

Study of The Factors Associated with The Delay in Seeking Health Care Services and The Experience of Tuberculosis Patients in Senegal

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Abstract

The general objective was to study the factors associated with the delay in seeking health care services and the experience of TB patients in Senegal. A mixed methods, multi-center design was conducted in Senegal using a simple multistage random survey. Quantitative data were entered using Epi 2000 software and analyzed using Epi Info 3.3.2 and R.2.2.9 software. For the qualitative survey, content analysis supported by thematic analysis was conducted using Iramuteq software. A total of 500 patients were enrolled. The mean age of the patients was $34.8 \pm (14.3)$ years, and male patients made up 70% of the sample with a sex ratio of 2.33. Patients with bacilloscopy positive pulmonary tuberculosis (BPT+) made up 83.2%. The average consultation time for 382 patients was 32.7 days and more than 2/3 (71.6%) used modern medicine. BPT+ patients residing in central (ajOR=4.29 [1.84-10.02]), western (ajOR= 2.91 [1.41-5.98]), urban (ajOR=1.90 [1.10-3.27]), not knowing the mode of transmission of TB (ajOR=1, 54 [1.1-2.38]), not thinking about TB at the appearance of signs of presumptive TB (ajOR=1.89 [1.1-3.38]) were more inclined to delay seeking care at the healthcare facilities. As for the qualitative survey, the delay in seeking care was often noted among patients who were unaware of the disease. Some patients used traditional medicine as their first recourse to care. The patients reported that tuberculosis had negative consequences on their socio-professional life by causing isolation and work disruptions. Most of the patients had adopted strategies to protect their families from being infected. In view of these associated factors, early diagnosis of tuberculosis should involve raising awareness of the disease and providing guidance to traditional practitioners for early referral of suspected TB patients to the nearest health facilities for better management.

Keywords: Prevention; Delay; Tuberculosis; Senegal

Introduction

Globally, an estimated 10 million people contracted tuberculosis (TB) in 2018. The burden of disease varies considerably between countries, ranging from less than five to more than 500 new cases per 100,000 people per year. The global average being approximately 130 new cases [1]. More than 95% of TB deaths occur in low- and middle-income countries [2]. Ending the TB epidemic by 2030 is part of the health targets identified in the Sustainable Development Goals adopted in 2015, namely SDG 3.3 [3].

In Senegal, TB is endemic and is the most common opportunistic disease associated with HIV infection [4]. The annual incidence of TB in Senegal is estimated at 122 cases per 100,000 people according to the 2017 Global TB Report [3]. In 2017, WHO reported 13,660 cases of all forms of TB. The estimated incidence is 122 TB cases per 100,000 people (87-163) with a detection rate of 68% (51-96) [3]. Therefore, controlling this epidemic can only be achieved by limiting the transmission of the bacillus, which requires early referral of TB suspects. According to Cai J et al, delays in seeking care, diagnosis and treatment explain the high incidence of TB in developing countries [5]. Delays in seeking healthcare are attributable to either the patient or the healthcare system [6]. TB has been historically stigmatized because of its contagious nature, incorrect knowledge about its cause, transmission or treatment, as well as its association with marginalized groups [7]. More recently, TB has been stigmatized because of its association with HIV/AIDS [8]. In Senegal, there are still severe forms of TB related to the delay in seeking medical attention, which can be life-threatening or have significant sequelae and also contribute to the spread of the epidemic. It is in this context that we aim to study the factors associated with the delay in seeking healthcare services and the experience of tuberculosis patients in Senegal.

Framework

Senegal, located in West Africa, is bordered to the north by Mauritania, to the east by Mali, to the south by Guinea and Guinea Bissau, to the west by the Atlantic Ocean. Its surface area is 196,722 km². The estimated poverty rate in Senegal was 46.7% in 2011 [9]. Senegal has 14 medical regions and 79 health districts. Each district has a treatment center (TC) for tuberculosis. Some regions face difficulties with geographical accessibility. During the rainy season, some health facilities are cut off from the rest of the region. The National Tuberculosis Control Program (NTP) is responsible for promoting information, awareness and communication on tuberculosis control; integrating tuberculosis control activities into packages at each level of the health system through the medical regions and health districts; and providing technical and financial assistance to health and community facilities for diagnosis, treatment, training, planning, monitoring and evaluation of tuberculosis control activities. [10]. The coordinator and his team at the NTP level work in close collaboration with the TC managers at the operational level. The latter are responsible for the management of TB patients. One of the objectives of the NTP is to increase the number of reported cases of new TB episodes to at least 20219 by 2022 and to maintain a treatment success rate of at least 90% as of 2018 [10].

Methodology

A concurrent quantitative and qualitative mixed-method study was conducted. This study was multicentric. It was conducted in five different geographical areas of Senegal (west, center, north, southeast and south).

Quantitative survey

Study type and period

A cross-sectional, descriptive, analytical study was conducted from October 30 to November 12, 2017.

Study population

The study population consisted of all TB patients who were followed at the health facilities of the selected districts.

Inclusion and non-inclusion criteria

Any TB patient who was followed at the district TC was included in the study. Any TB patient followed up at the TC whose health condition does not allow him/her to answer the survey or who refuses to give his/her consent and/or permission for the interview was not included.

Sampling

A two-stage sampling process was used. The first stage involved the selection of districts and the second stage involved the recruitment of TB patients followed at the TC level in each district.

First sampling stage

This sampling entailed identifying the districts from which the statistical units would be recruited. The districts were selected from a stratified simple random survey. The strata were composed of the 5 zones in Senegal. For each zone, all of the districts were listed by region. From there, 4 districts were randomly selected per zone (Figure 1).

Second sampling stage

This part of the sampling process dealt with the selection of patients. In each health facility at the TC level, all TB patients who came for an appointment were enrolled and surveyed (figure 1). A total of 500 TB patients were surveyed.

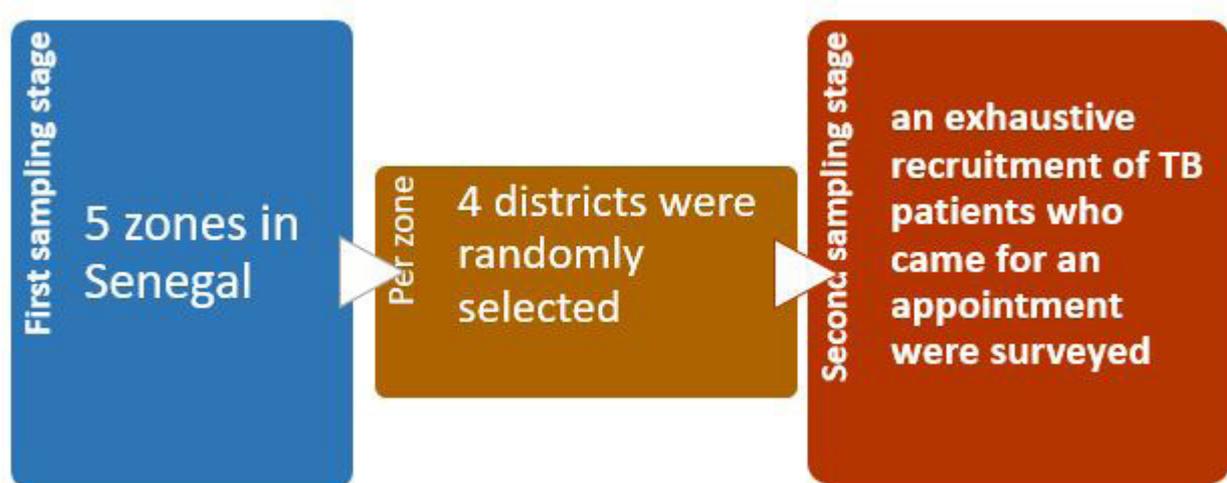


Figure 1: Schematic Diagram to show the selection of TB patients

Data collection

In each district, at the TC level, data was collected from the patients by the interviewers, with one interviewer assigned to each zone. A structured questionnaire was designed to collect information from patients with tuberculosis. The questionnaires were administered to the respondents. The data collection was done in a discreet and appropriate location to ensure that the information provided by the respondent was confidential.

Data entry and analysis

Quantitative data were entered using the Epi 2000 software version 3.5.4. The "Make view" module of this software was used to develop a data entry mask for the data collection tool. The descriptive part consisted of calculating the means, standard deviations,

modes, medians and extremes for the quantitative variables as well as the frequencies for the qualitative variables.

The analytical part consisted of a bivariate analysis using statistical tests to compare proportions. The Chi-square and Fisher tests were used depending on their applicability. The test was significant when the p was less than 0.05. A multivariate analysis was performed.

Binary logistic regression was used. The dependent variable was the delay in seeking healthcare services. The delay in seeking healthcare services was defined as the time between the first signs of a cough and the visit to a health facility. As a result, any visit to a health facility that occurred more than 15 days after a cough was considered to be delayed. All variables with a p value of less than 0.25 in the bivariate analyses were used in the final model [11] and distinguished into three categories based on Anderson Newman's model of TB care utilization (predisposing, enabling and need factors) [12]. In the models were adjusted with the predisposing, facilitating factors and the needs associations were measured by adjusted odds ratios (ajOR) and their 95% confidence intervals.

Qualitative Survey

Study type

The qualitative survey made it possible to understand the experiences of tuberculosis patients in dealing with this disease. It was carried out in the same districts where the quantitative survey was conducted. In-depth interviews were conducted at these facilities.

Study population

The same population of the quantitative survey was also targeted for the qualitative part. The sample was made up of tuberculosis patients receiving treatment at the TCs. The choice was made taking into account the diversity of the individuals being surveyed to better capture all the specificities.

Inclusion and non-inclusion criteria

Any TB patient who was followed at the district TC was included in the study. Any TB patient followed up at the TC whose health condition does not allow him/her to answer the survey or who refuses to give his/her consent and/or permission for the interview was not included.

Sampling

Individual interviews were conducted at the TCs. In each district, a TC was selected at random and the individual interviews were conducted with individuals presenting with tuberculosis and who had completed the quantitative survey.

Sample size

As for the individual interviews, 4 were conducted at the District level for a total of 16 interviews per zone. A total of 80 individual interviews were conducted with TB patients.

Data collection

The data collection consisted of in-depth interviews. In-depth interviews were conducted in the districts with people presenting with TB at the facility level. Data was collected using individual interview guides for in-depth interviews with TB patients. Information was collected on the delay in seeking healthcare services, the effects of the disease on patients' lives, family and

community management of the disease, and strategies for protecting the family from TB.

Data analysis

The content analysis which was reinforced by a thematic analysis was carried out with the *Iramuteq* software. All recorded interviews were transcribed. The transcribed data was analyzed using the contextual content analysis method. To this end, the analysis consisted, initially, of extracting from the transcripts the phrases or passages that are most representative of the individual's point of view (vertical analysis), and subsequently, of classifying these passages into categories (horizontal analysis).

Ethical considerations

In this study, TB patients were also enrolled on a voluntary basis. Informed consent was sought from all participants aged 18 years and older. Data collection was carried out after participants had given informed consent and received all the necessary information about the content of the study. A consent form was developed and validated. Approval from the National Health Research Ethics Committee (CNER) of Senegal (reference SEN 17/44) was required prior to beginning fieldwork. The identity of individuals who consented to participate was recorded on a specific form. Data were collected anonymously during the analysis and kept confidential. Only those responsible for the study have access to the data.

Results

Quantitative component

Descriptive results

✓ Predisposing factors

The mean age of TB patients was $34.8 \pm (14.3)$ years with extremes ranging from 18 to 85 years. The mode and median were 25 and 31 years, respectively. The age groups of 20-29 years and 30-39 years were those most affected, i.e. 32.7% and 22.1% of the cases respectively. TB patients were predominantly male (70%) with a sex ratio of 2.3. TB patients were married in 49.2% of cases. Patients were not educated in French school in 42.2% of cases. More than $\frac{3}{4}$ of the patients (81.0%) were aware of TB prior to their illness. The media and people surrounding the patients were the main sources of information (55.1% and 50.1% respectively). They were also informed about tuberculosis at school (14.1%), by health workers (8.9%), through community relays (2.1%) and others (2.5%). The main sign cited by the patients was coughing (58.6%). More than 1/3 (33.2%) did not know any sign of TB (table I). Slightly more than half of the patients (50.6%) were aware of the airborne route of TB transmission. ✓

Knowledge of presumptive signs of	Absolute frequency	Relative frequency (%)
Cough	293	58.6
Fever	88	17.6
Weight loss	123	24.6
Hemoptysis	24	4.8
Others	19	3.8
No signs cited	166	33.2

Table I: Distribution of patients according to knowledge of presumptive signs of TB before their illness

✓ Enabling factors

The patients who participated in this survey resided in the western (34.6%), northern (18.6%), southern (17.4%), central (17.2%), and southeastern (12.2%) regions of Senegal. The average distance between the place of residence and the nearest health facility was 2.1 ± 6.1 km, with extremes ranging from 0 to 80 km. The majority of patients (89.7%) resided within 5 km of a health facility. More than $\frac{3}{4}$ of the patients (88.6%) had informed their family members of their disease. Moral support was the main reason for informing the family (59.1%). Among the patients who refused to inform those around them, fear of rejection was the main reason for not doing so (49.1%) (Table II). Among the TB patients, 21.4% had experienced at least one stigmatizing experience. Among them, 70.1% were victims of physical isolation, where they ate alone (58.9%), and slept alone (26.2%). Others had lost their jobs in 3.7% of cases. One patient had been forbidden from wearing clothes belonging to his family members.

Raisons	Absolute frequency	Relative frequency (%)
Disease information		
Moral support	262	59.1
Psychosocial	115	25.9
Avoid contamination	105	23.7
Financial support	84	18.9
Others	60	13.5
No disease information		
Fear of being rejected	28	49.1
Nothing	13	22.8
Fear of being stigmatized	8	14.0
Fear of detection of a new case	8	14.0

Table II : Reasons for informing or not informing TB patients about their disease

✓ Needs

Only 92 patients (18.4%) had suspected that they might have tuberculosis when they first showed signs of the disease. The patients' first recourse was to modern medicine (71.6%), to traditional medicine (23.8%) and to self-medication (5.6%). Among the TB patients, 83.2% were bacilloscopy positive pulmonary tuberculosis patients (BPT+). The mean waiting time for BPT+ patients to visit was 32.7 days with extremes ranging from 0 to 365 days. The mode and median were 30 and 20 days, respectively. Delayed access to healthcare was observed in 204 patients (53.4%).

✓ Analytical results

BPT+ patients residing in central (ajOR=4.29 [1.84-10.02]), western (ajOR= 2.91 [1.41-5.98]), urban (ajOR=1.90 [1.10-3.27]), not knowing the mode of TB transmission (AjOR=1, 54 [1.1-2.38]), not thinking about TB at the onset of suspected TB signs (ajOR=1.89 [1.1-3.38]) were more likely to delay consultation at the health facility level (Table III).

TB patient characteristics	P value	aj OR [IC à 95%]
Predisposing factors		
Knowledge of the mode of transmission*	0.048	
Yes		1
No		1.54[1.1 -2.38]
Knowledge of effective treatment for TB	0.235	
Yes		0.66[0.33-1.30]
No		1
Knowledge of free treatment for TB	0.253	
Yes		1
No		1.41[0.78-2.56]
Enabling factors		
Zones	0.001	
Center*		4.29[1.84-10.02]
Where is*		2.91[1.41-5.98]
South East		1.34[0.56-3.17]
North		1.39[0.59-3.27]
South		1
Type of structure	0.401	
TC		1.25[0.74-2.11]
Health post		1
Residential area*	0.020	
Urban		1.90[1.10-3.27]
Rural		1
Needs		
Think about TB when you see the signs*	0.031	
Yes		1
No		1.89[1.1-3.38]

*: statistically significant link

Table III: Factors associated with delayed consultation at health facility level in patients with bacilloscopy positive pulmonary tuberculosis

Qualitative component

Description of the sample

A total of 80 TB patients were interviewed. The mean age of the patients was $34 \pm (3.5)$ years. Males predominated, i.e. 75% of the population surveyed, with a sex ratio in favour of males of 3.

Delays in seeking medical care

Many patients reported that they were delayed in seeking medical care for their tuberculosis. These delays were most often related to a lack of awareness of the symptoms of suspected tuberculosis, especially coughing. One TB patient said: « *When I first became ill, I had a severe cough that lasted for almost 30 days but I did not think it was tuberculosis. My lack of knowledge of the disease led me to seek the advice of a traditional practitioner but without success after 15 days of treatment and then to resort to self-medication. Given the persistence of the cough, I went to the health center where tests were done but they showed nothing;*

they prescribed medication but there was no improvement; I went to the hospital and it was there that they discovered my illness ». Some patients, because of fear of diagnosis, first turned to traditional healers. One TB patient said: *« ... I was afraid to go to the hospital and I went to the traditional healers because I am a soldier and I did not want to lose my job; but day by day it became more and more serious and I said to myself that I must go to the hospital ».* Attitudes toward the diagnosis of the disease depend on the circumstances surrounding it. The lesson that most patients learned from their experience was to go to the health facility early when signs such as coughing occur for better management of the disease. For example, one TB patient explained: *« ... The only thing, in order to better deal with it, is to go to the place where it can be cured. You must never accept to hang around with the disease until you hurt yourself and those around you ».*

Effect of the disease on patients' lives

✓ Psychological impact of the disease on patients

We realize that there are psychological impacts on patients with tuberculosis. This psychological impact is closely related to the physical effects of the disease and its treatment. Most patients feel stressed. Most of them say they rely on God. According to a tuberculosis patient: *“I lived through it while having faith in God, because I am a believer... It is difficult to live with, I strongly advise those who are diagnosed to respect the treatment and to always believe in God and to know that one day the pain will be over».*

✓ Physical effect of the disease

The physical effect is most often associated with weakness due to weight loss. Some patients report physical damage as a result of taking the drug. One patient stated: *“I can hardly move. Ringing in the ears is frequent. I sometimes have dysphonia after taking the medication”.* Another said: *“It's too hard because you lose weight every day, you look like a living skeleton, but when you know that there is a good treatment, you are really relieved”.*

✓ Socio-professional impact of the disease

Patients report that tuberculosis has caused some of them to stop working. Thus, some of them lost their job because of the physical weakness and/or stigma. Others had to take sick leave. One patient explained: *“I was a tailor... I was no longer working; I had no customers; I was working in the fields but at one point I was no longer being productive. According to a tuberculosis patient: “I was a chicken farmer but I stopped since I contracted the tuberculosis disease”.*

Disease management by families and communities

Managing confidentiality

Most of the patients had not informed the people around them of their illness, except for a small, very restricted family group. This was often the spouse or a parent. Only a limited number of patients had not informed any of their relatives of their status for fear of stigma. One TB patient said :*«... I therefore did not inform the other members of my family so as not to be stigmatized and create problems for my mother. According to a tuberculosis patient, “as far as the neighbors are concerned, I did everything to keep them from knowing about it for fear that my illness would be disclosed ».* Another explained: *“...I was not stigmatized by my family because I did not inform them of my illness because I was afraid of their reactions; but I took precautions not to infect them...”*

Care for patients by their families

The vast majority of patients receive moral and financial support from their families. Concerning the financial aspect, it takes

different forms. It mainly involves help to cover the daily expenses for food, etc. As one patient explained: « *My family has been very supportive, especially my wife in terms of financial support. She doesn't give me money but I know it from the food she prepared for me because I didn't give her enough money for the rich and good food she served me* ». Gender is reflected in this support through the involvement of women of the family in the care of the patient. They may be the mother, the wife, the brother's wife, the daughter, etc. They take care of the intimate aspects of the patient and are in direct contact with them. One TB patient said « *As far as my family is concerned, it is my daughter who takes care of me. Every day, she comes from her marital home to take care of me, fortunately we live close to each other. If I have dirty laundry, she takes care of it...* ».

A patient stated that: "It is my little brother's wife who takes care of me since my mother is old. She takes good care of me, she gives me food and does my laundry."

Another patient stated, "I am really happy with the support of my family. Without them I wouldn't be here. They have helped me a lot, especially my mother».

Strategies for protecting the family from tuberculosis

Most of the patients had adopted strategies to protect their families from becoming infected. These strategies mostly consisted of avoiding certain contacts, avoiding eating with them etc. There have been reports of children in the family even being entrusted to other family members not living in the same household to protect them.

One of the tuberculosis patients explained: « *For the moment, we are doing everything to protect ourselves and especially our families. I do everything to protect my family. With my disease, I don't spend much time with them, but it's just so I don't contaminate them. A TB patient said, "My family also behaves well with me, but I prefer to avoid them so as not to contaminate them and protect them."* Another said: "When I was diagnosed with the disease, I informed my family and sent my children to the village so as not to contaminate them. However, there were some cases of discrimination within families. One patient stated that: « *when I informed my two wives of my illness they both left me* ». According to another tuberculosis patient: "Although I live with my daughters-in-law, they only come at lunchtime to pick up the dish they have reserved for me, but otherwise it is my daughter who takes care of everything else. You know when you are sick people avoid you... ».

Community-based patient management

Most interviewees did not experience stigma from their neighbors. According to them, the majority of those around them behaved positively towards them. This behavior was perceived by them as moral support. One TB patient said, "...his neighbors have been very supportive. They come to greet me and ask about my health until I feel psychologically calm. I have never experienced any stigma". According to another patient: "... the community supports me financially because every time someone comes to visit me, they give me money. »

Patient management by health facilities

Almost all of the patients interviewed appreciated the medical attention given to them at the health facilities. According to them, they are well taken care of. In addition to good therapeutic follow-up, they receive psychological support, which sometimes goes as far as the social management of the disease and the psycho-social care of their families.

According to a tuberculosis patient, he said: "I am really well taken care of here. Every time they ask us if our medication is finished and they give it to us. They explain to us the treatments and my BARR controls that we have to do. They keep the disease a secret and are very discreet. Another said, "I think the stigma has decreased a lot with the sensitization, the head nurse makes a lot of effort regarding the management of the disease by the families. Sometimes, the patient is entrusted to a family member for directly

observed treatment (DOT) in the community ». The treatment is well appreciated despite the side effects reported. This positive appreciation of the treatment is linked to the physical improvement it brings but also to the fact that the medication is free. One patient explained: “Since I started the treatment I feel a significant improvement in my health and I can sleep normally again”. Similarly, another patient explained that: “the drugs are effective and free and effective. Within 2 weeks of taking them I felt a significant improvement which motivated me to adhere to the treatment and allowed me to resume my activities ».

Discussion

Limitations of the study

As a limitation of the study, a quantitative analytical survey of providers could have been conducted to identify factors associated with the delay in requesting BAARs from TB patients. Nevertheless, the delay in seeking medical care by TB patients accounts for the delay in the diagnostic and therapeutic process. In our study, delays occurred when the time between the onset of symptoms, especially a cough, and the consultation was greater than 15 days. In fact, according to one of the recommendations of the NTP, screening should be systematic for any person presenting with a persistent and unexplained cough of more than 15 days [10]. In order to give a good impression to the investigators, TB patients tend to shorten the consultation time. Thus, to avoid this social desirability bias, the 15-day period makes it possible to take into account certain patients who have underestimated this period of their own accord. The proportion of BPT + patients who were late in consultation (53.4%) was overestimated compared to that of Amar Ben J et al where this threshold was 30 days with a proportion of 20.4% [13]. On the other hand, the situation is more alarming despite the delay beyond 30 days in the study by Laohasirivong W et al, with a proportion of BPD + patients showing a delay in consultation estimated at 53.2% [14]. Despite these limitations, the results obtained allowed us to make the following discussions.

Predisposing factors and delay in seeking medical care

In our study, age and sex had no influence on the delay in consultation. This result was similar to the Lorant N series [15]. On the other hand, Rojpbulst M [16] in his study found that subjects in the age group of 30 to 45 years were 1.89 times overdue for consultation. In our study, patients who did not know the mode of transmission of TB were 1.54 times more likely to be delayed in consultation than those who knew the mode of transmission. This result was comparable to the study of Mesfin MM in Ethiopia with risk of 1.7 [17]. Indeed, ignorance and ignorance of tuberculosis make patients resort to other unconventional care structures which will further delay the diagnosis of TB. The level of education changes the timeframe for the first consultation. Xu B in his study in China found a reduction in consultation time in highly educated TB patients [18]. This result is in line with those of Mesfin MM [17] and Mfinanga SG [19] who found in their study that uneducated patients were twice as likely to be late for a health consultation.

Facilitating factors and delay in seeking medical care

In our study, patients who resided in the central and western areas had a 4.29 and 2.29 times risk of consultation delay, respectively, compared to other areas. Indeed, in these areas there is a high population density where economic activity is important. The fear of loss of time and financial resources could explain the delay in consultation at the level of health structures. In our case, patients who resided in urban areas had a 1.9-fold risk of delayed consultation compared to those who resided in rural areas. This result was comparable to the study by Nasehi M in Iran [20] which found a risk of delayed diagnosis of tuberculosis 1.31 times higher in urban dwellers compared to rural dwellers. But this result was contrary to the study by Li Y [21] who found rural residence as a factor in delay in consultation. The precariousness of resources delays the patient's first contact with the healthcare system. Unemployment and low income were thus observed in the lengthening of the consultation time for TB patients in the study of Mfinanga SG in Tanzania [19]. This result could be explained in developing countries where care is the responsibility of patients. In such a context, purchasing power to support the cost of care halves the consultation time. On the

other hand, when measures have been taken to facilitate financial access to health services, there is a reduction in patient consultation time. For example, Wang Y in his study in China found that TB patients who did not have health insurance were 1.5 times more likely to be late for a health consultation [22]. Aside from financial constraints, geographic ones arise. In fact, the average distance between the place of residence and the nearest health structure was 2.1 km less than that of Belay M et al of 3 km [23]. In our study, apart from the distance, the roads are impassable especially in rural areas and this isolation is increased during the rainy season. This reflects the difficulties of access for the populations, thus hindering patients suspected of TB from going to health facilities early in order to benefit from care, in particular screening for tuberculosis.

Needs and delays in seeking medical care

In our study, patients who did not suspect TB when the signs first appeared were 1.89 times more likely to be late for a consultation. Indeed, this result was comparable to that of Mfinanga SG [19] who found that TB patients who did not recognize the signs of TB had a 2.2-fold risk of delayed diagnosis. On the other hand, Wang Y found that patients with a good knowledge of the signs of TB had a shorter time to health consultation compared to those who were unaware of the disease [22]. Indeed, Xu B et al, in his study showed that the presence of hemoptysis reduces the time to consultation [18]. Severity of illness as a reason for health consultation was significantly associated with delay in seeking health care. This may be due to the fact that critically ill patients go to the health facility immediately since their life is in danger [24].

The experience of tuberculosis patients

More than $\frac{3}{4}$ patients (88.6%) had informed family circle of their illness. This result was comparable to that of Leye MMM [25] who found 98% but superior to that of Mesfin MM et al who found only 12% [17]. Moral support was the main reason for informing family and friends (59.1%). Indeed, patients have benefited from the moral and financial support of their families. It is mainly a question of financial support to cover daily expenses. Most of the patients did not tell those around them about their illness except for a small, very small family group. Often this is the spouse or a parent. Only a limited number of patients had not informed any member of their family circle for fear of being the victim of stigma. In our study 21.4% had experienced at least one stigmatizing behavior, comparable to that found in the study of Qureshi SA [26] which was 27%. In our study, 70.1% were victims of physical isolation. Parents and neighbors of stigmatized TB patients exhibited stigmatizing behavior, respectively 55.1% and 24.4%. In the study by Alema HB et al, some patients expressed shame about having tuberculosis. Thus, they hid their illness from those around them [24]. Thus, stigmatizing behaviors towards TB patients hamper the use of anti-tuberculosis care, including screening and preventive treatment with isoniazid [27]. Likewise, the absence of moral support can push the patient to deny his illness, to abandon or even refuse treatment with the risk of developing multiresistant TB.

Conclusion

Lack of knowledge of tuberculosis, in particular the mode of transmission and signs of presumption, explain the delay in consulting TB patients. This delay is accentuated by the inaccessibility of the geographical location of health structures and stigmatizing behavior. As a result, BPT + patients will spread the disease within the community and complications may also arise, making the management of these TB patients difficult and more expensive. Faced with this situation, the health authorities must strengthen communication focused on transmission, the signs of presumption of tuberculosis and the harmful consequences of stigmatization among populations with a view to changing behavior coupled with decentralization of screening on the site. All health structures with a view to bringing anti-tuberculosis care closer to the populations.

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References

1. WHO. World Tuberculosis Report: Executive Summary. Geneva: WHO; 2019. 9p.
2. Carpentier N, Ducharme F (2003) Predictive and explanatory approaches in the study of the use of services: the example of social gerontology. *Breaks* 9: 112-26.
3. National Agency for Statistics and Demography. Continuous Survey on the Delivery of Health Care Services 2017 Senegal 500p.
4. National Tuberculosis Control Program. Strategic plan to fight HIV / AIDS in Senegal period 2013 - 2017. Dakar: MSAS / PNT; 2012; 100p.
5. Cai J, Wang X, Ma A, Wang Q, Han X, et al. (2015) Factors Associated with Patient and Provider Delays for Tuberculosis Diagnosis and Treatment in Asia: A Systematic Review and Meta-Analysis. *PLoS ONE* 10: e0120088.
6. WHO (2018) Compendium of WHO guidelines and associated standards: ensuring optimal services in the chain of care for tuberculosis patients. Geneva: WHO 56 p.
7. Baral SC, Karki DK, Newell JN (2007) Causes of stigma and discrimination associated with tuberculosis in Nepal: a qualitative study. *BMC Public Health* 7: 211.
8. Kipp AM, Punggrassami P, Stewart PW, Chongsuvivatwong V, Strauss RP, et al. (2011) Investigating the stigma of tuberculosis and AIDS as a barrier to adherence to tuberculosis treatment using validated stigma scales. *Int J Tuberc Lung Dis.* 15: 1540-45.
9. Ministry of Health and Social Action (2017) National health financing strategy to move towards universal health coverage. MSAS / Department of Planning, Research and Statistics. 34p.
10. National Tuberculosis Control Program (2012) Strategic plan to fight tuberculosis in Senegal period 2018 - 2022. Dakar: MSAS / PNT 100p.
11. Collet D (2003) Modeling binary data. London: Chapman and Hall / CRC 387 p.
12. NEWMAN A, John F (1973) Societal and individual determinants of medical care utilization in the United States. *The Milbank Memorial Fund Quarterly. Health and Society* 95-124.
13. Amar Ben J, Khimis T, Salah Ben N (2016) Delay in diagnosis due to the patient during pulmonary tuberculosis according to the perception of stigma due to the disease. *J Resp Dis* 33: A142-3.
14. Laohasiriwong W, Mahato RK, Koju R, Vaeteewootacharn K (2016) Delay for First Consultation and Its Associated Factors among New Pulmonary Tuberculosis Patients of Central Nepal. *Tuberc Res Treat* 4583871.
15. Lorent N, Mugwaneza P, Mugabekazi J (2008) Risk factors for delay in the diagnosis and treatment of tuberculosis at a referral hospital in Rwanda. *Int J Tuberc Lung Dis* 4: 392-67
16. Rojpibulstit M, Kanjanakiritamrong J, Chongsuvivatwong V (2006) Patient and health system delays in the diagnosis of

- tuberculosis in Southern Thailand after health care reform. *Int J Tuberc Lung Dis* 10: 422–8.
17. Mesfin MM, Newell JN, Walley JD, Gessesew A, Madeley RJ (2009) Delayed consultation among pulmonary tuberculosis patients: A cross sectional study of 10 DOTS districts of Ethiopia. *BMC Public Health* 9: 1-10.
18. Xu B, Jiang QW, Xiu Y, Diwan VK (2005) Diagnostic delays in access to tuberculosis care in counties with or without the National Tuberculosis Control Program in rural China. *Int J Tuberc Lung Dis* 9: 784-90.
19. Mfinanga SG, Mutayoba BK, Kahwa A, Kimaro G, Mtandu R, et al. (2008) The magnitude and factors associated with delays in management of smear positive tuberculosis in Dar es Salaam, Tanzania. *BMC Health Serv Res* 8: 1-8.
20. Nasehi M, Hassanzadeh J, Rezaianzadeh A, Zeigami B, Tabatabaee H, et al. (2012) Diagnosis delay in smear positive tuberculosis patients. *J Res Med Sci* 17: 1001-4.
21. Li Y, Ehiri J, Tang S, Li D, Bian Y, Lin H, et al. (2013) Factors associated with patient, and diagnostic delays in Chinese TB patients : A systematic review and meta-analysis. *BMC Med* 11: 1.
22. Wang Y, Long Q, Liu Q, Tolhurst R, Tang S (2008) Treatment seeking for symptoms suggestive of TB: Comparison between migrants and permanent urban residents in Chongqing, China. *Trop Med Int Heal* 13: 927–33.
23. Belay M, Bjune G, Ameni G, Abebe F (2012) Diagnostic and treatment delay among Tuberculosis patients in Afar Region, Ethiopia: A cross-sectional study. *BMC Public Health* 12: 1.
24. Alema HB, Hailemariam SA, Misgina KH (2019) Health care seeking delay among pulmonary tuberculosis patients in North West zone of Tigray region, North Ethiopia. *BMC Infect Dis.* 19: 309.
25. Leye MMM, Thiam K, Seck I, Diop MD, Diongue M Et al. Factors associated with delayed diagnosis of tuberculosis in the Dakar suburbs (Senegal). *rev. Health Cams* 2016; 4 (221): 2-8.
26. Qureshi SA, Morkve O, Mustafa T (2008) Patient and health system delays: Health-care seeking behavior among pulmonary tuberculosis patients in Pakistan. *J Pak Med Assoc* 58: 318-21.
27. Sommerland N, Wouters E, Masquillier C, et al. (2017) Stigma as a barrier to the use of occupational health units for tuberculosis services in South Africa. *Int J Tuberc Lung Dis* 21: 75-80.