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Risk Factors and Complications in 947 Tuberculosis Patients Hospitalized in the Pulmonology Department of Fann Chnu from 2017 to 2019

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Abstract

Introduction: Despite current progress, tuberculosis remains a major public health problem, given its still high incidence, prevalence, and mortality, particularly in sub-Saharan African countries, including Senegal. This risk is higher for immunocompromised people. Complications and comorbidities can also affect the course of the disease, affecting the prognosis. It is in this context that this study was undertaken with the objective of determining the risk factors and complications in patients hospitalized for tuberculosis. **Materials and Methods:** This was a retrospective and descriptive study carried out in 2021, from records of patients hospitalized for tuberculosis from January 1, 2017, to December 31, 2019, at the Pulmonology Department of Fann. Inclusion criteria were all patients on TB treatment after diagnosis of tuberculosis has been confirmed bacteriologically or clinically according to the World Health Organization's TB case definition. Multidrug-resistant TB was excluded. **Results:** Out of 4516 hospitalized patients, 20.96% of patients were tuberculosis patients. The sex ratio was 2.18. 4/5 of the patients were between 18 and 39 years old. The main contributing factors of TB found were undernutrition (93.13%), active smoking (36.75%) and diabetes (35.97%). The time between hospitalization and onset of symptoms was greater than 2 months in 60.53% of cases. A complication was noted in 89.10% of patients, particularly bacterial/viral bronchopulmonary co-infection (31.15%). The trend was favorable in 88.49% of cases. It resulted in death in 10.98% of cases. **Conclusion:** Most integrated-care nutritional support programs focus on HIV. Undernutrition appears to play a much more important role than HIV in the extent of TB in poor countries. It creates a vicious circle with tuberculosis, one

of the components of which is immunosuppression and the increased frequency of complications such as bacterial/viral community/nosocomial co-infection, the actual incidence of which is poorly known and deserves special attention given the importance of added morbidity and mortality.

Keywords

Undernutrition, Tuberculosis, Bacterial Co-Infection

1. Introduction

Despite current progress, tuberculosis remains a major public health problem, given its still high incidence, prevalence, and mortality. Globally, an estimated 10.0 million (range, 8.9 - 11.0 million) people fell ill with TB in 2019, a number that has been declining very slowly in recent years [1]. Geographically, most people who developed TB in 2019 were in the WHO regions of South-East Asia (44%), Africa (25%) and the Western Pacific (18%), with smaller percentages in the Eastern Mediterranean (8.2%), the Americas (2.9%) and Europe (2.5%). Eight countries accounted for two thirds of the global total: India (26%), Indonesia (8.5%), China (8.4%), the Philippines (6.0%), Pakistan (5.7%), Nigeria (4.4%), Bangladesh (3.6%) and South Africa (3.6%). The TB incidence rate at the national level varies from less than 5 to more than 500 new and relapse cases per 100,000 populations per year. In 2019, 54 countries had a low incidence of TB (<10 cases per 100,000 population per year), mostly in the WHO Region of the Americas and European Region, plus a few countries in the Eastern Mediterranean and Western Pacific regions. These countries are well placed to target TB elimination. In the others, TB continues to be a public health threat. This is the case of Senegal, a TB-endemic area, where our study is taking place, and where were reported in 2020, 13,370 new cases of TB, an incidence of 117 cases per 100,000 inhabitants and a death rate of 4% [2].

The risk of morbidity and mortality is higher for people suffering from conditions that weaken the general or local immune system. Along with well-established risk factors (such as human immunodeficiency virus, malnutrition, and young age), emerging variables such as diabetes, indoor air pollution, alcohol, use of immunosuppressive drugs, and tobacco smoke play a significant role at both the individual and population level [3] [4].

Complications and comorbidities such as cardiovascular pathologies can also enamel the course of the disease, affecting the prognosis of the disease, especially in developing countries that do not have sufficient technical platforms for rapid detection and ideal management of these comorbidities and complications. It is in this context that we undertook this retrospective study, the first at the pulmonology department of Fann CHNU with the aim of determining the risk factors and complications in patients hospitalized for tuberculosis.

2. Materials and Methods

This was a retrospective and descriptive study conducted in 2021. It was carried out from records of patients hospitalized for tuberculosis from January 1, 2017, to December 31, 2019, a period of three years, at the Pulmonology Department of Fann CHNU which is a public level III hospital. It is located at the top of the of Senegal's health pyramid.

Inclusion criteria were all patients on TB treatment after diagnosis of tuberculosis has been confirmed bacteriologicaly or clinically according to the World Health Organization's TB case definition [5], *i.e.* pulmonary and/or extrapulmonary tuberculosis:

- With bacilloscopy (BAAR search), GeneXpert MTB/Rif and/or culture on positive specific media or,
- Strongly suspected in front of bundles of epidemiological, clinical, paraclinical and therapeutic arguments.

Multidrug-resistant tuberculosis and poorly informed records were excluded. The available information was recorded on a pre-established individual farm record containing the following elements: sociodemographic data, history, addictive behavior, comorbidities, clinical signs at entry, duration of symptomatology before hospitalization, paraclinical data, clinical forms of tuberculosis, treatment received and course of patients during the period of hospitalization, complications during hospitalization.

They were entered with the EPI Info 7 software and analyzed with the STATA 12 software. Qualitative variables were expressed in proportions and quantitative variables in average, median and extreme.

3. Results

Out of 4516 patients of all etiologies hospitalized during the same period, 947 were admitted for tuberculosis (20.96%), on average 315.6 cases/year. These were (**Figure 1**):

- Isolated pulmonary tuberculosis (79.50%),
- Pulmonary and extrapulmonary tuberculosis (11.70%)
- Isolated extrapulmonary tuberculosis (8.80%)

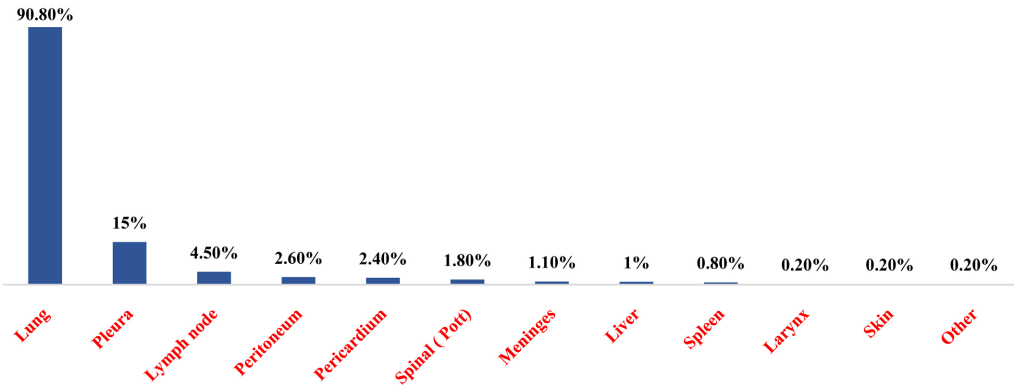

Figure 1. Distribution of tuberculosis patients by disease location.

3.1. Socio-Demographic Data

A male predominance (68.64%) was noted with a sex ratio of 2.18. The median age was 38 years with extremes of 15 years and 86 years. The 4/5 of patients were between 18 and 59 years old (Figure 2).

The "unemployed" class was the most represented, consisting of housewives, the unemployed, pupils and students (28.9%), followed by workers in the informal sector (24.92%) and those in the tertiary sector (transport) (20.80%). It was noted about as many singles (45.44%) as married (44.99%). Patients resided in the suburbs of Dakar in 54.44% of cases.

3.2. History of Tuberculosis

One hundred and six patients (11.20%) had already had pulmonary tuberculosis, of which 87 were treated and declared cured, 17 had voluntarily stopped treatment and 1 had failed treatment.

A notion of tuberculosis contact was found in 140 patients (16.18%), family source in 92 patients (9.71%), friendly/professional entourage in 46 patients (4.85%).

3.3. Comorbidities

Comorbidities were found in 241 patients (25.44%) and of these, 35 patients had at least two. The most common was undernutrition (93.13%), followed by diabetes (35.97%), high blood pressure (14.38%), asthma (10.79%) and HIV (7.86%) (Figure 3).

3.4. Addictive Practices

Active smoking affected 36.75% (n = 337) of patients of whom 97.03% were unweaned. Passive smoking was found in 2.97% of patients. Among smokers, 86.40% used cigarettes, 5.3% used traditional tobacco and 8% used both traditional tobacco and cigarettes.

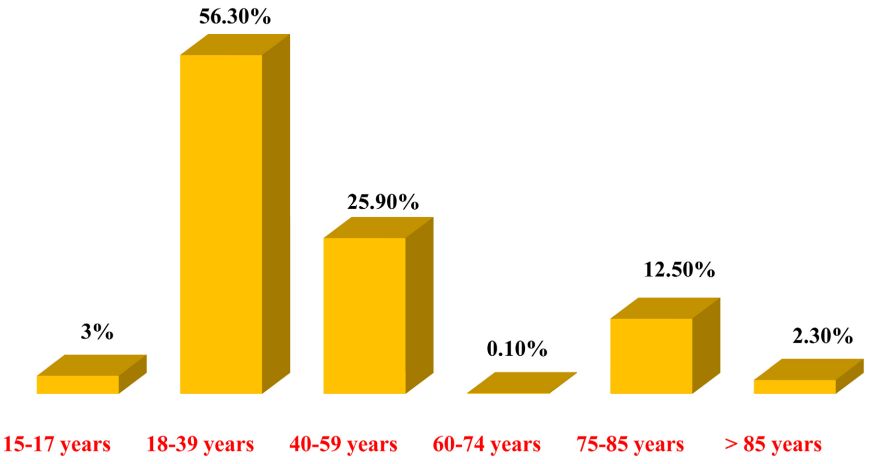

Figure 2. Distribution of Tuberculosis patients by age.

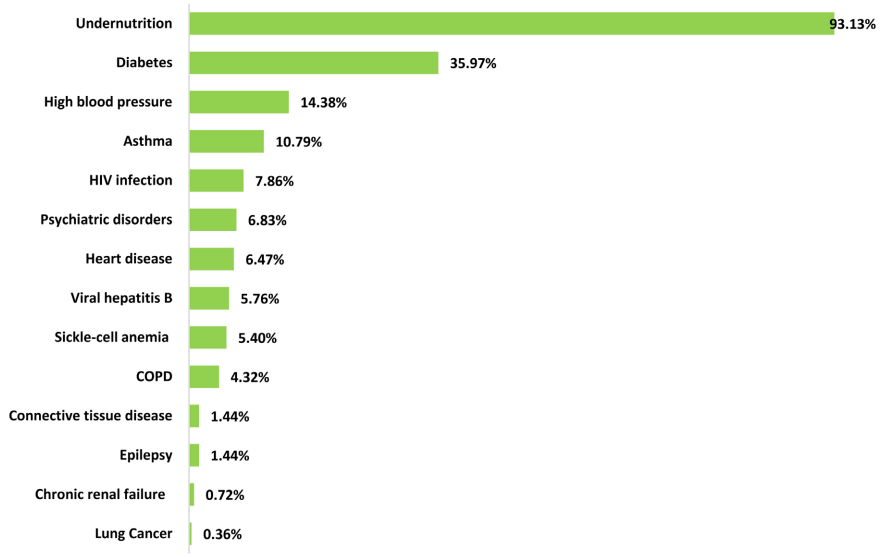

Figure 3. Distribution of tuberculosis patients according to the comorbidities found.

Tobacco consumption, quantified in 231 patients, was ≤10PA in 64.5% of cases, >10 PA in 35.5% of cases.

A notion of alcohol consumption was noted in 90 patients (9.85%) of which 64 (72.73%) occasionally, 11 (12.5%) a significant amount and 2 (2.27%) were chronic ethyls.

Drug use was reported in 61 patients (6.44%), including 56 (or 91.80%) marijuana, 4 (or 6.57%) hashish and one (1) cocaine.

3.5. Risk Factors for Tuberculosis

Risk factors Individualized were:

- Tuberculosis contact (16.18%),
- Comorbidities such as undernutrition (93.13%), diabetes (35.97%), HIV infection (7.86%), chronic renal failure (0.72%),
- Addictive practices: active smoking (36.75%), passive smoking (2.97%), drug use (6.44%)

3.6. Clinical Data

The time between hospitalization and onset of symptoms was greater than 2 months in 60.48% of cases (**Figure 4**).

The general and functional signs are listed in descending order in **Table 1**.

3.7. Paraclinical Data

3.7.1. Blood Test

The blood count performed in 829 patients (87.54%) mainly found:

- Anemia (73.70%) with an average hemoglobin level of 10.51 g/dl.
- Hyperleukocytosis (41.13%) within 89% of cases a predominance of neutrophils

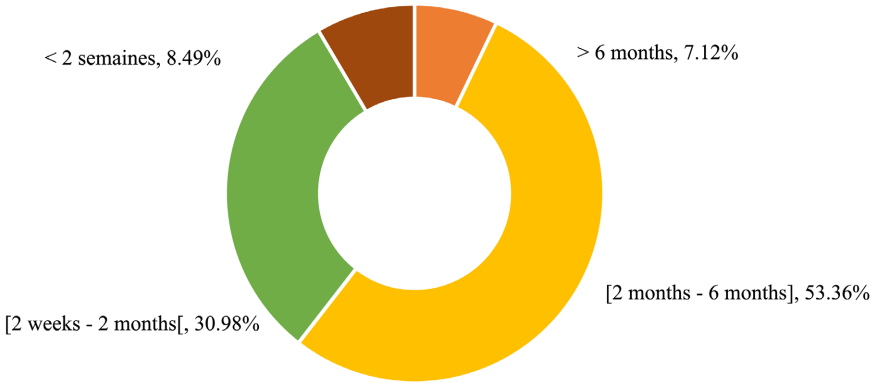

Figure 4. Distribution of tuberculosis patients by time from onset of symptoms to hospitalization.

Table 1. Distribution of tuberculosis patients by general and functional signs.

General signs	Alteration of the general condition (asthenia, anorexia, weight loss)	91.80%
	Fever	87.10%
	Sweats	49.70%
	Chills	46.90%
Functional signs	Cough	96.20%
	Expectoration	85.30%
	Dyspnea Sadoul	70.20%
	- Stade 5	4.11%
	- Stade 4	17.40%
	- Stade 3	40.88%
	- Stade 2	33.5%
	- Stade 1	4.11%
	Chest pain	66.60%
	Hemoptysis	25.80%
	Great abundance	8.20%
	Medium abundance	81.55%
	Low abundance	10.25%

- Neutropenia (1.45%), thrombocytosis (32.57%), thrombocytopenia (4.82%),
- Bicytopenia (5.18%) and pancytopenia (1.08%).

The CRP performed in 766 patients (80.89%) was >6 mg/l in 97% of cases with an average value of 120.53 mg/l.

The liver test performed in 53.75% of patients (n = 509) found:

- High ASAT (46.37%) with a maximum value of 3346.50 IU/l
- High ALAT (23.97%) with a maximum value of 787.50 IU/l.

The renal assessment was carried out in 394 patients (41.61%) and showed:

- High azotemia in 47 patients (11.93%) with a maximum value of 17 g/l.

- High serum creatinine in 75 patients (19.03%) with a maximum value of 165.41 mg/l.

The protein was measured in 160 patients and found hypo-albuminemia in 149 patients (93.125%) with an average value of 26.39 g/l and a minimum of 7.60 g/l.

Retroviral serology results were available for 458 patients (48.36%). It was positive in 36 patients (7.86%) with 88.90% HIV1, 8.30% HIV2 and 2.80% HIV1 + HIV2.

3.7.2. Tuberculosis Balance

Bacilloscopy or BAAR sputum, performed in 838 patients (88.49%) was positive in 84.96% of cases. GeneXpert MTB/RIF performed in 182 patients (19.22%) was positive in 109 patients (59.89%) with rifampicin sensitivity.

3.7.3. Radiographic Data

Pulmonary involvement was noted in 86.38% of cases, with a predominance of extensive (80.16%), bilateral (68.89%), apical (52.05%), cavitary (46%) lesions (Table 2).

3.8. Evolution—Complications

3.8.1. Complications

Of the 947 patients in our study, 89.10% had local and/or general short-medium-term complications which were presents before or who appeared during hospitalization (Table 3). It was essentially bacterial/viral bronchopulmonary co-infection (31.15%).

Germs were identified in 64 patients:

- Candida *albicans* (n = 23),
- Pseudomonas *aeruginosa* (n = 7), Klebsiella *pneumoniae* (n = 7),
- Staphylococcus a*ureus* (n = 6),
- Enterobacter *spp* (n = 5),

Table 2. Distribution of tuberculosis patients by radiographic signs.

Bronchopulmonary lesions (90.80%)	Cavities	46%
	Alveolo-interstitial opacities	35.96%
	Alveolar condensation	24.53%
	Interstitial infiltrate	17.37%
	Pulmonary fibrosis	1.16%
	Miliary	8.56%
	Bronchiectasis	0.31%
Pleural lesions (15%)	Pleurisy	12.20%
	Hydropneumothorax	5.51%
	Pneumothorax	1.76%

Table 3. Distribution of tuberculosis patients by radiographic signs.

Local complications	-	Bacterial bronchopulmonary superinfection	31.15%
	-	Deep vein thrombosis	5.38%
	-	Pyopneumothorax	3.90%
	-	Hydropneumothorax	2.95%
	-	Pulmonary embolism	2.74%
	-	Pneumothorax	2.63%
	-	Pulmonary hypertension	2.11%
	-	Chronic respiratory failure	1.8%
	-	Chronic pulmonary heart	1.16%
	-	Aspergillome	0.31%
	-	Rasmussen anevrysm	0.21%
General complications	-	Severe renal failure	6.33%
	-	Digestive intolerance to anti-tuberculosis drugs	8.13%
	-	Cardiovascular collapse/Shock	2.74%
	-	Hydro-electrolyte disorders	1.58%
	-	Macrophagic activation syndrome SAM	1.27%

- Staphylococcus s*aprophyticus* (n = 3), Escherichia *coli* (n = 3),
- Streptococcus p*neumoniae* (n = 2), Acinetobacter *spp* (n = 2), Citrobacter *spp* (n = 2),
- Staphylococcus *spp* (n = 1), Haemophilus i*nfluenzae* (n = 1), Flavobacterium *spp* (n = 1), Serratia *spp* (n = 1), Morganella *morganii* (n = 1), group C beta streptococcus (n = 1) and group D streptococcus (n = 1).

3.8.2. Outcome of Hospitalization

The evolution was favorable in 838 patients (88.49%).

It resulted in death in 104 patients (10.98%) and multidrug-resistant tuberculosis after two months of treatment in 1 patient. Four patients were discharged against medical advice.

4. Discussion

4.1. Socio-Demographic Data

In our study, there was a male predominance with a sex ratio of 2.18. In several sub-regional and international epidemiological studies, this gender-related disparity in the prevalence of tuberculosis is observed. It is classically described in the literature [3] [4]. To corroborate all these data, the WHO 2020 TB Report showed that globally, out of 10 million people who contracted TB in 2019, men (aged ≥ 15) accounted for 56% of people who contracted TB; women accounted for 32% [5]. Several possible answers exist to explain the difference in tuberculo-

sis between men and women. It could be explained by genetics related to the X chromosome [6] [7] or greater exposure of men to risk factors [8].

It is also noted that 4/5 of the patients were between 18 and 39 years old. These are patients of working age. The working-age population is that composed of individuals who have reached a legal age (15 years or more in Senegal) to carry out any economic activity or to engage in the active search for employment and it is the most exposed to the risk factors for developing TB [3]. These data are also consistent with the epidemiological profile of tuberculosis in endemic areas. It mainly affects young subjects who represent most of the general population.

Socio-economic insecurity is a widely documented risk factor for tuberculosis. It is responsible for promiscuity, difficult access to health care and low levels of education, which are determinants of the occurrence of tuberculosis. A large proportion of our patients were unemployed (28.9%). And they resided in the suburbs of Dakar in 54.44% of cases. Most of the poor and vulnerable population in Senegal (46.7% of Senegal's population) lives in neighborhoods characterized by precarious housing and difficult access to basic social care and services (water, sanitation, education, etc.). Data from the national program show that TUBERCULOSIS cases are more concentrated in peri-urban areas of large cities [9] [10].

4.2. History of Tuberculosis

People who have already had a tuberculosis infection are expected to develop immunity that partially protects them from the consequences of subsequent reinfection. However, these people are at risk of developing tuberculosis by endogenous reactivation of their old infection [11]. In our study 11.20% of patients had already had pulmonary tuberculosis, including 87 treated and declared cured, reinfection or endogenous reactivation? This rate is not negligible and requires additional studies to determine the causes, one of which may be the presence in these subjects with a relapse of favoring factors.

4.3. Risk Factors for Tuberculosis

The main individualized risk factors were undernutrition (93.13%), diabetes (35.97%) and active smoking (36.75%). Their relationship with tuberculosis is now well established and considered in the various tuberculosis control programs, at least about diabetes and smoking.

Tuberculosis causes malnutrition and malnutrition weakens immunity, which consequently increases the likelihood that latent tuberculosis will develop into an active disease. It is very difficult to determine precisely what the nutritional status of people with active TB was before the onset of the disease, making it impossible to determine whether malnutrition contributed to the progression of the disease or whether active TB caused malnutrition [12] [13].

There is evidence that diabetes increases the risk of TB by a factor of two or three; and the health burden of diabetes, which is increasing internationally,

with a rapid spread of the epidemic especially in low- and middle-income countries, threatens TB control efforts. This progress could even hamper progress towards achieving the Sustainable Development Goals to curb TB endemic disease by 2030 The presentation of TB can be atypical with more common and severe signs and symptoms in diabetic patients. Diabetes also has a negative impact on TB treatment outcomes as it delays microbiological response and is associated with increased rates of mortality, treatment failures and relapses after treatment. Inadequate or poor long-term glycemic control appears to increase the risk of TB and poor response to TB treatment. Similarly, tuberculosis can lead to hyperglycemia and true diabetes in susceptible people, diabetes that can be difficult to control. In 2011, a framework for collaboration was established between the World Health Organization (WHO) and the International Union Against Tuberculosis and Respiratory Diseases (The Union) for the management and control of diabetes and tuberculosis. This framework defines the common measures to be taken against these two diseases. Since 2019, practical recommendations have been available for front-line healthcare professionals responsible for the diagnosis, management, and care of patients with these two diseases [14].

Tobacco use and tuberculosis are two major public health issues at the global level, particularly in emerging countries. Tobacco is not only one of the major causes of morbidity and mortality, but also one of the independent risk factors for tuberculosis infection and progression to both pulmonary and extrapulmonary TB-disease, a severe disease with high mortality. Even passive exposure can increase the risk of infection and disease in adults and children exposed to TB. A delay in the diagnosis of TB is usual in smoking patients who consult later, compared to non-smokers, the disease is then at a more advanced stage with a more severe presentation associating cough, dyspnea, lower body mass index and bilateral localization with excavations in radiology. Smokers with TB adhere less to TB treatment. The risk of extensive fibrous sequelae associated with respiratory deficit is increased. The World Health Organization (WHO) has recommended coordination between national TB and tobacco control programs to control the TB epidemic [15] [16].

As for TB/HIV co-infection, they form a deadly combination, with each disease stimulating the progression of the other in infected patients. Tuberculosis is the leading cause of death for people living with HIV, where it is responsible for 30% of deaths. HIV-positive people are up to 30 times more likely to develop active TB than HIV-negative people. For this reason, HIV and TB services are most often integrated, especially in countries with a high TB burden. Anyone who is HIV-positive should be tested for and followed up for TB, and anyone diagnosed with TB should also be tested for HIV. The HIV positivity rate was 7.86% in our study, a low rate compared to other sub-regional studies [17].

The AIDS epidemic in Senegal is concentrated with a low prevalence in the general population. Prevalence is higher among women than men and very high in some localities (southern regions of Senegal) and key populations (men who

have sex with men (MSM), sex workers (TS), injection drug users (CDI) and prisoners) [10].

4.4. Complications

Complications were noted in 89.10% of patients. It was essentially bacterial/viral bronchopulmonary superinfection (31.15%). In tuberculosis patients with impaired respiratory function, due to respiratory disease of chronic course or other factor (tobacco) and/or general immunosuppression (undernutrition, diabetes, HIV), infectious agents responsible for nosocomial and/or community infections can be added to the clinical picture thus aggravating the symptomatology and compromising the patient's recovery. They are a source of significant morbidity and mortality in health facilities [18] [19]. Cytobacteriological examination of body fluids should be performed in patients who have had hospital stays of at least 48 hours, and in whom pulmonary signs and/or fever persist despite good adherence to treatment.

The germs isolated from our patients suggest that the infection was mostly nosocomial. Pseudomonas *aeruginosa* and Acinetobacter *baumanii* are often involved in severe nosocomial infections. Some pathogenic bacteria, such as enterococci or Staphylococci aureus, can also be multi-resistant to the most potent or proven antibiotics. Staphylococcus, for example, maintains a high level of resistance (40% resistance to meticillin, 20% to 30% to gentamicin, 45% to quinolones). This has motivated very large efforts in recent years, based on better control of cross-transmission (using hydro-alcoholic solutes for hand disinfection) and better use of antibiotics [19]. The role of Candida remains highly controversial due to an obvious lack of accurate and validated diagnostic criteria. It is now known that viruses can be responsible for PR, especially in the context of epidemic nosocomial infections. But their place is not clearly defined, because they are not always sought in the first line.

The recorded death rate was 10.98%. Mortality from nosocomial infections is highest for pneumonitis, ranging from 7% for all patients to 30% for patients hospitalized in intensive care. Nosocomial infection usually occurs in vulnerable patients, often elderly, who are carriers of one or more other pathologies potentially causes of death in the short term (cardiovascular disease, cancer, immunosuppression…). This makes it difficult to determine the exact role that nosocomial infection plays in the fatal outcome of the patient, as infection is sometimes only one of many medical complications contributing to death [19].

4.5. Constraints and Limitations

In the preparation of our study, we encountered some constraints and limitations related to its retrospective nature and the fact that patient records are not computerized. Several data were not reported in the files, explained by the poor keeping of the files. In addition, most patients did not have all the paraclinical assessments of exploration and impact, because of the financial difficulties they encounter to carry them out.

5. Conclusions

The integration of a comprehensive food and nutrition component into TB treatment and support programs is essential to improve the health of people affected by this condition. There are nutritional support programs integrated into care, but they focus mainly on HIV. Undernutrition appears to play a much more important role than HIV in the extent of TB in poor countries.

Indeed, tuberculosis is particularly prevalent in regions particularly affected by poverty and food insecurity, affecting populations that already have difficulty accessing healthy food. It often aggravates pre-existing food insecurity and malnutrition, creating a vicious circle: the cost of medical care and loss of income (due to prolonged illness or stigma), deterioration of the immune state, appearance of complications and comorbidities…

One of the most common complications is bacterial/viral superinfection of community/nosocomial origin, the actual incidence of which is poorly known and deserves special attention given the importance of added morbidity-mortality.

Conflicts of Interest

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

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Pre-Established Individual Record

1) IDENTIFICATION OF THE PATIENT

First names - last name: .....

Age: ..... years

Sex: M □ **F** □

Marital status: Married □ Divorced □ Single □ Widowed □

Number of children: .....

Permanent address/ Dakar-city □ Dakar-suburbs □ □ Regions

Specify region or city: .....

Mobile phone: .....

Level of education: Uneducated□ Primary□ Secondary□ University□

2) SOCIO-ECONOMIC CONDITIONS

Profession/Profession: .....

Sector of activity: Formal☐ Informal/Sector .....

Current exercise of an income-generating activity: YES/NO ☐

Unemployed/Retired/Housewife/Student/School Boy/girl☐

3) ANTECEDENTS AND COMORBIDITY

Previous tuberculosis: yes □ no □

Number of times.....

Since: ..... years

TB treatment well conducted: Yes □ No □

Anti TB treatment duration: .....months

Tuberculosis contact Yes □ No □ If yes who?.....

High blood pression: yes □ no □

diabetes: yes □ no □

asthma: Yes □ no □

COPD: Yes □ no □

heart disease: Yes □ no □

Systemic disease: Yes □ no

HIV: Yes □ no □

Non-smoker (never or occasionally) □

Current smoker (≥1 cig/day for ≥1 year) □

Ex-smoker (≥1 cig/day for ≥1 year but weaned for ≥6 months) □

Quantity consumed: ..... cig/j Number of packages/year: .....PA

Type of tobacco consumed (cigarette, traditional tobacco...): .....

Cannabis: yes □ no □

Heroin: yes □ no □

Other drugs.....

Passive smoking: yes □ no □ Home, home □ Office, Workplace □ Friend(s) □

Alcohol: yes □ no □

Frequency and quantity .....

Other:.....

4) CLINICAL EXAMINATION

a) Clinic

i) Functional and General Signs

Duration of symptoms evolution: .....

Respiratory symptoms:

Cough: yes □ no □ Sputum: yes □ no □ Chest pain: yes □ no □

Hemoptysis: yes □ no □ Dyspnea: yes □ no □ Stage: ..... Sadoul

Asthenia: yes □ no □ Anorexia: yes □ no □ Weight loss: yes □ no □

Fever: yes □ no □ Chill: yes □ no □ Sweats: yes □ no □

ii) Clinical Examination

✧ **Parameters**

Weight ..... **kg - Size** ..... cm **- BMI** ..... kg/m^2 **- SaO_2**..... **%**

Performans status..... **Pulse** ..... bpm **– Blood pression**...../..... mmHg

✧ **Examination of the respiratory system**

Pleuropulmonary examination Normal **yes □ no □**

Pulmonary condensation syndrome yes □ no □

Fluid pleural effusion syndrome yes □ no □

Gaseous pleural effusion syndrome yes □ no □

Mixed pleural effusion syndrome yes □ no □

Bronchial syndrome yes □ no □

Isolated crackling rails yes □ no □

Signs of struggle yes □ no □

Digital hippocratism yes □ no □

✧ **Other systems**

- **Cardiovascular:**

Signs of Pulmonary Hypertension yes □ no □

Right Heart Failure Syndrome yes □ no □

Other specify.....

b) Additional Examinations

✧ **Chest X-ray yes □ no □ ... Chest scan yes □ no □** ...

Lesions:

Parenchymals only □ Extra-parenchymals only □

Parenchymal and extra-parenchymal □ extra-thoracic seat .....

Unilateral □ bilateral □ Localized □ Diffuses □

Predominantly apical □ Predominantly basal □

Predominantly peripheral (subpleural) □ Predominantly proximal □

Type of lesion:

Alveolar opacities yes □ no □

Cavity (with or without hydro-aeric level) yes □ no □

Bronchiectasis yes □ no □ Alveolo-interstitial opacities yes □ no □

Miliary yes □ no □

Infiltrates yes □ no □ Obvious yes □ no □ Pachypleuritis yes □ no

Pulmonary fibrosis yes □ no □ Pneumothorax yes □ no □

Pleurisy yes □ no □ Hydropneumothorax yes □ no □

Mediastinal lymph nodes yes □ no □

Other:.....

✧ **Biology**

Wight cells.....		
Predominance.....	**Crp**.....	**TGD**.....
Hb.....	**Glycemia**.....	**Chol T**.....
VGM.....	**HbA_1C**.....	**Hdl**.....
CCMH.....	**ASAT**.....	**LDL**.....
PLQ.....	**ALAT**.....	**Urea**.....
GsRh:	**Protidemia**.....	**Creatinine**.....
INR.....	**Albuminemia**.....	**Blood ionogram**.....
Tp.....		**Uricemia**.....
	Bacilloscopy.....	
Other:	**GeneXpert**.....	**HIV**.....
	ECBE.....	

5) COMPLICATIONS

✧ LOCAL

Bacterial bronchopulmonary co-infection yes □ **no** □ **Germs**:……

Viral bronchopulmonary superinfection yes □ **no** □

SARS yes □ **no** □

Deep vein thrombosis yes □ **no** □ **Pulmonary embolism yes** □ **no** □

Pulmonary hypertension yes □ no □ **Chronic respiratory failure** yes □ no □

Chronic pulmonary heart yes □ no □

Aspergillome yes □ no □ **Massive/repetitive hemoptysis** yes □ no □

Asphyxiation/flooding of the bronchi yes □ no □

Rasmussen aneurysm yes □ no □

Pyopneumothorax yes □ no □ **Hydropneumothorax** yes □ no □

Pneumothorax yes □ no □ **Bronchopleural fistula** yes □ no □

Pachypleuritis yes □ no □

Other .....

✧ GENERAL

Intolerance to anti-tuberculosis drugs yes □ no □ **Specify**.....

Cardiovascular collapse/septic shock yes □ no □

Cardiovascular collapse/hemorrhagic shock yes □ no □

Hydroelectrolytic disorders yes □ no □ **Specify**.....

Macrophagic activation syndrome yes □ no □

Diabetic imbalance yes □ no □

Other .....

6) OUTCOME OF HOSPITALIZATION

Death yes □ no □ **Exeat** yes □ no □

Discharge against medical advice yes □ no □ **Escaped** yes □ no □