

Prevalence and risk factors for latent tuberculosis infection among primary health care workers in Brazil

Prevalência de infecção latente da tuberculose e fatores de risco entre profissionais de saúde na atenção primária no Brasil

Prevalencia de infección latente de la tuberculosis y factores de riesgo entre profesionales de salud en la atención primaria en Brasil

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doi: 10.1590/0102-311X00154916

Abstract

Health care workers (HCW) are at increased risk of latent tuberculosis infection (LTBI) from occupational exposure to *Mycobacterium tuberculosis*. The objective was to determine the prevalence of and risk factors for LTBI among primary HCW in five Brazilian cities. We conducted a cross-sectional study, from 2011 to 2013, among primary HCW, using a structured questionnaire and an evaluated for LTBI using the Quantiferon-TB Gold in-tube test. The magnitude of the associations was assessed using hierarchical logistic regression models. Among 708 HCW, the LTBI prevalence was 27% (n = 196; 95%CI: 24%-31%). We found that the following factors were positively associated with LTBI in primary HCW: age > 50 years (OR = 2.94; 95%CI: 1.44-5.99), absence of a BCG scar (OR = 2.10; 95%CI: 1.28-3.43), self-reported ex-smoker status (OR = 1.80; 95%CI: 1.04-3.11), being a nurse (OR = 2.97; 95%CI: 1.13-7.83), being a nurse technician (OR = 3.10; 95%CI: 1.26-7.60), being a community health agent (OR = 2.60; 95%CI: 1.06-6.40), and irregular use of N95 masks (OR = 2.51; 95%CI: 1.11-5.98). In contrast, HCWs who do not work in health care facilities with a TB control program were less likely to have LTBI (OR = 0.66; 95%CI: 0.45-0.97). This study demonstrated a substantial occupational risk of LTBI among primary HCW in Brazil. The Brazilian TB control program, as well as local programs, need to target these high-risk HCW with education, as well as with better personal protective equipment to prevent acquisition of new TB infection.

Latent Tuberculosis; *Mycobacterium tuberculosis*; Health Personnel; Occupational Exposure

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Background

Several studies have shown that health care workers (HCW) are at increased risk of latent tuberculosis infection (LTBI) from occupational exposure to *Mycobacterium tuberculosis* ^{1,2,3,4,5}. This observation has also been made in Brazil, where the prevalence of LTBI among HCW is higher than in the general population ^{6,7,8,9,10,11,12}. LTBI risk can be significantly reduced with the implementation of effective tuberculosis (TB) infection control measures ^{6,7,8,9,10,11,12,13}. According to World Health Organization (WHO) and Brazilian guidelines, HCW should be screened for TB infection, and preventive anti-TB chemotherapy should be provided only in case of conversion ^{13,14,15}. Routine surveillance for LTBI among HCW and other occupational infection control measures are not a reality in the country yet because of the programs' focus on case detection and treatment of TB ¹⁶.

For many years, the tuberculin skin test (TST) was the only diagnostic test for LTBI. More recently, T-cell based interferon- γ release assays (IGRA) became available. The U.S. Food and Drug Administration (FDA) have approved two commercial brands of IGRAs for use: the QuantiFERON-TB Gold in-tube (QFT-GIT) assay (Cellestis, QIAGEN Co., Ltd., Carnegie, Australia) and the T-SPOT.TB assay (Oxford Immunotec, Abingdon, U.K.). IGRA has several advantages over TST, including: requiring only one visit (one sample to be sent for processing), lower cross-reactivity with non-tuberculosis mycobacteria, not being affected by Bacillus Calmette-Guérin (BCG) vaccination and lack of subjectivity in measuring results and reduction in costs due to follow-up and treatment of false positives ^{17,18}.

On the other hand, the use of IGRA for serial testing is complicated by the lack of clear data on optimal cut-offs for such procedure and unclear interpretation and prognosis of conversions and reversions, reproducibility or time interval to conversion of IGRA after exposure to TB ^{19,20}. Therefore, a borderline zone may be helpful to distinguish true conversion and reversion from variations caused by chance, i.e., inherent within subject and/or test variability. Schablon et. al. ²¹ found a QFT conversion rate of 2.8% and a reversion rate of 37.3% among HCWs repeatedly tested using the dichotomous definition of a positive test result. On application of a borderline zone from 0.2 to 0.7IU/mL, conversions decreased to 1.1% and reversions decreased to 18.8%, which seems to be more realistic than the results of the dichotomous approach ²¹.

In Brazil, LTBI diagnosis is still based on medical history, TST result, chest X-ray and physical examination ¹⁴. A recent study, however, found that the LTBI prevalence estimated by TST was higher than that estimated by QFT-GIT. This discrepancy was thought in part to be due to prior BCG vaccination, suggesting that the QFT-GIT may provide a more accurate estimate of LTBI prevalence in countries with high coverage of BCG vaccination. Besides BCG vaccination, exposure to environmental mycobacteria in places such as Brazil may also play a role in explaining these findings ^{22,23}.

In 2004, after the Brazilian Tuberculosis Control Program redirected TB control efforts from the inpatient setting to primary health care facilities, strengthening decentralization of care ¹⁴, a discussion about the safety and risk of TB in HCW who work at primary health care facilities ensued. While few studies have examined LTBI associated factors among community health workers (CHW) in Brazil, there were none with large sample sizes ^{24,25}. No studies in Brazil have evaluated the risk of LTBI among all classes of HCW at primary health care facilities. Here we provide a comprehensive assessment of LTBI risk among all classes of HCW from a multi-center study using the QFT-GIT to estimate the prevalence of LTBI and to identify associated factors among primary HCW in five Brazilian cities.

Methods

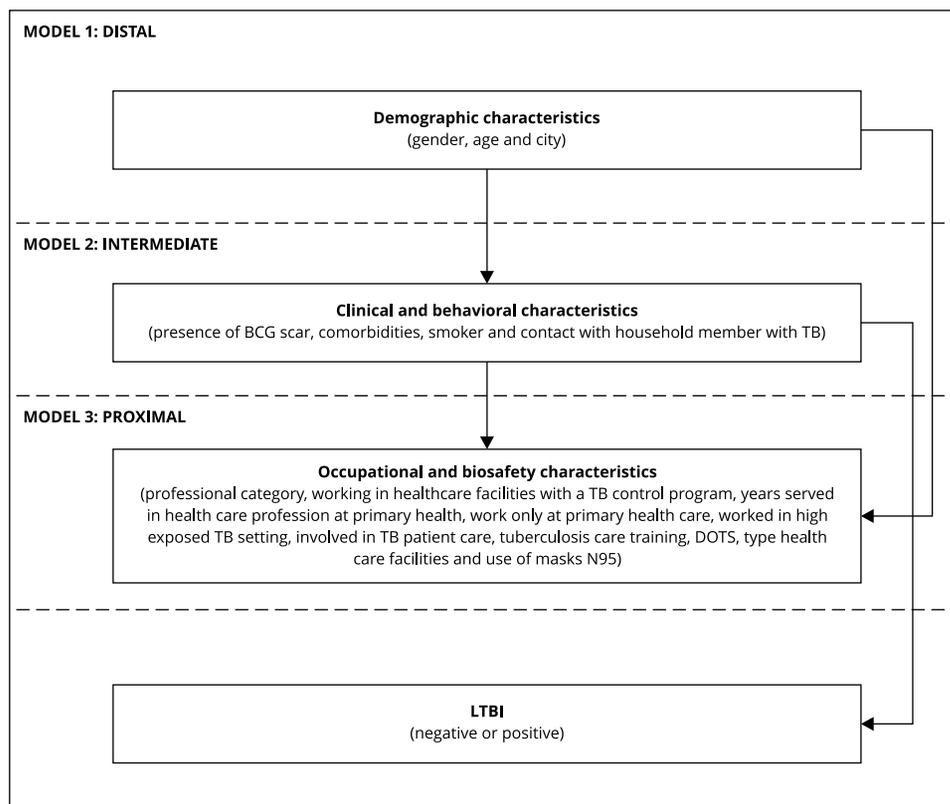
We conducted a cross-sectional study between 2011 and 2013 in five Brazilian cities: Cuiabá, Mato Grosso State (TB incidence of 78.21/100,000); Manaus, Amazonas State (TB incidence of 72.03/100,000); Salvador, Bahia State (TB incidence of 61.14/100,000); Porto Alegre, Rio Grande do Sul State (TB incidence of 105.00/100,000); and Vitória, Espírito Santo State (TB incidence of 42.10/100,000) (Brazilian Ministry of Health. <http://tabnet.datasus.gov.br/cgi/tabcgi.exe?idb2010/d0202.def>, accessed on Jan/2016).

HCWs were informed about the study at their workplace and were enrolled if they agreed to participate and provided informed consent. Study's exclusion criteria included: (1) known HIV-positive

status, (2) rapid test positive for HIV, (3) prior TB, or (4) pregnancy. Trained nurses carried out interviews using a standardized questionnaire with variables distributed in three groups: demographic [gender, age group (18-29, 30-39, 40-49 and ≥ 50 years) and city]; clinical and behavioral [presence of a BCG scar, household TB contact, smoking status, comorbidities (diabetes and hypertension)]; and occupational and biosafety [professional category (CHW, nurse technician, nurses and physicians), working in a higher TB burden city, working in health care facilities with a TB control program in place, working only at a primary health care unit, years served in a primary health care unit (< 10 and ≥ 10), involvement in TB patient care, involvement in TB training, DOTS (directly observed treatment, short course), type health care facilities and use of N95 mask during work (Figure 1). BCG vaccination status was assessed by visual inspection for a BCG scar by a trained nurse. These variables were included according to the theoretical model presented in Figure 1, which includes potential explanatory and confounding variables, both distal and intermediate, which were evaluated in the multivariate model.

Figure 1

Hierarchical theoretical model of possible relationships between demographic, behavioral, clinical and occupational variables and latent tuberculosis infection (LTBI) in primary health care workers (HCW).



DOTS: directly observed treatment, short course.

After the standardized questionnaire was completed, 3mL of blood were collected for the QFT-GIT (1mL in each tube). The test was performed according to the manufacturer's instructions. The samples were transported to a reference laboratory in each capital city (Municipal Laboratory of Cuiabá; Municipal Laboratory of Salvador; Center of Immunology and Infectious Diseases of the Federal University of Espírito Santo, Vitória; Laboratory of Microbiology of the Tropical Medicine Foundation Dr. Heitor Vieira Dourado, Manaus; and the Municipal Laboratory, Porto Alegre) within 4-6 hours of collection and incubated for 16-24 hours at 37°C. The samples were centrifuged at 3000x RCF (relative centrifugal force) for 15 minutes, and the collected plasma was stored at -70°C until the interferon- γ (IFN- γ) assay was performed. Plasma samples collected in Cuiabá, Manaus, Porto Alegre and Salvador were transported inside a cooler with ice packs to the Center of Immunology and Infectious Diseases of the Federal University of Espírito Santo in less than 6 hours, and stored at -70°C. The optical density (OD) of each test was read with a 450nm filter and a 620nm reference filter, with an ELISA plate reader.

Results were interpreted according to the manufacturer's instructions. The cut-off value for a positive test was 0.35IU/mL of IFN- γ in the plasma after stimulation, regardless of the result of the mitogen control. The result of the test was considered indeterminate if an antigen-stimulated sample tested negative and if the value of the positive control was less than 0.5IU/mL after subtraction of the value of the negative control. The rapid HIV test was performed on the same blood sample (Rapid Check HIV 1 & 2/NDI-UFES, Vitória, Brazil).

Pearson's chi-square test was used to compare proportions of baseline covariates between LTBI positive and LTBI negative study participants. Covariates associated with the LTBI in bivariate analyses ($p \leq 0.20$) were selected to be included in the logistic regression. For the multivariable logistic regression analysis, three models were performed, in which the variables were inserted in blocks, according to the methodology proposed by authors of similar studies²⁶. Model 1 was composed only of the demographic variables; model 2, of demographic, clinical and behavioral variables, and model 3 was composed of demographic, clinical, behavioral, occupational and biosafety variables. Final multivariable logistic regression models include all predictors with p -values < 0.05 . All statistical significance tests were two sided. All data analyses were performed using Stata 13 (StataCorp LP, College Station, USA).

The Institutional Review Board of the Federal University of Espírito Santo (UFES) approved the study under registration number 007/10. Primary HCW who had a positive rapid HIV test were referred to a health-care provider. As the QFT result is not the standard of care for LTBI diagnosis in Brazil, participants who were QFT-GIT positive were evaluated for the need to receive LTBI treatment or to rule out active TB by a physician, by an evaluation that included chest X-ray, symptom screening and TST testing. According to the Brazilian guidelines, preventive anti-TB chemotherapy should be provided only in case of conversion of TST^{14,15}. In our study, no HCW was treated for latent TB infection because none had previous TST results to assess conversion. In addition, because of the physician's evaluations, no HCW was diagnosed and treated for active tuberculosis disease.

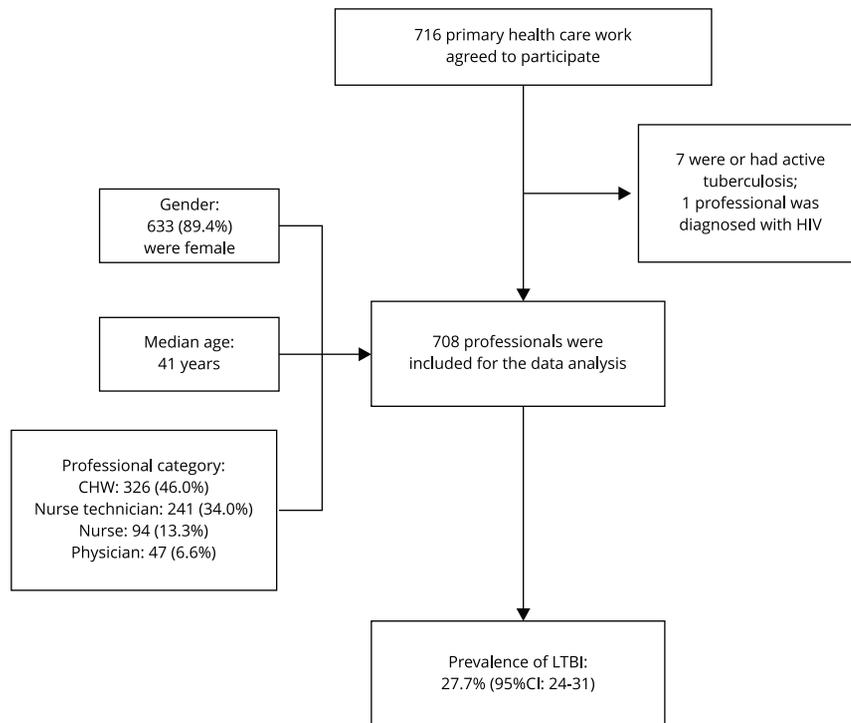
Results

We enrolled 718 HCW (Figure 2). Two (0.3%) participants were excluded because they refused to take a blood test, 7 (0.9%) because they had active TB or were under TB treatment, and 1 (0.1%) because of a positive-HIV test. Of the 708 primary HCW included in this study, 326 (46%) were CHW, 94 (13.3%) were nurses, 241 (34%) were nurse technicians and 47 (6.7%) were physicians. The median participant age was 41 years (range 20-70) and 633 (89.4%) were female. Prior BCG vaccination was common, with 620 (87.6%) participants having a BCG vaccine scar. The median time of work as a primary HCW was 9 years (range 1-39). LTBI prevalence in the study population was 27% ($n = 196$; 95%CI: 24%-31%). We did not observe an indeterminate result of QFT-GIT test among the health professionals included in our study.

Table 1 shows the results of the bivariate analyses. Age ≥ 50 years ($p < 0.0001$), having a household member with TB ($p = 0.014$), male gender ($p = 0.048$), comorbidities (diabetes or high blood pressure, $p = 0.042$), positive smoking status ($p = 0.034$) and city ($p = 0.002$) were all associated with LTBI in

Figure 2

Selection of study participants.



CHW: community health workers; LTBI: latent tuberculosis infection.

HCW. A BCG scar was present in 80% of HCW who tested positive for LTBI versus 90% among those who tested negative ($p < 0.001$).

Table 2 shows the associations between occupational and biosafety characteristics and LTBI in primary HCW. The proportions of the different categories of HCW varied significantly between people who were LTBI positive and LTBI negative ($p = 0.05$). QFT-GIT was positive in 71% of HCW working in health care facilities with a TB control program, compared with 29% among those not working in health care facilities with this program ($p = 0.05$). Serving as a health care professional at a primary health care unit for ≥ 10 years was associated with positive QFT-GIT results ($p = 0.05$). The use of the N95 mask varied significantly among the HCWs that were LTBI positive when compared with those that were LTBI negative ($p = 0.016$).

Table 3 shows the models with progressive adjustments for variables with a value of p less than 0.2 in the bivariate analyses. After adjusting for the variables of all domains, we found that HCWs aged > 50 years (OR = 2.94; 95%CI: 1.44-5.99) were more likely to have LTBI than people aged 18-29 years, HCWs without BCG scar (OR = 2.10; 95%CI: 1.28-3.43) were more likely to have LTBI than HCW who has BCG scar, HCWs who had self-reported ex-smoker status (OR = 1.80; 95%CI: 1.04-3.11) were more likely to have LTBI than HCW who had never smoked. Being a nurse (OR = 2.97; 95%CI: 1.13-7.83), being a nurse technician (OR = 3.10; 95%CI: 1.26-7.60), being a CHW (OR = 2.60; 95%CI: 1.06-6.40) increased the odds of LTBI compared with being a physician. In addition, HCWs who did not work in health care facilities with a TB control program were less likely to have LTBI (OR = 0.66; 95%CI: 0.45-0.97) than HCWs who worked in this type of service. HCWs who reported use of N95 masks irregularly (OR = 2.51; 95%CI: 1.11-5.98) were more likely to have LTBI than HCW who reported regular use of N95 masks.

Table 1

Demographic, clinical and behavioral characteristics associated with latent tuberculosis infection (LTBI) diagnosed by Quantiferon TB Gold in-tube test (QFT-GIT) among primary health care workers (HCW) by univariate analysis.

Variables	LTBI- n (%)	LTBI+ n (%)	p-value *
Gender			
Male	47 (9.2)	28 (14.3)	0.048
Female	465 (90.8)	168 (85.7)	
Age group (years)			
18-29	72 (14.0)	14 (7.1)	< 0.001
30-39	178 (34.8)	59 (30.1)	
40-49	168 (32.8)	58 (29.6)	
≥ 50	94 (18.4)	65 (33.2)	
Contact with a household member with TB			
No	430 (84.0)	149 (76.0)	0.014
Yes	82 (16.0)	47 (24.0)	
Presence of BCG scar			
Yes	463 (90.4)	157 (80.1)	< 0.001
No	49 (9.6)	39 (19.9)	
Comorbidities **			
No	398 (77.7)	138 (70.4)	0.042
Yes	114 (22.3)	58 (29.6)	
Smoker			
No	389 (76.0)	135 (68.9)	0.034
Ex-smoker	41 (8.0)	28 (14.3)	
Yes	82 (16.0)	33 (16.8)	
City/State			
Porto Alegre/Rio Grande do Sul	59 (11.5)	27 (13.8)	0.002
Vitória/Espírito Santo	169 (33.0)	39 (19.9)	
Manaus/Amazonas	91 (17.8)	40 (20.4)	
Cuiabá/Mato Grosso	113 (22.1)	40 (20.4)	
Salvador/Bahia	80 (15.6)	50 (25.5)	

* $p < 0.20$, Pearson chi-square test;

** Diabetes mellitus and high blood pressure.

Discussion

Brazilian primary HCW are a group at high risk of occupational TB exposure, but no prior studies have systematically quantified the prevalence of LTBI nor examined risk factors for LTBI in this population. Using a multi-center, cross-sectional study design comprising five cities in Brazil, we showed here that the prevalence of LTBI among primary HCW in these cities was 27%. The following factors were positively associated with LTBI in primary HCW: age > 50 years, absence of a BCG scar, self-reported ex-smoker status, being a nurse, being a nurse technician, being a CHW, irregular use of N95 masks. In contrast, HCWs who do not working in health care facilities with a TB control program were less likely to have LTBI.

Our results are consistent with previous studies of LTBI prevalence in hospital-based HCW but expand on this prior work by evaluating LTBI prevalence and risk factors among all classes of primary HCW ^{1,2,3,4,6,7,8,9,10,11,12}. Our work adds to existing knowledge by showing that the prevalence LTBI in this group is within the range, although closer to the lower limit of prevalence observed in hospital-based HCWs published in other studies using IGRA (range from 24% to 71%) ^{27,28,29,30}. Although we

Table 2

Occupational and biosafety characteristics associated with QuantiFERON-TB Gold in-tube test (QFT-GIT) among primary health care workers (HCW) by univariate analysis.

Variables	LTBI- n (%)	LTBI+ n (%)	p-value *
Professional category			
Physicians	40 (7.8)	7 (3.6)	0.05
Nurse	67 (13.1)	27 (13.8)	
CHW	243 (47.5)	83 (42.3)	
Nurse technician	162 (31.6)	79 (40.3)	
Working in healthcare facilities with a TB control program			
Yes	323 (63.1)	139 (70.9)	0.05
No	189 (36.9)	57 (29.1)	
Work only at primary health care			
Yes	292 (57.0)	102 (52.0)	0.232
No	220 (43.0)	94 (48.0)	
Years served in health care profession at primary health care			
< 10	259 (50.6)	83 (42.3)	0.05
≥ 10	253 (49.4)	113 (57.7)	
Worked in high exposed TB setting			
No	357 (69.7)	128 (65.3)	0.257
Yes	155(30.3)	68 (34.7)	
Involved in TB patient care			
No	136 (26.6)	47 (24)	0.482
Yes	376 (73.4)	149 (76)	
Tuberculosis care training			
No	132 (25.8)	52 (26.5)	0.839
Yes	380 (74.2)	144 (73.5)	
Use of masks N95			
Regularly	51 (10.0)	16 (8.1)	0.016
Irregularly	32 (6.2)	25 (12.8)	
No	429 (83.8)	155 (79.1)	
DOTS			
No	375 (73.2)	144 (73.5)	0.951
Yes	137 (26.8)	52 (26.5)	
Type of healthcare facilities			
Basic health unit	98 (19.5)	38 (19.8)	0.753
Basic health unit with Family Health Strategy	373 (74.3)	145 (75.5)	
Basic health unit with CHW Program	31 (6.2)	9 (4.7)	

CHW: community health workers; DOTS: directly observed treatment, short course.

* p < 0.20, Pearson chi-square test.

did not find association of type health care facilities and LTBI, we have identified that the HCW who does not work in health care facilities with a TB control program was less likely to have LTBI. We believe that this finding is due to the lower exposure to *M. tuberculosis* ³¹.

The high LTBI prevalence we observed among nursing professionals is consistent with prior work on LTBI in this group and may be due to increased exposure to TB patients compared with all the other categories of HCW in our study. Consistent with this possibility, we found that the median time worked by HCW was highest for nurse technicians, followed by nurses. Our study also found a high prevalence of LTBI among older HCWs compared with younger HCWs. The explanation for

Table 3

Logistic regression analysis to identify risk factors of latent tuberculosis infection (LTBI) among primary health care workers (HCW) using QuantiFERON-TB Gold in-tube test (QFT-GIT) (dependent variable QFT-GIT results: negative 0, positive 1).

Category	Model 1 OR (95%CI)	Model 2 OR (95%CI)	Model 3 OR (95%CI)
Gender			
Male	Reference		
Female	0.60 (0.35-1.01)		
Age group (years)			
18-29	Reference	Reference	Reference
30-39	1.49 (0.77-2.91)	1.41 (0.72-2.77)	1.67 (0.86-3.23)
40-49	1.66 (0.85-3.25)	1.40 (0.70-2.76)	1.66 (0.84-3.26)
≥ 50	3.53 (1.81-6.88)	2.61 (1.29-5.25)	2.94 (1.44-5.99)
City/State			
Porto Alegre/Rio Grande do Sul	Reference	Reference	
Vitória/Espírito Santo	0.48 (0.27-0.87)	0.59 (0.32-1.08)	
Manaus/Amazonas	0.92 (0.50-1.70)	1.16 (0.61-2.18)	
Cuiabá/Mato Grosso	0.76 (0.42-1.39)	0.85 (0.46-1.57)	
Salvador/Bahia	1.33 (0.73-2.41)	1.53 (0.82-2.85)	
Presence of BCG scar			
Yes		Reference	Reference
No		1.95 (1.19-3.18)	2.10 (1.28-3.43)
Comorbidities *			
No		Reference	
Yes		1.22 (0.81-1.82)	
Smoker			
No		Reference	Reference
Ex-smoker		1.81 (1.04-3.15)	1.80 (1.04-3.11)
Yes		1.05 (0.65-1.69)	1.01 (0.63-1.63)
Contact with a household member with TB			
No		Reference	
Yes		1.34 (0.87-2.06)	
Professional category			
Physicians			Reference
Nurse			2.97 (1.13-7.83)
CHW			2.60 (1.06-6.40)
Nurse technician			3.10 (1.26-7.60)
Working in healthcare facilities with a TB control program			
Yes			Reference
No			0.66 (0.45-0.97)
Years served in health care profession at primary health care			
< 10			Reference
≥ 10			1.04 (0.72-1.50)
Use of masks N95			
Regularly			Reference
Irregularly			2.51 (1.11-5.98)
No			1.24 (0.65-2.35)

95%CI: 95% confidence interval; CHW: community health workers; OR: odds ratio.

* Diabetes mellitus and high blood pressure.

Note: N = 708 primary health care workers.

this association could be either a longer time exposed to risks or the decreasing immunity that comes with age^{32,33}. CHW in our study had the highest risk of LTBI compared with all the other groups. This finding may be explained by the fact that they usually live in the high-risk TB communities where they work. In addition, TB care has been undergoing a decentralization process to primary care in Brazil. This process needs to be followed by strengthening environmental, individual and administrative controls strategies at the same level of care. Our results highlighted the need to keep this as a priority. Studies showed that CHW providing TB care do not always use appropriate respiratory protection²⁵.

Other studies also showed that cigarette smoking has adverse effects in respiratory immune function and is associated with an increased risk of respiratory tract infections, including TB^{34,35,36}. Our study showed an increased probability of LTBI among those who reported themselves as former smokers. A study carried out in a tertiary medical center in Taiwan showed that both previous (OR = 1.64; 95%CI: 1.00-2.68) and current smoking (OR = 1.88; 95%CI: 1.16-3.03) were independent factors associated with LTBI³⁷. Therefore, TB control programs should offer smoking awareness and smoking cessation strategies in partnership with the primary health care facilities. Finally, HCWs without BCG scar were more likely to have LTBI, pointing to the increased risk of *M. tuberculosis* infection among those who were not immunized, high specificity of the QFT-GIT, as well as the high capacity of this test to correlate occupational HCW risk with *M. tuberculosis* exposure³⁸.

Our study has some limitations. First, it is a cross-sectional study and therefore temporality between the positive QFT-GIT and infection by *M. tuberculosis* could not be established nor could changes over time be monitored. Second, there is no gold standard for detecting LTBI and, therefore, LTBI prevalence estimate might be impacted by the QFT-GIT performance. We believe that these limitations, while important to acknowledge, are outweighed by this study's strengths: its large sample size and the fact that it is the first multicenter study of LTBI prevalence and risk factors among primary HCW in Brazil. Our research adds to the body of evidence on LTBI prevalence among HCW in Brazil and suggests the potential utility of using QFT to screen candidates for TB chemoprophylaxis. Future study is needed to explore the latter possibility in more depth, but the use of IGRAs instead of the TST could result in false positives. False positive tests would reduce the number of people that need to be treated and thus increase the feasibility of broad treatment of LTBI among HCW in Brazil. Nowadays, Brazil is facing shortage of TST and QFT should be considered as a viable alternative by the TB Control Program³⁹.

Finally, this study demonstrated a substantial occupational risk of LTBI among primary HCW in Brazil. The Brazilian TB control program, as well as local programs, need to guide these high-risk HCW with education as well as with better personal protective equipment to prevent acquisition of new TB infection.

Contributors

T. N. Prado elaborated the methodology of the study, besides analyzing the data, writing the article and performing a critical review of the text. J. V. Rajan participated in the drafting of the text and critical review of the article. F. M. Souza participated in planning and data collection; in addition to performing the data analysis and critical review of the text. R. L. Locatelli and R. L. P. Nóbrega collaborated with data collection and critically reviewed the text. E. Zandonade, L. G. Possuelo, M. Sanchez and L. W. Riley participated in the critical review of the text. G. Fregona participated in the planning and data collection, besides performing the critical review of the text. E. L. N. Maciel participated in the data collection, analysis and interpretation of data. In addition to performing the critical review of the article.

Acknowledgments

This study was supported by CNPq (Brazilian National Research Council; MCT/CNPq n. 14/2009 – Universal), FAPES (Espírito Santo State Research Foundation; Universal 012/11), and the Capes (Brazilian Graduate Studies Coordinating Board; with the provision of a sandwich scholarship at the University of California, Berkely, USA). The funders had no role in the study design, data collection and analysis, decision to publish, or preparation of the manuscript.

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Resumo

Os profissionais de saúde apresentam risco aumentado de infecção latente da tuberculose (ILT) em função da exposição ocupacional ao *Mycobacterium tuberculosis*. O estudo teve como objetivo estimar a prevalência da ILTB e fatores de risco entre profissionais de saúde na atenção primária em cinco cidades brasileiras. Realizamos um estudo transversal entre 2011 e 2013 entre profissionais de saúde na atenção primária, usando um questionário estruturado, e avaliamos a ILTB com o teste Quantiferon-TB Gold In-Tube. A magnitude das associações foi avaliada com o uso de modelos de regressão logística hierárquica. Entre 708 profissionais de saúde, a prevalência de ILTB era 27% (n = 196; IC95%: 24%-31%). Os seguintes fatores mostraram associação positiva com ILTB entre profissionais de saúde na atenção primária: idade > 50 anos (OR = 2,94; IC95%: 1,44-5,99), ausência de cicatriz de BCG (OR = 2,10; IC95%: 1,28-3,43), ex-tabagista (OR = 1,80; IC95%: 1,04-3,11), profissão enfermeiro (OR = 2,97; IC95%: 1,13-7,83), profissão técnico de enfermagem (OR = 3,10; IC95%: 1,26-7,60), profissão agente comunitário de saúde (OR = 2,60; IC95%: 1,06-6,40) e uso irregular de máscaras N95 (OR = 2,51; IC95%: 1,11-5,98). Enquanto isso, os profissionais de saúde que não trabalham em serviços de saúde que dispõem de programa de controle da TB tem menor probabilidade de apresentar ILTB (OR = 0,66; IC95%: 0,45-0,97). O estudo demonstrou risco ocupacional substancial de ILTB entre profissionais de saúde na atenção primária no Brasil. O programa brasileiro de controle da tuberculose, assim como os programas locais, devem focar esses profissionais de saúde, de risco elevado, através de atividades educativas, assim como, equipamento de proteção individual melhor para prevenir a aquisição de novos casos de infecção pela tuberculose.

Tuberculose Latente; *Mycobacterium tuberculosis*; Pessoal de Saúde; Exposição Ocupacional

Resumen

El Los profesionales de salud presentan un riesgo aumentado de infección latente de la tuberculosis (ILT), en función de la exposición ocupacional al *Mycobacterium tuberculosis*. El objetivo del estudio fue estimar la prevalencia de la ILTB y sus factores de riesgo entre profesionales de salud en la atención primaria en cinco ciudades brasileñas. Realizamos un estudio transversal entre 2011 y 2013 entre profesionales de salud en la atención primaria, usando un cuestionario estructurado, y evaluamos la ILTB con el test Quantiferon-TB Gold In-Tube. La magnitud de las asociaciones fue evaluada con el uso de modelos de regresión logística jerárquica. Entre 708 profesionales de salud, la prevalencia de ILTB era 27% (n = 196; IC95%: 24%-31%). Los siguientes factores mostraron una asociación positiva con ILTB entre profesionales de salud en la atención primaria: edad > 50 años (OR = 2,94; IC95%: 1,44-5,99), ausencia de cicatriz de BCG (OR = 2,10; IC95%: 1,28-3,43), ex-fumador (OR = 1,80; IC95%: 1,04-3,11), profesión enfermero (OR = 2,97; IC95%: 1,13-7,83), profesión técnico de enfermería (OR = 3,10; IC95%: 1,26-7,60), profesión agente comunitario de salud (OR = 2,60; IC95%: 1,06-6,40) y uso irregular de máscaras N95 (OR = 2,51; IC95%: 1,11-5,98). Por otra parte, los profesionales de salud que no trabajan en servicios de salud que disponen de programa de control de la TB tienen una menor probabilidad de presentar ILTB (OR = 0,66; IC95%: 0,45-0,97). El estudio demostró riesgo ocupacional substancial de ILTB entre profesionales de salud en la atención primaria en Brasil. El programa brasileño de control de la tuberculosis, así como los programas locales, deben centrarse en esos profesionales de salud, de riesgo elevado, a través de actividades educativas, así como un mejor equipamiento de protección individual para prevenir el surgimiento de nuevos casos de infección por tuberculosis.

Tuberculosis Latente; *Mycobacterium tuberculosis*; Personal de Salud; Exposición Profesional

Submitted on 04/Sep/2016

Final version resubmitted on 13/Jan/2017

Approved on 03/Apr/2017