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Epidemiological Profile of HIV/Tuberculosis Co-infection in a City in the State of São Paulo, Brazil

Carolina de Castro Castrighini[1]*, Renata Karina Reis[2], Lis Aparecida de Souza Neves[3], Marli Terezinha G Galvão[4] and Elucir Gir[5]

[1]RN, Master's student, University of São Paulo at Ribeirão Preto College of Nursing (EERP-USP), Brazil
[2]RN, Ph.D. Professor of the Department of General and Specialized Nursing at EERP-USP, Brazil
[3]RN, Ph.D. by EERP–USP, Coordinator of the Ribeirão Preto Municipal Health Department Tuberculosis Control Program, Brazil
[4]RN, Ph.D., Professor, Federal University of Ceará – UFC, Brazil
[5]RN, Full Professor at EERP-USP, Department of General and Specialized Nursing, Ribeirão Preto College of Nursing, University of São Paulo, Brazil

Abstract

The purpose of this study was to describe the epidemiological pro-file of reported HIV/tuberculosis co-infected individuals in Ribeirão Preto (state of São Paulo). It is an epidemiological, descriptive and cross-sectional study con-ducted in 2012; the population was comprised of all individuals with HIV/tuberculosis co-infection, reported in 2010 and 2011. The data was collected from the TB web database. Of the 375 individuals reported with tuberculosis reported during the study period, 307 underwent HIV serologic testing; 222 (72.3%) of the results were negative and 85 (27.7%) were positive. In the cases of individuals who only had tuberculosis, as well as those who were co-infected, most were male-68.5% and 70.6% respectively. The predominant age range was from 30 to 49 years (40.0%) and 36.7% had completed 4-7 years of education. In terms of treatment outcome, there was an 80.5% cure rate. The gender, age range and end of treatment variables were subjected to the chi-square test. The prevalence ratio was computed for each variable to compare individuals with and without tuberculosis; who presented chance of risk with the co-infection as per their age range, education, the existence of extrapulmonary tuberculosis, negative baciloscopy, with normal x-ray image and treatment outcome of abandonment. As observed, HIV/aids is associated with a greater rate of deaths and more complicated forms of tuberculosis, evidencing the need to promote multidisciplinary actions reflecting on their diseases.

Keywords: Acquired Immune Deficiency Syndrome; Tuberculosis; Epidemiology

Introduction

HIV infection is one of the risk factors for contracting tuberculosis [1]. According to the World Health Organization, (WHO) the risk of people with HIV developing TB is much higher than in non-infected individuals [2].

According to the WHO, in 2011, there were approximately 34 million people suffering from HIV worldwide, with 2.5 million new cases and 1.7 million people who died from HIV/AIDS [3].

As HIV infection progresses and immunity declines, such individuals become more susceptible to infections, which is characteristic of the AIDS profile. The atypical or disseminated pulmonary tuberculosis is one of the main infections striking immunocompromised individuals [4].

One third of the world population is estimated to be infected with tuberculosis, approximately 9.2 million ill individuals every year [5], with estimates of 8.8 million new cases and 1.4 million deaths in 2011 [2].

In 2011, of the 8.7 million new cases of tuberculosis in the world, 13% (approximately 1.04 million) suffered from an HIV/TB co-infection and there were 430,000 deaths [2]. In Brazil, in 2011, 91 thousand people were co-infected with HIV/TB, 83 thousand new cases and an incidence rate of 42 cases per 100,000 inhabitants [6].

In the municipality of Ribeirão Preto, 1,273 cases of tuberculosis were reported between 1998 and 2003, with 377 of them presenting reactive serology for HIV, which represents a mean of 30% of co-infection [7].

In individuals infected with HIV, TB is known to be harder to diagnose, due to the possibility of modification in the clinical and radiological situation because of the immunodeficiency, as well as the lesser sensitiveness of the baciloscopy. Patients with HIV have a lower performance in the BAAR sputum test, a greater prevalence of infection by other mycobacteria and a greater incidence of multidrug-resistant tuberculosis [8].

The delay in the diagnosis of TB in the individual with HIV is associated with the increased risk for death and the contamination of closer contacts [9].

In light of this, the aim of this study is to characterize individuals co-infected comparing them to with others individuals with HIV/tuberculosis, as reported in Ribeirão Preto in 2010 and 2011, according to sociodemographic and clinical data.

Material and Methods

This is an epidemiological, descriptive, cross-sectional and retrospective study, conducted in 2012, in the city of Ribeirão Preto, which is located in the state of São Paulo, Brazil, and whose population, in 2010, was 604,682 inhabitants [10].

***Corresponding author:** Carolina de Castro Castrighini, RN, Master's student, Rua João Bim, 1125 Bl. 2 Ap. 31, Jd. Paulistano, Ribeirão Preto/SP, Brazil, Tel: (16)91767136; E-mail: carolcastrousp@hotmail.com

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The study population consisted of all individuals with HIV/tuberculosis co-infection, over 18 years, residing in the city of Ribeirão Preto, who received care during 2010 and 2011, and whose case of tuberculosis was reported in the TB web system.

The data was collected from the TBweb, which is the information system used in the state of São Paulo for storing the data related to the reporting, evolution and end of treatment of TB patients [11]. The variables available in this system, and which were evaluated in the study are: sex, age range, education, clinical form of TB, baciloscopy and x-ray tests, treatment outcome (cure, abandonment, death). The variables of interest in the study were gender, age range, education, tests performed, clinical form of tuberculosis, type of treatment, end of treatment.

Fisher's exact test and the prevalence ratio were estimated to meet the study purpose. The prevalence ratio was estimated by means of the log-binomial model implemented in the procedure PROC GENMOD of the program SAS, version 9.0.

This study was approved by the Research Ethics Committee of the University of São Paulo at Ribeirao Preto College of Nursing, Protocol No. 135/2012, in accordance with the recommendations of Resolution 196/96 of the National Health Council.

Results

Of the 375 individuals reported with tuberculosis reported during the study period, 307 underwent HIV serologic testing, where 222 (72.3%) of the results were negative and 85 (27.7%) were positive.

In the cases of individuals who only had tuberculosis, as well as those who were co-infected, most were male-68.5% and 70.6% respectively.

The predominant age range was from 40 to 49 years (40.0%) among co-infected individuals and over 50 years (31.2%) among the others. In terms of education, 36.7% had 4 to 7 years of education the both groups, and in 47.9% no information was available (Table 1).

A sputum smear test showed positive results in 55.1% individuals, with co-infected individuals presenting the lowest rate (18.5%); 88.0% of the thoracic radiographies showed a suggestive image of tuberculosis, the information regarding these variables was not available in 30.0% and 29.0% of the cases, respectively. Regarding the clinical form, 35.6% of the co-infected patients presented the extrapulmonary form; with this rate being 64.4% among other TB patients, the information regarding this variable was not available in 2.3% of the cases (Table 2).

Regarding the treatment outcome, there was an 80.5% rate of cure, 8.5%of abandonment and 11.1% of deaths (Table 3); however, regarding the groups, the death rate was higher among co-infected individuals (61.8%).

The prevalence ratio was computed for each variable in order to compare individuals with and without tuberculosis. The variables presenting chance of risk with the co-infected group were: age range between 30 and 39 years (PR=3.24; IC=1.41; 7.45) and between 40 and 49 years (PR=3.04; IC=1.29; 7.14), education between 4 and 7 years (PR=2.51;IC=1.14; 5.55), extrapulmonary tuberculosis (PR=1.83;IC=1.08; 3.10), negative baciloscopy (PR=2.63; IC=1.51; 4.56),with normal x-ray image (PR=2.08; IC=1.17; 3.69) and outcome of abandonment (PR=3.07; IC=1.89; 4.99).

Variables	Without HIV/aids		With HIV/aids		Total		P-value	Gross PR (IC)
	nº	%	nº	%	nº	%		
Sex								
Male	152	68.5	60	70.6	212	69.0	0.7833	ref
Female	70	31.5	25	29.4	95	31.0		0.92 (0.62; 1.38)
Age (years)								
18 to 29	60	27.2	13	15.3	73	23.9	<0.001	1.12 (0.55; 2.26)
30 to 39	51	23.1	25	29.4	76	24.8		**2.07 (1.14; 3.75)**
40 to 49	41	18.5	34	40.0	75	24.5		**2.85 (1.63; 4.99)**
≥50	69	31.2	13	15.3	82	26.8		ref
Education								
less 3 years	22	15.5	11	16.2	33	15.7	0.0693	1.61 (0.80; 3.23)
4 to 7 years	74	52.1	45	66.2	119	56.7		**1.82 (1.05; 3.18)**
Over 8 years	46	32.4	12	17.6	58	27.6		ref

*p-value regarding Fisher's exact test

Table 1: Distribution of individuals with HIV and tuberculosis, according to sociodemographic variables and prevalence ratio, Ribeirão Preto-SP, 2010-2011.

Variables	Without HIV/aids		With HIV/aids		Total		P value	Gross PR (IC)
	nº	%	nº	%	nº	%		
TB Classification								
pulmonary	182	82.0	59	69.4	241	78.5	0.0486	ref
extrapulmonary	40	18.0	26	30.6	66	21.5		**1.83 (1.08; 3.10)**
Baciloscopy								
positive	123	63.4	28	59.4	151	57.4	0.001	ref
negative	71	36.6	41	40.6	112	42.6		**2.63 (1.51; 4.56)**
X-ray								
Normal	20	10.2	12	17.1	32	12.0	0.0496	**2.08 (1.17; 3.69)**
Suggestive of TB	176	89.8	58	82.8	234	88.0		ref

*p-value regarding Fisher's exact test

Table 2: Distribution of individuals with tuberculosis and HIV/AIDS, according to clinical variables related to tuberculosis. Ribeirão Preto-SP, 2010-2011.

Variables	Without HIV/aids		With HIV/aids		Total		P-value	Gross PR (IC)
	nº	%	nº	%	nº	%		
End of treatment								
Cured	194	87.4	53	62.4	247	80.5	<0.001	ref
Abandoned	15	6.8	11	12.9	26	8.5		**3.07 (1.89; 4.99)**
Deceased	13	5.8	21	24.7	34	11.1		1.90 (0.96; 3.77)

*p-value regarding Fisher's exact test

Table 3: Distribution of individuals with HIV and tuberculosis, according to end of treatment. Ribeirão Preto - SP, 2010-2011.

Discussion

Of the total cases of tuberculosis reported in Brazil in 2006, 20.8% were diagnosed as infection by HIV/AIDS [5]. In this study, it was found that co-infection occurred in 27.7% of the cases, which corroborates a study done in Porto Alegre [12] where the rate was 29.2%, but contrasts with other studies that show this population as being smaller [13-15].

The co-infection rate was higher than that found in another study conducted in the same city between 1998 and 2003 [7]. This demonstrates the need for further actions aimed at reducing this rate, because the interaction between these two pathologies has a strong impact on their behavior and is responsible for increased mortality [16].

In our study, there was a predominance of males in cases of coinfection, which is consistent with other studies conducted in Brazil [7,13,17]. This high prevalence indicates that the male population is more vulnerable to both HIV and TB [14].

The high co-infection rate among working age people is in accordance with other studies conducted with this same population [17,18]. The prevalence of the HIV/TB link in this group of productive age is reflected in the socioeconomic issue and has social consequences for both the individual and his/her family [18].

Several studies highlight the importance of performing a sputum smear test [13,19], which is one of the complementary exams used for diagnosing tuberculosis, apart from being fast and cheap [20]. In this study, 85.7% of the individuals did the test, a higher result than in João Pessoa-PB [19]. Nevertheless, the percentage of negative tests among the co-infected individuals was higher than among other individuals (36.6% and 40.6% respectively), reinforcing the difficulty in the diagnosis of tuberculosis with this method among individuals with HIV. In addition, the greater number of extrapulmonary cases among co-infected individuals (30.6%, whereas it was 18% among non-co-infected individuals) also demonstrates the need for other methods to diagnose tuberculosis in these patients.

The results related to the clinical form agree with another study [7] carried out in the same city between 1998 and 2003, where the extrapulmonary type had the highest rate among individuals with HIV/TB coinfection.

As for the treatment outcome, a greater death rate was associated with the group of co-infected patients (24.7%). The high incidence of death may be related to the interaction itself between both pathologies, which leads to increased mortality rates [17]. A greater rate of abandonment was also observed among patients with HIV (12.9% against 6.8%), which agrees with other studies in Brazil [21-23]. A limitation to this study was the incomplete reporting of information in the data bank, resulting in much information not being available for use.

Conclusion

The co-infected individuals were mostly male, predominantly 30-49 years old, of working age and with little education.

The sputum smear was the main test performed, and over 80% presented the pulmonary form.

A high mortality rate detected demonstrates the seriousness of the link between these two diseases and the need to promote multidisciplinary measures to reduce its incidence.

The superposition of the epidemics of tuberculosis and aids, as well as the epidemiological behavior of tuberculosis in co-infected individuals reflect the need for a partnership between the programs that control both diseases.

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