Profile of hospital admissions and deaths from tuberculosis

Perfil das internações e óbitos hospitalares por tuberculose

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Abstract

Objective: Analyzing the profile of hospitalizations and deaths from tuberculosis in the state of Paraná, southern region of Brazil.

Methods: Ecological descriptive study using data of the Brazilian public health system aggregated into four three-year periods by macro-regional health units (administrative division) and analyzed with descriptive statistics and nonparametric tests.

Results: The admission rates increased until the third triennium with a sharp fall in the fourth triennium in all macro-regional, a pattern that was similar for deaths. Most hospitalizations occurred among individuals aged from 30 to 59 and most deaths for those aged over 60 years, both predominantly of male gender.

Conclusion: The profile of hospitalizations and deaths in the state of Paraná suggests that efforts to control tuberculosis have expanded diagnosis and access to treatment.

Resumo

Objetivo: Analisar o perfil das internações e dos óbitos por tuberculose no estado do Paraná, região sul do Brasil.

Métodos: Estudo descritivo ecológico com dados obtidos no sistema público brasileiro, agregados em quatro triênios por macrorregionais de saúde e analisados por estatística descritiva e testes não paramétricos.

Resultados: As taxas de internação aumentaram até o terceiro triênio com queda acentuada no quarto triênio para todas as macrorregionais, comportamento semelhante para os óbitos. A maioria das internações ocorreu em indivíduos com idade entre 30 a 59 anos e dos óbitos naqueles com mais de 60 anos, ambos com predomínio no sexo masculino.

Conclusão: O perfil das internações e dos óbitos no estado do Paraná sugere que as ações de controle da tuberculose têm ampliado o diagnóstico e o acesso ao tratamento.

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Introduction

Tuberculosis, a disease caused by the *Mycobacterium tuberculosis*, is more frequent in the pulmonary and bacillus form, which is responsible for maintaining the transmission chain.[1] Although the diagnosis is simple and treatment and vaccines are available for more severe forms, tuberculosis remains a challenge for public health policies.[2] It is the most lethal infectious disease in the world, it affects all age groups and is aggravated by poor social and economic conditions.[3]

There are 9.27 million new cases in the world, and Brazil is still one of the 22 countries in the priority list of the World Health Organization when it comes to disease combat, as together they concentrate 82% of the global burden.[4] In 2009 more than 73 thousand new cases have been reported in Brazil, with 41 thousand TB positive which corresponds to an incidence rate of 38.4/100,000 inhabitants.[4] Such data put Brazil in 19th position in number of new cases and in 104th in relation to incidence rate.[5]

The state of Paraná, located in the south of Brazil, struggles to control the disease as it has not yet reached the goals of the National Program for Tuberculosis Control. The program recommends that among all diagnosed cases, 70% should be of new cases and only 30% of relapses; at least 85% of cure rate and a treatment dropout of 5% tops. It should be noted that over the last years Paraná has reported a cure rate close to 72% and a treatment dropout of 7.2%.[6] There are no recent studies regarding hospitalizations due to tuberculosis in the state of Paraná. These analyzes however, inform about the most severe cases, which can help in disease prevention and control.

The aim of the study was to analyze the profile of hospitalizations and deaths due to tuberculosis in the state of Paraná, southern Brazil, in the period between 2000 and 2011.

Methods

This was an ecological descriptive study of hospital admissions and mortalities from tuberculosis in a state in southern Brazil. The state of Paraná has a total area of 199,316.694 km² and a population of 10,512,349 inhabitants distributed in 399 cities,[7] conglomerated in 22 health districts, grouped in six macro-regional health units.

Data on hospitalization, death and population were obtained from the database of the Hospital Information System of the Unified Health System (SUS), available on the website of the Brazilian Ministry of Health.[8] The profile of admissions was analyzed according to coefficients per 100,000 inhabitants, and hospital mortality rates per 100 admissions for tuberculosis. The tables were generated by the system and exported using the *software Tabwin* 2.7 for *Microsoft Excel 2010*.

Data were analyzed using descriptive statistics and non-parametric tests: Friedman for dependent groups, *Kruskal-Wallis* test for independent groups and chi-square test to verify the association of tuberculosis mortality and morbidity by sex and age, considering the significance level of 5% and using the software *Statística* 8.0.

The study followed national and international standards of ethics in research involving human beings.

Results

It is observed in table 1 that the highest rates of hospitalization for tuberculosis occurred in the third triennium in all macro-regional health units.

The East macro-regional presented the highest rates of hospitalization and hospital mortality due to tuberculosis throughout the period (Table2).

It is observed that during the 12 studied years, hospitalization rates were higher in the age group ranging from 30 to 59 years. But the mortality rate was higher among individuals aged 60 or over. Regarding gender, it is noteworthy that hospitalization and hospital mortality rates were at least three times higher for individuals of the male gender (Table 3).

Most hospitalizations and deaths from tuberculosis occurred in people of the male gender (73.1% and 77.6% respectively) and in the age group of 30-59 years (60.8% and 61.3% respectively).

The number of hospitalizations on every triennium was different (p=0.004) and the first and second triennial periods were different from the third triennium. There was no difference between the number of hospitalizations and deaths among the macro-regional health units of the state.

There was significant association between hospitalization and death rates and the male gender (p=0.03) and the risk of hospitalization and death from tuberculosis was 1.3 times higher among men. Hospitalization and death rates were statistically significant and the age group from 10 to 29 years ($p<0,001$) appeared as a protective factor for death from tuberculosis (OR=0.5). Individuals aged 60 years or over have a 2.1 higher chance of death when compared with those of other ages ($p<0.001$).

Table 1. Hospitalizations and hospitalization rates from tuberculosis

Macro-regional Health Unit	1st Triennium (2000- 2002)		2nd Triennium (2003-2005)		3rd Triennium (2006-2008)		4th Triennium (2009-2011)	
	Hospitalizations	Hosp rate	Hospitalizations	Hosp rate	Hospitalizations	Hosp rate	Hospitalizations	Hosp rate
East	781	24.3	1001	28.5	1346	37.7	1256	35.6
Campos Gerais	72	7.1	54	5.1	227	20.9	115	10.6
South Central	30	5.1	9	1.5	164	27.1	5	0.8
West	44	2.5	95	5.2	341	17.9	95	5.1
Northwest	81	4.9	119	7.2	284	16.6	192	11.0
North	112	6.8	130	7.7	307	17.8	245	14.1
Paraná	1120	11.4	1408	13.7	2669	25.2	1908	18.1

Legend: Hosp rate - Hospitalization rates

Table 2. Death and hospital mortality rates from tuberculosis

Macro-regional Health Unit	1st Triennium (2000- 2002)		2nd Triennium (2003-2005)		3rd Triennium (2006-2008)		4th Triennium (2009-2011)	
	Hospitalizations	Mort Rate	Hospitalizations	Mort Rate	Hospitalizations	Mort Rate	Hospitalizations	Mort Rate
East	72	2.2	80	2.2	76	2.1	34	0.9
Campos Gerais	9	0.8	3	0.2	10	0.9	3	0.2
South Central	4	0.6	2	0.3	2	0.3	0	0
West	7	0.4	7	0.4	3	0.1	5	0.2
Northwest	6	0.3	6	0.3	12	0.7	9	0.5
North	13	0.7	17	1.0	13	0.7	5	0.2
Paraná	111	1.1	115	1.12	116	1.0	56	0.5

Legend: Mort Rate - Mortality rates

Table 3. Hospitalization rates and hospital mortality rates from tuberculosis

	1st Triennium (2000- 2002)		2nd Triennium (2003-2005)		3rd Triennium (2006-2008)		4th Triennium (2009-2011)	
	Hosp Rate	Mort Rate	Hosp Rate	Mort Rate	Hosp Rate	Mort Rate	Hosp Rate	Mort Rate
Gender								
Male	17.1	1.7	20.8	1.7	34.3	1.7	29.1	0.8
Female	5.8	0.4	6.7	0.5	16.2	0.4	7.4	0.2
Age group								
10 to 29	7.1	0.2	9.1	0.4	11.0	0.2	9.0	0.1
30 to 59	20.7	2.0	23.6	1.9	32.8	1.5	33.3	0.9
60 or over	16.1	3.6	19.0	3.2	62.5	3.8	13.9	0.7

Legend: Hosp rate - Hospitalization rates; Mort Rate - Mortality rates

Discussion

The limits of this study results are related to the use of secondary data from the Hospital Information System, because of their quality and the fact that they compile only the care provided by public health system in Brazil. On the other hand, this use has advantages already mentioned in other studies, for example, making available data routinely collected for all hospitalizations of the Unified Health System, which represent approximately 70% of admissions in the country.[9]

In the case of tuberculosis, mortality data of this system can be even more accurate than those contained in the Information System on Mortality, since for many cases tuberculosis is not the cause of death. Thus, this study on hospital mortality provides important epidemiological information that allows knowing aspects of the disease profile and the role of public health services.

In the state of Paraná, between 2001 and 2011, were reported 27,997 new cases of tuberculosis, which corresponds to 3.4% of new the cases (802,660) registered across the country in this same period.[10] The use of data available in the Health Information System allows tracking the problem, collaborating with identification of relevant aspects and encouraging the pursuit of new interventions for disease control.[11] The data presented allows the observation of tuberculosis behavior in the state of Paraná, inclusive by macro-regional health units during the study period, confirming that in this state tuberculosis control continues to deserve attention from health professionals, managers, and the society in general.[1]

In Brazil, since the implementation of the Unified Health System - SUS in 1990, tuberculosis has been a matter of great concern for health. Thus, with the implementation of the National Plan for Tuberculosis Control in 1998, the dropout rates started to decline because of the strategy called *Directly Observed Treatment Short-Course* which aims to reach 85% of cure for cases in treatment and 70% of detection for new cases. The strategy also intends to build a relationship between health professionals and patients with consequent increased adherence to treatment, as well as prevention of drug resistance, thereby reducing treatment dropout cases and increasing cure probabilities.[1,12]

Although tuberculosis is preventable, curable, easily diagnosed and there is availability of free treatment, which has favored the declining rates, approximately 4500 people die per year in Brazil because of it.[4] The number of deaths from this cause in Paraná is relatively low if compared to the country as a whole but it is also significant, as the disease has diagnosis and the treatment is available in primary care.

The decentralization of public health services through the strategy of family health has been contributing to system qualification and seeking to overcome fragmentations of policies and programs with a regionalized network of actions, although this has not yet been enough to impact on disease rates.[13] It is noteworthy that tuberculosis is currently a problem, even for developed countries such as the United Kingdom, that has adopted active search and the *Directly Observed Treatment Short-Course* as strategies to reduce incidence rates of the disease.[14]

There was a difference in the number of deaths and hospitalizations over time, especially in the third triennium. The increase found in reports may result from the implementation of the National Program of Tuberculosis Control in 2004. Initially, the main activity of this program was to improve quality of information on tuberculosis cases and provide computers and training for health professionals in order to feed national databases.[15]

As there was no difference among the macro-regional but only among the study periods, it is believed that the impact of the program has been primarily in the reporting of tuberculosis cases and deaths and feeding of databases, triggering greater number of reports on all regions of the state, which does not mean, however, an increase in number of cases in the population.

The results of this study are consistent with other studies in which the majority of hospitalizations and deaths occur on males.[16] This can be attributed to the fact that men are more present in the labor market; less present in health services; have higher prevalence of HIV infection and alcoholism as well as drug use abuse.[11]

Younger individuals, aged between ten and 29 years have a protective factor for death from tuberculosis. The population above 19 years is usually inserted in the labor market by providing for their families,[17] and this may favor awareness of the need for appropriate treatment in order to remain active and employed, thereby reducing death chances.

It was also observed that the elderly have more chances of death, probably because of their vulnerability due to aging, as well as chances of relapse, possible difficulty of response to treatment and trivialization of symptoms.[11,12,17] The fact that the elderly population is more affected by tuberculosis may be due to past exposure with a late manifestation of disease, and likely, a functional impairment related to aging. However, there are other factors that may be linked to the greater number of cases of tuberculosis in this age group, for example, the difficulty of access to health services, institutionalized elderly and delay in seeking medical attention.[17] Therefore, the elderly deserve more attention from healthcare professionals and services, not only for early detection but also for tuberculosis monitoring aimed at reducing complications and deaths.[17]

The results indicate the importance of consolidating the program implementation in all regions of the country as they suggest that efforts to control tuberculosis have expanded diagnosis and access to treatment.

Conclusion

After the implementation of the National Program of Tuberculosis Control in 2004, hospitalization and hospital death rates increased until the third triennium, with a sharp fall in the fourth triennium for all macro-regional health units of the state, especially in relation to deaths, that decreased by half. This behavior indicates improvements in data recording and greater effectiveness of the program.

Collaborations
Cecilio HPM; Molena-Fernandes CA; Mathias TAF and Marcon SS declare to have contributed to the conception and design, analysis and interpretation of data, drafting the article, revising it critically for important intellectual content and final approval of the version to be published.

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