Epidemiological profile of non-daily smokers in South Africa: implications for practice

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Abstract

Background: This study sought to provide an epidemiological profile of non-daily (ND) smokers in South Africa.

Methods: Using data obtained from the 1998 South African demographic and health survey (SADHS) – the largest nationally representative dataset available – smokers were classified as non-daily (ND) smokers or daily smokers. NDS were defined as persons aged 18 and over who had ever smoked 100 cigarettes, but did not currently smoke daily.

Results: In 1998, an estimated 10% of current smokers were ND smokers (n = 255). Of the ND smokers, 69.7% had smoked daily in the past and currently smoked significantly fewer cigarettes per day (CPD) than current daily smokers (5.4 vs. 9.8). ND smokers were also significantly more likely to have made at least one attempt to quit smoking, live in smoke-free homes, have more than 12 years of schooling and live in urban areas. Compared to past daily ND smokers, those ND smokers who had never smoked daily smoked fewer CPD and were more likely to be younger than 25 years old.

Conclusions: The findings of this study suggest that the majority of ND smokers in South Africa are those trying to quit smoking rather than those initiating smoking. Smoking rates among ND smokers are still at a level that has been shown to pose significant health risks, therefore health practitioners should also prioritise non-daily smokers for interventions regarding smoking cessation.

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Introduction

Worldwide, tobacco-related mortality is expected to more than double, from four million deaths in 1999 to ten million annually in the next three decades.[1] Of greater concern is that 70% of these deaths are predicted to occur in the developing countries. Of the 17 mortality risk factors assessed in a recent study in South Africa, smoking ranked third highest after unsafe sex and high blood pressure.[2] Smoking is already estimated to be the cause of 8% of all annual adult deaths in South Africa.[2,3] This estimate is likely to grow in the future as the current smoking population ages and suffers health effects in middle age and beyond.[3]

Smoking cessation has clear health benefits compared to continuing to smoke, even at lower numbers of cigarettes[4] or using other forms of tobacco products.[5,6] In fact, compared to non-smoking, occasional smoking has been associated with a significantly increased risk for cardiovascular mortality among men.[7] Yet, published data in the past decade suggest a growing proportion of smokers who report occasional, intermittent, or "some day" smoking. It is therefore of public health importance to characterise and understand the non-daily (ND) smoking phenomenon, as this may inform the need for targeted interventions.

In the United States it has been estimated that one in five current smokers are ND smokers.[6] A study conducted in Australia during 1993 reported that 11% of smokers were ND smokers,[8] but a more recent study suggests that as many as 39% of women smokers in Australia could be ND smokers.[9] Studies from the United States consistently show that ND or occasional smokers are more likely to be of a younger age, Hispanic, black, better educated, and more likely to want to quit smoking than the reference populations.[6,10,11] ND smokers are also more likely to have smoke-free workplaces and live in smoke-free homes.[12]

It has also been suggested that ND smokers may not represent a homogenous group.[13,14] Some ND smokers may be those who have just started smoking (uptake smokers) and are transitioning to daily smoking; some may be former daily smokers who have come to establish a stable pattern of ND smoking without the intention to quit; while others may be those in transition towards stopping smoking completely.[10,14] Hassmiller et al previously reported that smokers following a stable pattern made up nearly half (44.6%) of the ND smokers in the United States.[10]

Given that the studies characterising ND smokers have largely been carried out in the United States, and considering that smokers elsewhere, particularly those in developing countries, may face different pressures economically and socially that may influence their smoking habits, this study seeks to provide an epidemiological profile of ND smokers in South Africa. In particular, we sought to provide information on the social and behavioural factors associated with non-daily smoking patterns in South Africa.

Methods

The data used in the current study were obtained from the 1998 South African Demographics and Health Survey (SADHS) – the largest, publicly

available, nationally representative dataset of South Africans aged 16 years and over (n = 13 826). The 1998 SADHS used a multistage cluster design, which identified clusters within the country's nine provinces and chose households randomly within these clusters that corresponded with the national census enumeration areas (EAs). The SADHS collected information about various health-related subjects, including the use of tobacco. The protocol for the SADHS was approved by the ethics committee of the South African Medical Research Council. More details on the survey procedure have been published previously.[15]

In this study, current ND smokers were compared to current daily smokers on several behavioural, social and demographic variables. The information collected included the respondents' age, gender, race, education, and age at smoking initiation. It also included the presence of others smoking at work, the presence of others smoking at home, socioeconomic status (SES), urban or rural living, belief that smoking causes harm, number of cigarettes per day, and previous attempts to quit. The four racially classified social groups (RCSG) used in this study – whites, coloureds (mixed race), Asians/Indians and black Africans – refer explicitly to the social conception of race.[16] Of South Africa's 40.6 million population in 1996, 77% were classified as black Africans, 9% as coloureds, 3% as Indian/Asians and 11% as whites.[17] The 1998 Poverty and Inequality report[18] identified race as one of the most significant indicators of poverty, with 61% of the black African, 38% of the coloured, 5% of the Indian, and only 1% of the white population categorised as being poor – assessed against consumption-based income poverty lines. The RCSGs are used here to demonstrate differences in smoking behaviour and implication for addressing the disparities in tobacco-related burden of disease. Whites were used as the reference group in this study, as they are the most affluent group in South Africa.[18] Material wealth (asset index) was used as a proxy for SES. Similar to previously published methods, the asset index was determined using factor analysis of a number of working household items (refrigerator, television, car and washing machine) owned by the respondents and access to electricity.[15] The reliability of the scale derived was considered very satisfactory, as reflected by a high internal consistency of response to scale items (Cronbach $\alpha = 0.83$). The index scores used in the analysis were then ranked to classify the respondents into three socioeconomic categories: high, middle, and low SES.

The study participants were categorised into smoking status categories as shown in Figure 1. In order to make our findings comparable to those of other similar studies mostly from the United States, the current study was restricted to smokers aged at least 18 who had smoked at least 100 cigarettes in their lifetime. These smokers were then further classified according to their current smoking status (daily or non-daily), and ND smokers were further subdivided into those who had at some stage been daily smokers and those who had never been daily smokers. Three ND smokers were excluded from the analysis for having highly implausible and aberrant reports concerning the number of cigarettes smoked per day.

Owing to the small number of observations, the Asian/Indian population had to be excluded from the characterisation of never daily non-daily (NDND) smokers, and the categories based on the number of cigarettes smoked per day (CPD) had to be reduced to two categories: "1 to 5" and "more than 5". The age groups were also redefined as younger than 25 or 25 and over, as it was expected that young adults (< 25 years) are less likely than the older ones to have fully established daily smoking habits.

Statistical analysis

All statistical analyses was done using SPSS version 13, with sample weighting to reflect the population distribution in South Africa and consideration of the cluster sample design used in the 1998 SADHS. Differences in weighted proportions and means were tested using chi-square and independent sample t-tests respectively. Multiple logistic regression analysis using backward selection was used to predict ND smoking, while controlling for potential confounding variables. This process was repeated to predict who among the ND smokers had never been daily smokers. Only those with complete data were included in the multiple regression analyses. Statistical significance was set at $p < 0.05$.

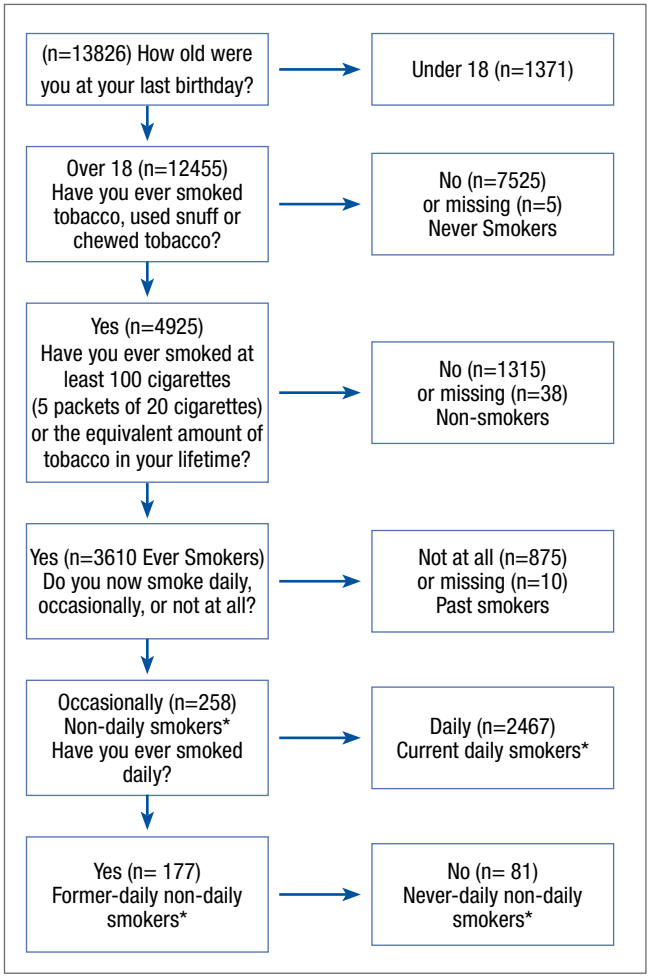

Figure 1: Classification of participants by smoking status (groups that were used in the analysis are indicated with an asterisk "*").

Results

Of the studied population, 21.9% (n = 2 725) could be classified as current smokers (daily and ND smokers). Overall, 10% of all current smokers were ND smokers. The average number of CPD among the daily smokers was 9.8, compared to 5.4 among ND smokers ($p < 0.001$). The ND smokers had smoked for an average of 14.2 years, compared to the daily smokers' average lifetime smoking duration of 21.4 years ($p < 0.001$). Among all the ND smokers, those who were former daily smokers had smoked for an average of 15.0 years, compared to 12.3 years for NDND smokers ($p = 0.091$).

Non-daily smoking

In a bivariate analysis, those respondents aged 18–35 and 55–64 had a higher prevalence of ND smoking when compared to that of the total

population of ND smokers (see Table I). Males did not differ significantly from females in the prevalence of ND smokers. Black people had the highest proportion of ND smokers, while coloured people (mixed race) had the lowest proportion of ND smokers. Also, in the bivariate analysis, those who believe that smoking causes harm had a higher prevalence of ND smokers (see Table I). Those with education beyond high school had nearly double the average prevalence of NDS. Table I also demonstrates that the proportion of NDS was also higher among those living in smoke-free homes, those living in urban areas who had attempted to quit in the past, those who started smoking in their twenties or later, and those who smoke five or fewer CPD on the days they smoke. Material wealth was not significantly associated with NDS.

Table I: Distribution of non-daily smokers and never daily non-daily smokers

Characteristic	% NDS among current smokers (n = 255)	p value	% NDNDS among current NDS (n = 79)	p value
Age				
18–24	13.5 (52)		55.9 (29)	
25–34	11.3 (67)		24.8 (17)	
35–44	9.7 (60)		29.9 (14)	
45–54	5.9 (27)		24.3 (8)	
55–64	13.2 (31)		9.9 (5)	
65+	6.3 (18)	0.003	32.0 (6)	0.001
Gender				
Male	10.4 (191)		31.2 (60)	
Female	9.1 (64)	0.376	27.6 (19)	0.622
Race group				
Black/African	12.7 (196)		31.7 (65)	
Coloured	3.9 (26)		23.5 (6)	
Asian/Indian	8.4 (6)		†	
White	10.2 (27)	< 0.001	27.2 (8)	0.792
Education				
None	8.7 (37)		33.8 (11)	
1–7 years	7.5 (61)		15.5 (13)	
8–12 years	11.0 (133)		34.3 (47)	
12+ years	19.0 (24)	0.001	38.2 (8)	0.109
Age started smoking regularly				
≤14	8.3 (23)		28.1 (6)	
15–19	6.5 (80)		33.3 (29)	
≥20	14.2 (152)	< 0.001	29.2 (44)	0.825
Others smoke at work				
Yes	8.5 (69)		34.1 (22)	
No	10.9 (185)	0.095	28.2 (56)	0.453
Others smoke at home				
Yes	6.5 (87)		28.2 (27)	
No	13.7 (168)	< 0.001	31.3 (52)	0.645
Asset index				
Low	9.2 (64)		38.5 (24)	
Middle	9.9 (106)		30.3 (32)	
High	10.8 (85)	0.679	26.0 (23)	0.411
Location				
Urban	11.2 (172)		25.6 (46)	
Rural	7.8 (83)	0.015	43.0 (33)	0.018
Belief that smoking is harmful				
Yes	11.1 (229)		31.5 (72)	
No	5.5 (26)	0.002	19.8 (7)	0.229
Cigarettes per day				
1 to 5	17.6 (177)		31.5 (60)	
6 to 10	6.7 (53)		25.1 (16)‡	0.388
11 to 15	2.0 (5)			
over 16	3.5 (16)	< 0.001		
Quit attempt				
Yes	13.7 (213)		28.6 (63)	
No	4.5 (42)	< 0.001	38.9 (16)	0.227
Total population	10.1 (255)		30.3 (79)	

NB: Number, n, was not consistent due to missing or incomplete data; † Due to small cell counts, Asian/Indians are excluded from this analysis; ‡ Due to small cell counts, this includes all values of CPD greater than 5

In the final model for the logistic regression predicting ND smoking among all current smokers, race, education, age at smoking initiation, smoke-free homes, number of CPD and past attempts to quit remained significantly associated with ND smoking. However, after controlling for lifetime smoking duration, those younger than 55 years were significantly less likely to be NDS when compared to those aged 65 years and older (see Table II). Coloured people were significantly less likely to be ND smokers than white people. Those who initiated smoking between the ages of 15 and 19 had significantly decreased odds of being NDS when compared to those who started smoking at 20 years or later. Having a smoke-free home and living in an urban area just about doubled the odds of being an NDS. Having made at least one attempt to quit smoking in the past trebled the odds of being an NDS, but the odds of being an NDS decreased with increasing number of years smoked.

Never daily non-daily smoking

Overall, 69.7% of all ND smokers had smoked daily in the past, leaving 30.3% as NDND smokers. NDND smokers smoked on average fewer CPD when compared to former daily ND smokers (4.3 vs 5.9 CPD; p = 0.016). In a bivariate analysis, the only significant differences in the distribution of NDND smokers were found with regard to age and area of residence (see Table II). More than half of all smokers aged 24 years and younger were NDND smokers, while only a tenth of those aged 55 to 64 were. Forty-three per cent of rural ND smokers were NDND smokers, while only 25.6% of the urban ND smoker population were NDND smokers (p = 0.02).

In a multiple logistic regression analysis, age and living in an urban area not only remained significantly associated with NDND smoking, but education and the age smoking was initiated became significant when these variables were controlled for (see Table III). The odds of NDND smoking were nearly six times as great among those younger than 25 years. However, those who initiated smoking as early as 14 years of age were less likely to be NDND smokers when compared to those who started smoking at age 20 or later. Urban ND smokers were less likely than rural ND smokers to never have smoked daily. Respondents with between one and seven years of education were less likely to be NDND smokers when compared to those who had finished more than 12 years of education.

Discussion

One in ten South African smokers surveyed in 1998 reported being occasional or ND smokers and more than two-thirds were former daily smokers. The proportion of ND smokers found in this study is somewhat similar to that found among the general adult population (10 to 19%) in other studies of occasional smoking.[8,10] As found in the literature,[14] former ND smokers and NDND smokers differed in some important respects. NDND smokers consumed fewer cigarettes, were younger than 25 years old, and were more likely to have begun regular smoking after their teenage years. This is consistent with the definition of those in the smoking uptake phase suggested by Gilpin et al.[14] However, the fact

Table II: Multivariate analysis of factors associated with being a non-daily smoker among all current smokers (n = 2 725)

Characteristic	Odds ratio (95% CI)
Age	
18–24	0.15 (0.05–0.44)
25–34	0.20 (0.08–0.49)
35–44	0.28 (0.13–0.60)
45–54	0.26 (0.12–0.56)
55–64	1.20 (0.57–2.52)
65+	1
Race group	
Black/African	0.54 (0.28–1.02)
Coloured	0.23 (0.11–0.49)
Asian/Indian	0.33 (0.10–1.05)
White	1
Education	
None	0.45 (0.21–0.99)
1–7 years	0.41 (0.21–0.80)
8–12 years	0.56 (0.31–1.02)
Over 12 years	1
Age started smoking regularly	
Age 14 or before	0.92 (0.49–1.7)
15–19	0.62 (0.39–0.96)
Age 20 or later	1
Others smoke at home	
Yes	1
No	2.05 (1.44–2.92)
Location	
Urban	1
Rural	0.54 (0.37–0.79)
Cigarettes per day	
1–5 CPD	6.99 (3.07–15.93)
6–10 CPD	2.30 (1.00–5.29)
11–15 CPD	0.45 (0.16–1.29)
More than 15 CPD	1
Quit attempt	
Yes	3.10 (2.04–4.71)
No	1
Years smoked	
For every 5 year increase	0.68 (0.60–0.77)

NB: The model excluded those who had not provided complete data on all variables (n = 76)

that about 70% of ND smokers were former daily smokers suggests that most of the ND smokers in South Africa during 1998 were not uptake smokers, but were more likely to be those trying to quit or reduce the harm caused by their continued smoking. This view is supported by the fact that ND smokers in general tended to be those who believed in the harm of smoking and were significantly more likely to have made one or more attempts to quit smoking in the past.

The ND smokers may be characteristically different from those who were previously characterised as "light" daily smokers (smokes < 15 CPD) in a previous study using the 1998 SADHS. This is because the current findings suggest that ND smoking is most prevalent among the most educated South Africans, while a previous analysis of the 1998 SADH suggested that light smoking was most prevalent among the least educated people.[15]

Table III: Multivariate analysis of factors associated with being a never-daily smoker among all non-daily smokers (n = 255)

Characteristic	Odds ratio (95% CI)
Age	
18–24	5.99 (2.28–15.73)
25 and over	1
Education	
None	0.68 (0.17–2.75)
1–7 years	0.19 (0.05–0.71)
8–12 years	0.62 (0.18–2.11)
More than 12 years	1
Location	
Rural	2.68 (1.20–6.00)
Urban	1
Age started smoking regularly	
Age 14 or before	0.28 (0.08, 0.99)
15–19	0.81 (0.35, 1.89)
Age 20 or later	1

NB: The model excluded those who had not provided complete data on all variables (n = 6)

The fact that material wealth was not significantly associated with ND smoking, but that the level of education was, suggests that ND smoking behaviour may not be significantly associated with the affordability of cigarettes, but may be related more to an increase in knowledge of the potential harmful health effects of smoking. This knowledge would more likely have been mediated through a better level of education. Indeed, health warning labels were introduced in South Africa in 1995,[19] but the subsequent evaluation of the level of exposure and responses to these warnings suggested that those with a higher education; white people; and urban residents, reported significantly greater exposure and had greater recall of the health warnings when prompted than the reference population groups, those with lower education, black people and rural residents.[20] It was therefore not surprising that those in the latter groups were more likely to be daily smokers rather than NDS, which possibly indicates a prelude to quitting.

Considering that ND smoking was most popular among the most educated South Africans, the ND smoking phenomenon could be reflective of an evolving innovation or new fashion in smoking being adopted from the trends in developed countries. While further studies are required to establish whether ND smoking represents harm reduction that will eventually lead to a cessation of smoking or an emerging new trend that may become ingrained, the introduction of graphic warning labels,[21] which will reach both highly educated and less educated South African smokers, may be needed to communicate not only the dangers of smoking, but also the health risks associated with ND smoking.

Similar to a previous US finding,[14] smoke-free homes and not smoke-free workplaces were associated with being an ND smoker. The results from the present study thus provide additional support for the view that smoke-free homes may provide higher odds of a person making an attempt to quit smoking than the association with smoke-free workplaces.[22,23] While the relationship between workplace smoking restrictions and home smoking restrictions deserves further investigation, it has been suggested that the difference in effects may be partially related to an inadequate enforcement of workplace smoking restrictions, especially among blue collars workers.[24] This view is further supported by the fact that ND smokers in the current study were most likely to be those

that were better educated and, by implication, most likely to be in white collar jobs rather than blue collar jobs. Our results therefore also suggest that, with the implementation of a partial ban on public smoking in South Africa in 2001,[25] together with a possible heightened public awareness of the harm caused by smoking, ND smoking may become even more prevalent. Indeed, Van Walbeek has more recently suggested that a greater proportion of the reduction in total cigarette consumption observed between 1993 and 2000 in South Africa is attributable to a decrease in the number of cigarettes consumed per smoker (60%), rather than to a decrease in the proportion of smokers (40%).[26] A recent review has suggested that, among other effects, smoking bans result in the reduction in the quantity of cigarettes smoked by continuing smokers, depending on the length of time after the ban.[27]

Although this study was not able to establish the time since the initiation of ND smoking behaviour in the studied population, but considering that ND smoking may be maintained for an extended period of time[10] and that occasional smoking, in turn, has been associated with significantly increased mortality,[7] there is a need for health practitioners to also advise ND smokers to quit smoking. This is particularly because the study findings suggest that the majority of ND smokers may be those already motivated to quit smoking, or at least reduce the harm to their health caused by smoking. Furthermore, considering that former daily ND smokers smoke an average of five CPD on the days they smoke, and given that even this low intensity of smoking has been associated with significantly increased health risks, there is a need for public health education campaigns to encourage ND smokers to completely quit smoking in order to derive the maximum health benefit.

Study limitations and strengths

Although, as far as we could ascertain, the present study is the first population-based study in South Africa to examine correlates of ND smoking in detail, the study's findings are subject to a number of limitations. The first is that the dataset dates from 1998. Nevertheless, the information provided in this study can still form the basis for an evaluation of the effect of tobacco control policy interventions implemented after 1998 on smoking patterns. Furthermore, the very large sample of the 1998 SADHS provided adequate statistical power for the current study. Secondly, because this was a cross-sectional study, reverse causality is possible. Accordingly, any inference about causality based on the current study should be made with caution. Furthermore, because of the cross-sectional design of the study we could only differentiate a limited subgroup of NDS. Finally, there is also the problem that smoking behaviour was assessed by self-report only and is therefore subject to reporting bias. However, we have used previously validated self-administered questionnaires, similar to those used in many other, similar national surveys, thus making our results comparable. Despite these limitations, this study provides useful information on the socio-behavioural characteristics of the ND smoking population outside those in developed countries.

Conclusions

This study's findings suggest that the majority of ND smokers in South Africa are those trying to quit or to reduce the harm of smoking, but that NDND smokers are more likely to be those who may just have taken up smoking. It may be useful to monitor population trends in ND smoking and study the subgroups of ND smokers with regard to the nature of addiction or dependence in these subgroups. Meanwhile, health practitioners should also advise and assist non-daily smokers to quit smoking.

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