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RESEARCH

INDICATORS OF LEPROSY IN THE STATE OF MINAS GERAIS AND ITS RELATIONSHIP WITH THE MUNICIPAL HUMAN DEVELOPMENT INDEX AND THE COVERAGE OF THE FAMILY HEALTH STRATEGY

INDICADORES DA HANSENÍASE NO ESTADO DE MINAS GERAIS E SUA RELAÇÃO COM O ÍNDICE DE DESENVOLVIMENTO HUMANO MUNICIPAL E A COBERTURA DA ESTRATÉGIA DA SAÚDE DA FAMÍLIA

INDICADORES DE LEPRA EN EL ESTADO DE MINAS GERAIS Y SU RELACIÓN CON EL ÍNDICE DE DESARROLLO HUMANO MUNICIPAL Y LA COBERTURA DE LA ESTRATEGIA SALUD DE LA FAMILIA

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ABSTRACT

The objective of this study was to analyze the relationship between the epidemiological indicators of leprosy, the coverage of the Family Health Strategy (ESF) and the Municipal Human Development Index (IDHM) in Minas Gerais – Brasil, from 1998 to 2013. It is an ecological study. The way to measure living conditions was through the IDHM. Two analysis were carried out: one considering the average of each indicator in the period from 1998 to 2005, and another from 2006 to 2013. A descriptive analysis was made of the epidemiological situation of leprosy, the coverage of the ESF and the IDHM in Minas Gerais. Next, a relationship was established between the general detection rates, in children under 15 years old and with degree 2 of disability; with the coverage of the ESF and the IDHM, using Poisson tests with zero inflation and Deviance. The analysis was performed in the statistical program SPSS version 19.0 and Stata version 10.0. The results suggest a reduction of the endemic disease in the state, identified by the decrease in the disease indicators. Increased ESF coverage has contributed to the increased detection of cases of the disease, reduction of cases in children under 15 years old and grade 2 disability. The increase in the IDHM has contributed to the reduction of cases of the disease and disability of grade 2. Despite policies to improve access to health services and the living conditions of the population, we observe the persistence of hyperendemic municipalities in the state.

Keywords: Leprosy; Health Inequalities; Primary Health Care.

RESUMO

O objetivo deste estudo foi analisar a relação entre os indicadores epidemiológicos da hanseníase, a cobertura da Estratégia da Saúde da Família (ESF) e o Índice de Desenvolvimento Humano Municipal (IDHM) em Minas Gerais – Brasil, no período de 1998 a 2013. Trata-se de um estudo ecológico. A forma de mensurar as condições de vida foi a partir do IDHM. Foram realizadas duas análises: uma considerando a média de cada indicador no período de 1998 a 2005, e outra de 2006 a 2013. Foi feita análise descritiva da situação epidemiológica da hanseníase, da cobertura da ESF e do IDHM em Minas Gerais. Em seguida, foi estabelecida uma relação geral entre as taxas de detecções, em menores de 15 anos e com grau 2 de incapacidade e a cobertura da ESF e o IDHM, utilizando os testes de Poisson com inflação de zeros e de Deviance. As análises foram realizadas no programa estatístico SPSS versão 19.0 e Stata versão 10.0. Os resultados sugerem redução da endemia no estado, identificado pela queda dos indicadores da doença. O aumento da cobertura da ESF contribuiu para o aumento da detecção de casos da doença, redução de casos em menores de 15 anos e com grau 2 de incapacidade. Além disso, o aumento do IDHM contribuiu para a redução de casos da doença e de incapacidade grau 2. Apesar das políticas de melhoria do acesso aos serviços de saúde e das condições de vida da população, observa-se a persistência de municípios hiperendêmicos no estado.

Palavras-chave: *Hanseníase; Desigualdades em Saúde; Atenção Primária à Saúde.*

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RESUMEN

El objetivo de este estudio fue analizar la relación entre los indicadores epidemiológicos de lepra, la cobertura de la Estrategia Salud de la Familia (ESF) y el Índice de Desarrollo Humano Municipal (IDHM) en Minas Gerais – Brasil, de 1998 a 2013. Se trata de un estudio ecológico. Las condiciones de vida se midieron a través del IDHM. Se realizaron dos análisis: uno basado en el promedio de cada indicador entre 1998 y 2005 y otro entre 2006 y 2013. Se realizó el análisis descriptivo de la situación epidemiológica de lepra, de la cobertura de la ESF y del IDHM de Minas Gerais. A continuación, se estableció una relación entre las tasas de detecciones en menores de 15 años y con discapacidad grado 2 y la cobertura de la ESF y el IDHM utilizando las pruebas de Poisson con inflación de ceros y de deviance. Los análisis se realizaron en el programa estadístico SPSS versión 19.0 y Stata versión 10.0. La caída de los indicadores de enfermedad en los resultados señala que reducción de la enfermedad endémica en Minas Gerais. El aumento de la cobertura de la ESF contribuyó al aumento de detección de casos y a la reducción de casos en niños menores de 15 años y discapacidad grado 2. Además, el aumento del IDHM contribuyó a la reducción de casos de la enfermedad y de discapacidad grado 2. Se observa que, a pesar de las políticas de mejora en el acceso a los servicios de salud y en las condiciones de vida de la población, aún persisten municipios hiperendémicos en el estado.

***Palabras clave**: Lepra; Las Desigualdades en la Salud; Atención Primaria de la Salud.*

INTRODUCTION

In the last three decades, leprosy control has improved due to the availability of free and effective chemotherapy as a multi-drug therapy (MDT), good strategies, strong collaboration with important partners and political commitment in countries where leprosy is endemic.[1]

According to a result of epidemiological indicators of leprosy, Brazil recorded 26,395 new cases of the disease in 2015, representing 13% of the total new cases in the world, of which 1,942 were cases in children. In the same year, the country was behind only India, with 127,326 new cases (60% of the global total); Indonesia was third, recording 17,202 new cases of the disease (8% of the global total).[2]

Minas Gerais is an area historically endemic to the disease, of the 26 clusters identified in Brazil, approximately 72 municipalities in the state belonged to cluster six in the period 2007-2009, representing a high detection rate, with a relative risk of 5,193.[3] New study carried out from 2011 to 2013, showed a decrease in relative risk in the state, ranging from 1.5 to 2.8, a value considered low compared to the new 10 clusters identified in this period in the country, in which the risk ranged from three to eight.[4]

Social inequity, poverty, and poor living conditions are factors directly interfering with the detection coefficient of leprosy,[5] reinforcing the fact that socioeconomic and environmental indicators are important predictors of the disease.[6,7]

One way of measuring the living conditions of a population, in the social and economic sphere, is based on the Human Development Index (HDI). The HDI brings together three of the most important requirements in an individual's life, which allow for the freedom and empowerment of people: the opportunity to have a long and healthy life (health), access to knowledge (education) and the life (income). The index ranges from zero to one where the closer to one, the greater the human development of that population.[8]

There is also a direct association between the risk of occurrence of leprosy or disability related to the disease and the indicator of social vulnerability or income variable and low education.[5-7]

The decentralization of the health system with the implementation of the ESF was a determining factor for the integration of leprosy control actions (LCA) in basic care. Also, it facilitated the access of these patients to the necessary care and free medications and contributed to scientific advances in the area.[9]

In some regions of India, the health system is also organized in a decentralized manner, with a surveillance system to monitor the performance of primary health care (PHC) in the National Leprosy Eradication Program, with satisfactory results in reducing the prevalence of leprosy.[10]

The decentralization of leprosy control actions to the ESF units responds to the demands of policies to improve access, resolving and overcoming inequalities that affect the health status of the population. However, it is observed that leprosy still remains a public health problem and occurs in a heterogeneous way in the states of Brazil and between municipalities of the same state.

Thus, it is important to evaluate the reflexes of the decentralization of health actions and the impact of the living conditions of the population, as measured by the HDI, in the results of actions to control leprosy.

MATERIAL AND METHOD

This is a territorially based ecological study that tests the association between leprosy indicators, ESF coverage and the HDI in the municipalities of Minas Gerais from 1998 to 2013. A relatively long period in which operational variations that may be found will be diluted, providing conditions for more approximation of the reality of the endemic.

The study was carried out using data from 853 municipalities in the state of Minas Gerais. The average per capita income of the state is R$ 733, with an HDI for the state of 0.731, according to the 2010 census by the Brazilian Institute of Geography and Statistics (IBGE), with a great disparity between its regions in economic and social development. The North and Northeast regions concentrate most of the municipalities with low HDI (up to 0.499), while in the South, Triângulo and Alto Paranaíba regions the situation is opposite, with high values (above 0.699).[11] The choice of scenario was justified by to treat a state with an epidemiological history of high endemicity for leprosy.

The selection of the epidemiological indicators was based on those recommended by the "Guidelines for Surveillance, Care and Elimination of Leprosy as a Public Health Problem", approved by Ministerial Order N° 149 of February 3, 2016, as they are considered important in directing the development of strategies and plans of action and fundamental in the analysis of the evolution of the endemic disease.[12]

The selected indicators were: annual detection coefficient of new leprosy cases per 100,000 inhabitants (used to measure the strength of morbidity, magnitude, and disease trend); annual detection coefficient of new cases of leprosy in children under 15 years per 100,000 inhabitants (used to measure the strength of the recent transmission and endemic tendency); and coefficient of detection of new cases of leprosy with grade 2 physical disability at diagnosis per 100,000 inhabitants (an important indicator of early detection).[12]

Population data were obtained from the demographic census for 2000 and 2010 of IBGE. The projections for the years in which the census did not occur were calculated by the IBGE and obtained through the page of the Department of Information Technology of SUS (DATASUS).

The following independent variables were used to achieve the proposed objectives: the proportion of the ESF coverage and the Municipal Human Development Index (IDHM).

Estimates of the proportion of the population covered by the ESF were calculated by reference to December of each year (1998 to 2013) and considering the criterion of one family health team (FHT) for each 3,450 people (standard calculation adopted by the Department of Basic Attention of the Ministry of Health – DAB/MS). Thus, the number of ESF teams multiplied by 3,450 inhabitants was used in the numerator, and the number of residents in the municipality was used in the denominator.[13] Data related to the number of ESF team originated from the Basic Care Information System (SIAB) and obtained by DAB/MS.

The Municipal Human Development Index (IDHM) adjusts the HDI for the reality of municipalities and reflects regional peculiarities and challenges in achieving human development in Brazil, following the same three dimensions of the Global HDI (longevity, education, and income). Although they measure the same phenomena, the indicators considered in the IDHM are adequate to evaluate the development of the Brazilian municipalities. The index ranges from zero to 1. The closer to one, the greater the human development of that population, following the same classification of HDI.[8]

The data of the IDHM were obtained from the Atlas of Human Development in Brazil, whose information originates from the IBGE demographic census for 2001 and 2010.[8]

Two analyzes were carried out: one was considering the average of each indicator or rate between 1998 and 2005 and another one was considering the average between 2006 and 2013. The only indicator that did not present values for each year was the IDHM. In this case, the data of the IDHM for 2000 and 2010 were analyzed, the years in which the IBGE censuses took place, using them, respectively, in the analysis of the first and second periods.

In the univariate analysis, simple Poisson models were constructed, with zeros inflation. As the study response variable (general detection coefficient, detection coefficient under 15 years old and coefficient of degree 2 of disability) represents a count in a given interval, the regression model indicated for the analysis was the Poisson model.

In the multivariate analysis, multiple Poisson models with zero inflation were constructed. A significance level of 5% was considered for the permanence of the explanatory variable in the final model.

Possible interactions between the explanatory variables were tested. The Deviance test was used to evaluate the fit of the final models. Models with a p-value greater than 0.05 were considered as a good fit. The analyses were performed in the statistical program SPSS version 19.0 and Stata version 10.0.

The Ethics in Research Committee (COEP) of the Federal University of Minas Gerais (UFMG) approved the study according to CAAE Opinion 24899313.7.0000.5149, dated December 11, 2013. The study complied with Resolution 466 N° 466, on December 12, 2012, that approves guidelines and regulatory norms for research involving human beings.

RESULTS

From 1998 to 2013, there were 39,339 new cases of leprosy recorded in the state of Minas Gerais, resulting in a general average detection of 13.18 cases per 100,000 inhabitants. Although this figure is considered high (10 to 19.99/100 thousand inhabitants), according to the parameters established by the Ministry of Health, there was a tendency to fall during the period, unlike what happened with the ESF coverage in the state, with growth of 400.06% from 1998 to 2013 (Figure 1).[12]

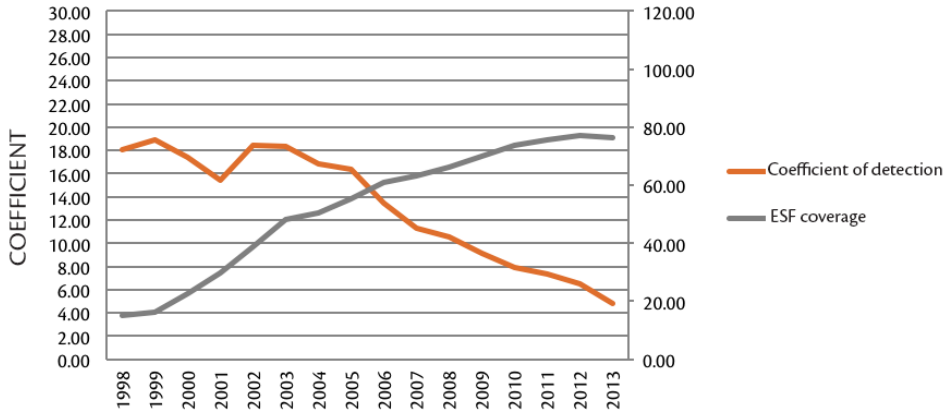

Figure 1 - ESF coverage and coefficient of detection of leprosy in Minas Gerais – 1998 A 2013.

As well as the improvement of the coverage, it was also observed an improvement in the living conditions of the population represented by the increase of the IDHM, whose average went from 0.548 in 2000 to 0.668 in 2010 (Table 1).

Between 1998 and 2005, the general detection rate of leprosy had an average of 16.9 cases per 100,000 inhabitants, with a decrease in the second period, to 9.9 per 100,000 inhabitants. Meanwhile, the average of ESF coverage increased from 50.3% from 1998 to 2005 to 101.7% from 2006 to 2013 (Table 1).

When analyzing the data of the coefficient of detection in children under 15 years old, the state classified it as high endemic (2.5 to 4.99 cases/100 thousand inhabitants), with an average of 2.8 cases per 100 thousand inhabitants from 1998 to 2005. In the second period, there was a reduction of the average to 1.9 cases per 100 thousand inhabitants (Table 1).

In the case of leprosy cases with grade 2 of physical disability, an average of 1.35 cases per 100,000 inhabitants was registered from 1998 to 2013, with an average of 2.1 per 100,000 inhabitants between 1998 and 2005 to 1.2 case per 100 thousand inhabitants from 2006 to 2013 (Table 1).

According to the results presented in Table 2, both the univariate and the multivariate, and in both periods, the explanatory variables (ESF and IDHM coverage) were significantly associated with the overall leprosy detection rate (CI = 95%).

For the general detection coefficient, there was a reduction in the average of 41.42% from the first to the second period, ranging from 16.9 (1998 to 2005) to 9.9 cases per 100,000 inhabitants (2006 to 2013) (Table 1).

In the multivariate analysis, the 1% growth in ESF coverage indicated an increase of 0.001 in the general detection rate of leprosy from 1998 to 2005 (Table 2). In the following period (2006 to 2013), there was the same effect of ESF coverage on the detection rate (Table 2). However, the interaction between ESF and IDHM coverage was not significant to modify the detection coefficient result in the multivariate analysis when compared to the univariate analysis.

Table 1 - Descriptive analysis of the indicators of leprosy, ESF and IDHM coverage in Minas Gerais from 1998 to 2013 (n = 853)

Variable		Mean	Standar Deviation	Minimum	Maximum	P25	Median	P75
Mean between 1998 and 2005	General Detection (/100.000)	16.9	26.4	0.0	265.7	3.7	8.2	17.9
	Detection < 15 years old (/100.000)	2.8	7.0	0.0	62.6	0.0	0.0	2.4
	Disability Grade 2 (/100.000)	2.1	3.4	0.0	28.3	0.0	1.0	2.7
	ESF Coverage (%)	50.3	35.0	0.0	349.1	24.6	48.5	69.8
IDHM 2000		0.548	0.071	0.336	0.726	0.500	0.550	0.600
Mean between 2006 and 2013	General Detection (/100.000)	9.9	16.5	0.0	176.4	1.8	4.8	11.4
	Detection < 15 years old (/100.000)	1.9	7.2	0.0	124.0	0.0	0.0	0.0
	Disability Grade 2 (/100.000)	1.2	2.5	0.0	32.9	0.0	0.0	1.6
	ESF Coverage (%)	101.7	36.6	0.0	407.2	80.7	103.7	124.4
IDHM 2010		0.668	0.050	0.529	0.813	0.633	0.670	0.702

Table 2 - Univariate and multivariate analysis: Poisson model with zeros inflation for variable response general leprosy detection rate (n=853)

Indicator		Univariate		Multivariate	
		Coefficient	IC 95%	Coefficient	CI 95%
Years 1998 to 2005	ESF Coverage	0.001	[0.001; 0.001]	0.001	[0.001; 0.001]
	IDHM 2000	-0.051	[-0.074; -0.028]	-0.047	[-0.070; -0.024]
	Interaction			–	–
Years 2006 to 2013	ESF Coverage	0.003	[0.003; 0.004]	0.001	[0.001; 0.002]
	IDHM 2010	-0.497	[-0.538; -0.455]	-0.469	[-0.513; -0.424]
	Interaction			–	–

Regarding the IDHM, in the first period (1998 to 2005) the increase of 0.1 in the value of the IDHM of the municipalities in 2000 corresponded to the decrease of 0.047 in the general detection rate. In the following period (2006 to 2013), there was a significant increase in the effect of this index, in which the increase of 0.1 in the IDHM caused a decrease of 0.469 cases of leprosy per 100,000 inhabitants (Table 2).

Considering the variable response rate of detection of leprosy in children under 15 years old, in both periods studied, the explanatory variables ESF coverage and IDHM were statistically significant in the univariate and multivariate analyses (Table 3).

It should be remembered that the reduction in detection rate in children under 15 years old was 34.14% from the first to the second period (Table 1).

In this case, the interaction between the two explanatory variables was significant in the multivariate model and there was an inversion of the effect of the ESF coverage variable, when the coefficients of the univariate and multivariate analyses were compared, that is, the increase in the ESF coverage controlled by the IDHM favored reduction of the disease in this age group (Table 3).

According to the results of the multivariate analysis, the 1% increase in ESF coverage resulted in a decrease of 0.012 in the leprosy detection rate in children under 15 years old from 1998 to 2005 (Table 3). From 2006 to 2013, the observed effect on the explanatory variable increased. The 1% increase in ESF coverage corresponded to the reduction of 0.044 in the rate in children under 15 (Table 3).

Regarding the IDHM of 2000, the increase of 0.1 in its value led to a decrease of 0.4 cases of leprosy in children under 15 years old for every 100 thousand inhabitants in the first period (1998 to 2005). In the second period (2006 to 2013), the same increase in the IDHM of 2010 generated a reduction of almost 1.2 in the rate of detection in children under 15 years old (Table 3).

In this study, a reduction of approximately 40% in the mean of the rate of coefficient of disability grade 2 from the first (1998 to 2005) for the second period (2006 to 2013) was obtained. The factors FHD coverage and IDHM were associated with this fall in the two periods analyzed (Table 4).

In the multivariate analysis, the interaction between the two factors (ESF coverage and IDHM) was also significant for the rate decline, as in the rate of children under 15 years old. From 1998 to 2005, the 1% increase in ESF coverage corresponded to a decrease of 0.016 in the disability coefficient 2. The increase of 0.1 in the IDHM was associated with a reduction of 0.459 in the disability grade 2 coefficient (Table 4).

In the second period (2006 to 2013), there was an increase in the effect of both factors. The 1% increase in ESF coverage represented a fall of 0.026 in the disability grade 2 coefficient, while the increase of 0.1 in the IDHM was equivalent to a reduction of 0.786 cases per 100,000 inhabitants (Table 4).

Table 3 - Univariate and multivariate analysis - Poisson model with zeros inflation for variable response rate of leprosy detection in children under 15 years (n=853)

Indicator		Univariate		Multivariate	
		Coefficient	CI 95%	Coefficient	CI 95%
Years 1998 to 2005	ESF Coverage	0.007	[0.006; 0.008]	-0.012	[-0.022; -0.002]
	HDI 2000	-0.280	[-0.332; -0.229]	-0.400	[-0.491; -0.309]
	Interaction			0.033	[0.015; 0.051]
Years 2006 to 2013	ESF Coverage	0.018	[0.016; 0.019]	-0.044	[-0.067; -0.021]
	HDI 2010	-0.836	[-0.921; -0.751]	-1.198	[-1.531; -0.865]
	Interaction			0.088	[0.053; 0.122]

Table 4 - Univariate and multivariate analyzes - Poisson model with zeros inflation for variable response coefficient grade 2 of disability (n=853)

Indicatores		Univariate		Multivariate	
		Coefficient	CI 95%	Coefficient	CI 95%
Years 1998 to 2005	ESF Coverage	0.007	[0.005; 0.008]	-0.016	[-0.029; -0.003]
	HDI 2000	-0.313	[-0.377; -0.250]	-0.459	[-0.578; -0.338]
	Interaction			0.041	[0.017; 0.065]
Years 2006 to 2013	ESF Coverage	0.009	[0.008; 0.011]	-0.026	[-0.049; -0.004]
	HDI 2010	-0.491	[-0.579; -0.403]	-0.786	[-1.128; -0.443]
	Interaction			0.051	[0.018; 0.084]

DISCUSSION

There is clear evidence of the impact of ESF coverage on epidemiological indicators of leprosy. When rates are part of the efforts of the teams, the number of newly detected patients increases substantially. However, in subsequent years, numbers tend to decrease. This means that the increased rate of detection of leprosy cases associated with ESF coverage does not reflect a higher incidence but increased detection of cases that would remain otherwise undiagnosed with a hidden prevalence.[13,14]

The effect of decentralization could also be observed on the detection rates in the age group of zero to 14 years old and of degree 2 of physical incapacity in the diagnosis - indicators responsible for measuring the recent transmission strength and to evaluate the deformities caused by leprosy in the general population, respectively.

The expansion of ESF increases individuals´ contact with health services and, therefore, it facilitates the access of spontaneous demand, active search, clinical evaluation and, consequently, early diagnosis. Another important aspect is that, with decentralized services, case follow-up is feasible, a factor that contributes to the prevention of disabilities.

Studies conducted in 1,358 Brazilian municipalities[15] and in Orissa, India,[10] found that greater ESF coverage contributed to the improvement of epidemiological indicators of leprosy. The impact of this variable has already been presented, even, on other outcomes, such as those related to child health[16] and to diseases preventable by immunization.[17]

In the case of leprosy, the integration of control actions in PHC was advocated by the Brazilian Ministry of Health, based on the implementation of the teams of community health agents (1991) and the Family Health Strategy (1994). However, this measure only gained prominence after 2000, reaching a peak of cases detected in 2003.[18,19]

It is well deserved to acknowledge the efforts that the MOH, through the expansion of the ESF, has gained in recent years. However, managers of the Unified Health System (SUS) still need to give due priority to leprosy, as it remains the leading cause of permanent physical disability among infectious diseases and high rates in different regions of the country.[20]

Therefore, the decentralization of the PCH to primary care favors early diagnosis and control of the disease. However, it is worth noting the importance of the maintenance of qualified professionals so such actions generate favorable results.

This means that the broad expansion of the ESF should be accompanied by qualification of the teams. Professionals need to be able to perform early diagnosis, treatment with a therapeutic regimen consistent with operational classification, evaluation and prevention of physical disabilities, contact evaluation and BCG vaccination.[21]

It is also important to highlight that, besides the issues related to the organization and structuring of the health service, the decline in the occurrence of leprosy is susceptible to the level of development of a society. In an attempt to explain the evolution of leprosy, this factor has been considered of more relevance than polychemotherapy (MDT). In favor of this hypothesis, here is the disappearance of the disease in Spain,[22] Norway[23] and its decline in Japan,[24] even before the implementation of the therapeutic scheme.

In spite of the difficulty of evaluating the multiple variables associated with the development of society, synthetic indicators have been used.[25] In this study, the MDHI - an indicator that considers the same three dimensions of the Global HDI - longevity, education, and income, but it goes beyond because it adjusts the global methodology to the Brazilian context and the availability of national indicators.[8]

The results of the study showed the adequacy of this indicator as one of the elements for planning and prioritizing actions to control leprosy, corroborating the idea that the occurrence of leprosy is not restricted to the relation of wealth indicators.

Unlike the perspective of economic growth, which sees the well-being of a society only by the resources or income it can generate, the development approach of a society seeks to look directly at people, their opportunities, and capacities. This concept is the basis of the Human Development Index (HDI), a composite indicator created by Mahbub ul Haq with the collaboration of the Indian economist Amartya Sen. First published in 1990, the HDI is now a world reference and in Brazil, it

has been used by the federal government and regional administrations through the IDHM.[8]

It is worth mentioning that the interpretation of the results alone can lead to the inference that the municipalities with the best indicators have health services that are more organized and, consequently, more efficient in diagnosing and treating leprosy cases in their areas. However, other indicators need to be analyzed before reaching this conclusion.

Among the limitations of this study, it should be emphasized that the use of secondary data can often result in inconsistencies in the estimated rates, underreporting and precarious records that influence the accuracy of the indicators that reflect the quality of care. In addition, there is instability of rates in small municipalities, that is, the increase of one case generates a more significant impact on the results of the epidemiological indicators when compared to the larger municipalities, with a larger population. However, choosing this type of source reduces operating costs and does not make analysis impossible.

CONCLUSION

The results suggest a reduction of the endemic disease in municipalities of Minas Gerais from 1998 to 2013, since there is an increase in the detection and diagnosis of new cases at an early stage, characterized by the fall in the rate of cases with grade 2 disability at diagnosis and by the reduction in the detection of the disease in children under 15 years old.

Increased access to health services, as a result of decentralization of actions, contributed to the detection of new cases of the disease, reducing hidden prevalence. On the other hand, the improvement of the living conditions of the population favored a reduction in the number of new cases of the disease.

For the detection of cases in children under 15 years old and coefficient with a degree of incapacity 2, the increase in the ESF coverage and the HDI contributes significantly to the reduction of the number of cases. The interaction between the two variables has more effect on these indicators.

Therefore, it is undeniable that the decentralization of PCH to primary care favors the early diagnosis and control of the disease. It is important to emphasize the importance of the maintenance of trained professionals in the assistance to leprosy, so these actions generate favorable results. Decentralization is an important factor for endemic control, but operational issues represent a large part of this process.

Although policies to improve access to health services and the living conditions of the population contribute to reducing the effects of iniquities and, consequently, to the magnitude of the disease, the current situation is still far below what is necessary to the effective fight of the disease.

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