

TEMPORAL TREND OF SMOKING AND HOSPITALIZATIONS FOR RESPIRATORY DISEASES IN THE CAPITALS OF SOUTHEASTERN BRAZIL: 2008-2013**TENDÊNCIA TEMPORAL DE TABAGISMO E INTERNAÇÕES POR DOENÇAS DO APARELHO RESPIRATÓRIO NAS CAPITAIS DA REGIÃO SUDESTE DO BRASIL: 2008-2013****TENDENCIA TEMPORAL DEL TABAQUISMO Y HOSPITALIZACIONES POR ENFERMEDADES RESPIRATORIAS EN LAS CAPITALES DE LA REGIÓN SURESTE DEL BRASIL: 2008-2013****Marco Aurélio Ferreira de Jesus Leite¹****Hugo Ribeiro Zanetti²****Jeffer Eidi Sasaki³****Joilson Meneguci⁴****Jair Sindra Virtuoso Júnior⁵****Cesar Augusto França Abrahão⁶****Received: 12/02/2014**
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This study aim to describe the prevalence of smoking and hospitalizations due to respiratory diseases in adults of capital cities of southeastern, Brazil. It is a quantitative research data were obtained from a systematic search of computerized databases made available by the Ministry of Health of Brazil, namely the Risk and Protective Factors for Chronic Diseases Surveillance through telephone (VIGITEL) and the Single System Database Health (DATASUS), focalizing changes in the percentage of smokers and number of hospitalizations due to respiratory diseases between the period from 2008 to 2013. Over the years analyzed there was a decline in the percentage of smokers and stabilizing the number of hospitalizations for respiratory diseases. The tendency of decline the percentage of smokers indicates the effectiveness of smoke-free policies in the country and possibly having positive impact on the prevention of respiratory diseases.

Descriptors: Smoking; Respiratory systems; Public Health; Uses of Epidemiology.

Este estudo tem como objetivo descrever a prevalência de fumantes e de internações por doenças do aparelho respiratório em adultos das capitais da região sudeste do Brasil. Trata-se de pesquisa quantitativa utilizando dados informatizados do Ministério da Saúde, sendo estes os de Vigilância de Fatores de Risco e Proteção para Doenças Crônicas por Inquérito Telefônico (VIGITEL) e Banco de Dados do Sistema Único de Saúde (DATASUS) com foco nas alterações dos percentuais de fumantes e número de internações por doenças do aparelho respiratório entre o período de 2008 a 2013. No decorrer dos anos analisados houve declínio no percentual de fumantes e estabilização do número de internações por doenças do aparelho respiratório. A tendência de declínio no percentual de fumantes sinaliza a efetividade de políticas antitabagistas no país e possível impacto positivo na prevenção de doenças do aparelho respiratório.

Descritores: Hábito de fumar; Sistema respiratório; Saúde Pública; Aplicações da Epidemiologia.

Este estudio tuvo como objetivo describir la prevalencia del consumo de tabaco y las hospitalizaciones por enfermedades respiratorias en adultos de las capitales de la región sureste del Brasil. Los datos se obtuvieron en bases informatizadas, puestos a disposición por el Ministerio de Salud del Brasil, que son Factores de Riesgo y de Protección para Enfermedades Crónicas de Vigilancia a través del Teléfono (VIGITEL) y de la Base de Datos del Sistema Único Salud (DATASUS) brasileño focalizando los cambios en el porcentaje de fumadores y el número de hospitalizaciones por enfermedades respiratorias entre el período de 2008 a 2013. A través de los años analizados se produjo una disminución en el porcentaje de fumadores y estabilización del número de hospitalizaciones por enfermedades respiratorias. La tendencia a la baja en el porcentaje de fumadores indica la eficacia de las políticas contra el humo en el país y que posiblemente tienen impacto positivo en la prevención de las enfermedades respiratorias.

Descritores: Hábito de fumar; Sistema respiratorio; Salud Pública; Usos de la Epidemiología.

¹ Physical Education Degree from the Federal University of Triângulo Mineiro (UFTM). marcoferreiraleite@hotmail.com

² Physical Educator. Master Degree in Physical Education by UFTM. hugo.zanetti@hotmail.com

³ Physical Educator. Specialist in Exercise and Quality of Life. Master in Physical Education. Doctor of Health Sciences. Post Doctorate in Education and Sport Sciences. Adjunct Professor of UFTM, linked to the Department of Sports Sciences. jeffersasaki@gmail.com

⁴ Physical Educator. Master in Physical Education. Ph.D. in Health Care by UFTM. joilsonmeneguci@yahoo.com.br

⁵ Physical Educator. Master in Physical Education. Doctor of Physical Activity and Health. Post-doctorate in Physical Education by UFTM. virtuosojr@yahoo.com.br

⁶ Physiotherapist. Ergonomics Specialist, Physical Training, and Physical Activity. Ph.D. in Health Sciences. Substitute Professor of UFTM by the Department of Physiotherapy. cesarabrahao@hotmail.com

INTRODUCTION

Active smoking is the act of consuming cigarettes or any other tobacco product (cigar, hookah, and cigarette), which drug or active ingredient is nicotine. Currently, smoking is the most aggravating of public health as well as being the leading preventable cause of death globally¹⁻³. The World Health Organization (WHO) reports that there are approximately 1.3 billion smokers in the world, and of these, 900 million have been observed in developing countries, with the highest prevalence of males³.

Although active smoking is a worldwide problem for Public Health, greater attention to passive smokers is required (passive smoking), since the polluted air contains on average, three times more nicotine, or even fifty times more carcinogens than the smoke inhaled by the active smoker, after passing the cigarette filter⁴⁻⁵. The smoke of tobacco is called environmental tobacco pollution, and even more serious indoors according to WHO⁴. Passive smoking is the third leading cause of preventable death in the world, after active smoking and excessive alcohol consumption⁶⁻⁷.

The high number of smoking enthusiasts reflects directly in the death rate in the world. Yearly, about 4.9 million people die due to smoking, accounting for over 10,000 deaths a day. In the last century, the tobacco epidemic caused about 100 million deaths⁸.

WHO estimates that in 2020, from 10 deaths due to tobacco use, seven will take place in developing countries, where information and interventions about the addiction of this drug are insufficient. This ascendancy in developing countries is strongly influenced by marketing strategies promoted by the national media, that primarily stimulate the adherence of young

people³. The exemplification of this process lies in the fact that 90% of smokers begin tobacco use before the age of 19 years old³. Evidence of this fact was observed in a study performed with health universities, which showed a considerable prevalence in smoking³.

In Brazil, it is estimated that about 200,000 deaths per year are due to tabagismo¹⁰. According to the data of Risk and Protective Factors for Chronic Diseases Surveillance through telephone (VIGITEL) held in 2012, the prevalence of people aged 18 years old or more who consume cigarettes ranged from 7.8% in Maceio to 22.6% in Porto Alegre. In men, the lowest percentage of smokers was in Salvador (10.6%) and the largest in Porto Alegre (24.6%). For women, the lowest proportion of smokers was in Aracaju (4.3%) and the largest in Porto Alegre (20.9%). On average, Brazilians use from 15 to 24 industrialized cigarettes per day, being the South region's the largest producer and consumer of tobacco in Brazil.

Several diseases are associated with smoking, and the habit considered a risk factor for the development of chronic non-communicable diseases (NCDs). Adolescents and adults smokers are affected more frequently from respiratory infections, oral health impairment, reduced physical capacity and nicotine dependence¹¹⁻¹². In 2011, a survey conducted by the Alliance for Tobacco Control (ACT), pointed out that Brazil spent about 21 billion reais (Brazilian currency) in the treatment of patients with tobacco-related diseases, value equivalent to 30% of the budget of the Ministry of Health and 3, 5 times higher than the Federal Revenue collected with products derived from tobacco in the same period¹³.

The high number of smokers jointly with the harmful effects provided by tobacco use may reflect in high financial costs for

Public Health, implicated in the treatment of diseases and complications caused by the use and/or inhaling the smoke of this drug. However, there are few studies that show a temporal trend of smoking and hospitalizations for degenerative diseases such as respiratory diseases. This study aims to describe the prevalence of smoking and hospitalizations due to respiratory diseases in adults in the southeastern Brazilian capitals.

METHOD

The research is quantitative, descriptive and exploratory, and data for the period from 2008 to 2013 were obtained from systematic search in the banks of computerized data provided by the Ministry of Health, which are the Unified Health System Database (DATASUS) and the Risk and Protective Factors Surveillance for Chronic Diseases by Telephone Inquiry (VIGITEL).

VIGITEL¹⁴ uses probability samples of adults (≥ 18 years) living in state capitals and the Federal District of Brazil, from the register of fixed telephone lines in each location. Annually, 5,000 telephone lines are selected in each locality, which are divided into replicas (or sub-samples) of 200 lines each, to identify the eligible lines, i.e. residential and active lines. In each eligible line, where there was a contact with a resident adult and agreement to participate in the study, is performed the random selection of the resident who will be interviewed.

The VIGITEL questionnaire consists of 94 questions, divided into the following modules: demographic and socioeconomic characteristics of individuals, eating and physical activity patterns, referred weight and height, cigarette smoking and alcohol consumption, own health status evaluation and cited morbidity. The questions are read on the computer screen, and the answers

immediately recorded electronically, allowing automatic advances in not valid questions arising from previous answers. In this study, the frequencies were evaluated in the percentage of adults (≥ 18 years) current smokers (those who smoke, regardless of the intensity and duration of smoking) of the Southeastern capitals¹⁴.

The DATASUS contain information about the sex and age of hospitalized patients, diagnosis, the length of hospital stay, hospitalization date and possible occurrences of deaths during hospitalization. Only the following selections were extracted: content (number of hospitalizations), period (year of reference between 2008 and 2013), ICD-10 Chapter (X: Diseases of the respiratory system), age group (≥ 20 anos), gender (Male and Female), in the municipalities of Belo Horizonte, Vitória, São Paulo and Rio de Janeiro in the specified period. In data analysis, procedures of descriptive statistics were used to establish the temporal trends frequency of smoker's and people hospitalized for cardiovascular diseases.

RESULTS

The percentage of the smoking population in the southeastern capitals, between the years 2008-2013 is shown in Table 1. The city of São Paulo had the highest percentages of smokers in population, in all analyzed year, highlighting the year 2008, in which about 21% of the total resident population of the city was a smoker.

The number of hospitalizations due to respiratory diseases in the Southeastern capitals, between the years 2008-2013 is shown in Table 2. It is noted that the city of São Paulo obtained, in all analyzed years, the highest number of hospitalizations concerning other capitals. Figure 1 shows the changes in total number of hospitalizations due to respiratory diseases each year (Figure

1A) with the total percentage of adult year in the southeastern Brazilian capitals smokers (Figure 1B) each.

Table 1. Adults smokers, by gender, according to the southeastern Brazilian capitals, between 2008 and 2013.

Years per capitals	% of Men	% of Women	% Total
Belo Horizonte			
2008	22,5	16,5	19,3
2009	18,9	12,4	15,4
2010	19,5	14,8	17,0
2011	20,1	11,7	15,6
2012	15,5	9,9	12,5
2013	15,8	10,3	12,8
Vitória			
2008	14,0	12,3	13,1
2009	16,2	12,0	13,9
2010	16,3	9,6	12,7
2011	15,2	7,8	11,2
2012	11,7	6,2	8,7
2013	10,2	6,5	8,2
São Paulo			
2008	27,7	15,1	21,0
2009	21,0	26,7	18,8
2010	22,2	16,8	19,6
2011	22,2	16,8	19,3
2012	20,7	11,1	15,5
2013	17,6	12,6	14,9
Rio de Janeiro			
2008	19,0	14,6	16,6
2009	15,6	11,8	13,5
2010	13,4	13,3	13,3
2011	15,5	12,9	14,1
2012	17,1	10,5	13,5
2013	15,1	9,0	11,8

Source: VIGITEL

Figure 1A and 1B. Hospitalizations due to respiratory diseases and percentage of smokers in the Southeastern capitals in the period from 2008 to 2013, according to VGITEL and DATASUS data.

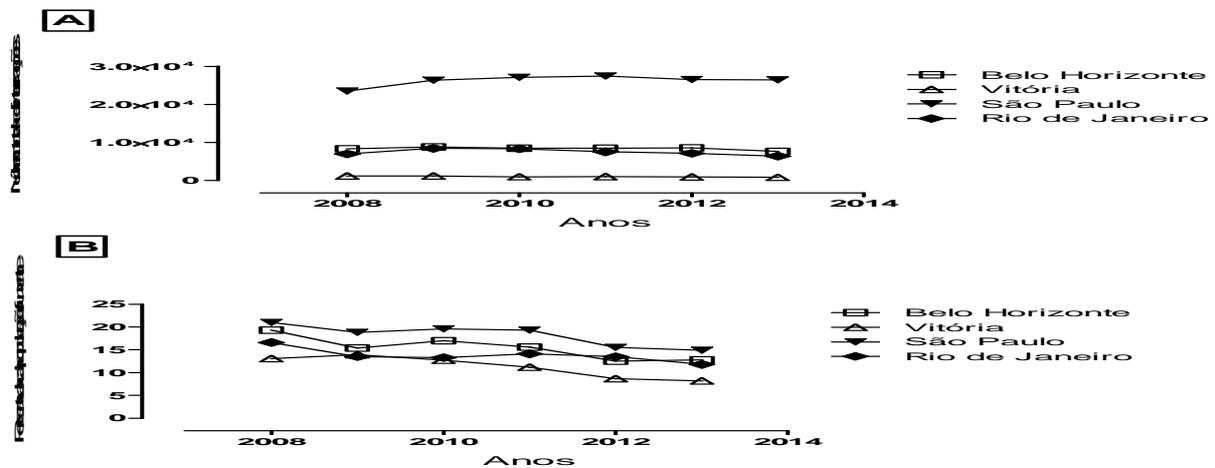


Table 2. Hospitalizations due to respiratory diseases, by gender, according to the southeastern Brazilian capitals, between 2008 and 2013.

Years per capitals	Men	Women	Total
Belo Horizonte			
2008	734	636	1370
2009	11635	9871	21506
2010	11070	9286	20356
2011	10864	9205	20069
2012	10853	9270	20123
2013	9957	8555	18512
Vitória			
2008	601	535	1136
2009	599	537	1136
2010	517	414	931
2011	572	426	998
2012	472	403	875
2013	431	365	796
São Paulo			
2008	29480	24815	54295
2009	32525	27999	60524
2010	33189	28145	61334
2011	33748	28138	61886
2012	32084	26644	58728
2013	32996	28111	61107
Rio de Janeiro			
2008	7225	6014	13239
2009	8548	7394	15942
2010	8384	7152	15536
2011	8161	6867	15028
2012	7560	6494	14054
2013	7294	6209	13503

Source: DATASUS

DISCUSSION

This study makes it possible to analyze VIGITEL data among adult residents in the southeastern Brazilian capitals and hospitalizations according to the DATASUS. The temporal analysis of the data showed a reduction in the prevalence of smokers, but hospitalizations for respiratory diseases, remained.

Several diseases are associated with smoking; wherein the tobacco smoking is considered a risk factor for six of the eight leading causes of death in the world, being ischemic heart diseases, cerebrovascular accidents, infections of the lower respiratory tract, chronic obstructive pulmonary disease, tuberculosis, and lung, trachea, bronchi cancers¹⁵. Other diseases, also directly related to tobacco use are: an arterial aneurysm, vascular thrombosis, digestive ulcer, respiratory infections and sexual impotence in men¹⁶.

Environmental tobacco smoke is also responsible for causing damage to health, especially in asthmatics, as well as for children and adults with heart disease trend¹⁷. Pollution smoke contributes to the concentration and exposure of particles whose chemicals are toxic or carcinogenic, affecting the air quality.

The city of São Paulo, besides evidenced as the capital with the highest rate and prevalence of smokers in southeastern Brazil, is still considered one of the cities with the largest population and air pollution in South America¹⁸. Such factors may have favored the high number of hospitalizations, presented by the town for respiratory diseases consequences in recent years.

These findings emphasize the reduction of smoking in the capitals of the Southeast in the period examined by this study, but it was not observed in the number of hospitalizations for respiratory diseases,

since these values had few changes. This finding shows that, although smoking may be the main cause of diseases related to respiratory system, there are other factors can contribute to the functional impairment of the respiratory tract, such as the environmental, epidemiological and individual aspects.

Polluted air can cause respiratory complications, as well as the emergence of communicable disease epidemics caused by viruses or bacteria that affect the respiratory tract and result in increasing the number of hospitalizations¹⁹. Together with these consequences, chronic respiratory diseases and/or congenital can also directly influence the number of hospitalizations²⁰⁻²¹.

There are several factors that stimulate tobacco use, and may be of individual and/or situational nature. Two classes of situations seem to trigger the desire to smoke: a) boring situations, which produce a need to increase cortical stimulation²²; and, b) stress, which indicates that people with high levels of neuroticism (nervous behavior) tend to be calmer after tobacco use in stressful situations, due to the function of reducing effects of stress propitiated by smoking²³⁻²⁴. The high percentage of tobacco users in the city of São Paulo can be caused mainly by the stressful routine.

In Brazil, in 2005, were performed 401,932 and 512,173 hospitalizations of women and men aged 35 years or more, respectively, for the three groups of diseases (cancer, cardiovascular and respiratory diseases). Of this total, 144,241 hospitalizations (35.9%) males and 138,308 (27%) females, were attributable to smoking²⁵. The total cost of these hospitalizations and chemotherapy reached R\$ 316,083,126.11 for both genders, of which R\$ 114,668,026.24 (36.3%) can be attributed to smoking²⁵.

In the United States, the direct and indirect costs reached US\$ 167 billion between 1997 and 2001²⁶. In Germany, estimates indicate that for the year 1996, the economic burden related to the provision of health services for the treatment of diseases tobacco-related was 16 billion euros, and in 2003, this cipher reached 21 billion euros²⁷. Although Brazil has spent fewer financial resources about the mentioned countries, it is observed that there were higher financial demands procedures of Hospital Systems of the Unified Health System (SUS). Such behavior burdens the public coffers and causes the rise in spending on Public Health that could be avoided through preventive strategies. Despite the progress observed in the temporal trend in the number of smokers in Brazil over the past few years, there is a need to expand the country's control/prevention smoking actions.

About two decades ago, the Brazilian government launched the National Program for Tobacco Control (PNCT), with marked acceleration of efforts since 1990, whose focus was directed towards interventions unrelated to prices, such as the ban on advertising and restrictions on smoking in public places, since then, there has been a decrease in the percentage of smokers in the country.

This study presents no inferential analysis, and this aspect appears as a limitation. However, from the descriptive analysis, it was possible to determine and point trends in the use of tobacco and the number of hospitalizations for respiratory diseases in the southeastern Brazilian capitals from 2008 to 2013.

There is a need for further studies with more robust designs to investigate the relation between smoking and hospitalizations due to respiratory diseases in different regions of the country.

CONCLUSION

It was noted that the evolution of hospitalizations due to respiratory diseases and the percentage of smokers in the capitals of Southeast (Belo Horizonte, Vitória, Rio de Janeiro and São Paulo) from 2008 to 2013 did not obey the same trend. However, the declining trend in the percentage of smokers, indicates the effectiveness of free-smoke policies in the country and possibly have a positive impact on stabilizing the quantity of hospitalizations due to respiratory diseases.

REFERENCES

1. Silva MAM, Rivera IR, Carvalho ACC, Guerra Júnior AH, Moreira TCA. The prevalence of and variables associated with smoking in children and adolescents. *J Pediatr*. 2006; 82(5):365–70.
2. Granville-Garcia AF, Lorena Sobrinho JE, Araujo JC, Menezes VA, Cavalcanti AL. Ocorrência de tabagismo e fatores associados em escolares. *RFO UPF*. [Internet]. 2010 [cited in 10 feb 2015]; 13(1):30-4. Available in: <http://www.perguntaserespostas.com.br/seer/index.php/rfo/article/view/587>
3. World Health Organization. World no tobacco day 2015: stop illicit trade of tobacco products [Internet]. Geneva: WHO; 2015 [cited in 10 feb 2015]. Available in: <http://www.who.int/tobacco/en/>
4. Joya X, Manzano C, Álvarez A-T, Mercadal M, Torres F, Salat-Batlle J, et al. Transgenerational exposure to environmental tobacco smoke. *Int J Environ Res Public Health*. 2014; 11(7):7261–74.
5. Kumar SR, Davies S, Weitzman M, Sherman S. A review of air quality, biological indicators and health effects of second-hand waterpipe smoke exposure. *Tob Control*. 2015; 24(Suppl 1):i54-i59.
6. Sebríé EM, Schoj V, Glantz SA. Smokefree environments in Latin America: on the road to real change? *Prev Control*. 2008; 3(1):21-35.
7. Surgeon General; US Department of Health and Human Services. Reports of the Surgeon General, U.S. Public Health Service [Internet]. Washington: US Department of Health and Human Services; 2015 [cited in 10 feb 2015]. Available in: <http://www.surgeongeneral.gov/library/reports/>

8. Pi IBH, Wirtz VJ. Background Paper 6.17: tobacco use cessation therapies [Internet]. [2012?] [cited in 10 feb 2015]. p.1-42. Update on 2004 Background Paper by Warren Kaplan and Samira Asma. Available in: http://www.who.int/entity/medicines/areas/priority_medicines/BP6_17Smoking.pdf.
9. Granville-Garcia AF, Branco ACL, Sarmiento DJS, Cavalcanti AL, D'Avila S, Menezes VA. Tabagismo e fatores associados entre acadêmicos de odontologia. RFO UPF. [Internet]. 2010 [cited in 10 feb 2015]; 14(2). Available in: <http://www.upf.br/seer/index.php/rfo/article/view/720>
10. Ministério da Saúde (Br), Instituto Nacional do Câncer. Tabagismo: jovem, mulher e tabaco. Rio de Janeiro: INCA; 2015.
11. Galván Fernández C, Suárez López de Vergara RG, Oliva Hernández C, Doménech Martínez E. Patología respiratoria em los jóvenes y hábito tabáquico. Arch Bronconeumol. 2000; 36(4):186-90.
12. Skjöldebrand J, Gahnberg L. Tobacco preventive measures by dental care staff. An attempt to reduce the use of tobacco among adolescents. Swed Dent J. 1997; 21(1-2):49-54.
13. Padilha A. Brasil gasta R\$ 21 bi com tratamento de doenças relacionadas ao tabaco. Estadão [Internet], 31 fev 2012 [cited in 11 may 2015]. Geral. Available in: <http://www.estadao.com.br/noticias/geral,brasil-gasta-r-21-bi-com-tratamento-de-doencas-relacionadas-ao-tabaco-imp-,880230>
14. Moura EC, Morais Neto OL, Malta DC, Moura L, Silva NN, Bernal RTI, et al. Vigilância de fatores de risco para doenças crônicas por inquérito telefônico nas capitais dos 26 estados brasileiros e no Distrito Federal (2006). Rev Bras Epidemiol. [Internet] 2008 [cited in 10 feb 2012]; 11(supl 1):20-37. Available in: <http://www.scielo.br/pdf/rbepid/v11s1/02.pdf>.
15. Oliveira AF, Valente JG, Leite IC. Aspects of tobacco attributable mortality: systematic review. Rev Saúde Pública. 2008; 42(2):335-45.
16. Taylor AL, Bettcher DW. WHO Framework Convention on Tobacco Control: a global "good" for public health. Bull World Health Organ. 2000; 78(7):920-9.
17. Seelig MF, Campos CRJ, Carvalho JC. Ventilation and environmental tobacco smoke. Ciênc Saúde Coletiva. 2005; 10:83-90.
18. Freitas CU, Junger W, Leon AP, Grimaldi R, Silva MAFR, Gouveia N. Poluição do ar em cidades brasileiras: selecionando indicadores de impacto na saúde para fins de vigilância. Epidemiol Serv Saúde. 2013; 22(3):445-54.
19. Toyoshima MTK, Ito GM, Gouveia N. Morbidade por doenças respiratórias em pacientes hospitalizados em São Paulo/SP. Rev Assoc Med Bras. 2005; 51(4):209-13.
20. Moreira MEL. O recém-nascido de alto risco: teoria e prática do cuidar. Rio de Janeiro: Fiocruz; 2004.
21. Andrade CF, Ferreira HPC, Fischer GB. Congenital lung malformations. J Bras Pneumol. 2011; 37(2):259-71.
22. Rondina RC, Gorayeb R, Botelho C. Características psicológicas associadas ao comportamento de fumar tabaco. J Bras Pneumol. 2007; 33(5):592-601.
23. Etter JF. The psychological determinants of low-rate daily smoking. Addiction. 2004; 99(10):1342-50.
24. Etter JF, Prokhorov AV, Perneger TV. Gender differences in the psychological determinants of cigarette smoking. Addiction. 2002; 97(6):733-43.
25. Pinto M, Ugá MAD. The cost of tobacco-related diseases for Brazil's Unified National Health System. Cad Saúde Pública. 2010; 26(6):1234-45.
26. Fenelon A, Preston SH. Estimating Smoking-attributable mortality in the United States. Demography [Internet]. 2012 [cited in 11 feb 2015]; 49(3): 797-818. Available in: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3809994/>
27. Ruff LK, Volmer T, Nowak D, Meyer A. The economic impact of smoking in Germany. Eur Respir J. 2000; 16(3):385-90.

CONTRIBUTIONS

All authors worked equally in the diverse stages of the development of the research and writing of the article.