CIGARETTE SMOKING IN AN ADOLESCENT PSYCHIATRIC POPULATION

Raymond M F Bérard, Ian A Lockhart, Frank Boermeester, Colin Tredoux

Objective. To examine the relationship between cigarette smoking and psychiatric symptomatology in an outpatient psychiatric population of adolescents.

Method. A retrospective analysis was done of 934 patient charts at an outpatient psychiatric centre.

Results. 48.4% of the psychiatric sample reported regular smoking behaviour, which is substantially more than the 18.1% prevalence found in a local epidemiological study. In comparing smokers and non-smokers within the psychiatric sample, it was noted that smokers were significantly younger and scored somewhat higher on depression rating scales than non-smokers. A logistical regression, using quasi-Newton estimation, was chosen as the most suitable statistical method for building a classificatory model of smoking. Two continuous variables, age and the Hamilton depression score, along with 39 discrete variables, were chosen for modelling purposes. Model building was conducted in a hierarchical fashion, starting with demographic variables, the variable selection being controlled by using chi-square tests of model differences. A predictive model of smoking with nine variables was finally selected.

Conclusions. As a whole the results support the strong association between smoking and psychiatric problems, but in this adolescent sample smoking is more likely to be part of a general risk-taking behaviour pattern than an attempt to medicate depression. Anti-tobacco campaigns that highlight the risks of smoking are therefore open invitations for adolescents to take up the habit.

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Department of Psychiatry, University of Cape Town

Raymond M F Bérard, MMed (Psych), FCPsych (SA)
Ian A Lockhart, MA (Psychol), DLitt et Phil (Psychol)
Frank Boermeester, MA (Psychol)

Department of Psychology, University of Cape Town

Colin Tredoux, PhD (Psychol)

Cigarette smoking is a major preventable cause of premature death and disability throughout the world. While the prevalence of smoking among adults in developed countries has declined during recent years, the prevalence among adolescents remains high, with a decreasing age of onset.[1] Although it can be argued that this is partly the result of the tobacco industry targeting its media campaigns at younger people, recent research has also begun focusing on the link between smoking and psychiatric problems because of increasing evidence that: (*i*) adolescents with psychiatric problems are more likely to smoke;[2-5] (*ii*) smokers with psychiatric problems are less likely to quit;[6,7] and (*iii*) smoking leads to further substance use.[8-10]

Theoretically, this suggests that distressed adolescents may use substances as a form of self-medication to produce positive affect.[11] Distressed adolescents, in other words, may be particularly vulnerable to cigarette smoking and other forms of substance use. Therefore, health promotion campaigns may need to focus their interventions on these vulnerable groups, as opposed to using superficial 'blanket' approaches that address adolescents as a general group.[2] In this study, data at a psychiatric assessment and treatment centre for adolescents were analysed with the following aims: (*i*) to determine the prevalence of smoking in a psychiatric population of adolescents, and compare it with the prevalence found in a community sample of adolescents;[12] and (*ii*) to explore the relationship between smoking and the use of other substances within an adolescent psychiatric population.

METHOD

Subjects and procedure

The sample for the present study comprised 934 adolescent and young adult patients aged between 12 and 23 years admitted to the William Slater Centre for Adolescents (WSC) in Cape Town, from February 1990 to April 1997. The WSC is an outpatient treatment centre for adolescents with emotional and behavioural problems. Referred patients undergo a full psychiatric assessment by a psychiatrist or psychologist, after which they may be admitted to the 12-week psychotherapeutic day patient programme.

Assessment instruments

A full psychiatric history was taken for each patient, after which the clinician used the WSC assessment form to focus systematically on the following areas: (*i*) depressive symptoms; (*ii*) suicidal ideation and parasuicide; (*iii*) eating disorders; (*iv*) substance use; (*v*) psychosexual history; (*vi*) sexual abuse and physical abuse; and (*vii*) *Diagnostic and Statistical Manual IV* (DSM-IV)[13] diagnosis.

The WSC assessment form is a semi-structured interview schedule, designed for use by trained clinicians. Smoking

status was assessed under the 'substance use' section, using a simple yes/no checkbox, with additional questions addressing previous use, quantity, and age of onset. Although smoking was inadequately defined, the clinicians responsible for assessment agreed that they only identified patients as smokers if they smoked 'regularly', i.e. at least on a weekly basis. Depressive symptomatology was assessed using a 41-item yes/no checklist.

In addition to the psychiatric interview, patients completed a self-report depression inventory: the Beck Depression Inventory (BDI)),[14] and the Hamilton Rating Scale for Depression (HDRS).[15] The BDI is a well-established self-report screening instrument widely used as a clinical and research measure of depressive symptoms in adolescents.[16] The HDRS is regarded as the most widely used observer rating scale in psychiatry[17] and has been shown to be reliable and valid in adolescent populations.[18]

RESULTS

Prevalence of smoking

The prevalence of smoking in the total sample stands at 48.4%, which is substantially higher than the 18.1% prevalence found in the 1993 Flisher *et al.*[12] study involving 7 340 Cape Peninsula high-school children. Whereas the community study elicited a gender difference (higher prevalence among males), no such difference was apparent in our psychiatric sample. In the community sample the prevalence of smoking increased with age, but in the psychiatric sample a somewhat higher prevalence of smoking was noted among the younger psychiatric patients. These results are presented in Table I.

Age of onset data for the psychiatric sample was available from 1994 onwards when this question was added to the assessment form. The resulting smaller sample of 236 subjects nevertheless revealed that the largest percentage of smokers (71.8%) commenced smoking in the age category 13 - 16 years. There is also a larger percentage of smokers in the under-13 age group (20.1%) compared with the over-16 age group (8.1%).

Table I. Comparison of the prevalence of smoking in the psychiatric sample (48.4%) with prevalence in a community sample (18.1%)

High-school children in the Cape Peninsula (N = 7 340)			Cape Peninsula adolescents attending outpatient psychiatric unit, 1990 - 1997 (N = 934)		
Standard	Males (%)	Females (%)	Age (yrs)	Males (%)	Females (%)
6	11.7	9.0	< 16	54.5	53.7
7	19.3	13.8	16 - 18	53.1	50.8
8	27.0	13.2	> 18	43.6	40.2
9	32.3	16.5			
10	27.6	20.7			

Comparing smokers and non-smokers within the psychiatric sample

A logistical regression, using quasi-Newton estimation,[19] was chosen as the most suitable statistical method for building a classificatory model of smoking. Two continuous variables, age and the Hamilton depression score, along with 39 discrete variables were chosen for modelling purposes. The discrete variables ranged from indicators of psychiatric symptomatology through educational status, employment status, religious status, abuse (physical and sexual), and substance use.

Model building was conducted in a hierarchical fashion, starting with demographic variables, the variable selection being controlled by using chi-square tests of model differences (i.e. a variable was included in the model if the chi-square test showed an improvement in model fit — analogous to the well-known sequential F-test used in multiple regression). A final model with nine variables was selected. Table II reports

Table II. Parameter estimates for the logistical regression predictive model of smoking

	Estimate	Standard error	t (855)	P-level	Odds ratio (unit ch)
Constant B0	0.69	0.52	1.33	0.18	1.99
Age	-0.11	0.03	– 3.65	0.001	0.90
Race (Caucasian)	-0.41	0.18	– 2.30	0.02	0.67
No prior psychiatric contact	0.82	0.20	4.13	0.001	2.28
Family history of psychiatric illness	0.47	0.16	2.91	0.001	1.60
Substance use	0.58	0.23	2.50	0.01	1.78
Promiscuity	1.06	0.46	2.28	0.02	2.87
Dangerous behaviour	0.93	0.41	2.29	0.02	2.54
Alcohol use	1.05	0.17	6.05	0.001	2.85
Cannabis use	1.36	0.20	6.66	0.001	3.91

parameter estimates and associated statistics for the predictive model of smoking.

It is clear from the odds ratios listed in Table II that the presence of the following discrete variables affects the likelihood of smoking behaviour. Being white (0.67) and increasing age (0.90) decreases the likelihood of smoking behaviour in this population. On the other hand, having no previous psychiatric contact (2.28), a family history of psychiatric illness (1.60), concurrent substance use (1.78), promiscuity (2.87), dangerous behaviour (2.54), alcohol use (2.85), and cannabis use (3.91) all increase the likelihood of tobacco smoking in adolescents who present with psychiatric problems. Promiscuity, alcohol use, and cannabis use are the strongest predictors of tobacco-smoking behaviour. When the model is used to classify or distinguish smokers and non-smokers, it results in a fairly accurate classification matrix. The matrix is reproduced as Table III.

Table III. Classification matrix for logistical regression predictive model of smoking

	Pred. non-smokers	Pred. smokers	Per cent correct
Non-smokers	350	91	79.37
Smokers	144	280	66.04

* Odds ratio = 7.48

Onset of smoking and other substance use

Smokers and non-smokers were compared in terms of the age of onset of other forms of substance use, viz. alcohol and cannabis. Tobacco smokers tended to commence using these substances at a slightly earlier age (14.3 and 15.3 years for alcohol and cannabis use in females, 13.4 and 15.2 years for alcohol and cannabis use in males) compared with substance-using non-smokers (15.6 and 16.4 years for alcohol and cannabis use in females, 14.2 and 15.1 years for alcohol and cannabis use in males). The age of onset data are presented in Table IV.

DISCUSSION

Firstly, the results suggest that the smoking behaviour of adolescents in a psychiatric population differs from that of their normal counterparts in the following ways: (*i*) adolescents with psychiatric problems are more likely to smoke than their normal counterparts; (*ii*) female adolescents with psychiatric problems are as likely to smoke as their male counterparts (contrary to females without psychiatric problems who appear less likely to smoke than males); and (*iii*) adolescents with psychiatric problems start smoking at an earlier age than their normal counterparts.

Table IV. Comparison of mean age of onset of substance use — smokers versus non-smokers according to gender

	Non-smoking		Smoking		*t*-test *P* value	
	Female	Male	Female	Male	Female	Male
Alcohol use	15.6	14.2	14.3	13.4	0.037	0.454
Cannabis use	16.4	15.1	15.3	15.2	0.050	0.847

The comparison with the community study has several methodological flaws. The present study's somewhat vague definition of smoking, and more importantly, the different methods used to assess smoking status in the two studies (i.e. in-depth psychiatric assessment compared with a brief self-report questionnaire in the classroom), may be partly responsible for the difference between the two samples. Nevertheless, the present findings of differences in smoking patterns between normal and psychiatric adolescent populations are consistent with findings of previous cross-sectional studies of tobacco use in adolescents with psychiatric problems.[3,5,20,21]

Secondly, the results indicate that adolescents within the psychiatric sample who display behavioural and substance use problems are more likely to smoke than adolescents who do not exhibit these behavioural tendencies. The findings in Table IV indicate that substance use problems relating to alcohol and cannabis are most strongly associated with cigarette smoking in this population. Cannabis users are almost four times as likely to be cigarette smokers than non-smokers, while tobacco smokers are almost three times as likely to use alcohol than non-smokers.

Furthermore, the tobacco smokers in this sample are more than twice as likely to be engaging in promiscuous and dangerous behaviour compared with non-smokers. Therefore, within this psychiatric sample, smoking is more closely associated with behavioural problems than depressive or anxiety-related symptoms.

This accords with the findings of Brown *et al.*[2] viz., that adolescent smoking is strongly related to substance abuse and disruptive behaviour disorders. These authors suggest that smoking in adolescents is linked to a general pattern of deviant behaviour that may include substance abuse and other externalising behaviour patterns. Brown *et al.*[2] and Wilens *et al.*[22] both reported a lack of evidence for a connection between smoking, major depression and anxiety in adolescents. The present findings also indicate that depressive and anxiety symptoms in adolescents are not as strongly related to smoking as substance use and externalising behaviour. Therefore, the 'self-medication' theory, which suggests that depressed adolescents smoke in order to manage their distress, is not corroborated by the present findings.

With regard to both male and female adolescents in this

sample, smokers are more likely to use alcohol and cannabis than their non-smoking counterparts, and are more likely to be doing this from an earlier age, except in the case of male tobacco smokers who use cannabis. Male non-smokers begin to use cannabis at approximately the same age (15.1 years) as male cigarette smokers (15.2 years). The findings indicate that smokers of both genders use alcohol at an earlier age compared with non-smokers.

Therefore, smoking may facilitate an earlier onset of alcohol use, but the 'gateway theory', i.e. that the use of 'soft' drugs such as tobacco leads to the use of other substances,[2] is not directly supported by the findings, because the latter do not indicate whether prior tobacco smoking leads to the use of other substances, or whether alcohol and cannabis use simply co-occur with cigarette smoking. Despite the lack of clarity concerning the direction of the relationship, the findings indicate that smoking is part of a cluster of 'acting-out' behaviours that may be linked to the development of antisocial and other personality disorders during adulthood.[2,13]

This suggests that smoking is one of a number of risk-related behaviours common among young people.[23] A key characteristic of adolescence, and in particular of the presently described behavioural problems, is risk-taking behaviour, e.g. promiscuity. It is telling in this regard that most (unsuccessful) anti-tobacco campaigns place primary emphasis on the risk involved in smoking. Such campaigns may openly invite adolescents vulnerable to expressing psychological distress in terms of risk-taking behaviour, to start smoking.

In conclusion, the present results indicate that adolescent psychiatric populations are more likely to smoke cigarettes than normal adolescent populations. However, those most at risk do not display depressive features; instead they show patterns of additional substance use and behavioural problems. Despite the lack of clarity concerning the direction of causation between tobacco smoking and other forms of substance use, early cigarette smoking in adolescence may be a key indicator of an externalising behaviour pattern used to cope with psychological difficulties during this period of development.

The present findings suggest that cost-effective anti-tobacco projects should neither target adolescents with depression, nor focus on warning them about the risks involved in smoking. Instead, antismoking campaigns should match the power of tobacco media advertising in glamorising a non-smoking lifestyle and deglamorising smoking. Qualitative research involving focus group discussions with adolescents is recommended in this regard.[23]

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