Cigarette Smoking Trends and Social Disparities Among South African Adults, 2003–2011

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Abstract

Introduction: Cigarette prices have almost doubled in South Africa within the past decade due to pricing/taxation policies. Little is known about the equity impact of these price increases in concert with other tobacco control policies. This study therefore examined trends in current cigarette smoking overall and by socioeconomic status (SES) in South Africa during 2003–2011.

Methods: Data were obtained from the 2003 (n = 2,855), 2007 (n = 2,907), and 2011 (n = 3,003) South African Social Attitudes Survey. Educational attainment (> grade 12, grade 12, grade 1–11, or no education) was used as a proxy for SES, and all analyses were restricted to respondents aged ≥25 years. Trends in current cigarette smoking—defined as daily or some days use of cigarettes—during 2003–2011 were assessed with estimates of annual percentage change (APC), while smoking disparities were assessed with relative concentration index (RCI).

Results: Although no significant change was observed in the overall prevalence of current smoking during 2003–2011, declines were observed among those with no education (APC = −8.2; $p < .05$ for linear trend). However, increased smoking was observed among the most educated women (from 4.0% in 2003 to 13.1% in 2011; $p < .05$ for linear trend). The RCI by educational status changed significantly during the study period, from 0.80 (2003) to 1.35 (2007) to 1.94 (2011).

Conclusions: The policy environment in South Africa during 2003–2011 had a significant positive equity impact by SES, even though no aggregate change in smoking prevalence was observed. Intensified implementation of taxation measures as part of a comprehensive tobacco control may further reduce smoking disparities.

Introduction

Reducing disparities in smoking is as significant a public health issue as reducing the aggregate smoking prevalence in South Africa. Disparities in tobacco use may further widen existing disparities in health and healthcare considering that tobacco is a product used disproportionately among individuals of low socioeconomic status (SES), who may have the highest burden of tobacco-attributable diseases[1] and the lowest access to healthcare.[2] This is particularly true in South Africa considering its history of institutionalized racial and social segregation. Despite the end of apartheid, socioeconomic disparities in health still remain along population subgroups defined by ethnicity, educational level, and gender.[2–4] For instance, South African women continue to report poorer health than men.[5]

In recent times, South Africa has witnessed several dynamic changes in the tobacco control climate.[6] The most recent amendments to the South African Tobacco Control Act included provisions for future introduction of graphic warning labeling, complete ban on smoking in enclosed areas, restrictions of point of sale display, and product content disclosures. However, these recently proposed measures are only part of major strides initiated decades ago towards achieving comprehensive tobacco control in South Africa, such as the tobacco tax increases implemented during the 1990s.[7] Tobacco control efforts were further strengthened in 2001 with the implementation of complete ban of cigarette advertising and partial ban on smoking in public places (designated smoking areas are still allowed).

In addition, significant increases in the real or inflation-adjusted prices of cigarette have been observed, especially prior to 2002,[7] but less so in recent years. Although the average retail price (per 20-cigarette pack) of cigarettes in the most popular price category in South Africa, rose nationally from 18.99 R ($2.59) in 2008; to 21.99 R ($3.00) in 2010, and reached 30.90 R ($3.77) in 2012,[8] the real price changes for the respective years were −1.5%, +6.7% and −0.6%.[7] However, during the study period (i.e., 2003–2011), marked increases were noted in the economy and earnings, with South Africa's gross national income status (as classified by the World Bank) rising from a "lower-middle" status during the 2003 calendar year, to an "upper-middle" status during 2011.[9] Hence, it would suggest that with increases in income being higher than inflation during this period, the price of cigarettes would conceivably be more affordable for those working or earning higher income, but less affordable for those of low income or unemployed, who may be less likely to experience appreciable income increase, especially post-2008 global financial crises.[10] Others have however argued that cigarette price increases are regressive for the poor.[1,11] This would arguably hold only if low-SES smokers, in the presence of increased cigarette prices, choose to forgo essential expenditures such as food or school fees for the family, rather than give up smoking. Research shows that increasing the tobacco taxes and prices is associated with a positive equity impact (i.e., reduced inequality).[12–13] However, the extent to which various social class groupings respond to price increases, with respect to changes in smoking prevalence, remains inconsistent.[1] In general, only limited information is available on the equity impact of cigarette price increases in concert with other tobacco control policies in low- and middle-income countries, particularly in sub-Saharan Africa.

In view of the tobacco control measures implemented in South Africa since 2001, this study's aim was to measure progress made in reducing overall smoking rates, and in

decreasing socioeconomic inequalities in cigarette smoking among South African adults. To this end, we examined social disparities in smoking and trends in educational disparities in smoking among South African adults aged ≥25 years during 2003–2011.

Methods

Sampling

This secondary data analysis included three nationally representative samples of South African adults (aged ≥16 years) who participated in the 2003 (n = 2,855, response rate = 71.4%), 2007 (n = 2,907, response rate = 72.6%) and 2011 (n = 3,003, response rate= 85.8%) South African Social Attitude Survey (SASAS). SASAS is an annual household survey which uses a multistage probability sampling strategy with census enumeration areas as the primary sampling unit. This SASAS sample was stratified by sociodemographic domain for each province and geographical subtypes, namely tribal areas, formal rural, formal urban, and informal urban. This stratification is designed to ensure sufficient geographical distribution across all nine provinces, and adequate distribution between South Africa's four race groups, namely: Black African; Colored; Indian or Asian; or White.

Measures

The survey collected information on smoking status, smoking intensity, as well as different sociodemographic characteristics. Determination of current smoking status was made by asking respondents "Do you use or have you used any of the following tobacco products in the past?" The products assessed were "manufactured cigarettes," "hand rolled cigarettes (Zol)," "pipes or cigars," "nasal snuff," or "oral snuff." Regarding frequency of use, respondents could select any of the following options for each of the products assessed: "every day," "some days," "stopped less than 6 months ago," "stopped more than 6 months ago," or "never before." Current cigarette smokers were defined as respondents who reported smoking manufactured cigarettes, or hand rolled cigarettes every day or on some days. Exclusive current users of water pipes, cigars, nasal snuff, or oral snuff were not included in the definition of current cigarette smokers.

The number of cigarettes smoked per day (CPD) was assessed with the question "On the days that you smoke (smoked), on average, how many cigarettes, including hand rolled cigarettes, do (did) you smoke per day?"

Data were also collected on sociodemographic characteristics such as gender (male or female), age (25–34, 35–44, 45–54, or 55+), race/ethnicity (Black, Colored, White, or Indian); residence (urban or rural); employment status (unemployed, housewife/pensioner/student, or employed), marital status (never married, divorced/separated/widowed, or married), and educational attainment (>Grade 12, Grade 12, Grade 1–11, or no education).

Educational attainment was used as a proxy for SES because of its correlation with other SES measures such as occupation and income—education being a prerequisite for certain occupations, as well as income received as reward.[14] The study population was thus

restricted to respondents aged ≥25years who are expected to have completed schooling. The pooled analytical sample from 2003, 2007, and 2011 comprised *n* = 6,927 persons aged ≥25 years old.

Data Analysis

The data were weighed using a weighting factor provided in the SASAS datasets to adjust for the differential probability of both selection and response. The "svyset" function in STATA V.12 (STATA Corp) was used to account for the complex survey designs. Unadjusted average annual percentage changes (APC) in current smoking prevalence and CPD over the study period were calculated using Join Point regression with NCI's Join point 4.0.1 software. The Wald's test for trend was used to assess linear trends in current smoking during 2003–2011 in a binary logistic regression model, adjusting for age, race/ethnicity, and gender in order to control for any potential changes in population composition during the study period.

Correlates of current cigarette smoking during 2003–2011 were assessed separately using a multivariable Poisson's regression model. Adjusted prevalence ratios (APR) were calculated rather than odds ratios because the outcome measure (current cigarette smoking) was common, and to also allow for ease of interpretation and communication.[15]

A backward deletion approach was used, starting with a full model. Factors were included into the model based on their statistical significance on bivariate analyses at *p* < .25, as well as their importance as potential confounders as identified in previous research.[16] In line with the WHO's recommendation to report at least two measures of inequality when reporting on health inequality,[17] we calculated the Slope Inequality Index (SII)—a measure of absolute inequality and the Relative Concentration Index (RCI)—a measure of relative inequality, taking into account changing sociodemographic distribution over time. The SII is the difference in the regression predicted parameter estimates between the most socioeconomic advantaged (ranked 1) and the most disadvantaged (ranked 0) with regards the level of educational attainment. The relative concentration index is generated in the same manner as the slope index of inequality, except the predicted values (at rank 1 and rank 0) are divided rather than subtracted. An SII of zero or RCI of one indicates a flat slope, or no difference in smoking prevalence between socioeconomic groups. A negative SII value or a RCI less than one indicates greater inequity in smoking prevalence to the disadvantage of those in the lowest socioeconomic position; whereas a positive SII or RCI greater than one indicates that smoking prevalence is more prevalent in the most advantaged socioeconomic subgroup.[17]

Results

In total over all survey waves, 45.9% of respondents aged ≥25 years were males (*n* = 2,801) while the distribution of participants by other sociodemographic characteristics is presented in Table 1. Determinants of current cigarette smoking during 2011 included self-identification as being Colored (APR = 2.68; 95% CI = 2.07–3.46), Indian/Asian (APR = 2.10; 95% CI = 1.57–2.80) or White (APR = 2.24; 95% CI = 1.66–3.02) compared to being Black

African; as well as completing grades 1–11 compared to completing >Grade 12 education (APR = 1.58; 95% CI = 1.14–2.18). On the other hand, being married compared to being never married (APR = 0.68; 95% CI = 0.53–0.87) and being female rather than male (APR = 0.29; 95% CI = 0.23–0.37) were inversely associated with current cigarette smoking (Table 2). There was no significant change in the overall prevalence of current cigarette smoking between 2003 (24.5%) and 2011 (21.5%) (p = .18; Table 1). A significant decline in smoking prevalence was however noted among smokers who had no education (22.4%–11.7%; APC = −8.2; p < .05 for linear trend) (Table 1). Similarly, a decline in current smoking was observed among married respondents (25.1%–20%; APC = −2.8; p < .05) (Table 1). As shown in Table 1, no statistically significant changes were observed by age, race, residence and employment.

Table 1. Trends in Current Smoking Among Persons Aged ≥25 Years in South Africa During 2003–2011: South African Social Attitudes Survey

	All respondents	Current cigarette smokers				
Characteristics	% composition (n)[a], 2003–2011	% (95% CI), 2003	% (95% CI), 2007	% (n), 2011	Annual percentage change (95% CI), 2003–2011	Adjusted linear trend p value[b], 2003–2011
Mean CPD (95% CI)	n/a	8.71 (8.96–10.46)	9.17 (8.37–9.98)	9.33 (8.50–10.17)	0.90 (−2.2 to 4.1)	.20
Overall prevalence	100.0 (6,927)	24.5 (568)	22.2 (562)	21.5 (522)	−1.4 (−8.1 to 5.8)	.18
Gender						
Male	45.9 (43.8–47.9)	42.9 (34.4–51.8)	37.0 (32.6–41.6)	34.2 (30.2–38.3)	−2.6 (−9.4 to 4.6)	.08
Female	54.1 (52.1–56.2)	9.2 (7.1–11.9)	10.0 (7.8–12.8)	10.3 (8.4–12.7)	1.4 (−3.8 to 6.9)	.45
Age (years)						
25–34	35.0 (33.1–37.0)	27.0 (16.8–40.3)	21.8 (17.7–26.4)	21.5 (17.3–26.3)	−1.9 (−21 to 21.9)	.41
35–44	25.1 (23.5–26.8)	22.4 (15.9–30.6)	26.3 (21.2–32.1)	23.2 (18.6–28.6)	−0.2 (−26.1 to 34.7	.70
45–54	18.1 (16.7–19.5)	27.9 (20.1–37.3)	23.3 (17.8–29.8)	24.9 (20.5–30.0)	−0.9 (−20.6 to 23.6)	.45
≥ 55	21.8 (20.2–23.4)	20.6 (14.6–28.1)	17.8 (13.4–23.2)	16.7 (13.2–20.9)	−2.5 (−9.5 to 5.0)	.18
Race/ethnicity						
Black Africans	74.2 (71.6–76.6)	21.9 (15.7–29.6)	18.7 (16.0–21.7)	17.1 (14.5–20.1)	−2.7 (−9.8 to 4.9)	.07
Colored	9.9 (8.5–11.4)	38.9 (31.6–46.8)	41.8 (34.2–49.8)	40.8 (33.5–48.6)	0.6 (−7.9 to 9.9)	.84
White	12.8 (11.2–14.7)	26.0 (16.7–38.2)	28.1 (20.9–36.5)	28.2 (22.3–35.1)	1.6 (−31.3 to 50.1)	.53
Indian	3.1 (2.6–3.8)	28.8 (20.3–39.1)	23.8 (16.1–33.8)	32.1 (23.7–41.84)	0.8 (−5.6 to 7.7)	.64
Residence						
Urban	33.7 (63.3–69.9)	26.5 (19.8–	23.4 (20.2–	23.9 (21.0–	−0.7 (−13.9 to 14.6)	.45

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Characteristics	All respondents	Current cigarette smokers				
	% composition (*n*)[a], 2003–2011	% (95% CI), 2003	% (95% CI), 2007	% (*n*), 2011	Annual percentage change (95% CI), 2003–2011	Adjusted linear trend *p* value[b], 2003–2011
		34.4)	27.0)	27.0)		
Rural	66.7 (30.1–36.7)	20.4 (15.6–26.1)	19.6 (16.0–23.8)	17.3 (13.4–22.0)	−2.1 (−10.8 to 7.5)	.07
Education						
>Grade 12	13.1 (11.8–14.5)	13.6 (8.1–22.0)	21.5 (15.4–29.2)	21.4 (16.2–27.7)	4.3 (−33.5 to 63.7)	.07
Grade 12	25.8 (24.1–27.5)	29.9 (20.8–41.0)	21.3 (16.5–27.1)	20.0 (16.0–24.6)	−4.9 (−26.2 to 22.5)	.42
Grades 1–11	53.6 (51.6–55.6)	25.5 (20.1–31.7)	23.8 (20.4–27.6)	23.68 (20.5–27.3)	−1.9 (−13.5 to 11.3)	.11
No education	7.5 (6.6–8.7)	22.4 (15.6–31.0)	14.5 (8.8–22.8)	11.7 (6.6–19.8)	−8.2 (−24.3 to 11.4)	.01[c]
Employment						
Unemployed	33.2 (31.2–35.2)	21.7 (13.6–32.7)	18.3 (14.4–23.0)	19.6 (15.6–24.3)	5.5 (−31.8 to 63.3)	.23
Housewife/pensioner/student	25.5 (23.8–27.3)	20.0 (14.4–27.1)	17.5 (13.4–22.4)	15.8 (12.2–20.1)	5.9 (−28.2 to 56.3)	.45
Employed	41.3 (39.3–43.4)	30.0 (23.8–36.9)	27.9 (23.7–32.5)	26.1 (22.3–30.2)	4.4 (−38.8 to 77.9)	.34
Marital status						
Never married	40.2 (38.0–42.3)	25.0 (15.6–37.5)	23.1 (19.1–27.6)	22.9 (19.0–27.3)	−0.7 (−7.8 to 6.9)	.57
Divorced/widowed	14.4 (13.2–15.7)	21.1 (13.9–30.6)	21.5 (15.6–28.8)	20.2 (15.5–25.9)	−0.7 (−7.7 to 6.9)	.73
Married	45.5 (43.4–47.5)	25.1 (20.8–29.9)	21.8 (18.4–25.5)	20.0 (16.9–23.5)	−2.8 (−7.8 to 2.5)	.04

CI = confidence interval; CPD = cigarettes per day.

[a]Composition shown for the pooled sample of respondents aged ≥25 years during 2003–2011.

[b]Test for linear trends from 2003–2011 (binary logistic regression, *p* < .05; adjusted for age, gender, and race).

[c]Statistically significant declines in cigarette smoking during 2003–2011 at the 5% alpha level.

Table 2. Poisson Regression Models of Significant Sociodemographic Correlates of Current Smoking Among Persons Aged ≥25 Years in South Africa During 2003–2011: South African Social Attitudes Survey

Characteristics	2003	2007	2011
Gender			
Male	1.00	1.00	1.00
Female	0.20 (0.15–0.26)*	0.24 (0.19–0.31)*	0.29 (0.23–0.37)*
Age (years)			
25–34	1.00	1.00	1.00
35–44	0.84 (0.58–1.21)	1.14 (0.86–1.51)	1.00 (0.76–1.32)
45–54	0.89 (0.62–1.28)	1.11 (0.80–1.54)	1.13 (0.82–1.55)
≥55	0.70 (0.48–1.03)	0.72 (0.48–1.07)	0.76 (0.54–1.07)
Race/ethnicity			
Black African	1.00	1.00	1.00
Colored	2.28 (1.72–3.02)*	2.61 (2.03–3.34)*	2.68 (2.07–3.46)*
Indian/Asian	1.29 (0.84–2.00)	1.66 (1.17–2.36)*	2.10 (1.57–2.80)*
White	1.48 (0.95–2.29)	1.85 (1.33–2.59)*	2.24 (1.66–3.02)*
Residence			
Urban	1.00	1.00	1.00
Rural	0.88 (0.59–1.31)	0.84 (0.65–1.08)	0.94 (0.71–1.25)
Educational status			
>Grade 12	1.00	1.00	1.00
Grade 12	2.43 (1.44–4.12)*	1.32 (0.89–1.96)	1.13 (0.80–1.59)
Grade 1–11	2.71 (1.63–4.49)*	1.74 (1.19–2.54)*	1.58 (1.14–2.18)*
No education	3.48 (1.87–6.49)*	1.25 (0.69–2.26)	1.11 (0.59–2.11)
Employment			
Unemployed	1.00	1.00	1.00
Housewife/pensioner/student	0.89 (0.62–1.28)	1.03 (0.75–1.41)	1.06 (0.77–1.46)
Employed	1.03 (0.79–1.35)	1.10 (0.85–1.43)	1.11 (0.86–1.44)
Marital status			
Never married	1.00	1.00	1.00
Divorced/widowed	1.25 (0.83–1.89)	1.18 (0.89–1.57)	0.90 (0.66–1.22)
Married	1.00 (0.73–1.35)	0.83 (0.65–1.07)	0.68 (0.53–0.87)*

Multivariate analyses adjusted for all factors listed in table.
*Statistically significant results ($p < .05$).

Although aggregate smoking prevalence among women saw an increase during 2003–2011 (9.2%–10.3%), this was not statistically significant ($p = .45$). However, a significant increase in smoking prevalence during 2003–2011 was observed among women with > Grade 12 education (4.0%–13.1%; $p < .05$), whereas no statistically significant difference was observed among men with > Grade 12 education (19.7%–27.4%) (Figure 1). In general, socioeconomic disparities observed in 2003, to the disadvantage of those with no education, became reversed after this period to their advantage (Table 3). Specifically, the SII assumed a negative value of –5.1 in 2003, but became increasingly positive in subsequent years, with a value of +6 in 2007 and +11.7 in 2011. Similarly, the RCI more than doubled over the same period.

Table 3. Slope Index of Inequality (SII) and Relative Concentration Index (RCI) by Educational Level Among Persons Aged ≥25 Years in South Africa During 2003–2011: South African Social Attitudes Survey

| Survey year	Educational level	Proportional distribution in the population	Cumulative range of population	Midpoint of cumulative range of population	Prevalence of current smoking (%)
2003	Lowest (no education)	0.096	0.000–0.096	0.048	22.4
	Grade 1–11	0.649	0.096–0.631	0.364	25.5
	Grade 12	0.239	0.631–0.865	0.748	29.9
	Highest (>Grade 12)	0.112	0.865–1.000	0.933	13.6
	SII (predicted value for highest−for lowest)				**−5.1** (20.4−25.5)
	RCI (predicted value for highest/for lowest)				**0.80**
2007	Lowest (no education)	0.076	0.000–0.076	0.038	14.5
	Grade 1–11	0.565	0.076–0.641	0.359	23.8
	Grade 12	0.243	0.641–0.884	0.763	21.3
	Highest (>Grade 12)	0.116	0.884–1.000	0.942	21.5
	SII (predicted value for highest−for lowest)				**+6** (23.11−17.11)
	RCI (predicted value for highest/for lowest)				**1.35**
2011	Lowest (no education)	0.057	0.000–0.057	0.029	11.7
	Grade 1–11	0.510	0.057–0.567	0.624	23.7
	Grade 12	0.290	0.567–0.857	0.712	20
	Highest (>Grade 12)	0.143	0.857–1.000	0.929	21.4
	SII (predicted value for highest−for lowest)				**+11.7** (24.20–12.49)
	RCI (predicted value for highest/for lowest)				**1.94**
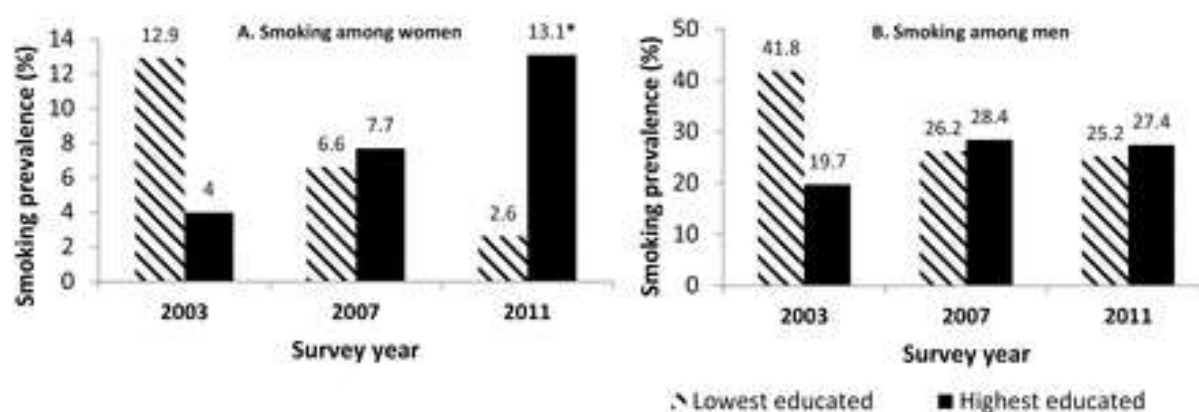
Figure 1. Trends in educational disparities in smoking among South African females and males aged ≥25 years in South Africa during 2003–2011: South African Social Attitudes Survey. Note: Lowest educated corresponds to respondents with no secular education at all, while highest educated corresponds to those with more than grade 12 education. Asterisks (*) indicate a statistically significant change in estimates during the period 2003–2011.

Among current cigarette smokers, there was no significant change ($p = .20$) in smoking intensity between 2003 (mean CPD = 8.71), and 2011 (mean CPD = 9.33) (Table 1). Mean CPD levels between 2003 and 2011 were as follows by educational attainment: no education (3.8–6.3); Grades 1–11 (8.0–8.3), Grade 12 (10.9 to 9.9), and >Grade 12 (11.6–

15.2) (Figure 2). Changes in mean CPD between 2003 and 2011 by all categories of educational attainment were not statistically significant.
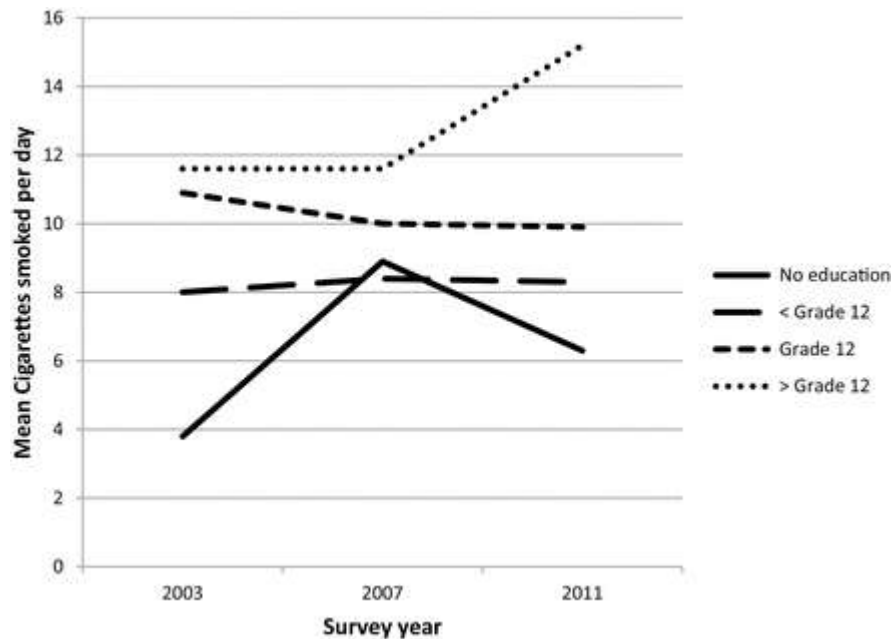

Figure 2. Mean cigarettes smoked per day among South African smokers aged ≥25 years stratified by educational attainment, 2003–2011.

Discussion

Our findings indicated that although there was no significant change in the overall prevalence or intensity of smoking between 2003 and 2011, cigarette smoking prevalence declined significantly among individuals belonging to the lowest socioeconomic group (i.e., those with no education). This decline in smoking prevalence among those with no education, which is consistent with findings from other countries that have pursued comprehensive tax and price policies for tobacco control,[1] suggest that the South Africa's cigarette tax increases (along with other tobacco control interventions) although producing no significant change in aggregate smoking prevalence or intensity, were effective in reducing smoking prevalence among low SES individuals.

The significant decline among those in the lowest socioeconomic position appears to have been offset by an increase in smoking prevalence among those in the highest socioeconomic position, particularly among women. The positive equity impact of implemented pricing/taxation measures during 2003–2011 is further evidenced by the changes in SII and RCI, indicating a narrowing of the disparities in cigarette smoking by educational level. Less affluent people (including less educated people) are more sensitive to changes in prices and taxes compared to more affluent populations because of their lower disposable incomes.[1] Hence increased tobacco taxes accompanied by reduced affordability have been consistently shown to help reduce tobacco consumption among low SES individuals.[18]

However, for price/taxation policies to achieve the desired effect of reducing overall tobacco use among price-sensitive individuals, due attention must also be given to tobacco industry interference which might attenuate the impact of taxation measures, such as use of rebates or couponing schemes.[19] In addition, an integrative approach towards taxation of different tobacco products may be necessary to avert or reduce price-minimization strategies, such as switching to relatively cheaper products such as hand rolled cigarettes, as previously noted in South Africa.[20]

This study found some striking disparities in smoking among certain population groups. For example, smoking prevalence increased among females with the highest education, but not among their male counterparts. The new sociopolitical dispensation in postapartheid South Africa continues to advocate for women emancipation and this new social climate has been characterized by increased movement of females to cities for job opportunities, reduced influence of tradition and customs, and overall greater corporate opportunities.[21] As a result, an increasing proportion of women in managerial/executive positions has been observed, with corresponding higher disposable income. During 2001–2011, the proportion of South African women in elementary (lowest) occupations declined from 29.5% to 24.4%, whereas the proportion in the management, professional, and technical group increased from 23.5% to 30.7%, and was higher than the proportion of males in such high paying positions during 2011 (24.6%).[5] While social empowerment and economic factors (i.e., increased disposable income) may partly explain this increased smoking observed among highly educated females, research has also shown that social influences could also play a role. For example, female executives have been shown to be particularly prone to the impact of high-strain jobs, and may start smoking as a coping mechanism,[22] and industry may target women through the promotion of cigarette design features such as the introduction of slim cigarettes that might appeal specifically to women. The increase in smoking among the most educated women in South Africa is of concern not only because it could potentially erode economic development gains if these women succumb to tobacco-induced diseases, but considering the central role women play in households this may also negatively influence children smoking and increase exposure of household members to second hand smoke.

The declines in cigarette smoking among married persons during 2003–2011, which is consistent with previous findings that marriage has a protective effect on smoking over time,[23] may be related to a number of factors. The stable social network and support available to married persons may provide stronger resilience against stressors and reduce the propensity to use smoking as a coping mechanism.[24] Also, with the proliferation of smoke-free laws in South Africa in recent years, married persons, particularly with partner's support, may be more inclined to quit smoking over time out of concern for the health of nonsmoking partner or other family household members.

This study's strength is the use of nationally representative data to assess socioeconomic disparities in tobacco use among South African adults. The survey protocols for all three waves were consistent across years. Hence the estimates produced are comparable over the years and thus provide valid information of trends. This study however has several limitations. First, the cross-sectional design of the study precludes causal inferences, given the limited information on the temporal order of events. Second, the self-reported nature of

the survey measures used might have also resulted in misreporting of tobacco use. However, several studies have found that self-report is a valid means of assessing smoking status.[25–26] Third, restriction of our analyses of trends in social disparities to those ≥25 years (to capture those that were out of school) might have excluded some individuals aged ≤24 years that were already out of the schooling system in South Africa, thus potentially limiting the generalization of the study findings to the general adult population in South Africa. Finally, the observed trends in smoking might not be attributable to recent tax increases exclusively, but also the effect of pre-2003 tobacco control policies such as ban in advertisement and the implementation of clean-indoor-air law.

Conclusions

The study demonstrated that the policy environment in South Africa during 2003–2011 did not produce a decline in aggregate smoking prevalence or intensity. However, reduced cigarette smoking prevalence was observed among individuals with no secular education whereas increased smoking prevalence was observed among the most educated women. This study's findings underscore the need for evidence-based measures such as increased taxation of tobacco products to reduce disparities in cigarette smoking prevalence as well as targeting the growing educated middle-class (especially women) with educational campaigns highlighting the adverse health consequences of tobacco use, including its causal effect on ectopic pregnancies, reduced fertility, and overall diminished health.

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Declaration of Interests

None declared.

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