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ORIGINAL ARTICLE

Profile of deaths from respiratory diseases in the state of Rio Grande do Sul, from 2006 to 2015

Perfil dos óbitos por doenças respiratórias no interior do Rio Grande do Sul, 2006 a 2015

Perfil de muertes por enfermedades respiratorias en el interior de Rio Grande do Sul, 2006 a 2015

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ABSTRACT

Background and objectives: Respiratory diseases affect all age groups and pose a high demand on health services. The present study aimed to analyze the profile of patients who have died from respiratory diseases, between 2006 and 2015, from the 9th Health Coordination of Rio Grande do Sul. **Methods**: This is a cross-sectional and descriptive study using the database of the Informatics Department of the Unified Health System (Datasus) from the Ministry of Health in Brazil. Data collection was carried out in November 2017 and included 10 years up to 2015. The causes of death from respiratory disease were selected according to the International Classification of Diseases 10th revision, Chapter X, vital statistics, mortality from 1996 to 2015. The variables for this research were collected according to chronological distribution, gender, age and period of the year. **Results**: Out of a total of 1,471 deaths from respiratory diseases, 52% were men, most were older adults (61%) with up to 3 years of education (73.3%), which is possibly associated with low income. The main causes of death were chronic diseases of the lower airways and pneumonia, representing 56% and 29% of deaths, respectively. In addition, 34% of deaths occurred during winter. **Conclusion**: The main causes of mortality from respiratory diseases from the 9th Health Coordination were chronic diseases of the lower airways and pneumonia, with higher mortality rates in colder months, among older adults and patients with a lower level of education.

Keywords: Respiratory Tract Diseases. Epidemiology. Mortality Registries.

RESUMO

Justificativa e objetivos: As doenças respiratórias atingem todas as faixas etárias e geram grande demanda dos serviços de saúde. O presente estudo objetivou analisar o perfil dos óbitos por doenças respiratórias na 9ª Coordenadoria de Saúde do Rio Grande do Sul, entre 2006 e 2015. **Métodos:** Trata-se de um estudo transversal e descritivo em que se utilizou o banco de dados do Departamento de Informática do Sistema Único de Saúde (Datasus) do Ministério da Saúde do Brasil. A coleta de dados foi realizada em novembro de 2017, abrangendo os últimos 10 anos.

A seleção das causas de óbitos por doenças respiratórias foi selecionada de acordo com o Código Internacional de Doenças 10ª revisão, Capítulo X, estatísticas vitais, mortalidade de 1996 a 2015. As variáveis para esta pesquisa foram coletadas de acordo com a distribuição cronológica, sexo, idade e período do ano do óbito. **Resultados:** Do total de 1.471 óbitos por doença respiratória, observou-se que 52% acometeram homens, na maioria idosos (61%) e com até 3 anos de estudo (73%), o que pressupõe baixa renda. As principais causas de óbitos foram as doenças crônicas das vias aéreas inferiores e pneumonia, equivalendo a 56% e 29% dos óbitos respectivamente, sendo 34% dos óbitos ocorridos durante o inverno. **Conclusão:** As principais causas de mortalidade por doenças respiratórias ocorridas na 9ª Coordenadoria de Saúde foram as doenças crônicas das vias aéreas inferiores e pneumonia, com maior ocorrência nos meses mais frios, acometendo mais homens idosos e com menor nível escolar.

Descritores: Doenças Respiratórias. Epidemiologia. Registros de Mortalidade.

RESUMEN

Justificación y objetivos: Las enfermedades respiratorias afectan a todas las edades y generan gran demanda por los servicios de salud. El presente estudio objetiva analizar el perfil de las muertes por enfermedades respiratorias en la 9ª Coordinación de Salud del Rio Grande do Sul, entre 2006 y 2015. **Métodos**: Se trata de un estudio transversal descriptivo con base en informaciones del Departamento de Informática del Sistema Único de Salud (Datasus) del Ministerio de la Salud (Brasil). La recolección de datos se realizó en noviembre de 2017, abarcando los últimos 10 años. La selección de las causas de muertes por enfermedades respiratorias fue estimada seguido la Clasificación Internacional de Enfermedades 10ª Revisión, Capítulo X, estadísticas vitales, mortalidad de 1996 a 2015. Las variables para esta investigación fueron recolectadas de acuerdo con la distribución cronológica, sexo, edad y período del año del óbito. **Resultados**: De las 1.471 muertes por enfermedad respiratoria, fue observado que 52% en hombres (767), la mayoría ancianos (61%), hasta 3 años de estudio (73%,) o que presupone bajos ingresos. Las principales causas de muerte fueron las enfermedades crónicas de las vías aéreas inferiores y la neumonía, equivalente al 56% y 29% de los casos, respectivamente, el 34% de las muertes ocurrieron durante el invierno. **Conclusiones**: Las principales causas de mortalidad por enfermedades respiratorias ocurridas en la 9ª Coordinación de Salud en los 10 años fueron enfermedades crónicas de las vías aéreas inferiores y neumonía, con mayor ocurrencia en los meses más fríos, afectando más hombres ancianos con menor nivel escolar.

Palavras clave: Enfermedades Respiratorias. Epidemiología. Registros de Mortalidad.

INTRODUCTION

Respiratory diseases affect individuals of all ages and socioeconomic levels and are associated with high morbidity and mortality rates, which poses a high demand for health services and affect the economy.[1] Respiratory diseases can be chronic or not, and some can be classified as chronic non-communicable diseases (NCDs), which are responsible for a reduction in quality of life.[2]

There are several agents that cause respiratory diseases, including virus, bacteria, allergens, trauma, and chemical and physical agents. Respiratory system diseases cause airway obstruction and affect both the lower and the upper respiratory tracts.[3] Several pathologies can affect the respiratory system: acute respiratory infections, chronic lower respiratory diseases and Chronic Obstructive Pulmonary Disease (COPD).[1]

Risk factors for respiratory diseases can be modifiable, such as lifestyle and smoking; or not modifiable,[4] such as age, gender, demographic status, and socioeconomic characteristics. These data can describe the profile of individuals affected by respiratory diseases.[5] In addition to these factors, changes in temperature and environment also have been studied for being possibly associated with deaths from respiratory diseases.[6]

A study on the mortality rate of chronic non-communicable diseases in Brazil, based on data from Datasus, showed that respiratory diseases appeared as the third leading cause of death in the country between 2000 and 2011.[2] According to the Epidemiological Report of the Ministry of Health (2016), between 2003 and 2013, most hospitalizations and deaths due to respiratory diseases occurred in the South region, with 6,876,361 hospital admissions at the Unified Health System and 685.031 deaths.[7]

Considering the relevance of the theme, the objective of this study was to analyze the profile of patients who died from respiratory diseases between 2006 and 2015 from the 9th Health Coordination of Rio Grande do Sul.

METHODS

Cross-sectional and descriptive study, using Datasus database, managed by the Ministry of Health in Brazil. Based on these data, we analyzed the epidemiological profile of deaths and hospitalizations due to respiratory diseases in the cities of the 9th Health Coordination/Rio Grande do Sul.

Data collection was carried out in November 2017 and included data from a 10 year period, available through Tabnet. The region of the 9th Health Coordination of Rio Grande do Sul (Cruz Alta) is composed by 13 cities, namely: Boa Vista do Cadeado, Boa Vista do Incra,

Colorado, Cruz Alta, Fortaleza dos Valos, Ibirubá, Jacuizinho, Quinze de Novembro, Saldanha Marinho, Salto do Jacuí, Santa Barbara do Sul, Selbach and Tupanciretã.

The selection of the causes of death from respiratory diseases was estimated according to the International Classification of Diseases 10th revision (ICD-10), Chapter X (Diseases of the respiratory system), vital statistics, mortality from 1996 to 2015. The variables for this research were collected according to the chronological distribution, gender, age, time of study and month of death. As the data was public and secondary, going through the Research Ethics Committee was not necessary.

RESULTS

Among all of 1,471 deaths from respiratory disease registered in Datasus in the 9th Health Coordination (Cruz Alta) from 2006 to 2015, 52% (767) of those affected were male.

For the present study, data from the Brazilian Institute of Geography and Statistics (IBGE) from 2010 was established as the average reference population, with a number of 152,070 inhabitants. In this study, the rate of mortality due to Respiratory Diseases was 9.67/10 thousand inhabitants. The highest incidence of deaths

occurred between the years 2012 and 2014, reaching a rate of 11.6 and 11.5 deaths (for every 10,000 inhabitants) respectively (Figure 1).

According to Chapter X from the ICD-10, the groups that can be described as diseases of the respiratory system are acute infections of the upper airways, influenza, pneumonia, other acute infections of the lower airways, other diseases of the upper airways, chronic diseases of the lower airways, lung diseases due to external agents, other respiratory diseases that mainly affect the interstitium, necrotic and suppurative disorders of the lower airways, other diseases of the pleura and other diseases of the respiratory system.[7] In this study, the following groups can be observed as causes of death from the 9th Health Coordination (Cruz Alta): Influenza, Pneumonia, Lower Airway Infections, Chronic Lower Airway Diseases, Asthma and several others.

Between 2006 and 2015, the main causes of mortality in the same region were chronic diseases of the lower airways and pneumonia, which represented 56% (826) and 29% (421) of the cases, respectively. As for gender, the highest percentage of deaths from Chronic Lower Airway Diseases was among men (59% - 487), differing from cases of Pneumonia, which affected more women (41% - 339), as shown in figure 2.
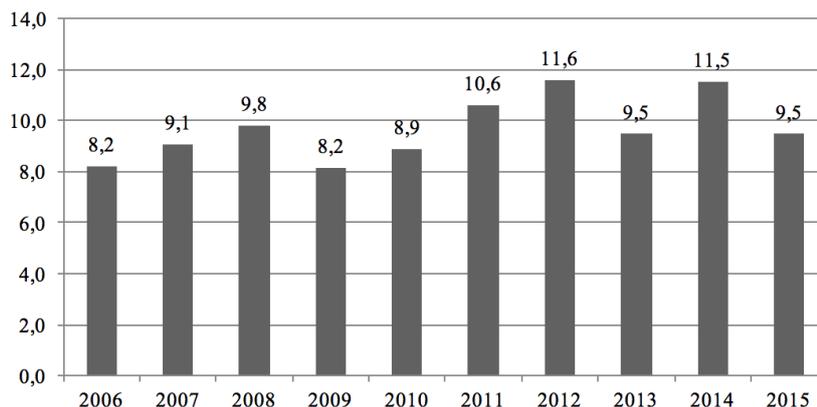

Figure 1. Chronological distribution of the rate of deaths from respiratory diseases between 2006 and 2015, from the 9th Health Coordination/Rio Grande do Sul, according to Datasus (for every 10,000 inhabitants).
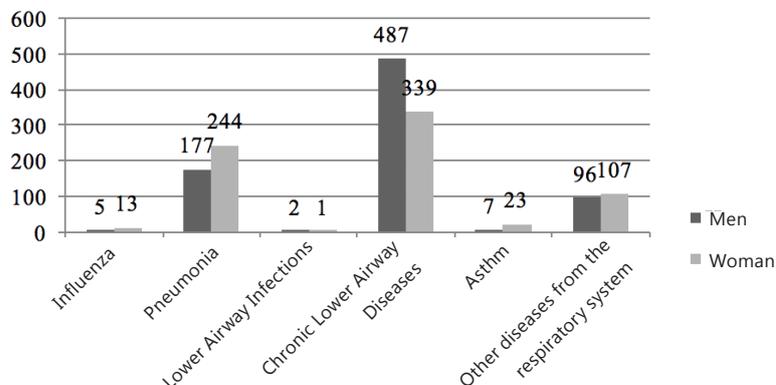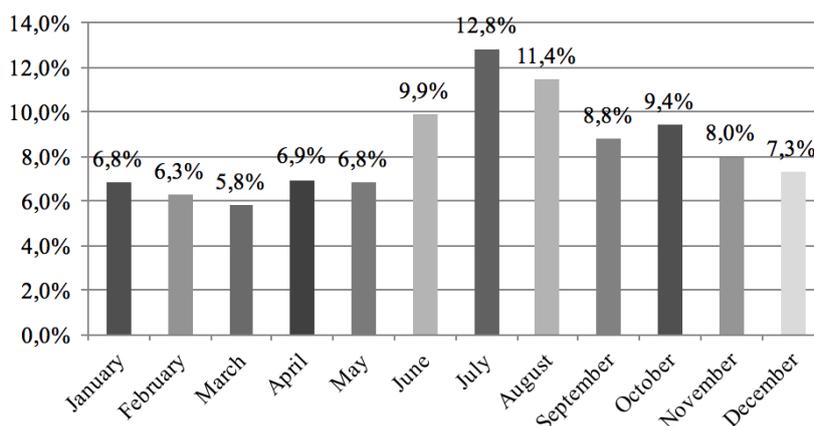

Figure 2. Number of deaths during the study period, grouped by gender, according to data from Datasus (9th Health Coordination / Rio Grande do Sul between 2006 and 2015).

Deaths from respiratory diseases were described according to the month of occurrence, with the objective of observing the seasonal distribution of deaths from respiratory diseases. The months with the highest rates were June (145 deaths), July (188 deaths) and August (168 deaths), representing 501 deaths out of a total of 1,471. Consequently, there was a higher percentage of deaths in the coldest months (Figure 3).

The analysis of the number of deaths according to the age group shows an increase from the age of 45 onwards, with a gradual increase following age. The age group with the highest number of deaths was 75 years old or more, with a total of 906 cases (61.6%). (Figure 4).

It was found that the highest number of deaths occurred in individuals with a lower level of education. However, 518 (35%) cases had no records regarding the level of education. Of the 953 (65%) individuals who had a record of their level of education, 474 (50%) had 1 to 3 years of education, 225 (24%) had no education and 209 (22%) had 4 to 7 years of education. Among those remaining, 29 (3%) had 8 to 11 years of education and 16 (2%) had 12 years or more of education (Figure 5).

Figure 3. Seasonal distribution of deaths during the study period, presented in months of the year, according to data from Datasus (9th Health Coordination/Rio Grande do Sul, 2006-2015).
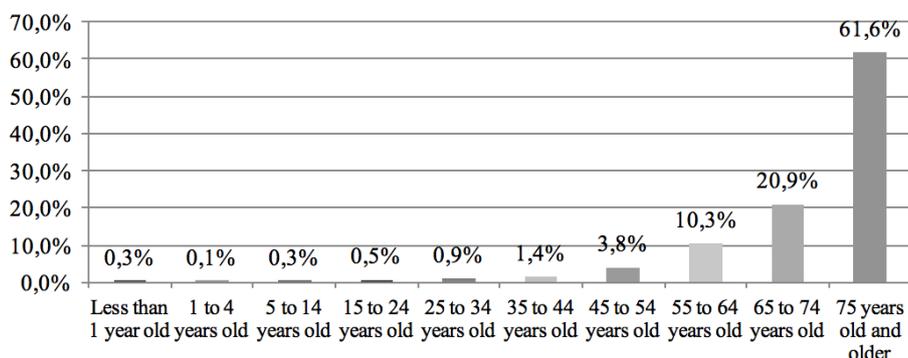
Figure 4. Distribution of the percentage of deaths, described by age groups, 2006-2015, according to Datasus (9th Health Coordination / Rio Grande do Sul).
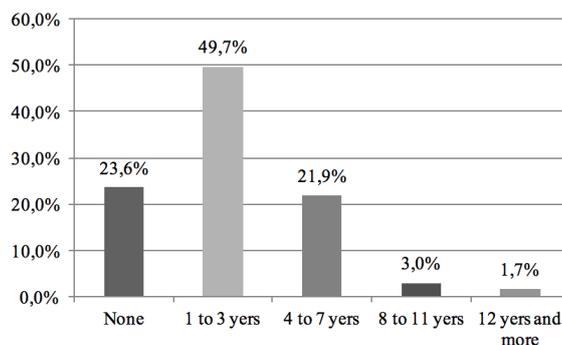
Figure 5. Distribution of deaths according to level of education, in years, according to data from Datasus (9th Health Coordination / Rio Grande do Sul between 2006 and 2015).

DISCUSSION

This study found that deaths from respiratory diseases are more common among men, which was also observed in similar studies. The reasons for this result include lifestyle habits, smoking, alcohol consumption and the greater search for healthcare among females.[8, 9]

Diseases of the respiratory system affected a greater number of older adults in the 9th Health Coordination, with emphasis on the age group of 75 years and older. Other studies found similar results.[10-11-12] Another fact that stands out is the high number of diseases of the respiratory system among older adults, concomitant to the growth of this population in Brazil.[13] A study carried out in the state of Rio de Janeiro analyzed the rates of hospital admissions of individuals aged 60 years or older and found that the second major cause of hospital admissions were diseases of the respiratory system.[14]

The overall mortality rate of respiratory diseases found in this study was 0.97/100 thousand inhabitants. According to the Epidemiological Report of the Ministry of Health, the mean number of deaths from respiratory disease in the South was 46/100 thousand inhabitants. According to the year, the number of deaths was 48.9/100 thousand inhabitants in 2003 and 47.0/100 thousand inhabitants in 2013.[8]

The Epidemiological Report, vol. 47. No. 19, carried out in 2016, demonstrated that chronic diseases of the lower airways are associated with the highest number of deaths in the South region.[8] The main causes of deaths from respiratory diseases in the region of the 9th Health Coordination (Cruz Alta) were chronic diseases of the lower airways (56%) and Pneumonia (29%). Some authors reported, that among respiratory diseases, Pneumonia is largely responsible, if not the main, responsible for the high number of deaths.[15-17] A study analyzed the main causes of hospitalizations and deaths that affected older adults between 2005 and 2015 in Brazil, and pneumonia appeared in the second position, both as a cause of deaths and as a cause of hospitalizations.[16]

In March 2010, the ten-valent pneumococcal conjugate vaccine (PCV10) was introduced in Brazil's National Immunization Program. A study evaluated the direct and indirect impact of the vaccine on hospitalizations for pneumonia in all age groups by analyzing time series, and found a significant decrease in hospitalization rates in the population aged 10 to 49 years. However, it did not change the growing trends in hospitalization for pneumonia in older adults ≥ 65 years old. The authors concluded that the escalating numbers of hospitalizations for pneumonia among older adults should be investigated for being a public health problem.[15]

In this study, cases of Pneumonia affected mostly women, with a rate of 58% of cases. A similar result was found in another study, which was carried out in a city in São Paulo-Brazil and found that prevalence of pneumonia cases was increasing over different periods, with an increase of 57.92% in the female population.[12] A Spanish survey analyzed the epidemiology of pneumonia cases over a period of ten years, aiming to describe the characteristics of patients diagnosed with the disease and found that, in a sample of 1,290 patients, 56.1% were men.[18]

Researchers carried out a temporal study analyzing mortality rates of Pneumonia and found that, in the South Region of Brazil, there was a decrease until the year 2000, followed by growth, whereas in the North and Northeast region, mortality for pneumonia increased during the entire studied period.[9] A study in the Northeast Region of Brazil evaluated deaths caused by influenza from 1998 to 2007 through data from the Datasus and concluded that the mortality rates of Influenza were high and increasing, differing from the 9th Health Coordination (Cruz Alta) region, where there were only 18 registered cases of influenza, the lowest percentage (1.2%) among the causes of death.[11]

Climate changes are part of the global reality. In addition, some regions have extreme temperatures, which represent a health threat and may cause or worsen respiratory problems.[19] In a meta-analysis that verified the effects of air temperature on morbidities and mortality among older adults, the authors found that a temperature reduction of 1ºC is able to increase mortality from respiratory problems (2.90%). In addition, it was found that pneumonia cases were directly associated with cold weather (6.89%), leading to the conclusion that the risks for the mentioned diseases are directly related to the climate.[3.] It is also worth mentioning that in addition to the direct relationship between climate change and mortality rates, climate changes also increase the rate of hospital admissions, generating high expenses for the health system.[16]

This study found a prevalence of respiratory diseases in the period of June, July, and August (34%) in the region of the 9th Health Coordination, which represents the period of the winter in Brazil. A study compared the climate and respiratory diseases in the city of Patrocínio-MG and found that during the winter months, when the air quality is worse, there is a significant increase in the number of respiratory diseases.[20] Another study conducted in the city of Campina Grande, aimed to identify the association between meteorological variables and respiratory diseases in the period between 2004 and 2013 and found that health is directly associated to seasonality, as the respiratory system tends to suffer from changes in air humidity and low temperatures.[21]

Socio-demographic differences were considered an important factor in the characterization of deaths from respiratory diseases. Most of these deaths occurred in individuals with a low level of education, with 1 to 3 years of education, or with no education, which suggests that mortality by respiratory diseases may be associated with low income.[22] A survey associated diseases of the respiratory system and low income and concluded that the lower the socioeconomic class, the greater the number of cases of respiratory diseases.[17] A cross-sectional study associated health conditions and risk factors in adults living in Puerto Rico, a place that experienced an economic crisis, and found that 51% of the population received government food benefits and 21% had respiratory health issues.[23]

A limitation of this study was the use of secondary data, collected through the Datasus Tabnet (Informatics Department of the Brazilian Unified Health System). This is a tool that provides information on the health of the population, but does not support the total demand for data from managers.[24]

There is an urge for other forms of prevention and monitoring of respiratory diseases for greater management of cases and better care of the affected population. Procedures must be taken to achieve equality in access to health for the entire population, especially the most vulnerable groups along with their risk factors.[25]

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Alana Martins da Veiga, Giovani Sturmer, Fabiana de Cássia Romanha Sturmer, Gilson Rodrigues dos Santos contributed to the conception, design of the article, analysis and writing of the article;

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All authors have approved the final version to be published and are responsible for all aspects of the work, including ensuring its accuracy and completeness.