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Research Article

Epidemiological Aspects of Pulmonary Tuberculosis in the Health District of Djenne, Mali.

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Abstract

Background: *Tuberculosis (TB is a frequent and fatal infectious disease, despite the existence of effective treatment. It is now a major public health problem worldwide. It is estimated that 10.6 million people will have developed tuberculosis worldwide by 2022. Several studies have been carried out to assess the epidemiological aspects of pulmonary tuberculosis in Mali and elsewhere in the world, but few in the Djenné health district. The aim of our work was to study the epidemiological aspects of pulmonary tuberculosis in the Djenné health district in Mali from January to December 2021.*

Methodology: *This was a cross-sectional descriptive and analytical study with retrospective data collection using a questionnaire to assess the epidemiological aspects of pulmonary tuberculosis in the Djenné health district in Mali. It took place from 1 January to 31 December 2021.*

Results: *A total of 304 patients consulted for a cough lasting more than 15 days, 77 (25.32% were microscopy-positive (BAAR). The 77 BAAR-positive patients were surveyed. The predominance of males was 62.30%. Tuberculosis/HIV co-infection was found in 9.72% of cases. The case fatality rate was 11.7%.*

Conclusion: *At the end of this study, we can conclude that the incidence of tuberculosis remains high in the Djenné health district. Tuberculosis remains a threat to developing countries, as it is a truly fatal disease in young adults. However, it is preventable if the DOTS strategy is effectively implemented.*

Keywords: Epidemiology, Pulmonary Tuberculosis, Djenne, Mali

1.Introduction

Tuberculosis (TB is a common and fatal infectious disease despite the availability of effective treatment. Today, it represents a major public health problem on a global scale. According to estimates, 10.6 million people will have developed tuberculosis worldwide in 2022. This concerns 5.8 million men, 3.5 million women and 1.3 million children. Tuberculosis is present in all countries and all age groups. However, it is a disease that can be avoided and treated [1].

In 2022, approximately 167,000 people will die from HIV-associated tuberculosis. The WHO African Region is the most affected by HIV-associated tuberculosis. HIV infection has increased the burden of tuberculosis, especially in populations where the prevalence of the latter is high, mainly in sub-Saharan Africa and Southeast Asia (1). In developing countries, the diagnosis of pulmonary tuberculosis is essentielle based on the isolation of acid-fast bacilli (AFB on direct examination of sputum. The diagnosis of extra-pulmonary tuberculosis is less easy, depending on the difficulty of obtaining material by invasive procedure (bone biopsy, cerebrospinal fluid, liver biopsy, etc. and bacteriological documentation, which is sometimes difficult (less bacterial inoculum [2].

Thus, increasingly, among people living with HIV (PLHIV), presenting smear-negative forms of tuberculosis and cases of extra-pulmonary tuberculosis are regularly recorded. The diagnosis of these forms is often difficult and late, especially when resources are limited, which causes high mortality . These patients infect 10 to 20 times more people around them than other diseases. The history of tuberculosis teaches us that 100 contagious patients infect 1000 people in two years and among these 1000 contaminated subjects, 100 will in turn become contagious. Untreated, 50 of them will die of their tuberculosis, 15 will recover and 35 will become

chronic subjects capable of infecting their environment in turn. The continents most affected are Africa and Southeast Asia with a global incidence estimated by the WHO at 10.4 million cases in 2016. The WHO estimates that the diagnosis and treatment of tuberculosis has saved 75 million lives since 2000 and 2 billion people living with the latent form, and 8.8 million new cases per year. Mali has an estimated incidence of 49 cases per 100,000 inhabitants in 2022. The Djenné health district has not carried out a scientific study on the epidemiology of pulmonary tuberculosis in recent years, hence our motivation to do this work to study the epidemiological aspects of pulmonary tuberculosis in the Djenné health district [3-9].

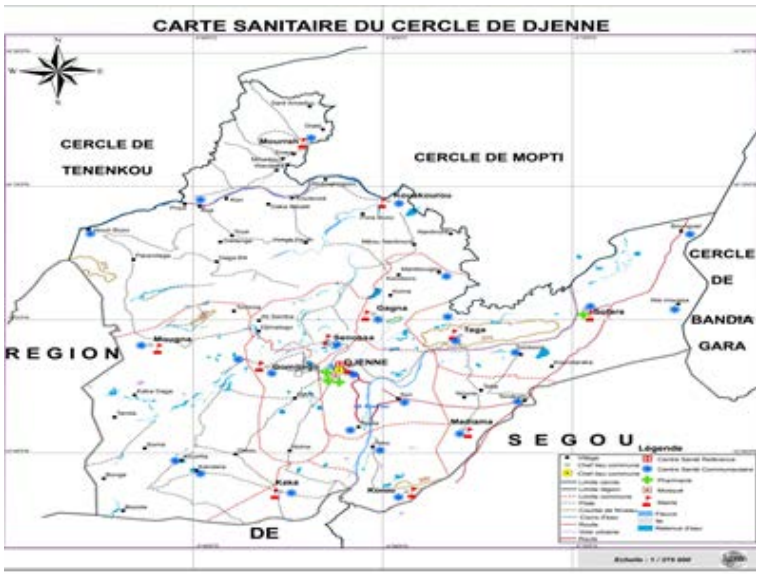
2.Methodology

2.1 Type of Study

This was a descriptive and analytical cross-sectional study using a questionnaire to assess the epidemiological aspects of pulmonary tuberculosis in the health district of Djenné, Mali.

2.2 Study Framework

This study took place in the health district of Djenné. The Djenné circle is a buffer between the Mopti region and the Ségou region. Located 135 km southwest of Mopti, and in the central delta of the Niger River.



Le cercle de Djenné couvre une superficie de 4.561 Km^2.
Le cercle est limité par :
Au Nord par les cercles de Mopti et Ténénkou
A l'Est par les cercles de Bandiagara et Tominian
Au Sud par le cercle de San
A l'Ouest par les cercles de Macina et Ténénkou.
Le cercle de Djenné couvre une population de 309 365 habitants, il est composé de 170 villages repartis en 12 communes, dont 11 rurales et 1 urbaine.

Figure 1 : Health Map of Djenne (Source: Igm/Mopti, 2022)

2.3 Location And Period of Study

This study took place within the tuberculosis unit and the CSRéf laboratory in Djenné covering data from January 1, 2021 to December 31, 2021, i.e. 1 year.

2.4 Study Population

Our study concerned all bacilliferous, radiological and clinical pulmonary tuberculosis patients in the Djenné health district who were notified to the national tuberculosis control program during the study period.

2.5 Sampling

Our sampling was exhaustive, including all cases of smear-positive and radiological pulmonary tuberculosis reported during the study period. The sample size was calculated by Raosoft software using the following parameters: 95% CI, 5% margin of error and a normal distribution. The sample size is 309,365. Our study involved 304 patients.

2.6 Inclusion Criteria

- Any microscopy-positive pulmonary tuberculosis notified
- Any pulmonary tuberculosis diagnosed by radiography.

2.7 Exclusion Criteria

- Pulmonary tuberculosis with positive microscopy for which the data could not be used;
- Pulmonary tuberculosis diagnosed by radiography for which the data was not usable.

2.8 Data Collection Period

The information was collected on a survey sheet established from quarterly screening and treatment notifications and annual activity reports from the national tuberculosis control program. The data was collected from March to April 2022, i.e. 2 months.

2.9 Data Entry and Analysis

The data were entered and analyzed using SPSS version 25 software. A descriptive analysis was carried out to calculate the frequencies and percentages of the variables; the comparison of variables was made using the Chi 2 test at the significance level of $p<0.05$.

2.10 Ethical considérations

The protocol for this study was approved by the management of the Private Higher Institute of Public Health (ISPSP in Bamako, Mali. Furthermore, authorization was obtained

from the medical authorities of the Djenné health district. The data from this survey was collected anonymously and will remain confidential.

3. Results

Our study lasting from January 1 to December 31, 2021, i.e. 1 year, concerned the CSRéf of Djenné where we recorded 304 patients who consulted for a cough lasting more than 15 days. Among the 304 patients who consulted for a cough lasting more than 15 days, 77 patients were positive on microscopy (AFB or radiology, i.e. 25.32%.

3.1 Sociodemographic Characteristics of Patients.

Socio-demographic characteristics	Frequency Percentage (%)	Frequency Percentage (%)
AGE GROUP		
15-44 years old	44	57,1
45-64 years old	28	36,4
Man	48	62,3
Women	29	37,7
MARITICAL SITUATION		
Married	65	84,4
Bachelor	7	9,1
Widower	4	5,2
Divorce	1	1,3
OCCUPATION		
Farmer	26	33,8
Housewife	21	27,3
Fisherman	13	16,9
Breeder/Shepherd	10	13,0
Others	7	9,1
LEVEL OF STUDY		
Primary	31	40,3
Secondary	7	9,1
Superior	1	1,3
Unschooled	38	49,4
ETHNIC GROUP		
Bambara	26	33,8
Peulh	16	20,8
Bozo	22	28,6
Sonrhaï	3	3,9
Soninke	1	1,3
Others	9	11,7
Total	77	100,0

Table 1 : Distribution Of Patients According To Sociodemographic Characteristics

Socio-demographic characteristics	Frequency Percentage (%)	Frequency Percentage (%)
Admission method		
Coming by himself	22	28,6
Addressed by a CSCom	55	71,4
Diagnostic means		
Bascilloscopy	72	93,5
Radiological	5	6,5

Therapeutic diet		
2RHZE/4RH	76	98,7
Autres régimes à préciser	1	1,3
Effets secondaires des médicaments		
No	58	75,3
Yes	19	24,7
Tuberculosis treatment outcome		
Cured	21	27,3
Processing completed	33	42,9
Death	9	11,7
Not rated	2	2,6
Lost sight of	12	15,6
HIV screening test carried out		
OUI	72	93,5
None	**5**	**6,5**
Negative	70	90,9
Positive	7	9,1
Total	77	100,0

Table 2 : Distribution Of Patients According To Clinical Characteristics

Concerning the type of HIV, all HIV-positive patients were type 1 (HIV 1), a raté of 100%.

Coïnfection TB/VIH	Tuberculeux avec VIH	Tuberculeux sans VIH	Total
Sérologie VIH	Positive	7	0
	Negative	0	70
Total	7	70	77

Table 3 : Distribution Of Patients According To Tb/Hiv Co-Infection

Fisher's exact test
KHI 2= 77, p= 0.000
Tuberculosis/HIV co-infection was found in 9.7% of cases with an exact Fisher chi square = 77 and a p= 0.000 where we found a statically significant link for Tuberculosis/HIV co-infection because the p is less than 0 .05.

4. Discussion

4.1 Socio-Demographic Characteristics Of Patients

➢ ***Age***

In our study, the age group most affected was 15-44 years old with 57.1%. The same observation was made by KOMBILA et al in Dakar and OUEDRAGO et al in Burkina Faso who obtained Respectively 39% and 55% of cases in the age group of 26-35 and 20-39 . This could be explained by the fact that this age group is the most active and productive segment of the population. Tuberculosis generally occurs in young, economically productive adults [10,11].

The male gender was predominant, i.e. 62.3% of cases. This male predominance in our study was noted by studies carried out in Senegal and Burkina Faso (10 (11 This could be explained by the fact that tuberculosis generally affects young, economically productive subjects, particularly those of the male sex [12, 13].

➢ ***Profession :***

In our study, farmers were the most represented with 33.80% of cases. The same observation was made in Senegal (10 and Burkina (11 where farmers represented 34.5% and 39.4% of cases. This could be explained by the fact that farmers form the majority of the général population.

➢ ***Level of education :***

Those not in school represented 49.4% of cases. This rate is higher than those of Mfinanga et al in Tanzania who had 42.6% of cases. The level of education plays a role in the decision to go for a consultation or not. Uneducated patients consulted later than those who were educated. Lack of knowledge of the symptoms, the mode of transmission of tuberculosis and/or its etiology contributes to the lengthening of the illness period [14].

4.2 Clinical Characteristics Of Patients

➢ ***Bacilloscopy :***

In our study, tuberculosis was found after examination of the sputum in 25.32% of cases, by microscopic examination. Segbedji K et al. In Togo found a result superior to ours with 39.19% positive microscopy. However, our result is higher than that of S Khatib et al who reported 10% [15,16].

➢ ***Tuberculosis/Hiv Coinfection :***

Tuberculosis/HIV co-infection was found with a statically significant link in 9.72% of cases with a Chi square = 77 and a p = 0.000.

Mabiala et al and Segbedji K et al. Had a higher frequency than ours. So, we could say that there is a relationship between tuberculosis and HIV. Thus, HIV infection should always be sought in cases of tuberculosis and vice versa [15-17].

5. Conclusion

At the end of this study, we can conclude that the incidence of tuberculosis remains high in the health district of Djenné. This study was interested in analyzing tuberculosis data which revealed a lethality of 11.7%, young people are the most affected by tuberculosis in the district. Tuberculosis is a threat to developing countries because it is a truly fatal disease among young adults. However, it is avoidable with the effective implementation of the DOTS strategy.Among the factors associated with the delay in diagnosis we could note the factors linked to the patients which were personal, financial, social, professional and age. The most common symptoms were cough, asthenia, weight loss, fever and chest pain. All patients were treated as outpatients and all received treatment according to the DOTS recommendation.

Through this work, we believe we have contributed to the **fight against** tuberculosis in Mali.

References

1. World Health Organization. (2024). WHO global sodium benchmarks for different food categories. *World Health Organization*.
2. Tékpa, G., Fikouma, V., Téngothi, R. M. M., Longo, J. D. D., Woyengba, A. P. A., et al. (2019). Epidemiological and clinical features of tuberculosis at the Hôpital de l'Amitié in Bangui. *The Pan African Medical Journal, 33*, 31-31.
3. Chahboune, M., Barkaoui, M., Iderdar, Y., Alwachami, N., Mourajid, Y., Ifleh, M.,et al. (2022). Epidemiological profile and diagnostic and evolutionary features of TB patients at the Diagnostic Centre for Tuberculosis and Respiratory Diseases in Settat, Morocco. *The Pan African Medical Journal, 42*, 185-185. Pan African Medical Journal. 2022;42(185). 10.11604/pamj.2022.42.185.35250.
4. Mazza-Stalder, J., Nicod, L., Janssens, J. P. (2012). La tuberculose extrapulmonaire. *Revue des maladies respiratoires, 29*(4), 566-578.
5. Gathogo, S. M. (2011). Prevalence Of Bovine Tuberculosis In Slaughter Cattle In Kenya: A Pathological And Microbiological Study (Doctoral dissertation, University of Nairobi.).
6. Maitre, T., Robert, J., Veziris, N. (2018). Introduction-Epidemiology of latent and active tuberculosis. *Revue des maladies respiratoires, 35*(8), 859-861.
7. Keubo, F. N., Tadongfack, T. D., Tsafack, J., Djoufack, G., Bianke, P. (2018). Clinical profile of patients with tuberculosis in Dschang, Cameroon: role of the therapeutic path in delaying diagnosis. *Médecine et Santé Tropicales, 28*(4), 399-403.
8. Zailani, S. B., Gabdo, A. H., Yusuph, H., Ahidjo, A., Mustapha, S. K., et al. (2005). Prevalence of sputum smear positive tuberculosis among patients at University of Maiduguri teaching hospital. *Highland Medical Research Journal, 3*(2), 24-30.
9. Bank, T. (2015). Incidence of tuberculosis (per 100,000 people).
10. Kombila, U. D., Ndiaye, E. H. M., Cisse, F., Diouf, N. F., Sagne, J. M., et al. (2017). Therapeutic itinerary and radiological features of positive microscopy tuberculosis patients at Centre Hospitalier National Universitaire de Fann (CHNUF), Dakar. *Revue de Pneumologie Clinique, 73*(5), 240-245.
11. Ouedraogo, M., Kouanda, S., Boncoungou, K., Dembele, M., Zoubga, Z. A., et al. (2006). Treatment seeking behaviour of smear-positive tuberculosis patients diagnosed in Burkina Faso. *The International Journal of Tuberculosis and Lung Disease, 10*(2), 184-187.
12. Dye, C., Floyd, K., Uplekar, M. (2008). Global tuberculosis control: surveillance, planning, financing. *WHO report, 2008*(393), 294.
13. Global Tuberculosis Control - IRIS Home, World Health Organization (WHO accessible at "https://iris.who.int › bitstream › 9241563141_eng". Consulted[Consulted September 6, 2023].
14. Ngangro, N. N., Chauvin, P., Des Fontaines, V. H. (2012). Determinants of tuberculosis diagnosis delay in limited resources countries. *Epidemiology and Public Health= Revue d'Epidémiologie et de Santé Publique, 60*(1), 47-57.
15. Segbedji, K. A. R., Djadou, K. E., Tchagbele, O. B., Kpegouni, M., Kama, L. B., Azoumah, K. D., et al. (2016). Tuberculosis in children in Togo: epidemiology, diagnosis, treatment, and outcome. *Médecine et Santé Tropicales, 26*(3), 318-322.
16. Ait-Khaled, N., Enarson, D. A., Stop TB Initiative. (2003). Tuberculosis: *a manual for medical students* (No. WHO/CDS/TB/99.272). World Health Organization.
17. Mabiala-Babela, J. R., M'Pemba Loufoua, A. B., Mouko, A., Senga, P. (2008). Pulmonary tuberculosis in infants in Brazzaville, Congo. A review of 117 cases. Medecine Tropicale: *Revue du Corps de Sante Colonial, 68*(2), 167-172.