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Risk perceptions of smokeless tobacco among adolescents and adult users and nonusers

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Abstract

The recent growth in smokeless tobacco (ST) consumption has raised questions about consumer risk perceptions of ST products, especially in high-risk vulnerable populations. This qualitative study examined risk perceptions of ST among adolescent and adult users and non-users in Ohio Appalachia. Focus groups and interviews were held with adolescents (n=53; mean age of 17 years) and adults (n=63; mean age of 34 years) from four Ohio Appalachian counties. Participants were asked about their perceptions of ST-related health risks, ST safety, and the relative safety of ST compared to cigarettes. Transcriptions were coded independently by two individuals. Overall, participants were knowledgeable about health problems from ST use (e.g., oral cancers, periodontal disease). Nearly all participants stated that ST use is not safe; however, there was disagreement about its relative safety. Some perceived all tobacco products as equally harmful; others believed that ST is safer than cigarettes for either the user or those around the user. Disagreements about ST relative safety may reflect mixed public health messages concerning the safety of ST. Comprehensive consumer messages about the relative safety of ST compared to cigarettes are needed. Messages should address the effect of ST on the health of the user as well as those exposed to the user.

Introduction

While higher cigarette taxes and smoke-free policies have contributed to declines in cigarette consumption in the United States (U.S.), consumption of smokeless tobacco (ST) has risen significantly (Food and Agriculture Organization of the United Nations, 2003; Giovino, 2007). In 2011, sales of ST in U.S. convenience stores reached over 1 billion units, a 57% increase from 2005 (Delnevo et al., 2012). Moist snuff, which is finely ground or shredded tobacco, represents a large majority of total ST sales (Federal Trade Commission, 2011). Since 2006, major U.S. cigarette companies, R.J. Reynolds (Reynolds American) and

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Philip Morris USA (Altria Group), have acquired ST companies (Conwood and U.S. Smokeless Tobacco Company, respectively) and introduced a variety of novel ST products under cigarette brand names such as Camel Snus, Camel Dissolvables, and Marlboro Snus (Biener & Bogen, 2009; Centers for Disease Control and Prevention, 2012; Federal Trade Commission, 2009; Rogers, Biener, & Clark, 2010; Romito, Saxton, Coan, & Christen, 2011). These novel ST products include snus (a spit-free form of moist snuff packaged in small pouches that are placed between the cheek and gum), which originated in Sweden, and dissolvable tobacco (a lozenge, strip, or stick that melts in the mouth; Hatsukami, Ebbert, Feuer, Stepanov, & Hecht, 2007; Carpenter, Connolly, Ayo-Yusuf, & Wayne, 2009). Snus and dissolvable tobacco products, which do not require spitting, have been heavily marketed as alternative products for cigarette smokers to use in situations where smoking is prohibited or when inconvenient (Carpenter et al., 2009).

The recent growth in ST promotion and consumption has raised questions about consumer perceptions regarding the safety of these products, especially in high-risk vulnerable populations. Research on risk perceptions of tobacco products has mostly focused on smoker attitudes and beliefs about conventional and “potential reduced exposure” cigarettes (e.g., OMNI, Advance, Eclipse, and Accord) in the general population (Hamilton et al., 2004; Institute of Medicine, 2011; Shiffman, Pillitteri, Burton, & Di Marino, 2004). The International Tobacco Control Four-Country Survey (ITC-4), a telephone survey of adult cigarette smokers, has provided some survey data on smoker beliefs about the relative safety of ST. Data from several waves of the ITC-4 show that relatively few U.S. cigarette smokers (e.g., 8% to 13% across waves 1-3) among those aware of ST believed that any ST products are less harmful than cigarettes (Borland, Cooper, McNeill, O'Connor, & Cummings, 2011; O'Connor, Hyland, Giovino, Fong, & Cummings, 2005; O'Connor et al., 2007). Beliefs about the relative safety of products appear to be influenced by whether one uses the product. O'Connor et al. found that cigarette smokers who concurrently used ST, known as “dual users,” were 2.7 times more likely than cigarette only smokers to believe that ST is less harmful than cigarettes (O'Connor et al., 2007). Among a nationally representative sample of U.S. consumers, McClave-Regan and Berkowitz (2011) found that 45% of ST only users believed that ST is less harmful compared to 8% of dual users and 2% of cigarette only smokers.

A few recent studies have used qualitative methods to better understand consumer perceptions of a variety of tobacco products (Choi, Fabian, Mottey, Corbett, & Forster, 2012; Sami et al., 2012; Wray, Jupka, Berman, Zellin, & Vijaykumar, 2012). Qualitative methods such as focus groups and interviews are especially useful for examining reasons and cognitive processes underlying individual perceptions (Kreuger, 1988). Consistent with survey findings from ITC-4, Sami et al. found that smokers perceived ST as more harmful than cigarettes. The constant and direct contact of ST with mouth tissue and lack of control over nicotine delivery were reasons for perception of greater harm associated with ST. Despite knowledge of health risks associated with cigarettes, smokers in the study were not motivated to quit or interested in reducing harm by switching to ST (Sami et al., 2012). Meanwhile, findings from focus groups with young adults reveal that there is some confusion and disagreement about the relative risks of tobacco products (Choi et al., 2012; Wray et al., 2012). Some young adults viewed novel ST products such as snus and

dissolvable tobacco as equally or more harmful as cigarettes; others perceived these products as less harmful than cigarettes because they are smokeless.

While these qualitative studies begin to broaden our understanding of tobacco risk perceptions, additional research that examines risk perceptions of ST by tobacco status and focuses on high-risk vulnerable populations is needed to inform future tobacco counter-marketing strategies. Risk perceptions (i.e., beliefs about potential harm and severity of harm) are a central component of many health behavior theories including the Health Belief Model (Rosenstock, 1974), Theory of Reasoned Action (Fishbein & Ajzen, 1975), Theory of Planned Behavior (Ajzen, 1985), and Extended Parallel Processing Model (Witte, 1992), which posit that intrapersonal factors such as knowledge, beliefs, and attitudes have a significant role in influencing individual behavior. These theories underscore the importance of understanding individual health motivations and beliefs about potential harm (“perceived susceptibility”) and severity of consequences (“perceived severity”).

The purpose of this qualitative study was to examine risk perceptions of ST products among adolescent and adult users and non-users in the Appalachian region of Ohio, where tobacco use, especially ST, is high and part of the culture and social norm (Meyer, Toborg, Denham, & Mande, 2008; Wewers et al., 2000). Understanding adolescent and adult risk perceptions of ST will help inform counter-marketing strategies and frame public health messages to prevent ST initiation and encourage cessation, especially among high-risk vulnerable populations.

Methods

Sample

Adolescents and adults in four Ohio Appalachian counties were recruited for this study. Through flyers, adolescent participants were purposively recruited from public and vocational schools and adult participants were purposively recruited from community colleges, colleges, churches, farm bureau agencies, and health department clinics. Eligibility criteria included being a resident of one of four Ohio Appalachian counties and at least 15 years old for the adolescent group and at least 18 years old for the adult group. Participants were asked if they currently use ST and how often they use. ST use was defined as self-reported *daily* use of chew and/or snuff or use on *most days*. The sample for this analysis consisted of adolescents (n=53) and adults (n=63). Assent was obtained from adolescent participants and informed consent was obtained from adult participants.

Setting

This study was conducted in four Ohio Appalachian counties (Washington, Ross, Pike, and Muskingum), which were chosen because of existing relationships with county Cooperative Extension Service offices. These counties span the Appalachian region of Ohio and range in size from 635-689 square miles with a population of 62,000-86,000 residents (Ohio Department of Development, 2011). Within the state of Ohio, 32 of a total 88 counties are designated as Appalachian. The Ohio Appalachian region, which is largely rural and farm-based, is characterized by high unemployment, low educational attainment, low

socioeconomic status, poor access to health services, inadequate health coverage, and poor health outcomes (Ohio Department of Development, 2011). The Appalachian region of Ohio also has the highest prevalence of cigarette smoking and ST use in the state. In 2010, the prevalence of cigarette smoking and ST use was 27.6% and 10.2%, respectively, among Appalachian males compared to 25.5% and 6.9% among rural non-Appalachian males (unpublished data, Ohio Family Health Survey, 2010). Social norms around tobacco use in Ohio Appalachia are largely influenced by tobacco's role as a primary cash crop in the region (Meyer et al., 2008). Approximately 97% of all burley tobacco, which is used in cigarette production, is grown in the Appalachian region (Wood, 1998). In December 2006, the state of Ohio enacted legislation prohibiting smoking in all indoor work facilities and public places but there has not been systematic state-wide enforcement of the legislation, which legally began in May 2007 (Ohio Department of Health, 2012). The majority of Appalachian counties in Ohio, including the counties in this study, are self-enforcing (Ohio Department of Health, 2009).

Data Collection

Fifteen focus groups and 23 qualitative interviews were conducted between February 2009 and May 2010. Adolescent and adult focus groups were stratified by gender and ST use. Adolescent focus groups were held during school hours (e.g., free period, lunch-time) and adult focus groups and interviews were held at community colleges and county agencies. All focus groups were conducted by a trained moderator. Participants were asked about their perceptions of risk from ST use, the safety of ST use, and the relative safety of ST compared to cigarettes. Interviews (n=23), following the same procedures and open-ended questions used in focus groups, were also conducted with adult male ST users given the low attendance at focus groups. Demographic and tobacco use characteristics were obtained at the start of the focus group or interview. Participants who reported ST use were asked about the type(s) of tobacco product(s) used (e.g., cigarette, snuff, chew) and the brands of tobacco. All sessions were audio-taped and transcribed. Focus groups lasted about one hour and qualitative interviews lasted about 30 minutes. Participants were reimbursed \$25 for their time. The study was approved by the university's Institutional Review Board.

Data Analyses

Focus group and qualitative interview data were transcribed verbatim. After reviewing focus group and interview transcriptions, the research team developed a preliminary coding structure of categories and codes based on major discussion topics and themes using content analysis methods. Text from focus groups and interviews were first organized by categories and then coded independently by two graduate research assistants in QSR NVivo. Initial inter-rater agreement was 89.6%. Discrepancies on coding were resolved by a third coder.

Results

Study Sample

A total of 116 residents (53 adolescents, 63 adults) from four Ohio Appalachian counties participated in the study. Sample characteristics for adolescents and adults are presented in Table 1. Adolescents were on average 17.0 years old (SD=0.8), 66% were male, 84.9% were

white, and 30.2% lived with both parents. Adults were on average 33.6 years old ($SD=13.8$), 79.4% were male, 98.4% were white, and 54.0% were married. The vast majority of adolescents (79.3%) and adults (81.0%) self-reported *ever use* of tobacco in the past. A higher proportion of adolescents (81.1%) than adults (44.4%) lived with other people who use tobacco. Only 22.2% of adults reported that more than half of the people they are in daily contact with use tobacco compared with 52.8% of adolescents.

ST Use

Table 2 shows tobacco use and related characteristics of adolescent and adult ST users. In the study, 43.4% of adolescents and 60.3% of adults reported *daily* use of chew and/or snuff or use on *most days*. Nearly half of adolescent ST users (47.8%) used both snuff and chew products whereas 60.5% of adult ST users used only snuff products. Only 31.6% of adult ST users reported dual use of ST and cigarettes compared to 56.5% of adolescent ST users.

Strong Perceptions of Health Risks Associated with ST Use

Participants were knowledgeable about the health consequences of ST use. All adolescents and adults in the study, with the exception of one adult ST user, believed that adverse health effects are associated with ST use. When asked whether ST affects health, the participants responded with comments such as “Most definitely!” and “Absolutely, yes!,” suggesting a fairly high level of perceived susceptibility of health problems from ST use. There were also some adult users who believed that ST would probably affect their health in the long-term. For example, one adult user said, “Major health [problems]? Nothing yet, but I am afraid of what could take place if I don't cease use.” Another adult user commented, “More than a year or so, it becomes to where it could start to be a health issue.”

Adolescents and adults, regardless of whether they were ST users or non-users, identified both short- and long-term health consequences of ST use. Immediate health problems localized to the mouth such as periodontal disease, teeth discoloration, blisters, and teeth problems were most frequently cited. An adolescent non-user stated, “[ST] is going to mess up your teeth, rot it all out and your teeth are eventually going to fall out.” Adult users offered their personal experiences as an example of how ST can affect oral health:

“I have had gum deterioration, yellowing of the teeth, my mouth was sore when I know it shouldn't be.” (Adult user)

“...as far as internally, like as far as my mouth goes I noticed changes. Just with my teeth alone I noticed that they tend to get stained and I get a receding gum line from it.” (Adult user)

“I have lost four teeth from [using ST]. I have gotten some sores.” (Adult user)

Oral and pharyngeal cancers were also commonly reported by participants. An adult non-user associated ST use with “just all the cancers you can get; cancer of tongue and gums and cheek, larynx-definitely not safe!” Phrases such as “big hole in your lip,” “lose your jaw” and “lose part of [your] face, part of [your] mouth” were used as synonyms for oral cancer. Only adolescent and adult ST users identified stomach ulcers and acid reflex as health

problems from ST use. Two adult users who had switched from cigarette smoking to ST indicated improved lung capacity and cardiovascular health after switching to ST.

Knowledge of these ST-related health problems, which were learned either from school or through firsthand observations of ST's effect on the health of others, influenced some adolescent and adult ST non-users to not initiate. One adolescent non-user said, "In elementary school they always showed us videos and pictures of things that happened to people who used it, like people got cancer and stuff. They were really graphic and just made me not want to do it." Another adolescent non-user shared, "I have seen what it can do to people's mouths; you know how they get their jaws taken out from it." Other adolescent and adult ST non-users decided not to continue after having a bad experience: "I tried [ST] once and puked my guts out for the next two days! The juices are just taste nasty and everything." (Adolescent non-user); "I tried [ST] once when I was younger; it just was a real bad experience for me...it was like the worst experience I have ever had. So to me I've never even attempted to use it again." (Adult non-user).

Widespread Belief that ST is not Safe

The notion that ST use is not safe was pervasive across focus group discussions and interviews. Nearly all participants, including ST users, strongly believed that ST use is not safe, citing exposure to chemical additives, the addictive properties of ST, and the range of health problems (e.g., oral and pharyngeal cancers) associated with ST use as reasons. When asked if ST use is safe, one adult ST user responded, "I am sure it isn't good for me. My dentist has told me you know, 'quit chewing.'"

During discussions about ST safety, feelings of regret emerged among some of the adult users. These participants started using ST despite being aware of its adverse health effects and regretted their decision to start given the difficulty in quitting.

"No, no, I definitely know it's not [safe]. We were taught you know in health class... I think [ST use] had a lot to do with being warned of the dangers of it...It's regrettable you know, I wish I had never started." (Adult user)

"I don't think any of [ST] is safe! I don't think any of it is good for your health. I think it is all harmful, but it is a personal choice that I made on smoking and dipping and now I am addicted to nicotine so I need one or the other." (Adult user)

"...you think [ST] is cool and everything, you start using it. By the time you want to quit you are addicted to it. Once you get hooked it is like really hard to quit. I have been trying to quit myself." (Adult user)

Disagreement about the Relative Safety of ST Compared to Cigarettes

Although nearly all participants believed that ST use is not safe, there was disagreement about the relative safety of ST. Some participants believed that tobacco products are equally harmful whereas others believed that ST is safer than cigarettes. The relative safety of ST compared to cigarettes was discussed in terms of their effect on the health of the tobacco user and also people around the user. Overall, beliefs about the relative safety of ST did not

differ by age group or ST status; disagreements were present among adolescents and adults as well as among ST users and non-users.

#1: Belief that ST is not safer than cigarettes—The belief that ST is not a safe alternative to cigarettes was popular among some of the ST users and non-users in the study. Overall, this subset of participants believed that there is no safe tobacco and considered ST products just as harmful as cigarettes. An adolescent user commented that tobacco companies “are trying to make it seem like the new chew is safer for you, but it is just like cigarettes.” Participants did not associate varying levels of severity with the different tobacco products. Minor health problems such as gum recession from ST use were perceived as equally harmful as lung cancer from cigarette smoking.

“[ST and cigarettes are] all about the same. One is just killing you in your lungs and the other is killing your gums.” (Adult user)

“I would say [ST] is not a safe alternative...you can either die from mouth cancer or die from lung cancer, so it is whatever one you want to choose.” (Adult user)

“I think [ST and cigarettes are] about the same. It's dangerous because snuff can give you lip cancer, but smoking can give you lung cancer.” (Adolescent non-user)

Some adult ST users pointed to the warning label on ST products as supporting evidence: “It even says it right on the label, ‘This product may be unsafe and it is not a safe alternative to cigarettes.’ So I mean it is definitely widespread and known that it is bad for you.”; “This one actually says, ‘This product is not a safe alternative to cigarettes.’”

#2: Belief that ST is safer than cigarettes for the tobacco user—Several adolescents and adults associated varying levels of severity with the different tobacco products. According to one adult user, “I always thought the lesser of the four evils: pipes, cigars, cigarettes, chewing tobacco and stuff, I guess five evils...I always thought the less evil was chewing tobacco.” These participants displayed a trade-off approach to their risk assessment of ST use and cigarettes, comparing the range and severity of health risks from ST with those from smoking cigarettes. In general, health problems from ST use were perceived as less severe than health problems from cigarette smoking. One adult user believed that cigarettes are more harmful than ST because “they can cause a lot of different types of cancer. Like with my dad, he had esophageal cancer...and you can get...lung cancer and all kinds of cancer, you can get throat cancer. I think cigarettes are a lot more dangerous than what chewing tobacco is or snuff or anything like that.” Furthermore, cancers caused from cigarette smoking, especially lung cancer, were considered more dangerous than cancers caused from ST use:

“I'd rather have a big hole in my lip than both of my lungs missing.” (Adolescent user)

“Cigarettes are worse because you can get lung cancer and you can die quicker than what you can with chew.” (Adolescent non-user)

“Your lungs are so much more delicate than your gums and teeth are.” (Adult user)

“[Cancers of the mouth] are more treatable if they are caught whereas with cigarettes after so long like with emphysema or lung cancer there's little that can be done.” (Adult non-user)

Many of these participants also believed that ST is safer than cigarettes for tobacco users because ST does not involve combustion and therefore is not associated with the negative health risks of smoke inhalation. Cigarette smoke was characterized as particularly harmful since it “goes everywhere” in the body. An adult user thought that ST is safer than cigarettes “because cigarettes—they go everywhere! They pass through your mouth, down in your lungs, through your throat and all that. Like snuff you are just keeping it in your mouth and usually spit it out; you don't usually swallow it.” Similarly, an adult non-user said, “[ST] is more of local whereas cigarettes can have a total body negative effect.” Participants also mentioned that inhalation of cigarette smoke is associated with higher risk for respiratory problems such as asthma, reduced lung capacity, and chronic obstructive pulmonary disease: “I think chew is safer than cigarettes because if you are chewing you can breathe a little bit better than when you are smoking.” (Adolescent user); “I think over the years smoking for an individual does more harm to you just because you are breathing in that smoke from the tobacco and stuff. I mean that is getting in your lungs and all that kind of stuff.” (Adult non-user).

#3: Belief that ST is safer than cigarettes for people around the tobacco user but not for the tobacco user—When evaluating the relative safety of ST, some participants considered the relative risks for not only the tobacco user but also those exposed to the user. These participants concluded that ST is safer than cigarettes for people around the user because there is no secondhand smoke but not safer for the tobacco user.

“I would say in comparison to using cigarettes it is safer to everybody else around you. You know you are affecting your own health, but at least you are not affecting the other people sitting in the room.” (Adult user)

“The only difference between snuff and cigarettes is to smoke a cigarette in public you can kill the guy beside you. To rub a pinch of snuff you are still only killing yourself.” (Adult user)

“Secondhand spit isn't going to kill anybody.” (Adult user)

“It is safer than other people like because you are not giving them secondhand smoke, but it's still just as bad for you...in a different way.” (Adolescent non-user)

[With cigarettes] you can get secondhand smoke which they say is worse, and if you smoke it is not just you you're hurting. It is the environment and the person next to you. Where chew, I mean yeah it is all you and one hundred percent tobacco...” (Adolescent non-user)

Comparing Safety of Traditional and Novel ST Products

Although not directly asked during focus groups and interviews, safety comparisons of different types of ST products also emerged. Some people perceived novel ST (i.e., dissolvable tobacco and snus) just as harmful as traditional ST (i.e., chew), viewing the

various ST products as different forms of the same product. According to one adolescent non-user, “[ST] is still bad. These little strips dissolve and everything, but it is still the same product. It is just used in a new way.” Some adolescents and adults believed that pouches are safer than traditional ST because snuff is not in direct contact with the cheek and gum.

Conclusion

Overall, adolescents and adults in the study were knowledgeable about both short- and long-term health risks associated with ST use. Nearly all participants, including ST users, perceived ST as not safe because of the associated chemical additives, addictiveness, and range of health problems. Study findings suggest that media campaigns focusing on the health risks of ST may not be an appropriate sole strategy to encourage cessation and prevent initiation. Although some ST non-users said that knowledge of the health consequences of ST influenced their decision to not initiate, a majority of adult ST users initiated despite having fairly high perceived susceptibility and severity of adverse health problems. For these adult ST users, the benefits associated with ST use, such as social acceptance or desirability, may outweigh the negative health risks. ST use is part of the Appalachian identity and central to the development of masculinity in the Appalachian community (Nemeth et al., 2012). Social norms around tobacco use in Ohio Appalachia are largely influenced by tobacco's role as a primary cash crop in the region, which grows approximately 97% of all burley tobacco (Meyer et al., 2008; Wood, 1998).

Consistent with findings from Choi et al. (2013) and Wray et al. (2013), there was disagreement about the relative safety of ST among adolescent and adult participants. Some participants believed that tobacco products are equally harmful and there is no safe tobacco; others believed that ST use is safer than cigarettes because it is associated with fewer and less severe health problems. These beliefs were held by both adolescent and adult ST users and non-users. Disagreement on the relative safety of ST may reflect the ongoing debate over the use of ST as a harm reduction strategy among public health experts and mixed public health messages concerning the safety of ST (Levy, Chaloupka, & Gitchell, 2004; Tomar, 2007). In general, proponents of ST as a substitute for cigarettes to reduce harm argue that the health risks associated with ST use are significantly lower than cigarette smoking (Lee & Hamling, 2009). Because ST does not involve combustion, exclusive ST users are not exposed to by-products of pyrolysis and may have lower risk for lung cancer, chronic obstructive pulmonary disease, and other lung diseases compared to smokers (Hatsukami, Lemmonds, & Tomar, 2004). Significant reductions in tobacco-related morbidity and mortality in Sweden have been attributed to the increased use of snus and decline in cigarette smoking among Swedish males (Foulds, Ramstrom, Burke, & Fagerstrom, 2003; Hatsukami et al., 2004).

Although ST lacks toxicants associated with combustion, other public health experts argue that ST contains 28 known carcinogens, including tobacco-specific nitrosamines (TSNAs) 4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone (NNK) and N'-nitrosonornicotine (NNN), which are strongly associated with cancer (Hatsukami et al., 2007). ST use has been found to increase the risk for oral and pharyngeal cancers, gum recession, lesions of the oral cavity, and cardiovascular disease (Hatsukami et al., 2004; Tomar, 2007). There are public

health concerns that promoting ST as a harm reduction product may encourage 1) initiation of nontobacco users, 2) relapse of former smokers, 3) continued tobacco use among smokers who would have quit, 4) dual use of cigarettes and ST, and 5) ST as a gateway to cigarette smoking (Hatsukami et al., 2004; Institute of Medicine, 2001; Savitz, Meyer, Tanzer, Mirvish, & Lewin, 2006; Severson, Forrester, & Biglan, 2007; Tomar, 2003). Research that addresses these public health concerns, especially the question of whether switching from cigarettes to ST reduces mortality and disease risk among smokers, is needed to inform the development of tobacco control strategies.

Although findings provide a better understanding of ST risk perceptions in a vulnerable population, there are some study limitations. Potential participants were recruited using flyers posted in a variety of agencies in four Ohio Appalachian counties. Because of the purposive sampling of adolescents and adults in select counties, findings may not be generalizable to those counties or the Ohio Appalachian region. Given the strong cultural role of tobacco in Appalachia, adolescent and adult beliefs about ST may be unique to the Appalachian community and different from other vulnerable populations. This study was limited to male ST users. Since the prevalence of ST use among females in rural Ohio is low, female ST users were not able to be recruited for the study. Given the sample size and qualitative study design, we were unable to provide sample characteristics of those who are more or less likely to perceive ST as safer than cigarettes. Unfortunately, participants were only asked about risk perceptions of ST in general and not about the relative risks of the various types of ST products such as chew, snus, and dissolvable tobacco available. This is an important area for future research given the recent emergence of novel ST products that do not require spitting.

This study adds to the tobacco control literature by using qualitative methods to examine risk perceptions of ST among adolescent and adult users and non-users in a vulnerable population. The disagreement about relative risk of ST suggests a need for consistent and comprehensive health messages that communicate comparative risks. However, additional research is first needed to determine whether ST should be promoted as a harm reduction strategy. The ongoing debate over the use of ST as a harm reduction strategy among public health experts has contributed to the mixed public health messages concerning the safety of ST (Levy, Chaloupka, & Gitchell, 2004; Tomar, 2007). Currently, several public health agencies including the National Cancer Institute and the Centers for Disease Control and Prevention assert that there is no safe tobacco product and ST is not a safe alternative to smoking cigarettes (Centers for Disease Control and Prevention, 2012; National Cancer Institute, 2010). Health messages like these are potentially misleading since consumers may misinterpret these messages to imply that all tobacco products are equally harmful (Kozlowski & Edwards, 2005). However, health messages conveying relative risks require careful attention. As Tomar, Fox, and Severson (2008) comment in their review paper, “A message that encourage[s] people to ‘not initiate or continue ST use because of its adverse health effects’ juxtaposed with ‘it’s okay to use ST if you are a smoker and have been unable to quit’ could result in confusion among the public. (p. 17)” Future research should examine communication strategies to convey nuanced health messages involving comparative risks. Given the potential for unintended consequences, ST counter-marketing strategies and health messages need to be evidenced-based. In October 2011, the U.S. Food and Drug

Administration and the National Institutes of Health announced the Population Assessment of Tobacco and Health Study, a national longitudinal study of 59,000 tobacco users and non-users that will examine issues such as how and why people start using tobacco and quit using it, which will help guide tobacco control efforts (National Institutes of Health, 2013).

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Table 1

Sample characteristics of adolescent and adult participants (n=116)

Characteristic	Adolescents (n=53) % (n) ^a	Adults (n=63) % (n) ^a	p-value
Age in years, mean ± SD	17.0 ± 0.8	33.6 ± 13.8	<.001
Missing ^b	13.2 (7)	3.2 (2)	
Gender			.134
Male	66.0 (35)	79.4 (50)	
Female	34.0 (18)	20.6 (13)	
Race			.028
White	84.9 (45)	98.4 (62)	
African American	3.8 (2)	0.0	
Other	7.5 (4)	1.6 (1)	
Missing	3.8 (2)	0.0	
Ethnicity			.294
Non-Hispanic	86.8 (46)	95.2 (60)	
Hispanic	9.4 (5)	3.2 (2)	
Missing	3.8 (2)	1.6 (1)	
Marital status			---
Single	---	36.5 (23)	
Married/Partnered	---	54.0 (34)	
Separated/Divorced	---	7.9 (5)	
Other	---	1.6 (1)	
Level of education			<.001
7th-8th grade	3.8 (2)	0.0	
9th-12th grade	60.4 (32)	1.6 (1)	
High school graduate or GED	0.0	25.4 (16)	
Some college	0.0	55.6 (35)	
College	0.0	17.5 (11)	
Missing	35.9 (19)	0.0	
Work for pay			<.001
Yes, Full-time	3.8 (2)	41.3 (26)	
Yes, Part-time	35.9 (19)	42.9 (27)	
No	56.6 (30)	15.9 (10)	
Missing	3.8 (2)	0.0	
Place of residence			---
Live with both parents	30.2 (16)	---	
Live with one parent	11.3 (6)	---	
Live with others	22.6 (12)	---	
Missing	35.9 (19)	---	
Household income			---
< \$15,000	---	15.9 (10)	
\$15,000-\$24,999	---	14.3 (9)	

Characteristic	Adolescents (n=53) % (n) ^a	Adults (n=63) % (n) ^a	p-value
\$25,000-\$34,999	---	15.9 (10)	
\$35,000-\$49,999	---	15.9 (10)	
\$50,000	---	30.2 (19)	
Missing	---	7.9 (5)	
Ever used tobacco in the past			.818
Yes	79.3 (42)	81.0 (51)	
No	20.8 (11)	19.1 (12)	
Current ST use			.069
Yes	43.4 (23)	60.3 (38)	
No	56.6 (30)	39.7 (25)	
Live with other people who use tobacco			<.001
Yes	81.1 (43)	44.4 (28)	
No	18.9 (10)	55.6 (35)	
People in daily contact with that use tobacco			<.001
More than half	52.8 (28)	22.2 (14)	
About half	35.9 (19)	39.7 (25)	
Less than half	11.3 (6)	38.1 (24)	

ST = smokeless tobacco. GED = General Educational Development.

^aPercent and frequency reported unless otherwise specified.

^bMissing information on questionnaire, although participants met eligibility criteria.

Table 2

Tobacco use and related characteristics of adolescent and adult ST users (n=61)

Characteristic	Adolescents (n=23) % (n) ^a	Adults (n=38) % (n) ^a	p-value
Duration of tobacco use in years, mean ± SD	5.1 ± 3.0	13.0 ± 13.7	.002
Age at tobacco initiation in years, mean ± SD	11.7 ± 2.9	15.0 ± 4.0	.001
Current ST product used			.005
Snuff only	17.4 (4)	60.5 (23)	
Chew only	34.8 (8)	15.8 (6)	
Both snuff and chew	47.8 (11)	23.7 (9)	
Tins/pouches per week			.184
1	13.0 (3)	18.4 (7)	
2-4	47.8 (11)	50.0 (19)	
5	26.1 (6)	31.6 (12)	
Missing	13.0 (3)	0.0	
Frequency of ST use			.038
5 days/week	43.5 (10)	34.2 (13)	
6-7 days/week	43.5 (10)	65.8 (25)	
Missing	13.0 (3)	0.0	
Time to first ST use in morning			.241
After 30 minutes	73.9 (17)	65.8 (25)	
Within 30 minutes	21.7 (5)	34.2 (13)	
Missing	4.4 (1)	0.0	
Used cigarettes in the past	65.2 (15)	60.5 (23)	.714
Self-reported cigarette smoker ^b			.040
No	39.1 (9)	68.4 (26)	
Yes	56.5 (13)	31.6 (12)	
Missing	4.4 (1)	0.0	

ST = smokeless tobacco.

^aPercent and frequency reported unless otherwise specified.^bSelf-reported smoking status was determined by asking participants if they currently use tobacco and the type(s) of tobacco product(s) (e.g., cigarette, snuff, chew) currently used.