

## Is Cigarette Smoking Associated With Suicidal Ideation Among Young People?

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**Objective:** The authors examined the association between suicidal ideation in early adulthood and daily tobacco smoking in a community sample of adolescents.

**Method:** Participants were enrolled in a longitudinal study of health and development. The factors of disadvantage, impulsiveness, stress, depressed mood, tobacco smoking, other sub-

stance use, and parental attachment were included in multivariate modelling of suicidal ideation.

**Results:** Data on tobacco use were available for 764 participants. Early tobacco smoking was significantly predictive of later suicidal ideation, but there was no longer a significant relationship when high levels of stress and depression and low levels of parental attachment in adolescence were included in the multivariate model.

**Conclusions:** Tobacco smoking in adolescence does not appear to elevate the risk of later suicidal ideation.

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Tobacco smoking in adolescence or early adulthood may predict later major depression (1), an association not attributable to related variables such as alcohol use. However, not all studies have found this relationship, and some suggest a reverse association (2). Among adults, smoking has been associated with suicidal behavior in psychiatric patients (3–5) and U.S. Army personnel (6).

We have reported a cross-sectional association between smoking and suicidal ideation among 15-year-olds (7). In this article we examine the predictive association between smoking in adolescence and suicidal ideation in early adulthood. We tested three hypotheses. First, tobacco smoking at age 15 predicts suicidal ideation at 18 and 21 years; second, smoking predicts later suicidal ideation, but only in the presence of depression at age 15; third, smoking predicts later depressive disorder, thereby placing the individual at risk of suicidal ideation.

### Method

The Dunedin Multidisciplinary Health and Development Study is a community-based investigation of 1,037 New Zealanders born in Dunedin in 1972–1973. The sample was first followed up at age 3 and most recently at age 26 years. Daily smoking was assessed at age 15 through self-report (7). Suicidal ideation with or without accompanying depressive disorder was assessed with the National Institute of Mental Health Diagnostic Interview Schedule (8) based on DSM-III-R criteria at ages 18 and 21 (9). A complete description of the study, including the assessment of mental health and suicidal ideation, was provided to participants, who then gave written consent. Before the participants were 18 years old, their parents were provided with full details of the assessments and their written consent was obtained. The children provided verbal assent to the assessments and could refuse to take part in any assessments if they so wished.

We examined several other variables in modelling the association between smoking and suicidal ideation because these might independently account for any relationships between them. Childhood disadvantage to age 9 years was based on a composite

index of the father's occupation, age of the mother at first pregnancy, the mother's educational qualifications, and sole parenting (9). Impulsiveness was assessed by 12 items based on DSM-III criteria for attention deficit hyperactivity disorder from parents' and teachers' reports at ages 9–11. At age 15, assessments included perceived attachment to parents (10), distress (11), significant depressed mood in the past year or DSM-III diagnosis of depressive disorder (12), and cannabis and alcohol use at school (12).

### Results

Data were available for 764 individuals from childhood to age 21; 100 (13.1%) reported daily smoking at age 15, and 130 (17.0%) reported suicidal ideation at ages 18–21. Logistic regression controlling for sex indicated that the odds ratio for later suicidal ideation associated with daily smoking at age 15 was 1.74 (95% confidence interval=1.06–2.87,  $p < 0.03$ ). Adolescents who were daily smokers at age 15 were nearly twice as likely to report later suicidal ideation as those who did not smoke daily.

Table 1 shows the multivariate logistic regression model of suicidal ideation in which the effect of each variable has been adjusted for all other variables. Later suicidal ideation was primarily a function of being female and experiencing depressed mood, high stress, and low parental attachment at age 15. After controlling for these, we found that there was no longer a significant relationship between daily smoking and suicidal ideation.

At age 15 there were 99 participants (13.0%) with depressed mood and 40 (5.2%) with a diagnosis of depressive disorder. To test our second hypothesis, we examined whether the rate of suicidal ideation was higher among adolescents who smoked daily and had depressed mood at age 15 or a diagnosis of depressive disorder at age 15, compared with those who had depressed mood or depressive disorder but did not smoke. This amounts to a test of a statistical interaction between daily smoking and de-

**TABLE 1. Multivariate Model of Suicidal Ideation at Ages 18–21 Years for 764 Participants in a Longitudinal Study of Health and Development**

Variable	Odds Ratio	95% CI
Female sex	1.55	1.02–2.33
Disadvantage (ages 0–9 years)	1.14	0.75–1.73
Impulsivity (ages 9–11 years)	1.09	0.68–1.75
Depressed mood (age 15 years)	3.97	1.76–8.94
High stress (age 15 years)	1.73	1.12–2.68
Low parental attachment (age 15 years)	2.14	1.29–3.58
Cannabis use (age 15 years)	1.10	0.58–2.07
Alcohol use at school (age 15 years)	1.01	0.62–1.64
Daily smoking (age 15 years)	1.25	0.67–2.33

pressed mood/depression at age 15. This interaction was not significant according to the likelihood ratio test for interaction for depressed mood ( $\chi^2=0.02$ ,  $df=1$ ,  $p>0.05$ ) and likelihood ratio test for a diagnosis of depression ( $\chi^2=1.25$ ,  $df=1$ ,  $p>0.05$ ).

Our third hypothesis was that tobacco smoking at age 15 predicts later depressive disorder. We examined this in a model similar to that shown in Table 1. The pattern of findings was the same as for suicidal ideation. Depressive disorder was predicted by being female, experiencing depressed mood and high levels of stress at age 15, and lower levels of parental attachment. Tobacco smoking at age 15 did not predict later depressive disorder.

## Discussion

Cigarette smoking in adolescence was significantly associated with suicidal ideation in early adulthood. This finding is similar to the finding of reports in psychiatric patients (3–5) and active-duty soldiers (6). However, our findings suggest that among young adults the association may be a function of dual associations with depressed mood, stress, and parental attachment in adolescence rather than a direct consequence of smoking.

Smoking among adolescents with depressed mood or with a diagnosis of depression was not associated with a greater risk of suicidal ideation. Furthermore, despite reports to the contrary (1), tobacco smoking at age 15 was not predictive of later depressive disorder. A recent study (2) suggested a small but significant predictive association between depression and tobacco smoking and argued for a self-medication hypothesis whereby depressed individuals smoke to reduce their symptoms. There are strong associations between anxiety and depression among young people (2, 12) and between smoking and anxiety disorders such as panic disorder (13). The key to clarifying the direction of causal influence may be a closer examination of the

predictive significance of smoking for anxiety disorders with and without accompanying depression.

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