Running Head: SMOKELESS TOBACCO CHARACTERISTICS

Smokeless Tobacco Characteristics in Rural Ohio Appalachians

A Senior Honors Thesis Presented in Partial Fulfillment of the Requirements for the

Degree of Bachelor of Science in Nursing with Distinction

College of Nursing of The Ohio State University

By

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Introduction

Scope of Problem

   While cigarette smoking is often publicized for its dangers, many American people do

not see smokeless tobacco use as a dramatic health problem. Since the 1970's, the prevalence

of smokeless tobacco use, in the form of snuff or chewing tobacco, has taken a significant

upward turn, going from 17.2 million pounds sold in 1972 to 53.2 million pounds sold in 1992

(Hatsukami & Severson, 1999). According to the 1994 National Household Survey on Drug

Abuse, prevalence of lifetime smokeless tobacco use is 17.2% in the total population, 30.2%

among males, and 4.8% among females. Smokeless tobacco use in the last month was found

to be 3.3% in the total population, 6.1% among males, and 0.7% among females. Prevalence

among young white male ages 18-25 was especially alarming, use within the last month was

found to be 16.6%.

   In 1985, the Surgeon General of the United States reported that smokeless tobacco is a

causal risk factor for oral cancer (Advisory Committee to the Surgeon General, 1985). More

recently, additional studies have noted this association for many other cancers, including

laryngeal, esophageal, prostate, colo-rectal, bladder, and pancreas (Winn, 1997). Smokeless

tobacco use has also been linked with arteriosclerosis and acute cardiac events (Benowitz,

1988). In a study of 302 smokeless tobacco users, 39.4% were found to have leukoplakic

lesions, a precancerous lesion (Martin, Brown, Eifler, & Houston, 1999). However, after six

weeks of cessation from smokeless tobacco use, 97.5% of the lesions had resolved.

   Smokeless tobacco prevalence is highest among young adults ages 18-25, with males

being ten times more likely than females to report current smokeless tobacco use (USDHHS,

2001). Tomar and Giovino (1998) also found that the following characteristics were significant

predictors of smokeless tobacco use: male, Caucasian, residents of South and Midwestern

United States, and those who had other people within their household that used smokeless tobacco.

Summary of Research Literature

While research on cigarette consumption is plentiful, research on smokeless tobacco consumption is more limited. Even more limited is the research in the area of why initiation of smokeless tobacco occurs, and why use is continued. While it is known that Appalachia is an area with a high prevalence, little is known about the smokeless tobacco consumption characteristics of this at risk group. This research project will focus on examining the age that one starts using smokeless tobacco, how age of initiation affects current usage and dependence, and if depression is linked with current usage, as well as examining the link between smokeless tobacco consumption and nicotine dependence.

Age of Initiation

According to the Centers for Disease Control and Prevention (1998), the median age of initiation of smokeless tobacco use is 12 years of age. Age of smokeless tobacco initiation has been found to be significantly and negatively correlated with the amount of nicotine exposure among adolescents, meaning that the earlier the age of smokeless tobacco initiation, the higher the level of use (Riley, Barenie, Mabe, & Myers, 1991). In another study of adults, smokeless tobacco use during preadolescence (before 12 years of age) was associated with greater adult use; however those who began use during adolescence were not found to have greater adult use than those who were adult onset users (Riley, Kaugers, Grisius, Page, Burns et al., 1996).

Smokeless Tobacco Dependence and Consumption

Smokeless tobacco dependence has been found to be similar to that of cigarette smokers. In a survey by smokers and smokeless tobacco users, reported craving for tobacco, difficulty quitting, and unpleasantness from abstaining for an hour or two were the same between both groups (Holm, Jarvis, Russell, & Feyerabend, 1992). Nicotine intake from single doses of smokeless tobacco and cigarettes is the same (Hatsukami & Severson, 1999).

Smokeless tobacco is absorbed more slowly than cigarettes, however peak nicotine levels are equivalent. The smokeless tobacco quid is consumed over a longer period of time, as compared to smoking a single cigarette.

Cotinine is a major metabolite of nicotine, and an excellent marker of nicotine exposure and dependence (Benowitz, Kuyt, Jacob, Jones, & Osman, 1983). Cotinine is used by researchers to validate the self-reported amount of tobacco product used.

Depression

In a study of 1,107 adolescents in Virginia, the Center for Epidemiologic Studies-Depression Scale (CES-D) was used to measure depressive symptoms among alternative tobacco users (Tercyak & Audrain, 2002). Any current alternative tobacco use, defined as smokeless tobacco, pipe, cigar, bidi, or kretek, was significantly associated with high depressive symptoms and the presence of clinically significant depressive symptoms.

Coogan, Gellar, and Adams (2000) also performed a study looking at adolescent risk taking behaviors and smokeless tobacco use. Depression was significantly associated with current smokeless tobacco use. This study was performed in both urban and rural school districts in Connecticut.

Existing literature fails to examine the role that depression plays in smokeless tobacco consumption among adults. While depression is addressed as a risk factor for the initiation of smokeless tobacco use among adolescents, there is little research that has examined the relationship between depression and intensity of smokeless tobacco use and level of nicotine dependence.

The relationship between age of initiation of smokeless tobacco use and dependence is addressed in the literature. However, there is a gap in the literature concerning research that examines age of initiation, risk factors that lead to initiation (e.g., depression), and adult dependence. While the current secondary analysis will not allow for such a study, it would be an

interesting longitudinal study. This cross-sectional study examined some of the factors that may partially explain current smokeless tobacco usage, such as depression and age of initiation.

Methods

Research Questions

1. What is the relationship between smokeless tobacco consumption and depression among current smokeless tobacco users?

2. What is the relationship between smokeless tobacco dependence and age of initiation among current smokeless tobacco users?

3. What is the relationship between smokeless tobacco consumption and nicotine dependence among current smokeless tobacco users?

Design

This study was a secondary analysis of a study that used a quasi-experimental design. The purposes of the original study were to compare oral health status in smokeless tobacco (ST) users and never users; characterize ST consumption patterns in ST users; evaluate an intervention that is expected to enhance ST cessation for rural Appalachians; and test oral health indicators for evaluating success of the intervention.

The purpose of this study was to perform a secondary analysis examining the association between smokeless tobacco consumption and depression, and to examine the association between smokeless tobacco dependence and age of initiation of tobacco use.

Sample

The target population for this study was rural Appalachians from two Ohio counties, Ross and Muskingum. A total of 261 males were enrolled in the study, however at the time of data analysis for this secondary analysis 184 males were used.

Inclusion criteria included:

1. Male
2. 18 years of age and older
3. Current self-reported use of snuff on a daily basis,

4. Resident of Muskingum or Ross county
5. English speaking
6. Absence of clinical condition that contraindicated use of over-the-counter nicotine replacement therapy, including severe arrhythmias, severe angina, or myocardial infarction within the previous 4 weeks
7. Informed written consent

To achieve a power of 0.80, alpha of 0.05, and to detect a correlation of 0.30 or greater, a total of 67 subjects were needed for this study (Cohen, 1988).

Procedure

The Ohio State University Biomedical Sciences Review Board approved the original study for the protection of human subjects. The sample was recruited by the project staff in each county at different types of events including: health department clinics, retail outlets, churches, farm bureau agencies, and county social events, such as county fairs, 4-H meetings and outdoor entertainment events. The subjects were then invited to participate in an oral examination and a face-to-face interview. A dentist or oral pathologist, blinded to participant ST use status, performed an examination within the county's local health department. The assessment included examining the subject for dental caries, periodontal disease, and for tooth loss. A face-to-face interview that included a questionnaire was administered by a project staff person from the community. Subjects were asked to provide a saliva sample for cotinine analysis. The subjects were paid $25 for their participation.

Instruments

Smokeless tobacco consumption refers to the use of ST on a daily basis. Consumption was measured by questions about frequency of use, amount used, and type of ST used. The instrument that was used for this study is the ST tobacco consumption questionnaire. This questionnaire was administered to characterize topography of ST use. These items included: 1) number of chew/dip per day; 2) amount of chew/dip per day; 3) duration of each chew/dip; 4) time interval between chew/dip; and 5) use of product overnight while sleeping.

Depression is an affective mood state. Measurement of depression was done using self-report signs and symptoms. This study used the Center for Epidemiologic Studies Depression (CES-D) scale to measure depression (Radloff, 1977). CES-D is a 20-item scale used to measure self-reported symptoms during the previous week. Scores can range from 0-60. A score of 16 or greater may indicate that the subject may have experienced some depression in the past week. The CES-D has demonstrated good internal consistency, moderate test-retest stability, and concurrent and construct validity (Radloff, 1977).

Smokeless tobacco dependence refers to experiencing patterns of craving nicotine, tobacco withdrawal symptoms, and having difficulty quitting (Holm, Jarvis, Russell, & Feyerabend, 1992). Smokeless tobacco dependence was measured by the Smokeless Tobacco Dependence Scale (S.T.O.P.), as developed by Herbert Severson. This questionnaire includes information about cravings for tobacco, difficulty quitting, and how often ST is used. Scores ranged from 0-9, with higher scores reflecting higher dependence.

Age of initiation refers to the age that a person started the use of ST. This information was obtained directly from the subjects as a question in the face-to-face interview.

Analysis

Descriptive statistics were used to describe the sample using frequencies, percentages, means, and measures of central tendencies as appropriate.

Research question 1: "What is the relationship between smokeless tobacco consumption and depression among current smokeless tobacco users?" was answered using a Pearson correlation coefficient.

Research question 2: "What is the relationship between nicotine dependence and age of initiation among current smokeless tobacco users?" was answered using a Pearson correlation coefficient.

Research question 3: "What is the relationship between nicotine dependence and smokeless tobacco consumption?" was answered using a Pearson correlation coefficient.

Results

At the time of data analysis, one hundred and eighty four male subjects had completed data collection and their information was available for data analysis. Descriptive statistics were used to measure the subject's age, income, and education. The subjects had a mean age of approximately 32, although ages ranged from 18-62. They were categorized into three income levels, and the subjects were distributed among these groups fairly evenly (see Table1). Education levels indicated 56 percent having a high school diploma/GED or less.

Of the 184 subjects, 155 (84%) were exclusive snuff users, and 29 (16%) used both cigarettes and snuff. The average number of snuff cans used per week was about 5. The average age of initiation was about 15, however the youngest any of the subjects reported trying ST was 4 years old. The number of years the subject had been using snuff was reported as an average of 14 (see Table 2).

The subjects were rated on their level of dependence on the Smokeless Tobacco Dependence Scale (STOP). The scores ranged from 2-9 with a mean score of 5.27,with higher scores indicating a higher level of dependence. The subjects also completed the CES-D to measure their level of depressive symptoms within the last week. The mean score was 10.27. A score of 16 or greater is considered to be positive for depressive symptoms. About 22% of the subjects scored 16 or greater (see Table 2).

Correlation coefficients were used to describe the relationships between age, education, and income. A positive significant correlation was found between age and education, and a moderate positive significant correlation was found between education and income. There was no significant correlation between age and income (see Table 4). There were no significant correlations between nicotine dependence and age, income, or education. However, there was a significant negative correlation between depression and income and depression and education (see Table 4).

Research question one was:"What is the relationship between ST consumption and depression among current ST users?" A correlation coefficient was used to determine this association. There was no significant correlation (see Table 4).

Research question two was: "What is the correlation between age of initiation and dependence among current ST users?" A correlation coefficient was used to compare these variables, and a significant negative correlation was found (see Table 5).

Research question three was: "What is the correlation between ST consumption and nicotine dependence among current ST users?" A correlation coefficient was used to compare these variables, and a significant moderately strong positive correlation was found (see Table 4).

Discussion

This study was the first that examined ST use characteristics in rural Ohio Appalachia, although this is a highly at risk population. This area of Ohio is characterized by lower income, fewer persons with high school educations, and higher levels of cigarette and ST use as compared to national and state levels. The participants of this study were representative of these statistics.

In this study, no significant correlation was found between depression and ST consumption. This was an unexpected finding. A wide base of research has shown cigarette smoking to be related to depression among both adolescents and adults. Significant correlations between adolescent ST use and depression have also been reported in larger studies (Coogan, Gellar, & Adams, 2000; Tercyak & Audrain, 2002). Research that examines the correlation between ST use and depression in adults is more limited, however one study found ST users to be more likely to be experiencing depression than non-users (Rouse, 1989). However, in this large household survey the age of the participants ranged from 12 years to adult, and depression was not reported categorically by age, it was simply reported as a whole. Therefore,

there was no way to determine whether adults ST consumption was significantly correlated with depression.

In the current sample the mean age of ST initiation was found to be 14.57 years of age, while according to the Centers for Disease Control and Prevention (1998) the mean age of initiation was 12 years of age. Our sample was found to have a higher age of initiation than the national average. This number may have been skewed by a number of participants that started using ST during their middle years, mainly during their thirties and forties. Researchers have found that following the cessation of cigarette use, current ST users may begin ST as an alternative means of nicotine consumption (Lando, Haddock, Klesges, Talcott, & Jensen, 1999).

Age of initiation and nicotine dependence were found to be significantly correlated. It is not surprising to note that younger age of initiation is related to increased dependence. Research was limited that examined the relationship between age of initiation and nicotine dependence; however this was an expected finding. A study by Riley, Barenie, Mabe, & Myers (1991) also found age of initiation of ST use to be significantly and negatively correlated to nicotine dependence.

A moderately strong positive correlation was found between ST consumption and nicotine dependence. In other words, the more ST the subject consumed, the higher he reported his dependence to be. This is an expected finding because users become dependent on nicotine by a neuroadaptation of the body to the effects of the drug (Hatsukami & Severson, 1999). As the body becomes adapted to the drug, in this case nicotine, more of the nicotine is needed to reach desired effects produced by the drug. A cycle is then formed. A user must increase consumption to reach a desired effect and in turn increase the level of dependence by increasing the amount of nicotine needed to reach the desired level.

This study found that rural Ohio Appalachians who start using ST at a young age were likely to be more addicted to ST than someone who started using at an older age, and that as the amount of ST use increased, the level of dependence increased. This information can be

used to teach clinicians about the importance of speaking to children at young age about the effects of nicotine, not just in cigarettes, but also with the use of smokeless tobacco. Clinicians need to be aware that ST is a harmful and highly addictive drug being used by many children and adults. Clinicians need to be made aware of prevention and cessation techniques to teach all users including children and their parents.

This secondary analysis has several limiting factors. First, the study is comprised of only male participants. Males do make up the majority of ST users, but a small percentage of females do report ST use. Second, this study was a convenience sample and may not be representative of the entire population. The cross sectional design of the study provides limited information about the behavioral patterns of ST users.

Further research needs to be done that examines the risks for adult onset of ST use. Perhaps these users are giving up the use of cigarettes due to the apparent negative health effects and are turning to ST because they perceive it as a safer alternative. Further research also needs to be done that examines the correlation between depression and ST consumption. Researchers have found significant correlations between depression and nicotine consumption in adolescent ST users, adolescent cigarette user, and adult cigarette users, but have yet to demonstrate a correlation in adult ST users.

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Table1.
Sociodemographic characteristics of male ST users in two Ohio counties (n=184)

Variable	N	Mean	SD	Range
Age	184	32.52	9.56	18-62

Variable	Level	N	Percent
Income	$0-25,000	53	28.8
	$25,001-50,000	69	37.5
	>$50,000	55	29.9
Education	HS-GED diploma Or less	104	56.5
	Greater than HS-GED diploma	80	43.5

Table 2.
Tobacco Use Characteristics, nicotine dependence, and CES-D scores of male ST users in two Ohio counties (n= 184)

Variable	Mean	Range	SD
Number of snuff cans used per week	4.79	1-20	3.39
Age of initiation	14.57	4-56	7.05
Number of years used snuff	14.37	1-42	8.36
Dependence score	5.27	2-9	1.51
CES-D score	10.27	0-48	7.84

	Level	Frequency	Percent
CES-D score	<16 (no depressive symptoms)	143	77.7
	>16 (depressive symptoms)	41	22.3

Table 3.
Correlation between Sociodemographic Variables, Nicotine Dependence, and
Depression in male ST users from two Ohio counties (n=184)

Variable	r	p value
Age x Education	0.189*	0.010
Age x Income	0.088	0.236
Education x Income	0.338*	0.000
Dependence x Age	0.033	0.658
Dependence x Income	0.085	0.252
Dependence x Education	-0.103	0.164
CES-D total x Age	-0.118	0.109
CES-D total x Education	-0.191*	0.009
CES-D total x Income	-0.303*	0.000

*Correlation is significant at the 0.05 level

Table 4.
Correlations between ST consumption, nicotine dependence, and depression of male ST users
in two Ohio counties (n= 184)

Variable	r	p value
Consumption x Dependence	0.529**	0.000
Consumption x CES-D Total	-0.034	0.650
Dependence x CES-D Total	0.156*	0.035

* Correlation is significant at the 0.05 level

Table 5.
Correlation between age of initiation and nicotine dependence of male ST users in two Ohio
counties (n= 184)

Variable	r	p value
Age of Initiation x Dependence	-0.213**	0.004

** Correlation is significant at the 0.01 level