influenced tuberculosis distribution and extrapulmonary tuberculosis prevalence ($p = 0.000$). 21.46% were permanently affected in their social life. Higher education level and non-smoking was linked to better health ($p = 0.016$; $p = 0.002$). These results contribute to a better management of diagnostic, treatment, and prevention strategies adapted to tuberculosis patients by strengthen health education and promote rapid access to specialist care.

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1. INTRODUCTION

Tuberculosis (TB) remains a major public health challenge worldwide, despite significant advances in treatment and prevention. Recently, according to the WHO Global Tuberculosis Report, in 2021, there is a partial number recovery of people newly diagnosed with TB up to 6.4 million, and in 2023, it highlighted a significant recovery in the number of people diagnosed and treated for TB, following the disruption caused by the COVID-19 pandemic [1]. However, the disease remains the second leading cause of death due to a single infectious agent, after COVID-19, and global targets for TB control are far from being achieved.

According to recent data, Morocco records around 30,000 cases of tuberculosis each year, with an incidence rate of around 87 cases per 100,000 inhabitants, underscoring the urgent need for concerted

action [2]. The Marrakech-Safi region is not spared this reality, where pulmonary tuberculosis accounts for half of all reported cases, and in 2021, the region recorded 2,427 cases, with an incidence of 50 cases per 100,000 inhabitants (Report from the Ministry of Health, Morocco). Despite major efforts by the health authorities, as part of a National Tuberculosis Control Program (PNLT), the epidemiological situation of the disease is not satisfactory. In the Marrakech-Safi region, the study of tuberculosis is crucial not only to understand local epidemiological dynamics, but also to respond to the specific needs of the most vulnerable populations. This involves analyzing risk factors, obstacles to treatment and impacts on patients' quality of life. The aim of this study is twofold: firstly, to assess the effectiveness of current diagnostic and treatment strategies, and secondly, to measure the impact of tuberculosis on patients' quality of life. By also looking at associated factors - be they behavioral, sociodemographic or environmental-this research aims to provide reliable, in-depth data as a basis for targeted interventions.

2. METHOD

Type and setting of the study: This is a descriptive and analytical cross-sectional study based on a survey on the diagnosis, treatment, quality of life, and associated factors in the epidemiology of tuberculosis in the Marrakech-Safi region (Morocco). The survey was conducted, between 2023 and 2024. The sample size (332 patients) was calculated according to (1).

$$Simple\ size(n) = \frac{\frac{z^2 \times p(1-p)}{e^2}}{1+(\frac{z^2 \times p(1-p)}{e^2 N})} \quad (1)$$

With: N (Population size) = 2,427
n = Sample size
Z (Z-score) = 1.96
e (standard error) = 5 %
p (standard deviation) = 0.5

In order to remedy probable biases and other possible hazards, and to represent the population accurately, we increased the sample size to 480. We also adopted stratified sampling based on the proportion of the disease in each province. Participants were randomly selected from patients under care at the diagnostic centers for tuberculosis and respiratory diseases (CDTMR) of the Marrakech-Safi region.

Inclusion criteria: Patients with TB, pulmonary or extra-pulmonary, under care at the CDTMRs of the Marrakech-Safi region during the study period were included. Exclusion criteria: Patients who were under care for a non-tuberculosis reason were excluded. Data analysis: the variables considered were indicated by the socio-demographic characteristics of the population (age, sex, social coverage, profession, household, and smoking), the tuberculosis diagnosis, the co-morbidities, treatment, the weight loss, and patient outcome. The data were analyzed using SPSS program (IBM® SPSS® Statistics version 26). To study the association between qualitative variables we used Pearson's χ^2 test, and to compare the group means we used Student's t test of and ANOVA test. The significance level of the tests was $p < 0.05$.

The data were collected after obtaining authorization from the Marrakech-Safi Regional Health Authority No. 7956/2021. Patient data were kept anonymous and confidential, and the authors did not have access to any information identifying individual participants.

3. RESULTS AND DISCUSSION

According to the results in Table 1 (see Appendix), our epidemiological study of tuberculosis revealed significant trends and very important factors influencing the prevalence of the disease in the Marrakech-Safi region. Men were more affected than women, with a proportion of 56.67% versus 43.33%, and the sex ratio (M/F) was 1.31. The age group most affected was adults (over 43%) of working age (15-34), highlighting the disease's potential impact on economic productivity. A low level of education was common among patients, with 23.80% having no level of education and 30.06% having only primary education, which may limit their access to health information and care services. The prevalence of unemployment was also notable, with 40.8% of patients unemployed. Around half of all patients were not covered by social security, and over 51% of beneficiaries were covered by RAMED (Medical Assistance Scheme) or AMO Tadamon (compulsory health insurance for people unable to pay their contributions), highlighting the challenges of access to healthcare and early detection of TB. For the correlation between housing density and disease prevalence. It appears that households with two rooms were the most affected, accounting for 40.50% of cases, followed by those with three rooms at 33.40%. Furthermore, the distribution of cases according to the number of people per household showed that six-person households were the most

affected, with 23.22% of cases surveyed. These results suggest an increased risk of tuberculosis transmission in small living spaces, indicating that prevention strategies should primarily target high-density households occupying small spaces. The majority of probable tuberculosis infections were associated with an unknown place of residence, accounting for 72.92% of cases, and the family setting was the second most common place of infection. A significant proportion of TB patients also suffer from other illnesses, with diabetes being the most frequent comorbidity (40.19% of cases with comorbidities), followed by arterial hypertension (AH) and anemia. This coexistence of diseases can complicate the diagnosis and treatment of tuberculosis. In addition, it is interesting to note that over 41% of patients had used treatments prior to consulting the tuberculosis and respiratory disease diagnostic center (CDTMR), with a predominance of the use of several drugs, including antibiotics, anti-inflammatories, and analgesics. Pulmonary tuberculosis was the most common form of the disease, but a significant proportion of extrapulmonary cases were also present. The most common symptoms include fever and weight loss, and the majority of cases were discovered following the onset of symptoms. All patients received treatment prescribed by a doctor, but some patients reported adverse effects. A significant proportion of patients use medicinal plants (27.5%). The majority of patients respected the doctor's recommendations (95.42%), but some patients stopped taking their medication when they felt better (8.45%), some forgot to take their medication (24.25%), and more than 42% found the treatment restrictive because of its undesirable effects in 77.36% of cases. Regarding treatment adherence, 13.11% of patients (48 individuals) admit to interrupting their medication because of the long duration of treatment. This can lead to drug resistance and relapse. In terms of perceived efficacy, 1.04% of patients (5 individuals) do not believe that prescribed medication will improve their health, and 13.33% (64 individuals) are uncertain. This mistrust or uncertainty can adversely affect compliance with treatment. In terms of nutrition, 83.54% of patients (401 individuals) changed their nutritional habits after the disease. Changes in dietary habits after diagnosis were statistically related (according to Student's T test) to the amount of weight lost due to illness ($F = 13.626$, dof = 464, $p<0.001$), and the correlation between the amount of weight lost due to illness and general health status after treatment was highly significant according to the ANOVA test ($F = 991.67$, dof = 4, $p<0.001$). Finally, the social impact of tuberculosis was significant: 21.46% of patients (103 individuals) were permanently bothered by their condition in their social life, and 17.71% (85 individuals) indicated that the disease can have profound consequences on social interactions and emotional well-being. These results highlight the importance of an integrated approach to TB management, including health education, improving access to healthcare, strengthening social coverage systems, and continuing to monitor intervening factors to better understand and effectively combat TB in the Marrakech-Safi region.

This study shows that males are more affected by tuberculosis than females, 56.67% versus 43.33%, and the sex ratio (M/F) is 1.31. This predominance of males is observed in several studies: males are at a higher risk of being affected by Mycobacterium Tuberculosis than females [3], [4]. Under-reporting by females may be associated with access to healthcare services and the quality of sputum samples used for tests [5]. It could also be due to male social and professional activities, which may expose them more to tuberculosis [3].

A low level of education was common among patients, which may limit their access to health information and care services. Higher education levels are associated with increased patient awareness of care and improved knowledge of tuberculosis infection, including prevention, treatment, and means of infection. This has been demonstrated in studies conducted in countries with high tuberculosis incidence, including Uganda, Bangladesh, and Pakistan [6]–[8]. The level of education had an impact on patients' health status, with uneducated individuals tending to describe their health as "poor" or "mediocre" demonstrating that educational level is a determining factor in the perception of health status among these patients.

Tuberculosis is seen as a disease of poverty and an indicator of low socio-economic status [9]. Although the association between socio-economic variables and increased tuberculosis relapses has never been proven, poverty may, in certain situations, act indirectly through the use of inadequate treatment [10]. This can be confirmed by our results, which show that 40.8% of patients are unemployed, and by the large number of patients who have no medical-social coverage, highlighting the challenges of access to healthcare and early detection of TB.

It is interesting to note that the correlation between housing density, number of people per household, and disease prevalence shows that two-room households are the most affected, with 40.50% of cases, and that six-person households are the most affected, accounting for 23.22% of cases. Previous studies have shown a positive correlation between household overcrowding and the incidence of tuberculosis [11], especially in populations with more than two people per room, in developed countries, such as Italy, United States (where the rate of households with more than one occupant per room is high) [12]. In West Africa, households with 6 to 10 adults or more than 10 adults had a higher risk of tuberculosis than households with fewer than 5 people [13]. These results suggest an increased risk of tuberculosis transmission in small living

spaces, which means that prevention strategies should primarily target high-density households where small spaces are occupied by a large number of people.

It is also interesting to note that over 41% of patients had been treated with antibiotics, anti-inflammatories, and analgesics, before being referred to the Tuberculosis and Respiratory Disease Diagnostic Center (CDTMR). This could indicate a tendency towards self-medication or non-specific prescriptions before the diagnosis of tuberculosis has been confirmed. A study carried out in Pakistan showed that over 50% of patients practiced self-treatment, and 42% of them had first used treatments for their TB symptoms [14]. This problem of self-medication was also highlighted by Liam and Tang [15]. These practices can contribute to drug resistance, which is a major concern in the treatment of the disease. The 25% of patients reported using medicinal herbs. According to the Arya study, the use of medicinal plants has been encouraged to palliate the side effects of anti-tuberculosis drugs [16]. In our study, undesirable effects were presented in 77.36% of cases. Traditional Chinese medicine treats tuberculosis with a combination of anti-bacterial treatments and liver-protecting herbs [17]. Other results show that most TB patients use both biomedical and traditional methods to manage TB [11], which may be a reflection of cultural customs or a lack of trust in modern medicine. The 13.33% of individuals are uncertain that prescribed medication will improve their health. This mistrust or uncertainty can adversely affect compliance with treatment.

With regard to nutrition, our findings show that around 84% of subjects changed their eating habits after being affected by the disease. Approximately similar results are found in another study, which states that 79.5% TB patients are undernourished [18]. According to the same study, undernutrition was more common (83.3%) in patients undergoing intensive therapy than in newly diagnosed patients (76.3%).

Tuberculosis has a significant social impact of patients. Indeed, 39% of patients reported being permanently or often affected by the disease, which could have profound consequences on their social interactions and emotional well-being. These results highlight the importance of an integrated approach to TB management, including aspects of quality of life and social interactions.

3.1. Distribution of pulmonary and extra-pulmonary tuberculosis cases according to various demographic factors

As shown in Table 2, our study highlighted significant differences in the distribution of pulmonary (PMT) and extra-pulmonary tuberculosis (EPT) according to various demographic factors. Men showed a higher prevalence of PMT (183 cases) compared to women (80 cases), while women showed a higher number of EPT (128 cases) compared to men (89 cases), with highly marked statistical significance ($p = 0.000$). Habitat proved to be a determining factor, urban residents having pulmonary TB with 110 of cases and extrapulmonary TB with 115 cases, indicating statistical significance ($p = 0.034$). Rural and peri-urban areas showed different distributions without notable statistical significance.

Occupation also influenced the distribution of pulmonary and extrapulmonary TB. Unemployed individuals recorded PT in 92 of cases and EPT in 104 of cases, while workers were more affected by PT (93 cases) than EPT (40 cases), highlighting a significant difference ($p = 0.000$). The other professional categories showed varying trends without pronounced statistical significance. Regarding the use of treatment before going to the hospital, those who received no prior treatment had higher extrapulmonary TB (163 cases) compared to those who did (54 cases), with a significant difference ($p = 0.000$). Finally, the presence of other concomitant diseases showed no significant correlation with tuberculosis ($P=0.191$), which suggests that tuberculosis can develop independently of other health conditions.

Regarding the TB form, women are more impacted by EPT (61.54% EPT vs. 38.46% PMT) while men are more affected by PMT (67.28% PMT vs. 32.72% ET). The same results have been reported by other researchers in Morocco [19] and other countries like Iran [20] and Niger [21]. Urban residents are more likely to develop ETP than rural/peri-urban where the most frequent cases are pulmonary tuberculosis (PMT), and the same result was found by Chahboune *et al.* [19]. This difference in the incidence of pulmonary TB can be explained by the fact of different living conditions and healthcare access.

Some occupations may expose individuals to different risk factors. People in contact with tuberculosis patients in enclosed workspaces are more likely to be confronted with PMT due to direct exposure to respiratory secretions. This may explain our findings regarding the form of tuberculosis and occupation where unemployed individuals and students are more infected by EPT while workers and day labourer by PMT. Our results are confirmed by an earlier United States study by indicating that some occupations may increase the overall probability of exposure to tuberculosis because the work environment is favorable to transmission [22] and other studies show the same thing [23], [24].

Concerning the use of treatment before going to hospital, the majority of EPT patients had never used treatment, and most PMT patients had used treatment before going to hospital. Probably due to the less specific and varied symptoms of EPT, which can delay recognition and treatment. In contrast, PMT patients, with more recognizable and alarming symptoms such as persistent cough and chest pain, were more proactive in seeking treatment before hospitalization. The age of the patient is influenced by the type of tuberculosis:

younger individuals (under 15 years) are more infected by EPT, while older individuals are more infected by PMT. In the study by Chahboune *et al*., PMT affect the 55-64 age group and under-15s are affected by EPT [19].

Table 2. Distribution of pulmonary and extra-pulmonary tuberculosis according to various demographic factors

Variables	Modalities	PMT	EPT	X^2	p-value
Gender	Male	183	89	39.52	0.000
	Female	80	128		
Place of residence	Urban	110	115	6.74	0.034
	Rural	92	67		
	Peri-urban	61	35		
Occupation	Without	92	104	45.90	0.000
	University student	12	11		
	Worker	93	40		
	Salaried	17	12		
	Civil servant	6	8		
	Commerce	4	0		
	Retired	9	3		
	Student	10	33		
	Day laborer	20	6		
Use of treatment before going to the hospital	No	118	163	44.82	0.000
	Yes	145	54		
Other diseases other than tuberculosis	No	199	175	1.71	0.191
	Yes	64	42		
Specify the disease	Diabetes	30	13	4.16	0.385
	Hypertension	11	10		
	Anemia	4	3		
	Other	14	14		
	Diabetes + hypertension	6	2		

PMT: pulmonary tuberculosis, EPT: extra-pulmonary tuberculosis

3.2. Distribution of patients by gender and symptoms

In our study, we observed tuberculosis symptoms in both genders, as shown in Table 3. The results show that males were significantly more likely to be symptomatic, with 85.29% of cases, than females, who were more often symptomatic-free with 31.25% of cases ($p<0.000$). For specific symptoms: sputum and weight loss were more frequent in males (163 cases; 224 cases) than in females (58 cases; 131 cases), with statistical significance; for cough and hemoptysis, males presented these symptoms more often (184 cases; 70 cases) than females (86 cases; 27 cases), with statistical significance. Fever, nocturnal sweating, anorexia, and fatigue/weakness were independent of gender. Concerning symptom severity, males tended to present very severe symptoms (39.7% of cases) more frequently than females (26.44% of cases) and females tended to present symptoms without severity (25% of cases) more frequently than males (11.76% of cases) with a significant difference ($p<0.000$).

The data about TB symptoms between males and females suggests that although males were more likely to present TB symptoms, and to present very severe symptoms (fever, sputum, weight loss, cough, and hemoptysis). Similar results indicate that PMT symptoms (such as cough, sputum, and hemoptysis) are much less frequent in women than in men [25]. Biological and socio-cultural factors may explain this difference. These findings may have important implications for TB diagnosis and treatment strategies, highlighting the need for a gender-differentiated approach.

3.3. Distribution of TB cases according to place of residence, level of education, smoking status and patients' state of health

Analysis of the data in Figure 1 reveals an interesting distribution of tuberculosis cases according to patients' place of residence. In urban areas, 'excellent' and 'very good' health status predominate, with 46 and 110 cases, respectively. Rural areas follow a similar trend, although the numbers were lower, with 24 'excellent' and 69 'very good' cases. Peri-urban areas show the lowest numbers, with 11 'excellent' and 42 'very good' cases. Cases with 'poor' and 'bad' health status were relatively low and evenly distributed across the different residential areas. Statistically, the p-value associated with this distribution is 0.261, indicating that the differences observed are not statistically significant. This suggests that the place of residence has no major impact on the health status of TB patients in our sample.

Table 3. Symptoms of tuberculosis in both males and females

Variables	Modalities	Gender		X^2	p-value
		Male	Female		
Presence of symptoms	None	40	65	18.88	0.000
	Present	232	143		
Fever	No	50	21	2.72	0.099
	Yes	182	122		
Sputum	No	69	85	32.24	0.000
	Yes	163	58		
Nocturnal sweating	No	43	31	.55	0.457
	Yes	189	112		
Weight loss	No	8	12	4.28	0.039
	Yes	224	131		
Rate	No	48	57	16.13	0.000
	Yes	184	86		
Hemoptysis	No	162	116	5.88	0.015
	Yes	70	27		
Anorexia	No	19	17	1.39	0.238
	Yes	213	126		
Fatigue/weakness	No	25	14	.092	0.761
	Yes	207	129		
Severity of symptoms	Without severity	32	52	19.43	0.000
	Slightly severe	42	40		
	Moderately severe	90	61		
	Very severe	108	55		

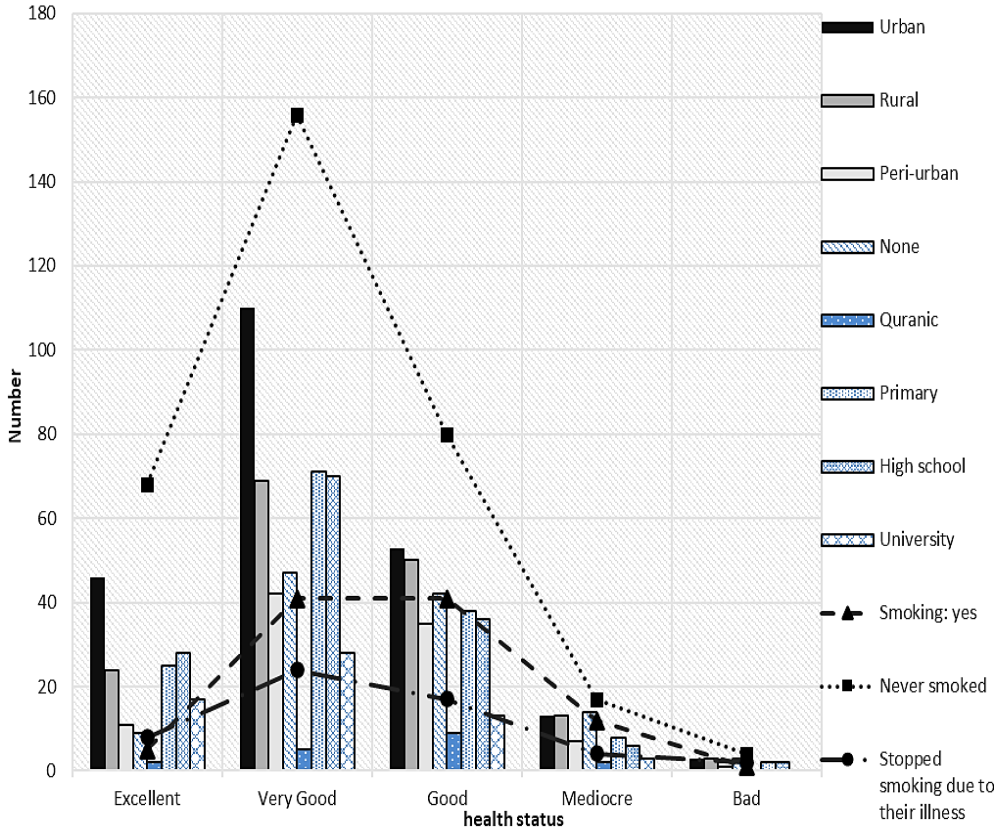

Figure 1. Distribution of TB cases according to place of residence, level of education, smoking status, and patients' state of health

Concerning the impact of level of education on the health status of tuberculosis patients. The results indicate a significant correlation between these two variables. In particular, patients with no education tended to rate their health status as 'poor' or 'mediocre', while those with education, particularly at secondary and tertiary level, predominantly reported 'excellent' or 'very good' health status. This was

confirmed by a Chi-square (χ^2) test, which revealed a value of p = 0.016, demonstrating that educational level is a determining factor in the perception of health status among these patients.

As for smoking, around 21% of patients smoke in parallel with their treatment, over 7% have stopped smoking because of their illness, over 4% for other health reasons, and the remainder have never smoked (67.71% of cases). With regard to the correlation between smoking and health status, patients who had never smoked reported a majority of 'excellent' or 'very good' health status, while those who currently smoke tend to assess their health status as 'poor' or 'bad'. What's more, patients who have quit smoking, whether due to illness or other health reasons, present a better assessment of their health status than patients who have quit smoking. This association is confirmed statistically by the χ^2 test (p = 0.002).

There is no significant association between place of residence and the health status of TB patients but 'excellent' and 'very good' health status predominate in urban areas. Compared to people who live in rural areas, urban residents are more susceptible to be infected [26]. The literature indicates that rural areas are TB pockets, which is further accelerated by the dynamics of disease knowledge. These areas are characterized by stigmatization, leading to under-utilization of treatment services, delayed diagnosis, and poor adherence to treatment [27], [28].

Smoking has a negative impact on the perceived health of TB patients, and stopping smoking is associated with an improvement in perceived health status. Our results can be confirmed by several studies such as the one by Tachfouti *et al*. which states that the chance of acquiring tuberculosis is greatly increased by alcohol and tobacco consumption [9]. Additionally, smoking has a significant correlation with death in TB patients [29]. And with unfavorable treatment outcomes [30].

4. CONCLUSION

To conclude, these findings could then be used to improve diagnosis, treatment, and prevention strategies, adapting them to the specific needs of different patient groups, as well as to strengthen health education to prevent self-medication and promote rapid access to specialist care. This article could not only contribute to the existing scientific literature, but also have a practical impact by helping healthcare professionals to better understand and respond to the needs of their patients. The study has notable limitations, such as a small sample size and a lack of population diversity, which may hinder the generalization of results. Additionally, potential biases from subjective responses and regional differences in care access should be acknowledged. Future research could benefit from a larger and more diverse sample, longitudinal studies to track evolving patient needs, and investigations into the effects of various educational strategies on self-medication and healthcare access, considering cultural and socio-economic factors. Limitations include response bias, where answers may be influenced by the wording of questions or the willingness of participants to give socially acceptable answers. There is also the risk of misunderstanding the questions, the difficulty of achieving a high response rate, and the limitation of the information gathered, which may lack detail due to the participants' state of health. However, this study also has its strengths, such as direct access to patients, enabling precise and detailed data to be collected on their experiences and symptoms, as well as the relatively low cost of this method compared with others. In addition, it is easy to implement, with simple distribution to various TB diagnostic centers.

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C : **C**onceptualization
M : **M**ethodology
So : **So**ftware
Va : **Va**lidation
Fo : **Fo**rmal analysis
I : **I**nvestigation
R : **R**esources
D : **D**ata Curation
O : Writing - **O**riginal Draft
E : Writing - Review & **E**diting
Vi : **Vi**sualization
Su : **Su**pervision
P : **P**roject administration
Fu : **Fu**nding acquisition

CONFLICT OF INTEREST STATEMENT

Authors state no conflict of interest.

INFORMED CONSENT

We have obtained informed consent from all individuals included in this study.

ETHICAL APPROVAL

The research related to human use has been complied with all the relevant national regulations and institutional policies in accordance with the tenets of the Helsinki Declaration and has been approved by the University Hospital Ethics Committee. Ethical considerations were taken into account throughout the study, with all research procedures and data collection methods conducted in accordance with the guidelines and regulations established by the Marrakech university-hospital ethics committee No. 42/2023.

DATA AVAILABILITY

The data that support the findings of this study are available from the corresponding author, [YEB], upon reasonable request.

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APPENDIX

Table 1. Sociodemographic, clinical, epidemiological characteristics, and associated factors of individuals

Variables	Modalities	N	%
Age groups	-15	33	6.9
	15-34	207	43.1
	35-54	144	30.0
	55-74	90	18.8
	+74	6	1.3
Number of rooms per household	1	40	8.35
	2	194	40.50
	3	160	33.40
	4	50	10.44
	5	35	7.3
Number of people in the household	2	36	7.53
	3	53	11.09
	4	71	14.85
	5	87	18.20
	6	111	23.22
	7	56	11.72
	+7	64	13.38
Social coverage	Yes	234	48.75
	No	246	51.25
Type of social coverage	RAMEED (ou AMO Tadamon)	120	51.28
	CNSS	82	35.04
	CNOPS	27	11.54
	Other	5	2.14

Table 1. Sociodemographic, clinical, epidemiological characteristics, and associated factors of individuals (continued)

Variables	Modalities	N	%
Type of tuberculosis	Pulmonary	263	53.33
	Extrapulmonary	217	45.21
Location	TPM+	249	51.88
	TGG	122	25.42
	Pleurale pleural	39	8.13
	Osteoarticular	15	3.13
	Peritoneal	17	3.54
	Multifocal	12	2.50
	Other rare forms	26	5.42
Discovery of the disease	Disease symptoms	338	70.42
	Accidental observation	136	28.33
	Contact tracing of another case	6	1.25
Probable tuberculosis infection	Family (place of residence)	94	19.58
	Workplace	22	4.58
	Hospital	7	1.46
	Other	7	1.46
	Unknown	350	72.92
Other disease besides tuberculosis	No	374	77.92
	Yes	106	22.08
Specify the disease	Diabetes	43	40.19
	Hypertension	21	19.63
	Anemia	7	6.54
	Other	28	26.17
	Diabetes + hypertension	8	7.48
Use of treatments before going to the hospital	No	281	58.54
	Yes	199	41.46
Treatment used before going to the hospital	Antibiotics	31	15.66
	Anti-inflammatories	9	4.55
	Analgesics	26	13.13
	Multiple medications	132	66.67
Constraining treatment	No	214	57.53
	Yes	158	42.47
If the answer is yes, why?	Long treatment	31	19.50
	Adverse effects	123	77.36
	Long treatment + adverse effects	5	3.14
Do you ever forget to take your medication?	No	278	75.75
	Yes	89	24.25
Do you follow the doctor's recommendations?	No	22	4.58
	Yes	458	95.42
Do you ever stop taking one or more medications when you feel better?	No	336	91.55
	Yes	31	8.45
Do you ever not take your medication because the treatment duration is very long?	Yes	48	13.11
	No	318	86.89
Do you think the medications prescribed by the doctor will help you improve your health?	No	5	1.04
	Yes	411	85.63
	Don't know	64	13.33
Do you ever use medicinal plants?	Yes	132	27.50
	No	348	72.50
The nature of medicinal plants	Fenugreek	42	8.75
	Melange	57	11.88
	Other	13	2.71
	Various	20	4.17
Have you changed your eating habits after the disease?	Yes	401	83.54
	No	79	16.46
Have there been times when your physical or emotional health has hindered your social life?	All the time	103	21.46
	Often	85	17.71
	Rarely	103	21.46
	Never	189	39.38

RAMEED: Medical Assistance Regime, AMO Tadamon: compulsory health insurance for people unable to pay their contributions, CNSS: National Social Security Fund, CNOPS: National Fund for Social Welfare, TPM+: Microscopy-positive pulmonary tuberculosis, TGG: lymph node tuberculosis.

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