

Factors Associated with Late Smoking Initiation in Minnesota Women

ABSTRACT

This case-control study investigated factors associated with late initiation (i.e., initiation after the age of 17 years) of smoking among young women. The most significantly elevated odds ratios for late initiation were having a significant other who smoked and having friends who found smoking acceptable at initiation. Peers, especially significant others, played an important role in smoking initiation among young women. Prevention efforts should focus on strategies that reduce the acceptability of smoking in the social environment. (*Am J Public Health*. 1993;83:1333-1335)

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Introduction

Over the past decade, young adult females have begun smoking at a higher rate than their male counterparts,¹ and their smoking rate has remained stable while the male rate has declined markedly.^{2,3} Although smoking is usually initiated during adolescence, 30% of 18- to 30-year-old Minnesota women smokers began daily smoking after the age of 17.⁴ The Minnesota Department of Health conducted this case-control study to explore factors influencing the initiation of smoking among young women.

Methods

This study was conducted in the spring of 1989 in conjunction with a population-based cross-sectional survey of smoking among 2017 Minnesota women aged 18 to 30 years (86% response rate). A probability sample of Minnesota households was selected by random-digit dialing, and trained interviewers used a computer-assisted structured questionnaire to gather information from a randomly selected age-eligible woman in the household.

The case-control study was restricted to 21- to 30-year-olds because most late initiators begin smoking between the ages of 18 and 21 years. The 180 case subjects (smokers who initiated regular smoking after the age of 17) and 167 experimenter controls (women who had smoked at least 1 but fewer than 100 cigarettes in their lifetime) were frequency-matched on age and urban or rural residence. Case and control subjects were similar in race and education to eligible subjects who did not participate; 84% of the age-eligible late initiators participated in this study.

Questions were based on predictors for adolescent smoking initiation⁵⁻¹⁴ and focus group information on young women smokers.⁴ Subjects were queried about experiences and exposures during 10th through 12th grade and the "period of initiation"—the time between finishing or quitting high school and smoking initiation. Data were collected on demo-

graphics, smoking by family and friends, acceptability of smoking to friends, involvement in school and work activities, church attendance, problem behaviors, and occurrence of stressful life events (as modified for late adolescence and early adulthood from the Life Events Questionnaire¹⁵). Stressful events were defined as death or serious illness (family, friend, self); pregnancy; parental divorce; being fired from a job (parent, self); failing in school; changing schools; and moving (to a new community or from the family home). To assess the reliability of key items, 53 case and 53 control subjects were randomly chosen for reinterview 4 to 6 weeks later.

Crude and age-adjusted odds ratios and their 95% confidence intervals were calculated by the Mantel-Haenszel method.^{16,17} Several logistic regression models^{16,17} were developed by hypothesis for the high school and post-high school periods. Significant variables from these models, along with education, age, and urban or rural residence, were entered in two summary models for the high school and post-high school periods. Reliability of interview and reinterview responses was assessed with the kappa statistic.¹⁸

Results

Crude and adjusted odds ratios revealed several factors that increased the odds of late initiation of smoking (Tables 1 and 2). Characteristics of subjects during the high school period that were associated with significantly elevated odds ratios were rare church attendance, poor grades, having a majority of friends who smoked, having a best friend who smoked, and having friends who found

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TABLE 1—Odds of Late Initiation of Smoking by Young Women in Minnesota, by Characteristics during High School (before Smoking Initiation)

	Crude OR	95% CI	Adjusted OR ^a	95% CI
Mother smoked	1.6	1.0, 2.5		
Sister smoked	2.2	1.0, 4.5		
Best friend smoked ^b	2.7	1.7, 4.2		
50% or more of friends smoked ^b	3.0	1.9, 4.5		
Smoking very acceptable to friends ^b	2.7	1.6, 4.3	2.1	1.2, 3.6
Grades (Cs and Ds)	3.7	2.2, 6.9	3.0	1.6, 5.6
Smoking curriculum	.6	.4, .9	.7	.4, 1.2
Drinking (> 5, > 2 times/mo)	.7	.5, 1.2		
Attended church rarely	2.2	1.3, 3.8	2.0	1.1, 3.7
Parents not interested in subject's ideas	1.2	.8, 1.9		
Parents strict	1.3	.9, 2.1		
Parents made life difficult if subject misbehaved	1.4	.9, 2.2		
Involved in extracurricular school activities	.6	.4, 1.1		
Went out > 2 nights/wk	1.1	.7, 1.8		
Had job	1.4	.6, 1.7		

Note. Only variables for which the 95% confidence interval (CI) did not include 1.0 were entered into the summary model. OR = odds ratio.
^aAdjusted for education, current age, urban/rural residence, acceptability of smoking to friends, grades, church attendance, smoking curriculum.
^bThese variables were highly correlated, so "smoking very acceptable to friends" was used as a composite measure of peer influence in logistic models.

TABLE 2—Odds of Late Initiation of Smoking by Young Women in Minnesota, by Characteristics after High School (at Time of Smoking Initiation)

	Crude OR	95% CI	Adjusted OR ^a	95% CI
Mother smoked	1.5	1.0, 2.4		
Sister smoked	1.6	1.0, 2.6		
Spouse/significant other smoked	12.2	6.2, 22.3	10.0	4.8, 21.2
Best friend smoked ^b	8.6	5.3, 13.1		
50% or more of friends smoked ^b	7.8	4.6, 11.3		
Smoking very acceptable to friends ^b	6.1	3.8, 10.2	4.7	2.1, 10.5
Used marijuana > 10 times	1.2	.7, 2.1		
Used illegal drugs ever	1.9	1.0, 3.4		
Drank alcohol (> 5, > 2 times/mo)	1.6	1.0, 2.5		
Attended church rarely	2.1	1.4, 3.4	1.6	.8, 3.5
Had problem behaviors	1.1	.6, 2.1		
Went out > 2 nights/wk	1.0	.7, 1.5		
Experienced stressful life event	1.5	1.1, 2.3	1.5	.7, 3.0
Employed full-time	1.9	.9, 2.1		
High school education or less (at interview)	3.0	1.9, 4.8	1.0	.4, 2.2

Note. Only variables for which the 95% confidence interval (CI) did not include 1.0 were entered into the summary model.
^aAdjusted for education, current age, urban/rural residence, acceptability of smoking to friends, significant other smoked, church attendance, and stressful life events.
^bThese variables were highly correlated, so "smoking very acceptable to friends" was used as a composite measure of peer influence in logistic models.

smoking very acceptable. Nonsmoking control subjects were more likely to be exposed to a smoking curriculum. For the period of initiation, significantly elevated odds ratios were found for having a spouse or significant other who smoked, having a majority of friends who smoked, having a best friend who smoked, having friends who found smoking very acceptable, and rare church attendance. Cur-

rent educational attainment was also significantly related to late initiation.

Kappas for agreement between the interview and reinterview were .51 to .64 for the five items tested. At the reinterview, 14 of 53 late initiators (26%) reported beginning smoking before age 18. This group also had a higher prevalence of 8 of 10 characteristics associated with late initiation than the other case subjects.

Discussion

To our knowledge, no other studies have examined predictors of smoking initiation in young adult women. The most significant predictors in our study were peer smoking, particularly smoking by a spouse or significant other, and perceived acceptability of smoking. These findings parallel the role of peer influence in adolescent smoking^{13,14,19} and spouse influence on quitting.^{20,21} Despite focus group anecdotes of young women's starting or increasing their smoking in response to stress, stressful life events were not found to be significantly related to late initiation in this study.

Factors that were predictive of late initiation in our subjects, such as poor grades in high school and rare church attendance, are also consistent with the clustering of problem behaviors.^{9,10} Although smoking is less of a normative transgression for young adults than for adolescents, smoking might be considered a problem behavior for our population because of contemporary social pressures not to smoke. Flay's causal model⁵ may also be useful in understanding smoking initiation in young women: interactions between environment, personality, and family influences may delay smoking adoption and result in the observed pattern of late initiation.

This study was population based; case and control subjects were selected from the same statewide sample of eligible Minnesota women. Although households without telephones would be missed by random-digit dialing, 96% of Minnesota households have telephones (Philip Sherwood, PhD, Winona MRB, telephone communication, March 1991). We would expect that these results could be generalized to other American women; however, since smoking in public places has been restricted in Minnesota for almost 20 years, these results might not apply to women in states with fewer smoking restrictions over the past 2 decades.

Control subjects were women who had smoked at least 1 but fewer than 100 cigarettes in their lifetime. If women who had never smoked had been included as controls, the estimates of effect might have been larger.

Smoking status and age of initiation of regular smoking were assessed by self-report. About 4% of young adult smokers present themselves as nonsmokers in telephone interviews,²² a figure that suggests a low rate of smoking status misclassification in this study. At reinterview, about 25% of

the case subjects reported initiating smoking prior to age 18. These women appeared to be early initiators with higher prevalence of characteristics associated with smoking; the effect of their inclusion would be to inflate the calculated odds ratios.

In summary, it appears that many factors influencing young adult women to begin smoking are similar to those that influence adolescents. Peers, particularly significant others, appear to be an especially important influence. Prevention efforts should target women of lower educational attainment, using approaches that reduce the acceptability of smoking in the social environment. Further research is needed to develop salient messages for young women at risk of becoming regular smokers. □

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ABSTRACT

Cotinine levels in the semen, urine, and blood of 88 male smokers and nonsmokers, aged 18 to 35, were analyzed via radioimmunoassay. Detectable cotinine levels were found in all three body fluids, and cotinine levels in all three fluids were highly correlated. Cotinine levels in semen and blood were of similar magnitude; cotinine levels in urine were an order of magnitude or more higher. In all three fluids, cotinine levels increased with an increase in cigarette smoke exposure. (*Am J Public Health*. 1993; 83:1335-1338)

Cotinine Concentrations in Semen, Urine, and Blood of Smokers and Nonsmokers

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Introduction

Cigarette smoking has been associated with various documented and suspected adverse reproductive outcomes, including reduced sperm density and motility and increased abnormal morphology.¹ The role of cigarette smoking with respect to these effects is unclear. The purpose of this study is (1) to document the presence of cotinine, a metabolite of nicotine and a marker of tobacco smoke exposure, in the semen of male smokers; (2) to correlate the amount of cigarette smoke exposure, as determined by questionnaire, with cotinine concentrations in

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