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Original article

Incidence and Determinants of Cigarette Smoking Initiation in Young Adults

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A B S T R A C T

Purpose: To describe the incidence and identify predictors of smoking initiation in young adults.

Methods: Data were collected in self-report questionnaires in 22 cycles over 13 years in a prospective cohort investigation of 1,293 students recruited in 1999–2000 from all grade 7 classes in a convenience sample of 10 high schools in Montreal, Canada. Participants were 12.7 years of age on average at cohort inception and 24.0 years of age in cycle 22. Independent predictors of smoking initiation in young adulthood (post–high school) were identified in multivariable logistic regression analysis using generalized estimating equations.

Results: Of 1,293 participants, 75% initiated smoking by cycle 22. Of these, 44%, 43%, and 14% initiated before high school, during high school, and in the 6 years after high school, respectively. The incidence density rate of initiation was .33, .13, .14, .11, and .12 initiation events per person-year in grade 7, 8, 9, 10, and 11, respectively, and .05 post–high school. Independent predictors of smoking initiation in young adults included alcohol use, higher impulsivity, and poor academic performance.

Conclusions: A total of 14% of smokers who initiated smoking before age 24 years did so after high school. The predictors of initiation in young adults may provide direction for relevant preventive interventions.

IMPLICATIONS AND CONTRIBUTION

The incidence of smoking initiation declines throughout adolescence and young adulthood, but 14% of youth who initiate smoking before age 24 years do so after high school. Predictors of smoking initiation in young adulthood include alcohol use, impulsivity, and poor academic performance. Preventive intervention targeted specifically to young adults may be warranted.

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Transition from adolescence to young adulthood represents a critical life period during which young people graduate from high school and leave home to attend college or university or join the workforce. These changes are typically characterized by decreasing parental control and changing social networks, which may increase susceptibility to smoking [1]. With the marked declines in smoking rates in the past 3 decades [2,3], there is growing concern that the tobacco industry is specifically targeting young adults to take advantage of this susceptibility [3], and that the incidence of smoking initiation in young adults may

be increasing. In fact, several reports suggest that the incidence of smoking initiation in young adulthood has increased [1,4,5]. The 2008 National Survey on Drug Use and Health survey, for example, reported that 1 million American adults initiated smoking as young adults, an increase of almost 50% over the 600,000 who initiated in 2002 [4]. If the incidence of smoking initiation in young adulthood is indeed high or increasing, tobacco prevention programs targeting this specific population may be warranted.

Whereas many studies have documented the rates and determinants of smoking initiation in adolescents [6–8] or in populations that include both youth and adults [9], little is known about smoking initiation in young adults [5]. More specifically, it is not known whether the incidence of smoking initiation in young adults is lower, equivalent to, or higher than in

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adolescence, and whether the determinants of later initiation differ from those during adolescence. The objectives of this study were to describe the incidence of cigarette smoking initiation in young adulthood, and to identify predictors of initiation in young adults. To contextualize the importance of initiation in young adults relative to younger persons, the incidence of onset throughout adolescence and emerging adulthood is described.

Methods

Data were drawn from the Nicotine Dependence in Teens (NDIT) Study, a prospective cohort investigation of 1,293 students recruited in 1999–2000 from all grade 7 classes in a convenience sample of 10 high schools in or near Montreal, Canada [10]. Self-report questionnaires were administered at school every 3 months during the 10-month school year from grade 7 to 11, for a total of 20 survey cycles during the 5 years of secondary school. School-specific data on tobacco control policies and activities within schools to promote nonsmoking were collected in self-report questionnaires completed by school administrators in spring 2003. In addition, students and teachers were asked to identify commercial establishments (i.e., convenience stores, gas stations, pharmacies, restaurants, fast food chains, grocery stores, and dollar stores) within a 1-mile radius of schools where students gather before school, during recess and lunch, and after school. Each establishment was visited by two trained observers who collected data through direct observation on the availability of and access to tobacco products, the visibility of no-smoking signs, and cigarette promotions, using an assessment tool adapted from previous work [11].

In 2007–2008, when the mean (standard deviation [SD]) age of participants was 20.4 (.8) years, and again in 2010–12 when the mean (SD) age of participants was 24.0 (.7) years, data were collected from 880 (68% of 1,293) and 858 (66% of 1,293) participants, respectively in mailed self-report questionnaires, in survey cycles 21 and 22. Survey cycle 21 covered a median of 3.1 years post–high school, and survey cycle 22 covered an additional 3.1 years after survey 21. Anthropometric measurements (i.e., height and weight) were collected at baseline and in survey cycles 12, 19, and 22. Finally, in addition to participant questionnaires, 654 parents (65% of those eligible) completed mailed self-report questionnaires in 2009–2010.

Parents and guardians provided written informed consent for their adolescent to participate at baseline. Participants themselves (who had attained legal age in survey cycles 21 and 22) provided consent in the post–high school survey cycles. The study was approved by the Direction de Santé Publique de Montreal–Centre and McGill University Institutional Review Boards and the Ethics Research Committee of the Centre de Recherche du Centre Hospitalier de l'Université de Montréal.

Study variables

Data on cigarette smoking were collected in three indicators in survey cycles 1–22. (1) Lifetime smoking history was measured in one item: Have you ever *in your life* smoked a cigarette, even just a puff (drag, hit, or haul)? [10]. Response choices included “no,” “yes, one or two times,” “yes, three or four times,” “yes, five to 10 times,” and “yes, >10 times.” (2) Current smoking status was measured in one item: “Check the one box that describes you best: “I have never smoked a cigarette, even just a puff”; “I have smoked cigarettes, even just a puff, but not at all

in the past 12 months”; “I smoked cigarettes once or a couple of times in the past 12 months”; “I smoke cigarettes once or a couple of times each month”; “I smoke cigarettes once or a couple of times each week”; or “I smoke cigarettes every day” [10]. (3) To collect data on recent cigarette smoking, participants completed a past 3-month recall in each survey cycle that collected data on cigarette smoking in each of the 3 months preceding each questionnaire. The recall included one item for each month that measured the number of days on which the participant had smoked during the month, and one item for each month that measured the number of cigarettes smoked per day on average during that month [10].

Participants were categorized into one of four categories based on these three indicators, to represent their smoking history during the 11-year follow-up. Never-smokers included participants who self-reported in survey cycle 20 that they had never smoked, even just a puff. To confirm their never-smoked status, each questionnaire completed during high school was checked for any indication of smoking in any of the smoking indicators. A total of 104 participants who reported at the end of high school that they had never smoked had actually smoked, and were therefore reclassified into one of the other three categories. Baseline smokers included participants who reported that they had smoked, even just a puff in survey cycle 1. High school initiators included those who indicated at baseline that they had never smoked, but who indicated that they had smoked, even just a puff, in at least one of the 19 follow-up questionnaires during high school. Finally, young adult initiators included participants who indicated that they had never smoked during or before high school, but reported cigarette smoking in either survey cycle 21 or 22 (i.e., he or she initiated smoking between the end of high school and survey cycle 22).

Potential predictor variables included sociodemographic indicators (sex, age, language spoken at home (French, English, or other), single-parent family status, mother's education, and doing well in school); indicators of smoking in the social environment (parent(s) smoke, sibling(s) smoke, friends smoke, or teachers/school staff smoke); psychological indicators (family stress, other stress symptoms, depression symptoms, impulsivity, novelty seeking, self-esteem, worry about weight); susceptibility to cigarette package warning, susceptibility to tobacco advertising; feeling as if one really needed a cigarette, overweight; asthma; lifestyle-related indicators (alcohol use, use of other tobacco products, level of light, moderate, and vigorous physical activity, participation in team sports, television viewing); and neighborhood context (tolerance of smoking at school, and in neighborhood corner stores and restaurants) [10].

Data were collected on most variables in every survey cycle. However, because they were not expected to vary substantially over time, data on several variables were collected in selected surveys only, depending on space available in the questionnaire. Appendix 1, which can be found in the online version of this article, describes potential predictor variables in detail including the reference, survey cycle(s) in which data on the variable were collected, the specific measurement items, response choices, and how response choices were recoded for analysis.

Data analysis

The incidence density of smoking initiation was computed in each survey cycle beginning with survey cycle 2 (because this analysis required participants to be nonsmokers in survey cycle

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