

# PREVALENCE AND CORRELATES OF INITIATION OF SMOKING BEHAVIOR AMONG PRETEEN BLACK AND WHITE CHILDREN

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This study estimated smoking prevalence and identified factors associated with initiation among preteens in Nashville, TN. An anonymous, self-administered questionnaire was given to 238 fifth- and sixth-graders in a middle-class neighborhood school. The mean age at initiation was 8.5 years (range 6–11 years). Overall, 10.5% of students had ever smoked; 16.1% of blacks and 9.3% of whites. Eighty-six percent continued to smoke. Black sixth-graders smoked (26.9%) four times the rate of black fifth-graders and 2.5 times that of white sixth-graders. Relatives initiated 78% of blacks while friends initiated 68% of whites. One-quarter of smokers got their cigarettes at home. Regular attendees of religious services had a lower smoking rate (6.9% versus 16.4%;  $p=0.01$ ). Smoking rates decreased with increased knowledge of risks ( $p=0.00001$ ). Among smokers, none believed that smoking is a risk factor for heart disease, 96% did not believe that smoking has any short-term health effects or is a risk factor for stroke. Few ever-smokers had a complete understanding of the health risks. Targeted messages and curriculum should be developed to teach preteens about the short- and long-term dangers of smoking. Clinicians can play a major role in educating their clients about the risks of smoking. (*J Natl Med Assoc.* 2004;96:200–208.)

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**Key words:** adolescent ♦ smoking ♦ race ♦ risk knowledge ♦ religion ♦ peer influence

## INTRODUCTION

Tobacco use is one of the most common causes of preventable death in the world. Globally, smoking causes about four million deaths per year, and

if this trend continues, the percent of smoking-related deaths will more than double in the next 20 years.<sup>1</sup> Tobacco use is responsible for at least one in every five deaths in the United States.<sup>2</sup> Along with killing half of lifetime users, cigarette smoking drastically increases the burden of disease in populations that smoke, accounting for 25% of ischemic heart disease and 75% of chronic bronchitis and emphysema.<sup>3</sup> While there has been a decline in adult tobacco use, adolescent use increased 73% from 1988 to 1996.<sup>4</sup> Though high-school-age smoking dropped to 29% in 2001, the rate is still unacceptable. Everyday, about 5,000 adolescents try a cigarette,<sup>5</sup> and almost half of them will become regular smokers.<sup>6</sup> Half of those—if they do not quit—will die as a result of their new habit.<sup>7</sup> Alarming high numbers of children are addicted to tobacco, making adolescent smoking a major public health problem.<sup>8,9</sup> The prevention of smok-

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ing behavior among adolescents has been a public health priority in the nation since 1995.<sup>9</sup>

Over 80% of adults who have ever smoked cigarettes started the behavior during or before their teenage years; about 50% of those were already regular smokers in their teens.<sup>7</sup> Other research has indicated that the earlier the age of initiation, the more likely children are to become habitual smokers<sup>10</sup> and the less likely they are to quit.<sup>11,12</sup> If the onset of smoking behavior can be prevented during childhood, smoking is less likely to occur during the rest of life.<sup>9</sup> In order to devise prevention strategies, it is essential to understand the reasons and factors influencing the initiation of smoking during the preadolescent years. Although many studies have focused on teenage smoking initiation behaviors,<sup>13-24</sup> not enough research has been done to understand the psychosocial and environmental factors related to the onset of smoking behavior in the preteen years.<sup>25,26</sup> It is crucial to identify and understand factors related to the initiation of smoking among preteens in order to prevent this behavior before children become regular smokers even in their teenage years.

The purpose of this study was to estimate the prevalence of smoking and to identify factors that are associated with the initiation of smoking behaviors among black and white preteens in a middle-class, southeastern United States community. We believe that the findings of this study will be beneficial in developing smoking prevention programs for this age group.

## METHODS

### Data Collection

A survey was conducted of fifth- and sixth-grade students aged 10–12 years old in a zoned middle- and upper-middle class neighborhood school in a suburban area of Nashville, TN. According to the 2000 Census<sup>27</sup>, the median income of residents in this area was \$69,446. From the same ZIP codes, 96% of the adults had finished high school. In comparison, the county within which the school zone was located had a median income of \$39,797, and 81% of the adults had finished high school. Only students from this smaller area could attend this particular school.

Data were collected using a one page, 25-item, multiple-choice, structured questionnaire. This questionnaire was developed based on focus group

discussions with study subjects and standardized questions taken from the Centers for Disease Control and Prevention's Youth Risk Behavior Surveillance System Questionnaire.<sup>28</sup> Four focus group discussions were conducted—two per grade with five to six participants per group—to understand issues related to the initiation of smoking. Each discussion group was facilitated by a peer from the same grade presenting the survey as a science project. Findings from the discussions were incorporated into the questionnaire, which was finalized after the pretesting of 18 students.

All concerns raised by the pretested students, such as the clarification of a general question about stress into subcategories of areas of life that can be stressful, were addressed. Also, the pretested students confirmed the readability of the questionnaire making sure that the questions were clearly understandable at the fifth-grade reading level. The variables in the questionnaire included: age, gender, race, grade level, live with single or both parents, ever smoked cigarettes, current smoking status, age started smoking cigarettes, who assisted in initiating smoking, reasons for smoking, any smoker in the household, knowledge of health risks of smoking, and level of stress in different areas of their lives.

The questionnaire was made anonymous by excluding the respondent's personal identification information such as name, social security number, parents' names, or home address. However, the zip code was collected to confirm location within the school zone. Homeroom teachers distributed the questionnaires to the fifth- and sixth-grade classes on two separate days, respectively. They asked the students to complete the anonymous and confidential questionnaire, then to fold and place it in a designated box. The teachers made clear to the students that filling out the questionnaire was voluntary and they could refuse to answer any questions, some questions, or all the questions. The students were given 10 minutes to complete the questionnaire but finished it in roughly 5–8 minutes.

### Data Analysis

Data were entered into the SPSS database and checked for errors, inconsistencies, and missing values. Missing information caused some variations in sample size for different characteristics, therefore the sample sizes are listed with all independent variables (Tables 1 and 2). Analyses were performed on

the total sample of blacks and whites. Due to a small sample size, the statistics for other racial groups were less meaningful and, hence, not analyzed. The

main outcome variable was “ever smoked cigarettes”. A composite knowledge variable was created from the responses on the risks of smoking for lung

**Table 1. Percent Preteen Ever-Smokers by Select Characteristics**

Variable	N Sample Size	Total+ N=238	Blacks N=57	Whites N=162
<i>Gender</i>				
All	238	10.5	16.1	9.3
Boy	118	11.9	20.0	10.7
Girl	118	9.3	14.3	7.8
<i>Grade</i>				
Fifth	109	7.3	6.7	7.1
Sixth	129	13.2	26.9**	10.9
<i>Home Environment</i>				
Live with both parents	153	8.6	14.3	7.5
Single parent	85	14.0~	17.1	14.3~
<i>Smoker at home</i>				
Yes	66	13.6	15.0	15.0
No	156	10.3	16.7	8.0~
<i>Religion</i>				
Attend weekly religious services				
Yes	130	6.9	10.7	6.6
No	103	14.6**	20.8*	12.9*
<i>Knowledge Score</i>				
≥80% Correct Answer	71	1.4	0.0	1.9
<80% Correct Answer	167	14.4***	19.6**	13.0**
<i>No Short-Term Health Risk of Smoking</i>				
Agree	27	96.0****	100.0****	93.3****
Disagree	211	0.5	0.0	1.0
<i>Psychological Characteristics</i>				
<i>Stress at home</i>				
Yes	68	17.6	23.5	17.1
No	170	7.6**	12.8*	6.6*
<i>Stress at School Work</i>				
Yes	85	12.9	15.2	11.9
No	153	9.2	17.4	8.3
<i>Feel Lonely</i>				
Yes	62	12.7	10.5	14.3
No	176	9.8	16.2	8.2
<i>Life is Boring</i>				
Yes	62	16.1	26.7	13.2
No	176	8.5~	12.2~	8.1~
<i>Stress Score Above 50%</i>				
Yes	77	14.3	18.5	12.8
No	161	8.7~	13.8	8.1

~0.06<p<0.1; \*p<0.05; \*\*p<0.01; \*\*\*p<0.001; \*\*\*\*p<0.0001

cancer, heart disease, stroke, oral cancer, and gum disease. The respondent received one point for each correct answer. A knowledge score was the sum of the answers to the five diseases; total scores ranged from 0 to 5. Then a dichotomous variable, Higher Knowledge Level, was created based on the students who gave more than three correct answers (equal to or more than 80% of the correct responses) and was assigned a value of 1, otherwise 0. A stress composite score was created from the sum of responses to the following variables: feel lonely, life is rather boring, feel stress at home, and find schoolwork difficult. A "yes" response to any one variable received one point with a total score range from 0 to 4. Chi-square tests for proportions were conducted to assess the significant differences between the two groups. Fisher's exact test with Yates correction<sup>29</sup> was applied where appropriate. Partial correlation coefficients were calculated between variables of interest and initiation of smoking after controlling for the effects of gender, race, grade, and living with one or two parents. A t-statistic was used to test significance of correlation coefficients. A conventional p value of less than or equal to 0.05 in a two-tailed method was used to determine significance.

## RESULTS

Two-hundred-thirty-eight of 240 students responded to the survey completely. Two students refused to complete the survey. Over half (54%) of the respondents were sixth-graders, and 46% were fifth-graders. Both genders were represented equally. Sixty-nine percent of the respondents reported as whites, 24% as blacks, and 7% as other races. Race information for one student was missing. Results for black and white students are discussed. However, due to the small sample size, the statistics for other racial groups were less stable and, hence, are not discussed.

About 64% of the respondents lived with both parents, 34% with a single parent, and 2% with other relatives. With respect to religious practice, 56% of the students reported that their families attended religious services weekly, and 44% attended irregularly or never. Thirty percent of the students reported that they lived in a home with at least one smoker. Overall, 10.5% of the students reported that they had ever smoked a cigarette (ever-smokers), and 86% of those had continued to smoke. The age of trying the first cigarette ranged 6–11 years with a mean of 8.5 years. Among races,

16.1% of blacks and 9.3% of whites had tried cigarette smoking. Table 1 shows the percent of students who had ever smoked distributed by their demographic, environmental, and psychosocial characteristics. In general, a higher percent of the boys in both grades—and the sixth-graders as a whole—smoked, compared with girls. This was true for the total sample whether black or white.

Black sixth-graders smoked (26.9%) at four times the rate of black fifth-graders, 2.5 times the rate of white sixth-graders and twice the rate of all sixth-graders. Only the difference between the black and white sixth-graders was statistically significant. Those children living with two parents had a lower rate of smoking (8.6% versus 14.0%;  $0.06 \leq p \leq 0.10$ ); and those living with a smoker had a higher rate (15.0% versus 8.0%;  $0.06 \leq p \leq 0.10$ ) for whites only. The students, whether black or white, attending weekly religious services had a significantly lower rate of smoking than their irregular or nonattendant counterparts (6.9% versus 14.6%;  $p=0.01$ ). Table 1 reveals that students who achieved the higher knowledge score (80% or more) on the health risks of smoking had a substantially lower rate of smoking behavior compared with the remaining students who did not (1.4% versus 14.4%;  $p=0.001$ ). This finding was consistent in blacks (0% versus 19.6%;  $p=0.001$ ) and whites (1.9% versus 13%;  $p=0.001$ ). The knowledge score had a negative correlation with smoking behavior ( $r=-0.38$ ;  $p=0.00001$ ) even after controlling for the effect of gender, race, grade level, and living with a single or both parents. Those students who did not believe that smoking has any short-term health risks had the highest rates of smoking behaviors (93%–100%). The weekly attendance at religious services is positively associated with knowledge score ( $r=0.17$ ;  $p=0.01$ ).

Psychological characteristics have varying associations with the initiation of smoking (Table 1). Those students who reported stress at home smoked at a significantly higher rate than that of their counterparts (17.6% versus 7.6%;  $p=0.01$ ). The students who thought that life was boring also had a tendency to smoke at a higher rate (16.1% versus 8.5%;  $0.06 \leq p \leq 0.10$ ). Stress over schoolwork (11.9% versus 8.3%;  $p=NS$ ) and feeling lonely (14.3% versus 8.2%;  $p=NS$ ) seemed to affect smoking behaviors among whites only. Those with stress scores more than the median had a tendency to smoke at a higher rate (14.3% versus 8.7%;  $0.06 \leq p \leq 0.10$ ) than their counterparts.

## Subgroup Analysis

Table 2 presents preteen-age ever-smokers' sources of assistance received in initiating smoking and reasons for trying smoking as well as their knowledge of the health risks of smoking.

### Assistance in Initiation of Smoking

Overall, 96% of smokers reported that a friend or a relative assisted them in the initiation of smoking by providing the first cigarette. Among blacks, a vast majority (78%) reported that they received assistance from a cousin or other relative, while 68% of whites reported getting assistance from a friend. Approximately one-quarter of all smokers mentioned that home was their main source of cigarettes.

### Reasons for Trying Cigarettes

Reasons for trying cigarettes had a multiple-response option: curious to test what it was like (47%–54%), to be cool (22%–47%), and to forget problems (33%–43%). Among the other reasons mentioned were to relax (27%–44%), being stressed

at home (11%–27%), to please a friend (11%–27%), and being afraid to say no (11%–20%).

### Knowledge of Health Risk of Smoking Among Preteen-Age Ever-Smokers

Table 2 reveals that none of the smokers knew that smoking is a risk factor for heart disease, and only 4% knew that it is a risk factor for stroke. The result also shows that 28% and 36% knew smoking is a factor for gum disease and oral cancer, respectively, and 60% of them knew that smoking is a risk factor for lung cancer. While, as a whole, only 4% recognized that smoking causes short-term health effects, none of the black respondents did.

## DISCUSSION

Smoking in preadolescence is predominantly experimental.<sup>26</sup> Correspondingly, in our study of preteens, smoking was mostly due to curiosity or to be cool. Research has documented that of those who initiate cigarette smoking before or during adolescence, more than half become regular smok-

**Table 2. Percent Ever-Smokers Reporting on Who Assisted in Initiation of Smoking, Their Reasons to Try it, and Their Knowledge of the Risk of It**

Variable	Total+ N=25	Blacks N=9	Whites N=15
<i>Assisted in Smoking Initiation</i>			
Friends	40.0	11.1	67.7
Cousin/relatives	44.0	77.8	20.0
Self	16.0	11.1	12.3
Home as a main source of cigarettes	25.0	25.0	27.0
<i>Reasons for Trying Cigarettes (Multiple Answers)</i>			
Curiosity	52.0	55.6	46.7
Everyone smokes	28.0	22.2	26.7
For fun	16.0	11.1	20.0
To be cool	40.0	22.2	46.7
To please a friend	24.0	11.1	26.7
Afraid to say no	20.0	11.1	20.0
Stress at home	24.0	11.1	26.7
Forget problems	41.7	33.3	42.9
Relax	36.0	44.4	26.7
<i>Knowledge of Risk of Smoking</i>			
Lung cancer	60.0	55.6	60.0
Mouth cancer	36.0	22.2	40.0
Gum disease	28.0	11.1	33.3
Heart disease	0.0	0.0	0.0
Stroke	4.0	0.0	6.7
Short-term health risk	4.0	0.0	6.7

+ Total included other races; so combining both blacks and whites will have a different percent.

ers in their teens.<sup>6</sup> Even irregular experimentation with smoking in adolescence significantly increases the likelihood of habitual smoking in adulthood.<sup>18</sup> Alarming, in our study, of the 25 students that had ever smoked, at least 80% continued to smoke.

Both onset and prevalence of smoking among adolescents usually increase with age and grade.<sup>24,30-32</sup> In our study, the prevalence of experimentation with smoking increased substantially from fifth- to sixth grade, especially for black children. Studies on older children found that black youths have significantly lower rates than whites in the initiation of smoking.<sup>33-35</sup> However, recent studies have revealed that the rate of smoking among black high school students almost doubled between 1991 and 1997.<sup>36</sup> The results of our survey could be an indication that black preteens have been introduced to smoking at higher rates than previously thought. The reasons for this increase have not been fully explored, but some research has suggested that recent cigarette marketing specifically targets black youth.<sup>37,38</sup> This hypothesis needs further investigation.

In order to develop strategies for prevention programs, it is crucial to identify the factors that either assist or impede the onset of smoking among children. Peer influence has traditionally been the largest factor in adolescent initiation, and research shows that its greatest effect is among whites.<sup>39</sup> Our study population reflected this among whites, but among blacks, the vast majority of smokers reported that assistance for the initiation of smoking came from their relatives. Our focus group discussions with black mothers revealed that they allowed smoking in family circles because, otherwise, children would go to strangers for cigarettes and end up using drugs like marijuana and cocaine, or even getting involved in gang activities. In this group, the African-American family view of smoking was that it does not pose as serious a threat to life as other drugs or violence. This finding could indicate another influence on the recent increase in black adolescent smoking rates. Future studies on the national level would be more indicative of factors underlying the increase of smoking among black youth.

Knowledge of the harmful health effects of smoking was a strong correlate against the initiation of smoking in this study. This finding is consistent with some studies done on adolescents,<sup>39-41</sup> but inconsistent with others.<sup>32,42</sup> In this study, very few ever-smokers had a complete understanding of the health risks of smoking. Of those children who

believed that there are no short-term health risks in smoking, almost all smoked.

This is an area where targeted public health messages and curricula should be developed to teach children at an early age about the dangers of tobacco use. Healthcare professionals can also play a major role in educating their clients about the adverse health effects of tobacco use. As found in this study, the weekly attendance of religious services was positively correlated to the knowledge of health risks and negatively associated with the initiation of smoking. Therefore, along with schools, religious institutions should be more widely used as channels of antismoking messages to communities. Members of a community are more likely to quit or never start smoking when they are provided with a complete understanding of the dangers of tobacco use.<sup>43</sup>

Since the onset of lung cancer and fatal heart disease seems a time-removed danger to the young,<sup>44</sup> emphasizing the short-term risks, such as an immediate increase of pressure in the heart,<sup>45</sup> slowed growth of lung function in adolescents,<sup>46</sup> and increased overnight hospital stays,<sup>47</sup> could play a major role in influencing adolescent attitudes about cigarettes. With recognition of the major threats of smoking, like lung cancer and emphysema, being nearly ubiquitous in American culture and among the subjects of this study, other strategies could include focus on less recognized diseases, such as permanent blindness,<sup>48</sup> acid reflux,<sup>49</sup> and bone degeneration,<sup>50</sup> which may overcome the complacency inherent with attitudes of invincibility. Also helpful in preventing initiation could be educating preteens of the over-95% failure rate of smokers attempting to quit,<sup>51</sup> and what the American Council on Science and Health calls the irreversible health effects of cigarette smoking.<sup>52</sup>

### Limitations of the Study

This cross-sectional study was not designed to test hypotheses. The purpose was to describe the prevalence of cigarette smoking and correlates of the initiation of smoking among preteens in a middle-class community of the southeastern United States. At this age, not a large number of children are smoking or experimenting with smoking; therefore, subgroup analysis within the ever-smokers is likely to be based on small numbers. Small sample sizes do not provide enough power to show statistical significance even when a difference is considerably large. The subgroup analysis among ever-smokers in this study obviously suffers from

this limitation. However, we believe that the findings of this research reveal some factors that were correlated with the problem and/or solutions and shed light on the importance of studying preteens in this subject matter. This result may be useful in generating future hypothesis-based studies.

This is research based on a convenience sample of 238 preadolescent students of a suburban school. The results from this study may not be generalizable to all students of different socioeconomic backgrounds. The development of the questionnaire included focus group discussions and pretesting with the same group of students. Those students who were exposed to the questions before the final administration of the questionnaire might have answered differently from those who were not exposed. However, since there were only 18 students involved in the pretest, we do not think the effect is great. Also, teachers distributed the questionnaires, and that might have pressured some students to participate unwillingly. It is possible but unlikely, since the questionnaire was anonymous and confidential. Moreover, the teachers announced repeatedly that responding to the questionnaire was voluntary and gave the students the option to refuse any, some, or all of the questions. Two students did not answer any questions at all. With an exception of the Attending Religious Services question, which had a response rate of 92%, all other variables had a response rate close to 99%. It is unlikely that the small variations in sample sizes for different questions compromised the study.

## Recommendations Summary

Much more research needs to focus on the factors influencing initiation of smoking at the preteen years in order to stem a resurgence of smoking rates among older groups, especially among blacks. Potential strategies to reduce smoking initiation within this vulnerable age group should focus on smoking-related health education, particularly on the short-term and permanent risks associated with smoking. Personalizing the effects of cigarettes may combat the complacency of this age group, which sees the negative health effects of smoking as something that occurs many decades further along in their lives. What they don't understand is that the addiction is likely going to be too strong at that point in their lives for them to quit. From a practical standpoint, we recommend a multi-layered approach: integrating information about

the dangers of smoking into school curriculums that progress with students through grade levels, the dissemination of information through socio-cultural and religious institutions as they interact with children 12 and younger, promotion of greater parental involvement on matters of health behavior, and public service announcements appealing to the under-13 age group.

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