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Human rights violations and smoking status among South African adults enrolled in the South Africa Stress and Health (SASH) study

Lauren M Dutra[1], **David R Williams**[2], **Jhumka Gupta**[3], **Ichiro Kawachi**[2], and **Cassandra A Okechukwu**[2]

[1]Harvard University & University of California San Francisco

[2]Harvard University

[3]Yale University

Abstract

Despite South Africa's history of violent political conflict, and the link between stressful experiences and smoking in the literature, no public health study has examined South Africans' experiences of human rights violations and smoking. Using data from participants in the nationally representative cross-sectional South Africa Stress and Health study (SASH), this analysis examined the association between respondent smoking status and both human rights violations experienced by the respondent and violations experienced by the respondents' close friends and family members. SAS-Callable SUDAAN was used to construct separate log-binomial models by political affiliation during apartheid (government or liberation supporters). In comparison to those who reported no violations, in adjusted analyses, government supporters who reported violations of themselves but not others (RR=1.76, 95%CI: 1.25–2.46) had a significantly higher smoking prevalence. In comparison to liberation supporters who reported no violations, those who reported violations of self only (RR=1.56, 95%CI: 1.07–2.29), close others only (RR=1.97, 95%CI: 1.12–3.47), or violations of self and close others due to close others' political beliefs and the respondent's political beliefs (RR=2.86, 95%CI: 1.70–4.82) had a significantly higher prevalence of smoking. The results of this analysis suggest that a relationship may exist between human rights violations and smoking among South Africa adults. Future research should use longitudinal data to assess causality, test the generalizability of these findings, and consider how to apply these findings to smoking cessation interventions.

Corresponding Author: Lauren M Dutra, Center for Tobacco Research and Education, University of California San Francisco, 530 Parnassus Avenue, Suite 366, San Francisco, California 94143-1390 USA, Phone: 415.496.0684, Fax: 415.514.9345, lauren.dutra@ucsf.edu.

Keywords

South Africa; human rights; trauma; smoking; cigarettes

Introduction

Smoking is an urgent public health concern in South Africa. Not only is overall smoking prevalence high (31.7% for men, 9.0% for women), it is disproportionately high for certain racial groups (W.H.O., 2011). At 55.5%, Indian men have the highest prevalence of smoking, closely followed by Coloured men at 52.1% (W.H.O., 2010). For women, Coloured women have the highest smoking prevalence by far at 41.8%, followed by White women at 27.3% (W.H.O., 2010).

The public health implications of smoking among South Africans are best viewed in the context of the country's other public health and social concerns. South Africa currently faces not only an HIV/AIDS epidemic but a related tuberculosis (TB) epidemic (Sitas et al., 2004). Smoking contributes to these epidemics because it is associated with an increased risk of TB, and TB infection predicts worse outcomes for HIV/AIDS patients (Saloojee, 2000). Thus, not only is the amount of smoking in South Africa disconcerting in and of itself, but smoking also has serious ramifications for the country's other burdensome health issues. Because both TB and HIV/AIDS run rampant in South Africa, it is essential that researchers fully understand the factors that contribute to the country's high prevalence of smoking.

When examining the problem of smoking, it is also vital to consider South Africa's unique social history. One of the most influential periods of South African history was "apartheid" (an Afrikaner word meaning "apartness"). During apartheid, which lasted between approximately 1936 and 1994, the South African government ruled under discriminatory laws that elevated the social status of Whites and oppressed other racial groups ("Apartheid," 1999; Franchi, 2003; Nightingale et al., 1990). Discriminatory Apartheid laws resulted in extreme civil unrest and disregard for human rights (Franchi, 2003; Gupta et al., 2012; Nightingale et al., 1990). Perhaps most importantly, the political and social conflict that resulted from the passage and enforcement of Apartheid laws radically changed the lives of many South Africans in other ways. During apartheid, the Population Registration Act of 1950 required South Africans to register as one of the four "official" races of the time: Black, Coloured, White, or later Indian (which included all Asians). All of these terms describe heterogeneous groups of Africans, including Coloured, which refers to a diverse group of individuals primarily composed of Africans of mixed racial ancestry (Goldin, 1987; Williams et al., 2008a). As a result of their mixed parentage, Coloured Africans were often rejected and discriminated against by members of all other racial groups, not just Whites. Because of the term's overgeneralization and its historical use, "Coloured" carries an implication of discrimination (Thompson, 2000; Williams et al., 2008b). The government used the Registration Act not only to require Africans to define themselves by broad racial categories, many of which were used in a derogatory way, but also to identify, persecute, and discriminate against all residents of South Africa who were not White.

During this era of human rights violations on a massive scale, the South African population could be broadly divided into two groups: those who supported the government's Apartheid policies (government supporters) and those who opposed and/or resisted Apartheid laws and policies to some degree (liberation or anti-government supporters). Violent clashes were common between government and liberation supporters during apartheid, with government intervention primarily consisting of violence towards liberation supporters.

During apartheid, many South Africans, especially liberation supporters, experienced human rights violations, which the Geneva Convention has identified as threats to life, liberty, and safety (Malik, 1947). Liberation supporters were likely to experience violations because the Apartheid government banned anti-government protests and other political activities and punished many liberation supporters for their involvement in these activities (Nightingale et al., 1990). In addition to human rights violations, liberation supporters experienced conflict-related changes in everyday life, which may impact mental health (Miller & Rasmussen, 2010).

Existing research suggests that experiences like those of South Africans during apartheid can impact smoking behavior (Cecil & Matson, 2006; Choudhary et al., 2008; Cisler et al., 2011; Feldner et al., 2007; Gidycz et al., 2008). Not only is smoking used as a coping mechanism for stressful situations, smoking may impact the ability to cope with stress due to its physiological effects on stress hormones such as cortisol (Back et al., 2008; Phillips et al., 2009; Ussher, 2006).

South Africa's history of human rights abuse may lend insight into the country's persistent high smoking prevalence for some populations. Although the public health literature has addressed tobacco control issues in South Africa, inadequate attention has been given to the political and social context of smoking. Human rights violations remain an underexplored contributing factor to smoking. Despite increasing research on the health impact of human rights violations, studies on South Africa remain scarce.

Although research on human rights violations is lacking, studies on victimization and smoking provide insight into the potential effect of similar experiences on smoking behavior. A prospective study of American adolescents found that experiences of assaultive violence were positively associated with smoking (Cisler et al., 2011). Additional research found a significant positive association between sexual victimization and smoking (Cecil & Matson, 2006; Choudhary et al., 2008; Gidycz et al., 2008). A review article also revealed that multiple traumatic experiences were associated with higher smoking prevalence, smoking intensity, and nicotine addiction (Feldner et al., 2007).

Unfortunately, many of the reviewed studies collapsed multiple forms of trauma into a single measure (i.e., "trauma events"), making it difficult to assess whether any of the reviewed articles examined human rights violations specifically (Feldner et al., 2007). Although apartheid-related experiences have not been examined in relation to smoking, research on similar types of conflict-related experiences (e.g., victimization, terrorism, or war-related trauma) may provide insight into the relationship between human rights violations and smoking. In Serbia, in 1999, researchers found that significantly more men

(70.7%) were current smokers after the 78-day NATO bombing campaign than before the bombing (63.5%; p<.05) and that those who smoked before the bombing increased their smoking intensity greatly during the bombing (Sokolova-Djokic et al., 2008). In Croatia, six years after the end of the Croatian civil war, residents who reported post-war stress (e.g., combat, being a refugee, being wounded or losing a close relative or friend due to the war) smoked more frequently than those who reported none (p<.0001) (Spalj et al., 2008). In addition, Lebanese hostages of war had a significantly higher prevalence of smoking (58.5%) than respondents who were not held hostage (33.3%; p<.0001) (Farhood et al., 2010). The mean length of time between hostage release and data collection was 5.7 years, suggesting that these types of experiences may continue to impact smoking behavior long after the original trauma has ended.

Research also suggests that the victimization of close friends or family may impact an individual's smoking behavior (Sullivan et al., 2004; Vermeiren et al., 2003). However, the existing literature on these experiences, which have been referred to as vicarious victimization, only studied adolescents. Vicarious victimization often occurs because witnessing or hearing about the victimization of others may induce the fear of future victimization of self or others (Kort-Butler, 2010).

In order to address gaps in the overall literature on human rights violations, as well as the specific lack of publications on vicarious victimization and smoking, this analysis included both violations experienced by the respondent and violations experienced by the close family members or friends of the respondent. The first aim of this analysis was to examine the association between the different types of violations and smoking status among government and liberation supporters. The second aim was to assess the relationship between each type of violation and daily smoking intensity among smokers.

The present study fills gaps in the existing public health literature by focusing specifically on human rights violations and smoking in post-apartheid South Africa. Ecosocial theory (Krieger, 2001, 2011) is the main driving theory of these analyses. Based on this theory, we conceptualized human rights violations as experiences that are embodied (or taken in) through their physical (e.g., bodily harm), biological (e.g., cortisol release in response to stress), psychological (e.g., trauma), and social effects (e.g., destruction of social ties) within the historical context of apartheid.

During apartheid, the government relaxed regulations on tobacco sales, and sales distribution of contraband tobacco products increased (Lemboe & Black, 2012; Malan & Leaver, 2002; van Walbeek, 2003). Also, apartheid created an environment of persecution, instability, and uncertainty for many South Africans. We anticipated that high levels of distress related to apartheid may have increased smoking initiation and lowered the probability of successful smoking cessation, especially among those who were specifically targeted through human rights violations.

The data for the current analysis were obtained from the South Africa Stress and Health study (SASH), an assessment of the psychological impact of apartheid on South Africans. The primary hypothesis investigated in this paper was that a significant relationship exists

between experiences of human rights violations and smoking status for both government and liberation supporters. The secondary hypothesis was that the number of violations reported would be positively associated with the mean number of cigarettes smoked per day (smoking intensity) among smokers.

Methods

Study Population—The South Africa Stress and Health study (SASH) is a representative sample of 4,351 non-institutionalized South African adults who completed in-person interviews between January of 2002 and July of 2004 (Williams et al., 2004; Williams et al., 2008b). Sampling and survey techniques have been discussed in detail elsewhere (Gupta et al., 2012; Williams et al., 2004). In brief, this sample was obtained via a three-stage randomized clustered area probability sampling design that identified census enumeration areas, geographic groupings of houses, and individual households, and randomly selected one adult respondent from each household (Gupta et al., 2012; Williams et al., 2004). The response rate was approximately 86%.

Respondents were given the choice to complete the interview in one of the seven most commonly spoken languages in South Africa: Afrikaans, English, Zulu, Xhosa, Northern Sotho, Southern Sotho, and Tswana (Tomlinson et al., 2009). In 2011, 85% of South Africans reported one of these languages as their first language, and most South Africans are multilingual ("Mid-year population estimates 2011," 2011). After data collection was complete, researchers at the University of Michigan and Harvard University created weights that adjusted for the clustering induced by sampling design, non-response, and the probability of selection of each respondent. In addition, they created weights that adjusted for imperfect sampling by matching gender, age, race, and geography to data from the 2001 South Africa Census (Herman et al., 2009). Because of high levels of missing data for income (n=1,367; 31.7%), those researchers also imputed missing income as the mean income for the respondent's race, age, gender and education group (Williams et al., 2004). SASH participants were included in the current analysis if they had non-missing responses for the exposure and outcome variables.

Measures

Outcome variables—Participant smoking status was ascertained from answers to the following questions: 1) "Are you a current smoker, ex-smoker, or have you never smoked?" and 2) "Have you smoked at least 100 cigarettes or 5 packs in your life?" Participants who self-identified as current smokers and reported smoking 100 or more cigarettes in their lifetime were classified as current smokers. Otherwise, participants were classified as non-smokers. For those missing a response to only the first question, a third questionnaire item, "Do you currently smoke?" was used to help determine baseline smoking status.

Among baseline smokers, the number of cigarettes smoked per day was also examined as a count variable.

Independent Variables—Pilot studies conducted before data collection began suggested that government and liberation supporters had experienced different types of human rights

violations during apartheid. Based on these reports, two sets of questions were drafted in order to accurately capture both groups' experiences of apartheid (Gupta et al., 2012). Based on responses to questions about political affiliation, interviewers administered either the government supporter questionnaire or liberation supporter questionnaire. These decisions, in combination with responses to multiple questions about political affiliation, were used to identify 2,081 government supporters, 1,711 liberation supporters, and nine neutral supporters, who were dropped from analyses. Government supporters first answered questions about their experiences of human rights violations (5 items), including whether, because of their political beliefs, they had been 1) criticized by others, 2) physically beaten or injured, faced with 3) someone's home or 4) other property being burnt, or 5) victimized in any other way. Then, they answered questions about violations experienced by their family or close friends due to those individuals' political activities (5 items), including 1) being arrested, 2) sexually assaulted, 3) imprisoned, 4) physically beaten or injured or 5) killed.

Liberation supporters first answered questions about their experiences of human rights violations (18 items), including whether, because of their political activities, they were 1) visited at home by the police, 2) stopped at roadblocks, 3) exposed to police raids, 4) on the run from police, 5) banned or had movements restricted, 6) physically beaten, 7) stabbed, 8) shot at, 9) stoned, witnessed 10) someone being necklaced or 11) killed, 12) abducted, 13) attacked by dogs, 14) a target of a parcel or letter bomb, faced with 15) their home or 16) other property or 17) possessions being burnt, or 18) placed under house arrest.

Liberation supporters also answered questions about violations experienced while in political custody (if applicable; 25 items). These items were not included in this analysis because of insufficient statistical power (only 16 respondents endorsed these experiences). Liberation supporters also answered the same five questions as government supporters answered about violations experienced by family or close friends due to *those individuals'* political activities (if applicable; 5 items). This was the only questionnaire that was administered to both sets of political affiliates. Liberation supporters also answered those same five questions about violations experienced by family or close friends due to the respondent's political activities (5 items).

All types of human rights violations were dichotomized as one or more experiences versus none. These coding choices are consistent with previous publications on the SASH dataset (Gupta et al., 2012). Then, multinomial exposure variables were created that represented all possible combinations of responses to violation questions. This type of coding created mutually exclusive exposure categories that minimized collinearity. Each category was transformed into an indicator variable before it was entered into statistical models. For all models, the reference group was respondents who did not endorse any human rights violations.

The multinomial human rights variable created for government supporters divided them into one of four categories: respondents who reported only violations of self, only vicarious violations (violations of close others), both, or neither. For liberation supporters, the variable divided respondents into one of five categories: respondents who reported only violations of

self, only violations of others (due to those individuals' political activities or the respondent's or both), violations of self and violations of others (due to either those individuals' political activities or the respondent's), violations of self and both types of violations of others, and none (Figure 1).

Covariates—Age, gender, education, household income (adjusted by number of household members), race, and marital status were included as covariates. Because of the small number of participants who identified themselves as Indian, Asian, or "other", these racial categories were collapsed, resulting in four categories: Black, White, Coloured, and Indian/Asian/other.

Data Analysis

Statistical analyses were conducted separately by political affiliation using SAS-Callable SUDAAN version 10.0.1 and SAS version 9.3. An alpha level of 0.05 was utilized to determine statistical significance.

Unadjusted analyses were first conducted to examine crude associations; then, adjusted analyses were conducted to incorporate the effects of race and other demographic variables. Descriptive analyses began with unadjusted, unweighted Chi-square tests to examine the association between each exposure variable and smoking status. Then, SAS-Callable SUDAAN was used to construct log-binomial (logistic, PROC RLOGIST) regression models. Because of the high prevalence of smoking in the sample, effect estimates were presented as risk ratios instead of odds ratios. PROC RLOGIST enabled us to produce conditional marginal proportions of risk that estimated model-adjusted risk ratios for smoking. Because of the small number of White liberation supporters, Whites were not included in liberation supporter models. We also used Chi-square analyses to identify demographic characteristics that were associated with experiencing human rights violations.

First, simple log-binomial regression models were used to obtain unadjusted estimates of the relationship between human rights violations and smoking status. SUDAAN allowed for the inclusion of weights that adjusted for the clustering induced by sampling design, non-response, and the probability of selection of each respondent. The weights that matched the SASH data to 2001 South Africa Census data were also included (Herman et al., 2009). SUDAAN provides robust standard errors and unbiased effect estimates regardless of correlated values within sampling tracts (Williams et al., 2008a). Based on existing smoking literature, all covariates, including race, gender, age, education, income, and marital status, were included in final models (Borrell et al., 2010; Okechukwu et al., 2010; Wiehe et al., 2010). In order to account for the potential impact of human rights violations on smoking cessation, we also constructed multivariable log-binomial models that tested the relationship between human rights violations and the risk of being a past versus never smoker and current versus past smoker.

To assess the relationship between human rights violations and smoking intensity, PROC LOGLINK in SUDAAN was used to employ a Poisson-like process and generalized estimating equations (GEE) to analyze the number of cigarettes smoked per day as count data (RTI International, 2012).

Results

Unadjusted descriptive statistics are provided separately for government and liberation supporters (Tables 1 and 2, respectively).

Several demographic characteristics varied significantly across the experience of violations by the respondent. Among government supporters, Whites were most likely to report violations at 10.0%, followed by Blacks at 8.55% (p=.0237); also, men (10.21%) were more likely to report violations than women (6.71%, p=.0045). Among liberation supporters, respondents with the greatest amount of education (16+ years) were most likely to report violations (21.74%, p=.0466), and men (20.13%) were more likely than women (10.04%) to report violations (p<.0001).

In simple log-binomial regression models for government supporters (Table 3), all human rights violations were associated with elevated an risk of smoking, but this association was significant only when participants had experienced violations themselves (RR=1.67, 95%CI: 1.24–2.46). In unadjusted analyses (Table 3), liberation supporters who reported only experiencing violations themselves (RR=1.64, 95%CI: 1.25–2.15), experiencing violations of others only (RR=1.78, 95%CI: 1.16–2.75), experiencing violations themselves and one type of vicarious violation (RR=1.87, 95%CI: 1.24–2.80), and experiencing violations themselves and both types of vicarious violations (RR=3.07, 95%CI: 2.30–4.09) had significantly higher risk ratios for smoking than those who reported none.

In multivariable analyses (Table 3), government supporters who reported that only they themselves had experienced violations had a significantly higher smoking prevalence (RR=1.76, 95%CI: 1.25–2.46). For liberation supporters, the experience of violations by the respondent only (RR=1.56, 95%CI: 1.07–2.26), violations of others only (RR=1.97, 95%CI: 1.12–3.47), and violations of the respondent and both types of vicarious violations (RR=2.86, 95%CI: 1.70–4.82) were significant predictors of smoking status.

To provide insight on determinants of past smoking, we conducted analyses using three-category smoking status (current smoker, ex-smoker, never smoker) as the outcome variable. Human rights violations predicted a higher risk of being a current smoker versus a never smoker, but not an ex-smoker versus a never smoker (see Appendix 1A). The only exception was that experiences of violations of self and one vicarious violation were significant for past versus never smokers. The same predictor variables were significant for current versus never smoking as for current versus nonsmoking for both government and liberation supporters. However, the experiences of violation of self and one type of vicarious violations were significant in adjusted models for current versus never smokers, but not for current versus nonsmokers. We also conducted analyses of ever-smoking (smoking 100 cigarettes or more in one’s lifetime) as the outcome variable (see Appendix 1B). These results were very similar to those found for current smoking. In multivariable Poisson regression models of smoking intensity, the human rights violation exposure variable was not significantly associated with the number of cigarettes smoked per day for government supporters (p=.2661) or for liberation supporters (p=.1229).

Discussion

The results of this analysis suggest that human rights violation have remained associated with the smoking status of South Africans long after the end of apartheid. Although SASH data was gathered between 10 and 12 years after the end of apartheid (2002–2004), lifetime personal experiences of human rights violations were associated with smoking status for both government supporters and liberation supporters. For liberation supporters, the traumatic experiences of close family and friends also predicted smoking status. For liberation supporters, the highest risk of smoking was found for those who reported they had experienced violations, their close others had experienced violations due to those individuals' political activities, and their close others had experienced violations due to the respondent's political activities. Because of differences in the number of items and item content, we were unable to compare results across political affiliation for most types of violations, or to conduct pooled analyses and test for effect modification. For violations of self, the greater number of questions for liberation supporters (18 versus 5) increased the likelihood that liberation supporters would endorse violations.

However, the wording was identical across affiliation for one set of questions- violations experienced by close others due to those individuals' political affiliations. We created logistic regression models that used this variable as the sole predictor variable. After adjusting for covariates, the risk ratio of current smoking was 1.41 (95%CI: 0.67–3.00) for government supporters and 1.93 (95%CI: 1.36–2.73) for liberation supporters. A significant association existed between violations of a friend or family member due to that individual's political activities and smoking status for liberation supporters but not government supporters.

Overall, the finding of a significant association between human rights violations of self and smoking is consistent with literature that suggests a significant relationship between experiences of physical violence or victimization and smoking (Ackerson et al., 2007; Cisler et al., 2011; Wheeler et al., 2010; Yoshihama et al., 2010). As is also consistent with previous literature, the victimization of close family and friends also varied significantly by smoking status among liberation supporters (Vermeiren et al., 2003). Unfortunately, we were unable to make a direct comparison of the effect estimates from our study to those of the existing literature because all of the existing publications presented their effect estimates as odds ratios.

We used ecosocial theory to hypothesize that we would find a relationship between violations and smoking. According to ecosocial theory, human rights violations are embodied through pathways of embodiment, such as the violations examined in this analysis, including physical injury, threats, intimidation, etc. These experiences "get under the skin" of the victim and may lead to persistent physical or psychological trauma. These factors, examined in a socio-historical context across time, help explain disease distributions and variation in smoking prevalence across groups (Krieger, 2001, 2011).

Stressful experiences such as human rights violations are associated with higher odds of smoking (Ackerson et al., 2007; Cisler et al., 2011; Farhood et al., 2010; Fernander et al.,

2010; Gass et al., 2010; Gidycz et al., 2008; Guthrie et al., 2002; Jun et al., 2008; Landrine & Klonoff, 2000; McKee et al., 2003; Slopen et al., 2012; Wheeler et al., 2010; Yoshihama et al., 2010). It is likely that persecution due to one's political beliefs, and/or due to factors that one cannot control, such as race, created a great deal of stress among South Africans.

Stress impacts biological responses to nicotine and the ability to cope with future stressors. In addition, if South Africans believed that they were more likely to die or experience harm from apartheid-related experiences than from smoking, they may have been less concerned about the negative health effects of smoking during that time (Sokolova-Djokic et al., 2008). Also, significant differences in the risk of being a current versus past smoker by experiences of human rights violations suggest that these types of experiences may be associated with quitting behavior and success.

The present analysis has several limitations. The greatest limitation is the cross-sectional nature of the data, which prevents us from making conclusions about causality. Among ever smoking liberation supporters (n=805), mean age of smoking initiation was 18.4 (SD=5.6). However, only 70 liberation supporters reported the age at which they first experienced one or more violations. For these respondents, the mean age at which they were first exposed to violations was 22.0 (SD=10.1). Because of missing data, we were unable to establish a timeline of smoking initiation, cessation, relapse and human rights violation, which would have also provided insight into changes in smoking behavior over the lifespan. Regardless, the data were susceptible to recall bias because the self-report of violations was retrospective. Another limitation of this analysis is our inability to adjust for certain confounders, such as differential effects of the tobacco control policies that became prevalent in South Africa after apartheid ended.

Because current distress related to the violation was not assessed, we were unable to assess the current emotional impact of the event on the respondent or measure whether distress moderated the relationship between violations and smoking status. Future analyses should complete such assessments. We were also limited in our ability to compare government and liberation supporters because they answered different sets of questions. However, the original researchers for SASH believed this was necessary to accurately capture the long-term psychological effects of apartheid on South Africans, and we were able to examine differences across affiliations for one set of human rights questions.

Our choice to analyze a multilevel predictor variable (i.e., several indicator variables) created smaller cell sizes that limited our ability to test for interactions. However, this type of coding was necessary to decrease concerns of collinearity. Another limitation of this analysis is that the generalizability of these results is restricted to South African adults. However, this limitation was unavoidable given the characteristics of the dataset.

The techniques used to categorize respondents by affiliation may have resulted in misclassification of respondents. Therefore, we assessed political affiliation a second time, not taking into account which questionnaire was completed but relying only on those respondents with complete answers for all affiliation questions. Analyses of the resulting subsample of 821 government supporters and 1,684 liberation supporters yielded results that

were almost identical to those for the full sample. Sensitivity analyses were also conducted to test the effects of imputing income. Excluding respondents with imputed income, all results were consistent with those that included these respondents, except that violations of self and one type of violation of close others were no longer significant (RR=1.41, 95%CI: 0.67–2.99) for liberation supporters.

Several strengths of this analysis stem from the sample itself. The random sampling techniques used to select participants increased the generalizability of results (within South Africa). In addition, focus group interviews that were conducted before data collection began ensured that government and liberation supporters were asked questions about human rights violations that were applicable to them. Also, in-person interviews in the respondent's native language (whenever possible) decreased the likelihood of missing or inaccurate answers due to comprehension difficulties. To our knowledge, this is the first study to examine the association between human rights violations and smoking. Nor has any previous study conducted separate analyses by political affiliation (or party loyalties) during a conflict. In addition, this is one of the first analyses to provide information about the impact of the traumatic experiences of others on an adult's smoking behavior. Another strength of the analysis is that the use of weights not only adjusted for clustering, but also made the sample comparable to South African census data, increasing generalizability. In addition, this analysis provided the opportunity to assess the relationship between human rights violations and smoking long after the source of the violations had ended.

Although this analysis addresses a large gap in the literature, further research on the topic is needed. Future studies should collect and analyze longitudinal data in order to assess causality. However, anticipating the conflicts in which human rights violations occur, and measuring smoking before, during, and after large-scale political and social conflict may be difficult. In order to provide further insight into the lasting effects of human rights violations, we also suggest that new data be gathered and analyzed for South African adults. In addition, researchers should investigate the relationship between violations and smoking outside of South Africa in order to assess the generalizability of our findings. Further research also has the potential to both clarify the relationship between violations and smoking and increase awareness of the occurrence of human rights violations.

Mediation studies could elucidate the mechanisms behind the relationship between human rights violations and smoking, such as levels of distress and variations in the effects of these experiences across groups. In addition to smoking, future studies should assess other types of risky behavior that have been associated with traumatic experiences, such as alcohol and drug use and suicidal ideation (Gidycz et al., 2008). These factors could also be incorporated into smoking cessation interventions that target victims of human rights violations and other types of trauma.

Additional research should be conducted to assess the implications of these findings for smoking cessation intervention development. Given South Africa's political history and the country's high smoking prevalence, researchers may wish to consider addressing traumatic experiences as part of smoking cessation interventions for South Africans. Taking into account possible residual stress from these events may lead to more successful quit attempts.

The role of traumatic events and experiences of victimization in smoking behavior should be considered for smoking cessation programs, especially for populations that have histories of political conflict and widespread violence.

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Research Highlights

- Analysis of human rights violations and smoking among South African adults.
- Violations positively associated with current smoking.
- The role of traumatic events should be considered in cessation interventions.

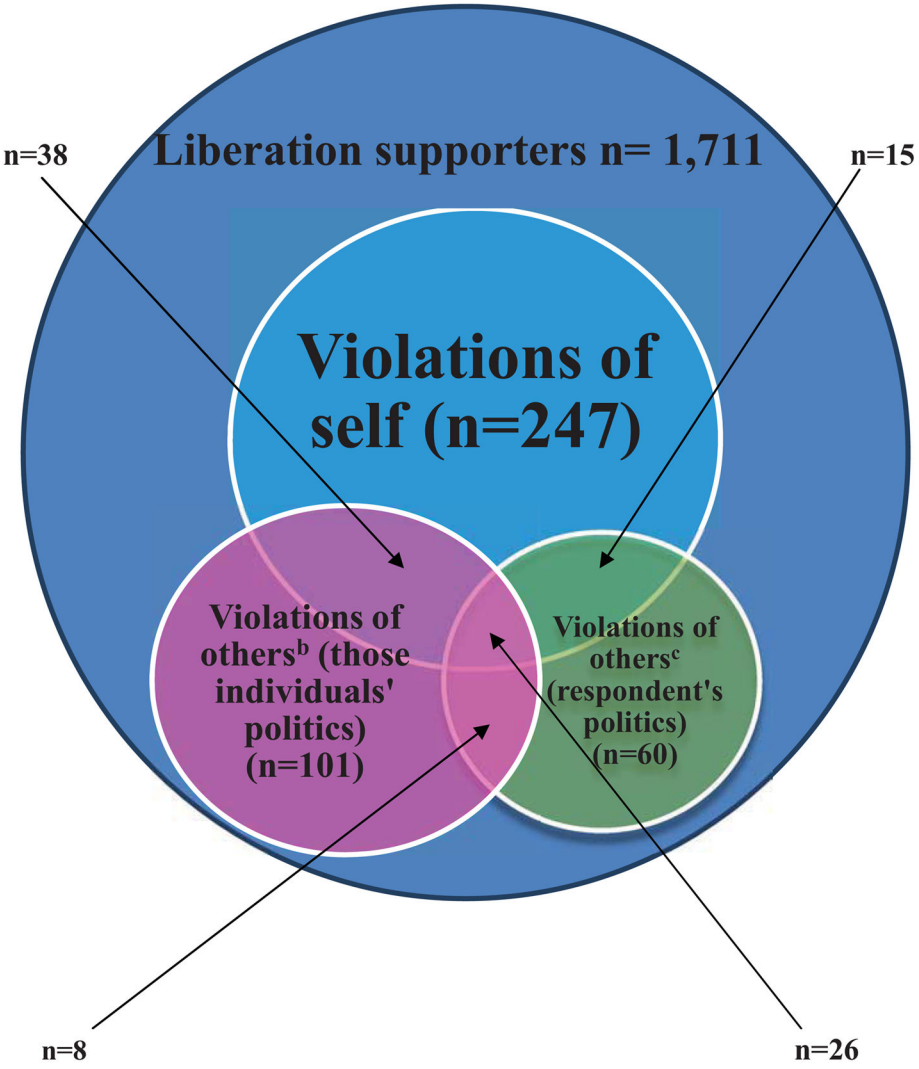

Figure 1. Exposure categories for human rights violations experienced by liberation (e.g., anti-apartheid) supporters in the South Africa Stress and Health study (n=1,711)

This figure visually depicts the number of respondents who fit into each type of exposure category for human rights violations experienced by liberation supporters. The figure is only approximately drawn to scale. “Violations of self” refer to human rights violations experienced by the respondent. “Violations of others (their politics)” refers to the experience of human rights violations by the close friends or family members of the respondent due to those individuals’ (the close others’) political affiliation during apartheid. “Violations of others (respondent politics)” refers to the experience of human rights violations by the close friends or family members of the respondent due to the respondent’s political affiliation during apartheid. Overlapping sections signify that respondents endorsed multiple types of violations.

Table 1

Characteristics of government supporters in the South Africa Stress and Health study (n=2,095)[a,b]

	All n (%)	Current Smoker n (%)	Non-smoker n (%)	p-value
All	2095 (100.0%)	382 (18.2%)	1713 (81.8%)	
Gender				<.0001
Male	754 (36.0%)	253 (33.6%)	501 (66.5%)	
Female	1341 (64.0%)	129 (9.6%)	1212 (90.4%)	
Race				<.0001
White	249 (11.9%)	78 (31.3%)	171 (68.7%)	
Black	1485 (70.9%)	186 (12.5%)	1299 (87.5%)	
Coloured	267 (12.7%)	94 (35.2%)	173 (64.8%)	
Indian/Asian/Other	94 (4.5%)	24 (25.5%)	70 (74.5%)	
Age category				.0006
<35	1084 (51.7%)	181 (16.7%)	903 (83.3%)	
35–49	563 (26.9%)	116 (20.6%)	447 (79.4%)	
50–64	306 (14.6%)	72 (23.5%)	234 (76.5%)	
65+	142 (6.8%)	13 (9.2%)	129 (90.9%)	
Education				.5374
0–11 years	1283 (61.2%)	246 (19.2%)	1037 (80.8%)	
12 years	475 (22.7%)	80 (16.8%)	395 (83.2%)	
13–15 years	255 (12.2%)	41 (16.1%)	214 (83.9%)	
16+ years	82 (3.9%)	15 (18.3%)	67 (81.7%)	
HH Income PP (rands)				.0281
0–624	749 (35.8%)	127 (17.0%)	622 (83.0%)	
625–1125	231 (11.0%)	33 (14.3%)	198 (85.7%)	
1126–2250	360 (17.2%)	60 (16.7%)	300 (83.3%)	
>2250	755 (36.0%)	162 (21.5%)	593 (78.5%)	
Marital status				
Married/cohabiting	1031 (49.2%)	189 (18.3%)	842 (81.7%)	.0613
Sep./Wid./Div.[c]	181 (8.6%)	44 (24.3%)	137 (75.7%)	
Never Married	883 (42.2%)	149 (16.9%)	734 (83.1%)	

[a] Observations with missing values for smoking status and race are not included in this table.

[b] Percentages are unweighted and unadjusted

[c] Separated, widowed, or divorced

Table 2

Characteristics of liberation supporters in the South Africa Stress and Health study (n=1,711)[a,b]

	All n (%)	Current Smoker n (%)	Not current smoker n (%)	p-value
All	1711 (100.0%)	368 (21.5%)	1343 (78.5%)	
Gender				<.0001
Male	745 (43.5%)	291 (39.1%)	454 (60.9%)	
Female	966 (56.5%)	77 (8.0%)	889 (92.0%)	
Race				
White[c]	26 (1.50%)	12 (46.2%)	14 (53.9%)	<.0001
Black	1462 (84.2%)	254 (17.4%)	1208 (82.6%)	
Coloured	198 (11.4%)	102 (51.5%)	96 (48.5%)	
Indian/Asian/Other	51 (2.9%)	12 (23.5%)	39 (76.5%)	
Age category				.0470
<35	840 (49.1%)	170 (20.2%)	670 (79.8%)	
35–49	539 (31.5%)	136 (25.2%)	403 (74.8%)	
50–64	255 (14.9%)	51 (20.0%)	204 (80.0%)	
65+	77 (4.5%)	11 (14.3%)	66 (85.7%)	
Education				.9860
0–11 years	1123 (65.6%)	242 (21.6%)	881 (78.5%)	
12 years	366 (21.4%)	80 (21.9%)	286 (78.1%)	
13–15 years	176 (10.3%)	36 (20.5%)	79.6 (80.0%)	
16+ years	46 (2.7%)	10 (21.7%)	36 (78.3%)	
HH Income PP (rands)				.0394
0–624	651 (38.1%)	124 (19.1%)	527 (81.0%)	
625–1125	188 (11.0%)	38 (20.2%)	150 (79.8%)	
1126–2250	251 (14.7%)	49 (19.5%)	202 (80.5%)	
>2250	621 (36.3%)	157 (25.3%)	464 (74.7%)	
Marital status				.0553
Married/cohabiting	819 (47.9%)	169 (20.6%)	650 (79.4%)	
Sep./Wid./Div.[d]	127 (7.4%)	38 (29.9%)	89 (70.1%)	
Never Married	765 (44.7%)	161 (21.1%)	604 (79.0%)	

[a] Observations with missing values for smoking status and race are not included in this table.

[b] Percentages are unweighted and unadjusted

[c] Whites were excluded from liberation analyses but are presented to show the racial make-up of the sample. As a result, the sum of respondents in all racial categories is greater than 1685.

[d] Separated, widowed, or divorced

Table 3

Risk ratios for current smoking in simple and multivariable log-binomial regression models of human rights violation exposure among participants in the South African Stress and Health study (n=3,690)

Parties experiencing violations	Violations N (%)[a]	Current smoking N (%)[a]	RR, 95% CI	ARR, 95% CI[b]
	Government supporters (n=2,081)			
Self only	153 (7.4%)	44 (28.8%)	1.67 (1.24–2.26)*	1.76 (1.25–2.46)*
Vicarious only[c]	27 (1.3%)	5 (18.5%)	0.92 (0.37–2.28)	1.19 (0.45–3.17)
Self and vicarious[c]	14 (0.7%)	4 (28.6%)	1.67 (0.68–4.09)	2.15 (0.89–5.21)
None	1887 (90.7%)	329 (17.3%)	REF	REF
	Liberation supporters (n=1,711)			
Self only	169 (9.9%)	49 (29.0%)	1.64 (1.25–2.15)*	1.56 (1.07–2.26)*
One type of vicarious violation only[d]	49 (2.9%)	16 (32.7%)	1.78 (1.16–2.75)*	1.97 (1.12–3.47)*
Self and one type of vicarious violation[e]	52 (3.0%)	17 (32.7%)	1.87 (1.24–2.80)*	1.62 (0.90–2.90)
Self and both types of vicarious violations[f]	26 (1.5%)	14 (53.9%)	3.07 (2.30–4.09)*	2.86 (1.70–4.82)*
None	1415 (82.7%)	272 (19.2%)	REF	REF

[a] Percentages are unweighted and unadjusted.

[b] Adjusted for race, age, gender, education, income, and marital status.

[c] Human rights violations experienced by close family and friends due to their political beliefs and activities.

[d] Human rights violations experienced by close family and friends due to their political beliefs and activities or the respondent's political beliefs and activities or both.

[e] Respondents who experienced human rights violations themselves and whose close others experienced violations due to either their beliefs or the respondent's beliefs (but not both).

[f] Respondents experienced violations, and the respondent had close others who experienced violations due to their beliefs and who experienced violations due to the respondent's beliefs.

* $p<.05$

Appendix 1A

Risk ratios for current smoking and three-category smoking (current, past, never) in simple and multivariable log-binomial regression models of human rights violation exposure among participants in the South African Stress and Health study

Parties experiencing violations	Smoking status	RR, 95% CI	ARR, 95% CI[a]	Smoking status	RR, 95% CI	ARR, 95% CI[a]
Government supporters (n=821)						
Self only	Smoker	1.67 (1.24–2.26)*	1.76 (1.25–2.46)*	Current	1.73 (1.30–2.32)*	1.81 (1.28–2.56)*
		-	-	Past	1.91 (1.07–3.42)*	1.76 (0.77–4.01)
	Non-smoker	REF	REF	Never	REF	REF
Vicarious only[b]	Smoker	0.92 (0.37–2.28)	1.19 (0.45–3.17)	Current	0.93 (0.38–2.28)	1.13 (0.42–3.04)
		-	-	Past	0.71 (0.17–3.04)	0.86 (0.19–3.99)
	Non-smoker	REF	REF	Never	REF	REF
Self and vicarious[b]	Smoker	1.67 (0.68–4.09)	2.15 (0.89–5.21)	Current	1.63 (0.67–3.95)	2.10 (0.85–5.18)
		-	-	Past	1.02 (0.21–4.82)	1.05 (0.18–6.14)
	Non-smoker	REF	REF	Never	REF	REF
Liberation supporters (n=1,684)						
Self only	Smoker	1.64 (1.25–2.15)*	1.56 (1.07–2.26)*	Current	1.61 (1.23–2.10)*	1.50 (1.02–2.20)*
		-	-	Past	1.16 (0.65–2.08)	0.92 (0.47–1.82)
	Non-smoker	REF	REF	Never	REF	REF
One type of vicarious violation only[c]	Smoker	1.78 (1.16–2.75)*	1.97 (1.12–3.47)*	Current	1.68 (1.10–2.57)*	1.83 (1.03–3.26)*
		-	-	Past	0.61 (0.15–2.40)	0.50 (0.11–2.28)
	Non-smoker	REF	REF	Never	REF	REF
Self and one type of vicarious violation[d]	Smoker	1.87 (1.24–2.80)*	1.62 (0.90–2.90)	Current	2.00 (1.39–2.87)*	1.81 (1.04–3.15)*
		-	-	Past	2.50 (1.13–5.53)*	2.51 (0.80–7.89)
	Non-smoker	REF	REF	Never	REF	REF
Self and both types of vicarious violations[e]	Smoker	3.07 (2.30–4.09)*	2.86 (1.70–4.82)*	Current	2.83 (2.14–3.75)*	2.43 (1.33–4.44)*
		-	-	Past	0.56 (0.08–3.94)	0.43 (0.05–3.70)

Parties experiencing violations	Smoking status	RR, 95% CI	ARR, 95% CI[a]	Smoking status	RR, 95% CI	ARR, 95% CI[a]
	Non-smoker	REF	REF	Never	REF	REF

[a] Adjusted for race, age, gender, education, income, and marital status.

[b] Human rights violations experienced by close family and friends due to their political beliefs and activities.

[c] Human rights violations experienced by close family and friends due to their political beliefs and activities or the respondent's political beliefs and activities or both.

[d] Respondents who experienced human rights violations themselves and whose close others experienced violations due to either their beliefs or the respondent's beliefs (but not both).

[e] Respondents experienced violations, and the respondent had close others who experienced violations due to their beliefs and who experienced violations due to the respondent's beliefs.

* $p<.05$

Appendix 1B

Risk ratios for current smoking (versus nonsmoking) and ever smoking (versus never smoking) in simple and multivariable log-binomial regression models of human rights violation exposure among participants in the South African Stress and Health study (n=3,690)

	Current versus nonsmoking		Ever versus never smoking	
Parties experiencing violations	**RR, 95% CI**	**ARR, 95% CI[b]**	**RR, 95% CI**	**ARR, 95% CI[b]**
	Government supporters (n=2,081)			
Self only	1.67 (1.24–2.26)*	1.76 (1.25–2.46)*	1.65 (1.29–2.10)*	1.69 (1.23–2.32)*
Vicarious only[c]	0.92 (0.37–2.28)	1.19 (0.45–3.17)	0.89 (0.43–1.84)	1.03 (0.46–2.28)
Self and vicarious[c]	1.67 (0.68–4.09)	2.15 (0.89–5.21)	1.44 (0.67–3.11)	1.79 (0.85–3.79)
None	REF	REF	REF	REF
	Liberation supporters (n=1,711)			
Self only	1.64 (1.25–2.15)*	1.56 (1.07–2.26)*	1.43 (1.14–1.78)*	1.31 (0.957–1.80)
One type of vicarious violation only[d]	1.78 (1.16–2.75)*	1.97 (1.12–3.47)*	1.40 (0.95–2.06)	1.39 (0.82–2.38)
Self and one type of vicarious violation[e]	1.87 (1.24–2.80)*	1.62 (0.90–2.90)	1.85 (1.39–2.45)*	1.79 (1.14–2.81)*
Self and both types of vicarious violations[f]	3.07 (2.30–4.09)*	2.86 (1.70–4.82)*	2.25 (1.72–2.95)*	1.75 (1.00–3.09)*
None	REF	REF	REF	REF

[a] Percentages are unweighted and unadjusted.

[b] Adjusted for race, age, gender, education, income, and marital status.

[c] Human rights violations experienced by close family and friends due to their political beliefs and activities.

[d] Human rights violations experienced by close family and friends due to their political beliefs and activities or the respondent's political beliefs and activities or both.

[e] Respondents who experienced human rights violations themselves and whose close others experienced violations due to either their beliefs or the respondent's beliefs (but not both).

[f] Respondents experienced violations, and the respondent had close others who experienced violations due to their beliefs and who experienced violations due to the respondent's beliefs.

* $p<.05$