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Completeness of tuberculosis information system data from prisoners in the state Rio Grande do Sul, Brazil

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Abstract *Tuberculosis (TB) has a high incidence in several countries and is even more severe in prisoners. We evaluated the completeness of prisoners TB notifications in the Notifiable Disease Information System (SINAN) carried out by prison primary care teams (eAPP) or by other health facilities in the state of Rio Grande do Sul (RS). This descriptive cross-sectional study used prisoners data notifications in the SINAN TB by the eAPP or other health facilities from January 2014 to November 2018. We analyzed the percentage of completeness of the variables: gender, ethnicity, schooling, HIV, entry type, sputum smear, sputum culture, AIDS, ART during TB treatment, directly observed treatment (DOT), sixth-month smear, and closure status. Around 52.9% of TB cases in prisoners were reported by eAPP, and other health facilities reported 47.1% of the cases. Eighty percent of the variables were classified in category 4 (75.1% to 100% completeness). However, the DOT and sixth-month smear variables were classified into category 3 (50.1% and 75% completeness). While it does not compromise the notification of TB in the SINAN, the lack of data can impair the quality of information about the disease.*

Key words *Mycobacterium tuberculosis, Information system, Prisons*

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Introduction

Brazil has about 90 thousand new TB cases annually, with a higher incidence in population groups with socioeconomic or immunological vulnerability, including prisoners. There is evidence that prison conditions may expand the disease in the general population[1,2]. Individuals enter prisons with a low risk of developing TB, but this risk increases rapidly over five years, 35 times higher than the general population[3-5].

In this context, planning and implementing public health care policies for prisoners are concerns of the World Health Organization (WHO)[6]. In Brazil, these public policies were consolidated with the publication of the National Policy for Comprehensive Health Care in the Prison System (PNAISP) in 2014, which guarantees prisoners access to health services through the implementation of prison PHC teams (eAPP). The following attributions of the eAPP stand out: elaborating and implementing health and epidemiological surveillance actions; and monitoring and evaluating specific indicators and health information systems, with data produced in the local health system[7,8].

TB is a notifiable disease, and the health unit that identifies the case is responsible for notifying it, which is carried out by completing the notification form, including information on patient identification, service, and clinical and epidemiological data. Data in this form must be entered into the Notifiable Disease Information System (SINAN) database, which is the official system for collecting and processing individual forms of mandatory legal notification, currently the primary source of data for TB surveillance in the country[9,10].

Information systems such as SINAN are essential tools for epidemiological surveillance, but problems can occur in data quality involving producers, managers, and users at all stages of the information production cycle. Thus, the analysis and evaluation of epidemiological data can also be performed through SINAN. SINAN's technical areas monitor the percentage of field completion of the notification forms, establishing parameters to assess the completion of the database. These cutoff percentage values are used to evaluate data from other information systems[11,12] qualitatively.

The proper completion of these forms (completeness) is essential and must be regularly updated by the health unit team, as it directs recommendations and provides subsidies for decision-making. If these issues are not considered, the knowledge generated based on these data may not adequately represent the reality studied[12-14]. In this context, the study aimed to evaluate the completeness of prisoners TB notifications in SINAN performed by prison primary care teams (eAPP) or other health facilities in the state of Rio Grande do Sul (RS).

Methods

This descriptive, cross-sectional study was conducted from secondary data obtained from SINAN TB through access granted by the State Health Secretariat of RS on December 18, 2020. Prisoners with TB in the state of RS reported from January 2014 to December 2018 were included in the study. Individuals without prison information at the time of TB notification and those under 18 years of age were excluded.

In 2019, RS had about 41 thousand prisoners distributed in 109 penal institutions[15]. According to the Ministry of Health, in 2020, 33 multidisciplinary eAPPs in RS were responsible for articulating and providing comprehensive care to around 19,000 prisoners [16].

The term completeness refers to the degree of completion of each field of the variables analyzed, measured by the proportion of notifications with a field completed with a different category from those indicating the lack of data. Fields completed in the SINAN as *unknown*, with a situation in progress, or fields that indicated lack of data without information or blank data were considered incomplete[17]. Completeness was calculated and compared between two groups: 1) TB notifications by eAPP and 2) TB notifications by other health facilities (hospitals, emergency care units, health posts).

We analyzed the following variables from the TB notification form:gender, ethnicity, schooling, HIV, entry type, sputum smear, sputum culture, AIDS, ART during TB treatment, directly observed treatment (DOT), sixth-month smear, and closure status.

The qualitative assessment of completeness was based on the SINAN classification: category 1, with 0 to 25% completeness; category 2, between 25.1% and 50%; category 3, between 50.1% and 75%; and category 4, between 75.1% and 100% completeness[17]. We performed descriptive analyses by frequency distribution, absolute numbers, and proportions using the statistical analysis software Statistical Package for the Social Sciences (SPSS), version 20.0.

Although this is research based on data extracted from secondary sources, it is noteworthy that the prerogatives of confidentiality and anonymity of data and information collected were preserved in compliance with the ethical precepts established in Resolution N° 466/12 of the National Health Council. The Research Ethics Committee of the School of Public Health/State Health Secretariat of RS approved the study under Opinion nº 3.047.876.

Results

During the study period, 1,881 (52.9%) TB cases in prisoners were reported by eAPPs (Figure 1), and 1,676 (47.1%) TB cases in prisoners were reported by other health facilities, corresponding to 11.3% of the total TB cases reported in the state of RS.

The completeness (completion percentage) of each variable analyzed is described in Table 1. The variables gender, entry type, sputum smear, schooling, ethnicity, HIV, sputum culture, AIDS, ART, and closure status were classified under SINAN's category 4 (75.1% and 100% completeness) in the notifications by eAPPs and other health establishments. DOT and sixth-month smear variables were classified in SINAN's category 3 (50.1% and 75% of completeness) in the notifications by eAPPs and other health establishments.

Discussion

We observed that more than 80% of the variables evaluated were classified in category 4 (75.1% to 100% of completion), both in notifications made by eAPP and other health facilities. However, we still observed categories that indicate low data completion in the SINAN, such as the variables classified in category 3 in this study. We can infer that completeness is directly related to the exist-

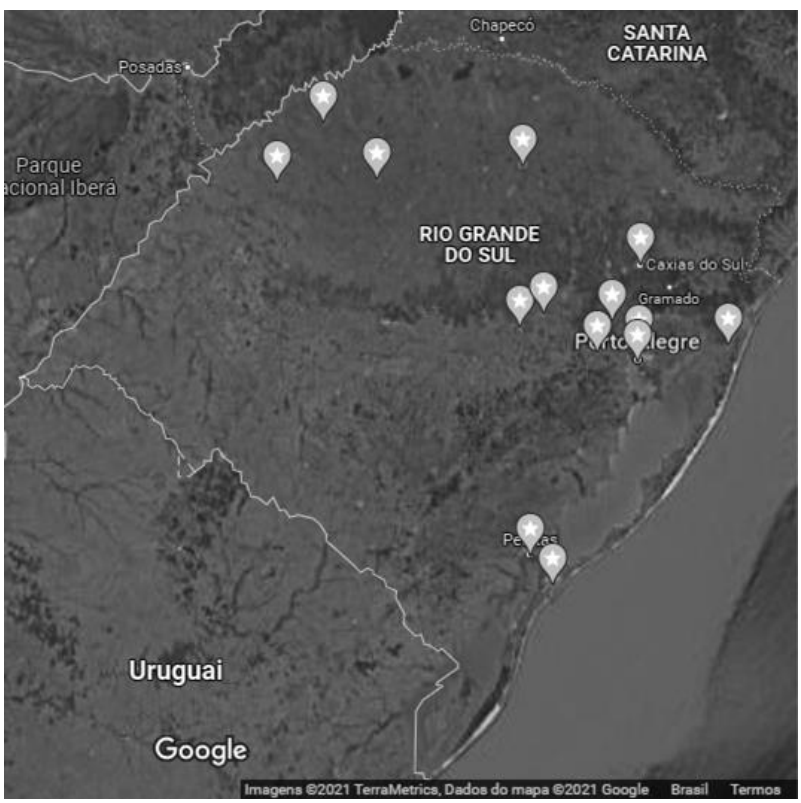

Figure 1. Location of eAPPs responsible for 52.9% of notifications in RS.

Source: Authors.

Table 1. Completeness of SINAN TB notification form variables, 2014-2018, Rio Grande do Sul, Brazil.

Variables	eAPP		Other health facilities	
	Total completed	%	Total completed	%
Gender	1,881	100	1,676	100
Schooling	1,421	75.5	1,266	75.5
Ethnicity	1,164	93.7	1,575	93.9
HIV	1,854	98.6	1,618	96.5
Entry type	1,881	100	1,676	100
Sputum smear	1,881	100	1,676	100
Sputum culture	1,770	94.0	1,624	96.8
AIDS	1,771	94.1	1,443	86.0
ART	1,767	93.9	1,472	87.8
DOT	1,399	74.4	969	57.8
Sixth month smear	1,069	56.8	1,001	59.7
Closure Status	1,815	96.5	1627	97.0

eAPP: prison primary care teams; ART: antiretroviral therapy during TB treatment; DOT: directly observed therapy.

Source: Authors.

ing fields to be completed for each variable on the SINAN form and the classification of completing these fields as essential or mandatory, per the Ministry of Health[13].

We emphasize that the entry type and sputum smear variables were 100% completed, as they are the only ones in the study without *unknown*, in progress, not informed/blank in their fields, which means that completion is not 100%. Likewise, according to the rules and instructions for completing in the SINAN, these are mandatory fields whose lack of data hinders the inclusion of the notification in SINAN[18].

The same occurs for the gender variable. However, this variable has an *unknown* field available for completion. Therefore, completing 100% of this variable can be justified because the responsible professional fills it out based on the type of penal institution (female or male) where the prisoners are located or even by observation at the time of completing the form.

The completeness of the variables ethnicity, schooling, AIDS, ART, DOT, sixth-month smear, and closure status was less than 100%, mainly due to a large number of notifications with categories *unknown*, no information, or blank, since these are mostly related to the lack of completing the field and not to the informant's lack of knowledge[19].

Studies have already shown weaknesses in TB epidemiological surveillance systems, such as the lack of completeness of variables. In this context, it is suggested that some areas, such as prisoners, be prioritized for improving TB surveillance since differentiated strategies to face this critical public health problem are required in this population[20,21].

The variables with a situation in progress as a completion option, such as the variable HIV and sputum culture, also did not achieve 100% completeness. It is noteworthy that knowledge of HIV serology is essential so that ART is available promptly (two to eight weeks after the start of TB treatment) for TB co-infected individuals[1,6].

On the other hand, the Ministry of Health must recommend that all prisoners submit to sputum culture for a subsequent sensitivity test. Therefore, the lack of completeness observed in this and other studies for the sputum culture variable probably occurred, as this method requires 20 to 60 days to obtain results. These data are not updated in this context, showing the need to correct this obstacle[14,20].

Furthermore, we did not observe any discrepancy in the classification of the categories between the data completed by the eAPPs or other health facilities. However, we emphasize that 52.9% of TB notifications in the state of RS were performed by eAPPs, which is extremely important, as it reflects the efficient work of these teams and the policy implemented, besides reducing the need to relocate prisoners for servicing in external units. Considering that RS is a pioneer in Brazil in the municipalization and co-financing of eAPPs, since the implementation of these

teams, a set of effective strategies for the diagnosis of TB in penal institutions of RS has been observed, limiting the burden of the disease[16,22].

Completing the notification form is vital for defining the effectiveness and quality of actions in municipal and state TB control programs. Moreover, the forms should be completed or updated monthly until the end of the TB treatment[12]. Improving completeness requires, among other factors, training, continuing education programs, appreciation of health professionals, and strengthening primary care since issues such as the high workload of eAPPs and the turnover of professionals can adversely influence the follow-up of patients with TB[16,23]. The use of secondary data was a limitation of the study. However, the results are relevant because 100% of TB cases reported in prisoners in RS were evaluated over five years, comparing eAPPs with other health facilities.

Furthermore, the data generated by the system are essential to know the reality and, thus, formulate adequate evidence-based policies and be used in the planning, implementation, and evaluation of health programs. The professionals completing the TB notification forms in the SINAN should participate in continuing education activities, especially regarding the epidemiological surveillance of TB. We also emphasize that the work carried out by the eAPPs increases the completion of TB notifications among prisoners in RS.

Collaborations

C Busatto: conception and design, data analysis and interpretation, and paper writing. RM Dotta, KZ Ely, C Jarczewski, PEA Silva: paper writing and critical review. IB Ramis and LG Possuelo: conception and design or data analysis and interpretation. All authors approved the version to be published.

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