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Tuberculosis infection among primary health care workers

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ABSTRACT

Objective: To estimate the prevalence of and determine the risk factors associated with latent *Mycobacterium tuberculosis* infection (LTBI) among primary health care workers in the city of Vitória, Brazil. **Methods:** This was a cross-sectional study with data collected through a survey regarding socio-demographic, occupational, clinical, and exposure characteristics, as well as knowledge about tuberculosis, conducted between 2011 and 2012. All participants underwent a tuberculin skin test (TST), and TSTs were read at 72 h by a trained professional. **Results:** A total of 218 primary health care workers participated in the study. The prevalence of TST positivity at the ≥ 10-mm and ≥ 5-mm cut-off points was, respectively, 39.4% (95% CI: 32.9-45.9) and 54.1% (95% CI: 47.4-60.7). Regarding occupational categories, community health agents had the highest proportion of TST positivity, regardless of the cut-off point (≥ 10 mm: 47.5%; and ≥ 5 mm: 60.5%). Regarding factors associated with TST results, "having had a previous TST" showed a statistically significant association with TST positivity at the ≥ 10-mm and ≥ 5-mm cut-off points (OR = 2.5 [95% CI: 1.17-5.30] and OR = 2.18 [95% CI: 1.23-3.87], respectively). **Conclusions:** The prevalence of LTBI was found to be high among the primary health care workers in this sample. Therefore, we recommend the establishment of a periodic screening program for LTBI and implementation of effective biosafety policies for the prevention of this infection among primary health care workers.

Keywords: Health personnel; Tuberculin test; Latent tuberculosis; Primary health care.

INTRODUCTION

The principles and guidelines of the Brazilian Unified Health Care System, which have been developed with the purpose of organizing this system and the health care facilities, have decentralization as one of their cornerstones. From this perspective, primary health care, because of its dynamism and capillarity, is the preferred gateway and center of communication between the users and the public health care network. The Family Health Program (FHP) strategy is the model of care that guides and reorganizes this scope of care regarding different adverse health events and health care needs, including public policies aimed at a serious and complex public health problem: tuberculosis.[1,2]

Despite being one of the leading causes of morbidity and mortality in the world,[3] tuberculosis continues to be a neglected issue in low- and middle-income countries and a major public health problem.[4] Among tuberculosis risk groups are health care workers, this group being one of the most vulnerable, as has been demonstrated in some studies.[5-7] Tuberculosis risk has been associated with duration of occupational exposure to patients with tuberculosis, delay in diagnosis and in laboratory confirmation of tuberculosis, occupational category, and activities in certain settings, as well as with a lack of administrative, environmental control, and personal protective measures.[5]

In 2004, the Brazilian National Ministry of Health emphasized the integration of the activities of the Brazilian National TCP into all facilities within the Brazilian Unified Health Care System. Following the TCP guidelines in relation to "longitudinality" in the fight against tuberculosis,[8] control measures were decentralized and redirected to primary care, which, in this case, would be the responsibility of the FHP strategy and the Community Health Agent Program.

For this reason, it has been hypothesized that, although studies have been conducted that confirmed a greater chance of infection in the hospital setting,[5,9-12] health care workers who work in primary care and act as a gateway to services for patients with suspected tuberculosis and those diagnosed with tuberculosis would also have a greater likelihood of infection, as has been demonstrated in other studies.[13-15]

Therefore, the present study was designed with the objective of estimating the prevalence of and analysing the risk factors associated with latent *Mycobacterium tuberculosis* infection (LTBI) among primary health care workers in the city of Vitória, Brazil.

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METHODS

This was a cross-sectional study in which the target population was health care workers—community health agents (CHAs), nursing assistants/technicians, nurses, and physicians—affiliated with the primary health care network and the tuberculosis control programs (TCPs) in the city of Vitória, Brazil.

The inclusion criteria were belonging to the aforementioned occupational categories and having a negative HIV rapid test result. The exclusion criteria were being known to be infected with HIV, having received prophylaxis for LTBI, having received treatment for tuberculosis, or being pregnant. Loss to follow-up was defined as failure to return for tuberculin skin test (TST) reading on the scheduled date.

For calculating the sample size, we adopted a prevalence of tuberculosis infection of 30% among the health care workers, given that, in the literature, this prevalence rate ranged from 10% to 40%.[8] The lowest projected prevalence was 20%, with a test power of 90% and a loss of 10%, totaling 230 health care workers for the final analysis.

The primary health care clinics (PHCCs) were selected by simple random sampling, being listed in their respective health categories—traditional PHCC, PHCC with an FHS program, PHCC with a Community Health Agent Program, and PHCC with a TCP. Participation of health care workers was conditioned on their agreeing to participate and giving written informed consent. All health care workers included in the study underwent chest X-ray and medical evaluation to assess epidemiological and clinical aspects with the aim of excluding the possibility of active tuberculosis, in accordance with instructions from the Brazilian National Ministry of Health.[1]

Participants were administered a questionnaire collecting data on socio-demographic characteristics, clinical characteristics, and knowledge about tuberculosis, as well as undergoing a diagnostic test, the TST, for the identification of LTBI. For the test, 0.1 mL (2 tuberculin units) of PPD RT23 (State Serum Institute, Copenhagen, Denmark) was administered i.d. in the middle third of the volar aspect of the left forearm. TSTs were read 72 h after injection, by measuring the maximum transverse diameter of the area of palpable induration with a millimeter ruler.[1] It was not possible to investigate the booster effect among the study participants. TSTs were administered by a professional trained by the Espírito Santo State Department of Health and certified by the State Tuberculosis Program. An HIV rapid test (HIV Rapid Check; Infectious Disease Center, Federal University of Espírito Santo, Vitória, Brazil) was used as a screening procedure and an exclusion criterion, being performed in accordance with the manufacturer's instructions.

To assess the questionnaire's face validity for collecting data for the research project, a pilot study was conducted at the Maruípe Health Care Clinic, in the city of Vitória, Brazil, in which a nurse who participated in the process of development of that instrument administered it to 10 health care workers invited to this assessment. As a result of this step, we made changes to the questions regarding the physical structure of the PHCCs.

The independent variables considered in this study included gender (male or female); age group (19-30, 31-40, 41-50, or 51-70 years); occupation (CHA, nursing assistant or technician, nurse, or physician); working at a PHCC that has a TCP in place (no or yes); length of time working in the current position in primary care (< 5 years or ≥ 5 years); working in primary care only (no or yes); having ever worked in a setting with a high risk of TB (no or yes); having received some training/education on tuberculosis (no or yes—if yes, less than 5 years ago or 5 years ago or more and appraisal of the contribution of such training to clinical practice [good, fair, or poor]); frequency of seeking information on tuberculosis (never, sometimes, or always); frequency of availability of personal protective equipment (PPE) at the PHCC (never, sometimes, or always); easy access to PPE at the PHCC (no or yes); frequency of PPE use during the care of patients with respiratory symptoms (never, sometimes or always); having a BCG vaccination scar (no or yes); having ever had close contact with someone with tuberculosis (no or yes); having comorbidities or being on immunosuppressive drugs (no or yes); smoking (no, yes, or former smoker); and drinking (no or yes).

The outcome variable was the TST result, in mm, as recommended by the Brazilian National Ministry of Health.[1] As an evaluation method, we established cut-off points of 10-mm and 5-mm induration at 72 hours for TST positivity, with TST results being grouped for comparison as follows: TST reactions < 10 mm and < 5 mm (negative TST); and TST reactions ≥ 10 mm and ≥ 5 mm (positive TST).[1]

All information was coded and stored anonymously in a dedicated database created with Windows® Excel. Data were collected on case report forms.

The chi-square test was used for proportion differences, and the Student's t-test or the Mann-Whitney test was used for mean differences, when appropriate. To estimate associations with *M. tuberculosis* infection, we used ORs, which were calculated with 95% CIs. In the bivariate analysis, a p value of ≤ 0.20 was considered to indicate a statistically significant difference, whereas in the multivariate analysis we used a p value of ≤ 0.05. For sample size calculation and statistical analysis, we used Stata statistical software, version 13 (StataCorp LP, College Station, TX, USA).

The present study was previously authorized by the Vitória Municipal Health Department and was approved by the Human Research Ethics Committee of the Federal University of Espírito Santo Health Sciences Center (CEP no. 007/2010).

RESULTS

Over the data collection period, the number of health care workers affiliated with the primary health care

network in the city of Vitória, Brazil, was 911. Of those, as shown in the flowchart in Figure 1, 568 worked at the health care facilities selected for the study and were therefore potentially eligible. However, only 231 voluntarily agreed to participate in the study. The distribution of the eligibility and participation samples of health care workers, by PHCC, is shown in Table 1. Of the 231 volunteer participants, 5 (2.1%) were lost because they failed to present at 72 h for TST reading, 5 (2.1%) had received treatment for LTBI, and 3 (1.3%) had been treated for active tuberculosis. All of those 13 were excluded from the study. Therefore, the study sample consisted of 218 participants who underwent screening. Active tuberculosis was not diagnosed in any of the health care workers included in the study, and none were recommended to receive LTBI prophylaxis.

The prevalence of LTBI among the 218 participants, according to the TST results at the ≥ 10-mm and ≥ 5-mm cut-off points, respectively, was 39.4% (95% CI: 32.9-45.9) and 54.1% (95% CI: 47.4-60.7).

Regarding the general characteristics of the health care workers included in the study, 200 (91.7%) were female, and 197 (90.3%) had a BCG vaccination scar. The mean age of the participants was 43 years (95% CI: 41.7-44.4), with normal distribution.

Figure 1 presents the study flowchart showing the distribution of the health care workers by TST cut-off points (≥ 10 mm and ≥ 5 mm). Regarding occupational categories, we found that 99 (45.3%) and 103 (47.5%) of those who had positive TST results at the ≥ 10-mm and ≥ 5-mm cut-off points, respectively, were CHAs. The mean length of time working in the current position in primary care was approximately 8 years (95% CI: 7.38-8.95).

Bivariate analysis (Tables 2 and 3) for the TST cut-off point of ≥ 5 mm revealed that the variables length of time ≥ 5 years working in the current position in primary care (p = 0.04), having had a previous TST (p = < 0.01), being a smoker (p = 0.01), and being an alcoholic (p = 0.13) were associated with positive TST results. For the TST cut-off point of ≥ 10 mm, age group (p = 0.09), appraisal of the training/education on tuberculosis (p = 0.16), having had a previous TST (53.1%; p = < 0.01), and being a smoker (p = 0.03) were the variables that showed a statistically significant association with positive TST results. Although BCG vaccination coverage was high among these health care workers (Table 3), this variable was not found to be significantly associated with positive TST results, regardless of the cut-off point.

Logistic regression analysis (Table 4) showed that only "having had a previous TST" maintained a statistically significant association with positive TST results at the ≥ 10-mm (OR = 2.5; 95% CI: 1.17-5.30) and ≥ 5-mm cut-off points (OR = 2.18; 95% CI: 1.23-3.87).

DISCUSSION

The hypothesis of high exposure to *M. tuberculosis* is corroborated by the increase in the prevalence of LTBI, from 39.4% to 54.1%, among primary health

Table 1. Distribution of the eligibility and participation samples of primary health care workers in the city of Vitória, Brazil, 2012.

Health category	Health care facility	Total number of eligible health care workers	Total number of health care workers interviewed
PHCC with a TCP	*Unidade de Saúde Maruípe*	83	15
	Unidade de Saúde Geny Grijó (Centro)	40	15
Traditional PHCC	*Unidade de Saúde Ilha de Santa Maria*	15	11
	Unidade de Saúde Dr. Carlito Von Schielgen (Jabour)	26	14
	Unidade de Saúde Raul Oliveira Nunes (Jardim Camburi)	51	7
PHCC with a CHAP	*Unidade de Saúde Dr. Jolindo Martins (Bairro República)*	52	16
	Unidade de Saúde Avelina Maria Lacerda Gonçalves (Bairro do Quadro)	10	9
PHCC with an FHP strategy	*Unidade de Saúde Maria Rangel dos Passos (Consolação)*	52	27
	Unidade de Saúde Santo André	24	19
	Unidade de Saúde Dr. Manoel Rocha Coutinho (Ilha do Príncipe)	20	6
	Unidade de Saúde Dr. Bolivar de Abreu (Forte São João)	37	16
	Unidade de Saúde Dr. José Moysés (Santa Luíza)	49	30
	Unidade de Saúde Thomaz Tommasi (Community Medicine/*Bonfim*)	31	13
	Unidade de Saúde Grande Vitória	43	19
	Unidade de Saúde Dr. Affonso Schawb (Fonte Grande)	15	3
	Unidade de Saúde Dr. Luiz Castellar da Silva (Jesus de Nazareth)	20	11
Total	16	568	231

PHCC: primary health care clinic; PCT: Tuberculosis Control Program; CHAP: Community Health Agent Program; and FHP: Family Health Program.

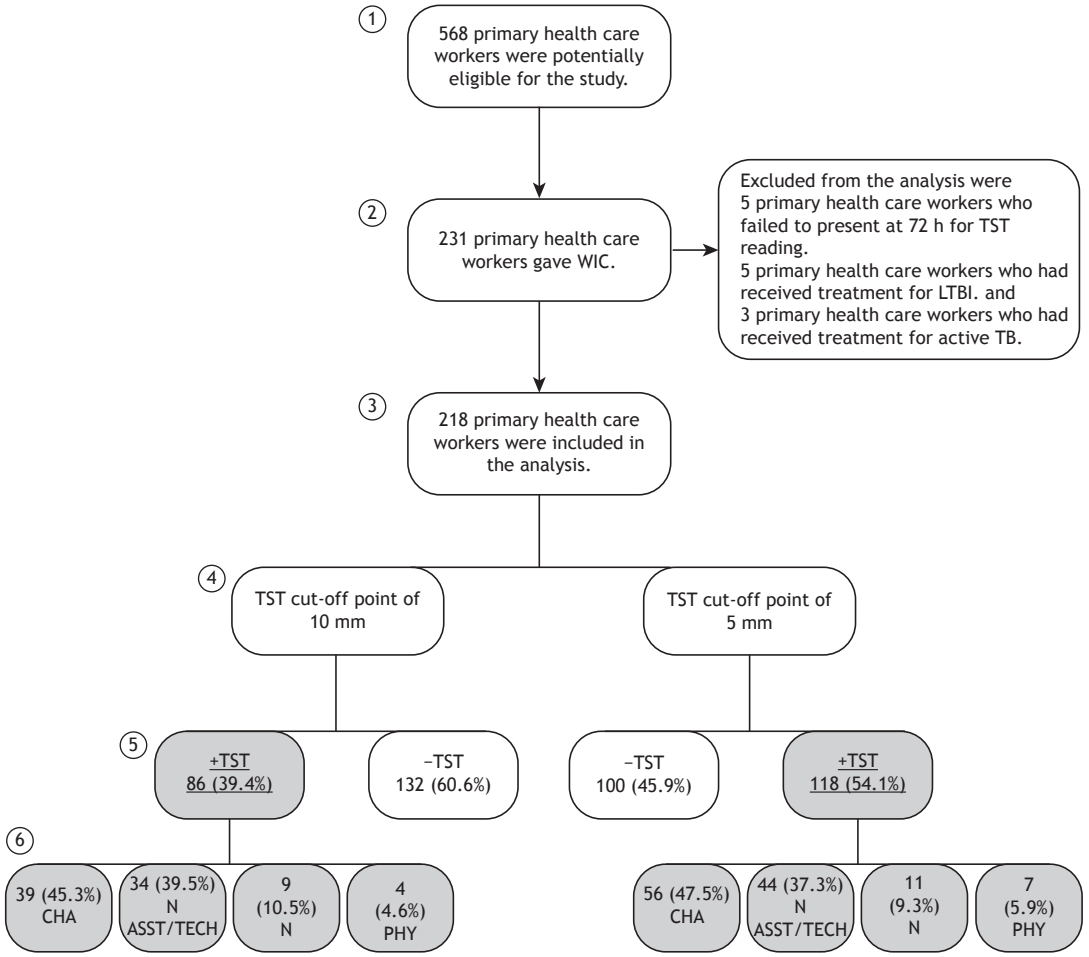

Figure 1. Flowchart of study participation and of tuberculin skin test results in primary health care workers in the city of Vitória, Brazil, 2012. WIC: written informed consent; TST: tuberculin skin test; LTBI: latent *Mycobacterium tuberculosis* infection; TB: tuberculosis; CHA: community health agent; N ASST/TECH: nursing assistant or technician; N: nurse; e PHY: physician. TST cut-off points were established at ≥ 10-mm and ≥ 5-mm induration for positive tests (+TST) and at < 10-mm and < 5-mm induration for negative tests (−TST).

care workers in the city of Vitória, Brazil, given the Brazilian National Ministry of Health's new proposal that takes the TST cut-off point of ≥ 5 mm into account.[1] Other studies conducted in Brazil have also reported a high prevalence of LTBI among primary health care workers.[13,15-18]

The present study had some limitations. First, cross-sectional studies are limited in their ability to identify causal associations; therefore, a longitudinal study would be more appropriate to determine TST conversion rates and associated factors.[19] The second limitation regarded logistical problems, which made it impossible to repeat the TST among the health care workers who were nonreactors at first and, consequently, to evaluate the booster effect. It is recommended that this effect be evaluated, since individuals infected with *M. tuberculosis* may have a decreased ability to react to the TST over time, because of loss of response of memory T lymphocytes, which would lead some people to have a negative response to the TST even when they are infected with this agent.[20,21] Therefore, this evaluation aims to reactivate the immune response to tuberculin by memory cells, by reinforcing the stimulus with a second injection of tuberculin one to three weeks after the first TST.[20]

The strengths of the present study were that a pilot study was conducted before the data collection period; TST administration and reading were standardized, as was recognition of BCG scars, all of which were performed by the same researcher; and information on HIV status was available, being obtained from the results of the rapid test administered to all participants.

Regarding the prevalence of LTBI by occupational category, the present study revealed that the highest proportion of TST positivity, regardless of the cut-off point, was among CHAs. CHAs are both part of the same community as their patients and simultaneously part of the health care team that assists patients with tuberculosis. This may lead CHAs to neglect or even ignore, for various reasons, the protective measures that they should adopt in their institutional relationship with individuals with the disease.[14,18] This leads us

Table 2. Distribution of socio-demographic and epidemiological characteristics of the primary health care workers who participated in the study (N = 218).

Variable	TST ≥ 10 mm		p	TST ≥ 5 mm		p
	+TST n (%)	−TST n (%)		+TST n (%)	−TST n (%)	
Gender						
Male	8 (44.4)	10 (55.6)	0.65	11 (61.1)	7 (38.9)	0.53
Female	78 (39.0)	122 (61.0)		107 (53.5)	93 (46.5)	
Age group, years						
19-30	5 (20.0)	20 (80.0)	0.09	10 (40.0)	15 (60.0)	0.22
31-40	26 (36.6)	45 (63.4)		35 (49.3)	36 (50.7)	
41-50	33 (47.8)	36 (52.2)		42 (60.9)	27 (39.1)	
51-70	22 (41.5)	31 (58.5)		31 (58.5)	22 (41.5)	
Occupation						
CHA	39 (36.1)	69(63.9)	0.24	56 (51.8)	52 (48.1)	0.50
N ASST/TECH	34 (46.0)	40 (54.0)		44 (59.5)	30 (40.5)	
N	9 (47.4)	10 (52.6)		11 (57.9)	8 (42.1)	
PHY	4 (23.5)	13 (76.5)		7 (41.2)	10 (58.8)	
Works at an HCC that has a TCP in place						
No	55 (38.0)	90 (62.0)	0.33	76 (52.4)	69 (47.6)	
Yes	25 (47.2)	28 (52.8)		32 (60.4)	21 (39.6)	0.56
Does not know	6 (30.0)	14 (70.0)		10 (50.0)	10 (50.0)	
Length of time working in the current position in primary care, years						
< 5	22 (33.3)	44 (66.7)	0.22	29 (43.9)	37 (56.0)	0.04
≥ 5	64 (42.1)	88 (57.9)		89 (58.5)	63 (41.4)	
Works in primary care only						
No	48 (37.5)	80 (62.5)	0.48	69 (53.9)	59 (46.0)	0.93
Yes	38 (42.2)	52 (57.8)		49 (54.4)	41 (45.6)	
Has worked in a setting with a high risk of TB						
No	56(36.8)	96(63.2)	0.23	82 (53.9)	70 (46.0)	0.93
Yes	30(45.4)	36 (54.6)		36 (54.5)	30 (45.4)	
Has received training/education on TB						
No	32 (36.8)	55 (63.2)	0.64	46 (52.9)	41 (47.1)	0.54
Yes						
Less than 5 years ago	41 (43.2)	54 (56.8)		50 (52.6)	45 (47.4)	
5 years ago or more	13 (37.1)	22 (62.9)		22 (62.9)	13 (37.1)	
Assesses the contribution of training to clinical practice as						
Good	20 (47.6)	22 (52.4)	0.16	22 (52.4)	20 (47.6)	0.51
Fair	24 (34.3)	46 (65.7)		38 (54.3)	32 (45.7)	
Poor	9 (56.2)	7 (43.7)		11 (68.7)	5 (31.2)	
Frequency of seeking information on TB						
Never	11 (52.4)	10 (47.6)	0.27	15 (71.4)	6 (28.6)	0.22
Sometimes	54 (35.8)	97 (64.2)		79 (52.3)	72 (47.7)	
Always	19 (43.2)	25 (56.8)		22 (50.0)	22 (50.0)	

TST: tuberculin skin test; CHA: community health agent; N ASST/TECH: nursing assistant or technician; N: nurse; PHY: physician; TCP: Tuberculosis Control Program; TB: tuberculosis; HCC: health care clinic. TST cutoffs were established at ≥ 10-mm and ≥ 5-mm induration for positive tests (+TST) and at < 10-mm and < 5-mm induration for negative tests (−TST).

to wonder whether being acquainted with and living near the clientele, together with limited information and knowledge, can be factors causing neglect, embarrassment, and limitation on the part of CHAs to integrate appropriate protective measures against tuberculosis into their professional routine and resulting in a lack of protection.[22] In addition, several risk factors have been associated with the high prevalence of TST positivity among health care workers.[6,7,14,15] Here, we found that those health care workers who had had a previous TST were more likely to test positive in the second test, regardless of the cut-off point. We believe that this finding may indicate a longer length of time working in health care and, consequently, their having

Table 3. Distribution of occupational characteristics of the primary health care workers in the study population (N = 218).

Variable	TST ≥ 10 mm		p*	TST ≥ 5 mm		p*
	+TST n (%)	−TST n (%)		+TST n (%)	−TST n (%)	
Frequency of availability of PPE at the PHCC						
Never	38 (38.4)	61 (61.6)	0.80	52 (52.5)	47 (47.5)	0.77
Sometimes	17 (37)	29 (63)		24 (52.2)	22 (47.8)	
Always	31 (42.5)	42 (57.5)		42 (57.5)	31 (42.5)	
Easy access to PPE at the PHCC						
No	10 (45.5)	12 (54.5)	0.58	14 (63.6)	8 (36.4)	0.39
Yes	38 (39.2)	59 (60.8)		52 (53.6)	45 (46.4)	
Frequency of PPE use during the care of patients with respiratory symptoms						
Never	60 (37.3)	101 (62.7)	0.46	87 (54.0)	74 (46.0)	0.83
Sometimes	16 (44.4)	20 (55.6)		19 (52.8)	17 (47.2)	
Always	9 (50.0)	9 (50.0)		11 (61.1)	7 (38.9)	
Has a BCG vaccination scar						
No	10 (47.6)	11 (52.4)	0.42	11 (52.4)	10 (47.6)	0.86
Yes	76 (38.6)	121 (61.4)		107 (54.3)	90 (45.7)	
Has had close contact with someone with TB						
No	69 (37.5)	115 (62.5)	0.23	97 (52.7)	87 (47.3)	0.40
Yes	16 (48.5)	17 (51.5)		20 (60.6)	13 (39.4)	
Has had a previous TST						
No	35 (29.2)	85 (70.8)	< 0.01	53 (44.2)	67 (55.8)	< 0.01
Yes	51 (53.1)	45 (46.9)		63 (65.6)	33 (34.4)	
Has comorbidities or is on immunosuppressive drugs						
No	64 (40.5)	94 (59.5)	0.60	89 (56.3)	69 (43.7)	0.29
Yes	22 (36.7)	38 (63.3)		29 (48.3)	31 (51.7)	
Smoker						
No	59 (36.9)	101 (63.1)		78 (48.7)	82 (51.2)	
Yes	9 (75.0)	3 (25.0)	0.03	10 (83.3)	2 (16.7)	0.01
Former smoker	18 (39.1)	28 (60.9)		30 (65.2)	16 (34.8)	
Drinker						
No	47 (36.7)	81 (63.3)	0.33	64 (50.0)	64 (50.0)	0.13
Yes	38 (43.2)	50 (56.8)		53 (60.2)	35 (39.8)	

TST tuberculin skin test; PPE: personal protective equipment; PHCC: primary health care clinic; and TB: tuberculosis. TST cutoffs were established at ≥ 10-mm and ≥ 5-mm induration for positive tests (+TST) and at < 10-mm and < 5-mm induration for negative tests (−TST). *Pearson's chi-square test.

had a TST more than once. However, TST conversion is defined not only by a positive result in the second TST but also by an increase in induration of 10 mm between the first and the second TST. Given this premise, LTBI prophylaxis should be started for health care workers who meet the two criteria above.[1] In our study, it was not possible to assess TST conversion, since the health care workers did not present a record of the quantitative results of the previous TST.

False-positive TST results may occur when health care workers have been previously sensitized by BCG vaccination or by exposure to environmental mycobacteria, since some of the antigens present in this vaccine and in these microorganisms make up the antigenic mixture that is present in PPD RT-23,[3] which could lead to cross-reactivity with the test.[23] However, having a BCG vaccination scar, which was present in nearly all of the health care workers participating in this study, did not show a statistically significant association with positive TST results, regardless of the cut-off point.

Obtaining information on biosafety was a distinguishing aspect of the present study, as well as being of fundamental importance to the impact of health surveillance, particularly with regard to the health of workers. Although N95 masks are known to be a type of PPE, they are not used by the vast majority of health care workers, which can be explained by the unavailability of PPE at the facilities, as was reported by most of the health care workers participating in this study. However, in addition to implementing personal protective measures, which include having PPE available for use, primary health care clinics should also introduce administrative and environmental control measures, such as making simple changes in the organization of health care services; training health care workers; reorganizing the care pathway of patients with active tuberculosis; keeping any long-stay environment

Table 4. Logistic regression for identification of factors associated with positive tuberculin skin test results (≥ 10-mm and ≥ 5-mm induration) among the primary health care workers in the study population (N = 218).

Variable	TST ≥ 10 mm			TST ≥ 5 mm		
	Adjusted OR	p	95% CT	Adjusted OR	p	95% CI
Age group, years						
19-30	Reference					
31-40	1.78	0.44	0.40-7.84			
41-50	2.42	0.24	0.54-10.85			
51-70	1.95	0.40	0.40-9.53			
Length of time working in the current position in primary care, years						
< 5				Reference		
≥ 5				1.48	0.20	0.80-2.73
Assesses the contribution of training to clinical practice as						
Good	Reference					
Fair	0.65	0.32	0.28-1.50			
Poor	1.47	0.52	0.44-4.97			
Smoker						
No	Reference			Reference		
Yes	2.78	0.28	0.43-17.83	4.34	0.06	0.89-21.12
Former smoker	1.21	0.69	0.45-3.24	1.87	0.08	0.92-3.80
Alcoholic						
No				Reference		
Yes				1.23	0.48	0.68-2.19
Has had a previous TST						
No	Reference			Reference		
Yes	2.50	0.01	1.17-5.30	2.18	< 0.01	1.23-3.87

TST: tuberculin skin test. *Pearson's chi-square test.

for patients with possible respiratory symptoms as ventilated as possible; having exhaust systems, filters, or fans; and destining an appropriate place for sputum collection and, when available, identifying it accordingly. These measures, taken together, are necessary to ensure that people with symptoms suggestive of tuberculosis can be readily identified and, if infected, be cared for at an appropriate time and place and subsequently treated.[1] In addition, we emphasize that these administrative and environmental measures are considered the most important for preventing the transmission of *M. tuberculosis*.[3]

In summary, the present study showed that the prevalence of LTBI was high among the primary health care workers in this sample and that recommending preventive therapy for this infection may raise reflections and questions, given that reducing the TST cut-off point to 5 mm will possibly result in the detection of a larger number of infected individuals, who would be referred for treatment, leading to new visits and additional costs to the health care system. In addition, it should be taken into account that widespread BCG vaccination coverage and exposure to environmental mycobacteria could be associated with positive TST results at this cut-off point.

Therefore, we recommend the establishment of a periodic screening program to detect and monitor LTBI among primary health care workers, as well as the implementation of effective administrative, environmental, and personal protective measures to prevent LTBI in those at risk of exposure to *M. tuberculosis*. Such measures are necessary, since they contribute to the achievement of the goals established by the World Health Organization,[24] especially in relation to the first pillar of the End TB Strategy, in which integrated, patient-centered care and prevention include systematic screening of high-risk groups for *M. tuberculosis*, as well as treatment for LTBI.

The results obtained in the present study, together with those of a multicenter study, will contribute to the development of the Brazilian National Plan for the Control of *M. tuberculosis* infection, as envisaged by the World Health Organization and recommended by the Brazilian National Ministry of Health.

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