Epidemiological Profile Of Tuberculosis Patients Followed At The Tibati Tuberculosis Screening And Treatment Center: 2006-2015

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Abstract

Background: Tuberculosis is a public health problem worldwide and unique in developing countries. The objective of this study was to determine the epidemiological profile of tuberculosis patients followed at the tuberculosis screening and treatment center in Tibati during the decade 2006-2015.

Methods: This was a retrospective descriptive study of patient data followed during our study period at the Tibati Tuberculosis Screening and Treatment Center. The variables studied were: sociodemographic data; the location and form of tuberculosis; the type of case, HIV status; and evolution under treatment. The data were collected using a questionnaire and then analyzed using Epi Infos 7.2 and Excel 2013 software. The Chi-square test or equivalent test was used to compare the qualitative variables.

Results: During the study period from 2006 to 2015, 2,075 cases of all forms of tuberculosis over the age of 15 were included in our study. Among these tuberculosis cases, 1045 (50.36%) were women and 1030 (49.64%) were men, giving a sex ratio (M / F) of 0.98. The average age (standard deviation) of the patients followed in this CDT was 36.43 ± (14.30). The most affected age group was 25 to 34 years old (38%). The prevalence of HIV coinfection was 44.08%. The outcomes of treatment during our study period were as follow: therapeutic success (cured and treatment completed) (81.73%); lost to follow-up (6.84%); death (9.35%); transferred (1.94%); failure (0.14%).

Conclusion: the study of this cohort in the city of Tibati permits us to present the conclusion that the data for the management of tuberculosis in this area approximates the indicators set up by the WHO and the National Tuberculosis Control Programs

Keywords: Tuberculosis;Profile;Epidemiological;Tibati

I- Introduction

Tuberculosis (TB) is pathology whose impact indicators are increasing despite the implementation of effective therapeutic measures [1]. It still remains one of the leading cause of death due to a single infectious agent in humans [2]. Globally, it still remains a public health problem with 10.4 million new cases of tuberculosis recorded worldwide. Among these new cases of tuberculosis, 11% are infected with the human immunodeficiency virus (HIV) [2]. In 2015, the World Health Organization (WHO) estimated number of deaths from tuberculosis of all forms at 1.4 million [3]. Most of the new cases are recorded in developing countries but also in Northern Europe. Tuberculosis infection still remains a public health problem in Cameroon according to the indicators presented by the WHO national office. The latter estimates that in 2012 the mortality rate from tuberculosis in Cameroon, excluding HIV, was 29 (12-54) / 100,000, the prevalence rate including all forms, was 319 (153-344) / 100,000; 82% of patients had an HIV test result and 38% were infected with the virus [4]. However, given the great uncertainty of these estimates, the National Tuberculosis Control Program (PNLT) uses the notification figures and their trends to estimate the burden of tuberculosis in Cameroon and for planning [5]. In the Adamawa region, a study report presented by the National Tuberculosis Control Program revealed in 2012 the following treatment results: 4% transferred, 4% lost to follow-up, 7% of deaths, 1 % failure, 3% complete treatment and 80% cured [5].

In the locality of Tibati, a town located in the rural area of the Adamawa region, the epidemiological situation of this disease remains poorly understood. However, the sociological and health characteristics of this city make it an area of high tuberculosis endemic and zoonotic potential where there is a strong agro-pastoral activity [5, 6]. To date, no studies have been conducted to assess the indicators of TB infection in Tibati. The objective of this ten-year study is to determine the epidemiological profile of tuberculosis

and to determine the therapeutic outcomes at the Tibati Tuberculosis Screening and Treatment Center.

II- METHODOLOGY

A. Site and type of study

The Tibati Tuberculosis screening and treatment center covers all health facilities of the Tibati division. This area is par excellence a cattle breeding area, hence the existence of zoonotic pathologies such as tuberculosis. Our work consisted in carrying out a retrospective observational study; the data were collected from the treatment registers of patients admitted at the Tibati Tuberculosis Screening and Treatment Center from January 1, 2006 to December 31, 2015. The treatment of tuberculosis patients in this center as well as in any health facility in Cameroon in accordance with WHO guidelines [6]

B. Population and inclusion criteria

The study population consisted of all patients over the age of 15 followed for tuberculosis or suspected tuberculosis in this CDT during the study period. We analyzed data from the therapeutic follow-up register for tuberculosis patients. All tuberculosis patients, all forms (pulmonary and extrapulmonary tuberculosis), notified in the center during the study period and whose variables studied were complete in the registers were included in this study.

C. Variables studied

For each patient, we collected the following variables:

- ➢ Sociodemographic data (age, sex,);
- ➢ The location and form of tuberculosis;
- ➢ The type of case (new, reprocessing, relapse
- ➢ and transferred);
- ➢ HIV-AIDS status;
- ➢ The therapeutic outcome;

Patients were classified according to the following operational definitions [7]:

- *According to the entry diagnosis*

New cases: any patient who has never received anti-tuberculosis treatment or who has been undergoing such treatment for less than a month.

Relapse: Any patient, who has already received anti-tuberculosis treatment, was, at the end of his last treatment, classified in the healing or treatment ended category, and is today diagnosed as having a recurrent episode of tuberculosis.

Retreatment: Any tuberculosis patient who has resumed treatment after a therapeutic interruption of two consecutive months or more.

Transferred: patient transferred to another treatment center and the evolution of which is unknown

- *Depending on the therapeutic outcome*

Therapeutic failure: any tuberculosis patient who continues to present positive results (according to the smear examination or the culture) after five months of treatment or more.

Healed and treatment completed: any tuberculosis patient who has completed treatment without signs of failure, but there is no data indicating that the results of the smear examination or culture were negative during the last months of treatment and at least once before, either because the tests have not been carried out or because the results are not available or the patient has completed his treatment and has presented 2 negative smears, one in the course of treatment and one in the course of the last month of treatment.

Death: any tuberculosis patient who dies for any reason during treatment or before starting it

Lost of sight or abandonment: any tuberculosis patient who has not started treatment or which has been interrupted for two consecutive months or more.

Transfer: patient transferred to another treatment center and we no longer know his evolution.

D. Management, data analysis and ethics

Data were entered and analyzed using Epi Infos 7.2 software (*EpiData Association, Odense, Denmark; http://www.epidata.dk)* and Excel 2013 (*Windows Excel®; MicroSoft, Redmond, WA, USA*) United). Qualitative data were compared using the Chi-square test or equivalent. A value of $p \leq 0.05$ was chosen as the significance threshold. We used retrospective anonymized notification data; as such the study did not require an ethical clearance. But we obtained an authorization from the administration of the health facility housing this center

III- Results

During the study period, the Tibati CDT recorded and followed 2,075 cases of tuberculosis of all forms. Sociodemographic characteristics among these tuberculosis cases, 1045 (50.36%) were women and 1030 (49.64%) men, with a sex ratio (M / F) of 0.98. The average age (standard deviation) of our patients followed in this CDT was 36.43 ± (14.30). This average was 33.63 ± (12.80) for women against 39.27 ± (15.09) for men (p <0.05). The most affected age group was 25 to 34 years old with a proportion of 38% (Figure 1). Clinical characteristics of patients and outcome of treatment regarding the entry diagnosis of our patients, we had 2,036 (98.12%) new cases, 16 (0.77%) relapsed cases, 8 (0.39%) retreatment, 15 (0.72%) transferred. Since 2006, the year of introduction of the HIV test for all tuberculosis patients, out of these 2,075 participants, 1,537 (73.71%) have had access to HIV testing. Among the TB patients tested for HIV, 44.08% were infected with the Human Immunodeficiency Virus (HIV). This coinfection rate was 48.04% for women and 39.89% for men. According to the forms of

tuberculosis, 36.10% of patients had extrapulmonary tuberculosis (TPE), 31.96% of microscopically negative pulmonary tuberculosis; (TPM -) and finally 31.94% of microscopically positive pulmonary tuberculosis; (TPM +) (table 1). During the study period, the analysis of the results of tuberculosis treatment in patients followed at the Tibati CDT reveals that 81.73% of patients completed their treatment and were declared cured, 6.84% have abandoned treatment or are lost to follow-up, 1.94% was transferred to reference structure; 0.14% failure was recorded and finally 9.35% died. (Figure. 2). The mortality rate was high among tuberculosis patients with a positive microscopy (16.29%) and in patients co-infected with HIV (11.06%) (Table 2 and 3)

IV- Discussion

Tuberculosis (TB) is pathology whose impact indicators are increasing despite the implementation of the effective therapeutic measures. We showed in the course of this study that women (50.36%) were most affected by tuberculosis at the TB screening and treatment center in Tibati (a sex ratio of 0.98 in favor of women) then the men. Our results are comparable to those of Gaspard Tékpa et al. (2019) [8] and Claire Francoise et al. (2018) [9] who found the rates of 58.18% and 52.6% of women respectively. On the other hand these data are not confirmed by those of Rakotson et al.; Michel Noubom et al.; Rakotonirina et al.; and Rakotondramarina et al. who reported that men are the most affected by this pathology [10, 11, 12, 13]. These results could be explained by the fact that in the Cameroonian population, the burden linked to HIV affects women more than men. What our study confirms: HIV coinfection was 48% in women compared to 39.89% in men. This constitutes in the sub-Saharan countries one of the determining factors favorable to the development of tuberculosis [14]. In addition to this, the strong involvement of women in agro-pastoral activities such as cattle breeding in the area constitutes a source of transmission of zoonotic pathologies such as tuberculosis [6].

The average age (standard deviation) observed in our series is 36.43 ± (14.30) with a high proportion in 25 to 35 age group. This age group was also more represented in the Michel Noubom et al.; Rakotondramarina et al. and Claire Francoise et al. [9, 10,13]. This could be justified by the fact that the Cameroonian population is essentially made of the youths who are more likely to be infected with HIV (multiple sex partners, unprotected sex) which is a breeding ground for the development of opportunistic diseases like tuberculosis. In addition to this, this age group constitutes the most active segment of the population [15].

Among the complications of tuberculosis is the relapse or the reoccurrence, which is of great concern for the tuberculosis patient's treatment structures. It occurs even after a well-conducted comprehensive treatment. In our study we recorded 0.77% of relapse cases. Our result was significantly lower than those found by Michel Noubom et al. (2013) to Baleng [10] and Gaspard Tékpa et al. (2019) in Bangui [8]. These relapses in our study could be due to the reactivation of the latent infection favored by the weaken system

The high HIV screening rate (73.71%) observed in our study is due to the introduction of the systematic HIV screening testing in all tuberculosis patients followed in tuberculosis screening and treatment centers (CDT). Our result is closer to that of Michel Noubom et al. who found a screening rate of 79.16% [10]. In addition to this, our results are closer to the objectives of the National Tuberculosis Control Program, which targets a rate of 95% of tuberculosis patients [5]. Coinfection was 44% with a higher rate among women (48.04%) and among men (39.89%). This coinfection is more accentuated in cases of pulmonary tuberculosis (56.35%). Our coinfection rate is comparable to that confirmed by the National Tuberculosis Control Program, which presented during a study report a rate of 38% in 2013 in all cases of tuberculosis listed in the various CDTs [5]. Furthermore, these results are lower than those found by Claire Francoise et al. (2018) at the Jamot Hospital in Yaoundé [9] and Gaspard Tékpa et al. in Bangui [8] who found a rate of 62% and 86.15% respectively. However, our results are nevertheless greater than those found by Michel Noubom et al. (2013) (26%) [10]. Indeed, the risk of developing tuberculosis during his lifetime is 50% in subjects co-infected with HIV. On the other hand, HIV infection increases the speed of development of recent tuberculosis but also of latent tuberculosis towards active tuberculosis or disease [16,17, 18]

In this series, the analysis of the profile according to the clinical form of tuberculosis shows us that the proportion of the pulmonary form of tuberculosis (with positive and negative microscopy) was more represented (63.90%) while the extrapulmonary form was less common (36.10%). This high proportion of the pulmonary form can be justified by the improvement of the techniques and methods of detecting the pulmonary forms (radiography and microscopy) in the hospital harboring the CDT and by the affinity of the tuberculosis bacillus to the oxygenated organs such as the lung. This oxygen which is necessary for its multiplication [15]. Our results approximate those found by Ouedraogo et al. (1999) in Ouagadougou [19], Michel Noubom et al. to Baleng [10], Claire Francoise et al. (2018) at the Jamot Hospital in Yaoundé [9]. However, our results are lower than those reported by Christian Kakisingi et al. (2014) in Lubumbashi [20], Gaspard Tékpa et al. to (2019) Bangui [8].

We obtained a therapeutic success of 81.73% in our studies; these results are closer to the objective indicators of the National Tuberculosis Control Program which in its 2015-2019 strategic plans targeted a therapeutic success rate estimated at 85% [5]. Our results corroborate those found in the literature [11]. However, they are higher than those found by Michel Noubom et al. in Baleng (76.6%) [10],

and those of Noel Emmanuel et *al.* (68%) in the city of Douala [20], Boulahbal et *al.* (71%) in the study results of a cohort in Africa [19]. Our therapeutic success rate, which is closer to the national objectives, is explained by the availability of the various inputs necessary for the care of the tuberculosis patient [5]. These results are part of the policy developed by "stop tuberculosis" aimed at improving the fight against tuberculosis.

Regarding the mortality rate, it was estimated at 9.35% in our study. Our results are similar to those of J.L. Rakotoson et *al.* (10.1%) in Madagascar in 2013 [11], by Michel Noubom et *al.* (9.0%) in the CDT of Baleng, [10], of Christian Kakisingi et *al.* (8.75%) in Lubumbashi [21].

On the other hand, our rate is lower than that found by Claire Francoise et *al.*; Eholie et *al.*; and Daucourt et *al.* who respectively found a rate of 13.7%, 11% and 14% [9, 22, 23]. This death rate is accentuated among HIV coinfected patients (11.06% compared to 6.86%). It is lower than that reported by Azon-Kouanou et *al.* who found a death rate of 25% among coinfected patients [24]. These high rates could be explained by the lower level of immunity due to the opportunistic diseases that these co-infected patients develop.

Limits of the study

This work has limitations. Due to the use of data from the archives, the use of secondary data did not allow us to control the quality of the information reported in the treatment registers of tuberculosis patients.

V- Conclusion

In conclusion, the study of this cohort in the city of Tibati allows us to present the conclusion that the data on the management of tuberculosis in this area is closer to the indicators set by the WHO and the National Programs for the fight against tuberculosis. Further studies should be done to determine the circulating strains to question the causes of treatment failures in order to reduce the rate of death observed there.

Conflicts of interest

The authors do not declare any conflict of interest.

What is known about this subject?

•Tuberculosis (TB) is pathology whose impact indicators are increasing despite the implementation of effective therapeutic measures

• It is more common in men than in women.

• In the Adamawa region, a study report presented by the National Tuberculosis Control Program revealed in 2012 the following treatment results: 4% transfer, 4% lost of sight, 7% of deaths, 1% failure, 3% complete treatment and 80% cured

What is new about your study?

• Tuberculosis (TB) is pathology whose impact indicators are increasing despite the implementation of effective therapeutic measures

• The disease predominates in women compared to men (a sex ratio (M / F) of 0.98)

• Extrapulmonary localization is more common than the pulmonary form of the disease.

Author contributions

ADAMOU VELHIMA Elie: Study design, article writing. **IBRAHIMA DJOULDÉ:** Implementation of the study,writing of the article. **SITTY EGUESSA Pierre Claver:** Study design. **NENBA SAMBO Jean Jacques:** Implementation of the study, writing of the article. **TANYI Eric AZEH:** Implementation of the study, writing of the article. **NGONDÉ ESSOMÉ Marie Chantal:** supervision of the study and proofreading of the article. **Aboubakar:** proofreading of the article.

All authors have read and approved the final version of the manuscript.

Abréviations

TB: tuberculosis

CDT: tuberculosis Screening and Treatment Center

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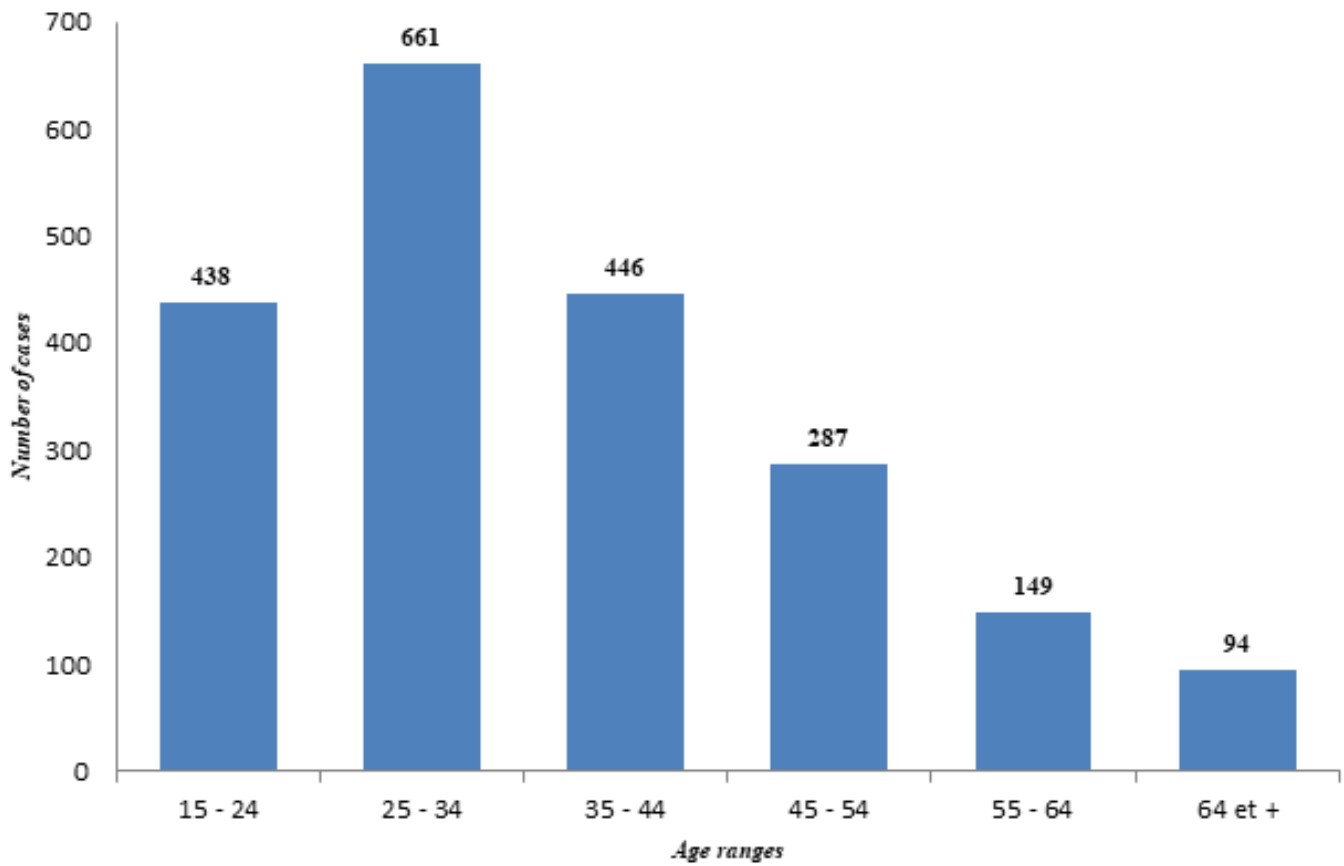
Figure 1: Proportion of different age groups over the 2006 – 2015 period
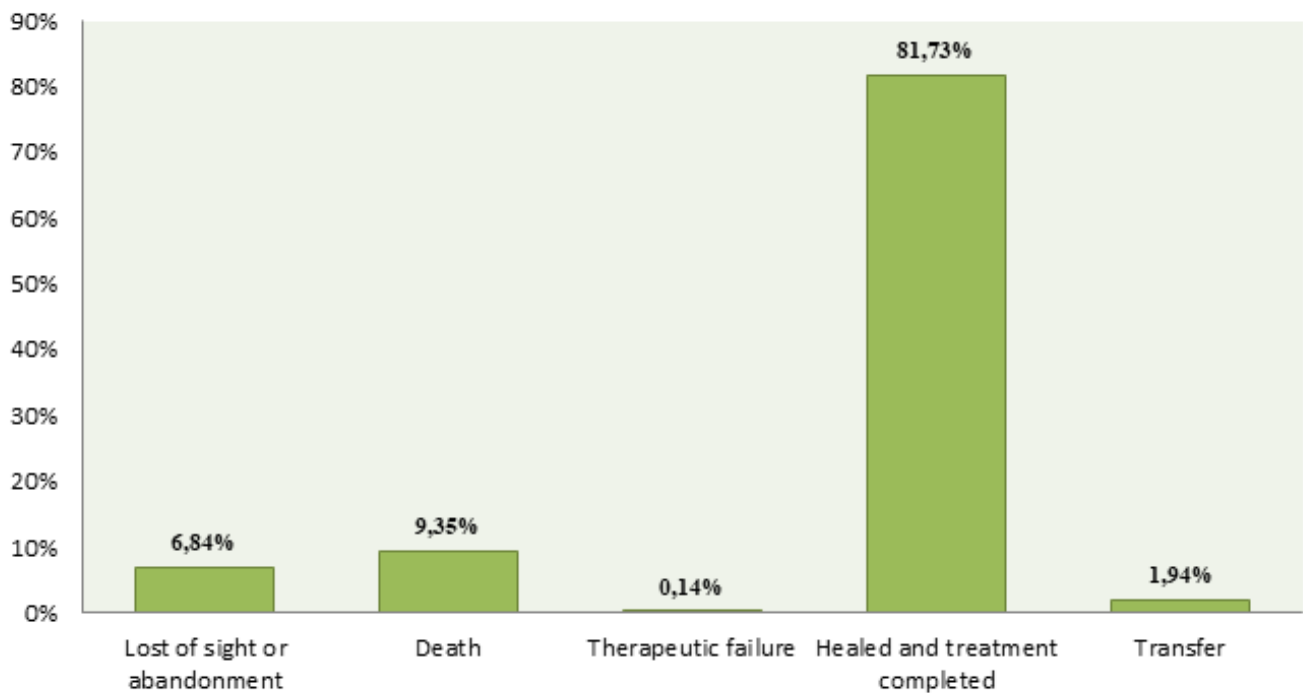
Figure 2: Results of treatment at the Tibati CDT center during the 2006- 2015 period

Table 1: Forms of tuberculosis among TB patients during the studied period 2006-2015

Types of tuberculosis	Percentage
Extrapulmonary tuberculosis	36.08%
Microscopically negative pulmonary tuberculosis	31.94%
Microscopically positive pulmonary tuberculosis	31.98%
Total	100.00%

Table 2: Therapeutic outcome of tuberculosis according to the type of tuberculosis

	Type of tuberculosis		
Therapeutic outcome	**EP (%)**	**M- (%)**	**M+ (%)**
Lost of sight or abandonment	7.62%	7.40%	5.28%
Death	5.88%	6.34%	16.29%
Therapeutic failure	0.00%	0.00%	0.45%
Healed and treatment completed	85.83%	84.89%	74.06%
Transfer	0.67%	1.36%	3.92%
Total	100.00%	100.00%	100.00%

EP: extrapulmonary tuberculosis; **M-**: Microscopically negative pulmonary tuberculosis; **M+**: Microscopically positive pulmonary tuberculosis

Table 3: Therapeutic outcome of tuberculosis according to HIV statuts

	HIV status	
Therapeutic outcome	**Negative (n, %)**	**Positive (n, %)**
Lost of sight or abandonment	31 (3.60%)	51 (7.52%)
Death	59 (6.86%)	75 (11.06%)
Therapeutic failure	0 (0.00%)	2 (0.29%)
Healed and treatment completed	749 (87.09%)	536 (79.06%)
Transfer	21 (2.44%)	14 (2.06%)
Total	860 (100.00%)	678 (100.00%)