

Early gender differences in adolescent tobacco use – The experience of a Swedish cohort

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Background: In Sweden, the prevalence of tobacco use in the youth population differs by product and gender, but there are no longitudinal studies of gender differences in the uptake of smoking and use of oral snuff (OS). **Methods:** A prospective cohort study ongoing in the County of Stockholm, encompassing 3,019 children recruited in 1997 in the fifth grade of compulsory school, of whom 96% were followed-up in the sixth grade. **Results:** At baseline, 22% of the boys and 15% of the girls had ever smoked, respectively 8% and 3% had ever used oral moist snuff. One year later, the overall smoking prevalence had markedly increased, as did the transition to more advanced stages of smoking, especially among girls. Among boys who at baseline had only used oral snuff, 41% had also smoked cigarettes at follow-up. Lack of a firm intention to abstain from tobacco use was strongly associated with onset of experimentation within one year, particularly among boys. **Conclusions:** Tobacco uptake in pre-adolescence differs between genders, with an earlier initiation among boys and a more rapid transition to regular smoking among girls. In most cases, experimentation with oral snuff among boys marks the transition to cigarette smoking.

Key words: children, cigarette smoking, cohort study, gender, smokeless tobacco, Sweden.

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INTRODUCTION

In Sweden, probably as a consequence of a comprehensive tobacco control legislation, the smoking prevalence among adults has continuously declined in the last 20 years and is the lowest in Europe (1). Among young people, a similar downward trend reached a plateau in the 1990s. Moreover, since the early 1970s, the smoking prevalence in adolescence has been constantly higher among females than among males. On the other hand, among Swedish men and boys the daily use of oral moist snuff (OS), the Swedish variety of smokeless tobacco, is as common as daily cigarette smoking (2). In spite of this exceptional scenario, no large prospective studies of tobacco use in the youth population have been conducted in Sweden.

We describe early gender differences in the uptake of cigarette smoking and smokeless tobacco among children between 11 and 12 years of age (BROMS Cohort Study).

METHODS

Study population

The BROMS Cohort Study was approved by the Ethical Board of the Karolinska Institute at Huddinge

University Hospital and is based on a sample of school children attending the fifth grade in the school year 1997–1998 in Stockholm County. Following parental consent, 3,050 children (65%) were enrolled and 3,019 completed the baseline assessment. Of these, 2,883 children (95.5%) participated in the sixth grade assessment.

Data collection

The information on smoking behaviour and use of oral snuff (OS) was collected by means of a self-completed questionnaire administered in the classroom. The set of questions on tobacco use was kept identical at each wave. The students were first asked whether they had ever tried cigarette smoking (even one single puff) or OS respectively. Those who answered affirmatively were asked to complete a lifetime history of use of either type of tobacco. This included information about age at initiation, symptoms at first use, progression to regular use, intensity of use, attempts to quit, desire to quit, symptoms experienced during quit attempts, circumstances of tobacco use and preferred brand. In addition, the questionnaire encompassed questions on potential explanatory factors of tobacco use.

Data analysis and statistical methods

Smoking behaviour was categorized as follows. "Ever smoked cigarettes" indicates any experience of cigarette smoking at the time of data collection. "Only puffed" means that the child had tried smoking, but had never smoked a whole cigarette on a single occasion. "Not current smoker" indicates having smoked one or more cigarettes (i.e. having tried or experimented), but non-smoking at present. "Current smoker" indicates a child who reported having smoked one or more cigarettes and is smoking presently, from "now and then, but less than monthly" to "daily". Children who answered affirmatively to the question "Did you ever try oral snuff?" were considered as having "ever used OS".

The lifetime experience of all tobacco use was compiled by combining into four mutually exclusive categories the separate answers for cigarette smoking and OS use.

Susceptibility to smoking or to OS use at baseline was conceptualized as lack of a firm intention not to smoke/use oral snuff in the near future (3). This construct corresponded to a positive or doubtful answer to the two separate questions "Do you think you will smoke a cigarette/try OS soon (e.g. within one year)?" This predictor was analysed only among children who at baseline had never smoked or used OS respectively.

The proportions of tobacco users were compared by means of the chi-squared statistic. In a univariate analysis of susceptibility to tobacco use, odds ratios (OR) and corresponding 95% confidence intervals (95% CI) were estimated by means of logistic regression (4). All analyses were performed with SPSS 10.0.5 for Windows (SPSS Inc, Chicago, IL).

RESULTS

Table I presents the cohort's lifetime experience of tobacco use in both grades by gender. At baseline, 23.9% of the boys and 16.4% of the girls reported having ever used tobacco, the difference between genders being significant ($p < 0.001$). One year later these proportions had increased to 39.1% and 31.3% for boys and girls respectively ($p < 0.001$).

At baseline, "current smoking" only accounted for about 1% of the reports (table II). Among the 36 current smokers at baseline, none smoked daily. In the sixth grade, the proportions of both experimental and current smokers had increased by a factor of three and current smoking was indeed more frequent among girls than among boys. Daily smokers ($n=9$) still represented a minor proportion (7%) of all current smokers (data not shown).

Table III shows the prevalence of any use of tobacco in the sixth grade according to use in the fifth grade. For the majority of children cigarette smoking marked the onset of tobacco use. Experimentation with both tobacco products was far more frequent among boys than among girls. Four in 10 boys with an initial experience of OS use had experimented with cigarette smoking one year later, while only 2 in 10 smokers had added a further experimentation with OS.

Children who were classified as "susceptible" to smoking at baseline were more than three times as likely to have experimented with smoking one year later (OR = 3.6, 95% CI = 2.7–4.8) compared with the "not susceptible" children. This association was indeed stronger among boys than among girls (table IV). The relative odds of OS use for susceptible boys was of a magnitude comparable with that of smoking.

DISCUSSION

Experimentation with tobacco was common and, not surprisingly, increased sharply with age in this large cohort of pre-adolescents. There were also clear differences between boys and girls. Boys were more likely than girls to experiment with both cigarettes and smokeless tobacco. They were also more precocious triers and experimenters. However, as early as in the sixth grade of the compulsory school the girls had progressed towards advanced experimentation or regular smoking to a greater extent. This is in line with the observation of a higher female prevalence of cigarette smoking in surveys conducted annually among Swedish students in the ninth grade (5). Similar results are reported in other studies from countries where the

Table I. Lifetime prevalence (%) of tobacco use by grade and gender BROMS Cohort Study, Stockholm County, Sweden

| Tobacco use | 5th grade | | 6th grade | |
|-----------------------------|-----------------------|------------------------|-----------------------|------------------------|
| | Boys ($n=1,537$) | Girls ($n=1,482$) | Boys ($n=1,467$) | Girls ($n=1,416$) |
| Never used tobacco | 76.1 | 83.6 | 60.9 | 68.7 |
| Oral snuff only | 2.3 | 1.3 | 2.7 | 1.8 |
| Cigarette smoking only | 15.7 | 13.3 | 21.4 | 24.3 |
| Both smoking and oral snuff | 5.9 | 1.8 | 15.0 | 5.2 |

Table II. Prevalence (%) of different stages of smoking experience by grade and gender BROMS Cohort Study, Stockholm County, Sweden

| | 5th grade | | 6th grade | |
|--------------------|---------------------|----------------------|---------------------|----------------------|
| | Boys (n = 1,537) | Girls (n = 1,482) | Boys (n = 1,467) | Girls (n = 1,416) |
| Tobacco use | | | | |
| Never smoked | 78.4 | 84.9 | 63.6 | 70.5 |
| Only puffed | 14.0 | 10.6 | 16.8 | 13.5 |
| Not current smoker | 6.2 | 3.4 | 15.9 | 11.0 |
| Current smoker | 1.4 | 1.1 | 3.7 | 5.0 |

Table III. Initial and subsequent use of tobacco by gender BROMS Cohort Study, Stockholm County, Sweden

| Gender | Initial tobacco use in 5th grade | n | Subsequent tobacco use in 6th grade | | | |
|--------|----------------------------------|-------|-------------------------------------|-----------------|------------------------|-----------------------------|
| | | | Never used tobacco | Oral snuff only | Cigarette smoking only | Both smoking and oral snuff |
| Boys | Never used tobacco | 1,114 | 80.3 | 1.7 | 12.3 | 5.7 |
| | Oral snuff only | 34 | — | 58.8 | — | 41.2 |
| | Cigarette smoking only | 231 | — | — | 76.6 | 23.4 |
| | Both smoking and oral snuff | 88 | — | — | — | 100.0 |
| Girls | Never used tobacco | 1,185 | 82.1 | 1.0 | 15.1 | 1.8 |
| | Oral snuff only | 18 | — | 72.2 | — | 27.8 |
| | Cigarette smoking only | 188 | — | — | 87.8 | 12.2 |
| | Both smoking and oral snuff | 25 | — | — | — | 100.0 |

Figures are reported as % of the total number of subjects in each row.

Table IV. Tobacco uptake among never-users at baseline according to their susceptibility measures, univariate analysis BROMS Cohort Study, Stockholm, Sweden

| Gender | In 5th grade, susceptible to: | n | In the 6th grade, ever use of: | Odds ratio | 95% CI |
|--------|-------------------------------|-------|--------------------------------|------------|----------|
| | Smoking | | Cigarettes (%) | | |
| Boys | No | 1,018 | 15.5 | 1 | |
| | Yes | 96 | 53.1 | 6.2 | 4.0–9.5 |
| Girls | No | 1,044 | 15.0 | 1 | |
| | Yes | 139 | 30.2 | 2.4 | 1.6–3.6 |
| | Oral snuff use | | Oral snuff (%) | | |
| Boys | No | 1,245 | 8.7 | 1 | |
| | Yes | 68 | 36.8 | 6.1 | 3.6–10.4 |

smoking prevalence among women is high (6–8). These findings strongly suggest that the trajectory from early experimentation to regular smoking in developed countries has different timing between genders, with a delayed onset but a hastened progression for girls compared with boys. This aspect adds to the discussion on the significance of early experimentation for the progression to regular tobacco use. Initiation of smoking prior to teenage years has been associated with regular smoking in late adolescence (9) or continuation of smoking among young adults (10). A few studies suggest, however, that trying and experimenting prior to teenage years is a weak predictor of later regular smoking (11, 12), and a mere delay of age at initiation

may not hinder the onset of the addicted behaviour (13).

The main concern with youth use of smokeless tobacco is whether this represents an alternative to smoking, a correlate, or else a “gateway” behaviour, ultimately conducing to smoking. Some of our findings support the view of smokeless tobacco as a “side” or “transitional” product among pre-adolescent boys, in line with other studies of adolescents (14, 15).

The classic target of tobacco prevention is the earliest stage of the smoking trajectory, when the behaviour is not yet apparent but youths’ opinions and attitudes towards smoking start to diverge (16). In this analysis we therefore included an indicator of susceptibility to

tobacco use, based on the lack of a firm intention to avoid use among non-users (3). In agreement with previous reports (17–19) this construct was indeed a predictor of smoking initiation and, in this study, also of smokeless tobacco use among boys. Susceptibility was associated to future smoking more often among boys than among girls. This gender difference was not reported in previous studies, and supports the notion that among females smoking initiation may be a response to more proximal stimuli, such as negative effects and stressful situations (20), rather than an expression of behavioural intentions.

As far as we know, this is the first large prospective study of adolescent smoking and smokeless tobacco use in Sweden. Early results clearly indicate that many youths experiment with smoking and smokeless tobacco before their teens, even in countries where the tobacco epidemic is on the fall. Some findings also suggest that experimentation with and regular use of tobacco are separate behaviours, the timing and determinants of which are probably largely gender-specific.

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