Effects of sociodemographic characteristics, alcohol dependence, and health beliefs on smoking cessation in South Africa

Abstract:

Objectives: The identification of risk factors for making a quit attempt and being successful in that attempt could help improve policy and clinical practices to decrease the prevalence of smoking in South Africa.

Methods: Using data from the 1998 South African Demographic and Health Survey, we compared 12 characteristics of those who made a quit attempt to the whole population of smokers as well as comparing successful quitters to those who made a quit attempt.

Results: Those who made a quit attempt were more likely to be female, white, have 12 or more years of education, have higher socioeconomic status, believe smoking is harmful, and be formerly dependent on alcohol, and not have others smoke at home. Those who succeeded in their quit attempt were more likely to be over age 55, female, not have others smoke at home, believe smoking is harmful, smoke more than 20 cigarettes per day, have started smoking by age 14, and be formerly dependent on alcohol.

Conclusions: Targeting males, alcohol dependent smokers, and those that smoke in the home, as well as increasing knowledge of the health effects of smoking could create more successful quitters in South Africa.

Of the estimated 1.3 billion tobacco users worldwide, approximately half (650 million) are expected to suffer premature death due to tobacco use (Shafey et al., 2003). Worldwide tobacco related mortality is expected to more than double from 4 million deaths in 1999 to 10 million annually in the next three decades (Peto and Lopez, 2000). By 2015, tobacco-related mortality will be 50% greater than that caused by HIV/AIDS worldwide (World Health Organization, 2007). This burden of disease can be reduced by preventing smoking initiation and by helping current smokers to quit. Smoking cessation results in clear health benefits compared to continued smoking, even at lower numbers of cigarettes or using other forms of tobacco (U.S. Department of Health and Human Services, 1990; Pisinger and Godfredsen, 2007). Preventing smoking initiation, particularly among youths and adolescents, will have long term effects starting near the middle of the century. However, in order to have a more immediate reduction in tobacco-related diseases, smoking cessation among current users is essential. In
2000 it was estimated that a 50% reduction in current smoking would prevent approximately 170 million premature deaths by 2050 (Lancaster et al., 2000; Peto and Lopez, 2000).

Ongoing public health efforts in South Africa have made some improvements: reducing the prevalence of smoking from 51.4% among men and 12.9% among women in 1993 to 43.8% among men and 11.7% among women (27.1% for both genders age 16 or over) in 2000 (van Walbeek, 2002, Shafey et al., 2003). This is close to the world average, (47% for males 11% for females) but well above the average for Sub-Saharan Africa (28% for males, 8% for females) (Jha et al., 2002). Smoking is estimated to be the cause of 8% of all adult deaths in South Africa, a figure which is likely to grow in the future as the current smoking population ages and suffers the health effects in middle age and beyond (Sitas et al., 2004).

In order to facilitate smoking cessation, Lee and Kahende (2007) have attempted to identify social and behavioral characteristics that are associated with increased odds of a successful quit attempt. These factors include increased age, higher education level, being married or living with a partner, being a non-Hispanic white, having fewer lifetime quit attempts, not switching to low tar/nicotine products, not having others smoke at home, and having a no smoking policy at work (Lee and Kahende, 2007)

Levy et al. (2004) found that younger smokers (aged 25-44 and 45-64) were more likely to make quit attempts, but less likely to be abstinent three or more months at the time of interview, compared to smokers 65+. Similarly, they also found that smoking less than 15 cigarettes per day (CPD) was associated with increased quit attempts and smoking 25 or more CPD was associated with decreased quit attempts, compared to smoking 15-24 CPD. However, of these, only smoking 25+ CPD was associated with increased abstinence.
This study seeks to determine what demographic and behavioral characteristics are associated with increased odds of a successful quit attempt among South Africans. Of additional interest is the role of comorbidity of tobacco and alcohol use, particularly the effects of alcohol dependence on making and succeeding in a smoking quit attempt. Although South Africa has a lower prevalence of current drinkers (44.7% for men and 16.9% for women) than other developing countries (e.g. Mexico with 77% for men and 44% for women), the misuse of alcohol remains high (Parry et al., 2005). Studies from the US show very high prevalence of smoking in alcohol dependent populations (Littleton et al., 2007), suggesting this vulnerable population may be a good place to focus interventions.

**Methods:**

This study used data from a nationally representative household survey conducted in 1998, the South African Demographic and Health Survey (SADHS). It contains data collected from 13,826 households on a variety of health related subjects including tobacco and alcohol use. Further information on the data collection procedures has already been published (Steyn et al., 2002).

This study compares those who have made a recent successful quit attempt to those who have made an unsuccessful quit attempt. A quitter was defined as a person who reported smoking at least 100 cigarettes in his or her lifetime, and smoking “not at all” at the time of the survey. They were further refined into recent quitters, who had stopped smoking within the past 6 months; successful quitters, who stopped smoking between 6 months and 10 years ago; and past successful quitters, who stopped smoking more than 10 years ago. For the rest of this paper, “successful quitter” refers to those who quit between 6 months and 10 years ago. Quitters of less than 6 months were excluded due to the high risk of relapse, and quitters for more than ten years
were excluded because of the probability that current answers would not reflect their status at the time of the quit attempt. An unsuccessful quitter was defined as a person who reported smoking at least 100 cigarettes in his or her lifetime, making a quit attempt, and currently smoking “daily” or “occasionally”. A flow chart of the categorization process is displayed in Figure 1.

Four categories of alcohol use were defined: never drinkers, alcohol dependents who do not currently drink (past dependents), alcohol dependents who do currently drink (current dependents), and ever drinkers who are not dependent (non dependents). Alcohol dependence was defined as answering “yes” to two or more of the four CAGE questions (Mayfield et al., 1974): “Have you ever felt that you should cut down on your drinking?”, “Have people annoyed you by criticizing your drinking?”, “Have you ever felt bad or guilty about your drinking?”, and “Have you ever had a drink first thing in the morning to steady your nerves or get rid of a hangover?”.

Information was also collected on social and demographic characteristics such as age, race, gender, years of education, urban or rural living, age the subject first smoked regularly, whether or not others smoke at home, whether or not other smoke at work, whether the subject believes smoking benefits one’s health, harms one’s health, or has no health effects. An asset index was calculated based on the ownership of a radio, television, telephone, refrigerator, personal computer, and washing machine. The index was then divided into three groups, corresponding high, middle, and low socioeconomic status, which were used in the analysis.

**Statistical Analysis:**

Statistical analysis was done using SPSS version 13.0 accounting for the complex sampling design. Successful and unsuccessful quitters (coded 1 and 0, respectively) were compared using independent samples t-tests, and chi-square analyses. A multivariate logistic
regression was used to predict quitting status based on the previously mentioned variables. A backward selection method was used, starting with the full model of covariates that had significant values in the bivariate analysis, and removing terms with significance levels greater than 0.1. Similar comparisons were made between those who made a quit attempt and continuous smokers.

**Results:**

The majority (69.5%) of South Africans age 16 or older have never smoked. An additional 9.4% have smoked, but less than 100 cigarettes in their lifetime. This leaves 21.1% of South African adults as ever smokers. Of these, 68.6% have attempted to quit smoking. Excluding those whose quit attempt was at less than 6 months at the time of survey, due to their high probability of relapse, only 28.6% of those who attempt to quit smoking succeed, leaving nearly three-quarters of quitters unsuccessful (data not shown).

Table 1 shows the percent of smokers in each category that made a quit attempt. Groups with above average (68.6%) frequency of quit attempts are ages 55-64 or over 65, females, Asians/Indians, Whites, those with 12 or more years of education, who started smoking at when over 20 years old, do not have others smoking at home, have high asset index, believe that smoking is harmful, smoke 11-20 or over 21 CPD, and report a past dependence on alcohol.

Also in Table 1 is the percent of quit attempters in each category that succeeded in the quit attempt. This table is limited to those who recent quitters in order to minimize the effect of changes in these characteristics since smoking cessation. The highest frequencies of successful quitters were found for the following characteristics: age 55-64 and over 65, female, white, smoking initiation before age 14 or after age 20, not having others smoke at home, high asset
index, belief that smoking is harmful, smoking 11-20 or over 21 CPD, and reporting a past dependence on alcohol.

The final logistic regression models for quit attempts (Table 2) and quit success (Table 3) found a number of significant predictors of cessation activity. The highest odds ratios for making a quit attempt were found for females, whites, and those with more than 12 years of education, smoke free homes, high SES, belief that smoking is harmful, and were dependent on alcohol in the past. Increased quit success was predicted by female gender, older age, increased CPD, younger age at smoking initiation, having a smoke free home, recognizing that cigarettes cause harm, and being a dependent on alcohol in the past. Being currently dependent on alcohol and starting smoking between the ages of 15-19 decreased the odds ratio of a successful quit attempt.

**Discussion:**

The relationship between alcohol dependence and smoking cessation was one of the strongest observed in this study. Never drinkers were not significantly different than non dependents in cessation behavior. Those who fit the definition for alcohol dependence but indicated that they had stopped using alcohol were twice as likely to make a quit attempt and twice as likely to succeed in that quit attempt as those who never drank or were non dependent. Current dependents were more likely to make a quit attempt, but were much less successful. This indicates the difficulties of smoking cessation faced by those who are dependent on nicotine and alcohol. This is in stark contrast with those who were formerly dependent on alcohol. They seem to have been able to reject multiple forms of addiction. This is consistent with other studies which have shown that alcoholics who have been abstinent for a number of years have
more success in quitting than those who are currently seeking treatment for alcohol use (Heffner et al., 2007).

The results from other demographic variables are similar to those shown in Lee and Kahende (2007), where increased age, no smoking at home, and white race (among other factors) were associated with increased quit success. This shows that these factors apply not only in wealthy nations, but in middle income countries as well. In both studies, smoking at home was one of the strongest predictors in the model, with an OR of 10.47 in the U.S. study where “yes” was the reference and an OR of .347 in this study, where “no” was the reference. While smoking in the home cannot be regulated by law, increased public education campaigns could help influence smokers to voluntarily stop smoking in the home. Interestingly, smoke-free workplaces were found to be significant predictors of quit success in the United States, but not in South Africa. This may be due to differences in enforcement of workplace smoking bans. In 2003, South Africa amended the 1993 Tobacco Control Act to significantly increase the fines for violation of smoking bans. It remains to be seen what effect, if any, this has had on quitting. Increased education, which was significant in relation to quit attempts, but not quit success in South Africa, was significant for quit success in the United States. A significant effect in the United States was only seen comparing college graduates to those who had not completed high school. The current analysis did not differentiate between people with more than 12 years of education, and therefore the effect of being a college graduate may have been lost.

This study found perception of harm to be a very strong predictor of success in quitting. While relatively few South Africans remain unaware that smoking is dangerous, those that are face a substantial disadvantage if and when they attempt to quit. The fact that knowledge of cigarettes’ harm is widespread reflects well on the efforts to regulate the tobacco industry, and
specifically through warning labels. The implementation of graphic visual warning labels could do a great deal to help this segment of the population, who are likely to also be disadvantaged by illiteracy and a lack of education. They would also promote knowledge of specific health outcomes (lung cancer, heart disease, stroke, and impotence, among others) and of the toxic constituents of tobacco smoke (such as carbon monoxide, arsenic and cyanide). Cigarette warning labels have been shown to be a major source of information about the health effects of smoking among smokers and are much more cost effective than mass media campaigns (Hammond et al., 2006). In particular, the large (covering 50% of the pack face), color, graphic warnings found on Canadian cigarette packages appear to be more effective than the smaller, black and white, text only warnings found in Australia, the United Kingdom, and the United States; Canadians displayed increased knowledge of the health effects of smoking compared to those other countries (Hammond et al., 2006). Given South Africa’s linguistic diversity, health warnings in the form of a picture could prove especially beneficial.

Levy et al. (2005) found that the number of cigarettes smoked per day was a significant predictor for quit attempts and 3 month abstinence. Compared to medium smokers, very light and light smokers were more likely and heavy smokers less likely to attempt to quit, while light smokers were less likely and heavy smokers more likely to succeed in the quit attempt (Levy et al., 2005). This contrasts with the findings here, where CPD was not a significant predictor of quit attempts after adjusting for the other covariates. The finding that higher CPD is associated with increased quit success is similar to Levy et al. but as noted in that paper, this finding differs from many other reports that lighter smokers have increased quit success over heavier smokers. Without further study, we cannot confirm their theory that current light smokers are those who remain after heavy smokers quit or reduce their CPD. Instead heavier smokers may be more
motivated to quit based on suffering cigarette related adverse health conditions, whereas light smokers might feel less motivation to quit based on a perception of lower individual risk.

The findings of this study have several implementations for both practice and policy. For primary health care providers, we suggest that special focus be paid to patients who are dependent on both nicotine and alcohol, as it may be even more difficult for them to quit smoking. Based on this and previous studies, it seems that a reduction in alcohol dependence may be a necessary first step before smoking cessation can be successful. From a wider policy perspective, this means that education campaigns and program funding should be altered to reflect this fact, and treatment centers be organized to treat codependence.

The other major policy and practice suggestion is to increase the focus on light smokers. Seventy-three percent of South Africa’s smokers smoke fewer than 10 cigarettes per day (data not shown), and this group has much lower odds of successfully quitting than heavier smokers. This leaves a lot of room for improvement, if primary health care providers can increase counseling to this population. From a policy standpoint, funding for tobacco cessation programs should not exclude this group on the assumption that nicotine replacement therapies or other forms of quit assistance are not needed.

**Limitations:**

This paper’s findings are subject to a number of limitations. First is that the dataset dates from 1998. However, it is the largest and most complete available for South Africa, and as such was uniquely able to identify these risk factors for smoking cessation. Other recent studies have used similarly dated populations (Lee and Kahende, 2007; Levy et al., 2005). Another limitation is the cross-sectional nature of the original survey. This temporal ambiguity leads to the possibility of reverse causation of the observed effects, so it may be that people who quit
smoking live longer, not that older people quit smoking more. We tried to address this by limiting the sample of successful quitters to a 10 year period, but the possibility remains for age and the other characteristics. There is also the problem that smoking and drinking habits were assessed by self-report only, and are therefore subject to bias. Despite these limitations, this paper provides a crucial look into the characteristics of the South African smoking, and quitting, population.

**Directions for further research:**

As it has been nearly 10 years since the first SADHS, a new large scale, nationally representative survey of South Africa would reveal what progress has been made in tobacco control, as well as other health measures, since 1998. In that time period there have been changes to tobacco control laws, such as the banning of smoking in restaurants and bars, regulation of nicotine and tar yields, and other measures to bring regulations in line with the Framework Convention on Tobacco Control. Research on South African smokers’ motivations for quitting could help explain why these characteristics are associated with differential quitting success, allowing for better targeted intervention strategies. Additional studies of alcohol dependent smokers are needed to determine the most effective intervention strategy for this group, which represents more than a quarter of South Africa’s smokers (data not shown).
References:


Figure 1. Classification of participants by smoking status

- Have you ever smoked tobacco, used snuff or chewed tobacco? No (n=8752) Never Smokers
  - Yes (n=4728) Have you ever smoked at least 100 cigarettes (5 packets of 20 cigarettes) or the equivalent amount of tobacco in your lifetime? No (n=1281) Non-smokers
- Yes (n=3447 Ever Smokers) Have you ever tried to quit smoking? No (n=1113) Continuous Smokers
- Yes (n=2334 Quit Attempters). Do you now smoke daily, occasionally, or not at all? Daily or Occasionally (n=1689) Unsuccessful Quitters
  - Not at all (n=636 quitters) How long has it been since you last smoked daily? <6 months (n=79) Recent Quitters or >10 years (n=306) Past Successful Quitters [Excluded from analysis]