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Nativity Status and Poly Tobacco Use among Young Adults in the United States

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Abstract

Introduction: Young adults are the second largest segment of the immigrant population in the United States (US). Given recent trends in later age of initiation of tobacco use, we examined variation in use of tobacco products by nativity status for this population group.

Methods: Our study included young adults 18-30 years of age sampled in the National Health Interview Survey (2015-2019), a nationally representative sample of the US population. We calculated prevalence of use of any and 2 or more tobacco products (cigarettes, cigars, pipes, e-cigarettes, and smokeless tobacco) for foreign-born (n=3,096) and US-born (n=6,811) young adults. Logistic regression models adjusted for age, sex, race-ethnicity, education, and poverty, while accounting for the complex survey design.

Results: Foreign-born young adults were significantly less likely to use any tobacco product (Cigarette = 7.3% vs 10.7%; Cigar= 1.8% vs 4.8%; E-cigarette= 2.3% vs 4.5%, respectively; $p<0.01$) or poly tobacco use (1.9% vs. 4.2%; $p<0.01$) than US-born young adults. Adjusted regression models showed lower odds of poly tobacco use among the foreign-born than their US-born counterparts (Odds Ratio = 0.41, (95% Confidence Interval: 0.26-0.63)).

Conclusion: Findings highlight the importance of targeted interventions by nativity status and further tobacco prevention efforts needed for the US-born.

Keywords: Poly tobacco, Nativity, Young adults

1. Introduction

Despite the steady decline in the rate of tobacco use in the United States (US), it remains the leading cause of preventable deaths in the nation[1–3]. About 40 million US adults are current users and every day about 1600 youths initiate cigarette use [1]. In the US, about 500,000 people die each year due to tobacco use or exposure to secondhand smoke, while an estimated 16 million are currently diagnosed and live with a chronic illness caused by tobacco use [1]. Tobacco use increases a person's risk for several health outcomes such as lung cancer, heart disease, stroke, lung disease & diabetes. Heart disease, which is associated with tobacco use, remains the leading cause of death in the US [1,4].

Tobacco use surveillance data in previous years have identified that most adult users initiated when they were adolescents leading to an adolescent-focused prevention programs [5]. However, a growing body of evidence now suggest a trend in later age of tobacco use initiation from adolescence to young adulthood [6,7]. Young adults are a particularly vulnerable target population for the tobacco industry because they are not completely covered by policies that limit the age of purchasing tobacco products and are not a priority population for tobacco prevention efforts [8,9]. This lack of attention on young adults is especially alarming given a recent study showing that young adults who use poly tobacco products have a 4.01 times higher relative risk of being more receptive to tobacco marketing than single tobacco product users and non-users [10,11].

Young adults are also an increasingly diverse segment of the US population. The foreign-born population includes anyone who is not a US citizen at birth is rapidly growing and it is projected to represent 1 in 5 individuals by the year 2060 [12,13]. Currently, there is an estimated 44.8 million foreign-born individuals in the US, of which young adults less than 35 years of age represent 25.8%. Moreover, this age group has been the second largest growing segment of the foreign-born population in the US over the past 30 years [14].

Despite the growth and relevance of young adults to tobacco prevention, little is known about tobacco product use in this population group, particularly regarding poly tobacco use. Poly tobacco product users have been shown to have a higher risk for nicotine addiction and dependence[15,16]. Another study found that, poly tobacco users have a 2 times higher odd for substance use disorders compared to single users[17]. Prior research has shown that foreign born

adults are less likely to consume tobacco products than their US born counterparts [4,18]. However, we know little about patterns of poly tobacco use for young adults or whether tobacco use differs in the foreign-born [19]. In the present study, we examine patterns in poly tobacco use for young adults and determine differences by nativity status using a nationally representative sample of young adults. Study findings can inform planning of tobacco prevention and control for a fast-growing segment of the US population.

2. Methods

2.1. Data Source

The National Health and Interview Survey (NHIS) is a nationally representative cross-sectional study of the US population. Data from five years (2015-2019) were merged to increase the foreign-born sample. Participants are asked to self-report on a variety of health concerns during interviews done in their homes by professional interviewers. For the objectives of this study, data from the NHIS sample adult, family, and person files were used.

2.2. Study Population

Our study population includes young adults aged 18-30 years of age following previous research with this age cut-off [20,21]. We further restricted the young adult population to non-White participants given the small percentage of non-Latino Whites who are foreign-born. Participants were defined as current tobacco users if they reported consuming any of 5 tobacco products in the last 30 days at the time of the survey.

2.3 Study Variables

2.3.1. Dependent Variable

The dependent variable is a binary measure (yes/ no) on use of any of the following 5 tobacco products: (1) cigarettes, 2) cigars, cigarillos, or filtered little cigars, 3) pipes, water pipes, or hookahs, 4) e-cigarettes, and 5) smokeless/ chewable tobacco of interest. Single tobacco use is defined as the use of only one tobacco product. Any tobacco use is defined as the current use of any combination of tobacco products. Poly tobacco use is defined as the use of 2 or more of the identified 5 tobacco products being studied.

2.3.2. *Independent Variable*

Our main independent variable is nativity status based on participant self-report. The foreign-born population is defined as young adults who were not born in the United States or any of its territories. Foreign born young adults were compared to their US born counterparts (referent group).

Confounders were selected a priori and include race/ethnicity, sex, age (18-30, 31-39, 40-49, 50-59, 60-69, 70 and above), education (less than high school graduate, high school graduate, some college and college graduate), and poverty (below poverty threshold, above poverty threshold). Participants self-reported their race/ethnicity and were classified as Latino, non-Latino Black and non-Latino Asian. Non-Latino Whites were excluded from the analyses due to a small sample size of foreign-born participants. The age variable was kept in continuous form given that the study population includes young adults 18-30 years of age.

2.4. *Statistical Analyses*

We merged 5 years of NHIS data (2015-2019), and all analyses included sampling weights to account for the complex sampling design and multiple years of study data. We generated descriptive statistics for the demographic characteristics of interest by tobacco use. Weighted prevalence estimates were conducted, and Pearson chi square test was utilized to determine if there were significant associations between nativity groups. We fit binary logistic regression models to examine the association between nativity and poly tobacco use and use of cigarette, cigars, and e-cigarettes. Smokeless tobacco and pipe use were excluded from regression models given small sizes. Model 1 represents Odds Ratio (OR) estimates for the crude association between nativity and tobacco use. Model 2 represents the fully adjusted model and includes age, sex, race/ethnicity, education, and poverty. All analyses were conducted using SAS software v. 9.4 with a 2-sided test of significance.

3. Results

Table 1 shows the weighted prevalence estimates of demographic characteristics by poly, any, and single tobacco use. The prevalence of poly, any and single tobacco use was significantly lower among foreign-born young adults (1.9%, 11.6%, 9.6%) compared to their US-born counterparts (4.2%, 17.6%, 13.3%) respectively. As educational attainment increased from less than high school degree to having a college degree or more, prevalence for poly, any, and single tobacco use decreased ($p<0.001$). Those with less than a high school degree had the highest prevalence of poly tobacco use compared to those that had a high school degree, some college, or a college degree (4.4%, 3.8%, 2.7% and 2.1%) respectively. The rate is much higher for any tobacco use and those with less than a high school degree still represents the highest prevalence category with about 20.8% as compared to 16.8%, 15.1% and 11.7% among those with a high school degree, some college or a college degree. A similar pattern was also observed for single tobacco product use. Men had a significantly higher prevalence for poly tobacco use compared to women (5.5% vs 1.6%) respectively ($p<0.001$). The prevalence estimates for men who use only one tobacco product is 15.4% while for women it stands at 8.9%. Overall, both men and women had more single tobacco product users as compared to poly tobacco users. For race and ethnicity categories, non-Latino Blacks had a significantly higher prevalence for poly tobacco use than Latinos or non-Latino Asians. Non-Latino Black young adults had a higher prevalence of poly tobacco use compared to Latinos and non-Latino Asians (4.9%, 2.9%, 2.8%) respectively. Non-Latino Whites were excluded from the sample due to small percentage of foreign-born non-Latino Whites. For any tobacco use, non-Latino Black young adults also had the highest prevalence estimate compared to Latino and non-Latino Asians (19.6%, 14.1%, 12.7%) respectively. We also see a similar pattern of higher prevalence among non-Latino Black young adults for single tobacco product use when compared to Latinos and non-Latino Asians (14.6%, 11.2%, 9.9%) respectively. Participants below the poverty threshold had a higher prevalence for poly any, and single tobacco use (4.1% vs 3.6%, 16.7% vs 3.6%, 12.5% vs 11.9%) respectively, although differences were not statistically significant when compared to those above the poverty threshold.

3.1. Figures and Tables

Table 1. Weighted Prevalence Estimates for Demographic Characteristics by Any, Poly and Single Tobacco Use- National Health Interview Survey (2015-2019) n=9,907

Demographic Characteristics	Poly Tobacco Use n (%)	Any Tobacco Use n (%)	Single Tobacco Use n (%)
Nativity			
Foreign Born	65(1.9) **	343(11.6) **	278 (9.6) **
U.S. Born	296(4.2) **	1281(17.6) **	985 (13.3) **
Educational Attainment			
Less than Highschool Grad	58(4.4) *	280(20.8) * *	222(16.3) **
Highschool Grad	121(3.8) *	501(16.8) * *	380(12.9) **
Some College	134(3.7) *	580(15.1) **	446(11.4) **
College +	48(2.1) *	263(11.7) * *	215(9.5) **
Sex			
Male	259(5.5) **	989(20.9) **	730(15.4) **
Female	103(1.6) **	636(10.5) **	533(8.9) **
Race/Ethnicity			
Latino	159(2.9) **	757(14.1) **	598(11.2) **
Non-Latino Black	149(4.9) **	644(19.6) **	495(14.6) **
Non-Latino Asian	54(2.8) **	224(12.7) **	170(9.9) **
Income			
Above Poverty Threshold	196(3.6)	859(3.6)	663(11.9)

Below Poverty Threshold	89(4.1)	400(16.7)	311(12.5)
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Note. **: p<0.001 *: p<0.05;

Figure 1 shows the weighted prevalence estimates of use of any of the 5 tobacco products by nativity status. Cigarette (9.6%) was the most used tobacco product for both foreign-born and US-born young adults. This was followed by cigars (3.9%), e-cigarettes (3.9%), pipes (2.14%) and smokeless tobacco (0.48%). The US-born young adults had a slightly higher prevalence for cigar use (4.8%) compared to e-cigarette use (4.5%), this estimate excludes non-Latino Whites due to a small foreign-born sample size. Additionally, the US-born were significantly more likely to consume cigarettes (10.70% vs 7.30%), cigars (4.8% vs 1.8%), and e-cigarettes (4.5% vs 2.3%), than the foreign-born respectively (p<0.001). There were no statistically significant differences by nativity status for smokeless tobacco and pipes.

Figure 1. Prevalence Estimates for each Tobacco Product

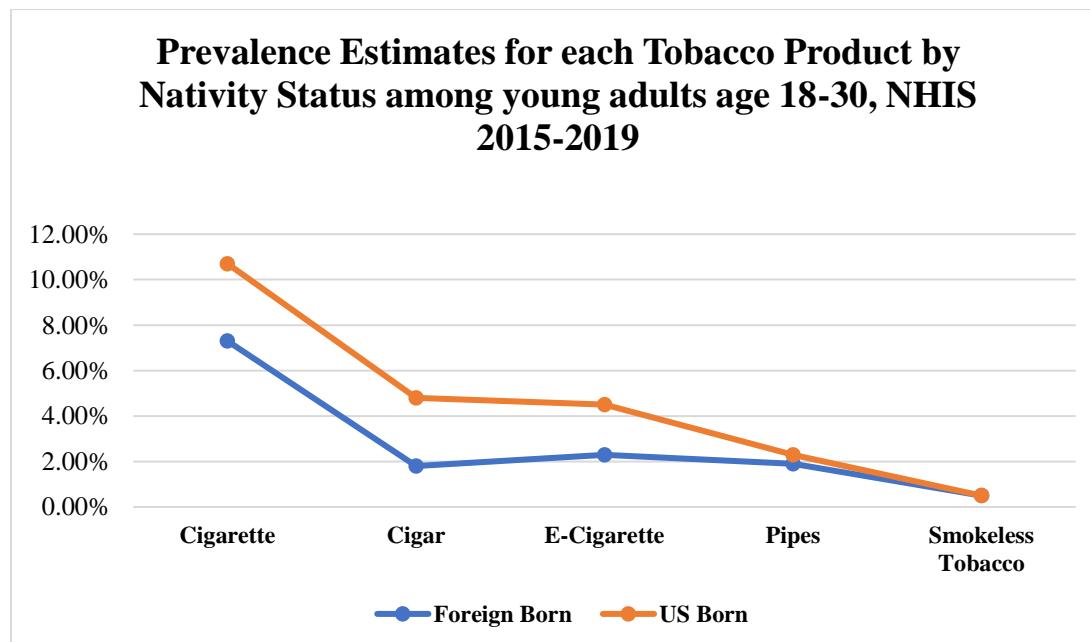


Table 2 shows results from the logistic regression model. In model 1 (crude estimate), foreign-born young adults have 55% lower odds for poly tobacco use compared to US-born young adults (Odds Ratio [OR]: 0.45, 95% Confidence Interval [CI]: 0.31-0.64). In model 2, after adjusting for age, sex, race, education, and poverty, this association remains with foreign-born young adults having 59% lower odds for poly tobacco use compared to US-born young adults (OR=0.41, 95% CI: 0.26-0.63, *p*-value <0.05). For any tobacco use, foreign-born young adults had 47% percent lower odds (OR=0.53, 95% CI:0.42-0.65), while for single tobacco use, they had 39% lower odds compared to their US-born counterparts (OR=0.61, 95% CI:0.49-0.79). We also fitted logistics regression models for each type of tobacco product (results were not included), and there is the same pattern of lower odds for tobacco use among foreign-born young adults compared to the US-born young adults.

Table 2. Logistic Regression Results for Tobacco Product Use by Nativity Status, NHIS 2015-2019, (n=9,907)

Nativity	Poly Tobacco Use		Any Tobacco Use		Single Tobacco Use	
	Model 1 ^a	Model 2 ^b	Model 1 ^a	Model 2 ^b	Model 1 ^a	Model 2 ^b
	UOR	AOR	UOR	AOR	UOR	AOR
	(95% CI)					
Foreign Born vs U.S Born	0.45(0.31-0.64)	0.41(0.26-0.63)	0.61(0.52-0.72)	0.53(0.43-0.65)	0.69(0.58-0.82)	0.61(0.49-0.79)

Note: bold indicates *p*< 0.05

a: unadjusted model

b: adjusted for age, sex, race, education, and income

4. Discussion

Our study provides new evidence on nativity differences in various measures of tobacco use for the young adult population living in the US. Results showed that for each of the five tobacco products examined foreign-born young adults were significantly less likely to consume any of the tobacco products examined than their US-born counterparts. Cigarettes were the most consumed tobacco product for both foreign and US-born young adults. Moreover, poly, single and any tobacco use was significantly lower among foreign born young adults compared to the US-born. There were no statistically significant differences by nativity status for pipe and smokeless tobacco.

Any tobacco use variations by 5 tobacco products were observed and this has important policy implications. Our study corroborates prior findings showing that cigarette, is the most commonly used tobacco product, another study found that 14% of adults currently use cigarettes [16]. Although prior studies have indicated a lower prevalence of any tobacco use among the foreign-born population [4,18,21,22], little evidence exists on differences by nativity status for young adults. Results from our study indicated a consistent pattern of lower rate of any tobacco use for foreign-born young adults compared to their US-born counterparts (11.6% vs 17.6%) respectively. Policies are an effective way to prevent tobacco use among the young adult population. A study by Ickes et al. [23], found that students who attend campuses without a comprehensive smoke-free policy were more likely to report tobacco use on campus compared to students on a tobacco-free campus (65% vs 36%) respectively. There's the need for comprehensive smoke-free policies targeted at young adults.

Poly tobacco use can be influenced by several marketing techniques. Use of poly tobacco products has increased in recent years given the novelty of some of the products and marketing directed at young adults [24–26]. A study by Herrera et al. [24], found that increased exposure to free samples and marketing from the tobacco industry at night clubs/bars increased the number of products used among non-tobacco users 6 months later. Another study found that advertising of any tobacco product on Reddit (social media site) increased the odds for e-cigarette use among young adults [25,27]. These studies suggest young adults are a key population targeted in tobacco marketing. Additionally, contrary to prior research showing that about 6.9% of study participants were dual users of cigarettes and other tobacco products[28] , we found that about 3.6 % of our

study population used two or more products. While the previous study[28], included the general adult population in their sample, we advance research by focusing on poly tobacco use patterns among young adults 18-30 years of age.

Single tobacco use is lower among foreign born and there are several factors that can explain the variation. Our study is also consistent with prior findings indicating that the foreign-born have lower prevalence of single or product use compared to the US-born population [1,29,30]. However, our study is unique in focusing on the young adult population and showing a lower prevalence of single or any tobacco product use in the foreign-born. There are at least two potential explanations for these findings. One is that foreign-born young adults may be from a lower socioeconomic status than the US-born and thus do not have the purchasing power to consume tobacco products. Some research has shown that foreign-born healthier individuals with higher socio-economic status tend to stay in their home countries[31]. Second, some authors have found that parents' healthy behavior approach and higher parental monitoring for their children may be responsible for lower prevalence tobacco product use in foreign-born young adults [31,32]. Previous research indicates that among adolescents, e-cigarette use is more common than cigar use [33]. In our study, the prevalence estimate was slightly higher for cigar use compared to e-cigarette use among US-born young adults. This difference may be explained by the exclusion of non-Latino Whites in the analyses due to a small foreign-born sample size.

The findings from our study are subject to some limitations. Although NHIS is a nationally representative of the U.S. population, we restricted our sample to the young adult population with a sizeable foreign-born segment. Results may not generalize to other young adult groups such as non-Latino whites. Self-reported data are also prone to recall bias. As a cross-sectional study, causal inference is limited since we are not able to demonstrate that nativity status led to the tobacco use patterns we observed. However, reverse causality is unlikely since tobacco use per se does not influence nativity status. Another limitation is the sample size. Although the total foreign-born population sample was sufficient to detect statistically significant associations, the use of certain tobacco products had insufficient numbers of foreign-born individuals, thereby possibly limiting study power.

5. Conclusions

This study provides several important implications for public health decision-making, policy, and practice. The nativity differences in tobacco use are crucial to help guide tobacco prevention and control efforts among the young adult population. Findings from the study also suggest the need for further research into the protective factors of tobacco use among the foreign-born young adults. This study contributes to the growing evidence on the need to prevent smoking initiation by expanding adolescent tobacco prevention programs to include the young adult population, as not all populations initiate during adolescence. Our study also provides insights on the expansion of tobacco prevention funding and policies for young adults in order to ensure tobacco-free generations. Finally, there's a need for the implementation of comprehensive tobacco-control policies and anti-tobacco campaigns especially targeted at the young adult population. Policies can also be enacted to limit the presence of tobacco stores in close proximity to college campuses.

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