



BRIEF REPORT

CHARACTERISTICS OF SMOKELESS TOBACCO USERS SEEKING TREATMENT

DOROTHY K. HATSUKAMI, JONI JENSEN, RAYMOND BOYLE,
MICHAEL GRILLO, and ROBIN BLISS

University of Minnesota

Abstract — Previous studies have described smokeless tobacco (ST) treatment seekers with minimal detail. In the present study, ST users ($N = 402$), who enrolled in a ST cessation treatment study, were asked to complete an extensive questionnaire that inquired about their ST use patterns, use of other tobacco products, extent of dependence, previous attempts to quit, situations associated with use and support for quitting. The results showed that this population experiences a high level of nicotine exposure and physical dependence on ST. ST use frequently is associated with negative affect situations and times of hunger. A high frequency of users have smoked cigarettes as well as cigars. A supportive social environment for ST cessation exists for these individuals. These results have implications for ST treatment content.
© 1999 Elsevier Science Ltd

The characteristics of adult smokeless tobacco (ST) users who seek treatment have been described in previous studies, although with relatively little detail. The description of the sample population is typically limited to information on age and race with minimal information on ST use history such as amount and duration of ST use, baseline cotinine levels, number of quit attempts and percent who are smoking cigarettes. Most of the studies show that ST users who seek treatment in a variety of settings (e.g., treatment clinic, dental office, HMO dental setting, professional baseball organization, nationwide contest for quitting) tend to be predominantly Caucasian (Hatsukami, Jensen, Allen, Grillo, & Bliss, 1996; Stevens, Severson, Lichtenstein, Little, & Leben, 1995), with a mean age ranging from 20 to early 30s (DiLorenzo, Kern, & Pieper, 1991; Glover, 1986; Hatsukami et al., 1996; Little, Stevens, Severson, & Lichtenstein, 1992; Sinusas & Coroso, 1993; Stevens et al., 1995; Zavela, Harrison, Smith, Smith, & Manske, 1995). The average number of dips per day ranges from 6 to 9 (DiLorenzo et al., 1991; Zavela et al., 1995) or 2.6–3.8 tins or pouches per week (Hatsukami et al., 1996; Sinusas & Coroso, 1993; Tillegren, Haglund, Ainetdin, & Holm, 1995; Zavela et al., 1995); the mean duration of use is between 5 and 10 years (DiLorenzo et al., 1991; Hatsukami et al., 1996; Sinusas & Coroso, 1993; Zavela et al., 1995); and several quit attempts have been made in the past (DiLorenzo et al., 1991; Hatsukami et al., 1996; Tillegren et al., 1995). In one of the studies, the average cotinine level at baseline was 441.1 ng/ml (Hatsukami et al., 1996). The present study

We thank Kathy Longley for the preparation of this article.

This research was funded by NIDA R01 05013.

Requests for reprints should be sent to Dorothy K. Hatsukami, Department of Psychiatry, Division of Neurosciences, University of Minnesota, Box 392 UMHC, Minneapolis, MN 55455; E-mail: hatsu001@maroon.tc.umn.edu

more thoroughly examines the characteristics of ST users who were enrolled in a ST cessation program.

METHOD AND PROCEDURE

Subjects

ST users ($N = 402$) were recruited from advertisements in the campus and metropolitan newspapers for a ST treatment study. This treatment involved the use of the transdermal nicotine system (TNS) versus placebo by mint snuff versus no mint snuff. ST users, interested in quitting, called the Tobacco Research Programs and Clinic and were briefly informed of the study over the telephone and asked to answer a ST use history and medical screening questionnaire. Subjects were recruited if they (a) used at least one tin of ST per week for at least 6 months; (b) did not regularly use other forms of tobacco products; (c) were motivated to quit use of ST (e.g., rate ≥ 7 on a scale of 1 to 10 on desire to quit); and (d) never used nicotine replacement or mint snuff therapy for more than a week. Subjects for whom TNS was medically contraindicated, who had current alcohol or drug abuse problems or emotional problems, or who were taking psychoactive medications were not accepted into the study. Subjects meeting the criteria were scheduled to come to the Clinic for a more thorough screening and written informed consent was obtained. During this visit, salivary samples for cotinine analyses were collected. Subjects were also asked to complete an extensive questionnaire inquiring about their tobacco use history. This questionnaire has been used in previous studies of ST users (Hatsukami, Anton, Keenan, & Callies, 1992; Hatsukami et al., 1996) and a similar questionnaire for cigarette smokers (Hatsukami, Huber, & Callies, 1993; Hatsukami et al., 1998; Hatsukami, Skoog, Allen, & Bliss, 1995). The responses to this tobacco use questionnaire forms the basis for the results in this study. The questionnaire is comprised of questions regarding the amount, duration and pattern of ST use, use of other tobacco products, experience during previous quit attempts, reasons for using based on items derived from the Horn-Waingrow Scale (Ikard, Green, & Horn, 1969), social support for quitting, basic demographic information and the degree of tobacco dependence as determined by items modified from the Fagerström Tolerance Questionnaire (Fagerström, 1978; Fagerström & Schneider, 1989). The items on the modified Fagerström Tolerance scale ask not only the amount of ST use but also ask about whether more ST is used in the morning, the number of minutes before first use of ST, the difficulty refraining from using ST in places where use is prohibited, using ST even when ill or during the night while sleeping and whether the spit from ST use is swallowed (Boyle, Jensen, Hatsukami, & Severson, 1995).

R E S U L T S

Demographics

The mean age of this population was 30.8 years ($SD = 8.7$) with 95.8% Caucasian, 99.8% males (reflecting the prevalence of males among ST users in the general population) and 54.5% married. The mean number of years of schooling was 14.9 years ($SD = 1.9$) with 46.6% employed in administrative, managerial, or executive positions; 23.3% in skilled or clerical positions; 15.6% in semiskilled or unskilled positions; and 14.1% were students. All the participants who were not students were employed.

Pattern of use

The majority of these ST users (95.0%) used moist snuff with the other 5% using chewing tobacco. Over half the population used Copenhagen (56.6%), with 42.3% using Skoal and 1% using Skoal Bandits or Hawkens. The average age they first tried ST was 17.7 years ($SD = 6.2$, range = 5–50) and average age at which they became daily users of ST was 19.9 years ($SD = 6.6$, range = 8–50). The majority of ST users (78.4%) indicated that their peers had introduced them to ST, with a small percent indicating introduction from their parents (0.8%), relatives (7.0%), self (9.9%), and other (4.2%). The pattern of use showed that these treatment seekers used approximately 3.7 tins per week ($SD = 2.5$, range = 1–22) resulting in about 10.6 dips per day ($SD = 6.1$, range = 1–56), with an average number of minutes per dip duration of 46.5 ($SD = 34.9$, range = 7–240) and an average number of hours per day of dip use of 8.9 ($SD = 5.0$, range = 1–24). This pattern of use resulted in a mean cotinine level of 489.6 ng/ml ($SD = 296.6$, range = 6–1,863).

Dependence on ST

Items from a modified Fagerstrom Tolerance Questionnaire were examined to determine extent of dependence (Boyle et al., 1995). Approximately 11.4% reported using more snuff in the morning than evening. The average number of minutes to the first use of ST was 57.9 minutes ($SD = 97.9$, range = 0–720), although 60.0% of the population had their first chew within 30 minutes upon awakening. About 46.4% indicated that the first chew was the most difficult to give up, 47.3% indicated that they had difficulty refraining from ST in places prohibiting the use of ST, 50.3% indicated using ST when ill or when they had mouth sores, 5.7% indicated using ST during the night. Approximately 74% reported swallowing spit from ST. The mean frequency of time in which the spit was swallowed during ST use was 48.5%.

The percent of ST users who indicated that it was frequently or always unbearable when they had run out of ST was 57.2% with only 9.7% reporting that they never or seldom felt that way. About 57.2% indicated that they were frequently or always aware of when they were not using ST with 13.4% reporting that they were never or seldom aware of when they were not using ST. The percentage of ST users who used ST frequently or always when angry was 39.2%, uncomfortable or upset was 54.6%, when blue was 44.4%, or when hungry was 82.3%.

ST users who made a quit attempt for at least 24 hours were asked whether they had experienced specific withdrawal symptoms during this attempt. Of the 86.3% of ST users who indicated having quit in the past for 24 hours, 95.7% reported having experienced craving, 76.1% impatience, 73.8% irritability, 66.3% increased eating, 65.4% restlessness, 65.1% anxiety, 60.2% difficulty concentrating, 22.5% depressed mood, and 17.0% disrupted sleep. Approximately 69% endorsed four or more withdrawal symptoms, the number required to meet criteria for nicotine withdrawal based on the fourth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (American Psychiatric Association, 1994).

Prior quit attempts

Approximately 90.7% reported having tried to seriously quit in the past (duration of quitting for more than 24 hours). Of those individuals who tried to seriously quit, 32.4% reported quitting less than 3 times, 29.1% indicated between 3 and less than 5, 21.1% between 5 and less than 10, and 17.5% at least 10 times. Of those who have tried to quit, the average longest number of days without ST was 125.8 ($SD = 364.7$,

range = 0–4385.0). Of those who tried to quit, 65.7% reported quitting cold turkey. A significant number reported using oral substitutes to help them quit: 61.2% reported using gum, 41.0% reported using sunflower seeds, and 28.5% using candy.

Social environment for quitting

Approximately 90.3% indicated that they lived with someone. Of these individuals who did not live alone, 70.7% indicated that none of their housemates smoked and 81.0% indicated none of their housemates used ST. About 40.8% indicated almost none of their friends used ST and another 28.9% indicated that less than half of their friends used. Similar percentages were observed for cigarette smoking (43.0% and 27.4%, respectively). The mean level of support for quitting on a scale of 0 to 100, with 0 meaning *never* and 100 meaning *always*, was 91.5 ($SD = 17.6$); 79.9% indicated that their spouse or significant other encouraged them to quit, 59.7% of friends, 73.9% of parents, 39.8% of co-workers, 51.0% of doctors, and 50.5% of other relatives. Only 1.5% indicated that nobody encouraged them to quit.

Relationship to cigarette smoking

The following results are biased because we excluded ST users who were regular cigarette smokers (smoked greater than 20 cigarettes per month). The majority of ST users had ever smoked cigarettes (69.2%). Of those who had ever smoked cigarettes, approximately 24.5% indicated smoking currently, with the majority smoking less than 1 cigarette per day (83.8%). A little over half those individuals who have ever smoked tried ST first (51.4%). About 45.1% of ST users indicated that they have had a history of being a regular (daily) cigarette smoker. Of these individuals, they reported becoming a regular cigarette smoker at the age of 17.4 years ($SD = 3.34$, range = 6–29) and smoking on the average of 19.7 cigarettes per day ($SD = 13.5$, range = 2–60). About 33.1% indicated that they were not using any ST at the time of regular smoking, 52.9% indicated that they had used occasionally, and 14.1% indicated that they had used regularly.

Approximately 25.9% of those who had ever smoked indicated that they used ST as an aid to quitting cigarettes, and 55.3% among those who had ever been regular users of cigarettes. Conversely, about 14.0% of those who ever smoked cigarettes used cigarettes as an aid to quitting smokeless, and 24.4% of those who were ever regular cigarette smokers. Among those who had ever smoked, 31.3% reported having used cigarettes as a substitute when smokeless tobacco was unavailable. This percentage increased to 49.5% among those who were ever regular cigarette smokers.

Relationship to other tobacco products

A significant number of ST users also reported having ever smoked cigars (61.9%), with 89.6% of these individuals reporting that they currently smoked a cigar. Most individuals first tried ST before cigars (68.2%). About a quarter of ST users reported having ever smoked a pipe (23.1%), with 58.7% of these individuals indicating that they currently smoked a pipe.

DISCUSSION

Although the results from this study may be biased towards healthy, regular, and perhaps heavy users of ST due to the exclusionary criteria employed in this study, the

data collected on a large sample of ST users reveal some interesting findings. As evidenced in other studies, the population of ST treatment seekers obtained from a mid-west metropolitan area tended to be young, White males with some college education and mostly involved in a white-collar profession. They tended to be heavy and frequent users of ST, but not unlike the frequency of use reported in previous treatment studies. They were, however, heavier users than those found in studies that described characteristics of nontreatment ST users (Gritz, Baer-Weiss, Benowitz, Van Vunakis, & Jarvik, 1981; Hatsukami, Anton, Callies, & Keenan, 1991; Hatsukami, Gust, & Keenan, 1987; Hatsukami, Keenan, & Anton, 1988). The daily duration of time that ST was placed in the mouth was about half of the waking hours, with some individuals using ST during the sleeping hours as well. The percent of individuals who positively endorsed the items that are on the modified Fagerström Tolerance Questionnaire was similar to those observed in previous studies (Boyle et al., 1995). Over half the population reported using dip within 30 minutes of awakening, but less than half reported that the first ST use in the morning would be the most difficult to give up. ST users used more in the afternoon than in the morning, possibly because of environmental constraints for use. This pattern of greater use later on in the day was also observed in a nontreatment-seeking population (Hatsukami et al., 1987; Gritz et al., 1981). One notable finding was the number of participants who swallowed the spit from the ST. This behavior is of particular concern because of the increased bodily exposure to the carcinogens in ST (Benowitz, 1997).

The situations most frequently endorsed for use of ST were similar to those observed for cigarette smokers, with a large number indicating use associated with negative affect and after eating. Other survey studies conducted with adolescent ST users have also observed that the situations most frequently associated with use include both positive and negative affective states (Ary, Lichtenstein, Severson, Weissman, & Seeley, 1989), being bored (Ary et al., 1989; Williams, Guyton, Marty, McDermott, & Young, 1986), after meals (Ary et al., 1989), and when participating in sports (Ary et al., 1989; Williams et al., 1986). Among adults, postmealtimes, low arousal moods (boredom and depression), and passive entertainment (watching television) were situations associated with ST use (Gritz et al., 1981; Hatsukami et al., 1991). About three-fourths of the population reported experiencing one or more withdrawal symptoms with over half the population experiencing negative affect, difficulty with concentration and increased eating. The prevalence of these symptoms are similar to those observed among cigarette smokers (Hughes, Gust, Skoog, Keenan, & Fenwick, 1991; MMWR, 1994). For example, in the study conducted by Hughes et al. (1991), 68% of the abstinent smokers reported at least four symptoms of withdrawal compared to 69% observed among the ST users in this study. These findings would indicate that negative affect, postmealtimes, and withdrawal symptoms are important areas of focus in a ST treatment program.

A significant number of individuals have quit in the past and have done so by quitting cold turkey. Use of oral substitutes were particularly popular. These findings concur with a study that interviewed a sample of nontreatment daily ST users. This prior study observed that the average number of quit attempts was four, with 77% of those who tried quitting having quit cold turkey. The majority of the ST quitters used oral substitutes such as sunflower and gum to aid quitting (Severson, Eakin, Lichtenstein, & Stevens, 1990). Many ST users have a very supportive environment for ST cessation and most of them have been encouraged to do so by their significant other or friends. This finding indicates that the extensive social support that is available to the ST user

should be capitalized in treatment. In addition, over half reported being encouraged by physicians to quit. This finding could either reflect the more active role physicians are taking in advising their patients to quit using tobacco products, or that those who received physician advice are more likely to consider cessation treatment.

A final area that is likely to require attention is the use of other tobacco products. A significant number of ST users currently smoke cigarettes or have smoked in the past, an association consistently found in other studies (Orlandi & Boyd, 1989; Peterson, Marek, & Mann, 1989). An even higher percentage smoke cigars. Although no study has explored the use of other tobacco products and its relationship to relapse to ST use, it is unlikely that they will facilitate maintenance of ST abstinence. Furthermore, there is concern over the increase in other tobacco use upon ST cessation. Clear directives against the use of other tobacco products may be necessary in treatment.

In summary, those ST users seeking treatment experience high level of nicotine exposure and physical dependence on ST. Treatment needs to be focused on this addiction to nicotine, coping skills to deal with negative affect and postmealtimes or hunger, and the use of other tobacco products. Furthermore, the supportive social environment should be utilized and the use of oral substitutes, which were frequently used in prior cessation attempts, may be a useful alternative for ST use.

REFERENCES

- American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders*. (4th ed.). Washington, DC: Author.
- Ary, D. V., Lichtenstein, E., Severson, H., Weissman, W., & Seeley, J. R. (1989). An in-depth analysis of male adolescent smokeless tobacco users: Interviews with users and their fathers. *Journal of Behavioral Medicine*, **12**(5), 449–467.
- Benowitz, N. (1997). Systemic absorption and effects of nicotine from smokeless tobacco. *Advances in Dental Research*, **11**(3), 336–340.
- Boyle, R. G., Jensen, J., Hatsukami, D. K., & Severson, H. (1995). Measuring dependence in smokeless tobacco users. *Addictive Behaviors*, **20**, 443–450.
- DiLorenzo, T., Kern, T., & Pieper, R. (1991). Treatment of smokeless tobacco use through a formalized cessation program. *Behavior Therapy*, **22**, 41–46.
- Fagerström, K.-O. (1978). Measuring degree of physical dependence to tobacco smoking with reference to individualization of treatment. *Addictive Behaviors*, **3**, 235–241.
- Fagerström, K., & Schneider, N. (1989). Measuring nicotine dependence: A review of the Fagerström Tolerance Questionnaire. *Journal of Behavioral Medicine*, **12**(2), 159–182.
- Glover, E. D. (1986). Conducting smokeless tobacco cessation clinics. *American Journal of Public Health*, **76**(2), 207.
- Gritz, E. R., Baer-Weiss, V., Benowitz, N. L., Van Vunakis, H., & Jarvik, M. E. (1981). Plasma nicotine and cotinine concentrations in habitual smokeless tobacco users. *Clinical Pharmacology and Therapeutics*, **30**(2), 201–209.
- Hatsukami, D., Anton, D., Keenan, R., & Callies, A. (1992). Smokeless tobacco abstinence effects and nicotine gum dose. *Psychopharmacology*, **106**, 60–66.
- Hatsukami, D., Huber, M., & Callies, A. (1993). Physical dependence on nicotine gum: Effect of duration on use. *Psychopharmacology*, **111**, 449–456.
- Hatsukami, D., Jensen, J., Allen, S., Grillo, M., & Bliss, R. (1996). Effects of behavioral and pharmacological treatment on smokeless tobacco users. *Journal of Consulting and Clinical Psychology*, **64**(1), 153–161.
- Hatsukami, D., Pentel, P. R., Jensen, J., Nelson, D., Allen, S. S., Goldman, A., & Rafael, D. (1998). Cotinine—Effects with and without nicotine. *Psychopharmacology*, **135**(2), 141–150.
- Hatsukami, D., Skoog, K., Allen, S., & Bliss, R. (1995). Gender and the effects of different doses of nicotine gum on tobacco withdrawal symptoms. *Experimental and Clinical Psychopharmacology*, **3**(2), 163–173.
- Hatsukami, D. K., Anton, D., Callies, A., & Keenan, R. (1991). Situational factors and patterns associated with smokeless tobacco use. *Journal of Behavioral Medicine*, **14**(4), 383–396.
- Hatsukami, D. K., Gust, S. W., & Keenan, R. M. (1987). Physiologic and subjective changes from smokeless tobacco withdrawal. *Clinical Pharmacology and Therapeutics*, **41**, 103–107.
- Hatsukami, D. K., Keenan, R. M., & Anton, D. J. (1988). Topographical features of smokeless tobacco use. *Psychopharmacology*, **96**, 428–429.

- Hughes, J. R., Gust, S. W., Skoog, K., Keenan, R. M., & Fenwick, J. W. (1991). Symptoms of tobacco withdrawal: A replication and extension. *Archives of General Psychiatry*, **48**, 52–59.
- Ikard, F., Green, D., & Horn, D. (1969). A scale to differentiate between types of smoking as related to the management of affect. *The International Journal of the Addictions*, **4**(4), 649–659.
- Little, S. J., Stevens, V. J., Severson, H. H., & Lichtenstein, E. (1992). An effective smokeless tobacco intervention for dental hygiene patients. *Journal of Dental Hygiene*, **66**, 185–190.
- MMWR. (1994). Reasons for tobacco use and symptoms of nicotine withdrawal among adolescent and young adult tobacco users—United States, 1993. *Morbidity & Mortality Weekly*, **41**(43), 745–750.
- Orlandi, M. A., & Boyd, G. (1989). Smokeless tobacco use among adolescents: A theoretical overview. *NCI Monograph*, **8**, 5–12.
- Peterson, A. V., Marek, P. M., & Mann, S. L. (1989). Initiation and use of smokeless tobacco in relation to smoking. *NCI Monograph*, **8**, 63–69.
- Severson, H. H., Eakin, E. G., Lichtenstein, E., & Stevens, V. J. (1990). The inside scoop on the stuff called snuff: An interview study of 94 adult male smokeless tobacco users. *Journal of Substance Abuse*, **2**, 77–85.
- Sinusas, K., & Coroso, J. (1993). Smokeless tobacco cessation: Report of a preliminary trial using nicotine chewing gum. *The Journal of Family Practice*, **37**(3), 264–267.
- Stevens, V. J., Severson, H., Lichtenstein, E., Little, S. J., & Leben, J. (1995). Making the most of a teachable moment: A smokeless-tobacco cessation intervention in the dental office. *American Journal of Public Health*, **85**(2), 231–235.
- Tillegren, P., Haglund, B. J. A., Ainettin, T., & Holm, L.-E. (1995). Who is a successful quitter? One-year follow-up of a National Tobacco Quit and Win contest in Sweden. *Scandinavian Journal of Social Medicine*, **23**(3), 193–201.
- Williams, T., Guyton, R., Marty, P. J., McDermott, R. J., & Young, M. E. (1986). Smokeless tobacco use among rural high school students in Arkansas. *Journal of School Health*, **56**(7), 282–285.
- Zavela, K., Harrison, L., Smith, C., Smith, M., & Manske, K. (1995). The effectiveness of mint snuff as an oral substitute in smokeless tobacco cessation. *Journal of the CDA*, **73**(3), 26–27.