



Sociodemographic and economic analysis of patients screened at the Daloa Anti-tuberculosis Center (Côte d'Ivoire)

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Abstract

Faced with the increasingly rapid spread of tuberculosis in a city with strong spatial and demographic growth, the socio-demographic and economic analysis of patients is not given enough emphasis in the search for a solution that could lead to its eradication. It constitutes the whole point of our study, the objective of which is to draw up the socio-demographic and economic profile of people suffering from tuberculosis who were screened at the Anti-Tuberculosis Center (C.A.T) in Daloa. The investigation initiated is based on the administration of a questionnaire to 125 patients over a period of 5 months. The analysis shows that the majority of patients are men of Ivorian nationality, aged between 30 and 50, of Muslim faith, single and illiterate. He carries out a liberal activity and resides in the Orly district for the most part.

Keywords: Daloa, CAT, tuberculosis, sociodemographic-economic profile

Introduction

Tuberculosis is a contagious disease, caused by a bacteria, Koch's bacillus (*Mycobacterium Tuberculosis*), named after the doctor who discovered it in 1924. It is transmitted from one person to another by droplets of saliva which found suspended in the air when a person coughs, sneezes, sings or plays a wind instrument. The World Health Organization (WHO) estimated that in 1997, 7.96 million new cases of tuberculosis, half of which were highly contaminated, occurred worldwide (Nadia Ait-K and D. Enarson, 1999). According to the WHO, the number of deaths worldwide in 1997 was more than 1.9 million. Tuberculosis thus represents the second cause of death in the world due to a single infectious agent (Nadia Ait-K and Donald Enarson, 1999). In 2015, 1.8 million people died from tuberculosis, among the 10.4 million carrying the disease (WHO, 2017). In Côte d'Ivoire, over the last five years, the number of patients has increased, from 21,204 patients in 2006 to 23,210 patients in 2010, including 14,131 cases of smear-positive pulmonary tuberculosis (the contagious form of the disease) according to the National Tuberculosis Control Program (PNLT) in their 2012-2015 ^[10] report. Among the reasons which have led to this growth of the disease, we note the constant impoverishment of populations with its corollary of malnutrition. These factors were aggravated by the massive displacement of populations due to the socio-political crisis that has occurred in the country since September 19, 2002.

According to the PNLT in 2012, the incidence of cases declared in all forms combined for the year 2010 was 106 cases per 100,000 inhabitants. Thus, the efforts undertaken by the Ivorian state were destroyed by the crisis that the country experienced and were reiterated after the crisis in 2011.

Faced with the scale of the problem, the government has set up care structures and trained competent personnel at all levels of the health pyramid. This State commitment is also

reflected in the regular and free availability of essential anti-tuberculosis drugs. According to the PNLT (2012-2015), the support of national and international partners contributed to improving the performance of the National Tuberculosis Control Program. In 2010, there were 140 functional Diagnostic and Treatment Centers (CDTs), including 16 Anti-Tuberculosis Centers (CAT), 1,642 health personnel trained to identify suspected cases and monitor patients undergoing treatment. The conjunction of all these efforts should go towards the eradication of the disease both in urban areas and in rural areas, but it is clear that there is a sharp increase in new cases of tuberculosis in Daloa with around 400 cases in the first half of 2022.

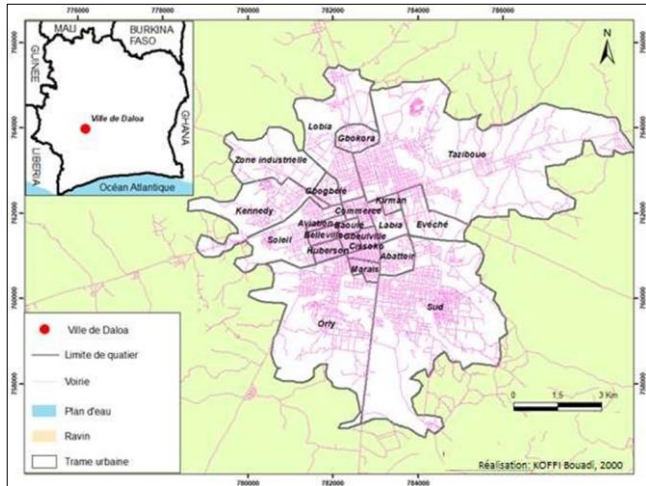
Faced with this observation, the research question that arises is the following: what is the social, demographic and economic profile of the incident cases detected at the Daloa CAT? The objective of the study is to establish a sociodemographic and economic profile of tuberculosis patients screened at the Daloa CAT.

1. Methods and data

This section is structured around three points: the presentation of the study area, the method of selection and acquisition of data and the processing of the data.

▪ Presentation of the study area

The town of Daloa is located in the center-west of Côte d'Ivoire (figure 1). The capital of the Haut-Sassandra region, Daloa is located 141 km from Yamoussoukro, the political capital and 383 km from Abidjan, the economic capital of Ivory Coast. Located between 6°30' and 8° North latitude and between 5° and 8° West longitude, it has 421,879 inhabitants, with an area of 5,305 ha according to the 2021 General Population and Housing Census (INS, 2021) ^[6]. It is the 4th most populous city in Côte d'Ivoire after Abidjan, Bouaké and Korhogo. It has thirty districts.



Source: cartographic background acquired from CCT/BNETD; field survey (2021)

Fig 1: Location of the study area

Located in the Haut Sassandra health region, Daloa is part of the 20 health regions and 82 health districts in the country. This important place that Daloa represents means that it is home to one of the health centers specializing in tuberculosis treatment (CAT) (figure 2)



Source: Based on field surveys, 2022

Fig 2: Daloa anti-tuberculosis center

This center welcomes an entire population coming from Ivory Coast but especially from the city of Daloa whose description of the socio-demographic profile constitutes the subject of this study.

The data acquisition method

The collection of the data necessary for this research was based on the administration of a questionnaire to a sample of screened patients and interviews with the nursing and administrative staff of the Daloa CAT.

The questionnaire created for this purpose focused on the sociodemographic identification of patients and their economic profile. The target population of our study concerned patients coming to the Daloa anti-tuberculosis

center either for screening or for a medical appointment residing in the town of Daloa.

To identify them, their place of residence was identified in collaboration with nursing and administrative staff. Once their place of residence was identified, a questionnaire was administered directly.

Concerning the sampling plan, we made a random and accidental choice of patients who attend the center during the duration of our survey. The study carried out is a survey of all patients who attended the anti-tuberculosis center in the city of Daloa from February 2022 to August 2022. This survey took place three days a week. Thus 125 patients were surveyed.

Data processing mode

Data processing was carried out with Microsoft Excel software in its 2010 version. After processing the questionnaires, a matrix was entered and from it a dynamic cross table was designed. This table made it possible to carry out a series of crossings between the sex variable of the patients (taken as the dependent variable) and the socio-economic and demographic parameters (taken as the independent variables).

Results

The results section is structured around two main points. The first is related to the sociodemographic characteristics of patients and the second deals with the economic profile.

1. Sociodemographic characteristics of tuberculosis patients at the Daloa CAT

This section presents the sociodemographic characteristics of tuberculosis patients in Daloa and the variables used concern age, sex, marital status, religion, level of education and nationality.

1.1. Adult patients with a majority of males

The distribution of tuberculosis patients attending the Daloa CAT according to gender shows a strong male predominance with a proportion of 70%, or approximately 5 out of 6 patients (table 1). In this context where female patients only represent 30% of the total workforce, the sex ratio, i.e. the number of men per 100 women, is 228.95.

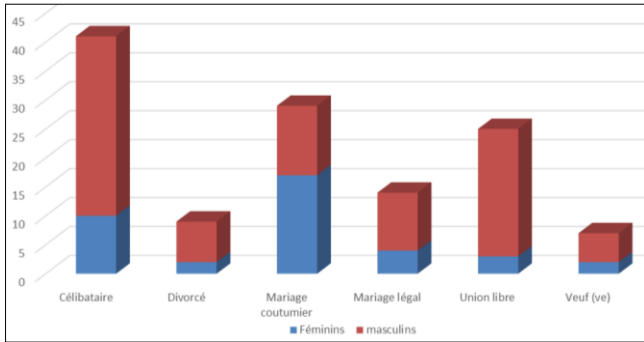
Table 1: distribution of patients by age and sex

Age group	Feminine	Men	Total General
Under 18	3	7	10
18-30 years old	14	21	35
30-50 years	11	44	55
Over 50	10	15	25
Total General	38	87	125

Source: Based on field surveys, 2022

1.2. Structure by sex of patients according to marital status

The distribution of patients according to marital status (figure 3) reveals that out of a total number of 125 patients surveyed, 32% are single, 23% have entered into a customary marriage and 11% a legal marriage, 20% live in a common-law union. Patients who find themselves separated from their partners due to divorce or death represent only 10% of the total patient population (7% widowed and 3% divorced). Divorced people represent the lowest proportion of the total workforce.



Source: Based on field surveys, 2022

Fig 3: Distribution of heads of households according to marital status

In terms of distribution by gender, we note that 26% of women are single compared to 36% of men. Among divorced people, there is a proportion of 5% women compared to 8% men. Customarily married women represent 45% of all women surveyed compared to 14% of men. As for legal marriage, it is contracted by 11% of women compared to 11% of men. Common-law women account for 8% of female patients compared to 25% of male patients. We observe that 5% of women are widowed compared to 6% of widowed men.

1.3. Tuberculosis patients with a Muslim majority

Analysis of the data contained in Table 2 below shows that the majority of tuberculosis patients are Muslims. They represent 64% of respondents. We also note the Christians. They account for 18% of respondents. Those without religion and animists correspond to 12% and 6% of patients respectively.

Table 2: Distribution of patients according to religion

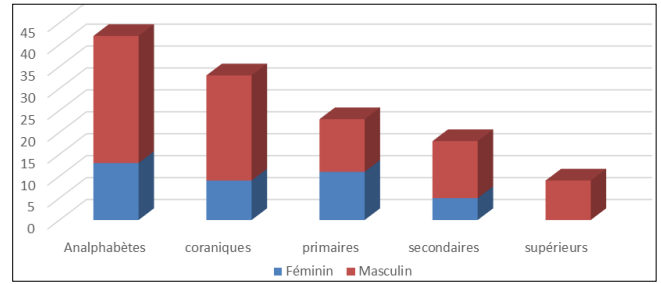
Religions	Feminine	Men	Total General
Animistic	4	4	8
No religion	7	8	15
Christians	7	15	22
Muslims	20	60	80
Total General	38	87	125

Source: Based on field surveys, 2022

In terms of distribution by gender, we note that 53% of women are Muslim compared to 69% of men. Christians represent 18% of the female population compared to 17% for men. Women who practice no religion represent 18% compared to 09% among men. As for animists, we note 11% women and 05% men.

1.4. Mostly educated patients

Among the patients interviewed (figure 4), 42 had never attended formal school, representing a non-schooling rate of 34%. This rate is above the national average which is 16%. Indeed, the net enrollment rate in Ivory Coast in 2016 is 84%. Patients who have attended Koranic school represent 27% of the total population. Among the patients who attended formal school, 18% were unable to exceed the primary level, 14% reached the secondary level which is below the national average, the net enrollment rate of secondary education in Côte of Ivory being 35%. Patients with a higher level of education represent 7% of patients who received school education.



Source: Based on field surveys, 2022

Fig 4: Distribution of tuberculosis patients according to level of education

In terms of distribution by gender, among patients who have received school education we observe no women with higher education compared to 10% among men. 29% of women have obtained primary education compared to 14% of men. There are 13% of women with secondary education while men have a percentage of 15%. The proportion of illiterate women is 34% compared to 33% among men. Concerning the Koranic school, the proportion of women is 24% compared to 27% of men.

It can be deduced from this analysis that female patients have a slightly higher level of education than male patients.

1.5. The nationality of tuberculosis patients in Daloa: a majority of Ivorians

We observe a predominance of tuberculosis patients of Ivorian nationality (55%). Non-Ivorians constitute 45% of respondents. The majority of them are nationals of the ECOWAS region. There is also a Lebanese man there. The Burkinabés are the most numerous. They represent 22% of patients interviewed and 50% of non-Ivorians. Other West African nationals, notably Guineans, represent only 5% of respondents and 11% of non-Ivorians. Ghanaians also represent 5% of respondents and 11% of non-Ivorians. Patients of Liberian nationality represent 2% of respondents and 5% of non-Ivorians. Malians represent only 10% of respondents and 21% of non-Ivorians. The Lebanese are the least numerous as shown in table 5 below. They represent 1% of respondents and 2% of non-Ivorians.

Table 3: Distribution of patients according to nationality

Nationality	Feminine	Men	Total
Burkinabe	10	18	28
Guineans	2	4	6
Ghanaians	1	5	6
Liberians	0	3	3
Malians	3	9	12
Lebanese	0	1	1
Ivorian	22	47	69
Total	38	87	125

Source: Based on field surveys, 2022

In terms of distribution by sex, no women are observed among Liberian and Lebanese foreigners (table 3).

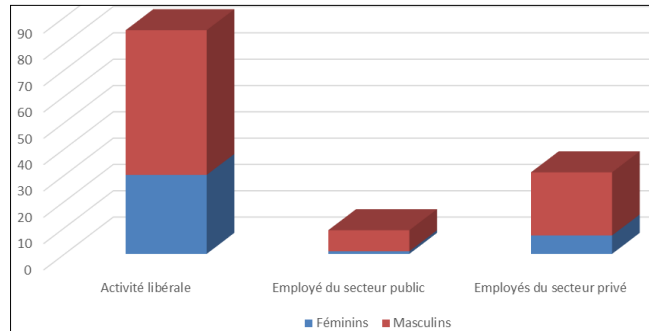
We observe that 58% of female patients are Ivorian. Then come the Burkinabé patients who represent 26%, the Malians (8%), the Guineans (5%) and finally the Ghanaians (3%). Among men we have a proportion of 21% Burkinabé, 10% Malian, 6% Ghanaian, 5% Guinean, 3% Liberian, 1% Lebanese and 54% Ivorian. We can therefore say that tuberculosis patients as a whole are of Ivorian nationality.

2. Socio-economic characteristics of patients with tuberculosis at the Daloa CAT

This chapter presents the socio-economic characteristics of patients with tuberculosis at the Daloa CAT. The variables used relate to profession, place of residence, income and the number of rooms in the home.

2.1. Patient activity, a majority of liberal employment

Patients working in self-employed occupations show a proportion of 68%. The presence of 25% of patients working as employees in the private sector was observed. 7% of respondents work in the public sector. This category appears to be the least represented in the sample. As shown in Figure 5 below.



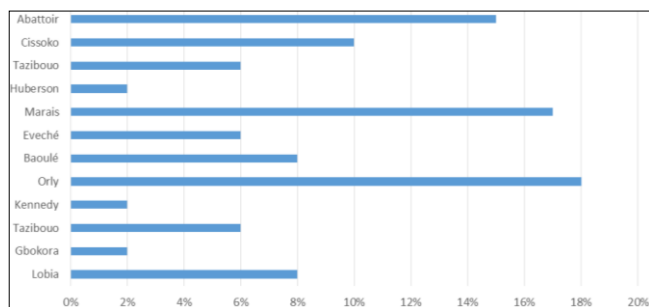
Source: Based on field surveys, 2022

Fig 5: Distribution of tuberculosis patients according to profession

In terms of distribution by gender, we note 79% of women exercising a liberal activity compared to 63% of men. 18% of women work as employees in the private sector compared to 28% of men. Regarding public sector employees, women represent 3% while men have a proportion of 9%. Patients are represented in all sectors of activity.

2.2. Orly, Marais and Abattoir, the main areas of residence for tuberculosis patients in Daloa

Twelve neighborhoods were listed as the place of residence of the tuberculosis patients interviewed out of the thirty neighborhoods in the city of Daloa. The districts which contain the most patients are Orly, Marais and Abattoir with respectively 18%, 17% and 15% of respondents. These three neighborhoods represent 50% of the sample. Patients living in the Cissoko district represent 10% of the sample. Those residing in the Baoulé and Lobia district each represent 8% of those surveyed. Patients from the Eveché and Tazibouo district each represent 6% of patients. The Gbokora (2%), Kennedy (2%) and Huberson (2%) districts record the lowest proportions of patients as shown in Figure 6.



Source: Based on field surveys, 2022

Fig 6: Distribution of patients by neighbourhood

In terms of distribution by gender, we note that no female tuberculosis patient resides in the Kennedy and Huberson districts and that no man surveyed resides in the Gbokora district.

In the Abattoir district, there are 21% women compared to 15% men. The Marais district has a proportion of 16% women compared to 17% men. 14% of female tuberculosis patients come from Orly compared to 21% of men. In terms of female tuberculosis patients, they display the same proportions in the Gbokora and Cissoko districts, i.e. a percentage of 10% each compared to 0% of men in Gbokora and 11% of men in Cissoko. The Lobia and Baoulé districts display the same proportions of women (8%) and men (8%). The same goes for the Tazibouo and Eveché neighborhoods which display the same proportions of women (5%) with 3% men in Tazibouo and 7% men in Eveché. The lowest proportion of women suffering from tuberculosis is found in the Soleil district (3%). This neighborhood has 6% men as shown in table 4 below.

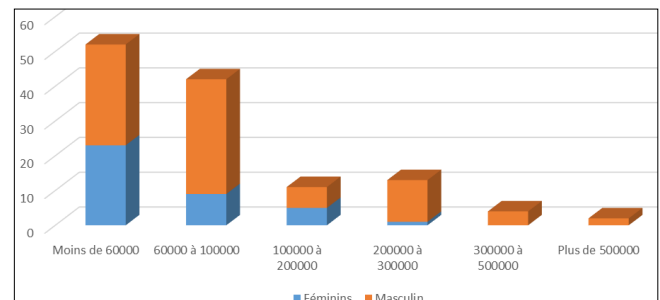
Table 4: Distribution of tuberculosis patients according to neighborhood of residence

Neighborhood of residence	Feminine	Men	Total
Lobia	3	7	10
Gbokora	4	0	4
Tazibouo	2	3	7
Kennedy	0	3	3
Soleil	1	5	6
Orly	5	18	23
Marais	6	15	21
Baoulé	3	7	10
Eveché	2	6	8
Huberson	0	3	3
Cissoko	4	9	13
Abattoir	8	11	19
Total	38	87	125

Source: Based on field surveys, 2022

2.3. Tuberculosis patients in Daloa with income below the minimum wage

The administered questionnaire revealed that 41% of the patients questioned declared having a monthly income of less than 60,000 CFA francs. It represents the income range bringing together the largest number of patients. Patients who declared an income between 60,000 and 100,000 CFA francs represent 34% of the sample while 09% claim to have a monthly income ranging between 100,000 and 200,000 CFA francs. We note that 11% of patients have monthly incomes between 200,000 and 300,000 CFA francs. Those with a monthly income between 300,000 F CFA and 500,000 FCFA represent only 3%. Incomes of more than 500,000 F represent only 2% of the patients surveyed as shown in Figure 7 below.



Source: Based on field surveys, 2022

Fig 7: Distribution of patients by income

In terms of distribution by sex, there are no patients with an income between 300,000 FCFA and 500,000 FCFA and more than 500,000 FCFA. For men this represents 5% and 2%. 60% of women have an income of less than 60,000 FCFA compared to 33% for men. Incomes between 60,000 and 100,000 FCFA concentrate 24% of women compared to 38% of men. 13% of women have an income between 100,000 and 200,000 CFA francs compared to 7% for men. Incomes of 200,000 to 300,000 f contain a proportion of 3% of women compared to 14% of men.

2.4. Patients mainly occupying 2-room accommodation

Table 5 below provides us with information on the different rooms occupied by tuberculosis patients who attend the Daloa CAT. The survey reveals that 47% of the patients questioned occupy 2-room accommodation. That is to say, these patients live in accommodation containing a living room and 1 bedroom. This type of accommodation is suitable for a number of 2 people. 1-room dwellings are occupied by 17% of respondents. Those with 3 rooms are inhabited by 28% of respondents. Those with 4 rooms are occupied by 5% of the total number of patients. 5-room accommodations are in the minority, they are occupied by 3% of the patients surveyed.

Table 5: Distribution of patients according to the number of rooms in the accommodation

Number of Pieces	feminine	Men	Total
1 Pieces	00	21	21
2 Pieces	23	36	59
3 Pieces	12	23	35
4 Pieces	02	04	06
5 Pieces	01	03	04
Total	38	87	125

Source: Based on field surveys, 2022

In terms of distribution by gender, we observe that no women live in one (1) room dwellings compared to 24% of men. The 2 rooms are occupied by 61% women and 41% men. We observe that 31% of female patients are in three-room homes compared to 26% of men.

As for men, they show a proportion of 5% for 4 pieces and 4% for 5 pieces. At the 4-piece level, women have a proportion of 5% and 3% for the 5-piece.

Discussion

Addressing the question of the sociodemographic and economic profile of tuberculosis patients at the Daloa tuberculosis center in the field of health geography is important due to the use of this information in explaining the levels and trends of tuberculosis. Incidence of tuberculosis in urban areas. The research conducted here highlighted that 7 out of 10 patients with tuberculosis are men, the majority (44%) are aged between 30 and 50 years. 32% of patients are single and predominantly Muslim (80%). Mostly Ivorian (55%), the majority are illiterate (34%).

These observed results confirm the findings of previous research on the sociodemographic characteristics of tuberculosis patients. According to the literature, tuberculosis is a disease of young adults. Several studies carried out in developing countries reveal a predominance of tuberculosis among young adults in full socio-economic activity (Soumare M *et al*, 2008) [12] (Kinde-Gazard D *et al*,

1997) [7]. Overall, our data agree with that of Comstock GW (1995) [4] on the incidence of tuberculosis in countries with high prevalence, particularly in Africa where we observe, on the one hand, a greater male incidence and, on the other hand, a maximum incidence for the categories aged 30 – 50 years. The relatively high incidence for older children and adolescents is justified for some by the duration of the vaccination coverage with BCG which would only protect against the disease for around fifteen years, explaining the resumption of infection in young adults. This reality observed within the framework of this research is similar to that of Okemba-Okombi *et al* (2018, p 46) [8] who explains that at the CAT in Brazzaville like a reference center for the management of tuberculosis, influx of a large number of patients of all kinds who present presumptive signs of tuberculosis, which explains a high percentage of elderly subjects (> 65 years old). Whereas according to him, in developed countries, the high frequency of tuberculosis in the elderly (over 70 years) is probably due to a significantly higher geriatric population carrying several comorbidities, exposing them to tuberculosis. Another fact, admission to centers for the elderly in industrialized countries would also be a predisposing factor for tuberculosis infection due to a large concentration of elderly people in a limited space.

Regarding marital status, the work carried out here showed that the majority of patients (32%) are single and illiterate (34%). This trend reflects the importance of marital status and level of education in the evolution of tuberculosis incidence in urban areas. For A. Camara (2006, p70) [3], the high incidence of tuberculosis among single, mostly illiterate subjects is due to the fact that single people have less responsibility unlike married subjects in African households. This gives them enough time to seek treatment. Concerning socio-economic characteristics, the study managed to show that 68% of patients have a self-employed activity with an income of less than 60,000 FCFA per month. The majority of them live in the Orly district (18%) in 2-room apartments. From these results we conclude that the incidence of tuberculosis in urban areas is dependent on various aspirations of the population, including the place of residence and the employment opportunities offered by the municipality. These results are consistent with the work of the Canadian Communicable Disease Report (CDR) (2007) on housing conditions as a risk factor for tuberculosis infection and active tuberculosis for which housing conditions are used as socioeconomic indicators of health and well-being. Poor housing quality and overcrowding are associated with poverty, certain ethnic groups and increased susceptibility to tuberculosis. Second, the RMTC study identified overcrowding as a risk factor for tuberculosis transmission. This is what Hawker JI *et al* (1999) [5] and Beggs CB *et al* (2003) [2] support when they show that in communities where people with active tuberculosis live, overcrowded housing contributes to increasing the risk of exposure to M. tuberculosis.

Conclusion

The objective of this research was to draw up the sociodemographic and economic profile of people suffering from tuberculosis who were screened at the Anti-Tuberculosis Center (CAT) in Daloa. The study shows that the majority of tuberculosis patients screened at the Daloa CAT are Ivorian with a proportion of 55%. The majority are aged between 30 and 50, 34% are illiterate. We note that

64% of patients are Muslim and 32% are single. At the socio-economic level, the study showed that the majority of patients (68%) work in the liberal sector and have an income of less than 60,000 FCFA at 41%. Most of them (18%) live in the Orly district in 2-room houses (47%).

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