

## INTERNATIONAL ARTICLE

# Smoking and Suicidality Among Adolescent Psychiatric Patients

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**Purpose:** To investigate the relationship between smoking and suicidality among adolescent psychiatric patients in Finland.

**Methods:** Data from 157 patients (aged 12–17 years) admitted to inpatient psychiatric hospitalization between April 2001 and July 2002 were collected. Logistic regression analyses were used to examine the association between regular daily smoking and suicidality. The data were adjusted for several sociodemographic and clinical characteristics.

**Results:** The results showed over four-fold risk for definite and/or life-threatening suicide attempts among smoking adolescents in inpatient psychiatric facility compared with nonsmoking ones (OR 4.33, 95% CI 1.23–15.20). Also, the smoking adolescents had three times greater risk for occasional (OR 3.32, 95% CI 1.09–10.10) or frequent (OR 3.00, 95% CI 1.08–10.10) self-mutilation. Suicidality was more common among girls than boys and among those adolescents who suffered from depression.

**Conclusions:** Among teens hospitalized for psychiatric illnesses, daily smoking was significantly related to suicide attempts and self-mutilation, even after controlling for several confounding factors, including psychiatric diagnosis. © Society for Adolescent Medicine, 2004

**KEY WORDS:**

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Several studies in adults, adolescents, and children have revealed a positive relationship between smoking and suicidality. Most of these studies, however, have focused on nonclinical samples [1–5]. The association between smoking and suicidality has been studied among adult psychiatric patients [6,7], but no previous studies focus on adolescent psychiatric inpatients. Recently, adult patients with a history of self-mutilation were reported to be at a greater risk for suicide, and, to underestimate the lethality of their attempts [8]. The association between smoking and self-mutilation has not been analyzed in earlier studies. We also, therefore, studied whether regular smoking increases the risk for self-mutilation among adolescents who were aged 17 years or younger.

## Methods

The STUDY-70-project was initiated to examine the association of various psychosocial risk factors to the outcomes of severe psychiatric and substance use disorders among hospital-treated adolescents aged 12–17 years. The study sample consisted of adoles-

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cents admitted to the Oulu University Hospital Department of Psychiatry between April 2001 and July 2002. Of the total of 198 adolescents admitted, 11 were excluded (9 mental retardation, one brain organic disorder, one over 18 years). Of the 187 patients, 84% ( $n = 157$ ; boys 70, girls 87) gave a written informed consent and were enrolled in the study. A total of 97.5% ( $n = 153$ ) were Caucasian adolescents. The study protocol was approved by the Ethics Committee of the Faculty of Medicine, University of Oulu (Finland).

The subjects were interviewed by the patient's treating physician using the Schedule for Affective Disorder and Schizophrenia for School-Age Children Present and Lifetime (K-SADS-PL) to obtain DSM-IV diagnoses [9], and the information about regular daily smoking (at least one cigarette per day). Data regarding the present and lifetime suicidal ideation ("none," "occasional," "frequent"), severity of the suicide attempts ("none," "ambivalent/mild," "definite/life-threatening"), and histories of self-mutilation ["no intention to die" (frequency variable: "none," "occasional," "frequent")] were collected from the K-SADS-PL.

Association between smoking and suicidality was assessed using logistic regression analyses after adjusting for adolescent's gender, age, family type (two biological parents, other type of family), school achievement (mean of grades), parental substance abuse (mother's or father's substance abuse, "yes"/"no"), psychiatric diagnosis [drug dependence/abuse (46.5% of the study population), conduct disorder (45.2%), depression (42.0%), anxiety disorders (32.5%), psychoses (10.8%) and other disorders (4.5%)], and mother's occupation. To assess the socioeconomic status (SES) of an adolescent, mother's occupation (67.8% educated) was used, because 33% of the subjects had grown up with both parents and only 7% with their father present. All analyses were carried out using SPSS version 10 for Windows [10].

## Results

Of the total study population 79.0% ( $n = 124$ ) were regular daily smokers (at least one cigarette per day). The proportion of smokers did not differ significantly between genders.

The rate of frequent suicidal ideation was significantly higher for girls (70.1%) than for boys (40.1%) ( $\chi^2 = 24.9$ ,  $df = 2$ ,  $p < .001$ ). Suicide attempts were more common among the girls (48.3%) as compared with the boys (17.1%) ( $\chi^2 = 23.3$ ,  $df = 2$ ,  $p < .001$ ).

Self-mutilative behavior was observed more frequently among the girls (48.3%) than the boys (25.7%) ( $\chi^2 = 15.5$ ,  $df = 2$ ,  $p < .001$ ). When analyzing differences between smoking and nonsmoking adolescents, the only significant difference was that the girls who smoked had higher proportion of frequent self-mutilation compared with the nonsmoking girls (52.2% vs. 35.0%;  $\chi^2 = 7.1$ ,  $df = 2$ ,  $p = .029$ ).

In logistic regression analyses (Table 1), regular daily smoking was associated with definite or life-threatening suicide attempts, as well as with both occasional and frequent self-mutilation. Suicide attempts and frequent self-mutilation were more common among the girls and adolescents suffering from depression. No association between smoking and suicidal ideation was detected in the total sample, but significantly increased risk for suicidal ideation was found among girls and among those subjects suffering from depression.

## Discussion

In this study, we found evidence that regular smoking is significantly related to increased risk for suicide attempts in a sample of adolescents undergoing inpatient psychiatric hospitalization. This association was positive even after adjusting for the presence of psychiatric disorders and sociodemographic variables. A novel finding in our study is that smoking was not only associated with definite suicide attempts, but also with self-mutilative behavior.

However, the direction of the causality between smoking, suicide attempts, and self-mutilation remains unclear. The smoking adolescents who attempt suicide or mutilate themselves may have impaired catecholaminergic and 5-HT function in CNS, leading to more impulsive and aggressive behavior than the adolescents who have suicidal ideation alone [11]. Exposure to nicotine during adolescence causes changes in the CNS noradrenergic, dopaminergic, and serotonergic (5HT) function [12,13]. Thus, it is tempting to speculate that adolescents who smoke may be attempting to "self-medicate" their feelings of depression, despair, impulsivity, and suicidality. To our understanding, no conclusive evidence has been presented suggesting that smoking *per se* would cause suicide attempts and self-mutilation.

The majority of the adolescents in this sample were smokers. The significance of the smoking habit of the adolescent psychiatric patients is often shadowed by their other severe problems, which may

**Table 1.** Results of Logistic Regression Analyses Predicting for Suicidal Ideation, Suicide Attempts and Self-injury Behavior (Outcome Variables) With Regular Daily Smoking After Adjusting for Sociodemographic and Clinical Covariates Among Adolescents Aged 12–17 Years

	Suicidal ideation			Suicide attempts			Self-injury		
	None n (%)	Mild n (%)	Frequent n (%)	None n (%)	Ambivalent/ "Mild" n (%)	Obvious/Life- threatening n (%)	None n (%)	Occasional n (%)	Frequent n (%)
Prevalence of outcome among smokers									
Boys	26 (45.6)	8 (14.0)	23 (40.4)	37 (64.9)	8 (14.9)	12 (21.1)	29 (50.9)	13 (22.8)	15 (26.3)
Girls	9 (13.4)	12 (17.9)	46 (68.7)	19 (28.4)	12 (17.9)	36 (53.7)	11 (16.4)	21 (31.3)	35 (52.2)
Total	35 (28.2)	20 (16.1)	69 (55.6)	56 (45.2)	20 (16.1)	48 (38.7)	40 (32.3)	34 (27.4)	50 (40.3)
Predictor variable <sup>a</sup>	<b>OR (95% CI)</b>			<b>OR (95% CI)</b>			<b>OR (95% CI)</b>		
Regular daily smoking	Ref.	0.88 (0.17–4.50)	0.64 (0.16–2.63)	Ref.	0.64 (0.23–1.70)	<b>4.33 (1.23–15.20)</b>	Ref.	<b>3.32 (1.09–10.10)</b>	<b>3.00 (1.08–10.10)</b>
Significant covariates <sup>b</sup>									
Gender (female)		4.89 (1.45–16.76)	4.83 (1.78–13.08)		2.74 (1.08–6.90)	7.93 (3.18–19.76)		3.68 (1.52–8.93)	4.45 (1.95–10.37)
Affective disorder (yes)		4.07 (1.09–15.15)	8.49 (2.62–27.47)		3.37 (1.30–8.74)	4.81 (1.95–11.84)			2.47 (1.08–5.67)

<sup>a</sup> Determined with multivariate logistic regression model in which each model contained the variable for regular daily smoking as the predictor after adjusting for age and gender of an adolescent and the most essential variables, which were selected on the base of the results of univariate analyses assessing relationships between outcome variables and each potential covariate (family type, mother's occupation, adolescent's school achievement, parental substance abuse, and psychiatric diagnoses (drug dependence/abuse, conduct disorder, affective disorder, psychoses, anxiety disorders, and other disorders)).

<sup>b</sup> Only results for covariates fulfilling for probably criteria (enter = 0.05, removal = 0.10) for the final model are presented in the table.

preclude attention to smoking. Smoking cessation should be supported because it may play a role in recovery from suicidality [14].

A surprisingly high proportion of the girls who smoked reported self-mutilative behavior. Suicidality among individuals with self-mutilative behaviors has often been underestimated and interpreted as manipulative or attention-seeking behavior. A recent study by Stanley et al [8] indicated that the number of suicide attempts or the lethality of the attempts did not differ between patients with and without a history of self-mutilation. Self-mutilators commonly underestimate the lethality of their suicidal behavior and view death with less finality. In our study, the frequency of self-mutilative behavior among the young adolescent smoking girls is alarming and may indicate a greater risk for suicide in the future.

Depression, anxiety, disruptive disorders, and substance abuse/dependence have been found to be risk factors for attempted and completed suicides among teenagers [15–17]. Many authors have described that young women demonstrate more suicidal gestures, whereas young men have more suicide completions [18–20]. We also found an increased risk for suicidal ideation, suicide attempts, and frequent self-mutilative behavior among girls. Individuals with depression were also at a higher risk for suicide attempt and self-mutilation. In accordance with some previous studies [2,6], smoking in this study was independently associated with suicidality even after controlling for psychiatric diagnoses.

## Limitations

The limitations of this study are that our sample consisted of hospitalized inpatients, which limits the generalization of our findings for all adolescents. Secondly, information on smoking and suicidality might be underestimated, although structured interviews and multiple reporters by K-SADS-PL diminish this bias.

## Conclusions

This study extends the earlier research on the association between smoking and suicidality into the realm of adolescent psychiatric inpatients. The results of our study suggest that direct relationship may exist between smoking and suicidality. However, smoking in adolescence may be one part of other health-risk behaviors [5,20]. Thus, associations between smoking and suicidality may be noncausal

and reflect the presence of other risk factors that are related to increased risk of suicidality. However, without profound investigation, many other health-risk behaviors (e.g., family dysfunction or substance abuse) may pass notice even from health care professionals. Regular smoking among adolescent psychiatric patients is an indicator of increased adolescent suicidality and, therefore, easy to notice. Paying attention to smoking may facilitate identification of those adolescents who are at risk for suicide, which may help them to receive professional help in time.

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