POVERTY: SOCIOECONOMIC CHARACTERIZATION AT TUBERCULOSIS

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This study aimed to evaluate the epidemiological status of Tuberculosis regarding to the socioeconomic characteristics of São José do Rio Preto between 1998 and 2004. Indexes estimated for 432 urban census tracts from the demographic census of 2000, sorted systematically according to the values of socioeconomic factors and grouped into quartiles were taken into account. The socioeconomic characterization was outlined based on Schooling, Income, and Number of Residents. The incidence rates were considered for 1998, 1999, 2003, and 2004. The socioeconomic factor accounted for 87% of the total variation. The disease prevalence is higher in the poorest areas. The incidence rate and the risk of being infected by TB in the poorest areas declined in 2003 and 2004. The results confirm that TB is determined by the population's living conditions in the city studied. It strengthens the relevance of understanding the TB conditional social factors to transform the worrisome scenario in which this population is inserted.

DESCRIPTORS: poverty; tuberculosis; social conditions

POBREZA: CARACTERIZACIÓN SOCIOECONÓMICA DE LA TUBERCULOSIS

El objetivo fue analizar la situación epidemiológica de la Tuberculosis en relación a las características socioeconómicas de São José do Rio Preto entre 1998 e 2004. Fueron considerados indicadores estimados para 432 sectores censales del área urbana, año censal 2000, ordenados según valores del factor socioeconómico, agrupados en quartiles. Caracterización socioeconómica delineada por la Escolaridad, Renta y Número de personas. Coeficientes de incidencia fueron calculados para 1998, 1999, 2003 y 2004. El factor socioeconómico fue responsable por el 87% de la variación total. La enfermedad incide con más fuerza en las áreas más pobres. En 2003 y 2004, disminuyó la incidencia y el riesgo de enfermar por Tuberculosis en las áreas más pobres. Resultados confirman la determinación de la Tuberculosis, en el municipio, por las condiciones de vida de la población, fortaleciendo la importancia de la comprensión de los condicionantes sociales de la TB para transformar el escenario preocupante en que está insertada.

DESCRIPTORES: pobreza; tuberculosis; condiciones sociales

POBREZA: CARACTERIZAÇÃO SOCIOECONÔMICA DA TUBERCULOSE

O objetivo foi analisar a situação epidemiológica da tuberculose (TB) em relação às características socioeconômicas de São José do Rio Preto, SP, entre 1998 e 2004. Considerou-se indicadores estimados para 432 setores censitários da área urbana, ano censitário 2000, ordenados segundo valores do fator socioeconômico e agrupados em quartis. A caracterização socioeconômica foi delineada com base em escolaridade, renda e número de moradores. Os coeficientes de incidência foram calculados para 1998, 1999, 2003 e 2004. O fator socioeconômico foi responsável por 87% da variação total. A doença incide com mais força nas áreas mais pobres. Em 2003 e 2004 diminuíram a taxa de incidência e o risco de adoecer por tuberculose nas áreas mais pobres. Os resultados confirmam a determinação da tuberculose, no município estudado, pelas condições de vida da população, fortalecendo a importância da compreensão dos condicionantes sociais da TB para transformar o cenário preocupante em que está inserida.

DESCRITORES: pobreza; tuberculose; condições sociais

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Rev Latino-am Enfermagem 2007 setembro-outubro; 15(número especial):762-7
www.eerp.usp.br/rlae

Poverty: socioeconomic characterization...
Santos MLSG, Vendramini SHF, Gazetta CE, Oliveira SAC, Villa TCS.

763

INTRODUCTION

*T*uberculosis (TB), supposedly a disease of the past, is found to be in continuous expansion all over the world, bringing concerns to health authorities, scientific communities and civil society. In spite of advances and incentives like the DOTS strategy and efficient, affordable drug therapy, TB poses as an unbearable burden of suffering and a large obstacle for socioeconomic development all over the world. The global incidence of the disease increases 1% every year, with 9 million new cases and 2 million deaths being registered annually in the world[1-2], which represents an incidence of 136 cases per 100,000 inhabitants.

Several authors have attributed the quick propagation of TB to poverty and low socioeconomic development. Although the overall health of people has improved in recent decades, it is easy to see that this situation is a privilege of groups with better income. Poorer, socially disadvantaged and marginalized populations are disproportionately and dramatically struck by diseases, among them TB, which has terrifyingly entrenched itself into disadvantaged countries.

TB and poverty are part of a bidirectional relation, for either poverty may be related to poor health conditions or these poor conditions may induce poverty, reducing opportunities of work and subsistence, thus forming a vicious circle that only tends to worsen. The severity and negative impact of the disease varies at an inverse rate to the HDI (Human Development Index), and its non-uniform distribution is influenced by factors like territorial extension, disordered population growth and the concentration of people in the poorer areas of the cities, which have been dragging along for years. The relationship between poverty and TB is well-documented regarding risks related to indicators of socioeconomic status, such as overcrowding, poverty and unemployment, but no effective solution has been found, although many investments are being made. However, such measures focus on treatment instead of prevention. Prevention is not inexistent -there are actions for prevention and control, strategies like DOTS that are innovative and effective, but political involvement and funding is unsatisfactory in this matter[2-3].

The fact that Brazil holds the 16th place in a list of 22 countries with the highest incidence of TB is a reflex of the distressing socioeconomic situation, poverty and inability of the government to act, due to ineffective governmental involvement, insufficient governmental commitment and inconsistent application of the programs to control the disease in the country. This situation of poverty and suffering has been a source of concern for international, governmental and non-governmental organizations devoted to development and cooperation. In response to the appeal of the World Health Assembly in May/2000, the Global Partnership to Stop TB was formed, made up by a network of over 400 organizations, countries and representatives from the public and private sector.

This Partnership resulted in the Global Plan to stop TB, promoted and coordinated by the World Health Organization (WHO) and supported by the World Bank, having the elimination of TB as one of the objectives to reduce poverty all over the world.

The first World Plan (2001-2005) brought advances in terms of new allies, research incentives and more impact on the places most affected by the epidemic. The amount of patients treated by the DOTS strategy rose to 2 million in 2004 and to 4 million in 2005.

The goals of the 2nd Global Plan against TB for 2015 aim to meet the Millennium Development Goals[6], as it proposes strategic action to reduce the burden of TB in the world, decreasing the incidence of the disease and halving its prevalence and mortality when compared to the rates of 1990[1].

Ecological studies, although based on the analysis of population census or postal codes, have found wide-ranging differences, so as to make a causal relation plausible by associating poverty to the incidence of TB. As mentioned before, poverty represents a facilitating aspect for the production of TB. Housing situations that are overcrowded due to lower socioeconomic conditions tend to lead to an increased transmission of the bacillus, resulting in a higher prevalence of TB infection and a consequent increase in the incidence of TB. Limited access to health services, in itself another reflex of poverty, may interfere in the incidence of the disease, which may be worsened due to delays in diagnosis and treatment, protracting the patients' period of contagiousness and increasing the risk of infection among their peers.

Poverty: socioeconomic characterization…
Santos MLSG, Vendramini SHF, Gazetta CE, Oliveira SAC, Villa TCS.

Rev Latino-am Enfermagem 2007 setembro-outubro; 15(número especial):762-7
www.eerp.usp.br/rlae

764

Difficulties found all over the world, particularly in disadvantaged countries, have poverty as a determining or worsening factor when it comes to falling ill to TB.

The present study aims to urge reflection on the necessity for a new outlook of TB, considering the impact of the socioeconomic conditions on the worsening of the epidemiologic situation of the disease. The magnitude of the problem causes grief and death, in spite of the availability of control strategies, by showing an alarming scenario, even though there is a presence of institutions responsible for the schooling of human resources in health sciences, and also the need for more investment in clinical, epidemiologic and operational research in a TB context.

METHODOLOGY

This is an exploratory-descriptive, epidemiologic study, performed in the city of São José do Rio Preto, in the state of São Paulo, Brazil -an urban area with 400 thousand inhabitants. Rated as one of the cities with higher quality of life, it shows a Human Development Index (HDI) of 0.834; life expectancy at birth of 71.5 years; Gross Domestic Product (GDP) at around US$ 2.3 million. The city features specific problems, particularly in its peripheral area, due to extreme poverty in 4% of its population. It is considered a priority by the Emergency TB Control Plan because of a high rate of TB/HIV co-infection[7-8].

The study population was delimited as all new cases geo-referenced for the 432 census tract levels of the urban area of São José do Rio Preto. Information from the TB Notification System (EPITB), the State System for Data Analysis Foundation (SEADE)[9] and the Information Department of the Brazilian Health Ministry (DATASUS)[10] was also used in the study.

The socioeconomic indicators for each of the 432 census tract levels were estimated based on the census year 2000. The socioeconomic characterization of the population in these census tract levels was outlined on the basis of the demographic census, in addition to the censual sector's level, based on the following variables: Average years of schooling of people responsible for each household; Average years of schooling of the women responsible for each household; Average income (in Reais) of people responsible for each household; Average income (in Reais) of the women responsible for each household; Rate of illiterate people over 5 years of age; Rate of illiterate women over 5 years of age; Rate of households with more than 5 inhabitants.

The 432 census tract levels were arranged according to the value of their socioeconomic factors, and arranged in four quarters. The group of census tract levels defined as the first quarter was rated as a socioeconomic level I (lowest); the second and third quarters were rated as socioeconomic levels II and III (intermediate); and the fourth quarter was rated as socioeconomic level IV (highest).

The new cases of TB were entered into a Microsoft Excel database, so that the coefficients of TB incidence (new cases of the disease per every 100,000 inhabitants) could be calculated for the periods of 1998/1999 and 2003/2004, according to the areas under analysis for the total population of São José do Rio Preto in 2003.

The socioeconomic variables were analyzed in STATA software according to the Principal Component Analysis statistical technique, which produces non-correlative factors and represents important aspects characterized by the correlation between variables[11].

RESULTS

The socioeconomic factor, identified in the Principal Component Analysis, was responsible for 87% of the total variation, and it corresponds to a score that was calculated for each of the census tract levels using the following formula: 0.97 × (average years of schooling of people responsible for each household) + 0.94 × (average years of schooling of the women responsible for each household) + 0.85 × (average income of people responsible for each household) + 0.85 × (average income of the women responsible for each household) + (-) 0.89 × (rate of illiterate people) + (-) 0.89 × (rate of illiterate women) + 0.56 × (rate of households with more than 5 inhabitants). Table 1 shows the characteristics of each of the four groupings of census tract levels obtained from the socioeconomic factor.

Rev Latino-am Enfermagem 2007 setembro-outubro; 15(número especial):762-7
www.eerp.usp.br/rlae

Poverty: socioeconomic characterization...
Santos MLSG, Vendramini SHF, Gazetta CE, Oliveira SAC, Villa TCS.

765

Table 1 - Socioeconomic characteristics of the four censual sector groupings, São José do Rio Preto, 2000

Variable	Groupings of census tract levels			
	I	II	III	IV
Average years of schooling of people responsible for each household	5.3	6.5	7.9	10.8
Average years of schooling of the women responsible for each household	4.6	5.8	7.2	10.0
Average income (in Reais*) of people responsible for each household	465.20	690.03	1046.9	2401.42
Average income (in Reais*) of women responsible for each household	298.50	453.60	687.20	1510.40
Rate of illiterate people over 5 years of age (%)	11.3	8.1	5.8	3.2
Rate of illiterate women over 5 years of age (%)	12.4	9.2	6.6	3.6
Rate of households with more than 5 inhabitants (%)	23.5	17.2	15.5	13.7

* As of September/2000

The values for the coefficient of TB influence obtained according to the socioeconomic levels for the periods of 1998/1999 and 2003/2004 are presented in Table 2:

Table 2 - New TB cases for every 100,000 inhabitants, according to the socioeconomic level and year of occurrence

Socioeconomic level	Year	
	1998/1999	2003/2004
I	51.7	37.7
II	36.2	31.1
III	30.1	30.0
IV	25.5	22.4

According to Table 2, improvements in the incidence indicators can be identified when the periods of 1998/1999 and 2003/2004 are compared regarding socioeconomic level, with the decreased incidence at the worst level (Level I) being most expressive. It could also be verified that, from 1998 to 1999, the risk of falling ill due to TB was twice as high in the areas with the worst socioeconomic levels. From 2003 to 2004, there was an improvement in the incidence indicators and a decreased difference in the risk of falling ill among the areas with the worst socioeconomic levels. No significant differences were identified in the risk of falling ill due to TB among the groupings that correspond to levels II, III and IV, in both periods.

DISCUSSION

Assuming that the health situation of people infected by TB has poverty as its determining factor, this study presents a few topics for discussion, considering the obtained results.

By looking at the socioeconomic variables identified in the principal component analysis in this study, factors such as years of schooling/illiteracy, income of the people responsible for each household and amount of inhabitants per household became evident. This fact has been mentioned by other researchers who claim that the most important indicators to determine the socioeconomic level associated to population health include level of instruction, income and occupation[12], although the latter was not significant in the present study.

The evidence of social stratification is a common factor among these variables. The individuals fill niches in the social hierarchy according to their occupation, income and level of education, and each of these indicators covers a different aspect of social stratification. The *level of education* shows the differences among people in terms of access to information and the possibility and perspectives of benefiting from new knowledge; *Income*, at first, represents access to consumer goods, including health services; and *occupational status* comprises both aspects, along with benefits received from some occupations, such as prestige, privileges and power.

In Brazil, the influence of education on health conditions was made evident through the results of the Research about Standards of Living (PPV), performed in 1996/1997 by the Brazilian Institute for Geography and Statistics (IBGE). By analyzing the importance of the socioeconomic variables, regarding the health status of individuals over twenty years of age, such as years of schooling, occupation and monthly income, it can be attested that the variable "years of schooling" was second in relevance only to "age"[13].

Such fact can be clearly analyzed in the socioeconomic map of the city (Figure 1), where the disease affects the poorer groups more strongly, and, as more investment in public policies was directed to the social issues of the city, there has also been a less-widespread distribution of the incidence of TB between levels IV and I. These results are in concordance with other studies that discuss the influence of social inequalities on health results.

Poverty: socioeconomic characterization...
Santos MLSG, Vendramini SHF, Gazetta CE, Oliveira SAC, Villa TCS.

Rev Latino-am Enfermagem 2007 setembro-outubro; 15(número especial):762-7
www.eerp.usp.br/rlae

766

Cases of tuberculosis per 100.000 inhabitants/year

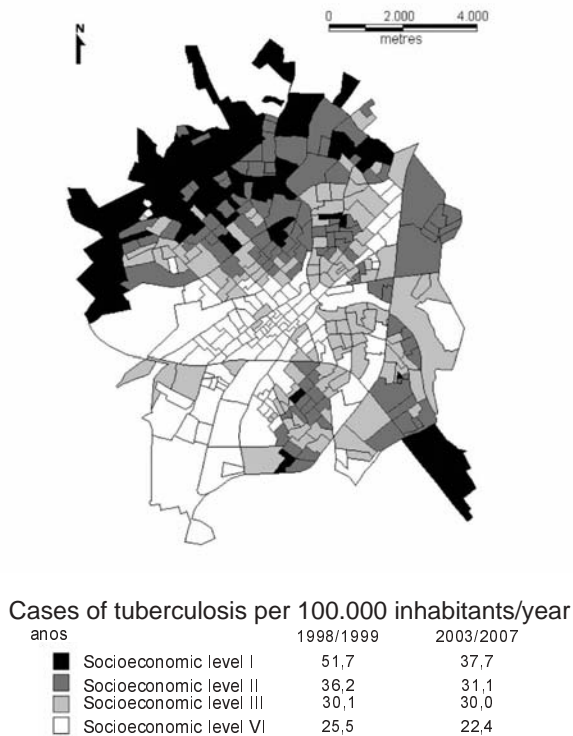| anos	1998/1999	2003/2007
■ Socioeconomic level I	51,7	37,7
■ Socioeconomic level II	36,2	31,1
▨ Socioeconomic level III	30,1	30,0
□ Socioeconomic level VI	25,5	22,4

Figure 1 - Map of São José do Rio Preto, according to socioeconomic areas and TB incidence coefficient, 1998/1999 and 2003/2004.

The assessment and planning of PCT actions require a model of analysis of collective risk situations to replace the model of individual risks, by using the land/territory as a reference. This view brings to light the inequalities that exist within the cities, making the planning of interventions and selective monitoring possible, according to the real needs of smaller areas. It also allows the redirecting of public policies, aiming for a better adequacy of public investment in areas that lack urban infrastructure, by means of offering better public services and the implementation of specific social programs[8]. With the results obtained, the proposed reflections aim to widen the approach of studies about TB, by incorporating epidemiologic indicators, and other instruments like geo-processing, which will allow the understanding of the dynamics of the disease by considering the component of social inequality.

Even though the city under study shows indicators that indicate good standards of living, there is a twice-higher incidence of TB among the population with the worst levels of socioeconomic development, which confirms the proposed reflection on the burden of TB for the understanding of social conditioners of the TB health-disease process.

The analysis of the living conditions of the population points to the fact that the risk of falling ill to TB is twice as high in the areas with the worst socioeconomic levels, compared to those of better levels. From 2003 to 2004, an improvement can be observed in the incidence indicators and a decreased difference in the risk of falling ill in the areas with the worst socioeconomic levels when compared to the area with better levels. It must be noted, however, that there have been investment in the change of the city's public policies in this period, directed to social issues.

CONCLUSION

In the city of São José do Rio Preto, the distribution of the population across the urban space follows practically the same inequality patterns of large centers, with groups with fewer privileges (regarding income and health conditions) living on the outskirts of the city.

The findings of this study confirm the previously-stated hypothesis, where the pattern of TB morbidity in the population of São José do Rio Preto is influenced by its living conditions.

By considering the magnitude of TB as a socially-produced disease, along with its negative impact on collective health, there is an evident need for a greater involvement of health professionals and the scientific community, regarding the implementation of operational action and relevant investigation to understand the social conditioners of the TB health-disease process and, consequently, to change the distressing scenario it is inserted in. Hopefully, this study has provided such understanding and the information obtained herein may prove useful to the task of outlining successful strategies of actions for TB control, thus ensuring the establishment of cooperation between the academy and health services.

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Rev Latino-am Enfermagem 2007 setembro-outubro; 15(número especial):762-7
www.eerp.usp.br/rlae

Poverty: socioeconomic characterization...
Santos MLSG, Vendramini SHF, Gazetta CE, Oliveira SAC, Villa TCS.

767

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