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Tuberculosis in prisoners and their contacts in Chile: estimating incidence and latent infection

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SUMMARY

SETTING: Contact investigation of tuberculosis (TB) patients in Chilean prisons.

OBJECTIVE: 1) To estimate TB incidence and the prevalence of latent tuberculous infection (LTBI) among prisoners and their contacts; and 2) to determine factors associated with disease transmission.

DESIGN: Cross-sectional study conducted in 46 prisons (51% of the total prison population) to assess the prevalence of and risk factors for LTBI among contacts of prisoners newly diagnosed with pulmonary TB. We used in vitro interferon-gamma release assays to establish LTBI and a questionnaire to address risk factors.

RESULTS: During the 1-year follow-up, we studied 418 contacts of 33 active TB cases. We found high TB incidence (123.9 per 100 000 prisoners) and high LTBI prevalence (29.4%) among contacts. LTBI rates are significantly higher in prison inmates than in non-prisoners (33.2% vs. 15.6%). Male sex, illicit drugs, malnutrition, corticosteroid use, low educational level and sharing a cell with a case increase the risk of LTBI. Multivariate analyses showed that corticosteroid use, duration of incarceration and overcrowding are the most relevant determinants for LTBI among all contacts.

CONCLUSIONS: Our results confirm that incarceration increases the risk of tuberculous infection and TB disease, and that it was associated not only with origin from vulnerable groups, but also with the prison environment. Reinforcing TB control is essential to prevent TB transmission in prisons.

KEY WORDS: IGRA; risk factors; prisons; tuberculosis; MIRU-VNTR

DESPITE ADVANCES in tuberculosis (TB) control worldwide, the global TB burden remains enormous, with TB remaining the second greatest cause of death due to a communicable disease.[1,2] One third of the world's population has latent tuberculous infection (LTBI), which is an obstacle to the goal of eliminating TB as a public health problem by 2050.[1] In this context, LTBI management is of particular relevance, especially in vulnerable groups.[3,4]

Prison inmates constitute a significant group at risk for TB; the overall incidence rate of active TB has been reported to be 23 times higher and that of LTBI 26 times higher in this group than in the general population.[1,5] Prisons provide ideal conditions for both TB transmission and development of active disease due to overcrowding, poor ventilation and inadequate diet. Inmates also usually come from socio-economically disadvantaged groups, where TB incidence and the prevalence of risk factors are higher. The shortcomings of the prison health system also contribute to delayed diagnosis and poor treatment outcomes, prolonging the infectious period and facilitating the emergence of multidrug resistance.[5–13] TB in prisons should therefore be seen as a neglected global problem.[6,7,14,15]

Like many other countries, Chile faces significant challenges in controlling TB in prisons. Earlier studies reported an incidence rate ratio (IRR) of between 15 and 29.3 among inmates compared to the general population.[16,17] In 2012, Chile's prison population was at around 50 000, including pre-trial detainees and remand prisoners,[18] across 108 prisons (incarceration rate 266 prisoners per 100 000 population; 92% males).[19]

In past decades, Chile has shown a declining TB incidence; however, this trend has tended to stagnate.[20,21] In 2012, the incidence rate was 12.6/100 000 for all forms of TB and 9.7 for pulmonary TB (PTB). Bacille Calmette-Guérin (BCG) vaccination began in 1951, and is currently mandatory for

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newborns, with 95% coverage.[21] The National TB Control Programme, created in 1973, grants free universal access for TB prevention, diagnosis and treatment. The Chilean prison system follows national guidelines, but lacks a specific budget for TB interventions and specific guidelines for prisons. While TB detection is performed mostly by passive case finding using direct sputum smear microscopy and culture in external laboratories, active case finding using symptom-based entry screening or periodic mass screening is also conducted, although not on a regular basis. TB care is provided primarily in prisons, and anti-tuberculosis treatment is delivered using directly observed treatment (DOT).

No previous studies on LTBI in prisons have been conducted and no contact tracing has been performed in adults using interferon-gamma release assays (IGRA) in Chile. The objectives of our study were 1) to estimate TB incidence and LTBI prevalence among prisoners and their contacts; and 2) to determine factors associated with disease transmission. The overall aim of the present study is to improve the quality of TB care in prisons.

MATERIALS AND METHODS

The study was conducted in all 46 prisons located in the central zone of Chile, covering 51% of the Chilean prison population ($n = 26\,644$); 91% were male.[19] During 1 year of prospective follow-up (31 July 2012–30 June 2013), all newly diagnosed PTB cases among prison inmates were recruited. Cases were confirmed using direct sputum smear microscopy or positive culture in accordance with the Chilean guidelines.[22] Cases were simultaneously interviewed to identify their contacts. TB samples were sent to the Chilean Institute of Public Health, Santiago, Chile, for genetic classification and determination of the genetic relationships of isolates using a standardised protocol for 24-locus mycobacterial interspersed repetitive unit variable number of tandem repeats genotyping (MIRU-VNTR). Analyses were performed using Bionumerics® software (Applied Maths, Sint-Martens-Latem, Belgium).

Contacts were defined as all persons aged $\geqslant 18$ years exposed to an index case within 12 weeks of TB diagnosis,[23] i.e., inmates who had close contact with the case (cellmates, persons who shared space on a daily basis), guards, health care workers (HCWs) and people who had visited the index case.

All contacts were tested for LTBI using the in vitro IGRA T-SPOT®.*TB* (Oxford Immunotec, Abingdon, UK). Approximately 4 ml of blood was collected by venipuncture directly into two heparin-lithium tubes and processed on the same day at Clínica Alemana de Santiago Laboratory, Santiago, Chile. IGRA was interpreted as positive (>8 spots), negative (<6 spots) or indeterminate (6–8 spots). Contacts were interviewed to detect TB symptoms,[24] and risk factors for disease transmission were determined using a standardised questionnaire.

IGRA-positive contacts underwent medical examinations, including direct sputum smear microscopy and chest radiography (CXR), to diagnose active TB or LTBI. Anti-tuberculosis drugs were prescribed for active TB cases according to Chilean guidelines.[25] For LTBI, chemoprophylaxis with isoniazid (INH) was indicated, with the consent of the patient, and an ad hoc protocol was elaborated by the Ministry of Health. Indeterminate IGRA results were repeated after a minimum 8-week period, and contacts underwent medical examinations and treatment based on the results.

We studied the following three categories of risk factors for LTBI: 1) social determinants: schooling, ethnicity, history of marginalisation (living in shelters or homeless); 2) individual susceptibility: sex, age, medical history (immune status) and behaviour; and 3) factors associated with incarceration and prison setting: length of detention and proximity to contagious cases, assessed by overcrowding (m^2/prisoner) and total volume of air available (m^3/prisoner) in the cells of the index cases. The questionnaires and laboratory results were sent to the Universidad del Desarrollo (UDD), Santiago, Chile, for analysis.

TB incidence was measured using the total number of reported cases; we also estimated incidence excluding cases diagnosed in the first 3 months of incarceration.[26] The denominator was the prison population in the middle of the study period. Cumulative incidence of TB among contacts was estimated using cases detected during contact investigation divided by the number of contacts with complete follow-up. LTBI prevalence was calculated by dividing the number of contacts with a positive IGRA result (and without active TB) by the total number of contacts who completed follow-up.

We included each LTBI risk factor in the bivariate analysis using contingency tables for categorical and median or mean analysis for quantitative variables; χ^2 and analysis of variance or the Mann-Whitney tests were used for P value ($P < 0.05$). Variables identified as significant were included in a multivariate logistic regression stepwise conditional forward model. Collinearity was assessed using Spearman's ρ test and controlled during stepwise analysis. Analyses and calculations were carried out using SPSS v.21 for Windows (Statistical Package for the Social Sciences, Armonk, NY, USA).

The study protocol was approved by the Ethics Committee of the Faculty of Medicine of UDD, Santiago, Chile. All participants were informed about the objectives of the study and provided informed consent.

Table 1 TB incidence by prison, Chile, 2012–2013

Prison	Prison population 31 January 2013 *n*	Pulmonary TB reported cases *n* (rate/100 000 prisoners/year)	Contacts identified/ investigated *n/N*	TB cumulative incidence among contacts *n* (%)	Total TB cases *n* (rate/100 000 prisoners/year)
Prison 1	5 301	13 (245.2)	123/120	1 (0.8)	14 (264.1)
Prison 2	1 471	3 (203.9)	73/71		3 (203.9)
Prison 3	532	1 (188.0)	35/35	1 (2.9)	2 (375.9)
Prison 4	2 945	6 (203.7)	74/73	1 (1.4)	7 (237.7)
Prison 5	456	2 (438.6)	51/48		2 (438.6)
Prison 6	534	1 (187.3)	29/29		1 (187.3)
Prison 7	300	2 (666.7)	28/27		2 (666.7)
Prison 8	2 379	1 (42.0)	15/15	1 (6.7)	2 (84.1)
Other prisons	12 726	—	—	—	—
Total	26 644	29 (108.8)	428/418	4 (9.6)	33 (123.9)

TB = tuberculosis.

RESULTS

Characteristic of TB cases

The 1-year follow-up of the 46 prisons led to the identification of 29 newly diagnosed cases of PTB. Further study of contacts resulted in the diagnosis of four additional TB cases, giving a total of 33 PTB cases. The incidence rate of PTB for the population under study was 123.9/100 000 inmates in 1 year (95%CI 85.2–173.9); however, it should be noted that only 8/46 prisons reported cases (Table 1). If we exclude the cases diagnosed in the first 3 months of incarceration (5/33), which some authors would consider prevalent cases, the incidence dropped to 105.1/100 000 (95%CI 69.8–151.8).

Most cases were males (30/33); the median age was 34.8 years (males 33.5, females 48.2) and the average duration of formal schooling was 7.3 years. The majority were Chilean; six belonged to native South American communities, mainly the Mapuche (5/6). The median time served in prison was 48 months (interquartile range [IQR] 29.4–74.0).

TB diagnosis was the result of spontaneous medical consultation due to respiratory symptoms in 23/33 cases, and the median time period between the onset of symptoms and initiation of treatment was 64 days (IQR 27–143). Nine more cases were detected using active case finding, including the four cases found among contacts. One case had been detected at entry screening during prison transfer; his symptoms had started 314 days before diagnosis. Thirteen cases remembered having been screened for TB on entry into prison, and 10/33 recalled having been subjected to mass TB screening.

Twenty-two TB strains were recovered from the 33 patients. Eighteen strains were viable for drug susceptibility testing (DST), of which two were resistant to streptomycin (11.1%). Spoligotyping revealed the presence of five lineages, Harley, Latin-American Mediterranean, Orphan, T and X, according to the international database. MIRU-VNTR analyses revealed the presence of 17 different codes, three of which were genetically close. One of them corresponded to a case and his contact who was diagnosed with active TB (1955-2012-S-1310 and 833-2013-S-524 codes) (Figure 1).[27]

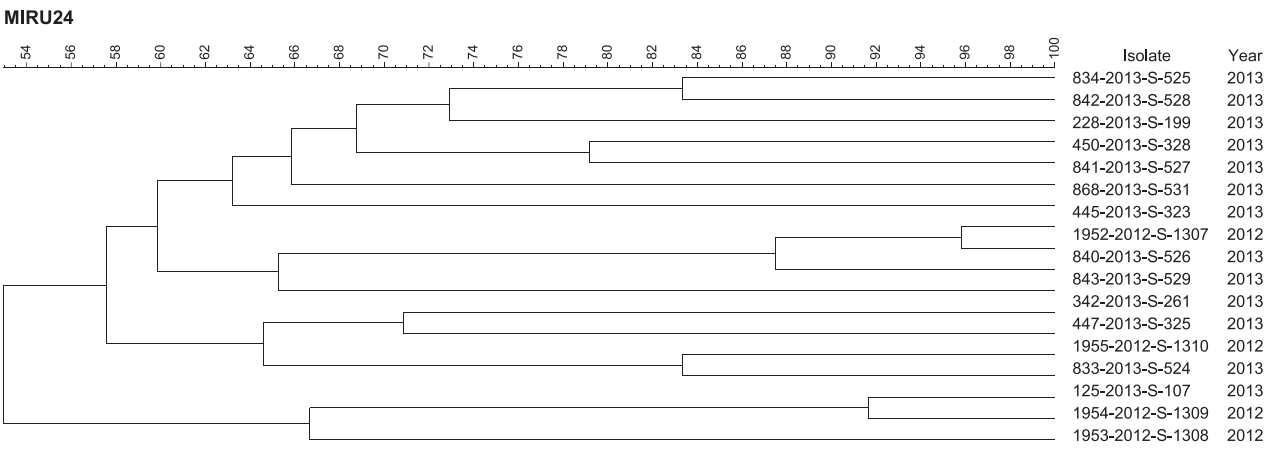

Figure 1 Unweighted pair group method with arithmetic mean tree based on 24-locus MIRU-VNTR of TB strains from prison inmates, Chile, 2012–2013.[27] MIRU = mycobacterial interspersed repetitive unit; VNTR = variable number of tandem repeats.

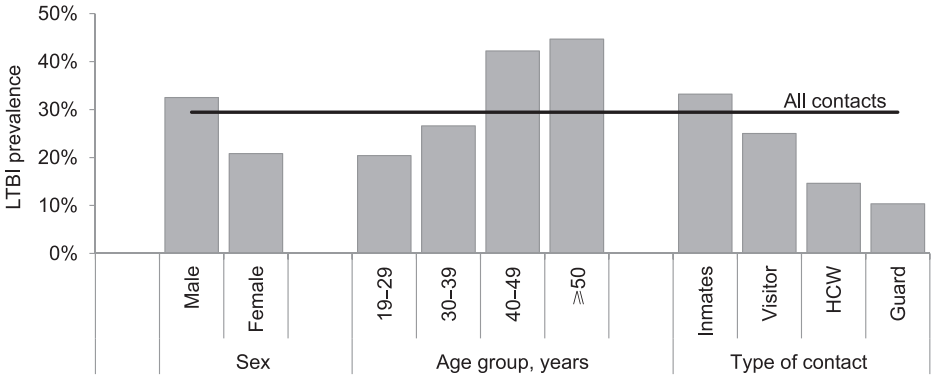

Figure 2 LTBI prevalence among contacts of TB cases in Chilean prisons, 2012–2013. LTBI = latent tuberculous infection; HCW = health care worker.

Characteristics of contacts

Of 517 contacts identified, 428 (83%) were interviewed and tested for LTBI; 25 declined to participate and 64 could not be located. The distribution of contacts was as follows: 336 prisoners, 41 HCWs, 31 guards and 20 visitors. Many had contact with more than one case, especially HCWs, resulting in an average of 28 contacts identified per case.

Contacts were predominantly males (77%); the median age was 31.7 years (males 31.3, females 35.3). The average duration of schooling was 9.3 years. Most were Chilean (98%), of whom 11.7% belonged to native South American groups. In 64.3% of the contacts, signs and symptoms compatible with TB were present at the moment of the interview; cough (40.5%), fatigue (30.8%), weight loss (23.7%) and chest pain (20.8%) were the most frequently reported symptoms.

LTBI prevalence and risk factors

Among 428 contacts, IGRA was positive in 120, negative in 279 and indeterminate in 29. After medical evaluation and repeat IGRA testing of indeterminate cases, 123 persons were classified as LTBI, four as active TB (all inmates) and 290 as non-infected, while one remained indeterminate on IGRA. Ten contacts with indeterminate test results were excluded from the analysis, as they could not be located for the second test, giving a total of 418 contacts with complete follow-up. INH preventive therapy was indicated in 27 contacts with LTBI.

Table 2 LTBI prevalence among contacts of TB cases in Chilean prisons, 2012–2013

Categories	*n*	LTBI *n*	LTBI prevalence % (95%CI)
All contacts	418	123	29.4 (24.9–33.9)
Sex			
Male	322	103	32.0 (27.9–38.5)
Female	96	20	20.8 (12.2–29.5)
Age group, years			
19–29	154	31	20.1 (13.5–26.8)
30–39	126	33	26.2 (18.1–34.3)
40–49	91	38	41.8 (31.1–52.4)
⩾50	47	21	44.7 (29.4–60.0)
Type of contact			
Inmate	328	109	33.2 (28.0–38.5)
Non-inmate	90	14	15.6 (7.5–23.6)
Visitor	20	5	25.0 (8.7–49.1)
HCW	41	6	14.6 (2.6–26.7)
Guard	29	3	10.3 (2.2–27.3)

LTBI = latent tuberculous infection; TB = tuberculosis; CI = confidence interval; HCW = health care worker.

LTBI prevalence among all contacts was 29.4% (95%CI 24.94–33.91), varying between 10.3% in guards and 33.2% in prisoners (Figure 2). Inmates had a higher risk of LTBI than other contacts (Table 2, Figure 2); in HCWs, a positive correlation was found between LTBI and the average number of TB cases to which they were exposed ($P = 0.037$), but this was not the case for guards and visitors.

Concerning individual susceptibility, bivariate analysis revealed that LTBI occurred most frequently in males, with increasing risk according to age. Regarding behavioural risk factors, a significant association was found only with illegal drug use, specifically cannabis use, but not with tobacco or alcohol abuse (both exceeding 60% prevalence of consumption) (Tables 3 and 4).

Bivariate analysis also revealed a significant association between LTBI and history of malnutrition and long-term use of corticosteroids (>4 weeks). There were only two HIV-positive contacts, and both had LTBI. A high prevalence of LTBI was found in 13 individuals with cancer (53.8%); however, this association did not attain statistical significance. No association was found with diabetes, renal failure, silicosis, gastrectomy or mental illness.

A significant association was found between LTBI and low educational level, with a significant inverse gradient with the number of years of schooling. Belonging to native South American groups did not reach statistical significance.

Considering only prisoners, LTBI was significantly associated with age, history of malnutrition and duration of incarceration (Tables 3 and 4), but not

Table 3 Determinants of LTBI among contacts of TB cases in Chilean prisons, 2012–2013 (categorical variables, $n = 413$, excluding contacts with active TB)

	All contacts			Inmates			Non-inmates		
Risk factors	Total *n*	LTBI prevalence *n* (%)	*P* value (Fisher)	Total *n*	LTBI prevalence *n* (%)	*P* value (Fisher)	Total *n*	LTBI prevalence *n* (%)	*P* value (Fisher)
Sex									
Male	317	103 (32)	0.018	271	97 (36)	0.05	46	6 (13)	0.35
Female	96	20 (21)		52	12 (23)		44	8 (18)	
Behavioural factors									
Alcohol abuse									
Yes	202	61 (30)	0.47	187	60 (32)	0.24	15	1 (7)	0.51
No	100	29 (29)		66	25 (38)		34	4 (12)	
Tobacco use									
Yes	273	85 (31)	0.26	230	78 (34)	0.54	43	7 (16)	0.56
No	138	38 (28)		92	31 (34)		46	7 (15)	
Illicit drug use									
Yes	243	84 (35)	0.01	238	84 (35)	0.2	5	0	0.42
No	170	39 (23)		85	25 (29)		85	14 (16)	
Cannabis use									
Yes	196	67 (34)	0.04	193	67 (35)	0.37	3	0	0.59
No	217	56 (26)		130	42 (32)		87	14 (16)	
Medical history									
HIV-positive									
Yes	2	2 (100)	—	2	2 (100)	—	0	0	—
No	411	121 (29)		321	107 (33)		90	14 (16)	
History of cancer									
Yes	13	7 (54)	0.06	10	6 (60)	0.08	3	1 (33)	0.4
No	400	116 (29)		313	103 (33)		87	13 (15)	
History of malnutrition									
Yes	30	16 (53)	0.005	26	15 (58)	0.008	4	1 (25)	0.5
No	381	107 (28)		296	94 (32)		85	13 (15)	
History of corticosteroid use (>4 weeks)									
Yes	22	11 (50)	0.03	17	9 (53)	0.08	5	2 (40)	0.16
No	386	111 (29)		303	100 (33)		83	11 (13)	
History of previous TB									
Yes	10	5 (50)	0.15	7	3 (43)	0.44	3	2 (67)	0.06
No	402	118 (29)		316	106 (34)		86	12 (14)	
Previous contact with TB cases									
Yes	200	58 (29)	0.39	140	48 (34)	0.49	60	10 (17)	0.5
No	211	65 (31)		182	61 (34)		29	4 (14)	
Social determinants									
Foreign nationality									
Yes	7	2 (29)	0.65	4	1 (25)	0.59	87	13 (15)	0.4
No	406	121 (30)		319	108 (34)		3	1 (33)	
Native South American									
Yes	49	19 (39)	0.1	39	17 (44)	0.12	10	2 (20)	0.49
No	360	103 (29)		281	91 (32)		79	12 (15)	
History of mining									
Yes	8	5 (63)	0.07	7	4 (57)	0.2	1	1 (100)	0.15
No	367	112 (31)		300	103 (34)		67	9 (13)	
History of homelessness									
Yes	70	20 (29)	0.49	64	18 (28)	0.32	6	2 (33)	0.23
No	232	64 (28)		173	56 (32)		59	8 (14)	
Proximity with the index case									
Sharing prison cell dormitory									
Yes	175	65 (37)	0.004	175	65 (37)	0.1			
No	238	58 (24)		148	44 (30)				
Sharing prison cell module									
Yes	42	10 (24)	0.24	42	10 (24)	0.1			
No	371	113 (30)		281	99 (35)				
Sharing daily activities									
Yes	154	55 (36)	0.028	154	55 (36)	0.28			
No	259	68 (26)		169	54 (32)				

LTBI = latent tuberculous infection; TB = tuberculosis; HIV = human immunodeficiency virus.

Table 4 Determinants of LTBI among contacts of TB cases in Chilean prisons, 2012–2013 (continuous variables, $n = 413$, excluding contacts with active TB)

Risk factor	All contacts			Inmates			Non-inmates		
	LTBI median [IQR]	No LTBI median [IQR]	*P* value	LTBI median [IQR]	No LTBI median [IQR]	*P* value	LTBI median [IQR]	No LTBI median [IQR]	*P* value
Age, years	36.9 [28.9–45.8]	30.4 [25.8–40.7]	<0.001*	36.1 [28.6–43.4]	29.9 [25.5–38.2]	<0.001*	42.5 [39.4–53.1]	32.8 [27.3–44.1]	0.006*
Schooling, years	8.0 [7.0–12.0]	10.0 [7.3–12.0]	0.025*	8.0 [6.0–11.0]	8.0 [6.0–11.0]	0.819*	12 [8.8–14.5]	12.0 [12.0–15.0]	0.317*
Time served in prison, months	–	–	–	72 [36–144]	48 [24–84]	<0.001*	–	–	–
Length of current incarceration				20 [8–44]	18 [7.8–36]	0.3*			
Overcrowding, m^2/prisoners, mean ± SD				0.78 ± 0.27]	0.91 ± 0.38]	0.022†			
Ventilation, m^3/prisoners, mean ± SD				2.37 ± 0.82]	2.68 ± 0.98]	0.038†			
Time of exposure to a contagious case, h	480 [104–1287]	314 [30.9–720]	0.06*	480 [182–1386]	450 [120–1065]	0.313*	0.63 [0.24–1.37]	0.028 [0.00–0.41]	0.057*

* Mann-Whitney.
† *t*-test.
LTBI = latent tuberculous infection; TB = tuberculosis; IQR = interquartile range; SD = standard deviation.

with illicit drug use, HIV positivity, corticosteroid use or cancer. We also found a significant association between LTBI and overcrowding (m^2/prisoner) and total volume of air available (m^3/prisoner) (Table 4).

The multivariate model, which included all variables significant in bivariate analysis, showed that corticosteroids, overcrowding and total time served in prison were the main determinants of LTBI among all contacts (Table 5). As variables such as sex, illicit drug use, cannabis use and being incarcerated were correlated, the model excluding the variables related to incarceration and prison settings also showed that LTBI was associated with malnutrition, illicit drug use and age.

DISCUSSION

This is the first field study of a TB contact investigation in Chilean adults using an IGRA, a technique that is more suitable than the tuberculin skin test for a population with high BCG coverage.[28] Our results show that incarceration increases the risk of tuberculous infection and disease in a population characterised by high vulnerability before incarceration. Chilean prisoners have less schooling, higher behavioural risk factors and poorer immune responses than the general population.[29,30] Our multivariate analysis also showed that time served in prison and overcrowding, along with corticosteroid use, are the most relevant determinants of LTBI among the contacts studied. The correlation found between LTBI risk factors and being incarcerated explains the pre-eminence of incarceration-related variables in the multivariate model.

The study found higher PTB incidence among prisoners (123.9/100 000, IRR 12.7, 95%CI 8.7–17.9) than in the general population.[21] These figures should be compared to those reported by Baussano et al. for prisons in high-income countries (average incidence rate 238/100 000 inmates, IRR 17.9).[5] However, our study was based on the prisons' routine TB detection procedures, most of which do not use CXR and have limited access to sputum smear microscopy; the number of cases in prisons may therefore be greater than reported. Underlining the shortcomings of TB detection, we observed long periods between onset of symptoms and treatment initiation, and active case finding activities were infrequent.

We found high LTBI prevalence among prisoners (33.2%); previous studies have reported rates of 17% in USA and 72% in Brazil.[31,32] Visitors, HCWs and guards had a significantly lower prevalence of infection than prisoners, at an average of 15.6% in non-prisoners. While the World Health Organization estimates that LTBI affects one third of the world's population,[1] a study among the general population of

Table 5 Multivariable logistic regression models showing risk factors for LTBI in all contacts of TB cases in Chilean prisons, 2012–2013 ($n = 413$, excluding contacts with active TB)

Risk factors	aOR (95%CI)	*P* value*
Determinants of LTBI in all contacts, using all significant variables		
History of corticosteroid use >4 weeks (no vs. yes)	4.71 (1.19–18.59)	0.03
Overcrowding (prisoners/m^2)	3.49 (1.06–11.47)	0.04
Time incarcerated, years	1.09 (1.03–1.16)	0.01
Determinants of LTBI in all contacts, excluding imprisonment variables		
Age, years	1.05 (1.03–1.07)	0.00
Illicit drug use (no vs. yes)	2.66 (1.58–4.47)	0.00
History of malnutrition (no vs. yes)	2.69 (1.25–5.82)	0.01

* $P \leqslant 0.05$ (significance level).
LTBI = latent tuberculous infection; TB = tuberculosis; aOR = adjusted odds ratio to all variables in the model; CI = confidence interval.

the United Kingdom reported an LTBI prevalence of 9%.[33] We could assume that LTBI prevalence among the general population is similar to that observed among non-prisoner contacts.

Although LTBI studies do not allow us to establish when infection was acquired, our study provides evidence that some infection occurred inside prisons: 37% of the 29 contacts who were initially IGRA-indeterminate were positive on repeat testing (performed after 8 weeks), suggesting recent infection.[34] In addition, the multivariable model showed that the duration of incarceration and proximity to active cases determined a significantly greater risk of LTBI, independently of the effect of all other risk factors associated with infection. A significant association was also observed between exposure to a larger number of active TB cases and LTBI prevalence in HCWs. Furthermore, clinical evaluation of IGRA-positive contacts led to the detection of four cases of active TB in this group. Finally, molecular analyses confirmed the presence of related *Mycobacterium tuberculosis* strains in three clusters.

There are some limitations to this study. First, as mentioned, the number of incident cases may have been underestimated. Second, as some TB samples were lost, DST and molecular studies of all related cases could not be performed. Third, recall bias made it difficult to quantify the time of exposure in all contacts.

The IGRA proved useful in measuring the prevalence of infection, indicating the benefits of IGRA in a possible screening programme for the elimination of the disease. However, the high cost precludes its routine use in prisons.

The results of this study indicate that there is an urgent need to improve TB prevention and control activities in Chilean prisons. Procedures to be considered include universal access to CXR, the use of new tools such as Xpert® MTB/RIF (Cepheid, Sunnyvale, CA, USA), and redesigning passive and active detection of new cases.[7,35]

CONCLUSIONS

We found high TB incidence and LTBI prevalence among prisoners and their contacts. The increased risk of TB in prisons may be attributed to the disadvantaged socio-economic origins of most prisoners, along with prison overcrowding and prolonged periods of incarceration. Deficiencies in the prison health care system could worsen the situation by delaying TB diagnosis. The results of this study underline the urgent need to reinforce TB control in prisons and strengthen political commitment among prison and health authorities to improve access to quality health care services.

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RESUME

CONTEXTE : Investigation des contacts de détenus chiliens tuberculeux

OBJECTIF : Estimer l'incidence de la tuberculose (TB) et la prévalence de l'infection tuberculeuse latente (LTBI) parmi les détenus et leurs contacts. De plus, déterminer les facteurs associés à la transmission de la maladie.

SCHÉMA : Etude transversale dans 46 prisons (51% de la population de détenus) pour évaluer la prévalence et les facteurs de risque de LTBI parmi les contacts de détenus récemment diagnostiqués comme TB pulmonaire. Nous avons utilisé le test de libération de l'interféron gamma in vitro pour confirmer la LTBI et un questionnaire à la recherche des facteurs de risque.

RÉSULTATS : Pendant un suivi d'un an, nous avons étudié 418 contacts de 33 cas de TB active. Nous avons trouvé une incidence de TB élevée (123,9/100 000 prisonniers) et une prévalence élevée de LTBI (29,4%) parmi les contacts. La LTBI est significativement plus élevée chez les détenus comparés aux non détenus (33,2% vs. 15,6%). Le sexe masculin, les stupéfiants, la malnutrition, les corticoïdes, le faible niveau d'instruction et le fait de partager une cellule avec un cas augmentent le risque de LTBI. Les analyses multivariates ont révélé que la prise de corticoïdes, la durée de l'incarcération et la promiscuité étaient les déterminants majeurs de LTBI parmi les contacts.

CONCLUSION : Nos résultats confirment que la détention augmente le risque de LTBI et TB maladie, associé non seulement à l'appartenance du détenu à un groupe vulnérable, mais également à l'environnement de la prison. Renforcer la lutte contre la TB sera essential pour prévenir la transmission de la TB en prison.

RESUMEN

MARCO DE REFERENCIA: Investigación de contactos de tuberculosis (TB) en cárceles Chilenas.

OBJETIVO: Estimar la incidencia de TB y la prevalencia de infeccion tuberculosa latente (LTBI) en prisioneros y sus contactos. Además, determinar los factores de riesgo de la infección.

METODO: Estudio transversal en 46 cárceles (51% de la población carcelaria) para medir la prevalencia y los factores de riesgo de LTBI entre contactos de casos nuevos de TB pulmonar. Utilizamos in vitro pruebas de liberación de interferón gama para detectar LTBI y un cuestionario para factores de riesgo.

RESULTADOS: Durante un año de seguimiento, estudiamos 418 contactos de 33 casos de TB activa. Encontramos una incidencia elevada de TB (123,9/100 000 prisioneros) y prevalencia de LTBI (29,4%) entre los contactos. La LTBI es significativamente mayor en contactos encarcelados vs no-encarcelados (33,2% vs. 15,6%). Aumentan el riesgo de LTBI: sexo masculino, drogas ilícitas, desnutrición, corticoides, baja escolaridad y compartir celda con un caso. Los principales determinantes de LTBI en el análisis multivariado fueron: uso de corticoides, duración del encarcelamiento y hacinamiento.

CONCLUSIONES: Nuestros resultados confirman que la prisión aumenta el riesgo de infectarse y enfermar con TB, debido tanto al origen socialmente vulnerable de los prisioneros como al ambiente carcelario. Reforzar el control de la TB es esencial para prevenir la transmisión de TB en prisiones.