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Tobacco use, cessation, secondhand smoke and exposure to media about tobacco in Brazil: results of the National Health Survey 2013 and 2019

Uso, cessação, fumo passivo e exposição à mídia do tabaco no Brasil: resultados das Pesquisas Nacionais de Saúde 2013 e 2019

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ABSTRACT: ***Objective:*** To compare indicators of tobacco use, secondhand smoke, cessation and exposure to pro- and anti-tobacco media in 2013 and 2019, and to describe these indicators according to sociodemographic variables in 2019. ***Methods:*** Cross-sectional study with data from the National Health Survey. The indicators of use, secondhand smoke, cessation and exposure to tobacco-related media were evaluated. Prevalence and confidence intervals (95%CI) were estimated for the total population in 2013 and 2019 and according to sociodemographic variables for 2019. Poisson regression with robust variance was used to assess differences in prevalence. ***Results:*** There was an improvement in most of the indicators studied: an increase in ex-smokers, a reduction in secondhand smoke and attempts to quit smoking. All pro- and anti-tobacco media exposure indicators declined. When considering the prevalence according to sociodemographic characteristics in 2019, 43.8% (95%CI 41.6–46.0) of men tried to quit smoking, and 50.8% (95%CI 48.5–53.2) of women. Secondhand smoke at home was higher among women (10.2%; 95%CI 9.7–10.8). Among those who thought about quitting smoking because of warnings, the proportion was higher among women (48.0%; 95%CI 45.3–50.6). Tobacco use was higher among men (43.8%; 95%CI 41.6–46.0), in the population aged 40 to 59 years (14.9%; 95%CI 14.2–15.6), with a lower level of education (17.6%; 95%CI 16.8–18.4). ***Conclusion:*** The study showed improvement in tobacco-related indicators between the years studied. It is noteworthy that this advance was smaller in relation to the other periods previously analyzed, and therefore, greater investments in public policies to combat and control smoking in Brazil are necessary.

Keywords: Tobacco use disorder. Smoking. Tobacco use cessation. Smoking prevention. Demography. Brazil.

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RESUMO: *Objetivo:* Comparar indicadores de uso do tabaco, fumo passivo, cessação e exposição à mídia pró e antitabaco em 2013 e 2019 e descrever esses indicadores segundo variáveis sociodemográficas em 2019. *Métodos:* Estudo transversal com dados da Pesquisa Nacional de Saúde. Avaliaram-se os indicadores de uso, fumo passivo, cessação e exposição à mídia relacionada ao tabaco. Estimaram-se as prevalências e intervalos de confiança (IC95%) para a população total em 2013 e 2019 e segundo variáveis sociodemográficas para 2019. Para avaliar diferenças nas prevalências, usou-se a regressão de Poisson com variância robusta. *Resultados:* Houve melhoria dos indicadores de uso do tabaco; aumento de ex-fumantes e redução do fumo passivo e da tentativa de parar de fumar. Todos os indicadores de exposição à mídia pró e contra o tabaco diminuíram. Ao se considerarem as prevalências segundo características sociodemográficas em 2019, 43,8% (IC95% 41,6–46,0) dos homens e 50,8% (IC95% 48,5–53,2) das mulheres tentaram parar de fumar. O fumo passivo no domicílio foi maior nas mulheres (10,2%; IC95% 9,7–10,8). Entre os que pensaram em parar de fumar por causa das advertências, a proporção foi maior nas mulheres (48,0%; IC95% 45,3–50,6). O uso do tabaco foi mais elevado nos homens (43,8%; IC95% 41,6–46,0), na população de 40–59 anos (14,9%; IC95% 14,2–15,6) e naquela com menor nível de instrução (17,6%; IC95% 16,8–18,4). *Conclusão:* O estudo mostrou melhoria dos indicadores relacionados ao tabaco entre os anos estudados. Ressalta-se que esse avanço foi menor em relação a outros períodos analisados previamente, e, portanto, torna-se necessário maiores investimentos em políticas públicas de enfrentamento e controle do tabagismo no Brasil.

Palavras-chave: Tabagismo. Fumar. Abandono do uso de tabaco. Prevenção do hábito de fumar. Inquéritos populacionais. Brasil.

INTRODUCTION

Globally, tobacco use and exposure are considered a threat to public health, responsible for a high and avoidable burden of morbidity and mortality. The World Health Organization (WHO) estimates that around 8 million deaths worldwide have occurred due to tobacco use[1]. Approximately 7 million results from direct use of it and 1.2 million from exposure to secondhand smoke[2].

In Brazil, smoking was responsible, in 2019, for 191,000 deaths and 5,159.945 million years of life lost adjusted for disability (disability-adjusted life years — DALYs)[3]. In 2017, among the deaths attributed to tobacco were ischemic cardiovascular diseases, chronic respiratory diseases and cancers of the lung, trachea and bronchi[4].

Combating smoking has been considered a successful action, and Brazil has become a global reference for anti-tobacco initiatives. These advances are attributed to the regulatory measures adopted in the country, such as the prohibition of advertising, promotion and sponsorship of cigarettes (except at points of sale), increase in cigarette prices, warning images on tobacco packages and packages, and banning smoking indoors, among others[4-7].

Several national and global commitments ensured tobacco monitoring and control. Highlights include the Action Plan to Combat Chronic Non-Communicable Diseases 2011–2022[8] and the WHO Global Action Plan for the Prevention and Control of Chronic Non-Communicable Diseases, which provides for a 30% reduction in smoking by 2025[9].

Monitoring indicators of tobacco use and exposure is essential for tracking progress on national[8] and global[9] commitments.

Therefore, this study aimed to: compare indicators of tobacco use, secondhand smoke, quitting and exposure to pro- and anti-tobacco media in 2013 and 2019 and to describe these indicators according to sociodemographic variables in 2019.

METHODS

STUDY DESIGN

This was a cross-sectional, population-based, descriptive study that used data from the National Health Surveys (NHS) of 2013 and 2019. The NHS is a nationwide household survey carried out by the Brazilian Institute of Geography and Statistics (IBGE) in partnership with the Ministry of Health[10,11].

The NHS sample is probabilistic and was conducted in three stages:

(1) census sectors,

(2) drawing of households

(3) drawing of the resident of each household.

In 2013, the sample size was calculated at approximately 80,000 households, and information was collected from 64,348 households[10].

In 2019, the sample was determined to be 108,525 households, and data were collected in 94,111, with a response rate of 93.6%[11]. To allow comparisons between the surveys, in 2019, data on the selected resident aged 18 or over would be analyzed, totaling 88,531 individuals. Further details about the methods can be found in specific publications[10-13].

VARIABLES

Indicators of tobacco use, quitting and smoking-related media selected for the present study are described below.

a) Tobacco use:

1. *Prevalence of **current tobacco users:*** individuals who use tobacco products that do or not emit smoke / number of individuals interviewed x 100.
2. *Prevalence of **smokers:*** current smokers / number of individuals interviewed x 100.
3. *Prevalence of **daily smokers:*** daily smokers / number of individuals interviewed x 100.
4. *Prevalence of **cigarette smokers:*** current cigarette smokers / number of individuals interviewed x 100.
5. *Prevalence of **daily cigarette smokers:*** daily cigarette smokers / number of individuals interviewed x 100.

b) Tobacco cessation:
   6. *Prevalence of **ex-smokers:*** ex-smokers/number of individuals interviewed x 100.
   7. *Proportion of smokers who **tried quitting** in the last 12 months:* smokers who tried quitting in the last 12 months/number of individuals interviewed x 100.

c) Secondhand smoke:
   8. *Prevalence of **passive smokers at home:** non-smokers exposed to tobacco smoke at home* at least once a month/number of individuals interviewed x 100.
   9. *Prevalence of **passive smokers at work:*** non-smokers exposed to smoke in their indoor workplace in the 30 days prior to the survey /number of individuals interviewed who work indoors x 100.

d) Exposure to media for and against tobacco:
   10. *Prevalence of **exposure to pro-tobacco media:*** individuals who saw some advertisements or announcements about cigarettes at points of sale in the 30 days prior to the survey/number of individuals interviewed x 100.
   11. *Prevalence of **exposure to anti-tobacco media:*** individuals who saw or heard some anti-tobacco information on television or radio in the 30 days prior to the survey/number of individuals interviewed x 100.
   12. ***Proportion of smokers exposed to anti-tobacco warnings:*** number of smokers who saw some anti-tobacco photo or warning on cigarette packs in the 30 days prior to the survey/number of smokers interviewed x 100.
   13. ***Proportion of smokers who thought about quitting because of warnings:*** number of smokers who thought about quitting because of some anti-tobacco photo or warnings on cigarette packs in the 30 days prior to the survey/number of smokers interviewed x 100.

Further details on the construction of the indicators are presented in Supplementary Table 1.

DATA ANALYSIS

The prevalences, proportions and 95% confidence intervals (95%CI) of all indicators for 2013 and 2019 were determined. Furthermore, in 2019, the indicators were analyzed according to the following sociodemographic variables:

a) sex (male, female);
b) age group (18–24, 25–39, 40–59 and 60 or older);
c) education (no education and incomplete primary education, complete primary education and incomplete secondary education, complete secondary education and incomplete higher education or complete higher education);
d) race/skin color (white, black or brown);
e) *per capita* income (up to one minimum wage [MW], >1 to 3 MW or >3 MW);
f) region (North, Northeast, Southeast, South or Central-West).

Table 1. Proportion and confidence interval of indicators of tobacco use, quitting, secondhand smoke and exposure to media about tobacco in adults aged ≥18 years old in 2013 and 2019. National Health Survey, Brazil, 2013 and 2019.

		NHS 2013		NHS 2019		PR (95%CI)
		%	95%CI	%	95%CI	
Tobacco use	1. Current tobacco users	14.9	(14.4–15.4)	12.8	(12.4–13.2)	0.86 (0.82–0.90)
	2. Tobacco smokers	14.7	(14.2–15.2)	12.6	(12.1–13.0)	0.86 (0.82–0.90)
	3. Daily tobacco smokers	12.7	(12.2–13.1)	11.4	(11.0–11.8)	0.90 (0.85–0.95)
	4. Cigarette smokers	14.5	(14.0–15.0)	12.3	(11.9–12.7)	0.85 (0.81–.89)
	5. Daily cigarette smokers	13.1	(12.6–13.6)	11.0	(10.7–11.4)	0.84 (0.80–0.89)
Tobacco cessation	6. Ex-smokers	17.5	(16.9–18.1)	26.6	(26.1–27.2)	1.52 (1.46–1.58)
	7. Tried to quit smoking	51.1	(49.3–52.8)	46.7	(45.0–48.3)	0.91 (0.87–0.96)
Secondhand smoke	8. Passive smokers at home	10.8	(10.3–11.4)	9.2	(8.8–9.6)	0.85 (0.79–0.90)
	9. Passive smokers at work	13.4	(12.6–14.3)	8.4	(7.9–9.0)	0.63 (0.57–0.69)
Media	10. Exposure to pro-tobacco media	28.7	(27.8–29.5)	18.4	(17.6–19.2)	0.64 (0.61–0.68)
	11. Exposure to anti-tobacco media	52.0	(51.0–53.0)	39.2	(38.4–40.0)	0.75 (0.73–0.77)
	12. Smokers exposed to warnings	86.1	(84.7–87.4)	83.2	(81.9–84.4)	0.97 (0.94–0.99)
	13. Smokers who thought about quitting because of warnings	52.1	(50.2–54.0)	44.4	(42.7–46.1)	0.85 (0.81–0.90)

NHS: National Health Survey; PR: prevalence ratio; 95%CI: 95% confidence interval

To assess differences between prevalences, Poisson regression with robust variance was used, and the significance level adopted was 5%. Statistical analyses were performed using the Software for Statistics and Data Science (Stata) version 14.

ETHICAL ASPECTS

The study followed the guidelines of Resolution No. 466/2012 of the National Health Council, which deals with research involving human beings. The NHS databases are available

for public access and use, and both editions of the NHS were approved by the National Research Ethics Committee of the Ministry of Health, under Reports No. 328.159 (2013) and No. 3.529.376 (2019).

RESULTS

Table 1 shows the prevalence of the indicators analyzed in the years studied. There was an improvement in all tobacco use indicators between 2013 and 2019, with a 15% reduction. Regarding quitting indicators, there was an increase in the prevalence of former smokers (17.5% in 2013 to 26.6% in 2019; prevalence ratio — PR 1.52; 95%CI 1.46–1.58); however, there was a decrease in the prevalence of smokers who tried to quit smoking (51.1% in 2013 to 46.7% in 2019; PR 0.91; 95%CI 0.87–0.96). Secondhand smoke at home and at work also decreased between 2013 and 2019, with emphasis on secondhand smoke at work, which declined by 37% (13.4% in 2013 and 8.4% in 2019; PR 0.63; 95%CI 0.57–0.69). With regard to exposure to pro- and anti-tobacco media, there was a decrease in all indicators: pro-tobacco media (28.7% in 2013 to 18.4% in 2019; PR 0.64; 95%CI 0.61–0.68), anti-tobacco media (52% in 2013 to 39.2% in 2019; PR 0.75; 95%CI 0.73–0.77), smokers exposed to warnings (86.1% in 2013 for 83.2% in 2019; PR 0.97; 95%CI 0.94–0.99) and smokers who thought about quitting because of the warnings (52.1% in 2013 to 44.4% in 2019; PR 0.85; 95%CI 0.81-0.90).

Table 2 describes the indicators by sex in 2019. Women have lower prevalences in most indicators, except for: attempt to quit smoking in the last 12 months (PR 1.16; 95%CI 1.08–1.24); passive smoking at home (PR 1.3 95%CI 1.18–1.42); smokers exposed to warnings (PR 1.03; 95%CI 1.01–1.06); and thinking about quitting smoking because of the warnings (PR 1.14; 95%CI 1.06–1.23). There was no difference in the prevalence of ex-smokers according to sex.

Table 3 presents the indicators according to age group. The PRs were calculated with reference to the population aged 18–24 years, which had lower prevalence of tobacco use. These were higher among individuals aged 40 to 59 years for the use of tobacco derivatives (14.9%; 95%CI 14.2–15.6; PR 1.38; 95%CI 1.23–1.56) and of current tobacco smokers (14.7%; 95%CI 14.015.4; PR 1.38; 95%CI 1.22–1.56). Regarding daily tobacco use and current and daily use of cigarettes, they were higher in the population aged 40 to 59 years (PR 1.61 95%CI 1.41–1.84; PR 1.50 95%CI 1.33 –1.70; and PR 1.76 95%CI 1.53–2.02, respectively) and above 60 (PR 1.26 95%CI 1.10–1.45; PR 1.15 95%CI 1.01 –1.31; and PR 1.35 95%CI 1.17–1.56, respectively). Adults aged 40–59 years and the elderly (60 years and over) were the ones who least tried to quit smoking (PR 0.87 95%CI 0.77–0.98 and PR 0.88 95%CI 0.77–0 .99, respectively) but with a higher prevalence of former smokers (PR 1.44 95%CI 1.31–1.57 and PR 2.27 95%CI 2.07–2.48, respectively). Secondhand smoke at home was high at 18–24 years (15.7%; 95%CI 14.0–17.3) and decreased with increasing age. Exposure to the pack warning was less perceived by the elderly (PR 0.89; 95%CI; 0.84–0.94). Anti-tobacco media exposure was highest among adults aged 40 to 59 years. The proportion of smokers who thought

Table 2. Percentage of tobacco use, quitting, secondhand smoke and exposure to media about tobacco in adults ≥18 years old by sex. National Health Survey, Brazil, 2019.

		Sex				
		Male (A)		Female (B)		PR B/A (95%CI)
		%	95%CI	%	95%CI	
Tobacco use	1. Current tobacco users	16.2	15.6–16.9	9.8	9.3–10.3	0.60 (0.57–0.64)
	2. Tobacco smokers	15.9	15.3–16.6	9.6	9.2–10.1	0.61 (0.57–0.64)
	3. Daily tobacco smokers	14.3	13.7–15.0	8.8	8.4–9.2	0.61 (0.58–0.65)
	4. Cigarette smokers	15.5	14.9–16.2	9.4	9.0–9.9	0.61 (0.57–0.64)
	5. Daily cigarette smokers	13.9	13.3–14.5	8.4	8.0–8.8	0.61 (0.57–0.65)
Tobacco cessation	6. Ex-smokers	26.8	26.1–27.5	26.5	25.7–27.2	0.99 (0.95–1.03)
	7. Tried quitting	43.8	41.6–46.0	50.8	48.5–53.2	1.16 (1.08–1.24)
Secondhand smoke	8. Passive smokers at home	7.9	7.3–8.5	10.2	9.7–10.8	1.30 (1.18–1.42)
	9. Passive smokers at work	10.4	9.4–11.3	6.7	6.1–7.4	0.65 (0.57–0.74)
Media	10. Exposure to pro-tobacco media	21.3	20.3–22.3	15.8	15.1–16.6	0.74 (0.70–0.78)
	11. Exposure to anti-tobacco media	40.4	39.3–41.6	38.1	37.2–39.0	0.94 (0.91–0.97)
	12. Smokers exposed to warnings	82.0	80.5–83.6	84.8	83.1–86.6	1.03 (1.01–1.06)
	13. Smokers who thought about quitting because of warnings	42.0	39.8–44.1	48.0	45.3–50.6	1.14 (1.06–1.23)

Percentage of tobacco use, quitting, secondhand smoke and exposure to media about tobacco in adults ≥18 years old by sex. National Health Survey, Brazil, 2019.

about quitting because of the warnings was higher between 25 and 39 years old (PR 1.31; 95%CI 1.11–1.54) and between 40 and 59 years old (PR 1.33; 95%CI % 1.12–1.58).

Table 4 describes the indicators according to the level of education. The population with no education and incomplete elementary school had the highest prevalence of most indicators: current tobacco use (17.6%; 95%CI 16.8–18.4), almost three times compared to the population with higher education; secondhand smoke at work (14.1%; 95%CI 12.6–15.7), about three times higher. The prevalence of all indicators of tobacco use, ex-smokers and passive smokers at work was lower with increasing schooling. The population with complete

Table 3. Percentage of tobacco use, quitting, secondhand smoke and exposure to media about tobacco in adults ≥18 years old according to age group. National Health Survey, Brazil, 2019.

		Age group (years)										
		18–24 (A)		25–39 (B)		40–59 (C)		60 or older (D)		PR (95%CI) B/A	PR (95%CI) C/A	PR (95%CI) D/A
		%	95%CI	%	95%CI	%	95%CI	%	95%CI			
Tobacco use	1.	10.8	9.6–12.0	12.0	11.2–12.7	14.9	14.2–15.6	11.9	11.2–12.6	1.11 (0.98–1.26)	1.38 (1.23–1.56)	1.10 (0.97–1.25)
	2.	10.6	9.5–11.8	11.8	11.1–12.5	14.7	14.0–15.4	11.4	10.7–12.1	1.11 (0.98–1.26)	1.38 (1.22–1.56)	1.07 (0.95–1.22)
	3.	8.6	7.5–9.6	10.2	9.6–10.9	13.8	13.1–14.5	10.8	10.1–11.5	1.19 (1.04–1.37)	1.61 (1.41–1.84)	1.26 (1.10–1.45)
	4.	9.6	8.5–10.7	11.6	10.9–12.3	14.6	13.9–15.3	11.1	10.4–11.8	1.20 (1.06–1.35)	1.50 (1.33–1.70)	1.15 (1.01–1.31)
	5.	7.6	6.7–8.6	9.9	9.2–10.6	13.5	12.9–14.2	10.4	9.7–11.1	1.29 (1.12–1.49)	1.76 (1.53–2.02)	1.35 (1.17–1.56)
Tobacco cessation	6.	18.6	17.0–20.2	18.7	17.8–19.6	26.8	25.9–27.7	42.2	41.1–43.3	1.00 (0.91–1.10)	1.44 (1.31–1.57)	2.27 (2.07–2.48)
	7.	51.5	45.8–57.2	48.0	45.0–51.1	44.9	42.4–47.5	45.1	42.1–48.1	0.93 (0.82–1.06)	0.87 (0.77–0.98)	0.88 (0.77–0.99)
Secondhand smoke	8.	15.7	14.0–17.3	8.2	7.5–8.9	7.8	7.2–8.4	8.4	7.7–9.1	0.52 (0.46–0.60)	0.50 (0.44–0.57)	0.54 (0.47–0.61)
	9.	9.5	7.4–11.7	8.0	7.1–8.9	8.5	7.7–9.3	7.8	6.3–9.4	0.84 (0.65–1.08)	0.90 (0.70–1.15)	0.82 (0.61–1.11)
Media	10.	20.2	18.5–21.9	21.1	20.0–22.2	19.0	17.8–20.2	12.6	11.7–13.4	1.04 (0.95–1.15)	0.94 (0.85–1.04)	0.62 (0.56–0.69)
	11.	37.7	35.7–39.7	38.6	37.4–39.8	40.5	39.3–41.8	38.7	37.5–39.9	1.02 (0.97–1.08)	1.07 (1.01–1.14)	1.03 (0.97–1.09)
	12.	84.4	80.5–88.4	84.2	82.1–86.3	85.9	84.3–87.5	75.3	72.7–77.8	1.00 (0.95–1.05)	1.02 (0.97–1.07)	0.89 (0.84–0.94)
	13.	35.7	30.1–41.4	46.8	43.8–49.8	47.5	44.8–50.2	39.8	36.7–43.0	1.31 (1.11–1.54)	1.33 (1.12–1.58)	1.11 (0.93–1.33)

Note: the description of the indicators (1 to 13) is provided in Methods. PR: prevalence ratio; 95%CI: 95% confidence interval

Table 4. Percentage of tobacco use, quitting, secondhand smoke and exposure to media about tobacco in adults ≥18 years old according to education. National Health Survey, Brazil, 2019.

		No schooling and incomplete primary (A)		Complete primary and incomplete secondary (B)		Complete secondary and incomplete higher (C)		Complete higher (D)		PR (95%CI) B/A	PR (95%CI) C/A	PR (95%CI) D/A
		%	95%CI	%	95%CI	%	95%CI	%	95%CI			
Tobacco use	1.	17.6	16.8–18.4	15.5	14.3–16.6	9.6	8.9–10.2	7.1	6.3–7.8	0.88 (0.81–0.96)	0.54 (0.50–0.58)	0.40 (0.36–0.45)
	2.	17.2	16.4–18.0	15.3	14.2–16.5	9.4	8.8–10.0	7.0	6.3–7.7	0.89 (0.82–0.97)	0.55 (0.51–0.59)	0.41 (0.36–0.45)
	3.	16.0	15.3–16.8	14.1	12.9–15.2	8.1	7.6–8.7	5.9	5.3–6.6	0.88 (0.80–0.96)	0.51 (0.47–0.55)	0.37 (0.33–0.41)
	4.	9.6	8.5–10.7	11.6	10.9–12.3	14.6	13.9–15.3	11.1	10.4–11.8	0.87 (0.80–0.95)	0.53 (0.50–0.58)	0.39 (0.35–0.43)
	5.	15.5	14.8–16.3	13.5	12.4–14.6	7.8	7.3–8.4	5.7	5.0–6.3	0.87 (0.80–0.95)	0.50 (0.46–0.54)	0.36 (0.32–0.41)
Quitting	6.	33.9	33.0 -34.8	26.1	24.7–27.5	22.3	21.4–23.3	20.7	19.6–21.8	0.77 (0.73–0.82)	0.66 (0.63–0.69)	0.61 (0.58–0.65)
	7.	47.4	45.1–49.6	51.1	47.0–55.1	44.5	41.3–47.8	40.5	35.3–45.7	1.08 (0.98–1.18)	0.94 (0.86–1.02)	0.85 (0.75–0.98)
Secondhand smoke	8.	11.1	10.4–11.8	11.0	9.7–12.2	8.6	7.8–9.3	5.1	4.4–5.9	0.98 (0.87–1.12)	0.77 (0.69–0.86)	0.46 (0.40–0.54)
	9.	14.1	12.6–15.7	10.6	9.0–12.3	8.2	7.3–9.1	4.2	3.5–4.8	0.75 (0.63–0.90)	0.58 (0.50–0.68)	0.30 (0.24–0.36)
Media	10.	14.9	13.9–15.8	19.8	18.4–21.2	20.7	19.6–21.8	19.7	18.3–21.2	1.33 (1.23–1.44)	1.39 (1.31–1.48)	1.33 (1.21–1.46)
	11.	39.7	38.6–40.9	40.7	39.0–42.4	39.9	38.7–41.2	34.9	33.4–36.3	1.02 (0.98–1.07)	1.00 (0.97–1.04)	0.88 (0.83–0.92)
	12.	77.6	75.7–79.4	86.8	84.1–89.5	88.0	86.0–90.0	92.0	89.0–94.9	1.12 (1.08–1.16)	1.13 (1.10–1.17)	1.19 (1.14–1.23)
	13.	45.1	42.8–47.4	47.2	43.0–51.5	43.3	40.0–46.6	38.1	33.2–43.1	1.05 (0.94–1.16)	0.96 (0.88–1.05)	0.85 (0.74–0.97)

Note: the description of the indicators (1 to 13) is provided in Methods. PR: prevalence ratio; 95%CI: 95% confidence interval

higher education or more was the one who least tried to quit smoking, had the least exposure to anti-tobacco media, and who thought the least about quitting because of the warnings on the pack. The prevalence of exposure to pro-tobacco media and the perception of warnings on the pack was higher among the more educated (Table 4).

Table 5 shows the analyses according to race/skin color. People of black and mixed race/color had a higher prevalence of all indicators of tobacco use and secondhand smoke at home and at work, trying to quit smoking and exposure to anti-tobacco media, and less exposure to warnings on the pack. The percentage of former smokers was higher in the population of black race/skin color (28.8%; 95%CI 27.2–30.5). Exposure to the pro-tobacco media was lower among people of mixed race/color.

In the supplementary material, analyses according to regions of Brazil and household income are presented. The worst indicators related to tobacco use, quitting, secondhand smoke and exposure to the media were observed in the North and Northeast regions (Supplementary Table 1). Regarding household income, in general, the worst indicators were found among those with up to 1 MW (Supplementary Table 2).

DISCUSSION

The present study showed that between 2013 and 2019: there was an improvement in most tobacco use indicators; there was a reduction in secondhand smoke at work and at home; there was an increase in the prevalence of ex-smokers, but a reduction in the attempt to quit smoking; and media indicators point to reduced exposure to pro and anti-tobacco media, as well as to warnings. When considering the sociodemographic variables, in 2019, tobacco use was higher in men, aged 40–59 years, in less educated, low-income, blacks and browns, from the South, Midwest and Southeast regions.

In 2019, 20.4 million (12.8%) adults were tobacco users, and smoked tobacco corresponds to almost all of this consumption — about 20 million, that is, 12.6% of users. Thus, only 0.2% reported using chewed tobacco or other forms of consumption of the product. These results differ from those of other Asian countries, such as Bangladesh and India, where chewed or smokeless tobacco, for cultural reasons, has higher prevalence[14]

It was found that the prevalence of tobacco use was higher among men, which has been described in most countries[14-16]. A study with data from Global Burden of Disease (GBD) highlights that 933.1 million people smoke daily worldwide, of which more than 80% are men[15]. In Brazil, at the beginning of the 20th century, tobacco use was a male practice, and initiation among women took place around the 1960s and 1970s, associated with the image of female emancipation and gender equality[17-19], which explains such differences. However, in recent decades, tobacco use has declined in both sexes[20,21].

The age group that smokes the most is 40–59 years old, but studies have shown a decline in all age groups[20]. Among young people, the lowest prevalence reflects the role of regulatory measures adopted and the lower use among adolescents[4,22]. For the elderly, the prevalence

Table 5. Percentage of tobacco use. quitting, secondhand smoke and exposure to media about tobacco in adults ≥ 18 years old according to race/skin color. National Health Survey, Brazil, 2019.

		Race/skin color							
		White (A)		Black (B)		Brown (C)		PR (95%CI) B/A	PR (95%CI) C/A
		%	95%CI	%	95%CI	%	95%CI		
Tobacco use	1.	11.8	11.2–12.4	13.7	12.5–15.0	13.5	12.9–14.2	1.16 (1.05–1.28)	1.14 (1.07–1.22)
	2.	11.6	11.0–12.2	13.5	12.3–14.7	13.3	12.7–13.9	1.16 (1.05–1.28)	1.14 (1.07–1.22)
	3.	10.6	10.0–11.2	12.4	11.2–13.5	11.9	11.3–12.5	1.17 (1.05–1.30)	1.12 (1.05–1.21)
	4.	11.2	10.6–11.8	13.3	12.1–14.5	13.0	12.4–13.6	1.18 (1.07–1.31)	1.15 (1.08–1.24)
	5.	10.2	9.7–10.8	11.8	10.7–12.9	11.5	10.9–12.0	1.15 (1.04–1.28)	1.12 (1.04–1.21)
Tobacco cessation	6.	26.4	25.5–27.3	28.8	27.2–30.5	26.2	25.5–27.0	1.09 (1.02–1.17)	0.99 (0.95–1.04)
	7.	42.8	40.1–45.4	54.1	49.9–58.2	48.2	45.9–50.5	1.26 (1.15–1.39)	1.13 (1.05–1.21)
Secondhard smoke	8.	7.9	7.3–8.5	10.4	9.1–11.7	10.1	9.5–10.6	1.32 (1.14–1.53)	1.27 (1.16–1.40)
	9.	6.8	6.0–7.5	10.7	9.0–12.3	9.8	8.8–10.7	1.58 (1.30–1.92)	1.45 (1.25–1.68)
Media	10.	19.2	18.2–20.2	19.1	17.6–20.6	17.3	16.4–18.2	0.99 (0.91–1.08)	0.90 (0.85–0.96)
	11.	38.1	37.0–39.2	41.8	40.0–43.7	39.7	38.7–40.7	1.10 (1.04–1.15)	1.04 (1.01–1.08)
	12.	87.0	85.2–88.8	82.2	79.1–85.2	80.2	78.4–81.9	0.94 (0.91–0.98)	0.92 (0.89–0.95)
	13.	42.8	40.1–45.6	45.4	40.9–49.9	45.7	43.2–48.3	1.06 (0.94–1.19)	1.07 (0.98–1.16)

Note: the description of the indicators (1 to 13) is provided in Methods. PR: prevalence ratio; 95%CI: 95% confidence interval

has also reduced, which can be attributed to doctors' guidelines and those of other health professionals to stop smoking[23].

There was also evidence of higher prevalence of tobacco use in the population with low income and education, which has already been described in studies carried out in Brazil[20,21] and in other countries[14] and attributed to lower access to health promotion practices and cessation.

Black and brown individuals had a higher prevalence of tobacco use and exposure to its smoke in the present study, which can be explained by their lower socioeconomic status, their lower access to health promotion practices and their higher exposure to tobacco at work. However, in other countries, such as the United States of America, opposite results were described, with a lower prevalence among blacks[24].

Tobacco cessation indicators showed an increase in ex-smokers for the total population, with an increase after 60 years and in the uneducated population. Former smokers in Brazil are twice as numerous (42.3 million) as smokers (20 million). This success can be credited to the anti-tobacco policies of recent years, such as the ban on advertising, the increase in product taxation and warnings[7,20,22,25]. Supporting smoking cessation is one of the milestones of the Framework Convention on Tobacco Control [26,27].

Furthermore, access to treatment has been expanded, through training of teams, as well as an increase in the acquisition and distribution of medications for cessation. Furthermore, treatment for smoking cessation (or treatment for nicotine dependence) has been offered free of charge by the Unified Health System (SUS) since 2004[28], updated in 2013, through Ordinance No. 571[29].

Among smokers, nearly half, or 46.6% (10 million), tried to quit smoking. However, this reduction was smaller compared to 2013, which was 51%. Brazil is one of the 23 countries that have adopted the "MPOWER" policy package, part of the WHO Action Plan for the prevention and control of non-communica0ble diseases (NCDs)[1]. MPOWER encourages countries to monitor tobacco use and prevention policies, protection from secondhand smoke, cessation support, and regulatory measures[1,30].

Secondhand smoke, that is, the inhalation of tobacco smoke and its derivatives, increases the risk of developing the same diseases that active smoking engenders, although to a lesser extent[31]. In 2019, in Brazil, 27 thousand deaths (1.9% of the total deaths) and 771,000 DALYs (1.1% of the total DALYs) were attributed to secondhand smoke[3]. Secondhand smokers at work are mostly men, young people, blacks with low education and low income[32]. This characterization is possibly the result of exposure to jobs with less regulation[32,33]. In 2011, Law No. 12,546 and, in 2014, Presidential Decree No. 8.262 prohibited the practice of smoking in public places[34,35]. There was also a greater reduction in the prevalence of secondhand smoke at work than at home between 2013 and 2019, an effect of this regulatory framework[34-36]. The prevalence of passive smokers at home, in addition to being higher than at work, covers 12.7 million non-smoking adults, mostly women, younger, with low education and income, black and brown. These results show that passive smokers at home represent a more vulnerable population with less protection by legislation, which refers to public collective places[34-36].

There was a reduction in smokers exposed to anti-tobacco media, which in 2013 were approximately half of the population, while in 2019 they totaled about 40%. WHO recommends investing in risk communication, anti-tobacco communication campaigns and other risk factors for NCDs[37]. The perception of reduction may be due to less investment in government social communication actions in the health area[4]. On the other hand, it is noteworthy that there was a reduction in exposure to the pro-tobacco media, which is positive, and that the regulatory framework for banning advertising[34-36] has worked[4,7].

The WHO also recommends the implementation of warning images on cigarette packages in order to increase knowledge about the harm caused by their use[30,38]. This indicator was measured among smokers and showed that they were less exposed to warnings between 2013 and 2019; the images had less impact among them, affecting 52% of them in 2013 and 44% in 2019, that is, less than half of smokers thought about quitting because of the warnings in the last survey.

Although there was an improvement in most indicators related to tobacco consumption in the country, the advances were less expressive in the analyzed period. This result has been confirmed by telephone surveys carried out in capitals, which showed that between 2015 and 2019 there was a smaller reduction in the prevalence of smokers, which may indicate flaws in regulation and pricing policies[4,21]. Another study, with data from the National Adolescent Health Survey (PeNSE), showed an increase in the use of other tobacco products, in particular the hookah, showing recent changes in the behavior of tobacco in the country among the young population[22]. Since 2015, Brazil has been going through a political and economic crisis and has implemented fiscal austerity measures, budget cuts, with the approval of Constitutional Amendment No. 95[39], in addition to less investment in public policies and regulation[21]. These measures have contributed to the deterioration of the population's health, also resulting in an increase in poverty[21,40-43]. There was less investment in the regulatory role of the Brazilian government, less inspection of tobacco products and an increase in illegal trade[44,45]. In this sense, there is the possibility of a plateau of prevalences or, worse, of an increasing trend. The maintenance and progress in fighting the tobacco epidemic depend on the expansion of the regulatory framework, such as the adoption of generic packaging, as well as support for small farmers in the diversification of their crops in order to achieve the goals of the 2030 Agenda for Sustainable Development Goals[5].

Among the limitations of this study, the cross-sectional design is highlighted, which makes it impossible to establish a causal relationship between the findings. However, the NHS is the gold standard in population-based surveys and is used as a basis for other estimates from other surveys. Another issue refers to the fact that the information is self-reported by the participants, which may be subject to information bias. However, studies that compare self-reported with measured data show that the former have good reliability[46].

In summary, the findings show improvement in indicators of tobacco use, cessation, secondhand smoke and media exposure between 2013 and 2019, but the reduction was smaller than in other periods analyzed. Consequently, it is imperative to invest more in public policies to fight and control the use of tobacco and its derivatives in Brazil.

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