Tuberculosis treatment drop out prevalence and associated factors in Sapucaia do Sul County (RS), Brazil, 2000-2008

Prevalência de abandono do tratamento da tuberculose e fatores associados no município de Sapucaia do Sul (RS), Brasil, 2000-2008

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Summary

Objective: To estimate the Tuberculosis treatment drop out prevalence and the variables associated in the patients registered in the Tuberculosis Control Program in Sapucaia do Sul (Brazil), between 2000 and 2008. **Method:** A cross-sectional study was conducted, which was based on the notified data in Information System for Disease Surveillance of the City Health Secretariat. **Results:** From the 632 cases included in the study, 65 (10.3%; 95%CI 7.9–12.7) were classified as treatment abandonment. Between 2000 and 2004, the prevalence of noncompliance was 12.7% (95%CI 9.1–16.2), and in the period 2005 to 2008 decreased to 7.0% (95%CI 4.0–9.9). In the crude analysis, we find association with sex, age and AIDS presence. The adjusted analysis with the Poisson regression didn't show significant differences between the independent variables. **Conclusions:** The analysis showed reduction in the prevalence of noncompliance with the creation of Tuberculosis Control Program, from 2005, although the confidence intervals are shown superimposed. Still, the prevalence of noncompliance was high and stove above the 5% target, agreed between levels of government.

Keywords: tuberculosis; cross-sectional studies; medication adherence; treatment refusal; patients dropouts; therapeutics.

Resumo

Objetivo: Estabelecer a prevalência de abandono do tratamento da tuberculose e fatores associados nos pacientes que ingressaram no Programa de Controle de Tuberculose do município de Sapucaia do Sul (RS), entre 2000 e 2008. **Método**: Foi realizado estudo transversal com base em dados notificados no Sistema de Informação de Agravos de Notificação da Secretaria Municipal de Saúde. **Resultados:** Dos 632 casos incluídos no estudo, 65 (10,3%; IC95% 7,9–12,7) foram classificados como abandono do tratamento. Entre 2000 e 2004, a prevalência de abandono foi de 12,7% (IC95% 9,1–16,2) e no período de 2005 a 2008 diminuiu para 7,0% (IC 95% 4,0–9,9). A análise bruta mostrou associação com sexo, idade e presença de AIDS. A análise ajustada, através da regressão de Poisson, não mostrou diferenças estatisticamente significativas entre as variáveis independentes. **Conclusões:** A análise mostrou uma redução das prevalências de abandono do tratamento a partir da criação do Programa Municipal de Controle da Tuberculose, a partir de 2005, embora os intervalos de confiança tenham apresentado superposição. Ainda assim, a prevalência de abandono foi considerada alta e situou-se acima da meta de 5%, pactuada entre os níveis de governo.

Palavras-chave: tuberculose; estudos transversais; adesão à medicação; recusa do paciente ao tratamento; pacientes desistentes do tratamento; terapêutica.

Introduction

Tuberculosis is an old public health problem in Brazil and worldwide. According to the World Health Organization (WHO), in 2008 and according to the number of cases, Brazil was among the 22 countries responsible for 80% of all tuberculosis cases in the world[1]. With regard to mortality, the estimated occurrence was approximately 8,400 deaths attributed to tuberculosis, which is equivalent to a rate of 1.3 deaths per 100,000 inhabitants[1-6]. Since 2003, tuberculosis control has been prioritized among public health policies[7-9].

In 2008, in Brazil, a total of 73,000 cases were reported and consolidated in the *Sistema de Informações de Agravos de Notificação do Ministério da Saúde* (SINAN/MS – Health Ministry Information System on Disease Notification), corresponding to an incidence rate of approximately 38.2 cases per 100,000 inhabitants, of which 4,500 resulted in deaths. This is the fourth cause of deaths from infectious diseases and the first cause of deaths in AIDS patients[9].

Currently, 24 cities in the state of Rio Grande do Sul concentrate about 80% of cases, the majority of which are in the Metropolitan Area of Porto Alegre. One of these cities is Sapucaia do Sul, which comes in 10th place in this state[10,11].

Early identification and follow-up of all diagnosed cases and treatments completed to obtain a cure are part of the disease prevention and control strategy, because they eradicate foci of infection in the community, thus interrupting the chain of transmission[12]. In their turn, treatment drop-out, inadequate drug use, irregular drug administration or inadequate drug dosage are important causes that make it more difficult for diseases to be eliminated. In addition, they can result in the development of bacterial resistance and its spread[13-16].

In 2005, the Brazilian government made a pact with the WHO, aiming to cure 85% of all estimated tuberculosis cases and maintaining the number of treatment drop-out cases worldwide below 5%[2-8]. The

reduction in the frequency and mortality from tuberculosis is one of the Millennium Development Goals (MDGs), requiring a detection rate of 84% and a cure rate of 87% by 2015[17]. In Rio Grande do Sul, in 2007, the incidence of tuberculosis was 41 cases per 100,000 inhabitants, the death rate was 3.7 cases per 100,000 inhabitants and the percentage of treatment drop-out was 11%. Consequently, the percentage of cure of at least 85% has not been reached yet, which would be higher than the MDGs[11].

The present study aimed to establish the prevalence of noncompliance to tuberculosis treatment and associated characteristics in patients who joined the Tuberculosis Control Program in the city of Sapucaia do Sul (RS), between 2000 and 2008.

Methods

The city of Sapucaia do Sul is situated in the Metropolitan Area of Porto Alegre, in the state of Rio Grande do Sul, with an estimated population of 126,085 inhabitants according to the 2008 IBGE, an area of 65.2 km^2 (42.1 km^2 of urban area and 23.1 km^2 of rural area) and demographic density of 2,084.3 inhabitants/km^2. The city's main economic activity is industry (79.05%), followed by commerce, services and agriculture (20.95%)[18]. The Municipal Health Network is comprised of 18 primary health units, of which 13 adopted the *Estratégia de Saúde da Família*'s (ESF – Family Health Strategy) principles and five are secondary referral units. Of these five, one is a tuberculosis referral unit, another is prepared to deal with TB-HIV co-infection, including a CAPS AD (Psychosocial Care Center for Alcohol and Other Drugs), a mental health outpatient clinic and women's health care clinic. In addition, there is the support from a primary bacilloscopy mycobacterial culture laboratory, a municipal hospital and a 24-hour emergency unit[18]. The entire municipal health network is prepared to operate in the *Programa Municipal de Controle da Tuberculose* (PMCT – Municipal Tuberculosis Control Program).

A cross-sectional study was conducted, based on secondary data reported in the SINAN of the *Secretaria Municipal de Saúde* (SMS - City Health Secretariat)[19].

The study population was comprised of all tuberculosis cases reported in the SINAN/SMS, residents of the city of Sapucaia do Sul (RS), between 2000 and 2008, totaling 749 cases.

The following cases were excluded: cases reported in the SINAN in the study period and referring to residents of Sapucaia do Sul, although they were reported and treated in other cities; cases reported and closed, with a change in diagnosis and duplicity; and cases reported in Sapucaia do Sul, but involving residents of other cities.

Data were collected from the DATASUS/SINAN/SMS database, the tuberculosis case treatment control and record book (black book), and the archives with tuberculosis report/investigation files.

SINAN/SMS data were obtained from operational reports found in the TABWINTB, installed in the same system. In addition, an Excel spreadsheet was developed to analyze cases such as those that had been closed due to death, in relation to age group and associated health problems.

In the present study, cases were classified as follows: "tuberculosis cases", when individuals had their diagnosis confirmed by bacilloscopy or culture or by doctors, based on clinical-epidemiological data and complementary tests; "new cases", when individuals had tuberculosis, although they had never used anti-tuberculosis drugs or used these for less than a month; and "drop-out", which were the cases that had stopped taking anti-tuberculosis drugs for more than 30 consecutive days[4,12].

The following independent variables, which were available in the system, were analyzed in this study: sex, age (in complete years), self-reported ethnicity, level of education (in complete school years), classification of entry in the Program, and presence of certain associated health problems, such as AIDS, alcoholism, diabetes and mental disease.

Data were entered using the Microsoft Excel software program. In 2005, the decentralization of the PMCT was implemented in Sapucaia do Sul. Thus, the prevalences of treatment drop-out between 2000 and 2004 and between 2005 and 2008 were shown, with the respective 95% confidence intervals. The crude analysis of data on treatment drop-out during the entire period was performed with the SPSS software program, where effect measures, 95% confidence intervals and statistical tests were calculated. The Stata Program was used to perform the adjusted analysis using Poisson regression and robust variance[20]. Variables that had a p-value of 0.10 were included in the model.

This research project was approved by the *Universidade Federal de Pelotas* School of Medicine Research Ethics Committee.

Results

Of all 749 tuberculosis cases initially included, 69 individuals died and 21 were transferred out of the city, thus being excluded from this study. A total of 27 individuals were included more than once in the program, when the most complete entry was the one maintained. As a result, of all 632 remaining cases, 65 (10.3%; 95%CI 7.9–12.7) were classified as treatment drop-out during the entire period. Between 2000 and 2004, 332 cases were observed, of which 42 individuals dropped out (12.7%; 95%CI 9.1–16.2). Between 2005 and 2008, there were 300 cases, with 21 cases of treatment drop-out (7.0%; 95%CI 4.0–9.9).

The individuals included in the present study were mainly males (69.5%), aged between 20 and 39 years (47.4%) and white (89.5%), had between four and seven years of education (55.2%), and were included in the Program as new cases (91.0%). With regard to the distribution of associated health problems, the following prevalences were observed: AIDS, 16.3%; alcoholism, 36.5%; diabetes mellitus, 13.3%; mental disorders, 6.0% (Table 1). It should be emphasized that the prevalences of health problems were calculated according to the total number of participants, the percentage of lack of information was 68.0% for AIDS; 9.2% for alcoholism; 77.0% for diabetes mellitus and 79.0% for mental disorders.

In the crude analysis, there were higher prevalences of treatment drop-out among men, individuals who had joined the Program again and those who had AIDS. Differences in the estimates of prevalences were significant (Table 1).

Drop-out was more frequent in the 30-to-39-year and 20-to-29-year age groups, showing statistically significant differences and a linear trend ($p<0.03$) (Table 1).

Ethnicity, level of education and certain health problems (alcoholism, diabetes mellitus and mental disorders) were not associated with the outcome (Table 1).

The adjusted analysis using Poisson regression did not show statistically significant differences among variables (Table 2).

Discussion

The use of secondary sources is criticized due to the possibility of underreporting and classification errors. With the implementation of the PMCT in 2005, socio-demographic data collected with the SINAN, in Sapucaia do Sul, apparently did not show any problems in terms of completion, consistency and classification.

However, it should be emphasized that, in the first years of the study, there were difficulties related to the diagnosis of health problems associated with tuberculosis, such as AIDS, alcoholism, diabetes and mental disorders. These problems appeared in 75% of cases as "ignored", hindering the consistency and analysis. Sometimes, for example, the team identified drug abuse or dependence during the follow-up of cases and the completion of the SINAN was inconsistent with regard to Mental Disease[21], which remained as "ignored". Likewise, a great number of individuals had not had an HIV test when joining the program, which could have affected the diagnosis of AIDS[19].

In the context of tuberculosis in the state of Rio Grande do Sul, the city of Sapucaia

Table 1. Crude analysis, sampling distribution, tuberculosis treatment drop out prevalence and associated factors. Sapucaia do Sul, 2000-2008

Tabela 1. *Análise bruta, distribuição da amostra, prevalência de abandono do tratamento de tuberculose e fatores associados. Sapucaia do Sul, 2000-2008*

	n (%)	Prevalence of noncompliance (%)	Prevalence ratio	95%CI	p
Sex					0,03
Female	193 (30.5)	12 (6.2)	1.0		
Male	439 (69.5)	53 (12.1)	1.94	1.06–3.55	
Age					0.01
≤19 years	57 (9.0)	4 (7.0)	1.60	0.47–5.46	
20–29 years	136 (21.6)	19 (14.0)	3.19	1.31–7.74	
30–39 years	163 (25.8)	25 (15.3)	3.50	1.48–8.29	
40–49 years	138 (21.9)	11 (8.0)	1.82	0.69–4.78	
≥50 years	137 (21.7)	6 (4.4)	1.0		
Ignored	1				
Ethnicity					0.14
White	554 (89.5)	53 (9.6)	1.0		
Non-white	65 (10.5)	10 (15.4)	1.61	0.86–3.00	
Ignored	13				
Level of education					0.12
0 to 3 years	123 (20.9)	12 (9.8)	1.53		
4 to 7 years	325 (55.2)	41 (12.60	1.98	0.67–3.50	
8 or more years	141 (23.9)	9 (6.4)	1.00	0.99–3.96	
Ignored	43				
Entry in the Program					<0.001
New case	575 (91.0)	54 (9.4)	1.0		
Re-entry	20 (3.2)	8 (40.0)	4.41		
Relapse or transference	37 (5.9)	3 (8.1)	0.99	2.69–7.23	
AIDS				0.38–2.57	0.01
No	99 (15.7)	6 (5.8)	1.0		
Yes	103 (16.3)	18 (18.2)	3.12		
Ignored	430 (68.0)	41 (9.5)	1.64		
Alcoholism				0.71–3.75	0.15
No	101 (63.5)	7 (6.9)	1.0		
Yes	58 (36.5)	8 (13.8)	1.99		
Ignored	473			0.76–5.21	
Diabetes Mellitus					0.21
No	124 (86.7)	9 (7.3)	1.0		
Yes	19 (13.3)	3 (15.8)	2.18		
Ignored	489			0.65–7.33	
Mental disorder					0.58
No	125 (94.0)	9 (7.2)	1.0		
Yes	8 (6.0)	1 (12.5)	1.74		
Ignored	499			0.25–12.06	

Table 2. Adjusted analysis, tuberculosis treatment drop out prevalence and associated factors. Sapucaia do Sul, 2000-2008

Tabela 2. *Análise ajustada, prevalência de abandono do tratamento de tuberculose e fatores associados. Sapucaia do Sul, 2000-2008*

	Prevalence Ratio	95%CI	p
Sex			0.49
Female	1.0		
Male	1.06	0.89–1.25	
Age			0.93
≤19 years	1.03	0.76–1.40	
20–29 years	1.09	0.86–1.37	
30–39 years	1.08	0.86–1.35	
40–49 years	1.02	0.80–1.28	
≥50 years	1.0		
Entry in the Program			0.49
New case	1.0		
Re-entry	1.26	0.85–1.84	
Relapse or transference	0.99	0.72–1.37	
AIDS			0.82
No	1.0		
Yes	0.92	0.70–1.19	
Ignored	0.95	0.77–1.17	

do Sul was considered to be a priority. With the creation of the PMCT, this city began a process of decentralization of tuberculosis program actions for primary care and implemented the Directly Observed Therapy Short-Course (DOTS). The analysis showed a reduction in the prevalences of treatment drop-out with the creation of the Program, although confidence intervals overlapped. Nonetheless, the prevalence of noncompliance was considered to be high, above the goal of 5% agreed upon among the different levels of government[1,14,15]. Currently, it is known that 8% of patients in Brazil who begin treatment subsequently drop out of it. "The objective of the *Programa Nacional de Controle da Tuberculose* (PNCT - National Tuberculosis Control Program) is to detect tuberculosis early and treat patients quickly", guaranteeing treatment to all individuals diagnosed with the disease[9]. In the Metropolitan Area of Porto Alegre, where Sapucaia do Sul is included, the prevalence of noncompliance to treatment was approximately 14%[11]. Other Brazilian studies[13,22-24] showed percentages of prevalences of discharge due to drop-out varying between 10.2 and 27.3%. A study conducted with the IAPI Health Center Tuberculosis Service of Porto Alegre (RS), found a percentage of 10.2% of patients that did not adhere to the treatment[24]. Another study performed in the city of Pelotas (RS), together with the city's Tuberculosis Control Program, found that approximately 20% of the patients did not adhere to the treatment[23], whereas there was a prevalence of noncompliance of 12.4% in Belo Horizonte, (MG)[13]. In Cuiabá (MT), a historical cohort study found a global incidence of 27.3% of treatment drop-out [22].

In Brazil, epidemiological studies have shown that tuberculosis is more frequent

among men and individuals aged between 20 and 39 years and with a low level of education[25,26]. These studies prove that such disease is closely associated with poorer socio-economic conditions[25-27]. In the present study, the following individuals showed differences in the estimate of prevalence of noncompliance in the crude analysis: males, those who joined the program again, and those diagnosed with AIDS. With regard to age, there was a statistically significant difference, with an increase in the prevalence of noncompliance among young adults aged between 20 and 39 years. Although there was no association in the adjusted analysis, the findings of the present study could be an indication of the possibility of interruption of treatment for health services and they were also observed in other studies performed worldwide[1,8,9].

By assessing tuberculosis control strategies performed in Brazil[8], the PNCT Coordinating Office analyzed the strategies proposed for Brazil and the world between 1980 and 2007. Based on the context presented, it could be concluded that, although governments have established pacts to work on prevention with the BCG vaccine in 100% of cases, to diagnose 70% of patients, to treat and cure 85% of cases, to maintain the level of treatment drop-out below 5% and to reduce morbimortality by half until 2015, the results shown point to the difficulty in making these indicators effective and in achieving them. Consequently, new challenges to implement such measures are posed.

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