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National Health Survey reveals high percentage of signs and symptoms of leprosy in Brazil

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Abstract *Leprosy is a debilitating, infectious, systemic or localized dermato-neurological disease caused by Mycobacterium lepra. In Brazil, the magnitude and high disabling power keep the disease as a public health problem. Skin spotting and numbness are pathognomonic signs and symptoms in leprosy.* The Instituto Brasileiro de Geografia e Estatística (IBGE) *2019 National Health Survey (PNS-2019) considered the following question as a proxy to estimate its magnitude in the country. "Do you have a spot with numbness or part of the skin with numbness?". In Brazil, 1,921,289 adults reported having a patch or part of the skin with numbness, with no regional differences. As for the age group, the older, the higher the prevalence, for example, between 18 to 29 years old (235,445) and 30 to 39 years old (236,485), 0.7% had the condition, between 40 to 59 years old (827,887), 1.5% and among the elderly, 1.8% (621,472). Being able to estimate, in population-based surveys, with statistical representativeness, a reported morbidity such as leprosy is essential to support the formulation of public policies, notably those related to primary health care actions. In this way, the IBGE fulfills its constitutional role of portraying the reality of the Brazilian population and today it is the main external evaluator of the Unified Health System (SUS) and of public policies developed by the federal level.*

Key words *Leprosy, Household survey, Prevalence, Brazil*

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On May 7, 2021, the IBGE released unpublished data on the 2019 National Health Survey (PNS 2019) population-based estimates of some communicable diseases reported among Brazilians. The data published by the IBGE reflect the interviews of 220,000 Brazilian adults aged 18 years and over from all Brazilian states and regions. These estimates considered a 95% confidence interval for a sample statistical significance level of 5%.

Given that "Numb patches on the skin are pathognomonic signs of leprosy", the PNS-2019 included, among the questions prepared by the Ministry of Health, considered the following question as a proxy to estimate the magnitude of leprosy in the country: "*Do you have patches with numbness or part of the skin with numbness*?". This question could lead to an information bias related to similar symptoms and signs of other diseases that go along with neuropathy, including diabetes and alcoholism. This bias should be noted since, although it was minimized since the PNS included specific questions for both conditions in other modules of the questionnaire: (i) one on chronic diseases and (ii) another on lifestyles – consumption of alcoholic beverages[1]. When people interviewed in these blocks (diabetes and alcoholism) reported numb patches, these responses were included in the leprosy estimates.

Leprosy is a debilitating, infectious, systemic, or localized dermato-neurological disease caused by *Mycobacterium leprae*[2]. In Brazil, the magnitude and high disabling power keep the disease a public health problem[3,4]. The global burden of leprosy has declined considerably[5] since the introduction of multidrug therapy (MDT) about three decades ago, with the simultaneous reduction in treatment time and prevalence. Nevertheless, it is still the cause of a high burden of morbidity, especially in greater social vulnerability areas. Leprosy is recognized as a poverty-related disease[6], with robust evidence on the socioeconomic factors associated with the risk of becoming ill[7].

In 2019, more than 200,000 new cases of leprosy were reported to the World Health Organization (WHO), with 71% in Asia, 10% in Africa, and 15% in the Americas. In 2019, Brazil diagnosed 27,863 new cases. India, Brazil, and Indonesia are the most endemic countries for this situation[6]. The Brazilian Institute of Geography and Statistics (IBGE) is the federal institution responsible for producing information on the Brazilian population. It conducts surveys regularly with a probabilistic household sample representing the 27 federative units. Its main research is the National Health Survey (PNS-2019) which recently released unpublished data[8] on some reported morbidities of communicable diseases, including suspected leprosy symptoms. In Brazil, 1,921,289 adults (1.2% CI95% [1.1%-1.3%]) reported having a patch with numbness or part of the skin with numbness in 2019, with no regional differences (Figure 1), in urban (1,645,113) and rural (276,176) areas.

Table 1 shows the selected variables that can characterize the profile studied. Men (816,338, 1.1%) and women (1,104,951, 1.3%) have similar prevalence and there are no differences in ethnicity/skin color (white 777,162, 1.1%; black 231,211, 1.3%; brown 873,946 – 1.3%). There is a statistically significant difference in the age groups: the older the age, the higher the prevalence of these symptoms. For example, in the 18-29 years (235,445) and 30-39 years (236,485) age groups, 0.7% had the condition, the 40-59 years (827,887) age group had 1.5%, and the rate was 1.8% (621,472) among older adults.

This condition is markedly present among the socially more vulnerable and less educated. In other words, 1,072,741 (1.9%) adults without schooling or with incomplete Elementary School reported symptoms. The prevalence declines with increased schooling level, reaching 417,174 (0.8%) of those with incomplete High School and Higher Education and 149,264 (0.6%) of those with Higher Education. Associated with this fact, this condition is also found in 842,779 (1.6% [CI95% 1.4%-1.8%]) adults who are outside the workforce, compared to those employed in the workforce, 953,658 (1.0%) [CI95% 0.8% - 1.1%]).

As for per capita household income, the least favored are those with a more significant presence of the health situation mentioned above: 225,774 (1.8% CI95% [1.4%-2.3%]) among those without income or with up to one-quarter of the minimum wage vs. 64,465 (0.8% CI95% [0.5%-1.2%]) for those earning more than five minimum wages per capita.

We emphasize that the research investigated the presence of symptoms potentially associated with leprosy, which cannot be interpreted as the precise magnitude of this disease in the population. We highlight the similarities between the prevalence of investigated conditions and the notification of leprosy by population groups, such as the progressive increase in detection rates with advancing age, its higher frequency in illiterates and those with incomplete elementary school,

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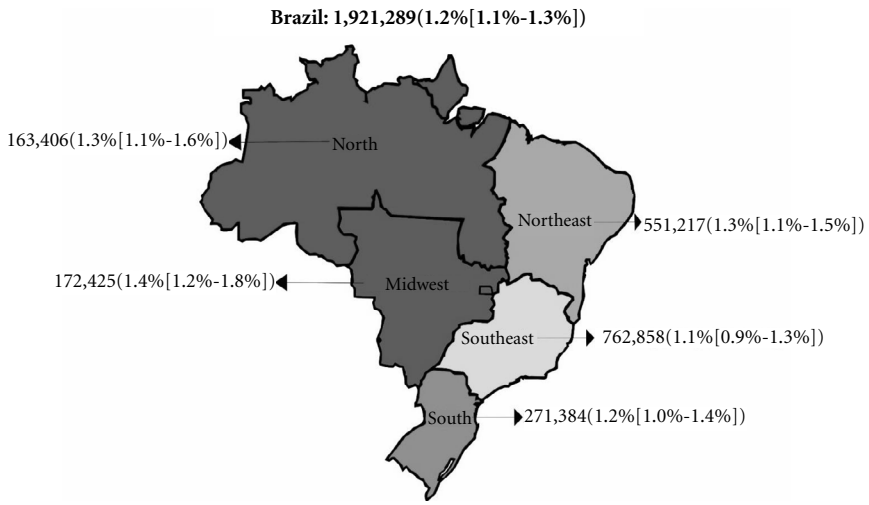

Figure 1. People aged 18 years or older who reported having a patch or part of the skin with numbness. Brazil and Major Regions, 2019.

Source: IBGE, Pesquisa Nacional de Saúde (PNS-2019).

Table 1. People aged 18 years and over reported having a patch or part of the skin with numbness according to selected characteristics. Brazil, 2019.

Selected variables	Abs. V	(%)	95% confidence interval	
			Lower limit	Upper Limit
Brazil	1,921,289	1.2	1.1	1.3
Urban	1,645,113	1.2	1.1	1.3
Rural	276,176	1.3	1.0	1.5
Sex				
Male	816,338	1.1	0.9	1.3
Female	1,104,951	1.3	1.2	1.5
Age group				
18-29 years	235,445	0.7	0.5	0.8
30-39 years	236,485	0.7	0.5	0.9
40-59 years	827,887	1.5	1.3	1.7
60 years and over	621,472	1.8	1.6	2.1
Ethnicity/skin color				
White	777,162	1.1	1.0	1.3
Black	231,211	1.3	1.0	1.6
Brown	873,946	1.3	1.1	1.4
Schooling level				
Illiterate or elementary incomplete	1,072,741	1.9	1.7	2.2
Elementary or high school incomplete	282,110	1.2	0.9	1.6
High school and incomplete higher education	417,174	0.8	0.6	0.9
Higher education	149 264	0.6	0.4	0.8
Condition of the workforce in the reference week				
In the workforce – occupied	953,658	1.0	0.8	1.1
In the workforce – unemployed	124,852	1.5	1.0	2.3
Not in the workforce	842,779	1.6	1.4	1.8
Per capita household income				
No income or up to 1/4 minimum wages	225,774	1.8	1.4	2.3
More than five minimum wages	64,465	0.8	0.5	1.2

Source: IBGE, Research Directorate, Work and Income Coordination, 2019 National Health Survey.

besides the association of the disease with low income and unemployment. On the other hand, contrary to the research data, the endemic has been registered quite differently among Brazilian regions, with much higher rates in the North and Midwest regions compared to the South and Southeast. Likewise, most reported cases occur in males (about 55%), and cases in brown individuals are 2.4 times more frequent than in whites[9].

Estimating in population-based surveys with a statistical representation a reported morbidity such as leprosy is fundamental to support the formulation of public policies, notably those related to PHC actions, which is strongly marked by the Strategy for Family Health Strategy (ESF) in Brazil. The results evidence the great challenge for these health policies to guarantee the implementation of strategies to clarify the actual incidence of leprosy among so many Brazilians who report symptoms suggestive of the disease. In this sense, the unpublished data from the IBGE in population-based research should serve as a pillar for planning actions to actively search for leprosy in specific population groups, especially by the ESF teams, which are the front-line force providing care to the Brazilian population, and they are the ones who can identify where people with leprosy are.

Thus, an almost century-old institution, the IBGE fulfills its constitutional role of portraying the reality of the Brazilian population and is today the principal external evaluator of the Unified Health System (SUS) and public policies established at the federal level.

Collaborations

All authors contributed at all stages to the writing of the article. GO Penna performed the final reading and review.

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