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Assessing Attitudes toward Nicotine Replacement Therapy for Adolescent Smoking Cessation

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ABSTRACT

The objective was to ascertain attitudes toward nicotine replacement therapy for adolescent tobacco cessation. The authors created a 17-item survey consisting of demographics, quantitative, and qualitative items which was distributed to middle and high school students in North Central Florida. The authors assessed associations and conducted discriminant analyses to compare results by age. One-hundred ninety-eight students completed the survey (57.6% female, 61.6% white). When asked to select the best way to help teens stop using tobacco, combination of methods was most frequently selected (31.6%), followed by “Cold Turkey” (19.5%), e-cigarettes (16.8%), NRT (14.7%), Counseling (10.5%), and Alternative Therapies (6.8%). Qualitative data from students revealed misconceptions toward tobacco use, but an overall awareness that tobacco is a harmful. High school students were more likely than middle school students to agree that nicotine is harmful and e-cigarettes or chewing tobacco are less harmful than traditional cigarettes. Discriminant analyses were inconclusive. These data highlight misconceptions regarding tobacco use and nicotine that might play a role in attitudes toward NRT for adolescent tobacco cessation. Whereas high school students might be more likely to agree nicotine is harmful, their decreased perception of harm of alternative tobacco products such as e-cigarettes or chewing tobacco could be problematic. Further research in this area remains a priority.

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BACKGROUND

Whereas tobacco prevention is heavily funded and researched, there remains no best practice for adolescent smoking cessation. Studies have shown that people who are addicted to smoking and smokeless tobacco products started to use those products during adolescence (U.S. Department of Health and Human Services, HHS, 2012). According to Centers for Disease Control and Prevention (CDC) national adolescent tobacco use prevalence, including cigarettes, cigars, and hookahs, was 7.7% for middle school students and 24.6% for high school students in 2014 (Arrazola et al., 2015). There remains a need for public health professionals to educate adolescents or disseminate information about tobacco cessation methods to assist adolescents in quitting (HHS, 2012; HHS, 2014).

Existing cessation methods include self-care, educational approaches, mass media and community programs, risk factor preventive trials, physician counseling, acupuncture, hypnosis, behavioral methods, medication, nicotine chewing gum or patch, and e-cigarettes (Fiore, 2008). Nicotine replacement therapies include the patch, gum, lozenge, inhaler, and

nasal spray. Although some products have side effects, such as nausea or problems sleeping, each of these products, have shown success in assisting tobacco users to quit (Hanson, Allen, Jensen, & Hatsukami, 2003; Moolchan et al., 2005). Whereas such treatment and cessation methods are heavily researched, only a few of studies have focused on adolescent populations. NRT has been found safe for adolescent use, but it is not yet widely recommended due to lack of evidence on effectiveness (Fiore, 2008). In order for NRT to be widely recommended, researchers need to address the issue of adherence among adolescents.

Purpose

This study aimed to ascertain the attitudes of adolescents toward NRT as a mechanism for adolescent tobacco cessation. The current study also analyzed whether perceptions toward tobacco or NRT and influence of knowing someone who used tobacco or NRT varied by grade level.

METHODS

The authors created a 17-item survey consisting of demographic, quantitative, and qualitative items. Two

schools were selected based on school board approval: one middle school and one high school from North Central Florida. Study description and consent forms were distributed by school personnel to students via physical education courses or during breakfast, depending on school schedule. Once parental signature was obtained for students under age 18, paper surveys were distributed. This study was approved by IRB02.

The survey consisted of three demographic items: grade, sex, and ethnicity/race. Additional descriptive items included: *do you know someone uses e-cigarettes; do you know someone who uses NRT; and do you know someone who uses or has used tobacco (cigarettes, chew, dip, etc.)*. The answer choices for each of these were *yes* or *no*.

Six items were used to assess nicotine perception. Students were asked to choose the extent to which they agree with each of the following items, each with the answer choices strongly agree, agree, disagree, strongly disagree, or I don't know: *nicotine is harmful; e-cigarettes are less harmful than traditional cigarettes; chewing tobacco is less harmful than traditional cigarettes; NRT are a good way to help people stop using tobacco*. Students were asked to choose the best way to help teens stop using tobacco among the following items: *counseling, alternative therapies, NRT (patch, gum, lozenge), no method ("cold turkey"), combination of above, or e-cigarettes*. The survey also contained one qualitative item: *In your own words, why is tobacco harmful?*

Data Analysis

Data were input and analyzed using SPSS version 21. We aggressively tried to retain all data reported from participants. However, one participant was dropped from analysis because the participant did not answer 47% of the questions. Missing data were replaced by the median of variable. Normality analyses of all variables indicated data were normally distributed. Categorical items were analyzed using chi-square tests; continuous variables analyzed using t-test. The qualitative item was analyzed using an iterative process. First, two researchers read through each item and generated a list of codes. Next, two researchers independently coded each item based on the generated *a priori* codes. Codes were then compared, with an inter-rater reliability score of 96.3%.

Discriminant analyses were conducted to compare responses among three groups of adolescents: people who were in (1) 6th, 7th, or 8th grade (MS), (2) 9th or 10th grade (HS1), and (3) 11th or 12th grade (HS2). Variables that were highly correlated to the discriminant variable were identified. Furthermore, the authors conducted follow-up procedures for each

discriminant analysis to examine which group generated the difference for both their perceptions and knowing someone who has used or uses nicotine or cessation treatments.

RESULTS

A total of 198 students completed the survey. The majority of participants identified as female (n=114; 57.6%) and white (n=122; 61.6%). When asked to select the best way to help teens stop using tobacco, combination of methods was most frequently selected (31.6%), followed by "Cold Turkey" (19.5%), e-cigarettes (16.8%), NRT (14.7%), Counseling (10.5%), and Alternative Therapies (6.8%). Qualitative analyses identified 14 codes: no response (n=20), inappropriate/silly (n=31), inaccurate (n=2), cancer (n=57), heart disease (n=5), addictive (n=22), vaguely negative (n=65), cost (n=7), smell (n=11), toxins (n=13), breathing (n=8), general health (n=40), performance related (n=6), secondhand smoke (n=3). Of those, 68 respondents had multiple codes. Sample qualitative responses are in Table 1.

Associations

Students were asked to report their perception of harm of nicotine, e-cigarettes, and chewing tobacco. They were also asked to report whether they knew someone who has used or uses e-cigarettes, NTR, and tobacco. A total of 49.5% (n=98) participants reported nicotine is harmful and 41.9% (n=83) agreed that e-cigarettes are less harmful than traditional cigarettes, yet 30.8% (n=61) disagreed that chewing tobacco is less harmful than traditional cigarettes. A large number (67.2%, n=133) knew someone who has used e-cigarettes, 53.5% (n=106) knew someone who someone who has used NRT, and 89.9% (n=178) knew someone who used tobacco.

Chi-square tests were conducted to determine significance of associations. Students were more likely to report e-cigarettes were less harmful than traditional cigarettes if they knew someone who had used e-cigarettes ($p < .001$, $\eta^2 = .329$) or NRT ($p = .005$; $\eta^2 = .231$). Similarly, students were more likely to report chewing tobacco as less harmful than traditional cigarettes if they knew someone who had used e-cigarettes ($p < .001$, $\eta^2 = .314$), NRT ($p = .01$, $\eta^2 = .214$), or chewing tobacco ($p = .04$, $\eta^2 = .181$).

Table 2 contains descriptive statistics for three groups of respondents (1) MS (n=32), (2) HS1 (n=110), and (3) HS2 (n=56). On average, high school students were more likely to agree that nicotine is harmful and e-cigarettes or chewing tobacco are less harmful. Also, students in HS1 were more likely to know someone who has used tobacco products or

Table 1
Sample Qualitative Responses

Code	# Responses	Sample Response
Vaguely Negative	65	“Because it kills people”
Cancer	57	“It causes cancer”
General Health	40	“It destroys your health, deteriorates your body slowly.”
Inappropriate/Silly	31	“Cause tobacco comes from the ground, and that's where creatures live.”
Addictive	22	“It is addictive, so you can't stop. Even if you want to.”
Toxins	13	“It has over 200 known chemicals in it”
Smell	11	“Tobacco is harmful because it smells really bad”
Breathing	8	“Tobacco fills and dirties your lungs, making it hard to breathe.”
Cost	7	“Because it is expensive.”
Performance Related	6	“You get tired faster and you can't exercise without feeling like you are about to die!”
Heart Disease	5	“It increases the chance of a heart attack.”
Secondhand Smoke	3	“It also can harm people around the user.”
Inaccurate	2	“Tobacco itself is not harmful. The plant itself has medicinal properties.”
No Response	20	

treatments than those in HS2 and MS. Further discriminant analyses were inconclusive.

DISCUSSION

Our aims were to: (1) gain understanding regarding acceptability of nicotine replacement therapy products for adolescent tobacco cessation; (2) examine whether there were grade level differences regarding the attitude toward NRT for adolescent tobacco cessation; and (3) identify whether there were grade level differences regarding knowing someone who has used tobacco or tobacco treatment products.

Analyses indicated that high school students were more likely than middle students to agree that nicotine is harmful, NRT and e-cigarettes are less harmful than traditional cigarettes, and natural remedies are safer. Also, high school students, especially those who are in the 9th and 10th grade, were more likely to know someone who used tobacco or used NRT and e-cigarettes.

Perception of harm reduction products such as e-cigarettes and chewing tobacco were largely associated with knowing someone who used NRT, e-cigarettes, or chewing tobacco, yet knowing someone who used this

product did not influence perception of NRT. Some of the qualitative responses related to nicotine indicated that adolescents might perceive products like the nicotine patch or nicotine gum as harmful themselves, whereas products such as e-cigarettes did not appear to have this same negative perception. It's possible that the increased positive marketing of e-cigarettes has influenced this perception. It's also possible students have seen parents struggle with quitting while using traditional NRT products yet find success with e-cigarettes or going cold turkey.

This study did face some limitations. First, this was a self-reported study, subject to memory and recall bias which could be a threat to the validity of this study. During the study review process with the school board, items related to individual smoking status were eliminated. Therefore, we were not able to analyze associations between items included in our study and participant's tobacco use behaviors. Among the population sampled, 2014 data cite approximately 24% of students within the county as current tobacco users (Florida Department of Health, 2015), so we do anticipate a portion of the students currently used some form of tobacco. However, this survey does provide

Table 2
Descriptive Statistics by Grade Level

	MS N=32 (%)	HS1 N=110 (%)	HS2 N=56 (%)	Total N=198 (%)
<i>Sex</i>				
Boy	46.9	38.2	48.2	42.4
Girl	53.1	61.8	51.8	57.6
<i>Ethnicity origin</i>				
Black or African American	12.5	10.0	14.3	11.6
Hispanic or Latino	12.5	14.5	12.5	13.6
Native American or American Indian	0	1.8	1.8	1.5
Asian/Pacific Islander	21.9	0.9	5.4	5.6
White	46.9	67.3	58.9	61.6
Other	6.3	5.5	7.1	6.1
<i>Tobacco is harmful</i>				
Strongly Agree	65.6	44.5	50.0	49.5
Agree	15.6	35.5	28.6	30.3
Disagree	0	6.4	3.6	4.5
Strongly Disagree	12.5	1.8	7.1	5.1
I don't know	6.3	11.8	10.7	10.6
<i>E-Cigarettes are less harmful than traditional cigarettes</i>				
Strongly Agree	18.8	19.1	14.3	17.7
Agree	43.8	44.5	35.7	41.9
Disagree	6.3	12.7	14.3	12.1
Strongly Disagree	6.3	3.6	8.9	5.6
I don't know	25.0	20.0	26.8	22.7
<i>Chewing tobacco is less harmful than traditional cigarettes</i>				
Strongly Agree	3.1	8.2	8.9	7.6
Agree	6.3	14.5	12.5	12.6
Disagree	31.3	30.9	30.4	30.8
Strongly Disagree	31.3	29.1	30.4	29.8
I don't know	28.1	17.3	17.9	19.2
<i>Do you know someone who has used or uses E-cigarettes?</i>				
Yes	28.1	77.3	69.6	67.2
No	71.9	22.7	19.7	32.8
<i>Do you know someone who has used or uses NRT?</i>				
Yes	28.1	60.9	53.6	53.5
No	71.9	39.1	46.4	46.5
<i>Do you know someone who has used or uses tobacco?</i>				
Yes	78.1	93.6	89.3	89.9
No	21.9	6.4	10.7	10.1

general information about overall perceptions of nicotine replacement therapy.

Implications for Public Health Practice

Data collected highlight overall perceptions regarding smoking and nicotine that might play a role in attitudes toward NRT for adolescent smoking cessation, as well as differences among grade levels. Further research in this area remains a priority. Future study is needed to analyze the association between participant's tobacco use status and whether they know someone that is close to them, such as family members, significant others, or someone that is not relevant to them who used tobacco products or treatments. Qualitative interviews among adolescent tobacco users would also provide greater information and understanding about the acceptability of NRT for this population. With particular reference to Florida, data may highlight a need for further instruction within

tobacco prevention about specific mechanisms related to nicotine. Students demonstrated knowledge of the harm of tobacco in general but were less versed in particulars related to physiology and addiction. Tobacco prevention efforts within Florida public schools might be improved by including more specific information about the mechanism of tobacco addiction.

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