

Active Screening for Tuberculosis in Sub-Saharan Africa: The Case of Mosques in the District of Bamako (Mali)

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Abstract

Original Research Article

Introduction: In 2016, tuberculosis (TB) was the ninth leading cause of death worldwide and the leading cause of death due to a single infectious agent (WHO Tuberculosis Report, African Region 2016). At Mali's last census, carried out in 2009, the country's resident or legal population stood at 14,528,662, with an annual growth rate of 3.6% since 2009. The District of Bamako accounts for more than half of the urban population, i.e. 55.3% (RGPH 2009, p. 19). Mali is a highly tuberculosis-endemic country, with an estimated incidence of 56 cases per 100,000 inhabitants in 2016 (Incidence of tuberculosis in the world, World Bank link). This means that the country expects to have at least 10,000 cases of tuberculosis (TB) every year. **Objective:** To carry out active screening for cases of tuberculosis in places of worship in a developing country in sub-Saharan Africa. **Methodology:** This was a prospective cross-sectional study of active screening for TB in religious settings. We carried out systematic sampling in 02 mosques in each health district of the District of Bamako, i.e. a total of 12 mosques over a period of 03 days per commune. During the campaign period, our sample size was 1,092 participants. The campaign was preceded by a social mobilisation session with the faithful of these mosques. **Results:** Our study included 1,092 participants with a ratio of 1.5 in favour of men, i.e. 60.16%. The age range was 15 to 65 years and over, with the elderly being the most representative. We had 18 positive cases, representing 1.64%, the majority of whom were women (55.56%, 0.8 in favour of women). Among the positive cases, young people were more represented, with an age range of 15-24 years, representing 27.77%. In addition to the positive cases, there were 1,074 chronic coughers with negative bacilloscopy (98.35%).

Keywords: Tuberculosis in religious settings, active screening, mosque, Bamako – Mali.

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INTRODUCTION

Tuberculosis is the leading cause of death from a single infectious agent, yet it is a preventable and curable disease. (WHO Unified Guidelines on Tuberculosis: Systematic Screening Module). In 2022, in the midst of the global health crisis caused by the coronavirus (COVID-19), tuberculosis was still considered to be the leading cause of death from a single infectious agent, ranking above HIV/AIDS. It is a

disease caused by the bacillus *Mycobacterium tuberculosis*, which is spread when people with pulmonary tuberculosis expel bacteria into the air (by coughing, for example). It is estimated that a quarter of the world's population has been infected with TB, but most people will not go on to develop the disease form of TB and some will clear the infection. (WHO, Global Tuberculosis Report 2022). In 2016, 2.5 million people contracted TB in Africa, accounting for a quarter of

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new TB cases worldwide. An estimated 417,000 people died from the disease in the African region (1.7 million worldwide). More than 25% of deaths due to tuberculosis occur in the African region (WHO Tuberculosis Report, African Region 2016). Without treatment, the mortality rate from tuberculosis is high (around 50%). With current treatment recommendations (a 4-6 month course of anti-tuberculosis drugs), around 85% of people can be cured. Multidrug-resistant tuberculosis remains a public health crisis and a threat to global health security. The WHO estimates that there have been 451,551 new cases of resistance to rifampicin in the African region, the most effective first-line drug (WHO Tuberculosis Report, African Region 2016). Of the total number of people who develop TB each year, around 90% are adults, with more cases in men than women. The disease generally affects the lungs (TP), the only transmissible form, but can affect other sites. (WHO, Report 2022). In 2015, the incidence of tuberculosis in Mali was estimated at 57 cases per 100,000 inhabitants for a population of 17,828,270 (Perspective RGPH, 2009). This is a country with a high TB endemic, where at least 10,000 cases of tuberculosis (TB) are expected every year. In 2016, Mali recorded 7,038 cases of TB (Sangho O *et al.*, 2021). In 2016, the District of Bamako reported 1,462 cases of all forms of TB, with a detection rate of 80.23% and a treatment success rate of 84.45% for new cases of microscopy-positive pulmonary tuberculosis (PT+) (Source: DRS Report, 2017). Analysis of tuberculosis data in the District of Bamako for 2016 shows that out of 1,173 cases of PMT+, 55 cases, or around 4.68%, are people aged over 65. This makes them vulnerable to tuberculosis and other diseases. It should also be noted that of the BAAR sputum requests carried out on 25 chronic coughers in a Bamako mosque, 3 cases came back positive. (Source: DRS Report, 2017). As a result, the Regional Health Department has set out to encourage health workers to diagnose tuberculosis early, refer suspected cases, provide therapeutic follow-up and offer psychosocial support to patients. Mass screening is frequently used in the fight against endemic parasitic diseases, but rarely for bacterial diseases, except in occupational medicine and prison medicine. On the strength of all these arguments, we felt it necessary to present the results of this activity to the scientific community. The aim is to understand what is at stake in this approach to the fight against tuberculosis.

MATERIAL AND METHOD

Our study took place in the District of Bamako, the capital of Mali. It extends over 30 km from west to east and 20 km from north to south with a total surface area of approximately 267 km² for a population estimated at 2,352,000 inhabitants in 2016 (updated RGPH 2009). Its population density is 8,809 inhabitants/km². The annual growth rate is 5.4. It is surrounded by the cercle of Kati (Koulikoro region). It is bordered to the west by the commune of Mandé, to

the south by the commune of Kalaban Coro, to the south-east by the commune of Baguineda, to the east by the commune of Moribabougou and to the north by the commune of Kati. In terms of health, the Malian capital is divided into 06 health districts, each of which has a Reference Health Centre (CSRéf). These structures constitute the first reference in terms of the health pyramid. Mali is a secular country, with Islam the predominant religion (Monographie du District de Bamako, 2020).

This was a prospective cross-sectional study over a cumulative period of approximately 180 hours in 12 mosques hosting Friday prayers in 06 health districts, i.e. 02 mosques per commune. The sampling technique was systematic, which gave us a sample size of 1,092 participants for the chosen period. We spent 3 days per mosque, corresponding to 06 days per commune, for a total of 36 days for the entire study. The screening sessions lasted from 6 a.m. to 11 a.m., i.e. approximately 05 hours per mosque, making a cumulative total of 180 hours.

The approach consisted of awareness-raising sessions using social mobilisation techniques. A team made up of 4 managers from the Regional Health Department (DRS) and 4 technical agents from the CSRéf went to the 06 communes to inform the religious leaders of the mosques concerned in order to obtain their support but also their support for a wide dissemination of the information. To better coordinate the screening campaign, 6 supervisory teams made up of DRS managers (Regional Health Director, TB focal point, the Health Information System (SIS) manager, the two DRS pharmacists and the regional biologist) and CSRéf managers were set up.

Data collection was carried out by teams, each of which included a laboratory manager who supervised activities in the field, a tuberculosis officer who registered participants, a deputy tuberculosis officer who labelled spittoons, and a tuberculosis laboratory officer (BARR) who took samples. The period of our study was from 02 to 07 May 2017.

The variables studied were socio-demographic characteristics such as age, sex, residence; bacilloscopy positivity rate, chronic cough status.

RESULTS

Our results are described in 3 main sections, socio-demographic characteristics, positive cases and chronic coughers.

Socio-Demographic Characteristics

Our study included 1,092 participants from 12 mosques in 6 communes of the District of Bamako for a cumulative period of 36 days. The sex ratio was 1.5 in favour of men (60.16%).

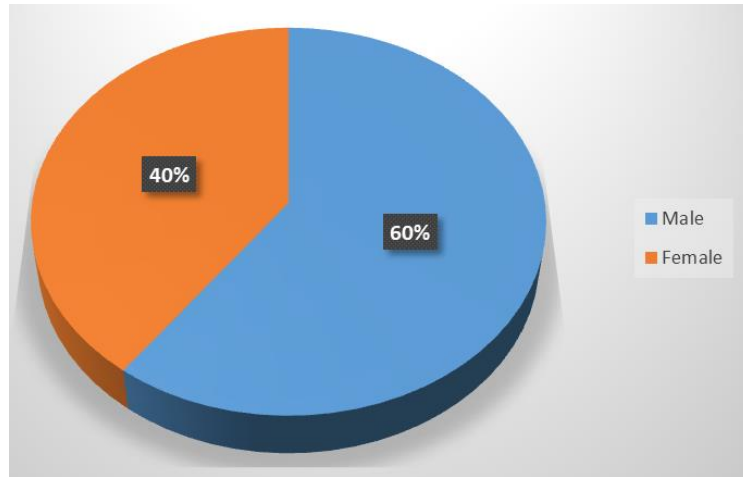


Figure 1: Breakdown of participants by gender

Participants ranged in age from 15 to 65 and over. Older people were the most represented, with

25.18% aged 65 and over, followed by the 55-64 age group with 21.79%.

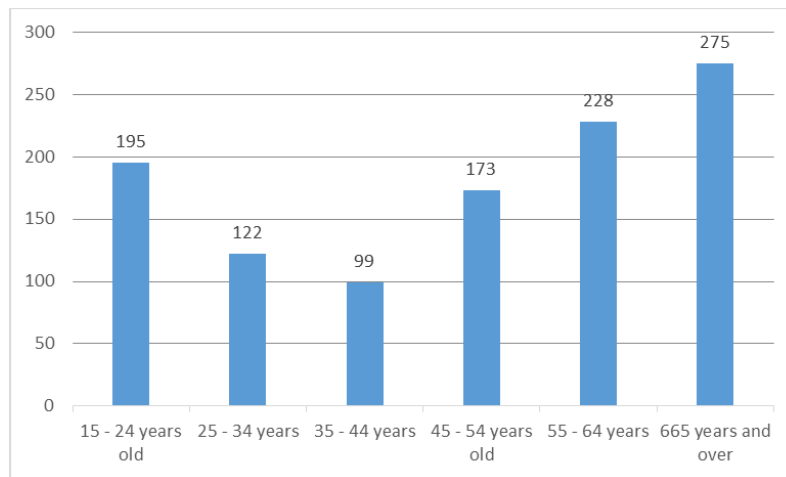


Figure 2: Breakdown of participants by age group

Positive cases: Among the 1,092 participants, we had 18 positive cases, i.e. 1.64%.

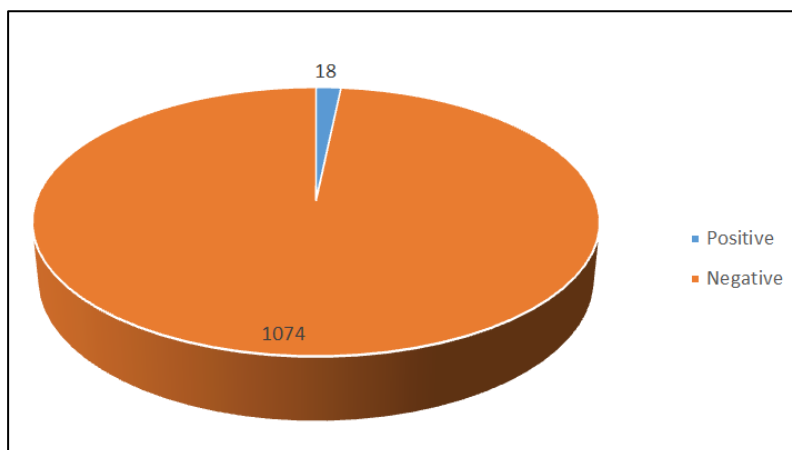


Figure 3: Distribution of participants according to bacilloscopy result

Of the positive cases, 10 out of 18 (55.56%) were female.

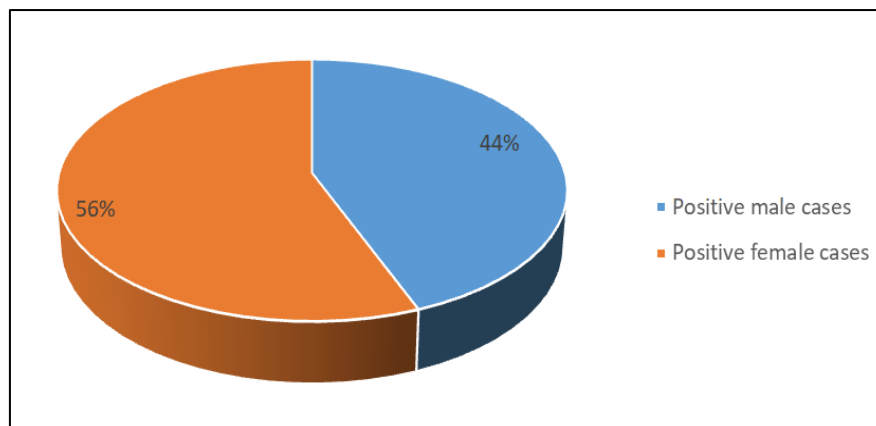


Figure 4: Breakdown of positive cases by sex

Young people were more heavily represented, with 5 cases out of 18 in the 15-24 age group (27.77%). The majority of positive cases came from commune VI of the District of Bamako, i.e. around 44.44%.

Chronic coughers: Of the 1,092 participants, we identified 1,074 chronic coughers with negative bacilloscopy, i.e. 98.35%. Of these, 60.42% were male and 39.57% female, giving a sex ratio of 1.52 in favour of men. Older people were much more represented in the 65+ age group with 25.41%, followed by the 55-64 age group with 20.94%.

DISCUSSION

The aim of our study was to describe the bacilloscopy positivity profile of worshippers at 12 mosques hosting Friday prayers in the 06 communes of the District of Bamako. It included 1,092 participants from 12 mosques in 6 communes of the District of Bamako during a cumulative period of 36 days (from 02 to 07 May 2017). D. M. Pelissari *et al.*, (D. M. Pelissari *et al.*, Brazil 2018,) in Brazil, included 10,326 prisoners in their study of systematic TB screening at the ALEGRE Central Remand Prison, Porto ALEGRE, in the capital of Rio State in southern Brazil for 23 months (October 2014 to August 2016). S. John *et al.*, (S. John *et al.*, Nigeria 2014) in Nigeria included 96,376 nomads in active community research over 2 years. Our sample is very far from these 2 studies, which can be explained by the duration of the studies and the techniques used. The Brazilian study conducted systematic active research for 23 months, whereas the Nigerian study conducted community-based active research among nomads for a period of 24 months. The sex ratio of participants was 1.5 in favour of men (60.16%). In our study, the age range of participants was 15 to 65 years and over. Older people were the most represented, with 25.18% aged 65 and over. A.P. Wachinou *et al.*, (A.P. *et al.*, Benin December 2018) found the approximate results to be a notification rate of cases among the elderly that was more than double that of young people (68 cases compared with 31 cases per 100,000 inhabitants). We recorded 18 positive cases, or 1.64%. In 2016, Mali had an estimated incidence of

tuberculosis of 56 cases per 100,000 inhabitants, which is indicative of a country with high tuberculosis endemicity (Incidence of Tuberculosis in the World, World Bank link). According to the WHO, countries with a low incidence of tuberculosis are defined by a rate of tuberculosis cases estimated at < 100 cases per 100,000 inhabitants (WHO Guidelines, 2008). We had more women than men, with 10 women compared with 08 men (55.56%), giving a sex ratio of 0.8 in favour of women. In a study carried out at the CHU du Point G in Mali by D.D.N Soumaré *et al.*, (D.D.N Soumaré *et al.*, Mali, 2018) among hospitalised TB patients, the sex ratio was 1.2 in favour of men. Our results are totally different from this study. Among the positive cases, we had more young people (age range 15 - 24 years) with 5 cases out of 18 or 27.77% than elderly people. Our results were similar to those of D. M. Pelissari *et al.*, in Brazil (D. M. Pelissari *et al.*, Brazil 2018,) who found 44.4% of participants with tuberculosis aged between 25 and 34 (37% of the population screened). This is explained by the fact that his study was based on a systematic screening technique of prisoners in ALEGRE prison. A. P Wachinou *et al.*, (A. P Wachinou *et al.*, Benin 2018) in Benin found different results in his study conducted from 1 January to 31 December 2013. The notification threshold for TB in subjects aged 60 and over was estimated at 601 out of 6,531 TB cases, or 9.2%, compared with only 31 cases per 100,000 inhabitants in young people. The majority of positive cases came from Commune VI of the District of Bamako, i.e. 44.44%. This could be explained by the fact that this commune is the most densely populated in the District of Bamako, with a total population of 470,269, for a population weight of 26, the highest in the whole capital in 2009, the year of the last RGPH (Source DRS, health map 2021). We identified 1,074 chronic coughers with negative bacilloscopy. Among them, the sex ratio was 1.52 in favour of men. The most representative age group were those aged 65 and over, with a rate of 25.41%, followed by those aged 55-64, with a rate of 20.94%. These results are similar to those of P Wachinou *et al.*, in Benin (D. M. Pelissari *et al.*, Brazil 2018,). All 1,074 chronic coughers were referred to the CSRéfs for confirmation by chest X-ray.

Limitations of the Study

There were difficulties in following up chronic coughers who had a negative bacilloscopy due to a lack of funding. According to the analysis of 2016 data, tuberculosis in the District of Bamako, we note that 55 out of 1173 cases of microscopy-positive pulmonary tuberculosis (MPT+) are people aged over 65. This is an age group that is vulnerable to tuberculosis. Advanced follow-up is needed to confirm or refute the diagnosis of tuberculosis in these subjects, who present all the arguments in favour of microscopy-negative pulmonary tuberculosis (MPT-), namely age and chronic cough.

The size of the sample compared with other mass screening studies in the sub-region. The duration of the study, which was 03 days per commune from 02 to 07 May 2017, i.e. a total cumulative duration of 36 days.

CONCLUSION

Tuberculosis is an opportunistic and persistent transmissible bacterial disease. It is more common in sub-Saharan Africa. We carried out a study of mass screening in places of worship, in the case of 12 large mosques hosting Friday prayers in the District of Bamako. Out of 1,092 participants, we identified 18 positive cases, a rate of 1.64%. The sex ratio was 0.8 in favour of women, with a younger age range of 15 to 24 years. We obtained 1,074 chronic coughers whose bacilloscopy was negative (they were all referred to the CSRéf for confirmation). The sex ratio of chronic coughers was 1.52 in favour of men. A study including a larger sample size over a longer period with the possibility of following up chronic coughers would certainly give better results.

Conflicts of Interest: None

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