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Associations between Race, Ethnicity, Religion, and Waterpipe Tobacco Smoking

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Abstract

We surveyed a random sample of 852 students at a large university in 2010–2011 to clarify associations between waterpipe tobacco smoking (WTS), ethnicity, and religion. Current (30-day) WTS was reported by 116 students (14%), and 331 (39%) reported ever use. Middle Eastern ethnicity was associated with current WTS (OR=2.37, 95% CI=1.06, 5.34) and ever WTS (OR=2.59, 95% CI=1.22, 5.47). South Asian ethnicity was associated with *lower* odds for ever WTS (OR=0.42, 95% CI=0.21, 0.86), but there was no significant association between South Asian ethnicity and current WTS. Being an Atheist and having lower religiosity were associated with both WTS outcomes.

Keywords

Hookah; Tobacco; Smoking; Race; Ethnicity; Arab-American; Asian; South Asian; Eastern Mediterranean; Religion

INTRODUCTION

While cigarette smoking in the U.S. is at its lowest in decades (National Association of Attorneys General, 2006), waterpipe tobacco smoking (WTS) is increasing across the U.S. (Luch, 2012; Maziak, 2011; Primack et al., 2013; Primack, Walsh, Bryce, & Eissenberg, 2009) and is particularly high among U.S. undergraduate students in national samples (Grekin & Ayna, 2012; Primack, Fertman, Rice, Adachi-Mejia, & Fine, 2010). These increased rates may be related to widespread perception that WTS is less harmful than cigarette smoking (Nakkash, Khalil, & Affifi, 2011; Noonan & Kulbok, 2009). This may stem from the aesthetic appeal of WTS, its sweet smell, the use of flavored tobacco, and the belief that water in the bowl “filters” the smoke (Carroll, Shensa, & Primack, 2012; Grekin & Ayna, 2012; Noonan & Kulbok, 2009; Primack et al., 2012). However, WTS contains substantial amounts of toxicants (Cobb, Shihadeh, Weaver, & Eissenberg, 2011; Eissenberg & Shihadeh, 2009; Alan Shihadeh & Saleh, 2005; A. Shihadeh et al., 2012). The World Health Organization estimates that a single WTS session may expose the user to 100 or more times the inhaled smoke compared with use of a single cigarette (World Health Organization, 2005). Although evidence is only preliminary, WTS has been linked to cancer, cardiovascular disease, decreased pulmonary function, and nicotine dependence (Al Suwaidi et al., 2012; Alsatari, Azab, Khabour, Alzoubi, & Sadiq, 2012; Auf et al., 2012; Raad et al., 2011).

In order to most appropriately target prevention and treatment interventions, prior studies in this area have assessed which socio-demographic characteristics are most strongly associated with WTS. For example, national U.S. studies suggest that users tend to be males in the initial years of college (Grekin & Ayna, 2012; Primack, et al., 2013). Current data also suggest that, compared with those of other racial and ethnic backgrounds, Caucasians are more likely to be WTS users (Grekin & Ayna, 2012; Primack, et al., 2013; Smith-Simone, Maziak, Ward, & Eissenberg, 2008). However, the race category of “Caucasian” in U.S. Census data includes Middle Eastern descent. Thus, the presumed association between Caucasian race and WTS may be driven by this Middle Eastern subgroup. However, although the practice has roots in the Middle East, empiric data are mixed in terms of whether there is actually an association between WTS and Middle Eastern ethnicity in the U.S. For example, a recent survey of over 2000 college students showed that, while Middle Eastern ethnicity was significantly associated with past-month WTS in multivariable models, it was not significantly associated with ever WTS (Abughosh, Wu, Peters, Hawari, & Essien, 2012).

Similarly, although extant studies generally suggest no specific association between Asian race and WTS (Grekin & Ayna, 2012; Primack, et al., 2013; Smith-Simone, et al., 2008), there may be important increases in this behavior among South Asians (e.g. Indians,

Pakistanis) because the practice has origins on the Indian subcontinent (Chattopadhyay, 2000). However, when this subgroup has been considered separately, results are mixed, with Indian or Pakistani descent being significantly associated with WTS for some outcomes but not others (Abughosh, et al., 2012).

Another complicating factor related to this line of research is the definition of “Middle Eastern,” and “South Asian,” because the studies that have been conducted in this area have utilized survey instruments which do not specifically elucidate these terms. Thus, there is a need to clarify associations between WTS and ethnicity, preferably with measurement tools that utilize accepted and elucidated definitions of certain key ethnicities.

WTS may also be associated with religion. Some data suggest that those with more religiosity in general are often less likely to use substances such as tobacco (Nollen, Catley, Davies, Hall, & Ahluwalia, 2005; Nonnemaker, McNeely, & Blum, 2006; Timberlake et al., 2006). However, WTS and cigarette smoking patterns among college students often strongly diverge. For example, a recent study suggested that, while club and intramural sports athletes were less likely than their non-athletic counterparts to smoke cigarettes, these athletes were simultaneously *more* likely than their counterparts to use WTS, both within the past 30 days and ever (Primack, et al., 2010). Furthermore, there are specific cultural reasons to believe that certain religious characteristics may be associated with *increased* WTS. For example, Muslim groups are known to engage in the practice, both on and off of college campuses (Syed, 2008). Similarly, waterpipes have been used across the U.S. in collegiate Jewish student society events, such as “Hookah in the Sukkah,” as part of the celebration of the Jewish harvest season (Lewin, 2006). Because of the aforementioned factors, and travel to Israel, where WTS is common, there may be higher rates of WTS among both Jewish Americans and Muslim Americans. Thus, there is a need to elucidate associations between WTS, religion, and religiosity.

Therefore, in order to help develop and implement appropriately-targeted intervention programs, the purpose of this project was to determine the independent associations between race, ethnicity, religion, and WTS. To achieve this aim, we conducted a Web-based survey of a random sample of University of Florida students with expanded assessments of ethnicity, religion, and WTS beyond those routinely provided in health surveys in this population.

METHOD

Procedures

We obtained from the registrar of the University of Florida a random sample of 2400 email addresses for first- and second-year undergraduate and graduate students for the 2010–11 school year. We focused on students in their initial years of schooling because these populations are particularly susceptible to new influences such as WTS (Grekin & Ayna, 2012; Primack, et al., 2013). In September 2010 we invited these individuals to participate in an online survey study. Participants were given a \$10 Amazon gift card for completing the survey. This project was approved by the University of Pittsburgh IRB (#PRO10070222) and the University of Florida IRB (#2010-U-598).

Measures

The survey consisted of items assessing WTS behaviors, race/ethnicity, religion and religiosity, and important sociodemographic covariates potentially associated with substance use behaviors.

WTS behaviors—We defined the primary outcome as any WTS use within the past 30 days, i.e. “current WTS.” This was selected for its known clinical relevance and its common usage in the biomedical and public health literature (Maziak, 2011; Primack, et al., 2013; Smith-Simone, et al., 2008). We defined the secondary outcome as any prior use of WTS, i.e. “ever WTS.” We also assessed other tobacco and marijuana use to place WTS rates in context.

Race and ethnicity—One item assessed students’ self-reported race using standard categories suggested by the National Institutes of Health. Because an insufficient number of individuals were Native American, Hawaiian, or Alaskan Natives, racial categories were categorized as White, Black, Asian, and Other. A separate item assessed self-reported ethnicity as Hispanic/Latino or not Hispanic/Latino. Because of the history of WTS, we also included two additional items assessing ethnicity as Middle Eastern and/or South Asian. A dichotomous item assessed Middle Eastern ethnicity by asking “Are you of Western Asian, North African, or Middle Eastern descent (such as Syria, Jordan, Lebanon, Israel, Tunisia, Algeria, Egypt, Yemen, Saudi Arabia, Iraq, or Iran)?” with possible responses of yes or no. A similar item assessed South Asian descent by asking “Are you of Southern Asian descent (such as India, Pakistan, Sri Lanka, or Bangladesh)?” with possible responses of yes or no.

Self-reported religion and religiosity—One item asked individuals to select from a list the term that best describes their religion, including (1) Atheist; (2) Catholic; (3) Other Christian; (4) Jewish; (5) Muslim; and (6) Other. In order to assess religiosity, we used two items based upon the Intrinsic/Extrinsic religiosity scale (Musgrave & McFarlane, 2004). Participants were asked “Are you a religious person?” and “Are you a spiritual person?” Responses were recorded on 4-point Likert scales, with response categories of definitely yes, somewhat yes, somewhat no, and definitely no.

Sociodemographic covariates—Other items assessed essential constructs potentially related to substance use in college, including age, sex, enrollment status (undergraduate vs. graduate student), and residence type (on-campus vs. off-campus).

Analysis

We summarized counts and percentages for outcomes (current and ever WTS), independent variables (race, ethnicity, religion, and religiosity), and sociodemographic covariates. Because all independent variables and covariates were categorical, we determined bivariable associations using chi-square tests.

We then used multiple logistic regression to determine independent associations between each of the independent variables and each outcome. We controlled in our primary models for all four key sociodemographic covariates (age, sex, undergraduate vs. graduate student

status, and residence type). However, to assess the robustness of results, we also conducted sensitivity analyses in which we only included covariates with bivariable associations with the outcome of $p < .10$.

A two-tailed alpha of 0.05 was used to define statistical significance. All analyses were conducted in Stata version 11.3 (Statacorp, College Station, TX).

RESULTS

Of the 2339 individuals who received an invitation (61 emails were returned), 852 (36%) completed the survey. Compared with the entire population to whom invitations were sent, respondents were younger (20.6 vs. 21.1, $p = .04$), more commonly female (46.8% vs. 40.0%, $p < .001$), and more commonly Caucasian (71.0% vs. 58.7%, $p < .001$). Of the 852 respondents, 37% were 18 years old, 31% were 19 years old, 6% were 20 years old, and 26% were 21 or over. About half (47%) of respondents were female, 76% were undergraduate, and 62% lived off-campus (Table 1).

Current WTS was reported by 116 (14%) individuals, and 331 (39%) reported ever use. By comparison, cigarette smoking was reported by 88 (10%) individuals in the past 30 days and 288 (34%) ever, and marijuana smoking was reported by 117 (14%) individuals in the past 30 days and 294 (35%) ever.

The majority of respondents were White (71%) or Asian (13%) race and Hispanic (17%), Middle Eastern (4%), or South Asian (5%) ethnicity. Religion was most commonly Christian (35%), Catholic (27%), or Atheist (22%); only 6% were Jewish and 1% Muslim. While only 36% agreed or strongly agreed they were a “religious person,” 71% endorsed being a “spiritual person” (Table 1).

Table 2 summarizes multivariable models, in which current WTS use was significantly associated with Middle Eastern ethnicity (OR=2.37, 95% CI=1.06, 5.34) but not South Asian ethnicity (OR=0.56, 95% CI=0.19, 1.62). There were no significant multivariable associations between current WTS and race or Hispanic ethnicity. With regard to religion, current WTS was associated with being Atheist (vs. being in any other religious category, OR=1.60, 95% CI=1.02, 2.52). While no other religious categories were significantly associated with current WTS, point estimates were highest for Jewish (OR=1.49, 95% CI=0.69, 3.20) and Muslim (OR=1.34, 95% CI=0.28, 6.37) participants. Both extrinsic religiosity (“being a religious person”) and intrinsic religiosity (“being a spiritual person”) were associated with lower odds for current WTS (Table 2).

Also displayed in Table 2, in multivariable models, ever WTS was associated with significantly higher odds of being of Middle Eastern ethnicity (OR=2.59, 95% CI=1.22, 5.47) but significantly lower odds of being of South Asian ethnicity (OR=0.42, 95% CI=0.21, 0.86) or Black race (vs. all other races, OR=0.51, 95% CI=0.28, 0.90). With regard to religion, ever WTS was associated with significantly higher odds of being Atheist (vs. being in any other religious category, OR=1.64, 95% CI=1.16, 2.32) but significantly lower odds of being Christian (OR = 0.71, 95% CI=0.52, 0.96). While no other religious categories were significantly associated with ever WTS, the point estimate was highest for the Jewish

group (OR=1.37, 95% CI = 0.74, 2.52). Both extrinsic religiosity (“being a religious person”) and intrinsic religiosity (“being a spiritual person”) were associated with lower odds for ever WTS (Table 2).

When we only included covariates with bivariable associations with the outcome of $p < .10$, all results were similar to the primary analyses represented above.

DISCUSSION

In this study of a random sample of students from one large Southeastern university, we found that current and ever WTS were significantly associated with higher odds of Middle Eastern ethnicity and Atheism, and lower odds of extrinsic or intrinsic religiosity. South Asian descent and Christian religion were significantly associated with lower odds for ever WTS only.

Our results for WTS smoking overall were higher than the general Florida population. In particular, the Florida Young Adult Tobacco Survey (“Florida Young Adult Tobacco Survey (FLYATS),” 2009) conducted among 18–24 year olds found ever use of 24% and current use of 9%, while we found ever use of 39% and current use of 14%. Our findings may be higher because WTS use is associated with college populations (Primack, et al., 2013), whereas the FLYATS was conducted among community-dwelling individuals. Additionally, our survey was more recent, and WTS use in Florida is increasing (“Florida Young Adult Tobacco Survey (FLYATS),” 2009).

In our study, Middle Eastern descent was significantly associated with increased odds for WTS for both outcomes in multivariable models. Other recent research among U.S. university students finds Middle Eastern ethnicity to be independently associated with current WTS use, but not ever use (Abughosh, et al., 2012). This differing outcome may be due to differing populations. Although both studies were conducted among large universities in the southern U.S., they were located in different cities. Middle Eastern descent was also measured differently in the two studies, as noted above. In either case, the association between Middle Eastern descent and WTS warrants further exploration.

South Asian descent was not associated with WTS for either outcome. In fact, South Asian descent was associated with significantly *lower* odds for ever WTS in multivariable models. This may seem reasonable, because although the practice has origins on the Indian subcontinent, WTS currently is practiced more widely in the Middle East (Maziak, 2011). However, this finding conflicts with some other results, which indicate that South Asian (Indian Asian and Pakistani Asian) descent was associated with significantly *higher* odds for current WTS (Abughosh, et al., 2012). Again, differences may be due to different populations and/or measurement differences.

Our results suggest that it would be valuable to target Middle Eastern populations (but not necessarily South Asian populations) for prevention and treatment programs. However, it may be challenging to intervene with this group and this behavior. For example, a recent high school based study showed that a generic anti-tobacco program did not improve WTS cessation among Arab-American adolescents (Rice, Weglicki, Templin, Jamil, & Hammad,

2010). Therefore, continued research and innovation in developing tailored interventions with this group and this particular type of tobacco use may be valuable.

These results also suggest that there may be specific value to elucidating definitions for key terms which could be differently interpreted, such as “Middle Eastern” or “South Asian,” especially in this particular area. At the very least, these results suggest it is highly valuable to assess Middle Eastern ethnicity specifically instead of only using the general term “Caucasian.” When time and space allows, even more specific operationalization of ethnicity would be valuable. For example, the current methodology did not discriminate between individuals with who had only one parent (vs. two parents) with Middle Eastern ethnicity. This may be valuable to assess in future studies with larger samples.

Jewish and Muslim religions were not significantly associated with WTS; however, we did not have sufficient statistical power to properly investigate these associations because only 6% and 1% of the sample were Jewish and Muslim, respectively. Because point estimates were relatively high for odds of current WTS among Jewish and Muslim participants, it would be valuable to explore these associations in larger samples.

Our results were consistent with others who have found higher religiosity to be associated with lower odds for tobacco use (Nollen, et al., 2005; Nonnemaker, et al., 2006; Timberlake, et al., 2006). However, as noted above, some religious groups had point estimates that suggested higher use. Thus, even if some members of certain religions are drawn to WTS use for cultural reasons, there may be important differences within those religious groups according to levels of both external and internal religious practice and belief.

Limitations

Our study was limited by its cross-sectional design, which reduces our ability to make causal inferences. Although it is unlikely that people who begin to use WTS subsequently change religion or religiosity, for example, this possibility must be considered. It is also important to note that external generalizability of our findings is limited in three ways. First, our use of a single study site limits drawing external inferences. Second, ethnic prevalence was relatively low, with only 4% Middle Eastern and 5% South Asian. While these proportions were substantial enough to utilize appropriate statistical methods to draw inferences, this still potentially reduces external generalizability of those findings. This study was also limited by an email survey response rate of 36%. Although systematic reviews have demonstrated 36% is a relatively strong response rate for this type of study (Sheehan, 2001), our sample respondents were slightly younger, more often female, and more often white than the sample frame provided. However, it should be noted that these differences were small and unlikely to have driven overall changes in study findings.

Conclusion

Despite these limitations, it is valuable to have clarified the associations between race, ethnicity, religion, and WTS. In particular, while in this population Middle Eastern ethnicity, Atheism, and low religiosity were associated with WTS, South Asian ethnicity was not. Our preliminary results in these areas will help guide future work, including further study in

larger samples to clarify whether there is any risk associated with Jewish and Muslim religions.

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Table 1
 Respondent Characteristics by Current and Ever Waterpipe Tobacco Use among a Random Sample of Students at the University of Florida, 2010–2011.

Characteristic	Total sample* (n = 842 [†])	Current Waterpipe Tobacco User [†] (N = 852)		Ever Use Waterpipe Tobacco (N = 842 [†])		p [§]
		Yes (n = 116)	No (n = 736)	Yes (n = 331)	No (n = 511)	
Demographic Covariates						
Age						.001
18	313 (37)	45 (39)	268 (37)	98 (30)	213 (43)	
19	259 (31)	46 (40)	213 (30)	113 (35)	144 (29)	
20	51 (6)	9 (8)	42 (6)	28 (9)	22 (4)	
21 or more	214 (26)	15 (13)	199 (28)	87 (27)	122 (24)	
Sex						.28
Female	397 (47)	49 (42)	348 (47)	147 (45)	246 (48)	
Male	452 (53)	67 (58)	385 (53)	183 (55)	263 (52)	
Enrollment status						.26
Undergraduate	640 (76)	99 (86)	541 (75)	242 (74)	391 (77)	
Graduate	201 (24)	16 (14)	185 (25)	85 (26)	114 (23)	
Residence						.051
On Campus	318 (38)	51 (44)	267 (37)	111 (34)	206 (41)	
Off Campus	522 (62)	64 (56)	458 (63)	215 (66)	299 (59)	
Independent Variables						
Race						.028
White	588 (71)	85 (75)	503 (70)	238 (74)	346 (69)	
Black	71 (9)	6 (5)	65 (9)	17 (5)	54 (11)	
Asian	109 (13)	14 (12)	95 (13)	39 (12)	70 (14)	
Other	60 (7)	9 (8)	51 (7)	27 (8)	32 (6)	
Ethnicity						

Characteristic	Total sample*	Current Waterpipe Tobacco User [†] (N = 852)		Ever Use Waterpipe Tobacco (N = 842 [‡])		p [§]
		Yes (n = 116)	No (n = 736)	Yes (n = 331)	No (n = 511)	
Hispanic	145 (17)	26 (22)	119 (16)	67 (20)	78 (15)	.059
Middle Eastern	32 (4)	9 (8)	23 (3)	19 (6)	12 (2)	.01
South Asian	44 (5)	4 (3)	40 (6)	11 (3)	33 (7)	.047
Religion						.035
Atheist	177 (22)	33 (28)	144 (20)	86 (27)	91 (18)	
Catholic	221 (27)	30 (26)	191 (27)	88 (27)	131 (26)	
Other Christian ^{//}	287 (35)	36 (31)	251 (35)	97 (30)	189 (38)	
Jewish	46 (6)	9 (8)	37 (5)	21 (6)	24 (5)	
Muslim	11 (1)	2 (2)	9 (1)	4 (1)	7 (1)	
Other	81 (10)	6 (5)	75 (11)	27 (8)	53 (11)	
Religious Person						<.001
Strongly Disagree	179 (21)	30 (26)	149 (21)	90 (28)	88 (17)	
Disagree	162 (19)	27 (23)	135 (19)	66 (20)	95 (19)	
Agree	324 (34)	45 (39)	279 (39)	127 (39)	195 (39)	
Strongly Agree	170 (2)	13 (11)	157 (22)	40 (12)	128 (25)	
Spiritual Person						<.001
Strongly Disagree	108 (13)	20 (18)	88 (12)	50 (15)	57 (11)	
Disagree	135 (16)	21 (18)	114 (16)	56 (17)	79 (16)	
Agree	368 (44)	54 (47)	314 (43)	157 (48)	208 (41)	
Strongly Agree	228 (27)	19 (17)	209 (29)	62 (19)	164 (32)	

* N = 852. Cells represent column percentages. Data do not always sum to total sample sizes because of missing data. Percentages are based on the total for each category and may not total 100 due to rounding.

[†] Defined as having smoked tobacco from a hookah in the last 30 days at least once.

[‡] Data were missing for 10 participants from the complete sample.

[§] For chi-square analyses.

^{//} Included Native American/Alaskan Native, Native Hawaiian, and Other.

Included Protestant and Other Christian, aside from Catholic.

Table 2

Bivariable and Multivariable Associations between Independent Variables and Waterpipe Tobacco Smoking among a Random Sample of Students at the University of Florida, 2010–2011.

Participant Characteristic	Current Waterpipe Tobacco User* (N = 852)		Ever Use Waterpipe Tobacco (N = 842 [†])	
	OR (95% CI)	AOR [‡] (95% CI)	OR (95% CI)	AOR [‡] (95% CI)
Race				
White	1.0 [Reference]	1.0 [Reference]	1.0 [Reference]	1.0 [Reference]
Black	0.55 (0.23, 1.30)	0.53 (0.22, 1.28)	0.46 (0.26, 0.81)	0.51 (0.28, 0.90)
Asian	0.87 (0.48, 1.60)	0.89 (0.48, 1.65)	0.81 (0.53, 1.24)	0.78 (0.50, 1.21)
Other [§]	1.04 (0.50, 2.20)	0.94 (0.44, 2.00)	1.23 (0.72, 2.10)	1.29 (0.74, 2.26)
Ethnicity				
Hispanic	1.49 (0.92, 2.41)	1.31 (0.80, 2.15)	1.42 (0.99, 2.03)	1.34 (0.92, 1.95)
Middle Eastern	2.58 (1.16, 5.73)	2.37 (1.06, 5.34)	2.54 (1.22, 5.30)	2.59 (1.22, 5.47)
South Asian	0.61 (0.22, 1.75)	0.56 (0.19, 1.62)	0.50 (0.25, 1.002)	0.42 (0.21, 0.86)
Religion				
Atheist	1.55 (0.998, 2.42)	1.60 (1.02, 2.52)	1.61 (1.15, 2.25)	1.64 (1.16, 2.32)
Catholic	0.94 (0.60, 1.47)	0.86 (0.55, 1.36)	1.04 (0.76, 1.43)	1.04 (0.75, 1.44)
Christian	0.82 (0.54, 1.25)	0.85 (0.56, 1.31)	0.69 (0.52, 0.94)	0.71 (0.52, 0.96)
Jewish	1.52 (0.71, 3.24)	1.49 (0.69, 3.20)	1.36 (0.75, 2.49)	1.37 (0.74, 2.52)
Muslim	1.36 (0.29, 6.37)	1.34 (0.28, 6.37)	0.87 (0.25, 3.01)	0.84 (0.24, 2.94)
Other	0.46 (0.20, 1.08)	0.48 (0.20, 1.14)	0.76 (0.47, 1.24)	0.71 (0.43, 1.16)
Religious Person				
Strongly Disagree	1.0 [Reference]	1.0 [Reference]	1.0 [Reference]	1.0 [Reference]
Disagree	0.99 (0.56, 1.76)	1.02 (0.57, 1.82)	0.68 (0.44, 1.04)	0.69 (0.44, 1.07)
Agree	0.80 (0.48, 1.32)	0.73 (0.44, 1.22)	0.64 (0.44, 0.92)	0.62 (0.43, 0.91)
Strongly Agree	0.41 (0.21, 0.82)	0.42 (0.21, 0.85)	0.31 (0.19, 0.48)	0.30 (0.19, 0.48)
<i>P</i> _{Trend}	.01	.01	<.001	<.001
Spiritual Person				
Strongly Disagree	1.0 [Reference]	1.0 [Reference]	1.0 [Reference]	1.0 [Reference]
Disagree	0.81 (0.41, 1.59)	0.86 (0.43, 1.69)	0.81 (0.48, 1.35)	0.79 (0.47, 1.32)
Agree	0.76 (0.43, 1.33)	0.78 (0.44, 1.38)	0.86 (0.56, 1.33)	0.82 (0.52, 1.27)
Strongly Agree	0.40 (0.20, 0.79)	0.44 (0.22, 0.89)	0.43 (0.27, 0.70)	0.42 (0.25, 0.69)
<i>P</i> _{Trend}	.009	.02	.001	.001

* Defined as having smoked tobacco from a hookah at least once in the past 30 days.

[†] Data were missing for 10 participants from the complete sample.

[‡] Adjusted for age, sex, enrollment status, and housing.

[§] Included Native American/Alaskan Native, Native Hawaiian, and Other.