Original Article

Non-communicable chronic disease hospital morbidity trends in Brazil, 2002-2012

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Abstract

Objective: *to analyze main Non-Communicable Diseases (NCD) hospitalization trends between 2002 and 2012.* ***Methods:*** *an ecological time series study was performed for Brazil and regions; data were obtained from the National Hospitalization Information System; Prais-Winsten regression models were used.* ***Results:*** *For Brazil as a whole hospitalization rates were stable for cardiovascular diseases (-2.00%; 95%CI:-6.23;4.47), cancer (-5.30%; 95%CI:-6.29;10.77) and diabetes (4.71%; 95%CI:-9.78;5.79); chronic respiratory disease rates decreased (-11.78%; 95%CI:-14.69;-1.40); rates increased among men for cancer (8,63%; 95%CI:4.72;11.91) and diabetes (7.75%; 95%CI:4.80;11.28); rates increased for diabetes in the Northern region (18,89%; 95%CI:4.75;19.78).* ***Conclusion:*** *overall trends in NCD hospitalizations were stable in this period, although some clear variations according to sex and regions were observed.*

Key words: *Cardiovascular Diseases; Respiratory Tract Diseases; Neoplasms; Diabetes Mellitus; Temporal Distribution.*

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Introduction

The population aging is an important factor in the rise of prevalence and mortality by Non-Communicable Diseases (NCDs). Due to the population aging, morbidity and mortality burden has changed from the younger groups to the elderly ones, and there was a growth in morbidity compared to mortality by NCDs.[1,2]

In Brazil, in 1998, NCDs were responsible for 59% of causes of potential years of life lost due to premature death, with the highest percentage being related to cardiovascular diseases (CVD) (24%), followed by cancers (12%), chronic respiratory diseases (5%) and diabetes *mellitus* (3%). When considering morbidity, the NCDs corresponded to 74.7% of causes of years lived with some disability, with 11.2% of the total related to chronic respiratory diseases, 7.2% to diabetes *mellitus*, 2.7% to CVD and 1% to cancer.[2] These four diseases have four risk factors in common: smoking; sedentary lifestyle; poor nutrition; and harmful use of alcohol. Longevity rise results in longer cumulative exposure to these factors.[3,4]

> *Population aging and epidemiological transition entail a significant growth in demand for health services.*

According to the World Bank, in 2005, the cost for treating NCDs already represented half the cost of all hospitalizations.[5] It should be highlighted that these high amounts do not include outpatient expenses, neither indirect costs related to patients' productivity loss.

Population aging and epidemiological transition entail a significant growth in demand for health services. Meanwhile, inequalities between the Brazilian geographic regions are still noticed, with regard to diagnosis and treatment access, service quality, accessibility, equity, universality and health services coverage.[6-8]

Understanding the NCDs profile, their risk factors and the hospitalizations that they generate, and also observing the geo-demographic differences is essential to guide the planning and execution of programs and public policies, adjusting them to regional and local realities. In Brazil, the National Hospitalization Information System (SIH/SUS) is a valuable source to generate such knowledge.[9,10]

This article aims to analyze main Non-Communicable Disease (NCD) hospitalization trends – cardiovascular diseases, chronic respiratory diseases, cancers and diabetes – based on SIH/SUS data, between 2002 and 2012.

Methods

An ecological time series study of hospitalization rates in the National Health System (SUS), between 2002 and 2012 in Brazil and its regions was conducted.

In Brazil, according to data from the National Household Sample Survey (PNAD), carried out by the Brazilian Institute of Geography and Statistics (IBGE), about 70% of hospitalizations were covered in SIH/SUS. This system registers the admissions in the following types of hospitals: public (federal, state and municipal), university (public and private), philanthropic and private (contracted by SUS)[9,10], allowing us to know the NCDs profile and hospitalizations motivated by them, in addition to identifying some of their risk factors. SIH/SUS has been an important source of data for epidemiological analysis, it is considered a reliable and useful tool in the monitoring process of health services, and is able to guide the formulation and conduction of public policies for the sector.[10]

For admissions selection, the International Statistical Classification of Diseases and Related Health Problems, 10th Revision (ICD-10)[11] was used, with the following diagnoses for NCDs, as listed by the World Health Organization (WHO):[12] cardiovascular diseases (Chapter IX); chronic respiratory diseases (Chapter X, J30-J98); cancers (Chapter II, C00-C97); and diabetes *mellitus* (Chapter IV, E10-E14). From the morbidity list, some codes of chapters X and II were excluded for not belonging to the group of NCDs: J00-J39 codes, Chapter X, related to infections; and D00-D48 codes, Chapter II, related to neoplasms *in situ*, benign and of uncertain or unknown behavior.

The number of hospitalizations was defined as numerators of hospitalization rates, regardless of the type of inpatient hospital authorization (IHA). These were obtained from SIH/SUS and are available at Datasus (SUS IT Department) website.[13]

The estimates of the resident population by sex and geographic region, used as denominators to calculate the admission rates were obtained from the IBGE, according to projections for the period 2000 to 2060.[14]

The annual hospitalization rates by NCDs were calculated according to disease groups (cardiovascular

diseases, chronic respiratory diseases, cancers and diabetes), sex and geographic region. For trend analysis of these rates by sex and region, for the period between 2002 and 2012, the regression model adopted was the Prais-Winsten, which is suitable to correct the serial auto-correlation losses in time series analyses.[15] Also, the annual variation rate (%) of hospitalization rates in the period was calculated. For this calculation, Prais--Winsten regression model was used, and the outcome was the logarithm of the hospitalization rate. After that, the regression coefficient was applied to the formula of the annual variation rate (%):

$$(-1 + 10^{b})x100$$

For the 95% confidence intervals calculation (95%CI), the following formula was used,

$$b \pm tEP$$

in which *t* is the tabulated value of the t test and EP corresponds to the standard error of the outcome coefficient given by the regression.[15]

The dependent variable (Y) model was the hospitalization rate and the years were considered as independent variable (X). A 5% significance level was considered. Analyses were performed using the softwares Excel (version 10) and Stata 11.

Datasus information was obtained in aggregate form, without patients' identification, according to Resolution of the National Health Council (CNS) no. 466, dated December 12, 2012.

Results

According to the SIH/SUS data for the first and last year of the researched period, for all causes, 12,031,590 (2002) and 13,031,584 (2012) hospitalizations were recorded. Of these totals, the NCDs were responsible for 48.90% in 2002 and 49.20% in 2012, especially cardiovascular diseases, chronic respiratory diseases, cancers and diabetes. As presented in Table 1, between these two years, the following percentages of hospitalization rates variation were found: by cardiovascular diseases -2.00% (95%CI:-6.23;4.47); chronic respiratory diseases, -11.78% (95%CI:-14.69;-1.40); cancers, -5.30% (95%CI:-6.29;10.77); and diabetes, 4.71% (95%CI:-9.78;5.79).

For the period, a stability in the hospitalization rates for CVD in almost all regions was noticed, except for the Central-Western region, where an annual decrease of -8.78% (95%CI: -11.69; -3.70) in hospitalizations was observed. Hospitalization rates for chronic respiratory diseases, in all Brazilian regions, showed a statistically significant declining trend: -11.78%; 95%CI:-14.69;-1.40. The greatest decreases in the period were observed in the Central-West (-15.52%; 95%CI: -18.16; -3.49) and Northeast (-13.64%; 95%CI: -16.80; -1.84) (Table 2).

Stable trends were observed in hospitalizations for cancers to almost all regions; except for the North, which showed a decrease: -7.70; 95%CI: -12.06; -5.10 (Table 2). With regard to diabetes, there was a significant increase in admissions in the North, where the annual growth rate was 18.89 % (95%CI: 4.75; 19.78). In the other regions, there was stability in these rates trend (Table 2).

An increase in CVD hospitalization rates among older people was also noticed. The highest rates were in the age groups over 40 years old, both for men and women. Individuals older than 70 years old had the highest hospitalization rates, regardless of sex. For hospitalizations for chronic respiratory diseases, individuals under 5 and older than 50 years old showed the highest rates, both for men and women (Figure 1).

Cancers hospitalization rates increased with age. There was a continuous increase among women aged

Table 1 – Hospitalization rate[a] for selected chronic non-communicable diseases (NCD). Brazil, 2002 and 2012

NCD	Hospitalization rate		Annual variation rate (%)	95%CI[b]	Trend
	2002	2012			
Cardiovascular diseases	693.10	658.91	-2.00	-6.23;4.47	Stability
Chronic respiratory diseases	481.84	286.62	-11.78	-14.69;-1.40	Decline
Cancers	212.20	279.11	-5.30	-6.29;10.77	Stability
Diabetes *mellitus*	69.71	76.98	4.71	-9.78;5.79	Stability

a) Per 100 thousand inhabitants

b) 95%CI 95%confidence intervals

Table 2 - Trends in hospitalization rates[a] for chronic non-communicable diseases (NCD) according to geographic regions. Brazil, 2002 to 2012

NCD	Region	Hospitalization 2002	Hospitalization 2012	Annual variation rate (%)	95%CI[b]	Trend
Cardiovascular diseases	North	359.14	398.74	1.21	-1.93;2.97	Stability
	Northeast	548.95	512.38	-1.62	-7.28;5.87	Stability
	Southeast	722.91	715.15	-2.13	-5.59;3.71	Stability
	South	970.74	953.26	-1.49	-5.06;3.75	Stability
	Central-West	886.82	614.64	-8.78	-11.69;-3.70	Decline
Chronic respiratory diseases	North	375.77	251.93	-8.42	-9.85;-1.91	Decline
	Northeast	539.4	276.99	-13.64	-16.80;-1.84	Decline
	Southeast	347.72	234.38	-9.39	-10.51;-1.94	Decline
	South	781.01	480.99	-11.68	-18.16;-2.21	Decline
	Central-West	561.18	282.45	-15.52	-13.97;-3.49	Decline
Cancers	North	131	105.28	-7.70	-12.06;-5.10	Decline
	Northeast	168.17	205.92	4.04	-6.15;9.59	Stability
	Southeast	207.78	313.32	8.53	-6.16;13.27	Stability
	South	358.4	435.92	3.41	-6.71;9.63	Stability
	Central-West	201.87	253.03	2.83	-4.92;7.34	Stability
Diabetes *mellitus*	North	43.26	76.18	18.89	4.75;19.78	Growth
	Northeast	57.15	85.79	16.38	-13.19;26.37	Stability
	Southeast	72.66	64.28	-2.86	-4.85;2.33	Stability
	South	95.26	93.21	1.33	-2.68;3.83	Stability
	Central-West	78.54	85.49	1.88	-4.69;6.31	Stability

a) Per 100 thousand inhabitants

b) 95%CI: 95%confidence intervals

30 years old and among men aged 40. Regarding diabetes, hospitalization rates have also increased proportionally with aging for both sexes, and the age group above 70 years old had the greatesthospitalization rates (Figure 1).

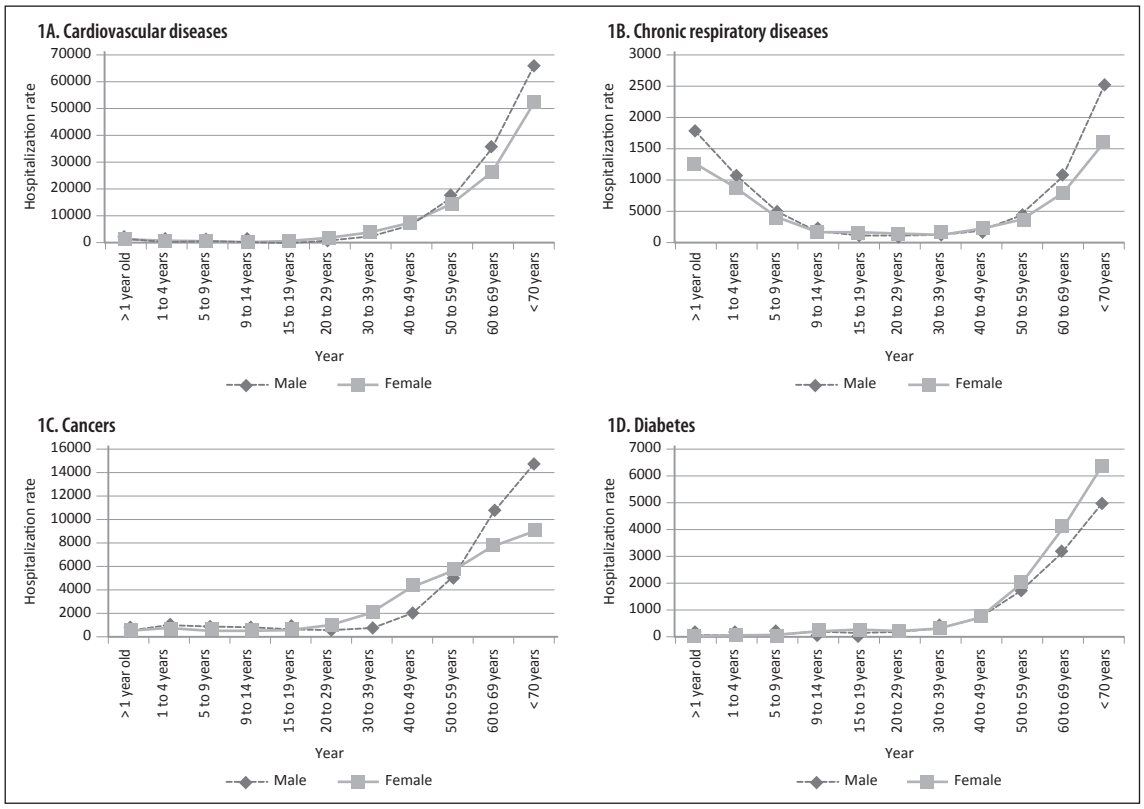
Hospitalization rates for CVD between 2002 and 2012 showed a stable behavior for both men (-0.80; 95%CI:-4.44;3.73) and women (-3.25; 95%CI:-7.80;4.92). Hospitalization rates for CVD were higher among women at the beginning of the reported period; however, from 2010 on, men answered for higher rates. The hospitalization rate for chronic respiratory diseases had annual decrease of 11.43% among men (95%CI:-8.79;-1.56) and of 12.19% among women (95%CI:-10.05;-1.24) (Figure 2 e Table 3).

The highest hospitalization rates for cancers for the period 2002-2012 were registered among women, although it showed a stable behavior (2.25%; 95%CI:-7.57; 9.50). For men, a trend of annual increase of 8.63% in the hospitalization for cancers was observed (95%CI:4.72; 11.91). Hospitalization rates for diabetes were higher among women, considering all the reported period. There was a statistically relevant annual average increase, of 7.75% (95%CI:4.80; 11.28) in hospitalization for diabetes among men; while among women, there was a trend toward stability (Figure 2 and Table 3).

Discussion

This study pointed out that, in the period 2002-2012, in general, there was some stability in the hospitalization rates for NCDs. However, when analyzing hospitalization rates by group of diseases, the respiratory ones had a decreasing trend, while the cardiovascular, cancers and diabetes *mellitus* showed stability trend. Among the country regions, trends in hospitalization rates varied, depending on the group of diseases. The elderly presented higher rates. With regard to sex, there was stability of hospitalization rates for CVD among men and women, and reduction for respiratory tract diseases for both sexes. Among men there was increase in hospitalization rates for cancers and diabetes.

From 2000 to 2012, in absolute numbers, there was a rise of 999,994 hospitalizations recorded in SIH/SUS. CVD, chronic respiratory diseases, cancers and diabetes were responsible for great part of the hospitalization rates for NCDs. Diabetes and CVDs, besides being directly related to hospitalizations, also present a worsening factor due to the number of derived com-



a) Per 100 thousand inhabitants

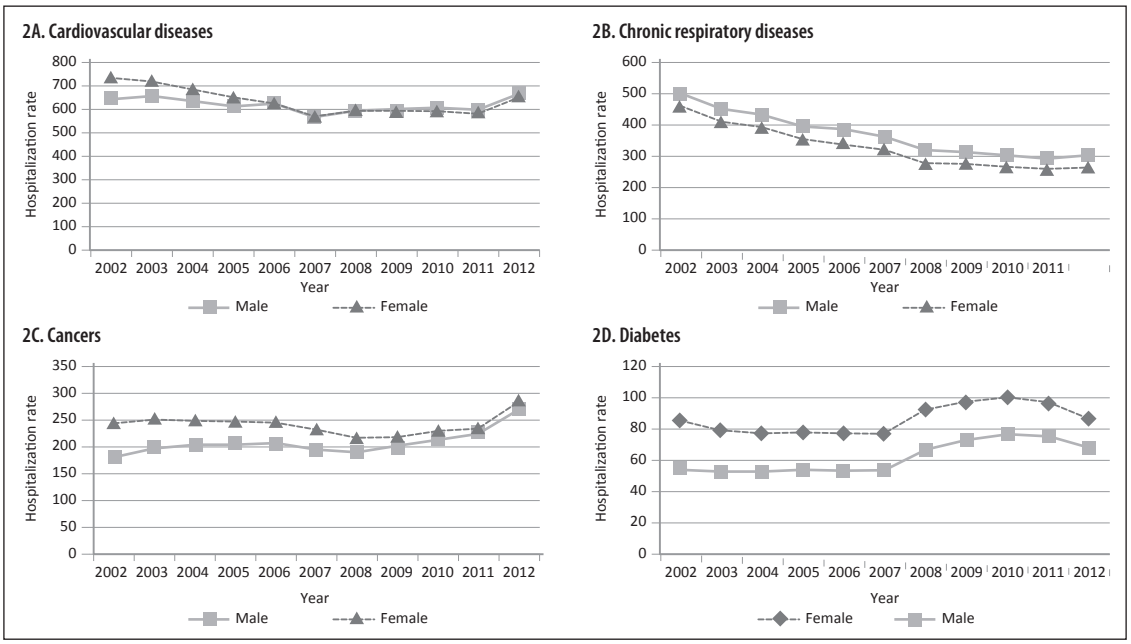
Figure 1 - Average hospitalization rates[a] by group of chronic non-communicable diseases (NCD) according to sex and age group. Brazil, 2002 to 2012

plications and comorbidities: they require even more use of medications and increase hospitalization rates.[5]

There was stability in the hospitalization rates for CVD among women and a positive relation with age for both sexes, especially among the age group above 70 years old. This stability in hospitalization rates, regardless of sex, can be a result of the free medicine distribution programs for hypertension and diabetes, as well as the higher access to primary health care, with the Family Health Strategy (ESF) teams increasing their services. It is important to mention that mortality burden for CVD affects the poorer population disproportionally.[17,18]

Hospitalization rates for chronic respiratory diseases showed the most significant reduction among the four studied NCDs. A possible reason to this finding would be the decline on smoking prevalence observed in recent years;[17,19] and this is one of the main associated factors with hospitalization for chronic respiratory diseases. Data from the Surveillance System of Risk and Protective Factors for Chronic Diseases by Telephone Survey (Vigitel) show a statistically significant reduction trend of smoking among men in the period between 2006 and 2013.[19] This trend is followed by the reduction of hospitalization rates for chronic respiratory diseases among men. Men present 1.5 more risk of hospital admission for respiratory diseases when compared to women.[3] This reduction in hospital admissions for respiratory diseases can also be related to the influenza vaccination program: in recent years the elderly vaccination was priority in order to reduce comorbidities associated to this age group.[20]

The older age groups had the highest admission rates for respiratory diseases. This growth is influenced by several factors such as (i) higher immunological susceptibility in the elderly, (ii) presence of a greater number of comorbidities in this age group and (iii) previous different exposure to risk factors (occupational, smoking and others).[17] Southern and Southeastern regions presented the highest hospitalization rates for respiratory diseases. According to VIGITEL data, the number of smokers in 2011 was higher in these regions' capitals.[20] However, there may be under-diagnosis of these diseases in the



a) Per 100 thousand inhabitants

Figure 2 - Average hospitalization rates[a] by group of chronic non-communicable diseases (NCD) according to sex. Brazil, 2002 to 2012

North and Northeast of the country, as well as regional differences related to environmental pollutants and the weather.[21] Colder regions, such as the South, have higher prevalence of respiratory diseases.[22] Another potential explanation is the faster population aging observed in the South and Southeast of the country, one of the determining factors for the high prevalence of chronic respiratory diseases and other NCDs.[23]

In this study, the highest hospitalization rates for cancers were found among women, despite the increasing trend observed among men. This sex difference may be related to higher demand of women for health services, including performing routine and prevention examinations.[24] Furthermore, investments on the expansion of public services for tracking and diagnosing cervix and breast cancers in recent years, and the consequent upward trend in the number of women submitted to Pap smears tests and mammography were noticed.[25] The rising in hospitalization for cancers among men can be attributed to the rise of prostate cancers in the past few years.[20]

With regards to diabetes, a global rise in the prevalence of diabetes *mellitus* type 2 is expected. In Latin America, this increase is expected to occur mainly among younger age groups, among whom negative impact on life quality and disease burden for the health system would be higher.[26]

In Brazil, a significant increase of hospitalization rates for diabetes was observed only in the North. This growth is related to this disease increasing prevalence, assigned to several factors: elderly population; dietary changes, with increasing replacement of foods rich in fiber, vitamins and minerals for industrial products; sedentary lifestyle, favored by changes in work structure and technological advances; among others.[27] In the North, a later demographic transition compared to other Brazilian regions may explain the fast rise in the number of hospitalizations for diabetes that was observed, while other regions have already passed through this transition and through a substantial change in the population age distribution.[28] Health care access has also increased across the country, and a reduction in the differences found between the South-Southeast and other regions could be noticed.[29]

The highest hospitalization rates for diabetes were found among women, although increasing trend was observed only among men. Hospitalization rates for diabetes increased for both men and women older than 40. This fact is directly related to the individual's age: the older they are, the higher is the number of hospitalization.[30]

For the group of diseases studied, Brazil presents a

Table 3 - Trends in admission rates[a] for chronic non-communicable diseases (NCD) according to sex. Brazil, 2002 to 2012

NCD	Sex	Hospitalization 2002	Hospitalization 2012	Annual variation rate (%)	95%CI[b]	Trend
Cardiovascular diseases	Male	649.16	664.5	-0.80	-4.44;3.73	Stability
	Female	736.39	653.44	-3.25	-7.80;4.92	Stability
Chronic respiratory diseases	Male	502.40	305.15	-11.43	-14.09;-1.56	Decline
	Female	461.57	268.52	-12.19	-15.32;-1.24	Decline
Cancers	Male	180.30	271.29	8.63	4.72;11.91	Growth
	Female	243.63	286.75	2.25	-7.57;9.50	Stability
Diabetes *mellitus*	Male	54.22	67.95	7.75	4.80;11.28	Growth
	Female	84.97	85.80	2.62	-6.48;8.73	Stability

a) Per 100 thousand inhabitants

b) 95%CI: 95%confidence intervals

great demographic and socioeconomic heterogeneity, reflected in different patterns of morbidity and mortality for NCDs.[16] The morbidity caused by NCDs in men and women, observed by the hospitalization rates analysis, should be treated with caution. Studies on gender differences in health, conducted in industrialized societies, reveal that, although women live longer than men, they report higher morbidity and use more health services, having, therefore, more opportunity to access diagnostic and therapeutic services.[20]

One of the limitations in this study lies on the fact that the public data provided by SIH/SUS, through TABNET program, only allows the diagnostic selection by chapter of ICD-10 and morbidity list; it is not possible to choose data by category, which can be done in the Mortality Information System (SIM), for example. Thus, it is impossible to delete the J36 code (peritonsillar abscess) of the respiratory diseases chapter (X).[13] Attention should also be given to the data source used, the SUS National Hospitalization Information System, and its limitations: irregular coverage between the countryregions, reliability of medical record information and possible attempts to increase the financial reimbursement, besides the limitation of IHA emission according to the population size, which may not be enough to cover local use.[10] The absence of age standardization is also a limitation in this study, because it impairs the comparability of hospitalizationamong thedifferent regions, as they present different age structures. Moreover, as the studied information was taken from SIH/SUS, its comparability between regions is also limited by regional differences in coverage of private hospitalization services, which favors the Southeastern region.[9]

Despite these barriers, SIH/SUS is one of most used systems by the various levels of health services management; including studies like this, which seek to describe the pattern of hospital morbidity and mortality. Its use range is important, not only in numbers but also in content diversity and complexity of possible analyzes, although the studied geographical area is constituted predominantly by states and country regions.[10] SIH/SUS use should be encouraged, including analyses based on smaller geographic units, with due regard to these limitations.

This study demonstrates stability of hospitalizations for NCDs, although this stability is not uniformly presented in the four disease groups studied, or by region and sex. As a contribution to control morbidity for NCDs, we recommend that (i) these details are to be observed in the planning and implementation of local actions, and (ii) health promotion actions related to these diseases are to be expanded, such as the Health Fitness Program, an agreement with industry to reduce sodium, besides the treatment for reducing the smoking habit and other actions foreseen in the Strategic Action Plan to Tackle Non-communicable Diseases (NCDs) in Brazil, 2011-2022.[4]

Authors' contributions

Saints MAS, Oliveira MM, Andrade SSCA, Nunes ML, Malta DC and Moura L participated in the study conception and design, data analysis and interpretation, drafting or relevant critical revision of the intellectual content of the manuscript, as well as the final approval of the version to be published.

The authors are responsible for all the aspects of the work, including the guarantee of its accuracy and integrity.

References

1. Lessa I, Mendonça GAS, Teixeira MTB, Doenças crônicas não-transmissíveis no Brasil: dos fatores de risco ao impacto social. Bol Oficina Sanit Panam [Internet]. 1996;120(5):389-413 [citado 2013 dez 18]. Disponível em: http://hist.library.paho.org/Spanish/BOL/v120n5p389.pdf
2. Schramm JMA, Oliveira AF, Leite IC, Valente JG, Gadelha AMJ, Portela MC, et al. Transição epidemiológica e o estudo de carga de doença no Brasil. Cienc Saude Coletiva [Internet]. 2004 out-dez [citado 2013 dez 18];9(4):897-908. Disponível em: http://www.scielo.br/pdf/csc/v9n4/a11v9n4.pdf
3. Costa EFA, Porto CC, Soares AT. Envelhecimento populacional brasileiro e o aprendizado de geriatria e gerontologia. Rev UFG [Internet]. 2003 dez [citado 2013 dez];5(2):[cerca de 14 p.]. Disponível em: http://www.proec.ufg.br/revista_ufg/idoso/envelhecimento.html
4. Malta DC, Morais Neto OL, Silva Júnior JB. Apresentação do plano de ações estratégicas para o enfrentamento das doenças crônicas não transmissíveis no Brasil, 2011 a 2022. Epidemiol Serv Saude [Internet]. 2011 out-dez [citado 2013 dez 20];20(4):425-38. Disponível em: http://scielo.iec.pa.gov.br/scielo.php?script=sci_arttext&pid=S1679-49742011000400002&lng=pt&nrm=iso
5. Banco Mundial. Enfrentando o desafio das doenças não transmissíveis no Brasil [Internet]. Relatório Nº 32576BR, 15 de novembro de 2005. Washington: Banco Mundial; 2005 [cited 2013 dez 20]. Disponível em: http://www.ppge.ufrgs.br/giacomo/arquivos/cd%20ispor/artigos/banco-mundial-2005.pdf
6. Guerra MR, Gallo CVM, Mendonça GAS. Risco de câncer no Brasil: tendências e estudos epidemiológicos mais recentes. RevBras Cancerol [Internet]. 2005 jul-set [citado 2013 dez 18];51(3):227-34. Disponível em: http://www.inca.gov.br/rbc/n_51/v03/pdf/revisao1.pdf
7. Chaimowicz F. A saúde dos idosos brasileiros às vésperas do século XXI: problemas, projeções e alternativas. Rev Saude Publica [Internet]. 1997abr [citado 2013 dez 18];31(2):184-200. Disponível em:http://www.scielo.br/scielo.php?pid=S0034-89101997000200014&script=sci_arttext
8. Barros MBA, César CLG, Carandina L, Torre GD. Desigualdades sociais na prevalência de doenças crônicas no Brasil, PNAD-2003. Cienc Saude Coletiva [Internet]. 2006 out-dez [citado 2013 dez 20];11(4):911-26. Disponível em: http://www.scielo.br/scielo.php?pid=S1413-81232006000400014&script=sci_abstract&tlng=pt
9. Silva ZP, Ribeiro MCSA, Barata RB, Almeida MF. Perfil sociodemográfico e padrão de utilização dos serviços de saúde do Sistema Único de Saúde (SUS), 2003-2008. Cienc Saude Coletiva [Internet]. 2011 set [citado 2015 fev 3];16(9):3807-16. Disponível em: http://www.scielo.br/scielo.php?pid=S1413-81232011001000016&script=sci_arttext
10. Bittencourt SA, Camacho LAB, Leal MC. O Sistema de informação hospitalar e sua aplicação na saúde coletiva. Cad Saude Publica. 2006 jan [citado 2014 fev 24];22(1):19-30. Disponível em: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0102-311X2006000100003
11. Organização Mundial da Saúde. CID-10 Classificação Estatística Internacional de Doenças e Problemas Relacionados à Saúde. 10. rev. Vol 1. São Paulo: Universidade de São Paulo; 1997.
12. Mathers C, Bernard C, Iburg K, Inoue M, Shibuya K, Stein C, et al. Global burden of disease in 2002: data sources, methods and results. Geneva: World Health Organization; 2004. [citado 2014 nov 28]. Disponível em: http://www.who.int/healthinfo/paper54.pdf
13. Ministério da Saúde (BR). Departamento de Informática do SUS. DATASUS: Informações de Saúde [Internet]. Brasília: Ministério da Saúde; 2013[citado2013 dez 20]. Disponível em: http://www2.datasus.gov.br/DATASUS/index,php?area=02
14. Instituto Brasileiro de Geografia e Estatística. Projeção da população do Brasil por sexo e idade para o período 2000/2060. Rio de Janeiro: IBGE; 2013 [citado 2013 dez 20]. Disponível em: http://www.ibge.gov.br/home/estatistica/populacao/projecao_da_populacao/2013/default.shtm
15. Antunes JLF, Toporcov TN, Biazevic MGH, Boing AF, Bastos JL. Gender and racial inequalities in trends of oral cancer mortality in Sao Paulo, Brazil. Rev Saude Publica [Internet]. 2013 May-Jun [citado2015 fev 23];47(3):470-8. Disponível em: http://www.scielo.br/pdf/rsp/v47n3/0034-8910-rsp-47-03-0470.pdf

16. Ministério da Saúde (BR). Plano de ações estratégicas para o enfrentamento das doenças crônicas não transmissíveis no Brasil 2011-2022. Brasília: Ministério da Saúde; 2011.

17. Schmidt MI, Duncan BB, Silva GA, Menezes AM, Monteiro CA, Barreto SM, et al. Doenças crônicas não transmissíveis no Brasil: carga e desafios atuais. Lancet [Internet]. 2011 Jun [citado2013 dez 20];377(9781):1949-61. Disponível em: http://download.thelancet.com/flatcontentassets/pdfs/brazil/brazilpor4.pdf

18. Bassanesi SL, Azambuja MI, Achutti A. Mortalidade precoce por doenças cardiovasculares e desigualdades sociais em Porto Alegre: da evidência à ação. Arq Bras Cardiol [Internet]. 2008 jun [citado 2013 dez 20];90(6):403-12. Disponível em: http://www.scielo.br/scielo.php?pid=S0066-782X2008000600004&script=sci_arttext

19. Silva GA, Valente JG, Malta DC. Tendências do tabagismo na população adulta das capitais brasileiras: uma análise dos dados de inquéritos telefônicos de 2006 a 2009. Rev Bras Epidemiol. 2011 jan-mar [citado2014 jan 20];14(1):103-14. Disponível em: http://www.scielo.br/pdf/rbepid/v14s1/a11v14s1.pdf

20. Góis ALB, Veras RP. Informações sobre a morbidade hospitalar em idosos nas internações do Sistema Único de Saúde do Brasil. Cienc Saude Coletiva [Internet]. 2010 set [citado 2014 mai 20];15(6):2859-69. Disponível em: http://www.scielo.br/pdf/csc/v15n6/a23v15n6.pdf

21. Mascarenhas MDM, Vieira LC, Lanzieri TM, Leal APPR, Duarte AF, Hatch DL. Poluição atmosférica devida à queima de biomassa florestal e atendimentos de emergência por doença respiratória em Rio Branco, Brasil – Setembro, 2005. J Bras Pneumol. 2008 jan [citado 2014 mai 20];34(1):42-6. Disponível em: http://www.scielo.br/pdf/jbpneu/v34n1/v34n1a08.pdf

22. Godoy DV, Zotto CD, Bellicanta J, Weschenfelder RF, Nacif SB. Doenças respiratórias como causa de internações hospitalares de pacientes do Sistema Único de Saúde num serviço terciário de clínica médica na região nordeste do Rio Grande do Sul. J Pneumol [Internet]. 2001 jul-ago [citado2014 mai 20];27(4):193-8. Disponível em: http://www.scielo.br/pdf/jpneu/v27n4/9193.pdf

23. Instituto Brasileiro de Geografia e Estatística. Sinopse dos resultados do Censo 2010: pirâmide etária [Internet]. Rio de Janeiro: IBGE; 2010 [citado 2013 dez 20]. Disponível em: http://www.censo2010.ibge.gov.br/sinopse/webservice/

24. Pinheiro RS, Viacava F, Travassos C, Brito AS. Gênero, morbidade, acesso e utilização de serviços de saúde no Brasil. Cienc Saude Coletiva [Internet]. 2002 [citado 2013 dez 20];7(4):687-707. Disponível em: http://www.scielo.br/scielo.php?pid=S1413-81232002000400007&script=sci_arttext

25. Martins LFL, Thuler LCS, Valente JG. Cobertura do exame de Papanicolau no Brasil e seus fatores determinantes: uma revisão sistemática da literatura. Rev Bras Ginecol Obstet [Internet].2005 ago [citado2013 dez 20];27(8):485-92. Disponível em: http://www.scielo.br/pdf/rbgo/v27n8/26760.pdf

26. Sartorelli DS, Franco LJ. Tendências do diabetes mellitus no Brasil: o papel da transição nutricional. Cad Saude Publica [Internet]. 2003 jan-fev [citado2013 dez 20]19(1):529-36. Disponível em: http://www.scielo.br/scielo.php?pid=S0102-311X2003000700004&script=sci_arttext

27. Toyoshima MTK, Ito GM, Gouveia N. Morbidade por doenças respiratórias em pacientes hospitalizados em São Paulo/SP. Rev Assoc Med Bras. 2005 jul-ago [citado 2013 dez 20];51(4):209-13. Disponível em: http://www.scielo.br/scielo.php?pid=S0104-42302005000400017&script=sci_arttext

28. Brito F. A transição demográfica no Brasil: as possibilidades e os desafios para a economia e a sociedade. Belo Horizonte: Universidade Federal de Minas Gerais; 2007 [citado2014 dez 10]. Disponível em: http://www.sae.gov.br/site/wp-content/uploads/07demografia1.pdf

29. Victora CG, Aquino EM, Carmo Leal M, Monteiro CA, Barros FC, Szwarcwald CL. Maternal and child health in Brazil: progress and challenges.Lancet. 2011 May [citado 2014 dez 20];377(9780):1863-76. Disponível em: http://www.thelancet.com/journals/lancet/article/PIIS0140-6736%2811%2960138-4/references

30. Tavares EL, Anjos LA. Perfil antropométrico da população idosa brasileira: resultados da Pesquisa Nacional sobre Saúde e Nutrição. Cad Saude Publica [Internet]. 1999 out-dez [citado 2013 dez 20];15(4):759-68. Disponível em:http://www.scielo.br/pdf/csp/v15n4/1016.pdf

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