

Original Article

Clinical and demographic characteristics of patients hospitalized with tuberculosis in Brazil between 1994 and 2004*

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Abstract

Objective: To describe the demographic and clinical characteristics of patients with tuberculosis hospitalized in the Nestor Goulart Reis Hospital, located in the city of Américo Brasiliense, Brazil. **Methods:** Epidemiological investigation by means of an observational, retrospective, descriptive study based on the medical charts of patients diagnosed with tuberculosis and hospitalized between 1994 and 2004. **Results:** There were 1787 patients diagnosed with tuberculosis during the period evaluated. Of those, 117 (7%) were females, 1670 (93%) were males; 1215 (68%) were single, separated or widowed. Most of the patients (74%) had not completed middle school, and most (63%) were between 30 and 50 years of age. In addition, 61% suffered from alcoholism. The most common occupation was farm worker (25% of the patients), and 70% of the patients were unemployed. The most common clinical form of the disease was the pulmonary form (in 92%). The rate of medical discharge was 60%. The treatment regimen differed from the standard (rifampin, isoniazid and pyrazinamide) in 34% of the cases. **Conclusions:** The profile of the patients with tuberculosis hospitalized in the hospital studied showed that they had special requirements: they were unable to take care of themselves (social cases) and required alternative treatment regimens, which justified their hospitalization. This hospital played an important social role in the treatment and guidance of these patients.

Keywords: Hospitalization; Tuberculosis; Demography.

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Introduction

Human fossils found in various regions and dated to 5000 B.C. present bone lesions that are consistent with tuberculosis, providing evidence that this infectious disease has been affecting mankind for thousands of years.⁽¹⁾ The identification (in 1882) of Koch's bacillus as the etiologic agent of tuberculosis was a fundamental milestone on the road to understanding the disease.

Currently, however, the importance of nonbiological factors determining morbidity and mortality has been emphasized. For some diseases, such as tuberculosis, the influence of these factors is clearer. The mere presence of Koch's bacillus is not sufficient to cause tuberculosis. Frequently, social, economic and cultural factors must be present for the disease to develop. Therefore, changes in the living conditions of people are often fundamental to changes in the incidence and prevalence of this disease.⁽²⁾ Malnutrition, which depresses cellular immunity, increases the prevalence of tuberculosis. Currently, HIV infection, injection drug use, greater poverty, increased numbers of homeless people, migration, malnutrition, urbanization and a drop in the efficiency of tuberculosis control programs have been considered responsible for the increased endemicity of tuberculosis worldwide.⁽¹⁾

The mean rate of treatment noncompliance in Brazil is 12%, which is a cause for concern.⁽³⁾ When drug combinations, which are considered the greatest trump over the emergence of resistance, are used inappropriately, such as in noncompliant cases, drug resistance appears because whenever medications are re-administered, there can be the selection of resistant mutants due to differences in the time to effect for each drug.⁽⁴⁾ This fact is of great importance for the National Program for Tuberculosis Control, not only for noncompliant patients or those who use the medications irregularly, but also for doctors, who have to manage the use of these medications considering their adverse effects, which requires adequate monitoring in order to prevent the emergence of resistant strains in these patients.⁽⁵⁾ Alcoholism, unemployment and acquired immunodeficiency syndrome (AIDS) are factors that contribute to treatment noncompliance.

In recent decades in Brazil, the possibility of closing hospitals specializing in phthisiology has been debated, which is still not feasible nowadays

due to the poor conditions under which the majority of the Brazilian population lives. Homeless people and those who do not have permanent jobs, who require adequate health care for the treatment of tuberculosis, as well as the so-called 'social hospitalizations, continue to be realities in Brazil.^(6,7)

The objective of this study was to characterize tuberculosis in patients hospitalized in the *Hospital Nestor Goulart Reis* (HNGR, Nestor Goulart Reis Hospital) in the city of Américo Brasiliense, Brazil, according to some epidemiologic characteristics of the disease, and the associations between tuberculosis and factors regarding this population of patients, based on the following variables: age, gender, level of education, occupation, treatment duration and comorbidities. An additional objective was to describe the incidence of the clinical forms, treatment modalities for pulmonary tuberculosis and the incidence of multidrug-resistant (MDR) strains.

Methods

This was an epidemiological investigation carried out as an observational, retrospective, descriptive study of patients with tuberculosis hospitalized in the HNGR between 1994 and 2004, based on the collection of data from the medical charts of the patients.

The HNGR is a state referral hospital for the treatment of tuberculosis. This hospital was inaugurated in 1958 with 672 inpatient beds but has been resized over the years: in 2001, there were 54 beds for patients with tuberculosis, 20 beds for patients with MDR tuberculosis and 12 beds for patients with AIDS.

This is a referral hospital for the Regional Health Boards of Directors of the cities Araraquara, Barretos, Franca, Ribeirão Preto and São João da Boa Vista, as well as, whenever necessary, for those of Araçatuba, Presidente Prudente, São José do Rio Preto, Bauru, Marília, Assis, Sorocaba, Botucatu and Piracicaba.

The Ethics in Research Committee and the Scientific Committee of the HNGR approved the study.

The collected data were analyzed using the Epi Info program, version 3.3.2. The following variables were subjected to descriptive analyses: gender, age, race, marital status, level of education, number

of children, residence, presence of comorbidities, occupation, employment status, clinical forms of tuberculosis, types of tuberculosis, reasons for discharge, length of hospitalization and medications used in the treatment of hospitalized patients during this period.

Results

The analysis of the epidemiological data of the patients hospitalized in the HNGR during the study period showed that, of a total of 1969 hospitalizations, 182 were readmissions. Therefore, the total number of patients with tuberculosis hospitalized during the study period was 1787.

Of those, 117 (7%) were females and 1670 (93%) were males. However, we must consider that, until 1998, the hospitalization of female patients was not permitted in this hospital, which could explain this distortion. After 1998, hospitalizations, 729 (85%) males and 129 (15%) females were hospitalized, totaling 858 hospitalizations between 1998 and 2004.

Caucasians were predominant (1074 patients; 60%). Regarding marital status, 1219 (68%) patients were single, separated or widowed. With regard to the level of education, most patients had not completed middle school (1322 patients; 74%). In addition, 1787 (41%) of the patients had no children.

The predominant age bracket was between 30 and 50 years of age, comprising 1127 (63%) of the cases. There was only one pediatric case, a two-year-old boy diagnosed with pulmonary tuber-

culosis. The mother of the child was HIV-positive and had been diagnosed with tuberculosis. Both the mother and the child, who was HIV-negative, started treatment at the same time. This was a case of household transmission that resulted in cure, and the patients were discharged after 171 days.

The most common occupations were farm worker (450 patients; 25%) and stonemason (244 patients; 14%). Only 1 patient (<1%) had no defined occupation and, in 99 (6%) of the cases, the occupation was unknown, although all of those patients reported having some occupation (Table 1). We found that 1252 patients (70%) were unemployed.

We also found that 782 patients (43.7%) had no declared place of residence, and 199 (11%) lived alone (Table 2). There were 67 cases of confirmed HIV seropositivity (3.7%). However, we must highlight the fact that the number of cases in which HIV testing was not performed (due to refusal or other reasons) was high (24%), which might have skewed the data. The most common outcome was medical discharge, which occurred in 1063 (60%) of the cases. The rate of noncompliance rate was 18%, and the mortality rate was 12%.

Sputum smear microscopy was positive in 794 (44%) of the cases.

Upon discharge, this number dropped to 68 (8% of those who tested positive for acid-fast bacilli upon hospitalization). The most common clinical form was pulmonary (1651 cases; 92%). Recurrence occurred in 279 cases (16%), there were 75 cases of MDR tuberculosis (4%), and 305 (17%) of the patients reported a family history of tuberculosis. Of the 1787 patients, 119 (7%) were hospitalized due

Table 1 - Age brackets and occupations of patients with tuberculosis hospitalized in the Nestor Goulart Reis Hospital between 1994 and 2004.

Age bracket	n	%	Occupation	n	%
0 10	1	0.05	Manual laborer	169	9.46
10 20	24	1.34	Homemaker	70	3.92
20 30	187	10.46	Farm worker	450	25.18
30 40	587	32.84	Driver	76	4.25
40 50	540	30.21	Mason	244	13.65
50 60	251	14.05	Painter	79	4.42
60 70	126	7.05	Other	593	33.19
70 80	44	2.46	No occupation	7	0.39
80 90	19	1.06	Unknown	99	5.54
No data	8	0.44			
Total	1787	100	Total	1787	100

Table 2 – Residence, HIV testing and outcome of the patients with tuberculosis hospitalized in the Nestor Goulart Reis Hospital between 1994 and 2004.

Residence	n	%	HIV testing	n	%	Outcome	n	%
Collective	24	1.34	Positive	67	3.7	Noncompliance	313	17.52
Multifamily	2	0.11	Negative	1289	72.1	Cure	1063	59.49
Living alone	199	11.14	Refused	1	0.1	Disciplinary discharge	45	2.52
Homeless	12	0.67	Not performed	192	10.7	Death	222	12.42
One family	768	42.98	Unknown	238	13.3	Relocation	38	2.12
Unknown	782	43.76				Unknown	106	5.93
Total	1787	100	Total	1787	100	Total	1787	100

to symptoms suggestive of tuberculosis, but active tuberculosis was not confirmed (Table 3).

Alcoholism was reported in 1101 (61%) of the cases. There were 16 patients (0.9%) who presented AIDS concomitantly. Length of hospitalization ranged from 1 to 814 days; the most common interval being 3 to 7 months (41%). The most common drug combination was rifampin+isoniazid+pyrazinamide (RMP+INH+PZA), which was prescribed in 1173 (66%) of the cases (Table 4).

Discussion

Until 1980, almost all patients with tuberculosis were hospitalized, although the Brazilian National Ministry of Health was already recommending that patients be treated at home rather than in hospitals.⁽⁶⁾ Although inpatient treatment has been less common, it is still impossible to consider the complete elimination of this treatment modality, which is essential for those who live under deplorable social conditions. This need is reinforced by other conditions, such as alcoholism, malnutrition and drug addiction.

The health policy changes effected in 1980 caused great transformations in the HNGR, reducing its operations by 50%. These changes downsized the number of inpatient beds to 54 for the treatment of tuberculosis, 20 for the treatment of MDR tuberculosis and 12 for the treatment of AIDS.

The data regarding place of residence, level of education, occupation and employment status characterize the social situation of the population of patients hospitalized in the HNGR, since most of them (77.8%) had a low level of education, were farm workers (25%) or masons (14%) and were unemployed upon hospitalization (70%), showing how tuberculosis jeopardizes the livelihood of these

individuals, who should be economically active. These data show that low level of education, low income and tuberculosis are associated, confirming the secular trend of this disease to preferably affect the poor.

The most affected age bracket, between 30 and 50 years of age (63% of the patients studied), is consistent with data obtained in other studies that showed that, in developing countries like Brazil, tuberculosis mainly affects the economically active population, which gives the disease a social connotation,⁽⁷⁾ whereas, in developed countries, the elderly constitute the most affected population.^(8,9) We found that the rate at which patients over the age of 70 were hospitalized in the HNGR was approximately 4%.

We found that the number of positive results for sputum smear microscopy upon hospitalization was lower than expected (44.5%), since the sensitivity of this test is expected to be approximately 60%.⁽¹⁰⁾ This low performance can be explained by the following factors: this test was not performed in 172 cases (9.6%); there were difficulties in sputum collection; the overall health status of hospitalized patients was poor; some refused to submit to the test; and there were errors in the completion of the medical records of 63 patients (3.5%). For the sake of accuracy of our data, we must mention these limitations.

However, when hospitalization is recommended, it is based not only on positive sputum smear microscopy but also on other clinical criteria that confirm the diagnosis of tuberculosis, such as expectoration, fever, sweating, weight loss and persistent cough, as well as other presumptive tests, such as X-rays, which can reveal features consistent with the disease. In addition, it is possible that patients

Table 3 - Sputum smear microscopy, clinical forms and type of tuberculosis in the patients hospitalized in the Nestor Goulart Reis Hospital between 1994 and 2004.

	Sputum smear microscopy upon				Clinical form				Types of tuberculosis					
	admission		discharge		n		%		MDR		Recurrence		Household	
	n	%	n	%					n	%	n	%	n	%
Unknown	63	3.5	224	12.5	Lymph node	05	0.3	Yes	75	4	279	16	305	17
Not performed	172	9.6	169	9.5	Miliary	07	0.4							
Negative	758	42.4	1326	74.2	Pulmonary	1651	92.4	No	62	4	610	34	1003	56
+	351	19.6	46	2.6	Other ^a	119	6.7							
++	169	9.5	13	0.7	Unknown	04	0.2	Unknown	1650	92	898	50	479	27
+++ or more	274	15.3	09	0.5	Intestinal	01	0.1							
Total	1787	100	1787	100	Total	1787	100	Total	1787	100	1787	100	1787	100

^apatients hospitalized with symptoms suggestive of tuberculosis that was not confirmed as being active tuberculosis; and MDR: multidrug-resistant.

were been submitted to sputum smear microscopy prior to being referred to HNGR (in their cities of origin), and that these results were not added to the medical charts. Nevertheless, we found that the percentage of negative results (42.4%) was within the expected range.

Regarding the undesirable finding of positive sputum smear microscopy upon discharge (8%), this can be explained by treatment noncompliance and disciplinary discharge, in which there is interruption of the treatment and, therefore, these cases complicate the disease transmission situation. It is known that, once treatment is initiated, its interruption can lead to the appearance of MDR strains, which is relevant for epidemiology.

The most common comorbidity was alcoholism (61%), which is in accordance with the findings of other studies that showed a strong association between tuberculosis and alcoholism.^(6,7,11) This is understandable, since the wasting resulting from alcoholism predisposes individuals to a low immunity condition.

The predominant clinical form of the disease (in 92%) was pulmonary tuberculosis through person-to-person transmission, mainly affecting immunocompetent patients, which characterizes the typical profile of tuberculosis. The advent of AIDS caused an increase in the number of patients with extrapulmonary tuberculosis.^(12,13) Therefore, the fact that 92% of the patients were diagnosed with pulmonary tuberculosis reinforces our data, since we found a low incidence of tuberculosis/HIV co-infection (4%) during the study period; although this is a state referral hospital for AIDS, this could be

explained by the limited number of inpatient beds for the treatment of AIDS in this hospital.

Table 3 shows that the rate of patients diagnosed with MDR tuberculosis was 4%. However, when Table 3 is compared with Table 4, in which the medications used for treatment are listed, it can be seen that there was a high percentage of patients submitted to a treatment regimen that differed from the standard (20%). Therefore, we can assume that these patients were not responding to regimen I (RMP+INH+PZA),⁽⁴⁾ and that alternative regimens were indicated, although this was not stated in the medical charts. This inference might be reinforced by the fact that 25% of the patients were hospitalized for over six months, which is recommended duration of treatment with regimen I. This rate might represent not only treatment failure but also social cases and drug intolerance (Table 4).

Still analyzing Table 3, we must highlight the distinction between readmission and recurrence in our study. Of the 1969 patients hospitalized during the study period, 182 cases of readmission of frequent patients were excluded, and we took into consideration only their first readmission during the study period. Recurrence was defined in those cases in which prior tuberculosis episodes had been reported in the medical charts, when patients were either treated in outpatient clinics or hospitalized in other institutions or in the HNGR itself prior to the study period. Unfortunately, the study of this variable was impaired, since this information stopped being registered in the medical charts, which resulted in the variable being recorded as 'unknown' for 50% of the cases. Nevertheless, the rates of recurrence

Table 4 - Other accompanying morbidities and symptoms, length of hospitalization (days) and medications most often used in the treatment of patients with tuberculosis hospitalized in the Nestor Goulart Reis Hospital between 1994 and 2004.

Other morbidities and symptoms	n		Length of hospitalization		Medications		n		%	
	n	%	days	n	%	n	%	n	%	
Wasting/anemia	17	0.95	0 30	363	20.31	AMC+FXT+CFZ+TZ+EMB	3	0.2		
Diabetes mellitus	27	1.51	30 60	173	9.68	AMC+FXT+MET+CFZ	3	0.2		
Psychiatric disorders	14	0.78	60 90	189	10.57	EMB+ETH	5	0.3		
Drug addiction	2	0.11	90 120	151	8.44	EMB+ETH+PZA	3	0.2		
Alcoholism	631	35.31	120 150	173	9.68	RMP+INH+PZA	1173	65.6		
Alcoholism + other	470	26.30	150 181	234	13.09	RMP+INH+PZA+EMB+ETH	7	0.4		
Hemoptysis	2	0.11	181 210	320	17.90	RMP+INH+PZA+EMB	126	7.1		
Cardiorespiratory failure	70	3.92	210 240	89	4.98	SM+ETH+PZA+EMB	81	4.5		
Acute respiratory failure	39	2.18	240 270	44	2.46	UNTREATED	219	12.3		
Mycoses	19	1.06	270 300	12	0.67	UNKNOWN	37	2.1		
Parasite infestation	60	3.36	300 330	12	0.67	OTHER	130	7.3		
AIDS	16	0.90	330 365	9	0.50					
Other	115	6.44	365 or +	18	1.00					
Unknown	3	0.17								
None	302	16.90								
Total	1787	100	Total	1787	100	Total	1787	100		

AMC: amikacin; FXT: ofloxacin; CFZ: clofazimine; TZ: thiobenzanilide; EMB: ethambutol; RMP: rifampin; INH: isoniazid; PZA: pyrazinamide; SM: streptomycin; and ETH: ethionamide.

(15%) and readmission (9.24%) due to treatment noncompliance or reinfection in those patients who were medically discharged suggest that the success in the control of the disease could be improved, considering that some individuals may have an inherent predisposition to recurrent episodes of tuberculosis.⁽¹¹⁾ Of the 1787 patients, 119 (6.7%) were hospitalized due to symptoms suggestive of tuberculosis, although active tuberculosis was not confirmed. These cases revealed sequelae caused by previous tuberculosis or by pulmonary infections other than tuberculosis.

The analysis of the family history of tuberculosis was also impaired due to a lack of data in the medical charts (27% unknown). In these cases, it would be interesting to conduct a study using molecular epidemiology in order to track the source of infection. Methods based on DNA sequencing of the bacterial genome, such as restriction fragment length polymorphism and mycobacterial interspersed repetitive units, have recently been used for the detection of connected cases, which enables the comparison between strains from various geographical areas and the screening of *Mycobacterium tuberculosis* clones, which is important for public health.^(14,15)

Regarding HIV-testing findings (Table 2), it is of note that the percentage of positive results might be slightly higher than what was found due to the number of cases in which testing was not performed due to various reasons (11%), as well as to the lack of data in the medical charts (13%).

The most common outcome was medical discharge (60%), followed by noncompliance (18%), death (12%), disciplinary discharge (2.5%) and relocation (2%). In 6% of the cases, there was no information regarding the outcome. These data are consistent with those found in the literature.^(10,11) In a study carried out in five hospitals specializing in tuberculosis in the state of São Paulo, the mean rate of medical discharge was 58.7%, compared with 7.5% for noncompliance, 12% for mortality, 3.5% for disciplinary discharge and 3.4% for relocation. The hospital in the present study achieved results that were higher than the mean results of other institutions specializing in tuberculosis in the state, playing an important role in society, despite the difficulties found in treatment compliance, as shown by the 20% combined rate of noncompliance and disciplinary discharge, which jeopardized treatment success. The difficulties faced by hospitalized alcoholics or drug addicts, both of which might

suffer from withdrawal syndrome, could explain this finding. Alcohol abuse has been implicated in the reactivation of tuberculosis and the difficulty in treatment compliance.⁽¹¹⁾ Chronic emotional instability is one of the factors that prevent compliance, especially when individuals overcome the acute phase of the disease and believe they are cured. Health care facilities must be alert to the needs and perceptions of the patients and be prepared to make changes to avoid 'social failure'. Alcoholism can be detected during the first interview with the patients, and it can be monitored through supervised treatment in the health care units. Various experiences have shown the validity of these measures as a resource for the prevention of recurrence and noncompliance. Social support from families and other people, such as health care professionals or neighbors, can improve treatment compliance. In addition, it is important to recognize which of the conditions that predispose to tuberculosis persist and which nonmedical interventions are indispensable to fight unemployment, alcoholism and malnutrition.

Through the analysis of the predominant profile of the patients with tuberculosis hospitalized in the HNCR during the study period, we found that this hospital plays a relevant social role in the treatment and counseling of these patients.

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