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The gender-specific association between asthma and the need to smoke tobacco

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ABSTRACT

Objectives: To examine the associations between multidimensional tobacco dependence and youths' asthma status with gender as an effect modifier.
Background: Despite the adverse respiratory effects, some adolescents with asthma smoke tobacco. Girls and boys have been shown to have different motivations for tobacco use.
Methods: Secondary analyses were conducted of data obtained from 1248 adolescents who completed the British Columbia Youth Survey of Smoking and Health II. The sample was limited to youth who reported current or experimental tobacco use and who provided asthma status information. Tobacco dependence was assessed with the modified-Fagerström Tolerance Questionnaire and four-dimension Adolescents' Need for Smoking Scale (ANSS), which assesses social dependence, physical dependence, emotional dependence, and sensory dependence on tobacco. All analyses were stratified by gender.
Results: The sample was 535 boys and 713 girls who were 15.9 years of age (SD = 1.5), on average. Gender was associated with both self-reported asthma status and the physical dependence dimension of the ANSS. Multiple linear regression analyses revealed that girls with asthma, compared with girls without asthma, had higher physical tobacco dependence scores, after adjusting for demographic and other factors. None of the tobacco dependence dimensions was associated with the asthma status of boys.
Conclusions: Asthmatic girls who report smoking may be doing so because they develop physical dependence relatively quickly and lose their autonomy with respect to tobacco use. They may require significant support for smoking cessation, including cognitive behavioral therapy and nicotine replacement therapy.

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Introduction

Cigarette smoking is responsible for several adverse cardiovascular and respiratory outcomes, and has particular harmful effects for people with asthma.[1–3] In the presence of asthma, smoking is associated with severe respiratory symptoms,[4,5] impaired therapeutic responses to corticosteroids,[6–8] and accelerated declines in lung function, including reductions in forced expiratory volume (FEV_1), which increase the risk of more serious respiratory diseases, such as chronic obstructive pulmonary disease (COPD).[4,9,10] Further, smoking cessation is associated with better asthma control.[11]

Despite the adverse respiratory effects of smoking and the benefits of abstinence, some adolescents with asthma smoke.[12,13] Indeed, the smoking prevalence rates of adolescents with asthma may be similar to, or even higher than, those of the general adolescent population.[14] Although the prevalence of smoking among Canadian adolescents with asthma is uncertain, survey data suggest that 22.7% of Canadian adolescents who report daily smoking have asthma.[15] Guo et al reported that 17.4% of youths with asthma in the province of British Columbia (BC), Canada were current smokers.[13] The persistence of smoking, despite considerable and potentially life-threatening respiratory effects,[16] speaks to the addictive nature of tobacco.

Several factors are associated with youth smoking, including having parents or friends who smoke, stress exposure, poor self-esteem, risk-taking behavior, depression, minimal if any participation in sports, and poor physical health.[12,17] Zbikowski et al found that the associations between various risk factors and current cigarette smoking were almost equivalent for adolescents with

Abbreviations: COPD, chronic obstructive pulmonary disease; ETS, environmental tobacco smoke; M-FTQ, modified-Fagerström Tolerance Questionnaire for adolescents; ANSS, Adolescents' Need for Smoking Scale; CES-D, The Center for Epidemiological Studies – Depression.

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and without asthma.[18] Established risk factors for current smoking in adolescents with asthma include exposure to smoking at home, having parents and peers that smoke, parental attitudes about smoking, alcohol use, marijuana use, psychosocial distress, peer pressure, limited physical activity, higher body mass index, poor general health status, older age, and race.[15,18–21]

In assessing adolescents' readiness to stop smoking, Van Zundert et al found that nicotine dependence was strongly related to their perceptions of the benefits of smoking and lower self-efficacy to resist smoking, and that there were no differences between those with and without asthma.[22] Van de Ven et al also reported that tobacco dependence develops more quickly in youth with asthma,[23,24] however, little attention has been paid to factors associated with tobacco dependence in this population. Moreover, several studies have shown that there are distinct gendered differences in tobacco use and dependence.[25,26] These differences affect tobacco use motivation and intentions.[27,28] However few studies have examined gendered differences in tobacco use and dependence among adolescent youth with asthma.

Given that tobacco dependence is a complex phenomenon, an exploration of the multidimensional aspects of tobacco dependence may shed light on the reasons why some adolescents with asthma persist in using tobacco despite its adverse respiratory effects.[29,30] Thus, to understand further the factors (i.e., demographic [age, gender, school grade, ethnicity/race], physical [perceived physical health status], psychosocial [parents' smoking status, friends' smoking status, depression symptoms], behavioral [frequency of exercise, alcohol use, marijuana use], and environmental [environmental tobacco smoke exposure]) that have a bearing on the smoking behavior of adolescents with asthma, the aims of this study were to examine the differences in tobacco dependence among adolescents with and without asthma, and to identify whether any differences, if found, were gendered (i.e., interacted with or were modified by gender).

Methods

Study participants

We used data collected from the 2004 BC Youth Survey on Smoking and Health II, a provincial, cross-sectional survey of the health status and tobacco and other substance use of adolescents ($n = 8225$). Adolescents from 49 schools participated (of 86 schools in 14 school districts, representing a 57% school participation rate). From within each participating school, there was an approximate student participation rate of 84%. Questionnaires were administered to participants, either by paper and pencil or online, in the participants' classrooms. Before completing questionnaires, the students were provided with information sheets to give to their parents or guardians regarding the study, but active parental consent was not required. No names and other identifiers were provided to maintain the anonymity of the participants. The study was approved by the University of British Columbia, Behavioural Research Ethics Board.

Of the 8225 adolescents who participated, 1251 (15.2%) were current or experimental smokers (i.e., had smoked at least once in the past month). However 3 participants did not provide any information about their gender. Hence, the data from this sample of 1248 current and experimental smokers with ($n = 108$; 8.7%) and without asthma ($n = 1140$; 91.3%) were included in the analyses presented here.

Measures

As described below, the variables selected for the analyses included the factor of interest, asthma status, and established risk factors that may have confounded the relationship between asthma status and tobacco dependence: demographic variables (i.e., age, gender, school grade, and ethnicity/race), and salient health and tobacco related factors, such as perceived physical health status, frequency of exercise, depression symptoms, exposure to smoking (i.e., mother's, father's, and best friend's smoking status), environmental tobacco smoke (ETS) exposure, age of tobacco use initiation, current tobacco use status, life-time cigarette use, alcohol use, and marijuana use.[15,18–22,29–31]

Asthma status

Adolescents who reported requiring a prescription medication to treat asthma in the past 12 months were classified as having asthma (i.e., "In the last 12 months, for which of the following conditions have you taken a prescription medicine – that is, a medicine that must be prescribed by a doctor or nurse? Please check all that apply."). Asthma was one of 15 options (e.g., no prescription medicines, medicines for ADD or ADHD, medicines for acne, allergy, asthma, anxiety, diabetes, depression, headaches, menstrual periods, infection, seizures, smoking cessation, stomach, or other condition).

In Norway, Skurtveit, Selmer, Tverdal, and Furu validated 15- to 16-year-old adolescents' self-reported use of prescribed anti-asthmatic medication with linked data from a comprehensive national prescription database. They reported a sensitivity rate of 79.1% (95% CI 66.9%, 91.2%) and specificity of 87.4% (95% CI 85.4%, 89.5%).[32] In the USA, a comprehensive evaluation of the comparability of Grades 6 through 10 students' self-reports and parents' reports of asthma concluded that the students' reports of a physician diagnosis and an asthma symptom in the past 12 months was a good indicator of probable asthma.[33] Among this group, 74.9% of the students who reported a physician's diagnosis of asthma also reported taking asthma medication.

Tobacco dependence

Tobacco dependence is theoretically defined as tolerance, a strong desire or need to use tobacco, withdrawal symptoms during cessation periods, and loss of control over the amount or duration of use.[34,35] To assess tobacco dependence, we used two measures: the modified-Fagerström Tolerance Questionnaire for adolescents (M-FTQ)[36,37] and the Adolescents' Need for Smoking Scale (ANSS).[29,30,38,39] The 7-item M-FTQ is a measure of dependence to nicotine adapted for adolescents. It was included with minor changes as described in Richardson et al.[30] Evidence of the reliability (Cronbach's alpha = .67–.70) and validity of the M-FTQ for adolescents has been provided.[30] The ANSS measures tobacco dependence by including psychosocial determinants of adolescents' smoking behavior. The ANSS has four gender-invariant dimensions of tobacco dependence: social (which describes smoking behavior for social contexts and social reasons), physical (which describes smoking behavior primarily related to the need for nicotine), emotional (which describes smoking behavior related to affect regulation), and sensory (which describes smoking for the desired sensations acquired from the act of smoking). These dimensions have been shown to have high internal consistency, good construct validity established through confirmatory factor analyses (CFA), are correlated with other measures of tobacco dependence,[30] and have equivalent measurement structures in boys and girls, with no indication of item-level gender bias.[39] Each item is coded as strongly agree (4), agree (3), disagree (2), or strongly disagree (1). In both measures, higher scores indicate a greater level of tobacco dependence.

Demographic characteristics

Demographic information was obtained, including age, gender, school grade, and ethnicity/race.

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