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Report on Anti-Tuberculosis Treatment in Patients Monitored Health Center in Dakar, Senegal

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Abstract

Introduction: Tuberculosis is a contagious infectious disease caused by a mycobacterium of the tuberculosis complex. It remains a serious disease worldwide despite the efforts made to eradicate it. This study aims to evaluate the outcome of anti-tuberculosis treatment in patients treated at the Nabil Choucair Health Center. **Methodology**: This was a retrospective, descriptive and analytical study which took place between January 2023 and December 2024, covering a period of 2 years. The work covered all patients diagnosed with tuberculosis and who received their anti-tuberculosis treatment at the Nabil Choucair Health Center. **Results**: We collected 707 patients with a median age of 32 years (minimum: 9 months and maximum: 88 years). The sex ratio was 2.3. The age groups 15 - 25 years and 25 - 35 years were represented in our study with respectively 28.1% and 27.9% of the study population. Pulmonary site of tuberculosis was the most encountered in our cohort (85.3%), followed by pleural (4.7%), lymph node (3.7%) and vertebral (3.4%). Regarding the therapeutic regimen, 96.5% of patients received a 6-month treatment according to the 2RHZE/4RH regimen, while 3.5% received a 12-month treatment according to the 2RHZE/10RH regimen. The treatment results of the patients in our study were marked by a therapeutic success (completed + cured) which was around 84.3%, including 72.3% cured and 12.4% completed. Those lost to follow-up and those deceased represented 9.9% and 3.8% of cases respectively. Statistical analysis revealed a significant association between treatment outcome and the form, site of tuberculosis and HIV status ($p < 0.05$). **Conclusion**: The monitoring of patients undergoing anti-tuberculosis treatment is satisfac-

tory at the Nabil Choucair health center. Nevertheless, efforts are needed to reduce the number of deaths and treatment failures.

Keywords

Anti-Tuberculosis Treatment, Report on, Nabil Choucair Health Center

1. Introduction

Tuberculosis is a contagious infectious disease caused by a mycobacterium of the tuberculosis complex [1]. It remains a serious global problem today, despite the efforts implemented to eradicate it. According to the World Health Organization (WHO), by 2023, there will be more than 10 million cases and nearly one million deaths worldwide. In the same year, it caused 1.3 million deaths, or one person every 20 seconds, and remains the leading cause of death from a single infectious agent in Africa with 2.5 million new cases and 404,000 deaths [2]. In addition to HIV co-infection, the resistance of *Mycobacterium tuberculosis* complex to standard treatments is also an obstacle to reducing tuberculosis mortality [3] [4]. In Senegal, figures for 2024 reveal an incidence of 110 cases per 100,000 inhabitants, or approximately 20,000 expected cases [2]. In order to combat this disease, Senegal established a national tuberculosis control program (PNT) in 1985. This program provides free diagnosis and treatment for tuberculosis patients. In addition, as part of the "END TB" strategy, the country has set itself the goal of achieving a treatment success rate of close to 90% by 2030, in line with WHO recommendations [5]. This ambition emphasizes the importance of regular evaluation of therapeutic results in treatment centers (CDT) in order to identify obstacles and optimize patient care. It is in this logic that this study is part of, which aims to evaluate the outcome of anti-tuberculosis treatment in patients followed at the Nabil Choucair Health Center.

2. Methodology

This was a retrospective and descriptive study that took place between January 2023 and December 2024, over a period of two years. The work focused on all patients diagnosed with tuberculosis, who received their anti-tuberculosis treatment at the Nabil Choucair Health Center. Data were collected using a survey form developed specifically for the study. Data were collected from the records of patients who had completed their anti-tuberculosis treatment, supplemented by information recorded in the follow-up register to compensate for any omissions. The variables studied included sociodemographic characteristics (age, sex, address, occupation), clinical data (form and location of tuberculosis, type of patient), bacteriological and paraclinical parameters (results of BAAR and GeneXpert test), associated comorbidities (HIV status, presence of diabetes, treatment with cotrimoxazole and antiretrovirals), as well as therapeutic data, including the

antituberculosis regimen received and the outcome of treatment. Data were entered into Excel 2010 and analyzed using SPSS version 23.0 software and presented in tables and figures. Results were expressed as percentages and numbers. Chi-square or Fischer exact test was used for comparison of proportions with a significance level of 5%.

3. Results

3.1. Descriptive Study

From January 2023 to December 2024, we enrolled 707 patients with a median age of 32 years (minimum: 9 months and maximum: 88 years). The sex ratio was 2.3. Pulmonary tuberculosis was the most common, accounting for 85.1% (Table 1).

Table 1. Baseline characteristics of the study population.

Parameters	Modalities	Numbers (Percentages) N (%)
Inclusion	N = 707	
Median Age	32 ans (18) (max: 9 mois min: 88 ans)	
Sex	Male	495 (70)
	Female	212 (30)
	Sex-ratio	2.3
Form of Tuberculosis	Pulmonary	602 (85.1)
	Extrapulmonary	99 (14)
	Pulmonary + Extrapulmonary	6 (0.9)
Patient Type	New case	591 (83.5)
	Relapse	63 (8.9)
	Resumption	21(3)
	Transfer In	20 (2.8)
	Failure	13 (1.8)
TB Confirmed	Yes	595 (84.2)
	No	1 (0.1)
	Unspecified	111 (15.7)
Therapeutic Regimen	2 RHZE/4 RH	682 (96.5)
	2 RHZE/10 RH	25 (3.5)

3.2. Age Group

The 15 - 25 and 25 - 35 age groups were represented in our study, with 28.1% and 27.9% of the study population, respectively (Figure 1).

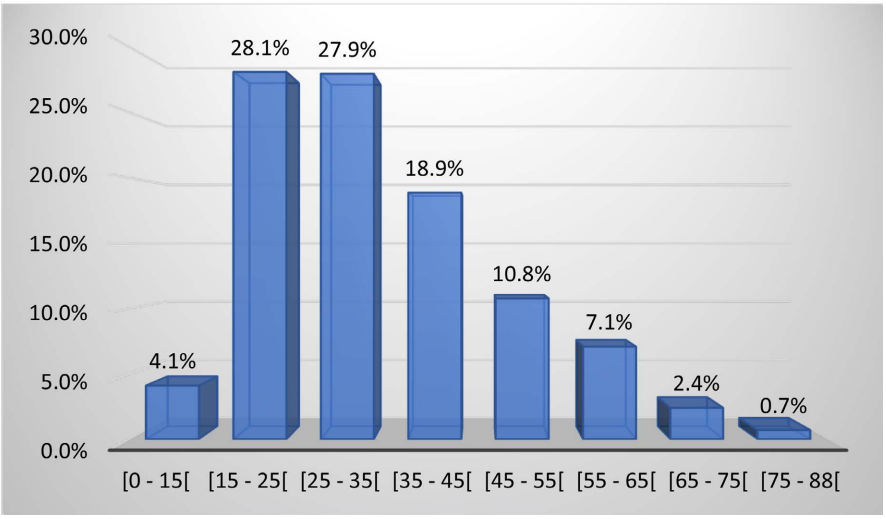

Figure 1. Distribution of patients according to age group.

3.3. Occupation

In our study, manual workers (41.9%) were the most common occupations (**Table 2**).

Table 2. Distribution of patients by occupational category.

Category	Number (N)	Frequency (%)
Student	118	16.7
Manual Worker	296	41.9
Unemployed/Retired	135	19.1
Merchant/Entrepreneur	82	11.6
Administrative Staff	50	7.1
Teacher	13	1.8
Health Professional	6	0.8
Not Specified/Other	7	1
Total	**707**	**100**

3.4. Residence

The majority of our patients receiving antituberculosis medication came from Grand Yoff and Patte d'Oie, with a frequency of 63.1% and 30.3% (**Table 3**).

Table 3. Distribution of patients by residence.

Residence	Number (N)	Frequency (%)
Grand Yoff	446	63.1
Patte d'Oie	214	30.3
HLM	18	2.5

Continued

Parcelles Assainnies	13	1.8
Grand Dakar	11	1.6
Sicap Liberté	2	0.3
Cambéréne	1	0.1
Guediawaye	1	0.1
Yeumbeul	1	0.1
Total	**707**	**100**

3.5. TB Site

Pulmonary site was the most frequently observed in our cohort, accounting for 85.3% (Figure 2).

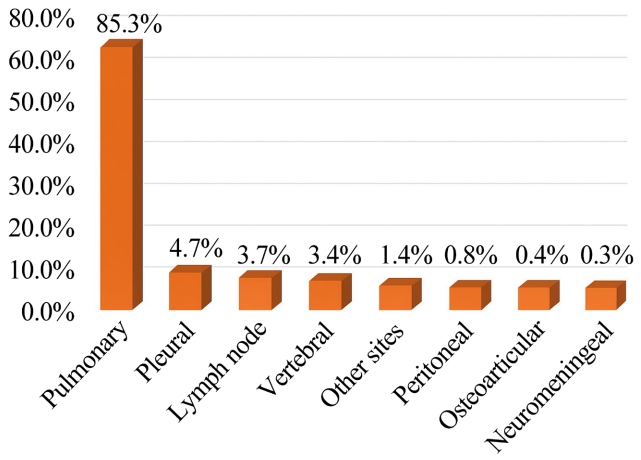

Figure 2. Distribution of patients according to the location of tuberculosis.

3.6. Positive Tests for Confirmation

The Genexpert was the most used test to confirm tuberculosis with an estimated frequency of 78.4%, followed by BAAR sputum (6.2%) and X-ray (6.8%) (Table 4).

Table 4. Distribution of patients according to the positive test used for confirmation.

Test	Number (N)	Frequency (%)
Genexpert	554	78.4
Unspecified	60	8.5
X-ray	48	6.8
BAAR	44	6.2
Culture	1	0.1
Total	**707**	**100**

3.7. Control Results at M2, M5, and M6

673 patients underwent the control at M2, of which 649 (96.4%) were negative and 24 (3.6%) were positive. At M5, 629 patients were tested, with 621 negative and 8 positive, and at M6, 607 patients with 602 negative and 5 positive (Table 5).

Table 5. Distribution of patients according to control results at M2, M5, and M6.

Results	M2		M5		M6	
	Number (N)	Frequency (%)	Number (N)	Frequency (%)	Number (N)	Frequency (%)
Negative	649	96.4	621	98.7	602	99.2
Positive	24	3.6	8	1.3	5	0.8
Total	**673**	**100**	**629**	**100**	**607**	**100**

3.8. TB/HIV and TB/Diabetes Activity

In our cohort, 3.1% were HIV-positive versus 96.5% negative, 5.9% had diabetes, 2.7% were on ARV treatment, and 97.3% were receiving cotrimoxazole (Table 6).

Table 6. Distribution of patients according to TB/HIV and TB/Diabetes activity.

TB/HIV and TB/Diabetes		**Number Frequency N (%)**
VIH Status	Positive	22 (3.1)
	Negative	682 (96.5)
	Unspecified	3 (0.4)
Diabetes	No	655 (94.1)
	Yes	42 (5.9)
TARV Treatment	No	688 (97.3)
	Yes	19 (2.7)
Cotrimoxazole	No	688 (97.3)
	Yes	19 (2.7)

3.9. Treatment Outcome

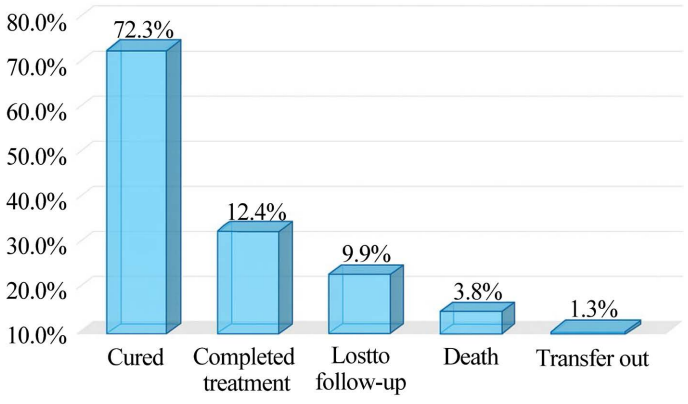

Figure 3. Distribution of patients according to treatment outcome.

The treatment outcome of patients in our study population was marked by a therapeutic success rate (completed + cured) of around 84.3%, including 72.3% cured and 12.4% completed treatment (Figure 3).

3.10. Analytical Study

HIV Status on Treatment Outcome

We noted a significant association between treatment outcome and HIV status ($p < 0.05$), with a predominance of cures among HIV-negative patients (Table 7).

Table 7. Association between treatment outcome and HIV Status.

VIH Status	Death N (%)	Failure N (%)	Cured N (%)	Lost to Follow-up N (%)	Completed treatment N (%)	Transfer out N (%)	Total N (%)
Negative	23 (3.4)	9 (1.3)	495 (72.6)	70 (10.3)	83 (12.2)	2 (0.3)	682 (100)
Unspecified	2 (66.7)	0 (0)	1 (33.3)	0 (0)	0 (0)	0 (0)	3 (100)
Positive	2 (66.7)	0 (0)	15 (68.2)	0 (0)	5 (22.7)	0 (0)	22 (100)
Total	27 (3.8)	9 (1.3)	511 (72.3)	70 (9.9)	88 (12.4)	2 (0.3)	707 (100)

Type of Tuberculosis and Treatment Outcome

Statistical analysis also showed a significant association between treatment outcome and type of tuberculosis ($p < 0.05$): cure was predominant in cases of pulmonary tuberculosis (83.4%) (Table 8).

Table 8. Association between type of TB and treatment outcome.

Type of TB	Death (%)	Failure N (%)	Cured N (%)	Lost to Follow-up N (%)	Completed treatment N (%)	Transfer Out N (%)	Total N (%)
Extrapulmonary	2 (2)	0 (0)	7 (7.1)	13 (13.1)	77 (77.8)	0 (0)	99 (100)
Pulmonary	25 (4.2)	9 (1.5)	502 (83.4)	57 (9.5)	7 (1.2)	2 (0.3)	602 (100)
Pulmonary + Extrapulmonary	0 (0)	0 (0)	2 (33.3)	0 (0)	4 (66.7)	0 (0)	6 (100)
Total	27 (3.8)	9 (1.3)	511 (72.3)	70 (9.9)	88 (12.4)	2 (0.3)	707 (100)

Site on treatment outcome

Treatment outcome was significantly dependent on tuberculosis site ($P < 0.05$) (Table 9).

Table 9. Association between treatment outcome and tuberculosis Site.

Site	Death N (%)	failure N (%)	Cured N (%)	Lost to Follow-up N (%)	Completed treatment N (%)	Transfer out N (%)	Total N (%)
Others sites	0 (0)	0 (0)	1 (10)	0 (0)	9 (90)	0 (0)	10 (100)
Lymph node	0 (0)	0 (0)	3 (11.5)	2 (7.7)	21 (80.8)	0 (0)	26 (100)
Neuromeningeal	0 (0)	0 (0)	1 (50)	0 (0)	1 (50)	0 (0)	2 (100)

Continued

Osteoarticular	0 (0)	0 (0)	0 (0)	1 (33.3)	2 (66.7)	0 (0)	3 (100)
Peritoneal	0 (0)	0 (0)	0 (0)	1 (16.7)	5 (83.3)	0 (0)	6 (100)
Pleural	1 (3)	0 (0)	2 (6.1)	5 (15.2)	25 (75.8)	0 (0)	33 (100)
Pulmonary	25 (4.1)	9 (1.5)	502 (83.3)	57 (9.5)	8 (1.3)	2 (0.3)	603 (100)
Vertebrale	1 (4.2)	0 (0)	2 (8.3)	4 (16.7)	17 (70.8)	0 (0)	24 (100)
Total	27 (3.8)	9 (1.3)	511 (72.3)	70 (9.9)	88 (12.4)	2 (0.3)	707 (100)

4. Discussion

During our study period, 707 patients received anti-tuberculosis treatment at the Nabil Chouker Health Center. Males were more prevalent (70%), with a sex ratio of 2.3. These data were identical to those of the study carried out by Diallo in Mali where the male sex represented 66.7% of cases, corresponding to a sex ratio of 2 [6]. On the other hand, Bemba *et al.*, in Congo Brazzaville reported a female predominance (55%) [7]. These results could be explained by the risky behaviors adopted by men such as smoking and alcoholism [8]. The median age of the population was 32 years (minimum: 9 months and maximum: 88 years) and the 15 - 25 age group was the most represented with 28.1% of patients followed by that of 25 - 35 years with 27.9%. These are relatively young subjects. Our results were comparable to those of Mbatchou Ngahane *et al.*, the median age was 32 years and most of their patients were aged 21 to 40 years (49.3%) [9]. The predominance of these age groups in our study confirms that tuberculosis preferentially affects young adults, particularly in urban and high-density population settings [10]. Manual Workers were the most affected in our cohort (41.9%), followed by unemployed/retired individuals with 19.7% of cases. Students also had a significant proportion (16.1%). In his study carried out at the pulmonology department of the CHNU of Fann, Cissé found that workers represented 28.58%, traders 27.80% and students13.86% [11]. The predominance of manual workers among the cases recorded is probably explained by precarious living conditions, exposing work environments (confined, poorly ventilated spaces), as well as limited access to prevention and early diagnosis. The majority of our patients came from Grand Yoff and Pate d'Oie, with frequencies of 63.1% and 30.3% respectively. These localities are located within the structure's direct area of influence. This highlights the importance of health sectorization in access to tuberculosis care. Pulmonary tuberculosis was the most common site in our cohort (85.3%), followed by pleural (4.7%), lymph node (3.7%) and vertebral (3.4%). The majority of these patients were new cases (83.5%). Our results are consistent with data already published in the literature [12] [13]. Tuberculosis was confirmed in the vast majority of cases, totaling 595 patients (84.2%). Regarding confirmatory tests, GeneXpert was the most used diagnostic tool, carried out in 554 patients (78.4%), followed by BAAR sputum (6.2%) and X-ray (6.8%). Chahboune Mouhamed in his study in Morocco had highlighted the use of bacteriology for confirmation in the majority of these patients (84.09%) [14]. The widespread use of the GenepXpert test reflects its po-

sition as a first-line diagnostic tool in cases of suspected pulmonary TB, recommended by the PNT for its high sensitivity and its ability to detect early resistance to rifampicin. 673 patients underwent the control at M2, of which 649 (96.4%) were negative and 24 (3.6%) were positive. At M5, 629 patients were tested with 621 negative and 8 positive, and at M6, 607 patients with 602 negative and 5 positive. A similar study carried out in Mali on a sample of 172 patients reported that the control rate was 79.7% at M2, 76.7% at M5 and 75% at M6. The number of positive patients decreased between the 2nd month and 6th month check-ups, going from 27 positive cases to 2 positive cases [15]. The evolution of the results of bacteriological control examinations shows an overall satisfactory therapeutic response in patients with pulmonary tuberculosis. During our study period, 3.1% were HIV positive versus 96.9% negative, 5.9% had diabetes. This proportion of comorbidity observed in our study is lower than that found in the work of Bitchong Ekono *et al.* where HIV infection represented 29.2% of cases and diabetes (6.2%) [16]. Kombila *et al.* also showed a high rate of HIV in their research, *i.e.* 30.4% of cases [17]. Regarding the therapeutic regimen, 96.5% of patients received a 6-month treatment according to the 2RHZE/4RH regimen, while 3.5% received a 12-month treatment according to the 2RHZE/10RH regimen. This distribution confirms compliance with current therapeutic protocols and illustrates an adaptation of the treatment according to the clinical forms presented by the patients. The treatment results of the patients in our study were marked by a therapeutic success (completed + cured) which was around 84.3%, including 72.3% cured and 12.4% competed treatment. Those lost to follow-up and those deceased patient represented 9.9% and 3.8% of cases respectively. Therapeutic failure was reported in 1.3% of cases. In general, the results obtained are in line with those published by other researchers [15] [18] [19]. The therapeutic success rate noted is close to the 90% target set for 2030 in the "END TB" strategy. Our results are higher than those reported by Moges *et al.* who found cases of loss to follow-up and death with respective frequencies of 5% and 0.6% [20]. Statistical analysis revealed a significant association between treatment outcome and the form, site of tuberculosis and HIV status ($p < 0.05$). Cure predominated in patients with pulmonary tuberculosis and HIV negative, while extrapulmonary forms, depending on their site, more frequently resulted in simply "completed" treatment than in cure. Similarly, Cissé in his study also highlighted that the outcome of treatment had a statistically significant link with the location of tuberculosis and serological status for values of $p = 0.000$ [11].

This study has several limitations, notably its retrospective and single-center nature, as well as the presence of incomplete data and the absence of certain socio-economic or environmental variables. Additionally, the two-year follow-up period limits the assessment of relapses and long-term effects.

5. Conclusion

Tuberculosis remains today an infectious disease of global concern, the persistence of which reflects both the fragility of health systems and structural social

inequalities. Although major advances have been made in diagnosis and treatment, it continues to represent a health emergency, particularly in low- and middle-income countries. At the Nabil Choucair Health Center, the monitoring of patients undergoing anti-tuberculosis treatment is satisfactory. However, efforts must be made to reduce the number of deaths and treatment failures.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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