Cogitare Enfermagem

ORIGINAL ARTICLE

DIAGNOSIS AND MONITORING OF TUBERCULOSIS – DIFFERENCES BETWEEN THE GENERAL POPULATION AND THOSE WITH VULNERABILITIES

Giselle Lima de Freitas[1]
Giovanna Eliza Moreira França[1]
Thaís Rodrigues de Souza[1]
Vanessa de Moura Macário[1]
Aline Figueiredo Camargo[1]
Simone Protti-Zanatta[2]
Ricardo Alexandre Arcêncio[3]

ABSTRACT

Objective: to compare the performance of diagnostic exams and monitoring of tuberculosis between the general population and those in situations of social vulnerability from the municipality of Belo Horizonte/MG. Method: an epidemiological study of the tuberculosis cases recorded between 2001 and 2017 in the Information System of Belo Horizonte - Brazil. A descriptive analysis and a comparison were performed between the general population and those in street situations and deprived of their freedom. Results: diagnostic and follow-up tests were performed more frequently in vulnerable populations, in up to 30%, with low use of the rapid molecular test (mean of 35.4%) and of the observed treatment, with 22% of performance in the street population. and 38% in individuals deprived of freedom. Conclusion: the study points to the need to prioritize the rapid test and the observed treatment, especially among vulnerable groups. Disseminating the use of these tools can determine interruption of the transmission chain, the possibility of a cure and non-occurrence resistance.

DESCRIPTORS: Tuberculosis; Social Vulnerability; Social Determinants of Health; Street People; Inmates.

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[1]Universidade Federal de Minas Gerais, Belo Horizonte, MG, Brasil.
[2]Universidade Federal de São Carlos, São Carlos, SP, Brasil.
[3]Universidade de São Paulo, Ribeirão Preto, SP, Brasil.

INTRODUCTION

Tuberculosis (TB) is known as a serious public health problem and represents an important challenge to be faced since, despite the possibility of being treated and even achieving a cure, it is still a disease with a significant potential for lethality and many people die even before being diagnosed[1]. The first cases in Brazil date back from the 19th century, when the disease was called the "Plague of the Poor"[2].

The World Health Organization (WHO) considers the social determinants of health (SDHs) as the social, political, economic, environmental and cultural circumstances in which an individual grows, lives and works and that influence their health status[3]. Illness by tuberculosis goes beyond the mere biological factors and is directly associated with the social determinants[4].

Developing countries present high morbidity and mortality rates due to the disease[5]. Population groups are recognized as those who, due to their living and health conditions, are at greater risk of illness than others, such as indigenous people, people living with HIV/AIDS, people deprived of freedom (PDoF) and the street population (SP)[4]. These groups are recognized by the National Tuberculosis Control Program (Programa Nacional de Controle da Tuberculose, PNCT) as special population segments, in addition to being in a situation of greater social vulnerability and more susceptible to the infection[6].

2018, PDoF represented 10.5% of the new tuberculosis cases in Brazil, and SP accounted for 2.5%, which evidences the social impact of the disease[7]. In 2014, PDoF represented 0.3% of the Brazilian population; however, they presented 7.8% of new cases in the country, with a 28 times greater risk of infection by the disease when compared to the general population, while SP had a 56 times greater risk[6]. In addition, the street population finds it difficult to access the Unified Health System (Sistema Único de Saúde, SUS), resorting to the service, mainly in urgent cases, compromising diagnosis and treatment of different diseases, including tuberculosis[8].

In 2013, the GeneXpert MTB/RIF (TRM/TB) diagnostic method was incorporated into the SUS, a rapid molecular test capable of detecting Mycobacterium tuberculosis and resistance to rifampicin[9]. The rapid test has technology capable of providing precision, safety and speed in diagnosis, which can improve efficacy in mapping the assistance provided to the users undergoing tuberculosis treatment[10]. According to the National Plan for the Eradication of Tuberculosis, it is fundamental to intensify the search for cases and promote actions that enable access to early diagnosis, objective for which the rapid test represents an important tool[4].

The Directly Observed Treatment (DOT) is a strategy to monitor the treatment that allows increasing adherence to the therapy against tuberculosis and reducing treatment abandonment. The strategy consists in a professional observing compliance by the patient with the medication dose, especially professionals linked to Primary Health Care (PHC)[11].

Considering social inequality in the country, in addition to other factors such as the growing number of people living on the streets and deprived of their freedom, the impact of tuberculosis on populations in situations of social vulnerability, the difficulty adhering to treatment and the global strategy to prioritize these populations for disease control, it is important to recognize how care is being provided to patients in situations of social vulnerability. The objective of this study was to compare the performance of diagnostic tests and monitoring of tuberculosis between the general population and those in situations of social vulnerability from the municipality of Belo Horizonte/MG.

METHOD

This is a descriptive and epidemiological study with a quantitative approach, based on data from the Tuberculosis Notifiable Diseases Information System (Sistema de Informação de Agravos de Notificação da Tuberculose, SINAN/TB) in the city of Belo Horizonte, from 2001 to 2017.

The population consisted of confirmed cases notified in the system, in that period, including residents of the city of Belo Horizonte, regardless of the diagnosis method (smear microscopy, culture and/or TRM) and considering only one entry into the service for each user, that is, duplicate cases were excluded. For analysis purposes, the study population was stratified into the general population (GP) and the vulnerable population, the latter represented by the street population and by people deprived of their freedom.

The database was processed between January and March 2021 by extracting the variables of interest. The following variables were selected to characterize the sociodemographic data: genre, age, race, schooling and beneficiary of the income complementation program. The following was analyzed for comparison purposes: frequency of requests for smear microscopy, culture and rifampicin resistance tests (by GeneXpert® MTB/RIF and by the sensitivity test); for monitoring of the treatment, the anti-HIV and DOT tests were considered. The mean time between the notification date and treatment initiation was also calculated in the period before and after introducing the rapid molecular test.

Data analysis was performed between April and June 2021, by resorting to the Microsoft Excel 2010 package for distribution of the absolute and relative frequencies of the variables selected.

The project was approved by the Research Ethics Committee of the Federal University of Minas Gerais (Universidade Federal de Minas Gerais, UFMG), under opinion No. 3,508,404.

RESULTS

The sample consisted of 21,841 tuberculosis cases, with 21,305 among the GP, 349 among PDoF and 187 among SP.

In 2015, the notification form underwent changes, with the incorporation of the following information: "Street population" and "beneficiaries of the governmental income transfer program"; the following health problems: "smoking" and "illicit drug use"; and the following exams: "rapid molecular test" and "sensitivity test". It is important to note the significant amount of data that were not filled-out or incorrectly filled-out, in this study called "missing".

The sample was predominantly male, aged between 31 and 49 years old, self-declared as brown-skinned and with 9 to 12 years of study among people deprived of their freedom, and from 0 to 4 and from 4 to 9 years of study, respectively, in the street population and the general population. Most of the sample receives no benefits from the government's income transfer programs. Table 1 presents the sociodemographic data.

Table 1 - Sociodemographic data of the tuberculosis cases from 2011 to 2017. Belo Horizonte, MG, Brazil, 2021

Sociodemographic Data	General Population		PDoF		SP*	
	n	%	n	%	n	%
Gender						
Male	14,056	66	271	77.65	149	79.67
Female	7,249	34	78	22.34	38	20.32
Age						
0-17 years old	1,135	5.32	0	0	0	0
18-30 years old	4,886	22.93	109	31.23	28	14.97
31-49 years old	9,195	43.15	174	49.85	127	67.91
50-60 years old	3,427	16.08	40	11.46	28	14.97
Over 60 years old	2,662	12.52	26	7.46	8	2.15
Race						
White	5,821	27.32	81	23.20	20	10.69
Black	3,134	14.71	51	14.61	45	24.06
Asian	124	0.58	4	1.14	1	0.53
Brown	6,947	32.60	135	38.68	82	43.85
Indigenous	26	0.12	0	0	0	0
Unknown**	3,393	15.92	63	18.05	38	20.32
Missing	1,860	8.75	15	4.29	1	0.53
Schooling						
0-4 years of study	1,963	9.21	14	4.01	17	9.09
4-9 years of study	3,406	15.98	38	10.88	17	9.09
9-12 years of study	3,053	14.32	43	12.35	12	6.43
More than 12 years of study	954	4.44	8	2.28	0	0
Unknown	8,586	40.30	206	59.02	130	69.51
Does not apply***	375	1.76	0	0	0	0
Missing	2,968	13.99	40	11.46	11	5.88
Beneficiary of the government's Income Transfer Program*						
Yes	41	1.44	0	0	8	4.27
No	1,145	40.21	5	12.19	49	26.20
Unknown	1,478	51.91	35	85.36	123	65.77
Missing	183	6.44	1	2.45	7	3.74

* Information included since 2015

** Unknown information

*** The information cannot be applied to the user

Source: Created for the purposes of this study

As for the performance of diagnostic tests, the vulnerable populations were submitted to a greater performance of culture, smear microscopy, rapid test and sensitivity test, as shown in Table 2.

The frequency of tuberculosis monitoring by performing the anti-HIV test was greater than 50% in all three groups under study. Regarding the monitoring performed via the Directly Observed Treatment, PDoF represented the population group that most indications and procedures obtained, followed by the general population. There was no record of observed treatment indication in the street population. The clinical data are presented in Table 2.

Table 2 - Clinical data of the tuberculosis cases from 2011 to 2017. Belo Horizonte, MG, Brazil, 2021

Clinical Data	General Population		PDoF		SP*	
	n	%	n	%	n	%
Tests Performed						
Quick Molecular Test for TB*	944	33,15	14	34,14	73	39.03
Sensitivity Test*	427	14,99	7	17,07	41	21.92
Smear Microscopy	15,266	71,65	269	77,07	169	90.37
Culture	4,420	20,74	95	27,22	98	52.40
HIV Test	12,354	57,98	258	73,92	159	85.02
Missing**	3,128		47		149	
Directly Observed Treatment						
Indicated	5,942	27,89	131	37,53	0	0
Performed	4,942	23,19	133	38,10	42	22.34

* Information included since 2015

** Data not filled-out and/or incorrectly filled-out

Source: Created for the purposes of this study

With the introduction of TRM/TB, there was a reduction in the mean time for treatment initiation in the populations studied. It is emphasized that the data about the street population and the rapid molecular test was incorporated to the form in 2015, and that the mean time between diagnosis and treatment initiation was 6.87 days. These data are represented in Table 3.

Table 3 - Mean time for treatment initiation in the tuberculosis cases from 2001 to 2017. Belo Horizonte, MG, Brazil, 2021

Mean time for treatment initiation (Days)	Before GeneXpert MTB/RIF	After GeneXpert MTB/RIF*
General Population	17.34	0

Population Deprived of their Freedom	16.57	0.95
Street Population*		6.87

* Information included since 2015
Source: Created for the purposes of this study

DISCUSSION

In the sociodemographic profile, all three population groups categorized for this study showed predominance of males, of mixed race, aged between 31 and 49 years old, with low schooling levels and not beneficiaries of any of the income transfer programs offered by the government. Performance of diagnostic tests was more frequent among the population groups in situations of vulnerability, especially in the street population. However, monitoring of the treatment via DOT was less indicated and performed in this population. It is noted that, with the incorporation of the rapid molecular test there was a reduction in the mean time for treatment initiation in the general population and among the people deprived of their freedom.

The sociodemographic profile of the tuberculosis cases reinforces the relationship of the disease with social order issues, as there was predominance of brown-skinned individuals and with low schooling levels. The social determinants of health that refer to individual, social, economic and cultural aspects and that exert an impact on the health of individuals expose populations to a situation of greater vulnerability3, bringing these populations closer to diseases with a strong social character and directly linked to poverty. The concept of vulnerability permeates the ideas of disadvantages, perils and exposure to harms in health due to a lower response capacity and to frailty linked to individual existence[12].

Reception of benefits through income supplementation programs in this study was restricted, aggravating the situation of social vulnerability of the populations studied and even compromising treatment of tuberculosis. A systematic review that evaluated the impact of social protection programs on adults diagnosed with the disease showed a positive relationship between receiving social assistance and improvements in patients with greater adherence to the treatment, as well as an increase in the cure rates by up to 8%[13].

The street population's life context favors infection by the Mycobacterium and absence of treatment or incomplete treatment of tuberculosis. Among the particularities that involve this population, the stigmatizing experience, physical and moral violence and quality of the care provided are described, compromising their access to health services[14]. In addition, these individuals have unmet basic needs related to food, elimination, sleep and rest, which causes health-related issues to be relegated[15]. A study conducted in Rio de Janeiro evidenced a high abandonment rate in treatments related to consumption of alcohol and other drugs, to deficient diet, to low self-esteem, and to the very fact of living on the street[16].

The National Policy for Comprehensive Health Care for Persons Deprived of Freedom (Política Nacional de Atenção Integral à Saúde das Pessoas Privadas de Liberdade, PNAISP) was born from the realization of an insufficiency of the pre-existing penitentiary model and the need for greater inclusion of persons deprived of freedom in the SUS[17]. The prison population in Minas Gerais was the second largest in the country in 2019 (74,712 inmates) and records overcrowding indices in prisons, only behind the state of São Paulo[18].

In the prison system, plurality in terms of population is found; these people are affected by the same diseases that affect the general population; however, due to the

conditions of confinement and overcrowding of cells, these diseases can be potentiated[17]. In addition to PNAISP, a number of ordinances were devised in order to establish health work in the prison system, with multiprofessional teams and focused on ensuring PDoF's access to health[19].

Knowledge about prevention, control and treatment of tuberculosis on the part of those working in prisons is considered relevant; however, the presence of health professionals in these places is insufficient, and the literature points to low motivation due to poor working conditions and impediment to respond to the ethical demands of their profession[16].

Prison officers who are in closest contact with people deprived of their freedom can strategically observe the TB symptoms and establish communication with the health team, in order to promote rapid diagnosis and treatment of the disease. A questionnaire applied to the state of Pará indicated that 68% of the agents participating in the research do not consider themselves well-informed about TB, which makes it necessary to implement educational actions about this pathology for workers in the area[20].

Confirmation of the tuberculosis diagnosis must be made by means of bacteriologic tests. In Brazil, sputum smear microscopy is considered the standard, allowing for the identification of 60% to 80% of the cases in adults. The rapid molecular test for tuberculosis, performed by means of the GeneXpert® MTB/RIF system, is capable of identifying the genetic material of the bacilli and detecting resistance to rifampicin with 90% and 95% sensitivity, respectively, for these two situations[4].

In 2010, the WHO had endorsed the use of the rapid molecular test for the diagnosis of TB; however, in Brazil, its incorporation within the scope of the Unified Health System took place in September 2013 through ordinance number 48 of the Ministry of Health[21]. In addition to being a fast tool, it provides the result in a maximum of two hours and is highly sensitive. In addition to that, the rapid test presents reduced biological risks, as its manual stage is minimal[22].

In the current study, however, low use of the rapid molecular test was observed since, as illustrated in Table 2, there were not more than 40% of performance notifications in all three population groups. Performance of diagnostic tests was more frequent among the population groups in situations of vulnerability, with TRM-TB as the one most performed among the street population. The sensitivity test was the least performed in all three population groups.

After introduction of the rapid test, the mean time for treatment initiation was reduced in the general population and among people deprived of their freedom, which reinforces the importance of disseminating its use, especially in vulnerable groups, due to the possibility of contributing to breaking the disease transmission chain.

A study points out that, in some municipalities, this time was longer after implementing the rapid test, and the authors suggest that, despite the existence of a technology that provides the result in a shorter period of time, strategies must be implemented so that the treatment is initiated as soon as possible, effectively taking advantage of the test's technology and preventing spread of the bacterium[23].

The difficulty carrying out diagnosis and monitoring in vulnerable populations requires that health professionals, especially in Primary Health Care, prioritize performance of the rapid test[24]. Recognizing the power of using the test for early diagnosis of tuberculosis, initiation of timely treatment and interruption of the transmission chain, expansion of its use is important, especially for vulnerable populations, which due to difficulties accessing health services can maintain the transmission chain and suffer complications related to non-treatment.

The basic treatment for tuberculosis lasts six months and, in cases of resistance to the

first-line drugs, it can be extended to nine months or one year. As it is a long treatment, at the first signs of the symptoms disappearing, it is not uncommon for the patients to stop taking the medication; thus, the Directly Observed Treatment is considered strategic for care continuity, especially for populations in vulnerable situations[15].

In the current study there was no record of observed treatment indication for the street population, only being performed by 22% of this group. Performance of the DOT presented a higher percentage among those deprived of their freedom (38.10%), when compared to the other population groups analyzed.

This result was also observed in another study and can be associated with access to health care within prison units[25]. The fact that this population segment is under a social internment regime seems to favor DOT implementation and enable adherence to the treatment[16]. In a national research study conducted from 2007 and 2013, 61% of the people deprived of their freedom underwent observed treatment, showing that the current study follows the national pattern[6]. However, this reality does not apply to all Brazilian cities and states, such as Paraíba, where low DOT performance stands out [26].

In 2003, creation of the National Health Plan in the Penitentiary System (Plano Nacional de Saúde no Sistema Penitenciário, PNSSP) jointly by the Ministry of Health and the Ministry of Justice aimed at strengthening policies and actions targeted at the health of the prison population, which is still considerably limited today[27]. The elaboration of structuring policies focused on socially vulnerable populations represents the guarantee of the right to health and access to the services, which are sometimes denied or neglected. In the case of tuberculosis, disseminating the use of tools already available in the SUS can determine interruption of the transmission chain, completion of the treatment for a cure and non-occurrence of resistance cases.

The limitations found in this study relate to the use of secondary data, the amount of data framed in "missing", especially in socially vulnerable populations, and the time limit of data on the street population, included from 2015. Even so, the study points to prioritization of the rapid molecular test because it allows interrupting the transmission chain and to performance of the observed treatment, especially among vulnerable groups.

CONCLUSION

The study made it possible to compare the performance of diagnostic and monitoring tests for tuberculosis among different population groups, indicating its higher frequency among populations in situations of vulnerability, even so, with restricted use of important diagnostic and monitoring tools, such as rapid molecular test and Directly Observed Treatment. Illness by tuberculosis is determined by social issues, confirmed in this study by the sociodemographic profile that was identified, aggravated by lack of access to income transfer programs.

Therefore, it is considered important to invest in the training and qualification of professionals to work with vulnerable populations, to encourage intersectoral work, to emphasize the importance of income transfer programs as a way of favoring adherence and effectiveness of the treatment for tuberculosis, and to prioritize the use of strategies already available in the Unified Health System.

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Corresponding author:
Giselle Lima de Freitas
Universidade Federal de Minas Gerais
Av. Prof. Alfredo Balena, 190 - Santa Efigênia, Belo Horizonte - MG, 30130-100
E-mail: gisellelf@yahoo.com.br

Role of Authors:
Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work - Freitas GL de, França GEM, Souza TR de, Macário V de M, Camargo AF, Protti-Zanatta S, Arcêncio RA; Drafting the work or revising it critically for important intellectual content - Freitas GL de, Souza TR de, Macário V de M, Camargo AF, Protti-Zanatta S, Arcêncio RA; Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved - Freitas GL de. All authors approved the final version of the text.

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