

BRIEF REPORT

Teen Use of Flavored Tobacco Products in New York City

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ABSTRACT

Introduction: Teen use of flavored tobacco products is a concern. Menthol cigarettes have been found to influence teen smoking; however, less is known about the association between teen use of other flavored tobacco products, such as cigars and dip, and cigarette smoking.

Methods: The New York City 2010 Special Communities Putting Prevention to Work Youth Risk Behavior Survey data ($N = 1,800$; age 13–17) were analyzed to examine the association between ever trying flavored tobacco products and current smoking, adjusting for demographics and ever use of menthol cigarettes.

Results: Twenty percent of teens reported ever trying flavored tobacco products; youth who were current smokers (58%) were more likely to have tried flavored tobacco products than youth who were not current smokers (16%). Controlling for menthol cigarette use, teens who had ever tried flavored tobacco products were nearly 3 times more likely to be current smokers than those who had never tried flavored tobacco products (odds ratio = 2.70, 95% confidence interval = 1.47, 4.98).

Conclusions: Ever trying flavored tobacco products were strongly associated with current smoking among teens. The findings from this study suggest that regulations prohibiting sales of flavored tobacco products could decrease youth smoking.

INTRODUCTION

Reducing adolescent tobacco use is a public health imperative. In an analysis of the 2011 National Youth Tobacco Survey (NYTS), the Centers for Disease Control and Prevention reported that the prevalence of current tobacco use among high-school students was 23.2% (Centers for Disease Control and Prevention, 2012). Studies suggest that flavored tobacco products, with flavors such as chocolate, strawberry, or piña colada, as well as menthol flavors, contribute to youth tobacco use (Carpenter, Wayne, Pauly, Koh, & Connolly, 2005; Hersey et al., 2006; Klein et al., 2008). Flavored tobacco products utilize flavoring agents to mask tobacco's harsh taste and toxicity, which in turn makes them more attractive and palatable to teens, and encourages both youth initiation as well as regular smoking (Carpenter et al., 2005; Hersey et al., 2006). Tobacco industry documents confirm that companies direct the marketing of flavored tobacco products toward younger smokers, and therefore, adolescent smoking rates may be impacted by the availability of these products (Carpenter et al., 2005). Additional 2011 NYTS analyses demonstrated that 9.6% of high-school students nationally reported current use of flavored cigarettes or flavored little cigars (including menthol flavors) and that among current cigarette smokers, 38.8% reported current use of flavored cigarettes (including menthol flavors)

(King, Tynan, Dube, & Arrazola, 2014). Other research on teen cigar use has shown that 95% of the cigar brands preferred by 12- to 17-year olds sell flavored cigars (Delnevo, Giovenco, Ambrose, Corey, & Conway, 2014). Looking beyond flavored cigar use to the use of other flavored tobacco products, extant research on young adults, ages 17 and older, has shown that use of any flavored tobacco products, both menthol-flavored and nonmenthol-flavored tobacco products, was more common among the younger aged young adults compared with the older aged young adults (Rock, Davis, Thorne, Asman, & Caraballo, 2010; Villanti, Richardson, Vallone, & Rath, 2013).

To our knowledge, no studies have examined whether ever trying flavored tobacco products is an independent predictor of current smoking among teens under age 18. Developing a better understanding of predictors of adolescent smoking is essential for designing and implementing effective strategies to prevent adolescent smoking (U.S. Department of Health and Human Services, 2013).

In September 2009, the United States (U.S.) Food and Drug Administration prohibited flavored cigarettes, but this prohibition did not apply to menthol cigarettes or to other flavored tobacco products (U.S. Food and Drug Administration, 2009). In New York City (NYC), an expansive sales ban was enforced beginning in January 2011, which prohibited sales of flavored non-cigarette products, excluding menthol-flavored products,

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in most retail settings (The New York City Council, 2009). We conducted an exploratory study of flavored tobacco product use among NYC teens using data from the 2010 NYC Special Communities Putting Prevention to Work Youth Risk Behavior Survey (YRBS). Our objective was to assess the relationship between ever trying flavored tobacco products and current smoking in NYC before enforcement of the sales prohibition. We also included ever use of menthol cigarettes in our analyses to control for experimentation with these similar products that may confound the relationship between flavored tobacco products and teen smoking.

METHODS

The 2010 Special YRBS was based on the traditional NYC YRBS, which is conducted in odd-numbered years by the NYC Departments of Education and Health. It is an anonymous, classroom-administered cross-sectional survey of public high-school students about health-related behaviors. A stratified, two-stage, cluster sample design is used to produce a representative sample of public high-school students in all five boroughs. School selection was proportional to enrollment, and eligible classes were randomly selected. The sample included 2,134 students from 30 schools. Usable questionnaires were submitted by 1,800 students in 28 schools. The student response rate was 84% and school response rate was 93%, for an overall response rate of 79%.

Measures

The survey assessed tobacco use behaviors and respondent demographic characteristics. Smoking one or more cigarettes in the past 30 days constituted current smoking. Measures of flavored tobacco product use and menthol cigarette use were as follows: "Have you ever tried any flavored tobacco products, such as chocolate, candy, fruit, cinnamon, or alcohol-flavored cigarettes, cigars, blunts, chewing tobacco, snus, snuff, dip, or dissolvable tobacco pellets?" and "Have you ever tried smoking menthol cigarettes, even one or two puffs?" The flavored tobacco product item was developed by the NYC Department of Health to capture information about the use of a broad range of products in a single question. It was pretested using retrospective debriefing methods with a racially diverse sample of high-school students with varying reading levels. No comprehension difficulties were identified when participants were probed about their interpretation of the question. Demographics included sex (female or male), race/ethnicity (White non-Hispanic, Black non-Hispanic, Hispanic, Asian, and other that included American Indians and Alaska natives, native Hawaiians and other Pacific Islanders, and multiple races non-Hispanic), and age (13/14, 15, 16, and 17 years old).

Analysis

Descriptive statistics were calculated for demographics, ever trying flavored tobacco products (exposure of interest), and ever menthol cigarette use (potential confounder) overall and stratified separately by smoking status (current or nonsmokers), ever flavored tobacco product use, and ever menthol cigarette use among all 13- to 17-year-old respondents. Multivariable logistic regression was used to estimate the association between

ever trying flavored tobacco products and current smoking while controlling for a priori determined covariates (sex, race/ethnicity, and age) and ever trying menthol cigarettes. *t* tests were used to identify significant variables; all comparisons in the text were significant at $p < .05$. The data were weighted to adjust for the probability of selection and poststratified by gender within grades and race/ethnicity. Analysis utilized SAS 9.2 and SAS-callable SUDAAN 11.0.1.

RESULTS

Female students were less likely to be current smokers than male students (38% vs. 62%, $p = .0221$). Whites (31%) were more likely to smoke than blacks (18%, $p = .0179$) and Asians (11%, $p = .0368$), while Hispanics (39%) were more likely to smoke than Blacks ($p = .0051$). Teens aged 15 (25%) and 17 (40%) were more likely to smoke than those aged 13/14 (10%, $p = .0279$ and $.0188$) (Table 1).

Twenty percent of teens have tried flavored tobacco products; current smokers were almost four times as likely as non-current smokers to have tried flavored tobacco products (58% vs. 16%, $p < .0001$). Hispanics (43%) were more likely to have tried flavored tobacco products than Blacks (30%, $p = .0051$) and Asians (9%, $p = .0016$), while Blacks were more likely than Whites (18%, $p = .0077$) and Whites were more likely than Asians ($p = .0053$). Older teens (age 16: 31% and age 17: 29%) were both more likely than younger teens (ages 13/14: 18%, $p = .0118$ and $.0005$; and age 15: 22%, $p = .0455$ and $.0125$) to have tried flavored products (Table 1).

Twelve percent of teens had ever tried menthol cigarettes; current teen smokers were 10 times as likely to have tried menthol cigarettes as noncurrent smokers (70% vs. 7%, $p < .0001$). Males were more likely to have tried menthol cigarettes than females (65% vs. 36%, $p = .0021$). Whites (30%) were more likely than Blacks (17%, $p = .0004$) and Asians (10%, $p = .0013$) to try menthol cigarettes, while Hispanics (43%) were more likely than Whites ($p = .0151$) and Blacks ($p = .0003$). The 15-year olds (25%) and 17-year olds (36%) were more likely than 13/14-year olds (13%, $p = .0406$ and $.0088$) to have tried menthol cigarettes, and 16-year olds (26%) were marginally ($p = .0615$) more likely than 13/14-year olds to have tried menthol cigarettes (Table 1).

Table 2 shows the independent associations between ever trying flavored tobacco products and current smoking, controlling for ever trying menthol cigarettes and other covariates. Teens who tried flavored tobacco products had significantly higher odds of being current smokers than teens who had not (odds ratio: 2.70, 95% CI = 1.47, 4.98).

DISCUSSION

To our knowledge, this study is one of the first to present data on the predictive relationship between flavored tobacco product use and current smoking among teens under the age of 18. We found that trying flavored tobacco products was independently associated with current smoking among NYC adolescents, adjusting for ever menthol cigarette use and demographics. Flavored tobacco product use was more likely among Hispanics, Blacks, and Whites than Asians, as well as among teens ages 16 and

Table 1. Population Demographics Overall, and by Smoking Status, Ever Tried Flavored Tobacco Products and Ever Tried Menthol Cigarettes

	Overall	Current	Noncurrent	Ever tried flavored	Ever tried menthol
	population	smokers	smokers	tobacco products	cigarettes
	% (95% CI)	% (95% CI)	% (95% CI)	Yes	Yes
	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)
Sex					
Female	50 (43–57)	38 (29–49)	52 (44–59)	50 (41–59)	36 (27–46)
Male	50 (43–57)	62 (51–72)	49 (42–56)	50 (41–58)	65 (54–74)
Race/ethnicity					
White	14 ^a (7–26)	31 (16–52)	13 ^a (6–25)	18 (9–32)	30 (17–46)
Black	35 (24–48)	18 (9–34)	37 (25–50)	30 (20–41)	17 (10–26)
Hispanic	36 (28–44)	39 (29–50)	35 (27–44)	43 (36–51)	43 (31–55)
Asian	15 (9–24)	11 ^a (5–23)	15 (8–26)	9 ^a (4–17)	10 ^a (4–21)
Other	1 (0–1)	1 ^a (0–2)	1 (0–1)	1 ^a (0–1)	1 ^a (1–2)
Age					
13/14	27 (19–36)	10 (5–19)	28 (20–38)	18 (12–25)	13 (7–21)
15	28 (23–34)	25 ^a (12–45)	28 (24–34)	22 (15–32)	25 (15–40)
16	24 (18–22)	24 (15–38)	25 (18–33)	31 (24–40)	26 (19–35)
17	21 (15–30)	40 (23–60)	19 (13–27)	29 (19–41)	36 (21–54)
Ever tried menthol cigarettes	12 (9–17)	70 (56–81)	7 (6–9)	35 (26–45)	–
Ever tried flavored tobacco products	20 (16–23)	58 (48–68)	16 (14–19)	–	56 (49–63)

Note. CI = confidence interval. Data were weighted to adjust for the probability of selection and poststratified by gender within grades and race/ethnicity. The sample includes 1,800 respondents and is limited to public high-school students aged 13–17.

^aRelative standard error >30 is considered unstable.

Table 2. Multivariable Logistic Regression Model of Current Smoking

	Current smoking
	OR (95% CI)
Sex	
Female (ref)	1.00
Male	1.26 (0.73–2.19)
Race/ethnicity	
White (ref)	1.00
Black	0.42 (0.18–1.01)
Hispanic	0.67 (0.33–1.35)
Asian	0.75 (0.26–2.21)
Other	1.13 (0.44–2.94)
Age	
13/14 (ref)	1.00
15	1.81 (0.65–5.10)
16	2.07 (0.77–5.57)
17	3.70 (1.46–9.36)
Ever tried flavored tobacco products	
Yes	2.70 (1.47–4.98)
No (ref)	1.00
Ever tried menthol cigarettes	
Yes	15.16 (8.34–27.57)
No (ref)	1.00

Note. CI = confidence interval. Significant odds ratios (ORs) are bolded. The current smoking model investigated ever tried flavored tobacco products as the predictor variable and sex, race/ethnicity, age, and ever tried menthol cigarettes as possible confounders to the association.

17. However, no gender differences were found. These results differ somewhat from those found by King et al. (2014). In their study, use of flavored little cigar and flavored cigarette was

more common among males, Whites, and other non-Hispanics (Asian, American Indian or Alaska Native, and Native Hawaiian or other Pacific Islander), while we found that use of flavored tobacco products was more common among Hispanics, Blacks, and Whites (King et al., 2014). These difference could be a result of their measure combining menthol with other flavored tobacco products and the focus on cigars and cigarettes only. It is also noteworthy that the characteristics associated with menthol use in NYC differed somewhat from national trends: nationally, females are more likely to smoke menthol cigarettes than males; in NYC, males were more likely to have tried menthol cigarettes than females (Center for Tobacco Products of the Food and Drug Administration, 2011; Rock et al., 2010). Nationally, Black teens are more likely to smoke menthol cigarettes, whereas in NYC, White and Hispanic teens were more likely to have tried menthol cigarettes (Rock et al., 2010). Like U.S. trends, older NYC teens were more likely to have tried menthol cigarettes and the odds of current smoking were significantly higher among NYC teens who had tried menthol cigarettes (Nonnemaker et al., 2013; Rock et al., 2010; Villanti et al., 2013; Wackowski & Delnevo, 2007).

This study has several limitations. Compared to the standard YRBS, which recently included responses from over 11,000 students, the sample size for the special YRBS is relatively small. However, the special YRBS sample is more than sufficient to make citywide inferences about the behaviors of public high-school students. The data were self-reported and, therefore, subject to both recall and response bias. The main exposure question about ever use of flavored tobacco products asked about a wide range of possible products that could have been tried by respondents and does not allow for disaggregation of the results. Additionally, it is possible that respondents interpreted the flavored tobacco products question as including menthol or mint flavors, thereby overlapping in reporting with

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the menthol cigarette question. The menthol cigarette question was asked before the flavored tobacco product question, which likely reduced some of the possibility for overlap. Finally, the YRBS is a cross-sectional survey, which prevents us from drawing causal inferences. Further research using longitudinal methods is needed.

The 1998 Master Settlement Agreement prohibited direct sales and marketing of tobacco to youth; however, tobacco industry documents have shown that since that time, ongoing innovation in the development of flavor technologies and of new flavored tobacco products has been focused on attracting minorities and youth (Villanti et al., 2013). The association we found between ever use of flavored tobacco products and current smoking among adolescents in NYC is concerning. These findings along with other studies suggest that jurisdictions should consider regulations that prohibit sales of flavored tobacco products to decrease youth smoking.

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DECLARATION OF INTERESTS

None declared.

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