

Socioeconomic inequalities associated with smoking habit in brazilians aged 50 years or over

Desigualdades socioeconômicas associadas ao hábito de fumar em brasileiros com 50 anos ou mais

Orlando Luiz do Amaral Júnior¹
<https://orcid.org/0000-0002-6611-3871>

Maria Laura Braccini Fagundes²
<https://orcid.org/0000-0001-5548-7408>

Gabriele Rissotto Menegazzo³
<https://orcid.org/0000-0002-4181-0267>

Jessye Melgarejo do Amaral Giordani⁴
<https://orcid.org/0000-0002-3825-9734>

Abstract

Introduction: Smoking is considered a predisposing factor for the occurrence of chronic non-communicable diseases, especially circulatory diseases and can be influenced by socioeconomic factors. **Objective:** To estimate the association between socioeconomic and demographic factors with smoking habit independently among Brazilian men and women aged 50 years or over. **Methods:** Cross-sectional study analyzed the baseline data from the Longitudinal Study of the Health of Elderly Brazilians (ELSI-Brazil) composed of 9,412 individuals. Associations between smoking habit and socioeconomic and demographic factors among men and women were verified. The analyzes were based on the prevalence ratios (PR) estimated by Poisson regression. **Results:** Women living in rural areas had a 35% lower prevalence of smoking than those living in urban areas. Women with an education level greater than 12 years of study had a prevalence 28% lower when compared to those who studied up to 3 years. In both sexes, men did not show association. In both sexes, individuals from the richest quintile had a lower prevalence for smoking, 61% lower in men (PR: 0.39; 95% CI: 0.30-0.51) and 42% lower in women (PR: 0.58; 95% CI: 0.42-0.80). **Conclusion:** It is suggested that public health policies should consider socioeconomic factors for implementing policies aimed at reducing smoking.

Keywords: Gender and health; smoking; aging

Resumo

Introdução: O tabagismo é considerado um fator predisponente para a ocorrência das doenças crônicas não transmissíveis, em especial as doenças circulatórias e pode ser influenciado por fatores socioeconômicos. **Objetivos:** Estimar associação entre fatores socioeconômicos e demográficos com o hábito de fumar de forma independente entre homens e mulheres brasileiros com idade superior a 50 anos. **MÉTODOS:** Estudo transversal que utilizou dados de base do Estudo Longitudinal da Saúde dos Idosos Brasileiros (ELSI-Brasil) composto por 9.412 indivíduos. Foram verificadas associações entre o hábito de fumar entre homens e mulher e fatores socioeconômicos e demográficos. As análises foram baseadas nas Razões de prevalência (RP) estimadas por regressão de Poisson. **Resultados:** Mulheres residentes na zona rural apresentaram uma prevalência 35% menor do hábito de fumar do que as que vivem na zona urbana. Mulheres com nível de escolaridade maior que 12 anos de estudo apresentaram

¹ Universidade Federal de Santa Maria. Santa Maria, RS, Brasil. E-mail: orlandodoamaraljr@gmail.com

² Universidade Federal de Santa Maria, Santa Maria, RS, Brasil. E-mail: mlaubf@gmail.com

³ Universidade Federal de Santa Maria, Santa Maria, RS, Brasil. E-mail: gabi_menegazzo@hotmail.com

⁴ Universidade Federal de Santa Maria, Santa Maria, RS, Brasil. E-mail: giordanijsma@gmail.com

uma prevalência 28% menor quando comparadas as que estudaram até 3 anos. Em ambos os casos, homens não foram associados estatisticamente. Em ambos os sexos, indivíduos do quintil mais rico apresentaram menor prevalência para o hábito de fumar, sendo 61% menor em homens (RP: 0,39; 95% IC: 0,30-0,51) e 42% menor em mulheres (RP: 0,58; 95% IC: 0,42-0,80). **Conclusão:** Sugere-se que políticas públicas de saúde considerem os fatores socioeconômicos na implementação de políticas voltadas para a redução do hábito de fumar.

Palavras-chave: Gênero e saúde; fumante; envelhecimento

Introduction

A substantial improvement in the population's health parameters has made increased life expectancy a reality, even though this improvement is not evenly distributed in different countries and socioeconomic contexts.¹ Population aging has brought the benefit of greater longevity, but it has increased the occurrence of chronic-degenerative diseases.² An important risk factor for the occurrence of chronic non-communicable diseases, especially circulatory ones, is the smoking habit, which contributes to the development of hypertension, stroke, myocardial infarction, lung cancer, oral cavity cancer, esophagus cancer, stomach cancer, colon cancer, bladder cancer, kidney cancer, cervix cancer, and chronic respiratory diseases.³ Smoking is a risk factor responsible for numerous deaths and loss of quality of life in South American countries and is associated with reduced productivity and high financial expenses for families, factors that contribute to an increase in poverty.⁴

Studies developed in the United States and Europe have consistently shown that individuals with lower socioeconomic status smoke more and have lower rates of smoking cessation than those with higher socioeconomic status.⁵ However, in low- and middle-income countries, the results are controversial.⁶ In addition, there are few studies on smoking emphasizing older populations; most prioritize young people and adults as target populations.⁷ Beyond age, unfair and avoidable inequalities related to social position, roles, and expectations among men and women in society are evident, and women have a

longer life expectancy but worse health status.⁸ Therefore, it is essential to formulate policies to combat smoking that encompass socioeconomic and demographic factors that may have different associations among men and women.

Regarding Brazil, the National Tobacco Control Policy establishes the commitment to continuous monitoring of tobacco consumption in the country.⁹ After the policy implementation, there was a reduction in the prevalence of smoking among men and women, which was 56.5% and 55.8%, respectively,¹⁰ but the magnitude of the disease burden associated with smoking is still high, generating an annual cost to the health system of 23.37 billion reais.⁹ Therefore, the aim of this study was to verify the association between socioeconomic and demographic factors and smoking habit independently among Brazilian men and women aged 50 years or older. This information can be useful for introducing gender equity as a priority criterion in the health system and to implement policies related to tobacco control, taking into account social inequalities.

Materials and methods

We analyzed the Brazilian Longitudinal Study of Aging (ELSI-Brazil) baseline data, carried out between 2015 and 2016, representative of the Brazilian population aged 50 years or over. All residents aged 50 years or over were considered eligible for the interview. All

interviews were carried out at the participants' homes by previously trained interviewers, through individual and household questionnaires including information regarding sociodemographic and behavioral characteristics, lifestyle, quality of life, health services use and general health. Oral health measures were collected through self-reported questions. More details on the methodology and descriptive results of ELSI-Brazil can be found elsewhere.¹¹

The ELSI-Brazil was approved by the FIOCRUZ ethics committee (Certificate of Presentation for Ethical Appreciation: 34649814.3.0000.5091) and also by the National Research Ethics Committee of Brazil (Certificate of Presentation for Ethical Appreciation: 63725117.9.0000.5091).

Sample and type of study

Data from the Demographic Census, carried out by the Brazilian Institute of Geography and Statistics (IBGE) in 2010, were used for the sample definition. The sample size was set at 10,000 people. It was assumed a significance level of 95% and a sample design effect equal to 1.5, being possible to estimate prevalence of 1%, with a sampling error of 0.25% or prevalence of 5% with sampling error of 0.55%. For the same level of significance and sample design effect, it is also possible to estimate differences of 2.2% for prevalence of 10%, with a power of 80%.

The sampling process took into account individuals aged 50 years or over, residents in 70 municipalities, proportionally distributed representing the urban and rural areas of the small, medium and large cities, among the five Brazilian macro-regions: North, Northeast, Central-West, Southeast and South, according to data from the IBGE, 2010. The municipalities were allocated in four strata,

according to the population size. The primary sampling units were the municipalities, the census tracts were the second ones followed by the households. More detailed information about the sampling procedure can be found in previous studies.¹¹ The final sample from ELSI-Brazil was composed of 9,412 included.

Dependent Variable

This study dependent variable was the smoking habit, which was collected through the question: "Do you currently smoke (considering industrial cigarettes, straw cigarettes or other tobacco products such as cigarettes, cigarillos, pipes, Indian cigarettes)?". With the following answer options: "yes, daily" for those who smoke every day, at least one of the products, regardless of how long they have smoked daily; "Yes, less than daily", for those who smoke, but not every day, regardless of the time of smoking; and "No", for those who do not smoke, not even occasionally, but may have smoked in the past. Short periods in which the participant has stopped smoking due to special situations such as: illness, travel, etc., were not considered. The variable was categorized in "Yes" and "No". This categorization is commonly used in the literature.¹²

Demographic and Socioeconomic Variables

The Brazilian regions correspond to the divisions of the Brazilian State based on natural, social, cultural and economic aspect as follows: North, Northeast, Central-West, Southeast and South. The household area was also taken into account, which may be urban or rural. The age was collected in full years and categorized into three groups: 50 to 59 years; 60 to 69 years; and 70 years or over.¹³ The education level is an indicator used to assess socioeconomic status during adolescence and early adulthood, being

widely used in epidemiological studies.¹³ For its evaluation, the following question was used: "What was the last year of the school that you were approved?". Its categorization was based on the number of self-reported years of schooling, as follows: 0 to 3 years (initial series); 4 to 7 years (elementary school); and 8 to 11 (high school) and 12 years or more (complete or incomplete higher education).¹³ Self-reported skin color was collected through the question: "Which of the following options better describes your color? White, black, brown, yellow or indigenous? ". These options are based on IBGE criteria to define race / ethnicity,¹⁴ and it was categorized as white and non-white (black, brown, yellow and indigenous) due to the low frequency of non-white categories.

The wealth index measurement was based on the analysis of main components.¹⁵ The ownership of durable goods and housing characteristics were assessed based on the following information: possession of internet; TV; VCR or DVD; cable television; fridge; washing machine; dishwasher; dryer; computer; landline; cell phone; microwave; air conditioning; motorcycle; car; presence of a domestic worker at home; presence of masonry wall; access to piped water; access by paved street; presence of bathroom; and family agglomeration, measured by the number of rooms in the house divided by the number of residents.¹⁵ The variable was categorized into quintiles, as used in previous studies.¹³

Inclusion criteria

This study used secondary data from ELSI-Brazil. Therefore, all those who participated in ELSI-Brazil and answered the outcome question were included.

Procedures

The data were analyzed using the statistical program STATA 14 (Stata Corporation, College Station, TX, USA).

As it is a complex sample, it was expanded using the sample weight. Crude and adjusted prevalence ratios (PR) were obtained with their respective 95% confidence intervals (95% CI) and significance level of 5%, through Poisson regression. All analysis were stratified by sex.

Results

The final sample comprised 9,409 participants, being (53.9%) women and (46.1%) men. Table 1 presents the data descriptive analysis stratified by sex, sample distribution, prevalence of smokers and the unadjusted prevalence ratios. We observed that smoking was more prevalent in men (20.3%). It was possible to observe a variation among the Brazilian macro-regions, with the southern region with the highest prevalence of smoking men (24.5%) and the central-west region with the highest prevalence of smoking women (17.4%). Those men who live in rural areas smoke more (22.3%) than those who live in urban areas (19.8%) while women who live in urban areas smoke more (15.5%) than those living in the rural area (11.6%). As for skin color, we observed that smoking is more prevalent in non-whites for men (20.6%) and women (15.1%). In both sexes we observed that those aged between 50-59 years showed the highest prevalence of smoking, being (22.9%) for men and (17.9%) for women. Those men with up to 3 years of study smoke more (23.7%) than those who have higher education. Among women, the highest prevalence was found among those who studied between 7-11 years of age, that is, who have complete or incomplete primary education (19.2%). Regarding the wealth index, in both sex the highest prevalence of smokers was found in the poorest quintile, men (27.6%) and women (18.1%), when compared to the wealthiest quintiles.

Tabela 1. Características da amostra ponderada, prevalência bruta e razão de prevalência (verificada por regressão de Poisson) de fumantes segundo as variáveis socioeconômicas e demográficas.

| Variáveis | Peso % | Prevalência de homens fumantes (95% IC) | Razão de prevalência bruta (Homens) (95% IC) | Prevalência de mulheres fumantes (95% IC) | Razão de prevalência bruta (Mulheres) (95% IC) |
|----------------------------|--------|---|--|---|--|
| Região | | | | | |
| Norte | 5,5 | 16,4 (08,8-28,5) | 1 | 10,1 (02,4-16,1) | 1 |
| Nordeste | 24,1 | 18,9 (16,3-21,7) | 1,15 (0,62-2,13) | 12,1 (09,6-15,2) | 1,19 (0,69-2,05) |
| Sudeste | 47,1 | 20,5 (17,8-23,5) | 1,25 (0,68-2,28) | 14,5 (12,5-16,8) | 1,43 (0,87-2,34) |
| Sul | 16,5 | 24,5 (18,8-31,4) | 1,49 (0,79-2,83) | 16,5 (11,8-22,6) | 1,62 (0,90-2,93) |
| Centro-Oeste | 6,6 | 17,7 (10,2-28,9) | 1,08 (0,47-2,45) | 17,4 (14,7-20,5) | 1,72 (1,04-2,85)* |
| Zona | | | | | |
| Urbana | 84,6 | 19,8 (17,7-22,2) | 1 | 14,7 (13,1-16,3) | 1 |
| Rural | 15,3 | 22,3 (17,3-30,0) | 1,16 (0,86-1,55) | 11,6 (08,1-16,4) | 0,79 (0,56-1,11) |
| Cor de pele | | | | | |
| Branco | 42,8 | 19,8 (17,3-22,6) | 1 | 12,9 (10,8-15,3) | 1 |
| Não Branco | 57,2 | 20,6 (18,2-23,3) | 1,04 (0,90-1,20) | 15,1 (13,0-17,5) | 1,17 (0,94-1,45) |
| Idade (anos) | | | | | |
| 50-59 | 47,7 | 22,9 (20,0-26,0) | 1 | 17,9 (15,4-20,7) | 1 |
| 60-69 | 29,7 | 21,3 (18,2-24,6) | 0,93 (0,81-1,06) | 14,5 (12,5-16,7) | 0,80 (0,69-0,94)* |
| ≥70 | 22,7 | 12,9 (10,3-16,0) | 0,56 (0,43-0,72)* | 06,9 (05,7-08,2) | 0,38 (0,31-0,46)* |
| Escolaridade (anos) | | | | | |
| 0-3 | 25,1 | 23,7 (20,4-27,2) | 1 | 14,1 (19,6-16,6) | 1 |
| 4-7 | 36,4 | 20,2 (17,3-23,4) | 0,85 (0,69-1,05) | 14,0 (11,5-17,0) | 0,99 (0,78-1,25) |
| 7-11 | 14,5 | 21,0 (17,3-25,2) | 0,88 (0,71-1,10) | 19,2 (16,0-22,8) | 1,36 (1,08-1,71)* |
| ≥12 | 23,8 | 16,6 (13,2-20,6) | 0,70 (0,53-0,91)* | 11,6 (09,2-14,4) | 0,82 (0,62-1,08) |
| Riqueza | | | | | |
| 1° quintil (pobre) | 20,0 | 27,6 (24,1-31,3) | 1 | 18,1 (15,0-21,6) | 1 |
| 2° quintil | 20,0 | 23,7 (19,7-28,3) | 0,86 (0,70-1,04) | 12,4 (10,1-15,2) | 0,68 (0,56-0,84)* |
| 3° quintil | 20,0 | 20,8 (17,3-24,8) | 0,75 (0,61-0,92)* | 13,5 (11,0-16,6) | 0,75 (0,58-0,96)* |
| 4° quintil | 20,1 | 16,7 (13,8-20,1) | 0,60 (0,49-0,74)* | 14,2 (11,7-17,1) | 0,78 (0,61-0,99)* |
| 5° quintil (rico) | 19,9 | 14,2 (11,2-17,7) | 0,51 (0,40-0,65)* | 12,4 (09,7-15,7) | 0,68 (0,51-0,92)* |

*=p-Valor < 0,05

IC: Intervalo de Confiança

Table 2 shows the prevalence ratios (PR) adjusted for socioeconomic and demographic variables for both sexes. It was possible to observe an association between individuals of both sexes living in the southern region and smoking, being 97% higher among men (PR: 1.97; 95% CI: 1.13-3.43) and 2.16 times higher among women (PR: 2.16; 95% CI: 1.20-3.88), than those from the northern region. It was found that women living in the rural area have a 35% lower prevalence (PR: 0.65; 95% CI: 0.46-0.91) of smoking habit, than those living in the urban area. For men, there was no statistical association between zone and smoking. For both sexes it was observed

that the older the age, the lower the prevalence of smoking, 47% lower for men (PR: 0.48; 95% CI: 0.38-0.62) and 33% lower for women (PR: 0.34; 95% CI: 0.28-0.41). Women with an education level greater than 12 years had a lower prevalence of smoking (PR: 0.72; 95% CI: 0.53-0.99) than those with 3 years of schooling or less. For men, there was no statistical association between education level and smoking. In both sexes, individuals from the richest quintile showed lower prevalence of smoking, 61% lower for men (PR: 0.39; 95% CI: 0.30-0.51) and 42% lower for women (PR: 0.58; 95% CI: 0.42-0.80).

Table 2. Adjusted prevalence ratios for both sexes, according to socioeconomic and demographic variables. Values obtained through multivariate Poisson regression.

| Variables | Prevalence ratio (men) (95% CI) | p-Value | Prevalence ratio (women) (95% CI) | p-Value |
|--------------------------|---------------------------------------|---------|---|---------|
| Region | | | | |
| North | 1 | | 1 | |
| Northeast | 1.14 (0.69-1.91) | 0.590 | 1.26 (0.71-2.23) | 0.425 |
| Southeast | 1.66 (0.99-2.76) | 0.052 | 1.74 (1.02-2.96)* | 0.041 |
| South | 1.97 (1.13-3.43)* | 0.016 | 2.16 (1.20-3.88)* | 0.010 |
| Midwest | 1.30 (0.65-2.20) | 0.454 | 1.89 (1.09-3.29)* | 0.023 |
| Zone | | | | |
| Urban | 1 | | 1 | |
| Rural | 0.91 (0.65-1.27) | 0.585 | 0.65 (0.46-0.91)* | 0.014 |
| Skin Color | | | | |
| White | 1 | | 1 | |
| Non-white | 0.98 (0.84-1.14) | 0.842 | 1.20 (0.99-1.47) | 0.059 |
| Age (years) | | | | |
| 50-59 | 1 | | 1 | |
| 60-69 | 0.87 (0.76-0.99)* | 0.038 | 0.79 (0.67-0.92)* | 0.004 |
| ≥70 | 0.48 (0.38-0.62)* | 0.000 | 0.34 (0.28-0.41)* | 0.000 |
| Education (years) | | | | |
| 0-3 | 1 | | 1 | |
| 4-7 | 0.84 (0.66-1.06) | 0.157 | 0.90 (0.71-1.18) | 0.431 |
| 7-11 | 0.91 (0.71-1.16) | 0.473 | 1.17 (0.89-1.53) | 0.241 |
| ≥12 | 0.86 (0.64-1.14) | 0.308 | 0.72 (0.53-0.99)* | 0.044 |
| Wealth | | | | |
| 1 ° quintile (poorest) | 1 | | 1 | |
| 2 ° quintile | 0.75 (0.62-0.91)* | 0.005 | 0.61 (0.49-0.74)* | 0.000 |
| 3 ° quintile | 0.58 (0.46-0.74)* | 0.000 | 0.63 (0.49-0.82)* | 0.010 |
| 4 ° quintile | 0.47 (0.36-0.61)* | 0.000 | 0.63 (0.49-0.81)* | 0.018 |
| 5 ° quintile (richest) | 0.39 (0.30-0.51)* | 0.000 | 0.58 (0.42-0.80)* | 0.023 |

*=*p*-Value < 0.05

Discussion

It was shown that there is a higher prevalence of smoking among men than women, which can be explained by historical and socio-cultural factors that are widely discussed in the literature.¹⁶ Also, there are generational influences that modulate smoking habits. For example, smoking among women was not considered socially acceptable until the 1960s, and therefore, older women generally show a lower prevalence of smoking.¹⁷ The prevalence of male and female smokers suggests that women born in a more egalitarian context in relation to gender exhibit smoking patterns similar to those of men.¹⁸ The social, economic, and political transformations that improved living conditions for women created opportunities

for the tobacco industry to specifically target the female audience, utilizing images of emancipation to represent smoking as a symbol of success and gender equality.¹⁶ In this context, the consideration of smoking as a symbol of independence and freedom is a risk, especially for women.

When we analyze the smoking habits among the Brazilian macro-regions, we observe that in relation to the northern region, those who live in the South (both sexes) showed a higher prevalence of smoking, in agreement with previous studies.¹² A possible explanation for this is the proximity of the southern region to countries such as Argentina and Uruguay, regions in which smoking has a prevalence close to 30% in the population¹⁹. In addition, there is a strong cultural influence

of European migrant populations, which may influence habits such as tobacco consumption.²⁰ Furthermore, Brazil is the second largest producer and exporter of tobacco in the world, and a large part of the tobacco crop is located in the south.²⁰ The southern region is responsible for 93.8% of Brazilian tobacco production, and there are 645 municipalities (144 in the state of Paraná, 223 in Santa Catarina, and 278 in Rio Grande do Sul) where the production of tobacco is significant (production exceeding 20 tons).²⁰

Previous research carried out in Brazil found a higher prevalence of smoking in rural areas compared to urban areas.^{25,26} According to data from the National Health Survey (PNS) conducted in 2013, in the southern region, smoking was also more frequent in rural locations.²⁶ However, when verifying the association between the Brazilian macro-regions with smoking habits stratified by sex, it was shown that women aged 50 years or older living in rural areas have a lower prevalence of smoking habit than those living in urban areas. This may be related to the fact that advertising strategies have a greater impact in urban areas, which has been associated with smoking, and is often related to aggressive *marketing* and weak regulatory environments.²⁷

The distribution of smoking according to age group in the present study demonstrated a decrease in the frequency of smokers with increasing age in both sexes. One of the factors that may have influenced this behavior is a possible survival bias, considering that there is a longer survival of ex-smokers, which can influence the reduction and awareness of active smokers.²⁸ It is also possible to attribute this to a reduction in health problems in the older population due to tobacco use.²⁹

However, older adults present characteristics that differentiate them from younger adults, such as a greater dependence on nicotine; they generally smoke a greater number of cigarettes for a

longer time, which can increase their dependence and make it difficult to quit the habit and as a consequence, have more health problems related to smoking.³⁰ In this study, it was shown that the older the individual, the lower the prevalence of smoking. However, the number of women over the age of 60 who do not smoke is greater than that of men. This behavior may be associated with the onset of diseases that lead to the recommendation for smoking cessation, since women generally have worse health indicators related to mental or chronic disease, disabilities, or self-perceived health.³¹ Gender differences in health are considered a paradox, as women present worse health status but have a longer life expectancy than men.³²

Regarding self-reported race or skin color, although we did not find a statistically significant association, we highlight that in both sexes, non-white individuals showed higher crude prevalence ratios of smoking. There are racial inequities in health, indicated by risks of falling ill and dying, due to limited choices, restricted access to health resources, and greater exposure to harmful factors.³³

In relation to socioeconomic indicators, it was found that those in the wealthiest quintiles had the lowest prevalence of smoking for both sexes, while higher education was a protective factor only for women. In most countries, there is a strong correlation between cigarette consumption among low-income populations and less access to formal education.¹⁰ This may imply a relatively large impact of the benefits of smoking in women among lower socioeconomic groups compared with higher socioeconomic groups.³⁴ The trend towards a reduction in the prevalence of smoking that is observed worldwide is heterogeneous in relation to socioeconomic status and sex, which means that rates of decline should be observed with caution, especially in women living in countries with greater social differences.³⁵

This study has some limitations, as its cross-sectional design did not allow for

causal inferences (reverse temporality). In addition, there is a lack of information about neighborhoods and municipalities, making it impossible to insert variables from different levels; however, the sample weight of each individual was taken into account. Furthermore, information on socially undesirable behavior was used, which is prone to underestimations. However, we highlighted a representative sample of Brazilian adults and older adults, which made it possible to trace the socioeconomic profile of this population in relation to smoking habit. In addition, stratification by sex allowed for an intersectional analysis of power relations in society, such as socioeconomic conditions

and gender, which should be considered a priority in research on health equity.

Conclusion

It is evident that the challenges regarding tobacco use in Brazil depend on the enrolment of the social, governmental and non-governmental sectors. We highlight the importance of public health policies aimed at tobacco control, taking into account socioeconomic and demographic factors among men and women. Although the benefits of smoking cessation are greater among younger people, smoking cessation at any age can reduce the risk of death and improve overall health.¹⁰

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