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Perfil epidemiológico da tuberculose no Município de Belo Horizonte (MG), no período de 2002 a 2008

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Abstract

Objective: To assess the epidemiological profile of tuberculosis in Belo Horizonte, Minas Gerais State, from 2002 to 2008. **Methods:** For descriptive epidemiological study, the data were obtained from the municipal National Health Surveillance System, after obtaining approval from the Research Ethics Committee at the City Health Department. Incidence coefficient, average rates and stratified data analysis with significance level of $p \leq 0.05$ were calculated. **Results:** About 7.590 new tuberculosis cases were reported between 2002 and 2008. There was a slight reduction in the number of cases throughout the historical trend, with an average annual incidence rate of 46/100,000 inhabitants. The study also showed a male gender ratio of 1.84:1, a higher incidence coefficient in the age group between 40 and 59 years old (73/100,000) and a higher incidence of tuberculosis among people who only had primary education level. Pulmonary tuberculosis was the most prevalent form in every year of the study ($p < 0,001$). Among the cases reported with associated diseases, alcoholism was registered in 47.9% and AIDS in 34.5%. Between 2002 and 2008, there was an increasing trend of cases treated under Directly Observed Treatment, accounting for 29.5% in total. Cure percentage rate was below the expected result (67.3%) and non-adherence to treatment showed a high total percentage (17.9%). **Conclusion:** The results indicated that tuberculosis control actions need to be intensified with investments on professional training, systemic audits of the information system, improved integration between AIDS/tuberculosis programs and raising awareness of the disease with the goal of mobilizing the society.

Keywords: Tuberculosis. Health profile. Primary health care. Health policy. Family health. Disease notification.

Resumo

Objetivo: Avaliar o perfil epidemiológico da tuberculose em Belo Horizonte, Minas Gerais, no período de 2002 a 2008. **Métodos:** Estudo epidemiológico, descritivo, de série histórica, cujos dados foram obtidos no Sistema de Informação de Agravos de Notificação, após a aprovação no Conselho de Ética e Pesquisa da Secretaria Municipal de Saúde. Foram calculados coeficientes de incidência, taxas médias e a análise estratificada dos dados com nível de significância de p ≤ 0,05. **Resultados:** Foram notificados, entre 2002 e 2008, 7.590 casos novos de tuberculose, houve um declínio do número de casos ao longo da série histórica, com taxa média anual de incidência de 46/100.000 habitantes. Observou-se uma razão de masculinidade de 1,84:1, um maior coeficiente de incidência no grupo etário de 40 a 59 anos (73/100.000 habitantes) e elevada ocorrência da tuberculose entre os indivíduos com até o ensino fundamental. A forma pulmonar foi a mais prevalente em todos os anos (p < 0,001) e entre os casos com notificação de agravos associados, o alcoolismo foi registrado em 47,9% e a AIDS em 34,5%. Entre 2002 e 2008, houve uma tendência do aumento de casos tratados na modalidade de Tratamento Diretamente Observado, representando um total de 29,5%. O percentual de cura foi abaixo do esperado (67,3%) e o de abandono elevado (17,9%). **Conclusão:** Os resultados indicaram que as ações de controle da tuberculose precisam ser intensificadas com investimentos em capacitação profissional, auditorias sistemáticas do sistema de informação, melhorias na integração dos programas da tuberculose/AIDS e difusão de informação sobre a doença, visando à mobilização social.

Palavras-chave: Tuberculose. Perfil de saúde. Atenção primária à saúde. Política de Saúde. Saúde da Família. Notificação de Doenças.

Introduction

Control of the tuberculosis (TB) remains a challenge for the public politics of health in developing countries, where this endemic disease prevails in high levels[1,2]. These countries, together, account for 95% of the 8 million new cases and for 98% of the 3 million deaths due to TB, annually, in the world[3]. The serious situation of TB is highly related to poverty, the precarious conditions of housing and infrastructure and logistic problems caused by rapidly spreading urbanization[4-6]. There is also the economic impact to these edemic places, generated by losses of workdays and by disabilities that occur due to this disease. This happens because of the highest predominance of cases reported in the age group that economically represents the active part of the population[3].

The barriers faced by the population in access to health services, for the diagnosis and treatment of the illness[7,8], also contribute to this scene. For example, the setting up of Primary Attention to Health (APS - Atenção Primária à Saúde) units[7], the geographic distances between the residences and health services, costs with respect to transport, acceptability and recognition of the population of these services and the way the users are received by the professionals in health services. In addition, there is also the need of overcoming the gaps in the organization, management and integration of public services at several levels of regional health planning to accomplish inter-sectorial actions that favor the control of TB[1].

This context gets worse with the endemic disease, Acquired Immunodeficiency Syndrome (AIDS), that contributes to the increase in the number of cases of TB[3]. The Human Immunodeficiency Virus (HIV) coinfection and the TB have relevant impact on the epidemiology of hazards and demand for integrated politics of prevention and control programs of these endemic diseases[9,10].

The TB scenario in Brazil is still worrying, although there is a reduction in the incidence of observed illness in the last few decades, and the country is outside the group of 22 nations that have 80% of the illness cases. In 2008, 68,147 new cases were notified in

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Brazil, corresponding to an incidence rate of 35,59/100,000 inhabitants. It is estimated that four to five thousand people die due to this illness, annually, in the country[3]. In 2010, the Ministry of Health revised the National Plan of Tuberculosis Control (PNCT) to minimize this situation. Based on the 1990s data as recommended by the World Health Organization (WHO)[10], actions, pointers and abilities for each governmental sphere were established, aiming to reach an incidence rate up to 25,9/100,000 inhabitants and reduce mortality rates by half by 2015.

Another PNCT highlight is the decentralization of TB control actions for APS, mainly tied with the Family Health Strategy (FHS). This fact generates expectations of a major program effectiveness, extending to diagnosis access between the respiratory symptomatic, increase in the Strategy of Directly Observed Treatment (SDOT) rates, major coverage of serology achievement for HIV and improvements in the information system allowing evaluation of the performance of the program[10]. With that, it is expected to favor premature detention of the infection sources and increase the adhesion rate of the treatment and cure of the illness.

However, despite the extent of population covered by the FHS[11] in the last few years, regarding the PNCT recommendations and available technologies to revert the epidemiological situation of the disease, it is not possible to foresee, in the near future, a scenario in which TB is not considered a public health problem in Brazil[10].

Another problem is the fact that the society is not aware of TB's real importance and magnitude. All these problems are intensified in the Brazilian capitals, where the TB incidence rates, in general, are higher, because there is a major health services offer, a large FHS coverage and better conditions of diagnosis and treatment[2,12]. In this context, the study aimed to evaluate the health profile of TB cases among the Minas Gerais (MG) residents in the city of Belo Horizonte, between 2002 and 2008, to contribute to the arguments on the prevention and control of the illness in the APS scope.

Methodology

This is an epidemiological study, descriptive, from a historical fact, carried out in the city of Belo Horizonte (MG), between 2002 and 2008. This historical fact was chosen, due to in this period happened an increase of population coverage by the FHS[11], as well as the process of computerization of the Basic Health Unit (UBS)[13], what justifies the epidemiological investigation of the illness in this period.

Belo Horizonte city is in the central region of the State of Minas Gerais and in 2010, there were 2,75,444 inhabitants[14]. In the investigated period, the health services in this city were organized in nine Local Health Systems corresponding to the regional administration of the City hall[15]. In 2002, there were 127 UBSs in these Local Health Systems, with FHS covering a population of 54.34% (2,284,469 inhabitants). In 2008, it increased to 144 UBS and a percentage increase in the population covered (2,434,642 inhabitants) by the FHS (71.45%)[11,14,15].

The TB cases are treated in the UBS near the patient's house. However, there are reference units, outpatient clinics and hospitals for the treatment of special cases, such as HIV-TB coinfection, heart failure and extrapulmonar TB, which are difficult to deal with. The health center, Oswaldo Cruz, located in the central region of the city, by means of the contrareference and the reference system, evaluate and/or carry out treatment of multidrug-resistant cases, and complicated situations of diagnosis or treatment failure. In each one of the nine Local Health Systems there is a service of epidemiology responsible for the collection and recording of data in the System of Hazard Information (SINAN)[11], which helps in regional control of TB.

The study used secondary sources of data for the new cases of TB among the inhabitants of Belo Horizonte city, registered in the Municipal Secretariat of Health SINAN[11], during the period 2002–2008. The demographic and geographic variables, and variables concerning infections placed in

the TB investigation form, were searched in this source.

Incidence rates were calculated with regard to sex (masculine and feminine) and age group (0 – 19 years, 20 – 39 years, 40 – 59 years and 60 years or more), by dividing the number of new cases of TB for the population of age groups and sexes described above, in each year of study, multiplied by 100,000; as well as the average rate of the new cases of incidence rate and mortality rate, that consist of the sum of absolute numbers, dividing by seven. The incidence and mortality rates were also calculated for each year of the historical series.

The tables and graphs were constructed using the Excel program of the software, Microsoft Office 2007 and the population bases per year were taken from the SUS Informatics Department (DATASUS)[11] website. The stratified analysis of data was carried out in the *Statistical Package for Social Science program* (SPSS), version 15,0, to calculate χ^2, with the level of significance of $p \leq 0.05$ for the identification of differences in the epidemiological standards throughout the historical series for age, sex, schooling and infection data.

This study was submitted and approved by the Ethics and Search Committee (COEP) of the Municipal Secretariat of Health of Belo Horizonte, expert's report 0073.0.410.410-09A. It followed the orientations of the resolution 196/96 of the Ministry of Health. The authors declare that there is no conflict of interests.

Results

Between 2002 and 2008, 7,590 new cases of TB, of all forms, were registered in the Municipality of Belo Horizonte, with an annual average incidence rate of 46/100,000 inhabitants. It was observed that, in this period, the number of cases per year and the incidence rate presented had decreased. In 2003, the biggest incidence rate (55/100,000 inhabitants) with decrease was evidenced between the years 2004 and 2007. The mortality rate for TB presented a variance of 1.0 to 2.3/100,000

inhabitants, with annual average rate of 1.6 deaths each for 100.000 inhabitants, with the biggest mortality rate in 2004 (Table 1).

A study of the demographic data reveals 4,918 cases of males (64.8%) and 2,672 cases of females (35.2%), showing a sex ratio of 1,84:1. Throughout the historical series, the statistical significance of this difference remained (p < 0.001). It was observed that both the sexes had presented a reduction in the incidence rate of TB throughout the evaluated period. However, in 2008, a new trend of growth in incidence rate (Figure 1) was verified among males.

The distribution percentages of TB cases, for age group, in the period between 2002 and 2008 had presented significant statistical differences (p < 0.001). The age varied between those younger than one year and more than 60 years, with bigger average of incidence rates in the age groups between 40 and 59 years (73/100,000 inhabitants) and between 20 and 39 years (56/100,000 inhabitants) that represented 34.8% (2.642) and 44.8% (3.398) of the evaluated cases in that period, respectively. The lesser average incidence rate was in the age group 0 to 19 years old (15/100,000 inhabitants) that represented a percentage of 9% (686) of the cases, in the studied period. The evaluation of the trend of TB incidence rate cases, in the investigated age groups in this study, showed that the populations ≤ 19 years and ≥ 60 years had a trend of reduction of cases from 2005. In the age group of higher incidence rate (40 – 59 years), it was observed that between 2004 and 2007, there was a fall, but in 2008 it returned to present a trend of increase of this coefficient (Table 2).

From a total of 4,427 cases with information on the schooling level, 244 (5.5%) were illiterate, 2,579 (58.2%) had completed up to junior high school, 1,022 (23.1%) had completed up to high school, 410 (9.3%) had completed up to higher level and 172 (3.9%) belonged to the age group to which schooling is not applicable. These statistical differences are significant (p < 0.001) in each year of the investigated historical series (Table 3).

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Table 1 - Distribution of cases and incidence rate (per 100,000 inhabitants) and mortality rate (per 100,000 inhabitants) for tuberculosis, according to year of occurrence in the city of Belo Horizonte (MG), Brazil, from 2002 to 2008.

Tabela 1 - Distribuição dos casos e do coeficiente de incidência (por 100.000 habitantes) e coeficiente de mortalidade (por 100.000 habitantes) por tuberculose, segundo o ano de ocorrência no Município de Belo Horizonte (MG), Brasil, de 2002 a 2008.

Years	Population	New cases	Death cases by TB	Incidence rate	Mortality rate
2002	2.284.469	1,080	43	47	1.9
2003	2.305.813	1,267	30	55	1.3
2004	2.327.049	1,202	53	52	2.3
2005	2.375.330	1,131	46	48	1.9
2006	2.399.920	1,060	25	44	1.0
2007	2.424.292	920	39	38	1.6
2008	2.434.642	930	34	38	1.4
Mean	2.364.502	1,084	39	46	1.6

TB: Tuberculosis / TB: Tuberculose.
Source: SMSA/BH – System of Hazard Information (SINAN), Brazilian Institute of Geography and Statistics (IBGE).
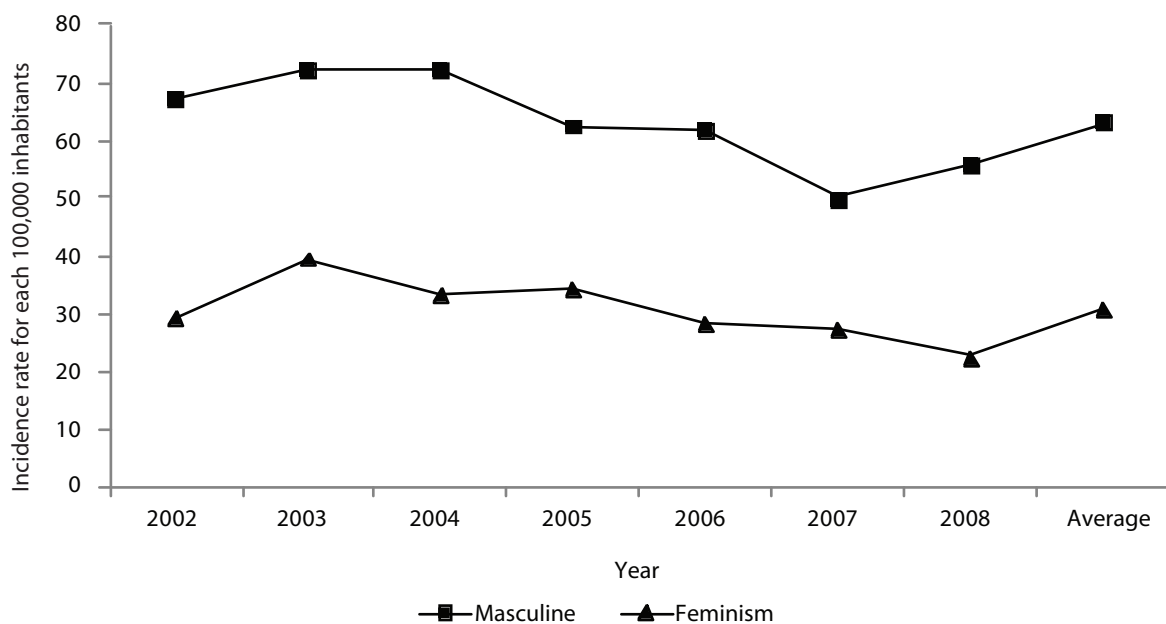
Source: SMSA/BH – System of Hazard Information (SINAN), Brazilian Institute of Geography and Statistics (IBGE).

Figure 1 - Incidence rate of tuberculosis (per 100,000 inhabitants), by genre and year of occurrence in the city of Belo Horizonte (MG), Brazil, from 2002 to 2008.

Figura 1 - Coeficiente de incidência de tuberculose (por 100.000 habitantes), segundo o sexo e o ano de ocorrência no Município de Belo Horizonte (MG), Brasil, de 2002 a 2008.

The clinical and epidemiological data of the TB cases in Belo Horizonte, for the period between 2002 and 2008, were verified. About 5,730 (75.5%) were classified with the pulmonary form of the illness, 18.7% (1.416) with the extrapulmonary form and 5.8% (442) presented the associated pulmonary form with the extrapulmonary form (Figure 2). These differences in percentages in the form of localization of the illness remained in the evaluation of the distribution of the cases in the years of study (p < 0.001). From the total of 2.332 cases (30.7%) with associated hazards, alcoholism presented a greater ratio (47.9%), that is, 1,117 cases, and AIDS comorbidity was found associated with 34.5% (804) of these cases. In lesser ratio, 12% (281) and 5.6% (130) of the cases

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Table 2 - Distribution of new cases and incidence rate of tuberculosis (per 100,000 inhabitants), by age group and year of occurrence in the city of Belo Horizonte (MG), Brazil, from 2002 to 2008.

Tabela 2 - Distribuição dos casos novos e coeficiente de incidência de tuberculose (por 100.000 habitantes), segundo faixa etária e o ano de ocorrência no Município de Belo Horizonte (MG), Brasil, de 2002 a 2008.

Years	Population Age group				New cases Age group				p-value	Incidence rate Age group			
	0–19	20–39	40–59	≥60	0–19	20–39	40–59	≥60		0–19	20–39	40–59	≥60
2002	781.153	810.022	484.522	208.772	137	466	345	124		18	58	71	59
2003	788.453	817.591	489.048	210.721	154	550	417	139		20	67	85	66
2004	795.714	825.120	493.553	212.662	114	565	378	145		14	68	77	68
2005	812.223	842.239	503.793	217.075	147	471	391	122	< 0.001	18	56	78	56
2006	820.630	850.959	509.009	219.322	115	430	397	113		14	51	78	52
2007	728.991	853.458	576.956	264.887	71	392	341	115		10	46	59	43
2008	721.447	854.822	584.036	274.337	62	389	373	106		9	46	64	39
Mean	778.373	836.316	520.131	229.682	114	466	377	123		15	56	73	55

Source: SMSA/BH – System of Hazard Information (SINAN), Brazilian Institute of Geography and Statistics (IBGE).

Table 3 - Distribution of new cases of tuberculosis, according to schooling and year of occurrence in the city of Belo Horizonte (MG), Brazil, from 2002 to 2008.

Tabela 3 - Distribuição dos casos novos de tuberculose, segundo a escolaridade e ano de ocorrência no Município de Belo Horizonte (MG), Brasil, de 2002 a 2008.

Years	Without information		Illiterate			Up to junior high school			Up to high school			Up to higher level			Not applied**			Total	Total of valid cases	p-value
	n	%	n	%	%*	n	%	%*	n	%	%*	n	%	%*	n	%	%*			
2002	519	48.1	40	3.7	7.1	312	28.9	55.6	121	11.2	21.6	56	5.2	10.0	32	3.0	5.7	1,080	561	
2003	503	39.7	51	4.0	6.7	448	35.4	58.6	167	13.2	21.9	55	4.3	7.2	43	3.4	5.6	1,267	764	
2004	463	38.5	42	3.5	5.7	427	35.5	57.8	187	15.6	25.3	70	5.8	9.5	13	1.1	1.8	1,202	739	
2005	424	37.5	38	3.4	5.4	386	34.1	54.6	192	17.0	27.2	63	5.6	8.9	28	2.5	4.0	1,131	707	<0.001
2006	391	36.9	37	3.5	5.5	354	33.4	52.9	168	15.8	25.1	76	7.2	11.4	34	3.2	5.1	1,060	669	
2007	371	40.3	24	2.6	4.4	336	36.5	61.2	121	13.2	22.0	56	6.1	10.2	12	1.3	2.2	920	549	
2008	492	52.9	12	1.3	2.7	316	34.0	72.1	66	7.1	15.1	34	3.7	7.8	10	1.1	2.3	930	438	
Total	3,163	41.7	244	3.2	5.5	2,579	34.0	58.2	1,022	13.5	23.1	410	5.4	9.3	172	2.3	3.9	7,590	4,427	

%*Percentage of the total valid cases, excluding cases with missing information. **Age group that education level it not apply - 0 to 6 years.
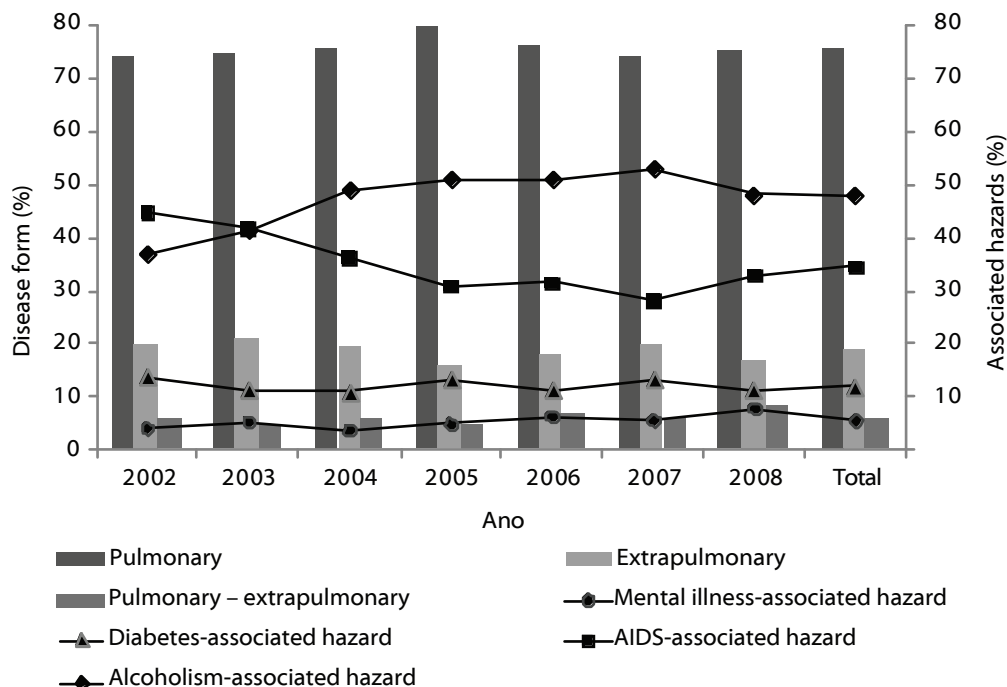
*%*Percentual sobre o total de casos validos, excluindo os casos sem informacao; **Faixa etaria em que o nivel de escolaridade nao se aplica - 0 a 6 anos;*

were associated with diabetes and mental illness, respectively.

It is important to emphasize that the information on the associated hazard variable was not available (ignored/white) in 79,6% (6.044) for alcoholism, 82.4% (6.255) for AIDS, 90.5% (6.870) for mental illness and 88.6% (6.725) for diabetes. Hence, it was not possible to infer if these cases dealt with situations in which the variable was not investigated or if they referred to cases in which the hazards were not associated with TB. In the evaluation of the historical series, hazards such as alcoholism and AIDS, associated with TB, presented a growth trend, while diabetes and mental illness presented the ratio of more stable cases in this same period.

For treatment administration, information was available for only 5,671 (74.7%) cases, of which a minor percentage of 29.5%, 1,675 cases, referred to the SDOT professionals of health (doctor, nurse, assistant or technician

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Source: SMSA/BH – System of Hazard Information (SINAN), Brazilian Institute of Geography and Statistics (IBGE).

Figure 2 - Percentage of new cases by form, hazards associated with tuberculosis and year of occurrence in the city of Belo Horizonte (MG), Brazil, from 2002 to 2008.

Figura 2 - Percentual de casos novos segundo forma, agravos associados à tuberculose e ano de ocorrência no Município de Belo Horizonte (MG), Brasil, de 2002 a 2008.

of nursing, community health workers) or someone close to the patient, who was considered responsible for treatment by health service. In 25,3%, 1,919 cases, information on the kind of treatment was not available (ignored/white) in the system of information used in the study. Considering the valid cases, it is worth emphasizing that there was a significant increase of the SDOT percentage, going approximately from 18.1% (132) in 2002 to 54,4% (396) in 2008 (p < 0.001). Regarding the condition of the new notified cases, of residents in Belo Horizonte presented in the study, at the time of closing, 67.3% (5,023) presented cure, 18% (1.340) abandoned the treatment, 5.2% (389) were transferred and 9.5% (712) had died. In the period of study, it was observed that the percentages related to the closing condition remained with little variability. From the total of 1.340 cases closed as abandonment, it was verified that a minor percentage of abandonment 352

patients (26.3%) had taken place among those who had received supervised treatment in relation to those who had treatment in self-administrated modality 626 patients (46.7%) (p < 0.001).

In the TB residence characteristics by the Local Health Systems of the city of Belo Horizonte, it was verified that the district of Barreiro presented 67.1% (5.096) of cases, followed by the district of Pampulha with 12,2% (928). The lesser ratio of cases was found in Venda Nova 0.9% (72) and Leste 1.5% (113) districts.

Discussion

The PNCT has been intending to intensify its actions, when integrating the scope of professional performance of the FHS that, in Belo Horizonte, in the studied period, had a coverage from 54,34% (2002) to 71,45% (2008)[11]. This may have contributed to the decline of

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the incidence rate of the illness, observed in this study, that went from 47/100.000 (2002) to 38/100.000 inhabitants (2008). Associated with this, there was little variation in the number of TB cases in relation to the increase of the population in the investigated period[11].

The average rate of the incidence rate, in the evaluated historical series, was of 46/100.000 inhabitants, being lesser than what was found in studies carried out in other capitals, Teresina[12] and Salvador[2], but bigger than what was estimated for the state of Minas Gerais and Brazil, of 26/100,000 and 41/100,000 inhabitants, respectively[11]. A bigger incidence rate of the illness in the year 2003 and mortality in the year 2004 was observed, but no information was found that would enable inference of the rise of these parameters in these years.

These results demonstrated that the control of TB remains a challenge for the health public policy in Belo Horizonte, because although improvements on infrastructure and projects investments as the "Vila Viva" and intensification of the APS actions[10,13] have taken place, the city still has serious problems related to poverty, as a great number of precarious and multifamiliar habitations thrive, which favor the occurrence of the illness.

The high ratio of the illness between men is a predominant aspect in some studies[1,7,8,16]. This aspect is not well-clarified in the literature of the area yet, but there are inferences to a bigger exposure of men to risk factors, a lesser rate of their use of health services[17] and the cultural aspects related to the ways of living of men, affecting health and becoming sick. This fact excites reflections about the possible gaps in the PNCT, and more specific actions to reach this population of higher incidence of the illness.

Another aspect related to the demographic standard of the illness, refers to the schooling level, that was not informed in 41,7% (3.163) of the studied cases. But, considering only the cases with this information, it was observed that less schooling seems to be a factor of social inequality associated to the illness[5,12]. Still in the demographic profile of the illness, the result has

demonstrated that the age group between 40 and 59 years was the one most stricken by TB in every investigated year. This result is different from other studies in Brazilian capitals that had pointed the age groups of those with a high predominance of the illness to be between 15 and 39 years and 20 and 49 years[2,12,18]. Although these vary, these findings demonstrate that it is about an economically active population, which loses days of work or study for incapacities generated on account of the illness and its treatment, leading to what results in an economic and social impact for the city and families[1]. Despite this, the aged population, due to the demographic transition, has also been a point of concern for the politics of control of this endemic disease worldwide, due to the possibility of infection and illness reactivation, as a result of the aging process[1,2]. However, in the study of this cohort in Belo Horizonte, the population higher than 60 years had a decrease in the incidence rate, that may be related to the increase of the FHS coverage and with the higher rates of the APS services use, expected for this 17,19 population.

The studied historical series data showed a predominance of the pulmonary form with similar values to the ones found in other studies[1,20]. Higher pathogen, therefore, demonstrates the importance of diagnosis based on mucus bacilloscopy to the confirmation and adequate control of the cases. This possible premature confirmation of the pulmonary form favors the implementation of measures to interrupt the chain of the illness transmission[2]. However, 89.1% (6.759) of the notified cases in the period between 2002 and 2008 did not have information about bacilloscopy. Of the 360 cases (9.9%) on whom bacilloscopy was performed, 62.8% (226) were positive, indicating the need of a bigger investment in the organization of services that provide access to the diagnosis of the illness.

A high percentage of absence of data was observed in schooling and associated illnesses, which do not always refer to a negation of such information by the patient. The gaps in these data may be related to the inadequate filling of the notification form

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and/or to not asking by the epidemiologic surveillance services at the district and municipal levels. This problem needs to be better investigated, because it ensures the establishment of a more complete profile of this illness and its control, and points to the need of promoting strategies that stimulate adequate filling of the notification form by the professionals of health in the investigated municipality, and the improvement of the quality and reliability of the information. The implementation of the notification forms online in the local level, mainly in the Brazilian capitals of epidemiological importance, could favor the identification of discrepancies and gaps in filling, and could contribute to improvements in the quality of the information system.

It was observed that alcoholism and AIDS were the two main TB-associated hazards, and the findings corroborate with other epidemiological studies on these associations[2,18,21]. Besides, AIDS is considered a contributing factor for the increase in mortality rate and for the increase in the most serious form cases of TB[22]. However, the impact of this hazard, associated with TB, in Belo Horizonte, may be underrated, because few serologic tests of HIV were carried out in patients with TB[13], by the health services, throughout the studied period. This is already being argued as a problem faced by the PNCT[10]. In this direction, a study carried out by Prado et al.[9], points to the need of integrating the TB and AIDS programs, that can be decisive for the increase of the population's access to the diagnosis of both the hazards. Alcoholism is another hazard that has the most associated impact on TB, and this challenge seems to be bigger than the health public policy. This is because there is a lack of services to pay attention to and offer social assistance to the individuals and families that face this problem. The increase of these services, with their integration to the PNCT, can be a public initiative of the endemic control, since this problem compromises the adhesion rates to the treatment, as observed in other studies[21,23].

The results also pointed that the treatment rates by the SDOT modality in the investigated period were increasing, especially after PNCT decentralization, in which the FHS may have contributed in a decisive form[13]. However, the abandonment rates, in this period, did not present a decline with the SDOT intensification, and it was bigger than what was recommended by the Ministry of Health and observed in other Brazilian capitals[2,12,10]. However, it was observed that the ratio of abandonment was significantly less among patients who received supervised treatment. This result indicates that the SDOT represents an important strategy for the reduction of the abandonment rate, but needs to be associated to the investments in social politics of support to people with higher risk of abandonment to the TB treatment, such as the unemployed, the alcohol dependents, those with low schooling, and with difficulties of access to health services[13,16,23].

It is known that besides these factors, adhesion to treatment faces questions due to the illness stigma, the long period of treatment and its possible collateral effects[13,21,23]. In this case, shelter and authentic dialogue between the person going through TB treatment and the professionals of health may be decisive in diminishing the abandonment and non-adhesion to treatment. It is here mentioned the mission of each professional in the attendance regulation of the TB cases, in a qualified listening and in an efficient dialogue, that favors the process of co-production, ethical and secure responsibility of the person, regarding to its health situation[13]. In this process, the health professional must create spaces so that the user vocalizes his or her knowledge, perceptions and feelings concerning the illness. Besides, the health professional must try to identify the points where scientific technician may act, extend the level of knowledge of the person with TB and favor their understanding of the illness and treatment[21]. This is all about recognition, that although most of the time we work with expected and pre-established patterns for the population, each individual possesses

singularity and values in a unique way, but is anchored to a knowledge that is socially constructed. The professionals of health, who work in the prevention and control of the illness, must lead the family and community participation[1,10,21,23].

In addition, treatment abandonment may be influenced by the organizational aspects of services, such as inequalities in the standby time, lack of appropriate reception and non-systematization of active search and SDOT[1]. The territorialization of APS services may also influence treatment adhesion. This happens because there is still an existing stigma about the illness, that takes some individuals to not adhere to the treatment, since they do not want to share their health situation with the people of the community in which they live[13]. This scenario suggests that the health services managers at the local level agree with professionals on the actions and strategies that specifically aim at preventing these situations. Studies also describe that initiatives, such as financial aid, supply of "transportation voucher"[23,24] and regular domiciliary visit of Community Health Workers (ACS), can reduce the abandonment rates. TB control also depends on the joint efforts with other sectors, to promote improvements in the conditions of habitation, income and schooling of the population.

The residence characteristics of the illness allows to infer on its epidemiological processes. In this case, the result pointed to the regional Barreiro as being responsible for 67,1% of the cases. The interpretation of this result leads to three inferences. The first one signifies the reporting system of cases that can be better in this sanitary district, the second one indicates the presence of a hospital as a center of reference in the state for infectious illnesses in this region and the third is related to the percentage of 47% of the population under a very high risk of social vulnerability[25].

Finally, the need was felt for constant dissemination of scientific information about the illness, its health profile, ways of prevention, treatment innovations and the PNCT actions, using mass communition and via social networks, as a strategy to keep a more frequent debate in the society that can contribute to the social participation in the illness control.

Conclusion

Although the limitation of the study related to the gaps of fulfilling the notification forms, the demographic and epidemiological profile of TB in Belo Horizonte, in the investigated period, have showed a decline of the illness cases between 2002 and 2008, but with an average rate of the high incidence rate, a bigger predominance of the illness in the masculine population, in the economically active age group, and a bigger association of the illness with the hazards of alcoholism and AIDS. For the management of municipal health, the illness profile indicates the need of improving the integration of AIDS and TB control programs and the services of reference for the treatment of the people who face the alcoholism problematic. Besides these, the ACS regular domiciliary visits, that are duly able, may help the process of premature detection of new cases, directing them for the APS services and to favoring the reduction of the abandonment rates.

The possible barriers in increasing the coverage of the SDOT by the FHS should be investigated. By the way, it seems to be very important the intensification of campaigns of health education ruled by the community participation and the prioritization of the high risk groups, including strategies that promote more accessibility of men to the APS services. Developing sensitization action and permanent qualification of the professionals involved in the control actions of TB, as well as improving the system for notification of cases, with more systematic audits, at municipal level, that can measure and generate improvements in the TB control.

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References

1. Hino P, Da Cunha TN, Villa TCS, Dos Santos CB. Perfil dos casos novos de tuberculose notificados em Ribeirão Preto (SP) no período de 2000 a 2006. Cien Saude Coletiva 2011; 16: 1295-1301.

2. Xavier MIM, Barreto ML. Tuberculose na cidade de Salvador, Bahia, Brasil: o perfil na década de 1990. Cad Saude Publica 2007; 23(2): 445-53.

3. Brasil. Ministério da Saúde. Secretaria de Vigilância em Saúde. Guia de Vigilância Epidemiológica. 7ª ed. Brasília; 2010.

4. Hijjar MA, Procópio MJ, Oliveira R, Teixeira GM. A Tuberculose no Brasil e no mundo. Bol Pneumol Sanit 2001; 9(2): 9-16.

5. Mascarenhas MDM, Araújo LM, Gomes KRO. Perfil epidemiológico da tuberculose entre casos notificados no Município de Piripiri, Estado do Piauí, Brasil. Epid e Serv de Saude 2005; 14(1): 7-14.

6. Brasil. Ministério da Saúde. Fundação Nacional de Saúde. Centro de Referência Prof. Hélio Fraga. Sociedade Brasileira de Pneumologia e Tisiologia. Controle da tuberculose: uma proposta de integração ensino-serviço. 5ª ed. Rio de Janeiro: FUNASA/CRPHF/SBPT; 2002.

7. Scatena LM, Villa TCS, Ruffino Netto A, Kritski AL, De Figueiredo TMRM, Vendramini SHF, et al. Dificuldades de acesso a serviços de saúde para diagnóstico de tuberculose em municípios do Brasil. Rev Saude Publica 2009; 43(3): 389-97.

8. Selig L, Belo M, Da Cunha AJLA, Teixeira EG, Brito R, Luna AL, et al. Óbitos atribuídos à tuberculose no Estado do Rio de Janeiro. J Bras Pneumol 2004; 30(4): 335-42.

9. Do Prado TN, Caus AL, Marques M, Maciel EL, Golub JE, Miranda AE. Perfil epidemiológico de pacientes adultos com tuberculose e AIDS no estado do Espírito Santo, Brasil: relacionamento dos bancos de dados de tuberculose e AIDS. J Bras Pneumol 2011; 37(1): 93-9.

10. Brasil. Ministério da Saúde. Secretaria de Vigilância em Saúde. Programa Nacional de Controle da Tuberculose. Brasília; 2010.

11. Brasil. Ministério da Saúde. DATASUS. Disponível em http://www2.datasus.gov.br/DATASUS/index.php (Acessado em 18 de julho de 2011).

12. Coelho DMM, Viana RL, Madeira CA, Ferreira LOC, Campelo V. Perfil epidemiológico da tuberculose no Município de Teresina-PI, no período de 1999 a 2005. Epidemiol Serv Saúde 2010; 19(1): 33-42.

13. Paixão LMM, Gontijo ED. Perfil de casos de tuberculose notificados e fatores associados ao abandono, Belo Horizonte, MG. Rev Saude Publica 2007; 41(2): 205-13.

14. IBGE (Instituto Brasileiro de Geografia e Estatística). Disponível em http://www.ibge.gov.br/home/mapa_site/mapa_site.php#populacao (Acessado em 18 de julho de 2011).

15. Prefeitura de Belo Horizonte. Secretaria Municipal de Saúde. Disponível em http://portalpbh.pbh.gov.br/pbh/ecp/comunidade.do?app=saude (Acessado em 18 de julho de 2011).

16. Ferreira SMB, Da Silva AMC, Botelho C. Abandono do tratamento da tuberculose pulmonar em Cuiabá - MT – Brasil. J Bras Pneumol 2005; 31(5): 427-35.

17. Pinheiro RS, Viacava F, Travassos C, Brito AS. Gênero, morbidade, acesso e utilização de serviços de saúde no Brasil. Cienc Saude Colet 2002; 7(4): 687-707.

18. Chaimowicz F. Age transition of tuberculosis incidence and mortality in Brazil. Rev Saúde Pública 2001; 35(1): 81-7.

19. Venturi I, Rosado LEFP, Cotta RMM, Rosado GP, Doimo LA, Tinoco ALA, et al. Identificação da área de influência do serviço de atenção básica do sistema público de saúde à população idosa, município de Viçosa-MG. Cienc Saude Coletiva 2008; 13(4): 1293-304.

20. Melo VO, Soares DA, Andrade SM. Avaliação do Programa de Controle da Tuberculose em Londrina, PR, Brasil, 1996. Informe Epidemiologico do SUS 1999; 8(4): 53-62.

21. Mendes AM, Fensterseifer LM. Tuberculose: porque os pacientes abandonam o tratamento? Bol Pneumol Sanit 2004; 12(1): 25-36.

22. Nunn P, Williams B, Floyd K, Dye C, Elzinga G, Raviglione M. Tuberculosis Control in the era of HIV. Nat Rev Immunol 2005; 5(10): 819-26.

23. Gonçalves H, Da Costa JSD, Menezes AMB, Knauth D, Leal OF. Adesão à terapêutica da tuberculose em Pelotas, Rio Grande do Sul: na perspectiva do paciente. Cad Saude Publica 1999; 15(4): 777-87.

24. Chirico MC. El subsidio económico al enfermo con tuberculosis incrementa la tasa de curación. Salud(i) Ciencia 2010; 17(8): 798-801.

25. Prefeitura de Belo Horizonte. Plano Municipal de Saúde de Belo Horizonte 2005-2008. Disponível em http://www.enf.ufmg.br/internatorural/textos/Manuais/planomunicipaldesaude20052008.pdf (Acessado em 18 de julho de 2011).

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