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Completeness of tuberculosis reporting forms for disease control in individuals with HIV/AIDS in priority cities of Bahia state

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Abstract *The control of HIV / Tuberculosis (TB) co -infection remains a challenge for public health. Notification is mandatory for both diseases and the National Case Registry Database (Sinan) is responsible for the collection and processing of individual forms of reporting and monitoring. The adequate fulfillment of these fields chips (completeness) is essential to follow the dynamics of the disease and set priorities for intervention. The aim of this study was to evaluate the completeness of the notification forms of tuberculosis in the priority municipalities of Bahia (Camaçari , Feira de Santana , Ilhéus , Itabuna, Jequié, Lauro de Freitas , Porto Seguro , Teixeira de Freitas , Paulo Afonso, Barreiras and Salvador) to control the disease in individuals with HIV/AIDS using tabulations obtained from the Sinan in the period from 2001 to 2010. The results showed that despite the completeness of the field HIV be above 50 %, more than half the cases were met as "undone" or "being processed" in all municipalities assessed in the period. The low completeness of reporting forms may compromise the quality of surveillance of TB cases. The results suggest the need for greater availability of HIV testing in these individuals.*
Key words *Tuberculosis, HIV, Public health surveillance, Disease notification*

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Introduction

Tuberculosis (TB) was under control in developed countries until the mid-1980s. However, after the emergence of the HIV / AIDS epidemic, the number of TB cases raised sharply. In the 1990s, TB was considered the second epidemic disease in Asia, Africa and Latin America and declared as a global emergency by WHO in 1993[1]. From the 1990s to 2012, the overall prevalence of TB dropped off 37%. Yet, the goal of 50% of TB cases reduction set by WHO until 2015is still far from being achieved[2].

Currently, Brazil ranks the 17th higher for the burden of TB among the 22 higher-burden countries[3]. Bahia is the third Brazilian state with higher total number of TB cases and the tenth among the states with higher incidence of the disease in the country[4].

The control of HIV / TB co-infection remains a challenge to public health. Although TB diagnosis and treatment are available, TB causes more than a quarter of deaths in people living with HIV/AIDS worldwide[5]. In addition, approximately 43% of HIV/TB co-infected patients have resistance to tuberculostatic drugs[6].

The prevalence of HIV/TB co-infection is more frequent in areas with high TB-burden. At the end of the 1990s, the relative risk of HIV/TB co-infection in Latin America was about three times higher than in United States, where HIV prevalence reaches 11% of individuals with TB[7]. In Brazil, 20% of patients infected with *Mycobacterium tuberculosis* has a positive HIV serology[8], while in Bahia state, 8.8% of patients hospitalized with TB were infected with HIV[9].

AIDS and TB are both diseases with mandatory notification at the Sistema de Informação de Agravos de Notificação (Sinan, Brazilian Case Registry Database), organization responsible for collecting and processing individual notification forms and follow-up of the cases[10]. Proper completion of all fields of these records (completeness) is essential to survey the disease dynamic and for priority setting of health intervention[11]. The lack of data exchange between AIDS and TB programs can contribute to adverse outcomes such as mortality, which reaches more than 50% of HIV/TB co-infected patients[12].

In order to restructure and improve the assistance to severe cases of TB (adverse reactions, drug resistance and co-morbidities such as diabetes, hepatitis and HIV / AIDS), the National Tuberculosis Control Program (NTCP) established new criteria to define priority cities for TB control in 2009. The current criteria include all capitals, cities with population greater or equal to 100,000 inhabitants, cities with TB incidence higher than 80% of the national level or with TB mortality higher than the national rate[13]. Currently, there are 181 priority cities in Brazil, 11 of which are located in Bahia[4].

The aim of this study was to evaluate the completeness of TB notification forms in people living with HIV / AIDS in priority cities for TB control in Bahia state.

Methods

This is a descriptive study, with data collected from Sinan reports for a ten years period (January 2001 to December 2010). The sample included reports from all priority cities in the state of Bahia: Camaçari, Feira de Santana, Ilhéus, Itabuna, Jequié, Lauro de Freitas, Porto Seguro, Teixeira de Freitas, Paulo Afonso and Barreiras, in addition to Salvador, the capital of the state[4]. Data were collected by three undergraduate students previously trained and revised in a second time by the researchers.

Completeness of HIV and AIDS fields of all TB notification forms was analyzed. Additionally, we evaluated seven other variables related to co-infection: sputum smear (1st and 2nd from the first month, 2nd month and 6th month), sputum culture, clinical presentation of tuberculosis and outcome.

Analysis of completeness was based on the Sinan classification for qualitative assessment: category 1 if there was 0-25% of completeness; category 2 between 25.1% and 50%; Category 3 between 50.1% and 75% and category 4 between 75.1% and 100%[14]. The rating previously proposed by Sinan categorized the completeness as excellent if fields were filled up to 90%, regular between 70 and 89% and poor if below 70%[15]. Fields "ignored" or "blank" were considered incomplete and excluded.

Results

A total of 44,952 TB notifications forms were evaluated in the priority cities, accounting for 59.7% of all TB cases in the state (75,246) during the ten years of the study. Salvador had the highest absolute number of notifications (33,987), followed by Feira de Santana (2,519), Itabuna (1,740) and Ilhéus (1,417).

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Table 1 depicts the completeness of TB notification forms for the HIV and AIDS variables. For HIV field, completeness ranged from 64.7% (Jequié) to 95.6% (Feira de Santana). Jequié and Itabuna were classified as Category 3 and the other cities as category 4.The percentage of fields filled in as "ongoing" or "not performed" accounted for more than 57% in all evaluated cities, ranging from 57.2% in Porto Seguro to 89.6% in Itabuna. Feira de Santana, the city with the highest completeness of HIV field, had the highest percentage of fields filled as "not performed" (84.5%). The number of HIV positive cases was 2,025, representing 4.5% of the notifications in the period (44,952).

Regarding to the AIDS variable, completeness rates were below 50% in all municipalities, ranging from 10.1% (Barreiras) to 40.6% (Lauro de Freitas). Seven cities were classified as category 1: Barreiras (10.1%), Ilhéus (13.5%), Itabuna (17.5%), Jequié (15.4), Porto Seguro (23.4%), Salvador (23.6%) and Teixeira de Freitas (17.5%), while all others cities were considered as category 2.

Table 2 shows the completeness of the variables related to the co-infection HIV / TB: The 1st smear and clinical presentation variables obtained 100% of completeness (category 4) in all evaluated cities. The 2nd smear variable was classified as category 2 in seven cities and as category 4 in only one, whereas the others cities were classified as category 3. The lowest completeness rates to the variables smear in the 2nd and in the 6th month were found in Teixeira de Freitas (29.2% and 16.7% respectively) and the highest in Feira de Santana (89.2% and 79.7%). The outcome field was considered as category 4 for nine cities and category 3 for the other two.

The completeness of the variables related to patients with AIDS diagnosis and TB are described in Table 3: the completeness of the 1st smear was classified as categories 2, 3 and 4 for

Table 1. Completeness of HIV and AIDS variables, state of Bahia. Period: January, 2001 – December, 2010.

Municipality	Notifications	HIV				
		Completeness n (%)	Positive n (%)	Negative n (%)	Ongoing n (%)	Not performed n (%)
Barreiras	571	510 (89.3)	12 (2.1)	209 (36.60)	61 (10.7)	289 (50.6)
Camaçari	1,070	955 (89.2)	27 (2.5)	241 (22.52)	112 (10.5)	687 (64.2)
Feira de Santana	2,519	2,408 (95.59)	74 (2.9)	206 (8.2)	111 (4.41)	2,128 (84.5)
Ilhéus	1,417	1,261 (88.99)	45 (3.17)	217 (15.3)	156 (11.0)	999 (70.5)
Itabuna	1,740	1,302 (74.8)	46 (2.6)	136 (7.8)	438 (25.2)	1.120 (64.4)
Jequié	911	589 (64.7)	26 (2.9)	225 (24.70)	319 (35.0)	338 (37.1)
Lauro de Freitas	556	479 (86.2)	18 (3.2)	159 (28.60)	74 (13.3)	302 (54.3)
Paulo Afonso	436	404 (92.7)	8 (1.8)	82 (18.8)	32 (7.3)	314 (72.0)
Porto Seguro	753	577 (76.6)	50 (6.6)	271 (35.99)	175 (23.2)	256 (34.0)
Salvador	33,987	27,176 (79.99)	1,695 (4.99)	3,439 (10.1)	6,713 (19.8)	22,042 (64.9)
Teixeira de Freitas	992	790 (79.64)	24 (2.4)	185 (18.65)	201 (20.26)	581 (58.57)

Municipality	Notifications	AIDS		
		Completeness n (%)	Yes n (%)	No n (%)
Barreiras	571	58 (10.1)	11 (1.9)	47 (8.2)
Camaçari	1,070	309 (28.9)	21 (2)	288 (26.9)
Feira de Santana	2,519	722 (28.6)	61 (2.4)	661 (26.2)
Ilhéus	1,417	192 (13.5)	34 (2.4)	158 (11.1)
Itabuna	1,740	305 (17.5)	31 (2.8)	274 (14.7)
Jequié	911	140 (15.4)	11 (1.2)	129 (14.2)
Lauro de Freitas	556	226 (40.6)	16 (2.9)	210 (37.7)
Paulo Afonso	436	121 (27.9)	6 (1.4)	116 (26.5)
Porto Seguro	753	176 (23.4)	34 (2.5)	142 (20.9)
Salvador	33,987	8,008 (23.6)	1,497 (4.4)	6,517 (19.2)
Teixeira de Freitas	992	174 (17.5)	26 (9.2)	148 (8.3)

Table 2. Completeness of the variables: smear, sputum culture, clinical form and outcome in co-infected individuals with TB/HIV, state of Bahia. Period: January, 2001 – December, 2010.

Individuals with HIV/TB (n)	Completeness n (%)						
	1st smear	2st smear	Smear 2nd month	Smear 6th month	Sputum culture	Clinical form	Outcome
Barreiras (12)	12 (100)	10 (83.3)	10 (83.3)	8 (66.7)	12 (100)	12 (100)	12 (100)
Camaçari (27)	27 (100)	14 (51.9)	22 (81.5)	17 (62.96)	25 (92.59)	27 (100)	26 (96.3)
Feira de Santana (74)	74 (100)	35 (47.3)	66 (89.2)	59 (79.7)	72 (97.3)	74 (100)	71 (95.95)
Ilhéus (45)	45 (100)	20 (44.4)	32 (71.11)	24 (53.33)	36 (80.00)	45 (100)	45 (100)
Itabuna (46)	46 (100)	22 (47.8)	38 (82.6)	31 (67.4)	42 (91.3)	46 (100)	45 (97.8)
Jequié (26)	26 (100)	8 (30.8)	23 (88.5)	16 (61.5)	25 (96.2)	26 (100)	26 (100)
Lauro de Freitas (18)	18 (100)	11 (61.1)	7 (38.4)	6 (33.3)	13 (72.2)	18 (100)	17 (94.4)
Paulo Afonso (8)	8 (100)	6 (75.0)	5 (62.5)	4 (50.00)	8 (100)	8 (100)	8 (100)
Porto Seguro (50)	50 (100)	21 (42.0)	20 (40.00)	14 (28.00)	46 (92.00)	50 (100)	50 (100)
Salvador (1,695)	1,695 (100)	799 (47.1)	664 (39.2)	572 (33.8)	1,247 (73.6)	1,695 (100)	1,162 (68.6)
Teixeira de Freitas (24)	24 (100)	11 (45.8)	7 (29.2)	4 (16.7)	24 (100)	24 (100)	18 (75.0)

Table 3. Completeness of the variables: smear, sputum culture, clinical form and outcome in individuals with TB and AIDS, state of Bahia. Period: January, 2001 – December, 2010.

Individuals with TB and AIDS (n)	Completeness n (%)						
	1st smear	2st smear	Smear 2nd month	Smear 6th month	Sputum culture	Clinical form	Outcome
Barreiras (11)	8 (72.7)	6 (54.5)	5 (45.4)	5 (45.4)	4 (45.4)	11 (100)	11 (100)
Camaçari (21)	17 (80.9)	7 (33.3)	6 (28.6)	5 (23.8)	5 (23.8)	21 (100)	21 (100)
Feira de Santana (61)	25 (41)	14 (22.9)	7 (11.5)	5 (8.2)	5 (8.2)	61 (100)	58 (95.1)
Ilhéus (34)	23 (67.3)	10 (29.4)	10 (29.4)	8 (23.5)	8 (23.5)	34 (100)	34 (100)
Itabuna (31)	18 (58)	8 (25.8)	8 (25.8)	1 (3.2)	1 (3.2)	31 (100)	30 (96.8)
Jequié (11)	6 (54.5)	3 (27.3)	4 (36.7)	3 (27.3)	3 (27.3)	11 (100)	11 (100)
Lauro de Freitas (16)	14 (87.5)	8 (50)	3 (18.7)	3 (18.7)	3 (18.7)	16 (100)	15 (93.7)
Paulo Afonso (6)	5 (83.3)	4 (66.7)	0 (0)	1 (16.7)	1 (16.7)	6 (100)	6 (100)
Porto Seguro (34)	17 (50)	4 (11.8)	9 (26.5)	9 (26.5)	9 (26.5)	34 (100)	34 (100)
Salvador (1,497)	985 (65.8)	370 (24.7)	165 (11)	106 (7.1)	106 (7.1)	1,497 (100)	1,008 (63.3)
Teixeira de Freitas (26)	15 (57.7)	2 (7.7)	7 (26.9)	3 (11.5)	3 (11.5)	26 (100)	20 (76.9)

2, 6 and 3 cities, respectively. Regarding the 2nd smear, two cities were classified as completeness 3 (Barreiras and Paulo Afonso) and the others, as categories 1 and 2. In all cities, the smear of the 2nd and the 6th months and sputum culture variables were classified as categories 1 and 2. For the variable clinical presentation, all municipalities reached completeness 4 and for the variable outcome, only Salvador was classified as category 3, while the other cities were category 4.

Discussion

The results of the present study indicate that the completeness of HIV and AIDS fields of TB notification forms is below the level set by the Brazilian Ministry of Health.

The need to improve access to HIV testing in individuals with tuberculosis has been described in the literature. Sanchez et al.[16] evaluated the clinical outcome of TB in individuals infected or not with HIV and reported that the serology was not available for 32% of TB cases reported in Brazil between 2003 and 2008. In the same study, the risk of an unfavorable outcome was three

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times higher in HIV-infected patients compared to HIV-uninfected individuals. An intermediate risk of unfavorable TB outcome was found in the group who did not perform HIV serology, suggesting the possibility of undiagnosed HIV-infected individuals.

In Brazil, AIDS as well as alcoholism and malnutrition play an important role in determining high TB mortality rates[17].

In the present study, although the completeness of HIV field was considered as categories 3 and 4, more than half of fields were filled as "not performed" or "ongoing" in all cities evaluated. The low number of HIV tests performed contradicts the Brazilian Ministry of Health recommendation for testing the virus infection in all patients with TB[18]. This fact might impair the care assistance and delay the development of preventive actions and injury control. The high percentage of fields filled as "ongoing" might be explained by delay in releasing the HIV results or updating the data in Sinan database by local health departments. Appropriate actions should be undertaken to correct these difficulties.

It is noteworthy that WHO considers as priorities to TB control both the availability of HIV tests and antiretroviral therapy for all HIV/TB co-infected individuals[2].

The "linkage" strategy (record linkage) should be employed in order to recover missing data from databases such as Mortality Information System data, Laboratory Tests Control System of the National Network of CD4 + / CD8 + Lymphocyte Count and viral load, the System of Medication Logistic Control and Sinan / AIDS[19]. Using this strategy and training health care professionals of surveillance are needed to improve the completeness of Sinan data.

Regarding the AIDS variable, the completeness was under 50% in all evaluated cities, lower than HIV field. The difference between completeness of HIV and AIDS variables may be related to the guidelines to fill the forms[20]: filling HIV field is mandatory to launch the notification in the Sinan database, while AIDS field is considered as an essential variable (not filling it affects the development of specific actions for co-infection control, but does not preclude the case report). Likewise, clinical presentation was classified as category 4 in all cities, which might be explained because this is a mandatory filed in patients with AIDS / TB. The outcome field, despite being an essential variable, was classified as category 4 in almost all (10/11) cities, probably due to its importance in defining the effectiveness and quality of National Tuberculosis Control Program actions in the city, especially in regard to HIV / TB co-infection. It is noteworthy that this co-infection is considered a major factor to acquire resistance to tuberculostatic drugs[18], which has become a serious problem in developed and developing countries.

The paucity of information in all fields with low completeness may still be related to the misconception of some health professionals that reporting forms represent a purely bureaucratic issue, with no impact on the panorama of public health[21].

Several models for evaluation of tuberculosis control program has been proposed and factors such as lack of technical and managerial autonomy, absence of human, financial and material resources as well as failure of integration between programs have been identified as major problems for development of actions to the disease control[22].

It is important to point that a limitation of this study is using secondary data with probable delay in the records updating by local health departments. In addition, it was not possible to determine the prevalence of the co-infection HIV / TB, due to the low number of HIV tests performed. However, the results obtained are relevant. This is a pioneer study since evaluates the priority cities to TB notification in Bahia, for a decade. The knowledge of these results may elicit actions to reverse the current scenario.

Collaborations

M Lírio, NP Santos, LAR Passos, A Kritski, B Galvão-Castro and MFR Grassi participated equally in all stages of preparation of the article.

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