

Prevalence of asthma medical diagnosis among Brazilian adults: National Health Survey, 2013

Prevalência de diagnóstico médico de asma em adultos brasileiros: Pesquisa Nacional de Saúde, 2013

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ABSTRACT: *Objective:* To estimate the prevalence of asthma medical diagnosis among the adult Brazilian population (aged ≥ 18 years). *Methods:* This is a cross-sectional, population-based study from the 2013 National Health Survey (NHS); it is a sampling cluster process with three stages of selection: census tracts, households, and individuals. The prevalence and 95% confidence interval for the outcome “asthma medical diagnosis” reported by the interviewed subjects were calculated, besides its distribution according to demographic and socioeconomic variables, macroregions, and urban or rural area of the country. Management of the disease was also evaluated among those who reported asthma medical diagnosis and the analyses were weighted. *Results:* A total of 60,202 adults were interviewed. The prevalence of asthma medical diagnosis was 4.4% (95%CI 4.1 – 4.7), and it was higher among the female subjects, the white skin-colored subjects, those with higher educational level, and those who lived in the south of Brazil. Among those who reported asthma medical diagnosis, a high percentage of asthma attacks were seen in the last 12 months, with around 80% using medication and about 15% referring severe limitation to their daily activities. *Conclusions:* Although it seems there is asthma diagnosis stability in the country when compared with other researches, we still need public policies for improving the disease management.

Keywords: Asthma. Diagnosis. Prevalence. Health surveys. Chronic disease. Cross-sectional studies.

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RESUMO: *Objetivo:* Estimar a prevalência de diagnóstico médico de asma na população adulta brasileira (≥ 18 anos).

Métodos: Estudo transversal de base populacional com dados da Pesquisa Nacional de Saúde (PNS), de 2013; processo amostral por conglomerado com três estágios de seleção: setor censitário, domicílio e indivíduo. Calculou-se a prevalência e intervalo de confiança de 95% (IC95%) do desfecho “diagnóstico médico de asma” relatado pelo entrevistado e sua distribuição conforme variáveis demográficas, socioeconômicas, macrorregiões e zona urbana ou rural do país. Ainda foi investigado o manejo da asma naqueles que responderam afirmativamente sobre o diagnóstico médico; as análises foram ponderadas. *Resultados:* Foram entrevistados 60.202 adultos. A prevalência do diagnóstico médico de asma foi de 4,4% (IC95% 4,1 – 4,7), maior no sexo feminino, nos de cor branca, com maior escolaridade e moradores na região Sul; entre aqueles com diagnóstico médico, observou-se percentual elevado (38,2%) de crises de asma nos últimos 12 meses, com cerca de 80% usando medicação e 15% com limitação severa às atividades diárias. *Conclusões:* Apesar da estabilidade da prevalência da asma comparada a estudos anteriores no país, ainda são necessárias políticas para melhor manejo da doença.

Palavras-chave: Asma. Diagnóstico. Prevalência. Inquéritos epidemiológicos. Doença crônica. Estudos transversais.

INTRODUCTION

Most of the studies about asthma have been conducted in childhood and adolescence through surveys such as the International Study of Asthma and Allergies (ISAAC)¹ and the Global Initiative for Asthma (GINA)². The European Community Respiratory Research (ECRHS)³ and the World Health Survey (WHS), from 2001 to 2003^{4,5}, evaluated the asthma prevalence in adults from several countries. The WHS showed that the global prevalence of asthma self-report diagnosis was estimated to be 4.3% (95%CI 4.2 – 4.4). It also evaluated the disease load, which showed that 1 in every 2 subjects with clinical asthma (medical diagnosis and/or treatment any time in life or in the last 2 weeks) reported an attack in the last 12 months, and 1 in 5 never received any treatment in life⁵.

In Brazil, one of the WHS participating countries, the prevalence of asthma self-report diagnosis was around 12%, considering the age range of adults aged ≥ 18 years, which is higher than the global prevalence estimated by the WHS. Among the countries with mean gross national income adjusted for purchasing power parity (GNI PPP), the Brazilian prevalence was the highest, although it was lower when compared with some other countries with high GNI PPP⁶. Unlike the WHS estimative, another population-based research carried out in Brazil during three moments (1998, 2003, and 2008), the Household Sample National Survey (PNAD), including adults aged ≥ 20 years, showed a prevalence of asthma medical diagnosis in the studied years of 4.1% in 1998 and 2003 and 4.0% in 2008⁷.

This article aimed at estimating the prevalence of asthma medical diagnosis in a sample that represents the adult population of a country and the disease management.

METHODS

This investigation is a cross-sectional, population-based study. It used the data collected in the 2013 National Health Survey (NHS), conducted by the *Instituto Brasileiro de Geografia e Estatística* (IBGE), with subjects aged ≥ 18 years. The calculation of sample size considered information from the 2008 PNAD health supplement. The minimum size of the sample was 1,800 households per Federation Unit (FU), and the chosen sample was composed of 81,167 households⁸. It was a NHS cluster sampling process with three stages of selections: census tracts, households, and individuals. Only one subject aged 18 years or older of each household was chosen for the sample through a simple randomized process. Specific variables based on the probability of being chosen to be part of the sample were used. This process ensured representativeness for Brazil, macroregions, FUs, and some metropolitan regions. Detailed information about the sampling process can be seen in the NHS technical report⁸.

The questionnaire applied to the chosen residents included themes such as self-perception of health, violence and accidents, woman and child's health, elderly health, physical activity, smoking, and nontransmitted chronic diseases, among others. The entire questionnaire was applied with the use of personal digital assistants (PDA)⁸.

The main outcome from this article was asthma medical diagnosis that was evaluated using the following question: "Has any physician provided you asthma diagnosis (or asthmatic bronchitis)?" The presence of asthma crisis was also evaluated in the last 12 months (yes/no) among subjects who answered "yes" for the previous question. Moreover, in this subgroup, the use of medications for asthma (yes/no) and degree of limitation in the daily life activities owing to asthma were also analyzed and categorized as: without limitation (including "light or moderate") or very severe limitation (including "severe").

The exposure variables were: gender; age (18 – 29, 30 – 39, 40 – 49, 50 – 59, 60 – 69, 70 – 79, and ≥ 80 years); educational level (without education/incomplete elementary school, complete elementary school/incomplete high school, complete high school/incomplete higher education, and complete higher education or higher level); skin color (white, black, and mulatto); Brazilian macroregions (north, northeast, southeast, south, and midwest); and home place (urban and rural).

The analyses were conducted using Stata statistical package, version 13.1 (StatCorp, College Station, TX, US). Absolute and relative frequencies of the exposure variables and prevalence of outcomes for the total sample and exposure variables were obtained. The comparison of asthma medical diagnosis prevalence according to the exposure variables was done through the χ^2 -test, in which results with $p < 0.05$ were considered statistically significant. Owing to the complexity of the sample outline, such variables were used based on the group of *svy* commands of the statistical software. The Research Ethics Committee approved the NHS under the number 328.159 from June 26, 2013. Participation of adults in the research was voluntary, and information confidentiality was ensured.

RESULTS

The final sample included 60,202 adults with more women, about two-thirds in the age range of 18–49 years, mostly white or mulatto, about 13% with complete higher education, and around 80% residents from the urban area (Table 1). The prevalence of asthma medical diagnosis in this population was 4.4% (95%CI 4.1 – 4.7), which was higher in females when compared with male subjects ($p < 0.001$) (Table 1). With regard to age, the prevalence was higher in those aged 18 – 29 years and lower in the age range ≥ 80 years, with variances in the other ages. There was not a difference in the prevalence according to educational level.

The white subjects showed more prevalence of medical diagnosis when compared with the others ($p < 0.015$). The urban area residents reported more medical diagnosis than those from rural areas ($p < 0.001$). The southern area presented the highest prevalence and the northeastern area, the lowest ($p < 0.001$) (Table 1).

As to the FUs in the country, Rio Grande do Sul showed the highest prevalence of asthma medical diagnosis, whereas the lowest ones were found in Alagoas, Maranhão, and Bahia (Figure 1).

Among the individuals who reported asthma medical diagnosis, around 43 and 30% of women and men, respectively, presented an asthma crisis in the last 12 months. About 80% of them took a medication for asthma, and 16.1% women and 15.0% men mentioned limitations of severe or very severe degree to perform their activities owing to the limitations from the disease (Figure 2).

DISCUSSION

Studies on asthma with a representative sample including Brazilian adults are rare; among them, the PNAD should be mentioned, which allowed assessing a time tendency among the years of 1998, 2003, and 2008. Asthma medical diagnosis in adults aged ≥ 20 years in the PNAD presented stability throughout the years of about 4.0%, similar to the result obtained in the current NHS^{7,9}.

The WHS assessed the adult population in 70 countries and found, in 2002–2003 period, a 4.3% global prevalence of asthma diagnosis self-report (95%CI 4.2 – 4.4) restricting the analysis for adults aged 18 – 45 years. The outcomes of this research, mainly for Brazil, pointed out a 12.4% prevalence (95%CI 12.9 – 22.6)⁵. The higher age limit of 45 years, in this WHS analysis, was chosen with the objective of decreasing the possible false-positive results owing to chronic obstructive pulmonary disease (COPD) that assails the elderly subjects. Another WHS publication, which did not present restriction of higher age limit, showed a 6.0% global prevalence of asthma diagnosis self-report, which in Brazil was of 12.0% (95%CI 11.0 – 13.1)⁶. Asthma prevalence with population older than 45 years of age might be overestimated, which was seen in the

Table 1. Sample description and asthma medical diagnosis prevalence in adults aged ≥ 18 years, National Health Survey, 2013, Brazil.

	Sample description		Asthma medical diagnosis
	n	%	% (95%CI)*
Gender			< 0.001
Male	25,920	43.1	3.6 (3.2 – 4.0)
Female	34,282	56.9	5.1 (4.7 – 5.6)
Age (complete years)			p = 0.011
18 – 29	14,321	23.8	4.8 (4.2 – 5.4)
30 – 39	14,269	23.7	4.5 (3.9 – 5.1)
40 – 49	11,405	18.9	4.4 (3.8 – 5.0)
50 – 59	9,030	15.0	3.4 (2.8 – 4.0)
60 – 69	6,238	10.4	4.6 (3.8–5.6)
70 – 79	3,441	5.7	5.7 (4.3 – 7.4)
80+	1,498	2.5	3.4 (2.4 – 4.8)
Educational level**			0.380
Without education and incomplete elementary school	21,987	38.5	4.1 (3.7 – 4.6)
Complete elementary school and incomplete high school	8,515	14.9	4.5 (3.8 – 5.4)
Complete high school and incomplete higher education	19,272	33.8	4.6 (4.1 – 5.2)
Complete higher education	7,310	12.8	4.9 (4.0 – 5.9)
Skin color			0.015
White	24,106	40.0	4.9 (4.4 – 5.3)
Black	5,631	9.4	3.9 (3.1 – 5.0)
Yellow	533	0.9	3.1 (1.6 – 5.9)
Mulatto	29,512	49.0	4.0 (3.6 – 4.5)
Indian	417	0.7	2.0 (0.8 – 5.2)
Home place			< 0.001
Urban area	50,015	83.1	4.6 (4.3 – 4.9)
Rural area	10,187	16.9	3.1 (2.6 – 3.8)
Macroregion			< 0.001
North	12,536	20.8	4.5 (4.0 – 5.1)
Northeast	18,305	30.5	3.2 (2.9 – 3.6)
Southeast	14,294	23.7	4.8 (4.3 – 5.4)
South	7,548	12.5	5.3 (4.7 – 6.1)
Midwest	7,519	12.5	4.2 (3.6 – 4.8)
Brazil	60,202	100.0	4.4 (4.1 – 4.7)

*Prevalence measured by the selected person weight for the sample with correction for no interviews with calibration through the projected population for the selected resident. **The highest number of missing values (n = 3,118).

global prevalence of diagnosis self-report in the WHS; in Brazil, however, there was a minimum difference, including or not including the oldest subjects (12.4% in the entire sample and 12.0% considering the age range until 45 years)⁵. There is a possibility that the main reason responsible for such high prevalence seen in Brazil, in the WHS, was how the outcome was evaluated, that is, “asthma diagnosis self-report,” which could have overestimated the prevalence.

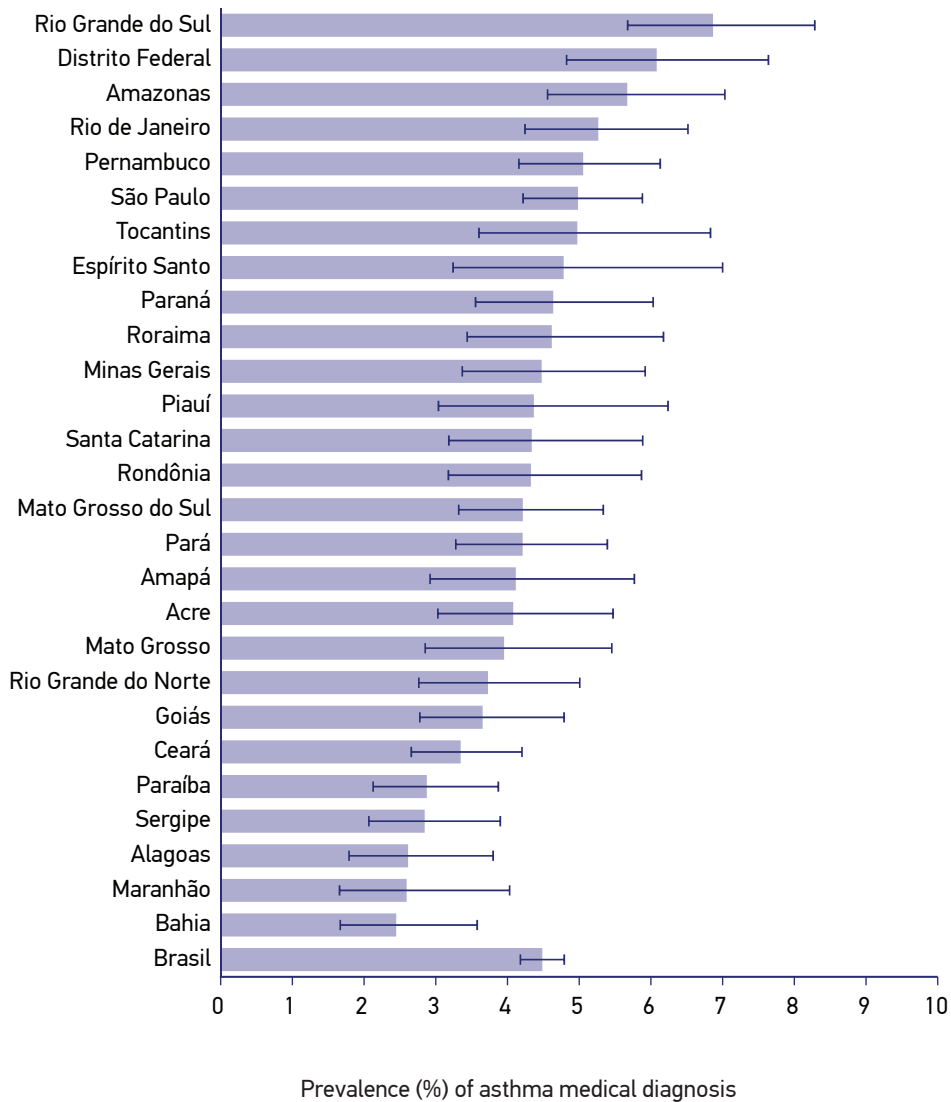
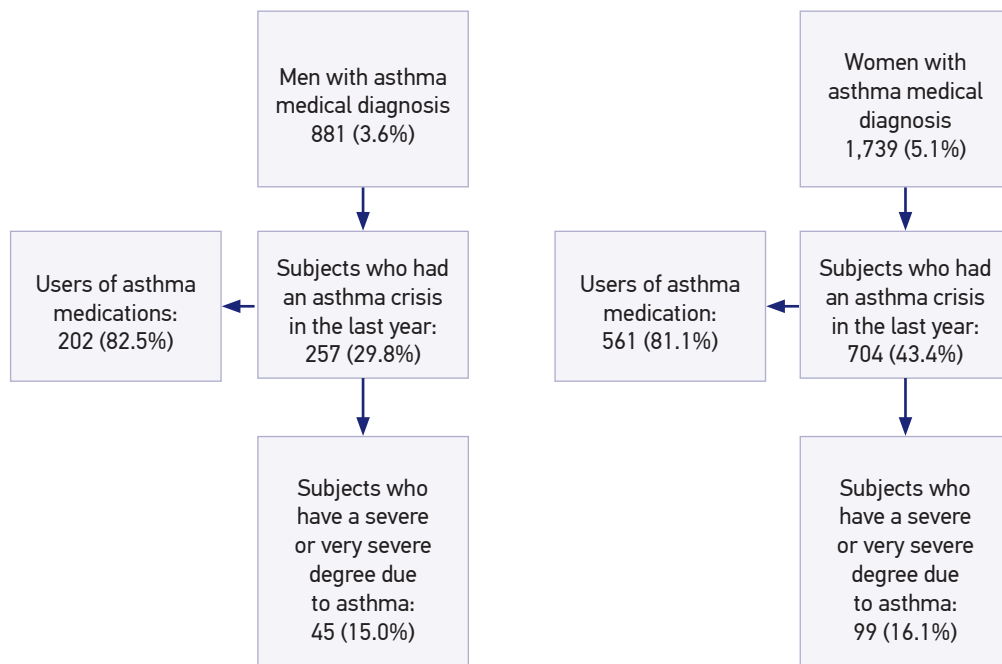


Figure 1. Prevalence of asthma medical diagnosis in adults aged ≥ 18 years according to federative units, National Health Survey, 2013 (Brazil).

In the adult age, most investigations demonstrated a larger prevalence of asthma in the female gender, regardless of the definition used (symptoms or medical diagnosis)¹⁰, differently of childhood, in which the male gender presents a wider prevalence. Although the reasons for these differences according to gender have not been established, possible explanations were proposed in literature, such as the smaller diameter of the airways to the pulmonary volume and higher sensitivity to allergens in male children¹⁰.

Both the low educational and low socioeconomic levels have been considered as risk factors for asthma in Latin America, even though this investigation could not find this outcome. It is worth noting that it is hard to distinguish poverty from other environmental variables or lifestyles that go with it and may be involved in asthma, such as pollution, smoking, respiratory infections, low weight, and prematurity¹¹⁻¹³. An ecological analysis including 20 Brazilian centers presented a direct association between asthma prevalence and inappropriate sanitation conditions, child mortality, inequity index (GINI), and mortality of all causes¹⁴.

Some studies, not only in Brazil but also in other Latin American countries, Europe, Asia, and Africa, found higher asthma (self-reported or symptoms) prevalence in the urban area when compared with the rural area¹⁵⁻²¹. The few studies carried out in the rural area suggest



Note: Frequencies presented on parenthesis are measurements.

Figure 2. Asthma crises in the last month, use of medications, and limitations owing to asthma among those who were diagnosed as asthmatics, stratified by sex. National Health Survey, 2013 (Brazil).

that population living there are protected from asthma or allergy for unknown reasons²²⁻²⁴. In the last year of PNAD follow-up (2008), there was a 4.1% prevalence in the urban area against the 3.3% in the rural area in adulthood⁷.

With regard to the macroregions of the country, in both the PNAD and the current research, the southern area showed a higher prevalence of asthma medical diagnosis, regardless of the age^{7,20}. Access to health services might be one of the factors responsible for more diagnosis in the South; another aspect as to the southern area is its climate, because several studies in literature mention the cold temperature as a “trigger” for asthma crisis^{25,26}. Nevertheless, one of the difficulties in understanding the higher asthma prevalence in some regions of the country is because Brazil does not have a single genetic standard. There are several influences of million immigrants who colonized different areas in the country, which could also be responsible for not being able to find a higher asthma prevalence in the urban area, as it would be expected.

About 90% of the Brazilian participants, in the WHS, reported being under treatment for asthma, and around one-fourth used medication in the last 2 weeks, and 13.5% self-reported bad or very bad health²⁷. Despite the divergences between asthma prevalence in the WHS when compared with the NHS, we must emphasize that, in the 12–13-year period between the two surveys, results about medical treatment, medication use, and limitation to activities or self-report or health remain with similar prevalence. This indicates that asthma management is still not appropriate in our country; around 40% of women and 30% of men showed an asthma crisis last year, of which about 20% did not take medication. We could not find the reasons for the lack of treatment through the questionnaire used in this research. According to the Brazilian consensus of asthma²⁸, every asthmatic patient must be treated; those with occasional asthma must use medication when symptoms are present, and the remaining ones should use it permanently. Because it was found that a part of the population does not receive treatment, it was expected that such patients would report a great limitation to activities, as seen in this study, or would consider their health as moderate, bad, or very bad similar to that in the WHS (53.8%)²⁹. In addition, patients using medications showed around two times more limitation to their activities owing to asthma than those who were not using it (data were not presented in tables with p-value of 0.029 in the χ^2 -test), which might indicate a greater severity of the disease.

A study done by Franco et al., including severe asthmatics from the ProAR program in Salvador (Bahia state, Brazil), showed that a control program with free monitoring, examinations, care, and medication could decrease morbidity (less than 5 hospitalization days and less than 69 visits to the emergency room, in average, per year), improve asthma control scores in 50% and quality of life scores in 74%, and decrease the annual costs for health services in US\$ 387 per patient and family costs in US\$ 733¹⁴.

There is not an established pattern for the tendency of asthma prevalence in the world. Some countries have showed a decrease of asthma, whereas in others, there is a stability or increase of asthma prevalence or severity. When Solé et al.¹⁹ assessed the phases I and III adolescents of ISAAC, in many Brazilian cities, they found a small, but significant, decrease

of attacks and night cough symptoms, although this result was not consistent in the different studied cities. In the age range of the adults, it has been seen a stability of asthma medical diagnosis the last years, based on PNAD and NHS²⁹.

The NHS results show that around one-fifth (18.7%; 95%CI 14.9 – 23.3) of the subjects with asthma medical diagnosis and crisis in the last year were not receiving treatment; in this same group of patients, 15.6% (95%CI 11.9 – 20.3) reported a severe or very severe limitation in their daily activities.

CONCLUSIONS

It is believed that several factors were responsible for the stability or decrease of asthma medical diagnosis in Brazilian adults. Among them, we can mention more access to health services in the country and availability of free medication for asthma in the last years, besides the introduction of the drug in the *Programa Aqui tem Farmácia Popular*³⁰. A recent publication about the “Attention Programs and Center to Asthmatics (PCAAs)” evaluated that there is still a lot to be done, despite the improvement in the disease treatment in Brazil, such as expanding the PCAAs to other centers in the country³¹ and implementing a plan for an asthma care line.

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