



# The Brazilian Longitudinal Study of Adult Health (ELSA-Brasil): Factors Related to Smoking Cessation

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## Abstract

**Background** Smoking cessation is not an easy accomplishment. However, the benefits are several for those who do it, such as cardiovascular risk reduction 1 year after quitting smoking. This study aimed to verify the factors related to smoking cessation in civil servants of The Brazilian Longitudinal Study of Adult Health (ELSA-Brasil).

**Methods** This study had a longitudinal design using data from a prospective cohort of civil servants (ELSA-Brasil). Our variable of interest was smoking cessation. The relationship between socio-demographic characteristics, job stress, health-related variables, legislation, and smoking cessation was analyzed by Cox proportional hazard models. The analyses were stratified by gender. Second-hand smoke exposure, age, education, excessive alcohol consumption, common mental disorder, and smoking control law were the variables considered in the final model.

**Results** Information of 2020 women and 2429 men was analyzed. Individuals without second-hand smoke exposure, with up to 49 years of age, with higher education, without excessive alcohol consumption, without common mental disorders, and who initiated smoking in 1989 or after the smoking control law had a higher risk of stopping smoking. The risks magnitudes were higher for women.

**Conclusions** Our study reinforces the necessity of alcohol consumption regulation, the relevance of Public Health Policies, and the need for more smoking cessation measures focused on men, on people with mental disorders, alcoholism, and older adults. Also, our results did not show significant risks regarding the psychosocial working environment.

**Keywords** Smoking cessation · Occupational stress · Survival analysis · Tobacco

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## Introduction

Smoking is a worldwide concern with several harmful effects on health [1]. This behavior is responsible for eight million preventable deaths worldwide [2], and smoking-related diseases represent a large amount of total cost for the Brazilian National Health System [3]. In an attempt to regulate smoking, the Brazilian government has implemented several health policies and programs to support smoking control and smoking cessation [4].

The National Program for Tobacco Control includes educational, legislative, economic, and health support measures to reduce the prevalence of smoking and reduce the morbimortality of smoking-related diseases. This program has offered clinical evaluation, free access to drug therapy or other treatment through the Brazilian National Health System since 2002 [5, 6]. Furthermore, other legislations support smoking cessation reducing tobacco social acceptability and promoting smoke-free environments [4, 7].

The results of these interventions could be observed when analyzing smoking prevalence and frequency in the Brazilian adult population [4, 8, 9]. The smoking frequency was 12.6% in 2019 [10], and its prevalence declined almost 50% in relative terms between 1989 and 2008 [10, 11]. As such worldwide estimates [12], the smoking frequencies were higher for men than for women. In 2019, 15.9% of smokers in the adult population were men, while 9.6% were women [10].

Aside from gender, other individual characteristics could influence smoking cessation. Throughout the literature, younger ages, lower educational level, lower level of physical activity, weight gain, poor self-rated health, chronic diseases, personality and psychiatric illness, and degree of nicotine dependence seem to make smoking cessation difficult [13–15].

Along with individual characteristics, the influence of the psychosocial work environment on smoking cessation was also the aim of several studies [16–21]. The literature suggests that individuals with low job strain [18, 19], passive jobs [17], and high social support at work [17] usually have higher chances of smoking cessation. However, the role of the psychosocial work environment on smoking is still unclear since some studies show no association after adjustment for individual characteristics [20–22].

Despite advances in smoking control and frequency reduction, continuous support encouraging smoking cessation is necessary since smoking is still responsible for several preventable deaths [1, 3]. Besides these already known influences, further research is required to understand how these individual and working characteristics are related to smoking cessation. Our hypothesis is that

lower number of cigarettes per day, absence of second-hand smoke exposure, aging, higher education, high socio-occupational class, normal body mass index, no excessive alcohol consumption, presence of diseases, absence of common mental disorder, low job stress, and high social support at work have a higher risk of stopping smoking. Accordingly, this study aimed to verify the factors related to smoking cessation in civil servants of The Brazilian Longitudinal Study of Adult Health (ELSA-Brasil).

## Methods

### Study Design and Population

This study analyzed information of 4449 participants (2429 men and 2020 women) of The Brazilian Longitudinal Study of Adult Health (ELSA-Brasil). ELSA-Brasil is a prospective cohort conducted in six cities in Brazil (Belo Horizonte, Rio de Janeiro, São Paulo, Rio Grande do Sul, Vitória, and Bahia). The ELSA-Brasil follows 15,105 civil servants aged between 35 and 74 years in the baseline (2008–2010) [23]. We did not include inconsistent information about smoking, variables with missing data, and information about retired participants because they do not have information about occupational characteristics (Fig. 1).

### Measures

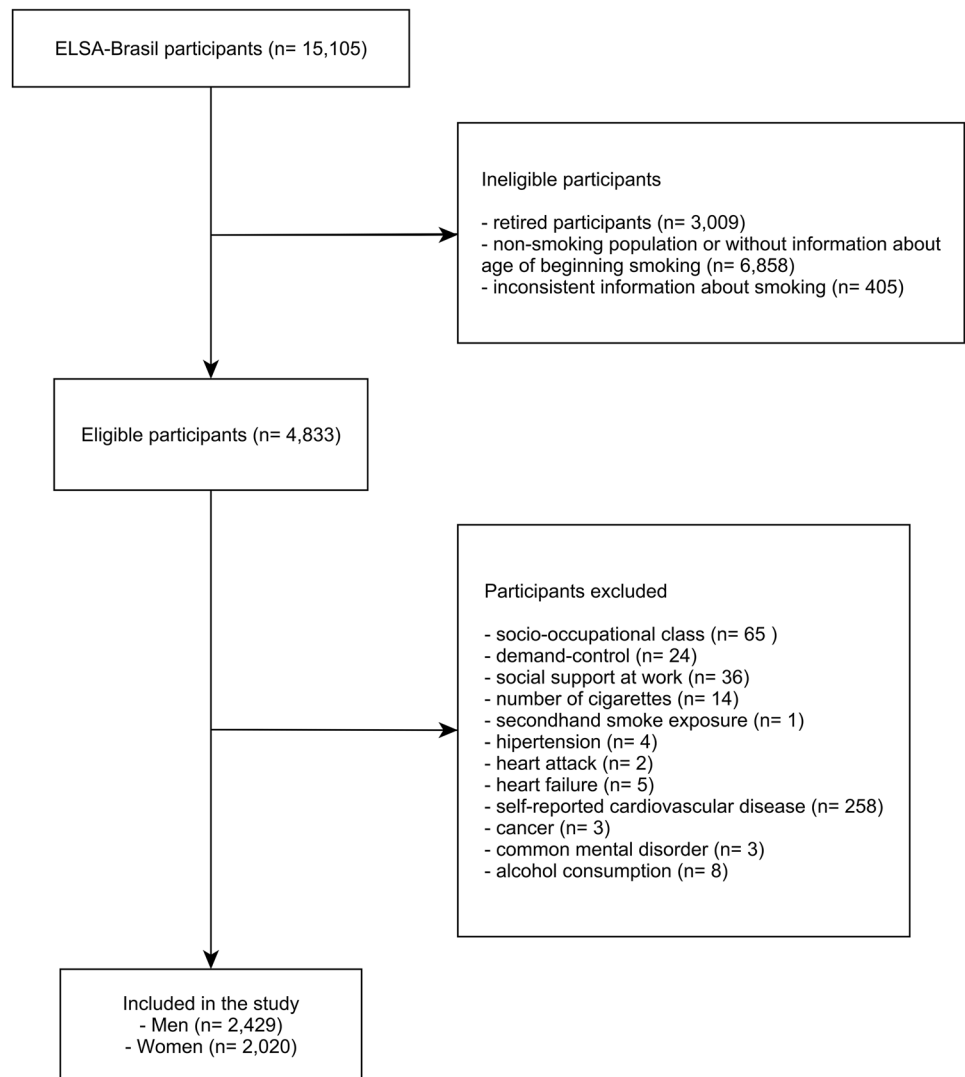
The outcome is stopping smoking. Censoring occurred when participants did not have the event at the follow-up because they had not stopped smoking or they did not have information at follow-up.

The smoking covariates of this study were the number of cigarettes per day (continuous variable) and second-hand smoke exposure or passive smoking (yes — reference category or no). We also included socioeconomic characteristics, alcohol consumption, health variables, and job stressors.

Age was categorized as up to 49 years of age and 50 years of age or more (reference category). Education was treated as up to elementary school (reference category), up to high school, and higher education. Socio-occupational class was categorized as high, medium, and low (reference category) [24]. This variable was constructed “from the participants’ socioeconomic status based on their described occupation, expected income (average market value) and observed income” [25]. It was calculated as “an average between observed income (economic component) and expected income (educational component)” [25].

Excessive alcohol consumption was a dichotomous variable (yes — reference category or no) considering different cut-off points depending on sex. For men, excessive

**Fig. 1** Flow-chart of participants, ELSA-Brasil, 2008–2014



consumption was  $\geq 210$  g of ethanol/week, and for women was  $\geq 140$  g of ethanol/week. The body mass index (BMI) was classified as  $\leq 24.9$  kg/m<sup>2</sup> for normal weight, between 25 and 29.9 kg/m<sup>2</sup> for overweight, and  $\geq 30$  kg/m<sup>2</sup> for obesity (reference category). Information about diseases was collected through the following question: “Have you ever been told by a doctor that you had or have any of the following diseases? — hypertension, heart attack, heart failure, cardiovascular disease (any type or severity), or cancer”; the answer options were yes or no (reference category). The common mental disorders were assessed using the Clinical Interview Schedule Revised (CIS-R) — Brazilian-Portuguese version. The CIS-R score ranges from zero to 57, and participants with a score  $> 11$  were classified as having a common mental disorder (yes — reference category or no) [26].

Job stressors were evaluated through the Brazilian version of the Swedish demand–control and social support questionnaire. This instrument has three main dimensions: psychological demands (composite reliability: 0.79; 0.76–0.82),

control (composite reliability: 0.70; 0.66–0.74), and social support at work (composite reliability: 0.87; 0.85–0.89) [27]. The questionnaire scores were summed and dichotomized into high and low using the median of these dimensions as a cut-off point (14, 17, and 20 points, respectively). Since a study about the dimensional structure of the Brazilian version suggested excluding repetitive work item due to low loading not statistically significant (0.08; –0.02–0.18) [27], this item was not considered when creating the variable categories proposed by Karasek [27–30]. Job stressor categories were low job stress (low psychological demand/high control), active job (high psychological demand/high control), passive job (low psychological demand/low control), and high job stress (high psychological demand/low control- reference category) [29, 30]. Social support was categorized as high and low (reference category).

Finally, we created a variable considering the effect of the Brazilian smoking control law [4]. The cut-off point of this variable was 1989, the year of the National Program

for Tobacco Control implementation. The participants were stratified into those who initiated smoking before 1989 (reference category) and those who initiated in 1989 or after.

## Statistical Analyses

Mean, standard deviation, maximum values, proportions, and frequency were used to describe population characteristics regarding years of smoking, smoking cessation, and censoring. The effects of factors in smoking cessation were estimated through Cox proportional hazard models, stratified by gender. The stratification was based on gender differences found in our population regarding health behaviors, including tobacco use [31].

First, we defined time as the period from age at smoking initiation to age at smoking cessation in years. These ages were reported at the baseline or follow-up. Participants who smoked for less than a year were considered to have one year of smoking. Second, we performed a single covariate model to evaluate crude effects. The inclusion criteria to the final model were the relevant variables on the theoretical model and significant in a single analysis. Stratified Cox regression was performed for men's analyses since the variable BMI did not respect the independence between residuals and time analyzed by Shoenfeld graphics. All variables in the women's final model respect the independence between residuals and time. The results were interpreted as hazard ratios (HR) with a 95% Confidence Interval (CI). We had some influential (Score) points but no outliers (Martingale). The concordance measure was used as a global assessment of discrimination. Values close to one have better discriminatory power [32]. The analyses were performed in the R software [33], version 4.1.1, library "survival" [34].

The ELSA-Brasil was approved by the ethic committees of each institution involved in the study and by the National Ethics Counsel in Research (CONEP), CAAE number: 0016,1,198,000–06. The present study was approved by the Research Ethics Committee of the National School of Public Health, Oswaldo Cruz Foundation, and it is in accordance with the 1964 Helsinki declaration and its later amendments. Informed consent was obtained from all individual participants included in the study.

## Results

In the study population, the mean age was 51 years for men and 50 years for women. In total, 575 women and 629 men were censored. The mean years of smoking were 26 years for both sexes, and the maximum was 62 years for men and 63 years for women. On average, men smoked a higher number of cigarettes per day.

A large proportion of individuals stopped smoking at the end of the follow-up, 74% for men and 71.5% for women. Among men, the proportion of smoking cessation was higher for individuals aged 50 years or more, with higher education, with higher socio-occupational class, without second-hand smoke exposure, without excessive alcohol consumption, with overweight and obesity, with diseases, without common mental disorder, with low job stress or active job, with high social support at work, and who initiated smoking before the implementation of the Brazilian smoking control law. Among women, the proportion of smoking cessation only differed for social support at work, which women with low social support at work had a high proportion of smoking cessation (Table 1).

Tables 2 and 3 show the models for smoking cessation. Among men (Table 2), socio-occupational class and low job stress were no longer significant in the final model. In the final stratified model, participants without second-hand smoke exposure (HR = 1.42), with up to 49 years of age (HR = 1.27), with higher education (HR = 1.46), without excessive alcohol consumption (HR = 1.51), without common mental disorders (HR = 1.14), and who initiated smoking in 1989 or after (HR = 1.49) had a higher risk of stopping smoking (Table 2). The estimated concordance probability had a predictive value of 59.4%.

For women (Table 3), socio-occupational class and social support at work were no longer significant in the final model. Participants without second-hand smoke exposure (HR = 1.48), with up to 49 years of age (HR = 1.41), with higher education (HR = 1.75), without excessive alcohol consumption (HR = 1.53), without common mental disorders (HR = 1.13), and who initiated smoking in 1989 or after (HR = 2.91) had a higher risk of stopping smoking (Table 3). The estimated concordance probability had a predictive value of 61.4%. Except for excessive alcohol consumption and common mental disorders, the magnitudes of the risks were higher for women.

## Discussion

In this study, for both sexes, younger age (up to 49 years of age), higher education, no excessive alcohol consumption, absence of common mental disorders, no second-hand smoke exposure, and who initiated smoking in 1989 or after had higher risks of stopping smoking. Our study considered the time until smoking cessation in hazard estimates and contemplated particularities of the working population.

Some research points out that older people have more chances of quitting smoking due to the development of diseases [35–38]. However, our result was somehow different from these studies. We found that people with 49 years of age or less were more likely to stop smoking. A possible

**Table 1** Characteristics of the study population, 2429 men and 2020 women, according smoking status, ELSA-Brasil, 2008–2014

	Men		Women	
	Smoking cessation		Smoking cessation	
	No ( <i>n</i> = 629)	Yes ( <i>n</i> = 1800)	No ( <i>n</i> = 575)	Yes ( <i>n</i> = 1445)
	<i>n</i> (%; CI) or mean (SD)		<i>n</i> (%; CI) or mean (SD)	
Number of cigarettes per day	15 (10)	17 (14)	12 (8)	13 (12)
Second-hand smoke exposure				
Yes	329 (35.9; 32.7–39.0)	588 (64.1; 60.9–67.2)	278 (39.7; 36.0–43.4)	423 (60.3; 56.6–64.0)
No	300 (19.8; 17.8–21.9)	1212 (80.1; 78.0–82.1)	297 (22.5; 20.3–24.9)	1022 (77.5; 75.1–79.7)
Age				
≥ 50 years of age	329 (22.4; 20.2–24.6)	1140 (77.6; 75.4–79.7)	286 (25.7; 23.1–28.3)	829 (74.3; 71.7–76.9)
≤ 49 years of age	300 (31.2; 28.3–34.3)	660 (68.8; 65.7–71.7)	289 (31.9; 28.9–35.1)	616 (68.1; 64.9–71.1)
Education				
Up to elementary school	168 (33.4; 29.3–37.7)	335 (66.6; 62.3–70.7)	71 (39.4; 32.2–47.0)	109 (60.5; 53.0–67.7)
Up to high school	273 (29.0; 26.0–32.0)	670 (71.0; 68.0–73.9)	280 (34.2; 30.9–37.5)	539 (65.8; 62.4–69.0)
Higher education	188 (19.1; 16.7–21.7)	795 (80.9; 78.3–83.3)	224 (21.9; 19.4–24.6)	797 (78.1; 75.4–80.6)
Socio-occupational class				
Low	266 (31.1; 28.0–34.3)	589 (68.9; 65.7–72.0)	153 (37.9; 33.1–42.8)	251 (62.1; 57.2–66.9)
Medium	249 (28.2; 25.2–31.3)	635 (71.8; 68.7–74.8)	321 (29.4; 26.7–32.2)	770 (70.6; 67.8–73.2)
High	114 (16.5; 13.8–19.5)	576 (83.5; 80.5–86.2)	101 (19.2; 15.9–22.9)	424 (80.8; 77.1–84.0)
Excessive alcohol consumption				
Yes	176 (38.7; 34.2–43.3)	279 (61.3; 56.7–65.8)	57 (38.8; 30.5–47.1)	90 (61.2; 52.8–69.1)
No	453 (22.9; 21.1–24.9)	1521 (77.1; 75.1–78.9)	518 (27.6; 25.6–29.7)	1355 (72.3; 70.2–74.3)
BMI				
Normal	272 (35.6; 32.2–39.1)	492 (64.4; 60.9–67.8)	246 (33.1; 29.7–36.6)	498 (66.9; 63.4–70.3)
Overweight	262 (23.5; 21.0–26.0)	855 (76.5; 73.9–79.0)	198 (25.8; 22.8–29.1)	568 (74.1; 70.9–77.2)
Obesity	95 (17.3; 14.2–20.8)	453 (82.7; 79.2–85.7)	131 (25.7; 21.9–29.7)	379 (74.3; 70.2–78.0)
Diseases				
Yes	244 (23.8; 21.2–26.5)	782 (76.2; 73.5–78.8)	180 (25.8; 22.6–29.2)	517 (74.2; 70.7–77.4)
No	385 (27.4; 25.1–29.8)	1018 (72.6; 70.1–74.9)	395 (29.8; 27.4–32.4)	928 (70.1; 67.6–72.6)
Common mental disorder				
Yes	165 (31.6; 27.6–35.8)	357 (68.4; 64.2–72.4)	260 (33.1; 29.8–36.5)	526 (66.9; 63.5–70.2)
No	464 (24.3; 22.4–26.3)	1443 (75.7; 73.7–77.6)	315 (25.5; 23.1–28.0)	919 (74.5; 71.9–76.9)
Job stressors				
Low job stress	121 (20.6; 17.4–24.1)	466 (79.4; 75.9–82.6)	103 (26.5; 22.1–31.2)	286 (73.5; 68.8–77.8)
Active job	76 (22.8; 18.4–27.7)	257 (77.2; 72.3–81.6)	91 (26.5; 21.9–21.4)	253 (73.5; 68.5–78.1)
Passive job	314 (29.1; 26.4–31.9)	765 (70.9; 68.1–73.6)	243 (30.0; 26.8–33.3)	567 (70.0; 66.7–73.1)
High job stress	118 (27.4; 23.3–31.9)	312 (72.6; 68.1–76.7)	138 (28.9; 24.9–33.2)	339 (71.1; 66.8–75.1)
Social support				
Low	341 (28.2; 25.6–30.8)	869 (71.8; 69.2–74.3)	326 (27.4; 24.9–30.0)	864 (72.6; 70.0–75.1)
High	288 (23.6; 21.3–26.1)	931 (76.4; 73.9–78.7)	249 (30.0; 26.9–33.2)	581 (70.0; 66.7–73.1)
Smoking control law				
Initiated smoking before 1989	583 (25.1; 23.3–26.9)	1743 (74.9; 73.1–76.7)	551 (28.3; 26.3–30.4)	1394 (71.7; 69.6–73.7)
Initiated smoking in 1989 or after	46 (44.7; 34.8–54.8)	57 (55.3; 45.2–65.1)	24 (32; 21.7–43.8)	51 (68.0; 56.2–78.3)

*SD* standard deviation, *CI* confidence interval

explanation could be higher education since it is related with better chances of quitting smoking [39] and a lower relapse rate [40]. In our study, individuals with higher education had a higher risk for smoking cessation.

Regarding alcohol consumption, the presence of drinking problems has been pointed out as a negative factor in the process of quitting smoking [41–45]. Consistent with these findings, we observed an association between the

**Table 2** Hazard ratios for men smoking cessation ( $n = 2429$ ) and socio-demographic, occupational, health, and legislation variables — ELSA-Brasil, 2008–2014

	Simple model hazard ratio (95% CI)	Final model hazard ratio <sup>a</sup> (95% CI)
Number of cigarettes per day	1.00 (0.99–1.01)	-
Second-hand smoke exposure		
Yes	1	1
No	1.51 (1.37–1.67)	1.42 (1.29–1.57)
Age		
$\geq 50$ years of age	1	1
$\leq 49$ years of age	1.27 (1.15–1.41)	1.27 (1.15–1.41)
Education		
Up to elementary school	1	1
Up to high school	1.35 (1.19–1.54)	1.27 (1.11–1.45)
Higher education	1.69 (1.48–1.92)	1.46 (1.28–1.67)
Socio-occupational class		
Low	1	-
Medium	1.16 (1.03–1.29)	-
High	1.53 (1.37–1.72)	-
Excessive alcohol consumption		
Yes	1	1
No	1.53 (1.35–1.74)	1.51 (1.33–1.71)
Diseases		
No	1	-
Yes	0.97 (0.88–1.06)	-
Common mental disorder		
Yes	1	1
No	1.16 (1.03–1.30)	1.14 (1.02–1.28)
Job stressors		
High job stress	1	-
Low job stress	1.17 (1.02–1.35)	-
Active job	1.15 (0.97–1.35)	-
Passive job	0.94 (0.82–1.07)	-
Social support		
Low	1	-
High	1.06 (0.97–1.17)	-
Smoking control law		
Initiated smoking before 1989	1	1
Initiated smoking in 1989 or after	1.83 (1.40–2.40)	1.49 (1.13–1.97)

CI confidence interval

<sup>a</sup>All covariates were included in the same model (second-hand smoke exposure + age + education + excessive alcohol consumption + common mental disorder + smoking control law)

absence of excessive alcohol consumption and smoking cessation, suggesting that other policies and investments focused on alcohol consumption could indirectly help to quit smoking. Brazil has alcohol control policies such as the “Emergency plan to expand access to treatment and prevention for alcohol and other drugs” [46] and “National Alcohol Policy” [5]. However, more regulation regarding alcohol consumption is still needed [47]. These regulation actions could combine similar successful measures used in smoking control, for example, marketing restrictions

and actions to reduce the social acceptability of alcohol consumption [47].

Our findings show that people without common mental disorders had a higher risk of stopping smoking. A study using information about the Brazilian National Health Survey shows that the prevalence of smoking is higher in the population with mental illness, and they attempted to quit less than the population without mental illness [48]. A prior review, investigating smoking in the population with anxiety or depression, shows that more quitting attempts and



**Table 3** Hazard Ratios for women smoking cessation ( $n=2020$ ) and socio-demographic, occupational, health and legislation variables — ELSA-Brasil, 2008–2014

	Simple model hazard ratio (95% CI)	Final model hazard ratio <sup>a</sup> (95% CI)
Number of cigarettes per day	1.00 (0.99–1.00)	-
Second-hand smoke exposure		
Yes	1	1
No	1.54 (1.37–1.72)	1.48 (1.32–1.66)
Age		
$\geq 50$ years of age	1	1
$\leq 49$ years of age	1.40 (1.25–1.55)	1.41 (1.26–1.57)
Education		
Up to elementary school	1	1
Up to high school	1.46 (1.19–1.80)	1.30 (1.06–1.61)
Higher education	1.98 (1.62–2.43)	1.75 (1.43–2.15)
Socio-occupational class		
Low	1	-
Medium	1.34 (1.16–1.54)	-
High	1.65 (1.41–1.93)	-
Excessive alcohol consumption		
Yes	1	1
No	1.44 (1.16–1.78)	1.53 (1.23–1.89)
BMI		
Obesity	1	-
Overweight	1.01 (0.88–1.15)	-
Normal	0.92 (0.81–1.05)	-
Diseases		
No	1	-
Yes	0.96 (0.86–1.07)	-
Common mental disorder		
Yes	1	1
No	1.17 (1.05–1.30)	1.13 (1.01–1.26)
Job stressors		
High job stress	1	-
Low job stress	0.99 (0.85–1.16)	-
Active job	0.98 (0.84–1.16)	-
Passive job	0.95 (0.83–1.08)	-
Social support		
Low	1	-
High	0.87 (0.78–0.97)	-
Smoking control law		
Initiated smoking before 1989	1	1
Initiated smoking in 1989 or after	3.35 (2.52–4.46)	2.91 (2.18–3.90)

CI confidence interval

<sup>a</sup>All covariates were included in the same model (second-hand smoke exposure + age + education + excessive alcohol consumption + common mental disorder + smoking control law)

relapses were associated with specific domains of depression (inability to feel pleasure and low feelings of happiness, pleasure, energy, delight, interest, enthusiasm, and pride). For anxiety disorders, fear or symptoms of somatic tension and arousal were related to unsuccessful quitting attempts and to rapid relapse [49]. Smoking cessation would improve

quality of life of this population since evidence suggests that quitting reduce anxiety and stress levels [50].

Second-hand smoke is an important indoor exposure linked to the development of health problems [51]. Similar to our results, some research found associations between second-hand smoke exposure and smoking cessation, showing

that the fewer exposure hours, the higher are the chances of quitting smoking for a longer period [52, 53]. In Brazil, the prevalence of second-hand smoke is decreasing [8], mainly due to smoke-free legislation for public and private closed environments [46]. However, it is important to add that 6.6% of the Brazilian adult population still are exposed to second-hand smoke at the workplace [8], and this exposure could lead to occupational injuries [54].

Besides exposure in the workplace, the literature about the contextual factors of smoking suggests the importance of family members and friends of adolescents and younger adults (up to 24 years) in initiating smoking. Studies have shown that having someone that smokes in the same house (parents or another family member), having friends that smoke, and having parents that do not worry if smoking is initiated increase the chance of smoking regularly [55, 56]. A qualitative investigation shows that restriction at home and/or the workplace is helpful when quitting smoking [57].

In this paper, the implementation year of the National Program for Tobacco Control [4] was used to check if participants who initiated smoking after the program implementation had a higher risk of quitting smoking. We observed for both genders that individuals who initiated smoking in 1989 or after had a higher risk of smoking cessation. For women, the magnitude of the risk was more relevant than for men. These results suggest the relevance of educational, legislative, economic, and health support measures of Public Health Policies in tobacco control.

Since 1979, Brazil has had Health Policies and regulations to reduce the prevalence of smoking and promote smoking cessation. The actions include, for example, cigarette taxes, restrictions in tobacco advertisements, prohibition of smoking in public closed environments, and health campaigns about the negative impact of smoking [4]. These measures have been causing a decline in smoking prevalence and an increase in prevented deaths. Over 10% of the prevalence decline was due to cessation treatment programs, and similar to our results, women benefit more from smoking cessation policies [9].

This study has found no association between job stress and smoking cessation. However, throughout the literature, studies support this relationship [16, 18, 19, 58], making it relevant to consider the investment and support of smoking cessation policies in the workplace. Brazilian National Health System has a free program that offers treatment for smoking cessation; however, it's not focused on the workplace environment. This program includes cognitive-behavioral treatment, medications, and considers a different approach for specific population groups, such as individuals with mental illness and alcoholism [59]. More investments in smoking cessation would be in parallel to the third Sustainable Development Goals by reducing premature mortality from non-communicable diseases [60]. In our case,

diseases related to tobacco, such as cardiovascular disease, respiratory diseases, and cancer.

One of the limitations of the present study is the lack of information about lapse and relapse during smoking cessation. Also, we did not have information if quitting smoking was succeeded using some type of treatment since it is known that only 3% of individuals who try to quit smoking succeed without help [61].

To conclude, our study reinforces the relevance of investments in the regulation of alcohol consumption to promote smoking cessation. Also, it reinforces the relevance of the National Tobacco Control Policy, showing the need for more measures focused on men, on people with mental disorders, alcoholism, and older adults. Since our population is composed of civil servants, our study supports interventions promoting smoking cessation in the workplace. All these suggestions would contribute to reducing premature mortality from non-communicable diseases related to tobacco.

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## Declarations

**Disclaimer** The funders of this research did not contribute to study design development, analysis, interpretation of data and in writing the manuscript.

**Ethical Approval** The ELSA-Brasil was approved by the ethic committees of each institution involved in the study and by the National Ethics Counsel in Research (CONEP), CAAE number: 0016,1,198,000–06. The present study was approved by the Research Ethics Committee of National School of Public Health, Oswaldo Cruz Foundation.

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

**Informed Consent** Informed consent was obtained from all individual participants included in the study.

**The Welfare of Animals** This article does not contain any studies with animals performed by any of the authors.

**Conflict of Interest** The authors declare no competing interests.

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