Population-based evidence of a strong decline in the prevalence of smokers in Brazil (1989–2003)

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Objective To evaluate the evolution in smoking indicators in the adult Brazilian population between 1989 and 2003.

Methods We compared age-adjusted prevalence ratios and means for smoking indicators, stratified by age, sex and sociodemographic variables, obtained from two comparable household surveys that used probabilistic sampling of the Brazilian population aged $\geq$ 18 years (n = 34 808 in 1989 and n = 5000 in 2003).

Findings Between 1989 and 2003, there was a substantial decrease in the prevalence of smoking (from 34.8% to 22.4%; age-adjusted prevalence ratio, 0.65; 95% confidence interval, CI, 0.60–0.70) and a modest reduction in the mean number of cigarettes smoked per day (from 13.3 to 11.6; age-adjusted difference, −1.8; 95% CI, −2.6 − −1.0). Reductions in the prevalence and intensity of smoking were greater among males, younger age groups and higher socioeconomic strata.

Conclusion The prevalence of smoking in the adult Brazilian population declined by 35% between 1989 and 2003, or an average of 2.5% per year. This exceptional reduction surpasses those seen in other countries that implemented wide-ranging and rigorous policies for controlling smoking during the same period. The more intense decline in smoking in younger age groups was consistent with the concentration of efforts of the Brazilian tobacco control programme to prevent the onset of smoking among youths and the total prohibition of cigarette advertising. We recommend the intensification of programme initiatives targeting women and less economically favoured population strata.

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Une traduction en français de ce résumé figure à la fin de l'article. Al final del artículo se facilita una traducción al español. الترجمة العربية لهذه الخلاصة في نهاية النص الكامل لهذه المقالة.

Introduction

The adverse effects of tobacco smoking on health have been known since at least the 1950s.[1,2] Even the large multinational cigarette companies, who previously denied the problem and questioned the validity of scientific studies, now explicitly admit that tobacco smoking has adverse consequences. There is scientific evidence that even nonsmokers exposed to tobacco smoke ("passive smokers") have a greater incidence of cancer, cardiovascular disease and respiratory disease.[3] As well as being a risk factor for a variety of diseases, smoking is characterized by chemical dependence, and falls into a model of chronic disease with a long-term natural history and with periods of recurrence and remission.[4]

The accumulation of knowledge on the risks of tobacco smoking has not been enough to reduce worldwide consumption. In fact, tobacco consumption in developing countries has been increasing at an alarming rate as a result of sophisticated global promotion strategies developed by multinational cigarette companies. Favoured by the liberalization of commerce brought about by globalization, such companies are promoting the rapid transfer of the burden of tobacco consumption from rich to poor countries.[5] In 1999, smoking already accounted for four million deaths per year worldwide, and half of these occurred in developing countries. At current trends, the number of deaths attributed to smoking will double by 2020, and seven of every ten tobacco-related deaths will take place in developing countries.[6]

In light of the adverse effects of smoking and the evidence for increased consumption of tobacco, especially in developing countries, the World Health Assembly has approved several wide-ranging resolutions to contain the global demand for tobacco. These culminated in 1999 with the sanction of the Framework Convention on Tobacco Control, a set of multisectoral actions aimed at reducing the demand for, and consequent health effects of, tobacco in the world.[7]

Despite being the second-largest producer of tobacco in the world, Brazil has a notable record of initiatives aimed at combating smoking. The origin of such initiatives dates back to the 1970s, when scientific medical societies began to work towards enlightening the Brazilian population about health hazards associated with smoking, at the same time pressuring the Ministry of Health to assume responsibility for controlling the problem.[8] However, coordinated and persistent initiatives did not begin until 1989, when the Ministry of Health assigned the coordination of a national tobacco control programme to its cancer institute. The initiatives in this programme gained in strength, organization and scope throughout the years, evolving

from a campaign-oriented character in the early 1990s to a set of coordinated nationwide measures. These involved educating the population and pressuring government agencies and Congress to adopt fiscal measures to increase the price of cigarettes and to approve laws prohibiting the advertising of tobacco products and smoking in public places. A complete description of the strategies and actions performed by the Brazilian tobacco control programme between 1989 and 2003 can be found elsewhere.[9]

The absence to date of repeated and comparable national surveys on smoking in Brazil has prevented the adequate evaluation of the results of the Brazilian tobacco control programme. Indirect evidence for the programme's success can be deduced based on the declining trend in cigarette commercialization in the country, and comparisons between the prevalence of smoking in large Brazilian cities in the early 2000s and that reported in the only national survey of smoking available at the time, which was conducted in 1989.[10] The availability of the results of a second national smoking survey carried out in 2003 allows us to assess changes in the prevalence and intensity of smoking in Brazil during a period marked by the creation of a notable body of measures for containing tobacco consumption.

Methods

The data sources were two national household surveys conducted in Brazil: the National Survey of Health and Nutrition, carried out in June–September 1989, and the Brazilian module of the World Health Survey, carried out in January–September 2003. Similar stratified, clustering sampling procedures applied to census lists of all Brazilian households (except those located in the sparsely populated rural areas of the northern region) were used in the two surveys.[10,11] The 1989 survey studied a probabilistic sample of 17 920 households and investigated smoking among all subjects aged ⩾ 15 years within these households. The 2003 survey studied a probabilistic sample of 5000 households and randomly selected one household member aged ⩾ 18 years to obtain information on smoking. The present study considered only subjects aged ⩾ 18 years from both surveys, that is, 34 808 from the 1989 survey and 5000 from the 2003 survey. The household participant

rate exceeded 70% in the two surveys and there were no non-responses for questions regarding smoking in either survey.

The 1989 survey used two questions to evaluate smoking: (1) "Do you smoke cigarettes, a pipe, or cigars?", having "yes" and "no" as possible answers; and (2) (if yes) "How much do you smoke per day?". Two questions were employed in the 2003 survey to evaluate current smoking: (1) "Do you currently smoke any tobacco product (i.e. cigarettes, cigars or a pipe)?", possible answers being "daily", "yes, but not daily" and "no"; and (2) (if daily) "What amount of the following products (i.e. cigarettes, hand-rolled cigarettes, a pipe, cigars and other) do you smoke per day?". In both surveys, the questions on smoking as well as all other questionnaire items were asked by trained interviewers.

The present study investigated two indicators of smoking: the prevalence of smokers and the mean number of cigarettes or similar products smoked per day. We considered smokers to be all subjects who answered "yes" to the first question of the 1989 survey and all those who answered "daily" or "yes, but not daily" to the first question of the 2003 survey. In the absence of information on the total number of cigarettes or similar products smoked by non-daily smokers in the 2003 survey (approximately 10% of total smokers), a consumption equivalent to one cigarette per day was attributed to these non-daily smokers.

The comparison between smoking indicators obtained from the two surveys was done separately for men and women, according to age group, urban or rural location of household, schooling, and three categories of family purchasing power (i.e. low, medium or high). Purchasing power was based on per-capita family income in 1989, and on the number of consumer goods in the household in 2003. The low, medium and high purchasing-power categories originally employed by the 2003 survey corresponded to 0 to 3, 4 to 7 and ⩾ 8 consumer goods and involved 32.7%, 53.3% and 14.0% of the studied individuals, respectively. In 1989, the same three categories of purchasing power corresponded to groups of increasing income, with the same proportions of subjects found grouped according to the three classes of consumer goods in the 2003 survey.

For the statistical analysis of time trends in smoking indicators, we cal-

culated age-adjusted prevalence ratios (with 95% confidence intervals, CI) using Poisson regression with robust variance, and age-adjusted differences in mean values (with 95% CI) using linear regression models. Sampling weights and the effect of the complex sampling design on standard errors were dealt with using the survey commands of Stata software, version 9.2.[12]

Results

There was a marked and statistically significant decline (approximately 35%) in the prevalence of smoking; the estimated frequency of smokers among the Brazilian adult population decreased from 34.8% in 1989 to 22.4% in 2003. Decline among males (37%) was slightly higher than among females (32%) and the relative excess of smokers in the male population was consequently reduced slightly (from 1.6 to 1.5 times). In both sexes, the reduction in smoking was substantial and statistically significant across all age groups, with more intense declines in younger groups (< 35 years) and among the elderly (⩾ 65 years) than among other age groups. In the case of men, this trend determined a delay in the "peak" of smoking prevalence from those aged 25–44 years to those aged 45–64 years. In the case of women, the highest prevalence moved from those aged 24–44 years to those aged 35–54 years (Table 1).

Substantial and statistically significant declines in the prevalence of smoking were observed for both sexes, in urban and rural settings, and across different socioeconomic strata of the adult Brazilian population when level of schooling or family purchasing power was considered. For both sexes, the intensity of decline was a direct function of family purchasing power. The relative excess of smokers with the lowest purchasing power relative to those with the highest increased by approximately 100% between 1989 and 2003. A similar trend of lower decline in the prevalence of smoking among groups of lower socioeconomic status was found among women, but not among men, when the population was stratified according to schooling (Table 2).

The mean number of cigarettes consumed by Brazilian male smokers was reduced significantly between surveys (from 14.9 to 12.6 cigarettes per day). This reduction was minimal among

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Table 1. **Temporal variation in the prevalence of adult smokers (⩾ 18 years) in Brazil between 1989 and 2003, according to sex and age**

Age (years)	Men			Women			Total		
	Prevalence (%)[a]		Prevalence ratio (95% CI)[b]	Prevalence (%)[a]		Prevalence ratio (95% CI)[b]	Prevalence (%)[a]		Prevalence ratio (95% CI)[b]
	1989	2003	2003/1989	1989	2003	2003/1989	1989	2003	2003/1989
18–24	34.1 (1.2)	21.9 (2.4)	0.64 (0.51–0.81)	24.2 (1.1)	13.7 (1.8)	0.56 (0.43–0.74)	29.0 (1.0)	17.8 (1.6)	0.61 (0.51–0.74)
25–34	48.2 (1.1)	29.6 (2.4)	0.61 (0.52–0.73)	33.6 (1.1)	19.0 (1.7)	0.56 (0.47–0.68)	40.6 (0.8)	23.6 (1.4)	0.58 (0.51–0.66)
35–44	48.6 (1.3)	26.2 (2.1)	0.54 (0.46–0.64)	29.2 (1.1)	24.2 (1.9)	0.83 (0.70–0.98)	38.6 (0.9)	25.1 (1.5)	0.65 (0.57–0.73)
45–54	45.3 (1.4)	34.5 (2.9)	0.76 (0.64–0.91)	26.2 (1.3)	20.7 (2.1)	0.79 (0.63–0.99)	35.3 (1.1)	26.7 (1.9)	0.76 (0.65–0.88)
55–64	45.7 (1.9)	31.8 (3.0)	0.70 (0.57–0.85)	21.1 (1.4)	16.7 (2.4)	0.79 (0.58–1.07)	32.7 (1.2)	23.5 (1.9)	0.72 (0.60–0.86)
⩾ 65	33.5 (1.9)	19.1 (2.6)	0.57 (0.43–0.76)	18.4 (1.5)	9.8 (2.0)	0.53 (0.34–0.82)	25.1 (1.3)	14.6 (1.6)	0.58 (0.46–0.74)
Total	**43.3 (0.7)**	**27.1 (1.1)**	**0.63[c] (0.58–0.69)**	**27.0 (0.6)**	**18.4 (0.9)**	**0.68[c] (0.61–0.76)**	**34.8 (0.5)**	**22.4 (0.8)**	**0.65[c] (0.60–0.70)**

[a] Standard error of prevalence is given in parentheses in these columns.
[b] CI, confidence interval, given in parentheses in these columns.
[c] Prevalence ratio adjusted for age.

female smokers (from 10.9 to 10.2 cigarettes per day) and did not reach statistical significance. Among men, as was the case with the reduction in frequency of smoking, the reduction in mean number of cigarettes smoked per day tended to be greater among younger subjects, again showing an advantage for younger cohorts. It is interesting to note that, among subjects aged ⩾ 65 years, the mean number of cigarettes consumed remained virtually constant among men and increased among women (Table 3).

Statistically significant reductions in the mean number of cigarettes smoked per day were detected in urban and rural settings, for all levels of schooling, and for the high and medium purchasing-power categories. In the case of female smokers, statistically significant reductions were observed only among subjects with at least 9 years of schooling. Increases, although not significant, in the number of cigarettes smoked per day were observed among women with less than 5 years of schooling and among those with low purchasing power. The evolution in the number of cigarettes smoked per day led to a substantial reduction in the relative "protection" in the less-affluent strata. For example, in

1989 men with high purchasing power smoked an average of 7.2 cigarettes more per day than men of low purchasing power, while in 2003, this difference was only 2.9 cigarettes per day. In the same period, the difference in the mean number of cigarettes smoked by women with a high (⩾ 12 years) or low (< 5 years) level of schooling reduced from 5.2 to 1.2 cigarettes per day (Table 4).

Discussion

Comparison of two household surveys conducted in 1989 and 2003 on probabilistic samples of the Brazilian adult population showed evidence for a substantial decline (approximately 35%) in the prevalence of smokers and a modest reduction (about two cigarettes per day) in the mean number of cigarettes smoked. Both the decline in prevalence and the reduction in the intensity of smoking tended to be stronger among males, younger age groups and higher socioeconomic strata.

The rigorously probabilistic character of the two national surveys and the fact that the prevalence estimates obtained in these surveys were consistent with those from independent studies conducted in large Brazilian cities in 1989[13,14] and 2003[15–17] reinforce the

validity of the observed decline in smoking in Brazil. The magnitude of this decline is also in agreement with the 47.5% estimated decline in the annual per-capita availability of cigarettes in the country (calculated as [production plus importation minus exportation]/population aged ⩾ 15 years) between 1990 and 2000.[18]

It is interesting to note that the estimated annual cigarette availability in Brazil in 1990 (1601 cigarettes per capita) divided by the proportion of smokers estimated in the 1989 survey (0.346) results in a consumption rate of 4627 cigarettes per smoker per year, or 12.7 cigarettes per day. This consumption rate is only slightly lower than the 13.3 cigarettes per day estimated directly by the 1989 survey. Likewise, the estimated annual cigarette availability for 2000 (869 cigarettes per capita) divided by the proportion of smokers in 2003 (0.224) results in a yearly consumption of 3879 cigarettes per smoker, or 10.6 cigarettes per day – a number also only slightly lower than the 11.6 cigarettes per day estimated directly by the 2003 survey.

The decline in the prevalence of adult smokers in Brazil between 1989 and 2003 – 35% in 14 years, or an

Table 2. **Temporal variation in the prevalence of adult smokers (≥ 18 years) in Brazil between 1989 and 2003, according to sociodemographic variables**

Variable	Men			Women			Total		
	Prevalence (%)[a]		Prevalence ratio[b] (95% CI)[c]	Prevalence (%)[a]		Prevalence ratio[b] (95% CI)[c]	Prevalence (%)[a]		Prevalence ratio[b] (95% CI)[c]
	1989	2003	2003/1989	1989	2003	2003/1989	1989	2003	2003/1989
Household settings:									
Urban	41.1 (0.8)	26.2 (1.3)	0.65 (0.59–0.72)	26.5 (0.6)	18.2 (1.0)	0.67 (0.52–0.85)	33.3 (0.6)	21.8 (0.8)	0.66 (0.61–0.72)
Rural	50.0 (1.0)	31.8 (2.6)	0.63 (0.53–075)	29.0 (1.1)	19.6 (2.4)	0.68 (0.52–0.87)	39.9 (0.9)	25.5 (2.0)	0.64 (0.54–0.75)
Years of schooling:									
0–4	48.2 (0.8)	32.2 (1.7)	0.68 (0.61–0.76)	28.1 (0.7)	22.8 (1.5)	0.84 (0.73–0.97)	37.8 (0.6)	27.0 (1.2)	0.74 (0.67–0.81)
5–8	41.4 (1.3)	29.4 (2.3)	0.71 (0.60–0.84)	29.6 (1.2)	19.5 (1.6)	0.65 (0.55–0.77)	35.4 (1.0)	24.1 (1.3)	0.68 (0.60–0.76)
9–11	33.3 (1.5)	19.3 (1.9)	0.59 (0.48–0.74)	22.2 (1.2)	11.0 (1.6)	0.51 (0.37–0.69)	27.1 (1.0)	14.9 (1.3)	0.56 (0.46–0.68)
≥ 12	28.8 (2.1)	18.1 (2.5)	0.70 (0.52–0.95)	21.5 (1.4)	13.4 (2.0)	0.67 (0.49–0.93)	25.0 (1.2)	15.6 (1.7)	0.67 (0.53–0.85)
Household purchasing power:									
Low	50.5 (1.0)	35.8 (2.1)	0.72 (0.63–0.81)	32.7 (1.1)	23.4 (1.8)	0.72 (0.61–0.84)	40.9 (0.9)	29.0 (1.5)	0.71 (0.64–0.80)
Medium	42.1 (0.9)	24.9 (1.4)	0.60 (0.53–0.67)	25.1 (0.7)	16.9 (1.2)	0.67 (0.58–0.79)	33.4 (0.6)	20.6 (1.0)	0.62 (0.56–0.68)
High	35.2 (1.7)	18.9 (2.7)	0.55 (0.41–0.74)	22.8 (1.1)	13.4 (2.1)	0.59 (0.43–0.81)	28.7 (1.0)	15.9 (1.8)	0.56 (0.45–0.70)

[a] Standard error of prevalence is given in parentheses in these columns.
[b] Prevalence ratio adjusted for age.
[c] CI, confidence interval, given in parentheses in these columns.

average of 2.5% per year – is exceptional from various standpoints. In a similar period, the annual rate of decline of smoking was 0.6% in Japan, 0.7% in the United States of America (USA) and 0.8% in the United Kingdom.[19] In California, the first state to implement a large-scale tobacco control programme in the USA (in 1988) and one of the most successful in reducing tobacco consumption, the prevalence of smoking among adults has declined from 22.8% in 1988 to 15.4% in 2004, or an average of 2% per year.[20] South Africa and Thailand, which in the 1990s implemented wide-ranging and rigorous policies to control smoking, recorded annual declines in the prevalence of smoking during this period of 1.8% and 1.9%, respectively.[21,22]

It should be noted that the prevalence of smoking in 2003 among adults in Brazil (Table 1), albeit still high at 22.4%, places the country in a favourable position in relation to other countries undergoing economic transition (estimated prevalence of smoking, 32.7%), to developed countries (27.4%) and to developing countries (28.9%).[20] In the Americas, the percentage of smokers in Brazil is closer to that in the USA (20.8% in 2004)[23] and Canada (20% in 2005)[24] than to that in other Latin American countries such as Mexico (34.8% in 1998), Cuba (37.2% in 1995) or Argentina (40.4% in 2000).[19]

It should also be noted that the more intense decline in smoking among younger age groups indicates a probable cohort effect, which allows us to anticipate additional declines in the frequency of smokers in the country. The more intense decline in smoking among younger age groups is consistent with the concentrated efforts of the Brazilian programme to reduce the number of young people who start smoking. These efforts are translated into educational measures in schools (7709 schools involved as of 2002) and the total prohibition of cigarette advertising (despite the opposition of a strong alliance involving cigarette manufacturing companies, mass media, tobacco producers and automobile-racing promoters).[9] Especially encouraging is the fact that the intense reduction in the prevalence of smoking in the group aged 18–24 years (from 29% to 17.8%) means that the prevalence in this group is now much lower than that in countries

Table 3. **Temporal variation in mean number of cigarettes smoked per day by adults (≥ 18 years) in Brazil between 1989 and 2003, according to sex and age**

Age (years)	Men			Women			Total		
	Mean no. of cigarettes per day[a]		DM[b] (95% CI)[c]	Mean no. of cigarettes per day[a]		DM[b] (95% CI)[c]	Mean no. of cigarettes per day[a]		DM[b] (95% CI)[c]
	1989	2003	2003–1989	1989	2003	2003–1989	1989	2003	2003–1989
18–24	12.4 (0.4)	8.9 (1.0)	−3.5 (−5.6 − −1.4)	10.1 (0.4)	8.5 (1.4)	−1.6 (−4.4 − 1.2)	11.4 (0.3)	8.7 (0.8)	−2.7 (−4.3 − −1.0)
25–34	14.9 (0.3)	13.1 (1.2)	−1.8 (−4.2 − 0.6)	11.6 (0.4)	10.0 (0.6)	−1.6 (−3.1 − −0.2)	13.5 (0.2)	11.6 (0.7)	−1.8 (−3.3 − −0.4)
35–44	16.6 (0.4)	13.3 (1.0)	−3.4 (−5.4 − −1.3)	11.9 (0.4)	12.3 (0.8)	0.4 (−1.3 − 2.1)	14.8 (0.3)	12.8 (0.6)	−2.0 (−3.3 − −0.7)
45–54	16.4 (0.5)	14.7 (1.2)	−1.7 (−4.3 − 0.9)	11.2 (0.5)	10.6 (1.1)	−0.6 (−2.9 − 1.7)	14.4 (0.4)	12.9 (0.8)	−1.5 (−3.3 − 0.3)
55–64	15.4 (0.6)	13.7 (1.4)	−1.7 (−4.6 − 1.2)	9.1 (0.5)	6.5 (1.1)	−2.6 (−5.0 − −0.2)	13.2 (0.5)	10.9 (1.0)	−2.3 (−4.5 − −0.1)
≥ 65	11.4 (0.6)	11.3 (1.5)	−0.1 (−3.4 − 3.1)	8.0 (0.6)	9.8 (2.0)	1.8 (−2.2 − 5.8)	10.0 (0.5)	10.8 (1.2)	0.8 (−1.8 − 3.4)
Total	**14.9 (0.2)**	**12.6 (0.5)**	**−2.3[d] (−3.4 − −1.1)**	**10.9 (0.2)**	**10.2 (0.4)**	**−0.8[d] (−1.7 − 0.2)**	**13.3 (0.2)**	**11.6 (0.4)**	**−1.8[d] (−2.6 − −1.0)**

[a] Standard error of mean is given in parentheses in these columns.
[b] DM, difference in means.
[c] CI, confidence interval, given in parentheses in these columns.
[d] DM adjusted for age.

such as the USA and Canada (28% and 31%, respectively).[23,24]

Tobacco use by younger generations should concern us for several reasons,[25] including the fact that about 70% of adult smokers in large Brazilian cities began to smoke before age 20 years.[15] One of the most efficient ways to inhibit smoking among young people is to increase the price of cigarettes.[26] This is particularly important in Brazil, where the price of cigarettes is still one of the lowest in the world.[9] In Brazil, the price of a pack of one of the most popular worldwide brands of cigarettes is equivalent to US$ 0.85, versus approximately US$ 1.50 in other Latin American countries and about US$ 4 in most developed countries.[27]

The less intense decline in smoking among females suggests that the initiatives of the Brazilian tobacco control programme were less efficient among this group. Indeed, the increase in smoking among women, especially in developing countries, is acknowledged as being one of the great global challenges to public health.[28] Worthy of note are marketing strategies that specifically target women, attempting to associate cigarette consumption with an aura of modernity, independence, style, sophistication, glamour and physical fitness.[29,30] Aesthetic factors underlying the decision to smoke also seem to be more relevant among women than men. Women begin, and continue to smoke to remain thin; this is extensively exploited in marketing strategies for products designed specifically for the female public.[28]

The trend seen in Brazil towards a less marked decline in smoking among lower socioeconomic strata reproduces the usual trend of decline in smoking seen in developed countries.[31] The relationship between smoking and poverty is complex, since poverty may favour smoking and smoking may, in turn, contribute to the impoverishment of smokers and their families.[31] As in the case of young people, the increase in taxation of cigarette sales and the corresponding increase in the price of these products seem to be especially efficacious in inhibiting consumption among lower-income groups.[31] This is another powerful argument that recommends the intensification of fiscal instruments in the Brazilian tobacco control policy.

The mean number of cigarettes smoked per day by Brazilian smokers was modestly reduced among young and middle-aged adults, but remained constant or increased among the elderly. This finding may be attributed to the intense decline in the frequency of smokers, per se, along with a possible selection of individuals with a greater degree of addiction to tobacco. This seems plausible among men but not among women: heavy smokers (20 or more cigarettes smoked per day) represented 28.6% of all male smokers in 1989 (12.4% of 43.3%) and 32.1% in 2003 (8.7% of 27.1%), while heavy smokers represented 26.7% of all female smokers in 1989 (7.2% of 27.0%) and 24.5% in 2003 (4.5% of 18.4%). However, another explanation could exist in the case of older adults, who tend to spend more of their time at home and therefore were less exposed to the restrictions on smoking in public places. There is evidence that restrictions at the workplace led smokers to smoke less by disrupting the automatic component of smoking.[32] Brazilian legislation has prohibited smoking in closed public environments since 1996 and, since the early 1990s, the promotion of smoke-free environments has been one of the

Table 4. **Temporal variation in mean number of cigarettes smoked per day by adults (⩾ 18 years) in Brazil between 1989 and 2003, according to sociodemographic variables**

Variables	Men			Women			Total		
	Mean no. of cigarettes per day[a]		DM[b] (95% CI)[c]	Mean no. of cigarettes per day[a]		DM[b] (95% CI)[c]	Mean no. of cigarettes per day[a]		DM[b] (95% CI)[c]
	1989	2003	2003–1989	1989	2003	2003–1989	1989	2003	2003–1989
Household setting:									
Urban	16.2 (0.3)	13.4 (0.6)	−2.8 (−4.0 − −1.5)	11.8 (0.3)	10.8 (0.5)	−1.1 (−2.2 − 0.0)	14.3 (0.2)	12.2 (0.4)	−2.2 (−3.1 − −1.3)
Rural	11.7 (0.3)	9.3 (1.0)	−2.4 (−4.4 − −0.4)	8.0 (0.2)	7.2 (0.8)	−0.9 (−2.6 − 0.8)	10.4 (0.2)	8.5 (0.7)	−2.0 (−3.5 − −0.6)
Years of schooling:									
0–4	13.7 (0.2)	11.8 (0.7)	−1.9 (−3.4 − −0.4)	9.5 (0.2)	9.6 (0.6)	0.0 (−1.3 − 1.3)	12.1 (0.2)	10.8 (0.5)	−1.4 (−2.4 − −0.4)
5–8	16.1 (0.4)	12.5 (1.0)	−3.8 (−5.9 − −1.7)	12.6 (0.4)	11.8 (0.9)	−1.0 (−2.9 − 1.0)	14.6 (0.3)	12.2 (0.7)	−2.8 (−4.2 − −1.3)
9–11	17.6 (0.6)	15.6 (1.3)	−3.2 (−6.0 − −0.3)	13.1 (0.7)	9.7 (1.3)	−3.6 (−6.3 − −0.9)	15.5 (0.4)	13.3 (1.0)	−2.9 (−4.9 − −0.9)
⩾ 12	20.0 (1.2)	13.1 (1.7)	−6.8 (−10.8 − −2.9)	14.7 (0.9)	10.8 (1.2)	−4.4 (−7.7 − −1.1)	17.6 (0.7)	12.0 (1.1)	−6.4 (−9.2 − −3.7)
Household purchasing power:									
Low	12.2 (0.3)	11.2 (0.8)	−1.0 (−2.6 − 0.5)	8.6 (0.3)	8.8 (0.7)	0.3 (−1.2 − 1.7)	10.6 (0.2)	10.2 (0.5)	−0.6 (−1.6 − 0.5)
Medium	15.5 (0.2)	13.5 (0.7)	−2.0 (−3.5 − −0.5)	11.7 (0.3)	10.9 (0.6)	−0.9 (−2.2 − 0.4)	14.0 (0.2)	12.3 (0.5)	−1.8 (−2.9 − −0.8)
High	19.4 (0.6)	14.1 (1.6)	−5.7 (−9.2 − −2.3)	14.3 (0.6)	12.3 (1.4)	−2.2 (−5.2 − 0.7)	17.3 (0.4)	13.2 (1.2)	−4.5 (−6.9 − −2.0)

[a] Standard error of mean is given in parentheses in these columns.
[b] DM, difference in means, adjusted for age in these columns.
[c] CI, confidence interval, given in parentheses in these columns.

most important axes of the Brazilian tobacco control programme, with 1102 companies and 2864 health-care units having adhered (as of 2002).[9]

In any case, the fact that nearly 30% of Brazilian smokers smoke 20 or more cigarettes per day suggests that a considerable proportion of smokers have a high degree of physical dependence on nicotine, and therefore require therapeutic support based on behavioural or medical approaches to quit smoking. This scenario entirely justifies the efforts currently expended by the Brazilian tobacco control programme to increase the supply and quality of public services specializing in helping smokers to quit smoking.[9] ■

Competing interests: None declared.

Résumé

Preuves dans la population d'une forte baisse de la prévalence du tabagisme au Brésil (1989-2003)

Objectif Evaluer l'évolution des indicateurs du tabagisme parmi la population brésilienne adulte entre 1989 et 2003.

Méthodes Nous avons comparé les taux de prévalence ajustés pour l'âge et les moyennes des indicateurs du tabagisme, stratifiées selon l'âge, le genre et des variables sociodémographiques, obtenus à partir de deux enquêtes comparables auprès des ménages réalisées sur des échantillons statistiques de la population brésilienne de 18 ans et plus (n = 34 808 en 1989 et n = 5 000 en 2003).

Résultats Entre 1989 et 2003, on a relevé une diminution substantielle de la prévalence du tabagisme (de 34,8 % à 22,4 % ; taux de prévalence ajusté pour l'âge : 0,65 ; intervalle de confiance à 95 % (IC) : 0,60-0,70) et une baisse modeste du nombre moyen de cigarettes fumées par jour (de 13,3 à 11,6, différence ajustée pour l'âge : -1,8 ; IC à 95 % : -2,6 - -1,0). Les baisses de la prévalence et de l'intensité du tabagisme étaient plus fortes parmi les hommes, les tranches d'âges correspondant aux jeunes et les couches socioéconomiques supérieures.

Conclusion La prévalence du tabagisme dans la population brésilienne adulte a diminué de 35 % entre 1989 et 2003, soit 2,5 % en moyenne par an. Cette baisse exceptionnelle dépasse celles observées dans des pays ayant mis en œuvre, sur la même période, des politiques de lutte anti-tabac rigoureuses et de grande ampleur. La diminution plus importante du tabagisme observée chez les jeunes est cohérente avec la concentration des efforts des programmes brésiliens de lutte anti-tabac sur la prévention de l'apparition du tabagisme dans cette tranche d'âges et sur l'interdiction totale de la publicité pour les cigarettes. Nous recommandons une intensification des initiatives programmatiques visant les femmes et des louches socioéconomiques moins favorisées.

Resumen

Evidencia poblacional de una fuerte disminución de la prevalencia del tabaquismo en el Brasil (1989-2003)

Objetivo Analizar la evolución de los indicadores de tabaquismo en la población brasileña adulta entre 1989 y 2003.

Métodos Comparamos las razones de prevalencia y las medias de diversos indicadores de tabaquismo, ajustadas por la edad y estratificadas por edad, sexo y variables sociodemográficas, obtenidas a partir de dos encuestas de hogares comparables realizadas mediante un muestreo probabilístico de la población brasileña ⩾ 18 años (n = 34 808 en 1989 y n = 5000 en 2003).

Resultados Entre 1989 y 2003 se registró una disminución sustancial de la prevalencia de tabaquismo (del 34,8% al 22,4%; razón de prevalencias ajustada por la edad: 0,65; intervalo de confianza (IC) del 95%: 0,60-0,70) y una moderada reducción de la media de cigarrillos fumados diariamente (de 13,3 a 11,6; diferencia ajustada por la edad: -1,8; IC95%: -2,6 - -1,0). Las reducciones de la prevalencia e intensidad del hábito fueron mayores entre los hombres, en los grupos de edad más jóvenes y en los estratos socioeconómicos superiores.

Conclusión La prevalencia del hábito de fumar en la población brasileña adulta disminuyó un 35% entre 1989 y 2003, o una media del 2,5% al año. Esta extraordinaria reducción supera la observada en otros países que aplicaron políticas rigurosas y de amplio alcance en ese mismo periodo. La más intensa disminución del tabaquismo observada en los grupos de edad más jóvenes es probablemente el resultado de la focalización de las actividades del programa de lucha antitabáquica en la prevención del comienzo del hábito entre los jóvenes y de la prohibición total de la publicidad de tabaco. Recomendamos que se intensifiquen las iniciativas del programa centradas en las mujeres y en los sectores más desfavorecidos de la población.

ملخص

بيّنات مستندة على السكان حول نقص شديد في معدلات انتشار المدخنين في البرازيل (1989–2003)

الهدف: تقييم التطور الـمُحْرَز في مؤشرات التدخين لدى البالغين من سكان البرازيل في الفترة بين 1989 و2003.

الطريقة: قارنا نسب ووسطي معدلات الانتشار المصحَّحة وفق العمر لمؤشرات التدخين، ورتَّبناها في طبقات وفقاً للعمر والجنس والمتغيرات الاجتماعية والديموغرافية التي حصلنا عليها من مسحَيْن يمكن مقارنتهما للسكان، وباستخدام اعتيان احتمالي للسكان البرازيليين الذين تتجاوز أعمارهم 18 عاماً (وعددهم 34 808 في عام 1989 وعددهم 5000 في 2003).

الموجودات: لقد حدث نقص واضح في معدل انتشار التدخين في الفترة بين 1989 و2003، فبعد أن كان 34.8% أصبح 22.4%، فيما بلغت نسبة معدلات الانتشار المصحَّحة وفق العمر 0.65 بفاصلة ثقة 95% إذ تراوحت القيم المقاسة بين 0.60 و0.70، كما حدث نقص معتدل في العدد الوسطي للسجاير التي تُدخَّن يومياً، فبعد أن كانت 13.3 أصبحت 11.6، وبلغ الفرق المصحَّح وفق العمر 1.8 بفاصلة ثقة 1.95 وتراوحت القيم المقاسة بين 1.5 و2.6. وقد كان النقص في معدل الانتشار وفي كثافة التدخين على أشده بين مجموعات الذكور واليفعان والطبقات الاجتماعية الرفيعة.

الاستنتاج: لقد نقص معدل انتشار التدخين بين البالغين في البرازيل بمقدار 35% في الفترة بين 1989 و2003، بمعدل 2.5% سنوياً. وقد تجاوز هذا النقص الاستثنائي ما حققه ما يعمل في البلدان الأخرى على تنفيذ سياسات صلبة وواسعة النطاق لمكافحة التدخين لدى اليفعان. وقد تماشي النقص الأكثر وضوحاً في التدخين لدى اليفعان مع الجهود المكثَّفة لبرنامج مكافحة التبغ في البرازيل لتجنُّب البدء بالتدخين بين الشباب ولدى مجمل السكان، ولتفادي تأثير الدعاية لتدخين السجاير. ونوصي أن يستهدف تكثيف المبادرات في البرنامج النساء والطبقات الأقل ثراءً من السكان.

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