SMOKELESS TOBACCO USE: A SAFE ALTERNATIVE?

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INTRODUCTION

Compared to the voluminous literature on the health effects of cigarette smoking, relatively little is known and published regarding smokeless tobacco products. Nonetheless, a brief review of the health consequences of smokeless tobacco was presented in the 1979 Surgeon General's report on smoking and health,[1] while a more comprehensive review from the Advisory Committee to the Surgeon General was published in 1986.[2] Observations concerning deleterious health effects of smokeless tobacco use were first noted in 1761 by John Hill,[3] a British physician who (inter alia) reported:

> "Whether or not the tumours which occur amongst snuff-takers are absolutely caused by the custom, or whether the principles of the disorder were there before, and snuff only irritated the parts, and hastened the mischief I shall not pretend to determine. Even supposing the latter only to be the case, the damage is certainly more than the indulgence is worth... No man should venture upon snuff who is not sure that he is not liable to cancer and no man can be sure of that."

Hill's 225-year-old warning (albeit from sniffing) has,until recently,gone largely unheeded.

The taking of smokeless tobacco products in the United States was widespread until the turn of the last century. The advent of antispitting laws associated with the spread of contagious diseases,and the increased popularity of cigarette smoking, brought about a marked decline in usage during much of this century. Recent data, however, indicate a resurgence in smokeless tobacco use habits, particularly amongst teenage and young adult males.

In the United States, the smokeless variety of the pernicious weed is produced in two basic forms: chewing tobacco and snuff. Chewing tobacco is marketed mostly in the looseleaf (pouch) and plug (tightly packed) varieties, looseleaf being predominant. Snuff is more finely ground and is marketed in both dry and moist forms. Dry snuff can be placed or inhaled into the nasal cavity, a rare practice in the U.S. Gum painting with dry snuff, however, is somewhat more common -- especially with women.

Between 1944 and 1968, total smokeless tobacco production declined from 150

to around 90 million pounds.[4] By 1985, production had climbed to 135 million pounds.[5-10] Between 1964 and 1985, the prevalence of smokeless tobacco use for adults remained fairly stable,[11-13] but a marked change in the overall age distribution of users took place during this period. For example, in 1970, use of smokeless tobacco was most common amongst older men, while in 1985, the highest rates of use were observed in the younger age groups.[13,14]

Recent estimates indicated that 16 percent of males between the ages of 12 and 25 used some form of smokeless tobacco in the year preceding the study, and five to eight percent used it at least once a week. Around 10 percent of men over age 25 used smokeless tobacco in the preceding year. Use by females of all ages was consistently less than that of males, about two percent having used smokeless tobacco in the previous year.[14]

Other studies mimic these findings and indicate increased use of smokeless tobacco products by young males. General findings include the following:

1) Use of smokeless tobacco by youth is generally higher in rural than urban areas, in small communities, and in areas where there is a tradition of smokeless tobacco use.[15-17]

2) Information on smokeless tobacco use by ethnic and racial background indicates that rates for youth are comparable for Hispanic and non Hispanic Whites. Native American rates were consistently higher than those for Whites and, in most locales, use was less common for Asians and Blacks.[17]

3) Amongst youth, the likelihood of using smokeless tobacco appears to increase with age as well as over time.[15-21]

4) Peers and family members are found consistently to be important influences on smokeless tobacco use by children and adolescents.[15,19-20,22-27]

Health issues surrounding the use of smokeless tobacco products do not rival national problems involving cigarette smoking and hard drug use. Nonetheless, it is clear that the use of smokeless tobacco products is increasing on a near-epidemic scale, and along with the increased use is a growing body of literature suggesting adverse health effects.

The purpose of this paper is to add to this important literature, and report smokeless tobacco use habits amongst select population groups, with emphasis on miners, other adults living in mining communities, and children of both miners and non-miners.

MATERIALS

Information contained in this paper involves smokeless tobacco use rates and related information for various groups; all, save two, in the state of West Virginia.

The data comes from a number of sources; Center for Disease Control and state health agency-sponsored surveys, studies by the National Institute for Occupational Safety and Health, University-sponsored studies, and several surveys conducted by the author. Each data base was developed differently, and a brief description of methods is contained along with the general results from each survey.

DATA

(A) Smokeless Tobacco Use in the U.S. - 1986 Behavioral Risk Factor Surveillance System[28] -- Twenty-five states and the District of

Columbia collected data on smokeless tobacco use by telephone interview techniques. Data were adjusted to account for the age, sex, and race distribution of adults ≥ 18 years of age in each state. Prevalence rates (in excess of 10%) of smokeless tobacco use for males are shown in Table 1 for selected states.

Table 1
Prevalence (%) of Current Smokeless Tobacco Use for Males in Selected States

State	%
Alabama	17.2
Georgia	11.2
Kentucky	10.8
Montana	17.1
North Carolina	10.9
North Dakota	12.0
Tennessee	10.7
West Virginia	21.4

While only half of the states participated in the survey, it is clear that Appalachia and the South are areas of high usage; a similar trend is suggested for the northern plains area. The reported prevalence of current smokeless tobacco use for West Virginia males was over 20 percent. The smokeless tobacco use rate of one in five adult males in West Virginia is so excessive,relative to other areas,that one might consider this an artifactual statistic. However, it is most likely true--and perhaps even low. Firstly, the composition of the state work force, and prohibitions against smoking in many industries,tends to set an appropriate atmosphere for the use of a smoking substitute. Secondly, the history and social structure of the area is most certainly conducive to increased smokeless tobacco use. Thirdly, it is quite possible that all estimates from this national survey are biased downward--for 2 basic reasons:

1) Telephone surveys are known to exclude certain individuals who may be prone to have different vicious habits than those surveyed.

2) The national estimates shown relate only to adult (≥ 18 years of age) males, whereas there is now ample evidence of increased smokeless tobacco usage amongst school-age males.

(B) West Virginia Communities of Mullens and Richwood; Miners and Non-Miners -- In the mid 1960's, the U.S. Public Health Service performed over 1600 examinations in two West Virginia towns. The major purpose of the studies was to assess the respiratory health of coal miners and non-miners living under similar conditions. In addition to the ordinary battery of pulmonary examination procedures and the administration of a respiratory disease questionnaire, subjects were asked to provide information regarding tobacco use -- smoking and smokeless. No distinction was made between tobacco chewers and snuff takers. This data set provides sufficient details to possibly relate smokeless tobacco use to general morbidity and mortality outcomes, but such analyses are beyond the scope of this paper. Nonetheless, these data provide an excellent (but dated) opportunity to evaluate smokeless tobacco use for underground coal miners vs. use by their neighbors, and to further evaluate the rate of combined usage of cigarettes and smokeless tobacco.

Table 2 shows the distribution of tobacco use for a sample of adult males by occupational status for the two communities.

Table 2
Tobacco Use (%) by Occupational Status (Males) in Richwood and Mullens, West Virginia

Richwood	Miner	Ex-Miner	Non-Miner
% chew (only)	21.7	21.0	13.8
% chew and smoke	26.3	12.3	8.3
% smoke (only)	25.7	40.1	35.2
Mullens			
% chew (only)	11.8	15.6	9.6
% chew and smoke	34.4	8.5	6.7
% smoke (only)	28.5	42.2	39.5

Overall tobacco use rates for all occupational groups must be considered high. Nearly three-quarters of the miners in both communities used tobacco in some form. Smokeless tobacco use rates for miners vs. non-miners were more than doubled in Richwood (48.0% vs. 22.1%), and nearly tripled in Mullens (46.2% vs. 16.3%). While miners in both communities used smokeless tobacco at roughly the same rate (48.0% and 46.2%), the mix relating to use in conjunction with cigarette smoking was dramatically different; e.g. 21.7 percent of the miners in Richwood used smokeless tobacco in the absence of cigarette smoking, while the corresponding rate in Mullens was only 11.8 percent.

The rates of smokeless tobacco use in these two communities (especially amongst the miners) are higher than might be expected. While these overall reported rates are excessive, there is high likelihood that they are underreported if the contemporary scene is considered. Firstly, the information is somewhat dated and does not reflect the results of generalized increased smokeless tobacco production and usage in the last few years, and secondly, the data relate only to adult males -- and ample evidence now exists relating to dramatically increased usage patterns for young males.

(C) Georgia Kaolin Miners and Millers -- In 1975, the University of Western Ontario examined over 2000 male subjects involved in the Georgia kaolin industry. As with the subjects in the West Virginia community studies, the purpose was to gain an assessment of respiratory health. Again, no distinction was made between tobacco chewers and snuff takers. Briefly, Tables 3 and 4 show the prevalence of smokeless tobacco usage by race and by age for the kaolin workers.

Table 3
Smokeless Tobacco Use (%) by Race for Georgia Kaolin Workers

Race	%
White	23.4
Black	20.9
Total	22.4

Table 4
Smokeless Tobacco Use (%) by Age for Georgia Kaolin Workers

Age	%
<29	19.8
30-39	20.6
40-49	22.1
50-59	25.9
≥60	27.1
Total	22.4

Over 20 percent (22.4%) of the kaolin workers examined were admitted users of chewing tobacco or snuff. This is a two-fold elevation in prevalence from the 11.2 percent reported for Georgia by the Behavioral Risk Factor Surveillance System.[28] While a slight disparity in the prevalence of smokeless tobacco use was reported between blacks and whites (20.9% vs. 23.4%), the difference is basically unremarkable. However, for this occupational group, the prevalence of chewing, rubbing, and dipping relate directly to age,with the older subjects reporting proportionately higher rates.

Within the last year, the author conducted pilot educational seminars in various school systems in West Virginia and Maryland. Seminar information presented included health education slides, handouts, and other materials showing the deleterious effects from using smokeless tobacco products. In conjunction with the seminars, questionnaires on smokeless tobacco usage, cigarette usage, and related factors were completed. What follows is a brief synopsis of survey data from three separate West Virginia school systems.

(D) School System No. 1 -- 162 males, aged16-19,completed a questionnaire relating to tobacco product usage. Table 5 shows general usage patterns for the group.

Table 5
General Tobacco Usage (%)
WV School System No. 1

Smokeless Tobacco Usage	Cigarette Usage Current	Ex	Non	Total
Current	11.7	11.1	30.9	53.7
Ex-	4.9	3.7	15.4	24.1
Non-	3.7	1.2	17.3	22.2
Total	20.4	16.0	63.6	100.0

If nothing more, these data perhaps emphasize just how inquisitive and prone to experimentation are the young. Only 17 percent of the group had totally abstained from tobacco usage. Clearly, the use of smokeless tobacco was predominant, nearly 54 percent being current users. In contrast, around 20 percent were cigarette smokers.

Nearly 95 percent of the smokeless tobacco users rubbed snuff; the remaining five percent being chewers of pouch tobacco. By far, the preferred brand of smokeless tobacco was "Copenhagen" snuff -- 64 of 87 users used it. On average, the users of smokeless tobacco started chewing or dipping at around 10 years of age.

Although the prevalence of smokeless tobacco use for this group was quite high, of particular interest was one of the possible factors and interrelationships influencing the excessive use rates. Table 6 shows smokeless tobacco use patterns in the immediate families of student users and non-users.

Table 6
Smokeless Tobacco Use Patterns (%)
in Immediate Families of
Student Users and Non-Users
WV School System No. 1

Student Status	Smokeless Tobacco Use in Immediate Family Yes	No
Smokeless Tobacco User	66.7	33.3
Non-User of Smokeless Tobacco	19.4	80.6

The data in Table 6 are obvious in their indication of a strong family influence regarding the use of chewing tobacco and snuff by students. Two thirds of the admitted users reported that members of their

immediate family were also users, while only 19 percent of the non-users reported that members of their immediate family were regular users.

(E) School System No. 2, grades 9-12 -- 165 males and 159 females completed a questionnaire relating to tobacco product usage.

Seven (4.4%) of the females surveyed admitted to being current chewers. Of the seven, five dipped moist snuff, one used dry snuff, and one chewed pouch tobacco. There were four ex-chewers, two who were obvious experimenters, having chewed for less than a year. The other two had chewed for three and six years, respectively. While (admitted) prevalence of chewing, rubbing, and dipping amongst the females was low, the tobacco use habits of their immediate families nonetheless suggested a similar trend as seen previously; i.e. that family use is a significant factor influencing youth usage.

As might be expected, the male segment of this school system showed a dramatically different picture in terms of chewing and dipping. The overall tobacco usage for males is shown in Table 7.

Table 7
General Tobacco Usage (%)
WV School System No. 2

Smokeless Tobacco Usage	Cigarette Usage			
	Current	Ex	Non	Total
Current	12.7	6.7	21.8	41.2
Ex-	3.6	4.2	9.7	17.6
Non-	3.0	3.6	34.5	41.2
Total	19.4	14.5	66.1	100.0

Chewing tobacco and snuff taking is obviously a dominant habit for this group, with 41.2 percent reporting current and regular usage. This dwarfs its rate for cigarette smoking (19.4%). Of the 68 male smokeless tobacco users, only three chewed pouch tobacco, the remainder being takers of moist snuff. Almost all snuff takers dipped either "Copenhagen" or "Skoal", the former being predominant.

The smokeless tobacco use patterns of families of the male student users and non-users was as expected, a distinct and direct interrelationship being shown between family use and subject use. These data are contained in Table 8.

Table 8
Smokeless Tobacco Use Patterns (%)
in Immediate Families of
Student Users and Non-Users
WV School System No. 2

Student Status	Smokeless Tobacco Use in Immediate Family	
	Yes	No
Smokeless Tobacco User	67.6	32.4
Non-User of Smokeless Tobacco	29.4	70.6

(F) School System No. 3, grades 7-12 -- 131 males and 139 females completed a questionnaire relating to smokeless tobacco usage. The questionnaire administered was different than in the other two West Virginia school systems in that no information was solicited regarding other tobacco products; more details regarding smokeless tobacco habits were sought. The reported prevalence of smokeless tobacco use for the female students (one ex-user) was essentially nil. A few details from the male segment of the student body follow, in Tables 9-14.

Table 9
Smokeless Tobacco Use (%)
WV School System No. 3

Use Status	%
Current	21.4
Ex -	22.9
Non -	55.7

Table 10
Smokeless Tobacco Use (%)
by Type Used (Current Users)
WV School System No. 3

Type	%
Moist snuff	78.6
Pouch/plug	21.4

Table 11
Smokeless Tobacco Use (%)
by Brand Used
WV School System No. 3

Brand	Current User %	Ex User %
Copenhagen	14.3	13.3
Skoal	60.7	33.3
Other	25.0	53.3

Table 12
Smokeless Tobacco Use Patterns (%)
in Immediate Families of
Student Users and Non Users
WV School System No. 3

Student Status	Smokeless Tobacco Use in Immediate Family Yes	No
Smokeless Tobacco User	80.8	19.2
Non-User of Smokeless Tobacco	38.0	62.0

Table 13
Smokeless Tobacco Use (%)
Attitude Question
WV School System No. 3

Do you think it's harmful ?	Current User %	Non User %
Yes	69.2	95.8
No	23.1	2.8
Don't Know	7.7	1.4

Table 14
Smokeless Tobacco Use (%)
Attitude Question
WV School System No. 3

Would you Stop for Health Concerns ?	Current User %
Yes	23.1
No	50.0
Don't Know	26.9

Around one in five (21.4%) of the males surveyed were users of smokeless tobacco. A great deal of what might be termed experimentation with the product had taken place; i.e. 30,or 22.9%,reported that they were ex-users. Most of these ex users had chewed for only a few months to a year. All grade levels contained chewers and dippers; the prevalence ranging from 10.5 percent in the seventh grade to 34.8 percent in the eleventh grade. Moist snuff (generally Copenhagen and Skoal) was preferred over pouch or plug tobacco. Family use patterns of student users and non-users of smokeless tobacco corresponded with the other survey results mentioned previously, i.e. a dramatic and direct relationship existed regarding family influence. Of particular interest in this survey are the data in Tables 13 and 14. Nearly 70 percent of the current users thought dipping would be harmful to their health while nearly all (95.8%) of the non-users had similar thoughts. Even so, while a majority of users thought dipping would be harmful to their health, only 23.1 percent indicated that they would stop for health reasons.

COMMENT

In the lecture series and surveys of the three West Virginia school systems, students were asked to make any other comments they liked on the survey document. Additional comments were received from some of the users (none from non-users) of smokeless tobacco. All comments were essentially negative in nature and provide some insight into attitudes regarding the subject; e.g. although most students recognize and agree that smokeless tobacco products can and do produce adverse health consequences, they remain convinced that they will not be affected. The 'choice' comments received from male students are unpublishable.

By any reasonable yardstick, the information contained in this paper indicates smokeless tobacco use in epidemic proportions, at least in some segments of American society. The data relating to coal miners in Richwood and Mullens, West Virginia is exceedingly high and,with high likelihood,are underestimated. Prohibitions against cigarette smoking in underground environments due to methane considerations may lead more miners to chew, i.e.to take on a smoking substitute.While this may well start as a cigarette substitute, most miners tend to use the product habitually. Although the Georgia kaolin workers do not show a prevalence nearly as high as that of coal miners, it is nevertheless quite excessive. The chance that other occupational groups in Georgia and the South in general would show prevalences of smokeless tobacco use to be equally high are good. The West Virginia school systems where surveys were performed, while not physically far apart, were different in one important aspect,which is shown markedly in the statistics. Major industries in two of the areas were mining and lumbering,while agriculture was dominant in the third area. The areas with mining and lumbering activities showed the prevalence of smokeless tobacco use amongst the youth to be quite excessive (40 to 50 percent) while the farming area showed a prevalence for the young males of just over 20 percent.

While figures of the magnitude presented may seem astounding to the general public and to the health profession, they in fact may be rather commonplace to residents of mining villages and other similar settings. How to intervene successfully and to curb the rate of smokeless tobacco use is another problem altogether. On two separate occasions (not included in the statistics for this paper), the author presented health education materials to high-use groups and coupled the lecture and information series with pre-and post-survey questionnaires on tobacco usage.

Pre-to post-period smokeless tobacco usage changed (in both cases) from around 75 percent to 30 percent. Whether the lecture and information series was a factor, whether this was a period of generalized increased publicity on the subject, or whether the results are merely a rather temporary and artifactual state of affairs remains to be seen.

Health education and promotional materials, however, obviously did not make the situation worse. Materials presented involved:

1) a brief history of smokeless tobacco usage.

2) myths regarding smokeless tobacco use as a 'safe' substitute for cigarette smoking.

3) case reports of disease outcomes associated with chewing tobacco and snuff use.

4) misleading advertising.

5) general statistics on what is currently known about deleterious effects from using smokeless tobacco.

Major findings from other work (noted in the Introduction) are confirmed -- and dramatically so -- by the statistics presented in this paper. Given the documented high prevalence of usage in West Virginia and very possibly in other mining states, and given the excessive rates of usage for miners and for children in mining communities, an intensive health promotion and education campaign on the subject seems in order; at least in select areas for specific risk groups. As a start, appropriate officials might consider including a training module on the effects of smokeless tobacco use in the annual mandatory safety and health courses for the nations coal miners. In fact, such a module should most likely not be limited to concerns about smokeless tobacco, but should involve educational materials on all forms of tobacco,as well on as alcohol and controlled substances.

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