Characteristics of African American Teenage Smokers Who Request Cessation Treatment

Implications for Addressing Health Disparities

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Background: Ethnoracial disparities in both tobacco-related mortality and treatment outcome for smoking cessation have been reported among adults, but there is a dearth of information on ethnoracial differences among adolescent smokers.

Objective: To compare smoking-related characteristics in African American and non–African American teenaged applicants for a smoking cessation trial.

Participants, Design, and Setting: Four hundred thirty-two teenaged smokers (mean [SD] age, 15.6 [1.5] years; 61.8%, female; 31.9%, African American) responded via telephone to various media advertisements. Self-reported sociodemographic, smoking-related, and clinical data were obtained to determine preeligibility for trial participation.

Main Outcome Measures: The number of cigarettes smoked per day, Fagerström Test for Nicotine Dependence (FTND) score, motivation to quit, self-reported health problems, and medication use.

Results: Compared with non–African Americans, African Americans had lower FTND scores (mean [SD] score, 5.31 [2.24] vs 6.18 [2.18]; P < .01), and smoked fewer cigarettes per day (mean [SD] number of cigarettes, 12.6 [8.3] vs 15.4 [7.5] cigarettes/d; P < .04). The FTND scores were similar in both groups when adjusted for the number of cigarettes smoked per day. African American and non–African American teenagers reported similar motivation to quit (mean [SD] score, 8.64 [1.68] vs 8.53 [1.59], respectively). No difference was found in frequency of physical health problems (eg, asthma), diagnosed psychiatric conditions, or prescribed psychiatric medication although fewer African American teenaged smokers took medication for physical problems (21.2% vs 36.7%).

Conclusions: Cessation treatment interventions designed for African American youths should include lower FTND-defined levels, or the use of other instruments that do not focus on the number of cigarettes smoked per day. Our findings also highlight the importance of ethnocultural issues in treatment research that aims to address health disparities.

macological approaches by clinicians for youth.\textsuperscript{10,11} Compared with white and Hispanic youths, African American adolescents are less likely to use physician offices for access to care and preventive care\textsuperscript{12}; furthermore, compared with non–African American smokers, African American adults were significantly less likely to recall being advised to quit smoking by their primary care physician.\textsuperscript{13}

Adolescent tobacco use typically follows a series of steps from initial and experimental use to regular and, eventually, daily intake.\textsuperscript{14} Because most regular teenaged smokers will continue to smoke as adults,\textsuperscript{15} the observed tobacco-related health disparities reported among African Americans are likely to increase if appropriate prevention and treatment programs are not implemented within relevant communities. To this end, the validity of research data is contingent on representative sampling and inclusion of African Americans in such research, as recommended by recent National Institutes of Health guidelines.\textsuperscript{16} This need is also highlighted by ethnic differences in nicotine-cotinine metabolism and menthol preference, which have been linked to potential differences in health outcomes.\textsuperscript{17-21} Ensuring adequate recruitment of adolescent African Americans into clinical and treatment research is critical to address the smoking trajectory into adulthood, thereby helping to close the gap in smoking-attributable mortality.

Regrettably, smoking cessation treatment opportunities for youth have not kept pace with demand despite polls indicating adolescent smokers’ desire for cessation.\textsuperscript{22,23} Regardless of ethnic group considered among teenaged smokers, the combination of systemic barriers to recruitment, high attrition, and low quit rates have hampered the collection of needed data, leaving practitioners with guidelines for cessation treatment that are put forth by expert opinion rather than empirical findings.\textsuperscript{11,24} As outlined earlier, this dearth of cessation treatment opportunities is related to systemic obstacles that might be even more problematic for African American youth.\textsuperscript{12} For example, even the few open-label research trials that have been reported to date have not included many African American teenagers.\textsuperscript{25,26} As such, African American adolescent smokers represent an understudied group that challenges the field of cessation research from the standpoint of both their age and their membership in a group that is underrepresented in research. Because few studies have analyzed ethnорacial differences\textsuperscript{27,28} in smoking characteristics among teenagers, the purpose of this study was to examine these differences. We report sociodemographic, smoking-related (tobacco dependence and smoking history), and self-reported clinical information from the screening procedure of a pharmacotherapy trial that aims to help adolescent smokers quit.

### METHODS

**PARTICIPANTS AND SETTING**

Participants in this study were teenaged smokers who responded via telephone to advertisements for an outpatient teenaged smoking cessation study that uses medication and group therapy and provides free transportation. The treatment study protocol was approved by the National Institute on Drug Abuse institutional review board, Baltimore, Md. In our endeavor to establish a viable tobacco research program for the youth of the Baltimore area, our advertising was broadly directed at area youth and included community channels (schools, churches, and others), some of which were ethnic specific. We advertised the program through several media, including print, radio, and television advertisements and word of mouth. The radio commercials were started earlier in the study when community penetration was low; a prominent and well-established disc jockey was used on a popular station favored by non–African American youth. The television commercial was run on a channel that showed programs predominantly viewed by African American youth.

While the smoking cessation study had recruitment goals to ensure adequate power to evaluate treatment efficacy, the sample size for the present analysis was determined by the number of individuals who responded to the recruitment effort. All youths (13-17 years old) who called in to request treatment between September 1, 1999, and September 30, 2001, were included in this analysis.

**PROCEDURES AND MEASURES**

When teenaged participants telephoned to inquire about their eligibility to participate in the treatment research program, they underwent a 15- to 20-minute (internally developed) structured telephone interview performed by a clinical social worker. Sociodemographic information (age, sex, self-reported ethnорacial affiliation); medical, psychiatric and medication history; smoking-related history; previous cessation attempts; and motivational level to quit were recorded on intake forms. For the determination of ethnic group category, callers were asked: “Which of the following best describes your ethnорacial background: White, African American, Latino or Hispanic, Native American, or Asian?” Smoking histories were explored by asking the following questions: “How old were you when you took your first puff?” and “How old were you when you smoked your first cigarette?” For previous quit attempts, callers were asked: “Have you seriously tried to quit before, and if so, how many times?” and “What was the longest time you were able to stay smoke free during any one of these quit attempts?” For motivation to quit, an integer scale was used. Participants were asked: “On a scale of 0 to 10, with 10 indicating you would quit immediately and 0 you do not really know if you want to quit, how motivated would you say you are to quit smoking cigarettes?”

The Fagerström Test for Nicotine Dependence (FTND) was also administered.\textsuperscript{29} The FTND is a commonly used paper-and-pencil measure of tobacco dependence for smokers. It is a self-administered 6-item questionnaire that can be completed within 2 to 3 minutes and yields a score between 0 and 10. The number of cigarettes smoked per day question was asked as a continuous measure, then scored by the investigative team according to the FTND cutoff points for best reliability.\textsuperscript{30} There is no standard cutoff for the presence or absence of nicotine dependence; one suggested scoring system is 2 indicates very low dependence; 3 to 4, low dependence; 5, medium dependence; 6 to 7, high dependence; and 8 to 10, very high dependence.\textsuperscript{31} The number of cigarettes smoked per day and Fagerström-derived instruments as used in a telephone interview have been reported\textsuperscript{32} with acceptable validity and reliability compared with face-to-face and self-administration surveys. Only recently has the Fagerström test been administered via telephone to a population of young smokers.\textsuperscript{28,33}

In further characterizing our sample and because health concerns are the most frequently cited reasons for adolescents who wish to quit smoking,\textsuperscript{34,35} participants were asked: “Do you
have any medical problems? If yes, describe the specific problems. Are you currently taking any prescription or over-the-counter medications? If yes, list them. Do you have any diagnosed psychiatric problems? Are you currently receiving any psychological or psychiatric treatment?"

Prior to tabulation, we removed the personal identifiers of participants found ineligible for the treatment protocol. Because subsequent analyses were performed on such unlinked data, the current screening study was separately approved with an exemption from the institutional review board by the National Institutes of Health Office of Human Subject Research.

**DATA ANALYSIS**

After testing their distribution, continuous variables were first compared by univariate analysis of variance. Because there was a significant difference in age between African American and non–African American teenagers, age was included in all subsequent analyses as a covariate in a multiple analysis of covariance. Frequencies were compared using χ² tests. Backward conditional logistic regression analysis was used to look at the association between FTND items and ethnicity. Differences were considered statistically significant at P<.05. Given the exploratory nature of the study, trends (P<.1) are also noted. Data are presented as mean (SD) or frequencies (percentage) unless otherwise indicated.

**RESULTS**

**DEMOGRAPHIC CHARACTERISTICS**

Four hundred thirty-two teenaged smokers responded via telephone to our various media advertisements. Their self-identified ethnic categories were white (282 or 65.0%), African American (138 or 32.0%), Latino or Hispanic (7 or 1.6%), Native American (4 or 0.9%), and Asian (1 or 0.2%). Because of the low prevalence of participants within ethnoracial categories other than African American and white, these individuals were collapsed into the non–African American group.

The mean age of responders was 15.6 (1.5) years (age range, 12-19 years); 267 (61.3%) were female. African American smokers were older than non–African American smokers although the difference does not seem clinically meaningful. African Americans had significantly later age of onset of smoking (first cigarette) (Table 1). There was no ethnoracial difference in sex distribution. More African Americans reported no previous attempts to quit and more non–African American teenagers reported more than 5 attempts to quit. This difference remained statistically significant even after controlling for years of smoking (P=.03). Compared with non–African Americans, African American teenagers reported a trend toward lesser parental knowledge of their smoking (African Americans, 127 teenagers (92%) vs non–African Americans, 278 teenagers (96.2%); χ²; test, 3.315; P=.07).

**SMOKING-RELATED CHARACTERISTICS**

Multiple analysis of covariance for the number of cigarettes smoked per day, cigarettes smoked on weekdays and weekends, and adjusted for present age, showed that African American youth overall smoked fewer cigarettes per day (P=.01), on weekdays (P=.02), and on weekends (P=.01). There was no difference in the number of cigarettes smoked per day between boys and girls or sex by ethnicity interaction (ie, how sex modulates the effect that is due to ethnicity). Motivation to quit was similar for African Americans and non–African Americans and for boys and girls. African American teenagers reported significantly fewer previous quit attempts than non–African American teenagers (Table 2).

Data from the total sample show substantial dependence on the FTND score (5.9 [2.2]) (Table 2 and Table 3). Age-adjusted total FTND scores were significantly lower in African American than in non–African American youth (5.31 [2.24] vs 6.18 [2.18], P<.001); there were no significant sex differences in FTND scores. When total FTND scores were adjusted for the number of cigarettes smoked per day, these between–ethnicity differences disappeared (P=.93).

To determine which FTND items were associated with ethnicity (adjusted for sex), all FTND items were included in a stepwise backward conditional logistic regression model. Table 3 summarizes the results of the final model. The Hosmer and Lemeshow test showed that the model fitted well to the collected data. Among the 6 FTND items, 4 were associated with ethnicity. African American adolescents smoked reported smoking fewer cigarettes per day were more likely to smoke later in the morning, were about 50% less likely to find it difficult to refrain from smoking in places where smoking is forbidden, and 65% less likely to smoke when they were so ill as to stay in bed. The 2 other items—“Do you smoke more in the morning?” and “Which cigarette do you hate to give up?”—were not associated with ethnicity. Of the subset for which cigarette type (menthol vs nonmenthol) was available, no effect of menthol smoking on the number of cigarettes smoked per day was found (data not shown).

**OTHER CLINICAL CHARACTERISTICS**

African Americans and non–African Americans reported similar motivation to quit and frequency of health problems (eg, asthma), but African American adolescents showed a trend toward fewer reported diagnosed psychiatric conditions and treatment medications. The higher rate of medication than self-reported diagnoses in the non–African American teenaged group (Table 4) was mostly because of self-treatment of pain with over-the-counter medications (data not shown).

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**Table 1. Demographic Characteristics of Adolescent Smokers Seeking Treatment**

<table>
<thead>
<tr>
<th>Variable</th>
<th>African American Subjects (n = 138)</th>
<th>Non–African American Subjects (n = 294)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, mean (SD), y</td>
<td>15.8 (1.5)</td>
<td>15.5 (1.5)</td>
<td>.01</td>
</tr>
<tr>
<td>Sex distribution, No. (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>50 (36.2)</td>
<td>115 (39.1)</td>
<td>.38</td>
</tr>
<tr>
<td>Females</td>
<td>88 (63.8)</td>
<td>179 (60.9)</td>
<td>.22</td>
</tr>
<tr>
<td>Age of subject when first cigarette was smoked, mean (SD)</td>
<td>12.7 (1.8)</td>
<td>11.5 (2.0)</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

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The main findings of this analysis are that, compared with non–African American youth, African American youth (1) had lower number of daily cigarette smoking rates and FTND scores despite similar motivation to quit and similar degrees of health problems at the time of treatment request; (2) were less likely to have difficulty refraining from smoking in places where it is forbidden; and (3) smoked their first cigarette later after waking up. The current findings extend an earlier less-detailed analysis.28 Our report also confirms those of others who have reported later onset of smoking in African American than non–African American youth.6

The differences in FTND scores are interesting because these scores correlate with plasma cotinine concentrations (the main metabolite of nicotine) and may, therefore, reflect kinetic aspects of nicotine dependence.29 Several publications have reported ethnic differences (between African Americans and whites) in nicotine-cotinine metabolism among adult smokers.17-20 Slower nicotine-cotinine clearance could explain a need to smoke fewer cigarettes to maintain nicotine levels, despite a similar degree of addiction and perceived need for treatment. Moreover, African American adults have higher cotinine concentrations compared with whites for the same number of cigarettes smoked per day.37 Almost one third of the total FTND score is accounted for by the number of cigarettes smoked per day. Because of this slower nicotine-cotinine clearance in African American adult smokers—a metabolic difference,28 a lower number of cigarettes smoked per day results in a lower total FTND score in African American smokers compared with non–African Americans. Our findings suggest that African American adolescents might be as addicted as non–African American youth despite their lower mean FTND score. Because the FTND may be somewhat confounded in its assessment of tobacco dependence among teenaged African American smokers, we propose that other relevant measures (which focus less on the number of cigarettes smoked per day) such as the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition subsection on Nicotine Dependence,38 the Nicotine Dependence Syndrome Scale,39 or the Hooked on Nicotine Checklist40 be considered as alternatives for this population. Various instruments that complement each other may be required to adequately assess the underlying constructs of tobacco addiction across different age and ethnic groups,41 thereby affecting sampling for studies and inclusion in treatment interventions.

The finding that African American teenaged smokers, compared with non–African Americans, are less likely
Recent increases in smoking prevalence among African American teenagers and the observation that most regular teenaged smokers will continue to smoke as adults suggest that currently observed tobacco-related health disparities between African Americans and non–African Americans will likely increase. Compared with non–African American adult smokers, African American smokers show differences in smoking rates along with slower nicotine-cotinine clearance, which may predispose them to higher risk. Because of the current dearth of information among youth, characterization of ethnoracial differences among adolescents is needed.

In a clinical sample, compared with non–African American youth, African American teens smoked fewer cigarettes per day despite other indicators that they were as addicted. Because this might effect inclusion in clinical trials, especially in populations that are disproportionately influenced by tobacco, instruments used to assess dependence need to consider factors other than the number of cigarettes smoked per day. Representative sampling of teenaged African American smokers along with the use of tailored methods are key to uncovering differences in tobacco dependence that will inform treatment interventions for youth.

to find it difficult to refrain from smoking in places where it is forbidden, smoke their first cigarette later during the morning, and are less likely to smoke when ill could also be linked to sociocultural factors, namely, more parental supervision and smoking interdiction in that population. Compared with whites, later morning smoking of African American youth, which contrasts with earlier morning African adult smoking, may also be partly because of these same sociocultural factors. That fewer African American adolescents reported a prior quit attempt may be due to lesser access to supportive channels for quitting, or, alternatively, a shorter smoking history.

Given the disproportionate effect of tobacco on the African American population, it is essential to develop ways for the research community and the health care system to address the needs of African American youth to decrease the subsequent burden of tobacco in later adult life. This suggests that several issues need to be addressed in tandem. In addition to the judicious use of instruments for determining eligibility in pharmacotherapy trials, improved systems and methods are needed to attract African American youth. Most important will be outreach programs that are developed in environments that are user friendly for young smokers in general. Research designs are still needed to distinguish between pharmacological, genetic, and sociocultural determinants of ethnoracial differences in addictive smoking. The clustering of risk factors around tobacco use (ie, alcohol and other drug use, sexual risk) during the adolescent years, a period when long-lasting behaviors that are responsible for subsequent morbidity become established, suggests that successful models used to address tobacco use among African American youth might also help to develop solutions for other areas of health disparities.

This study has some limitations. First, reported data are from a sample of treatment requesters, individuals who are motivated to quit, that is, a subset who is likely to represent only a minority of teenaged smokers. Therefore, these data are not generalizable to all teenaged smokers. Second, because of the intended brevity of the telephone screening process, socioeconomic status, which was previously found to moderate interethnic differences in youth smoking patterns, was not obtained. Thus, future studies of this type should seek to address this shortcoming. Despite these limitations, the prominent associations of tobacco use with multiple physical, mental, and emotional health problems indicate that solutions found for this issue promise to benefit our society in multifaceted ways.

Accepted for publication December 13, 2002.

We are grateful to the Teen Tobacco Addiction Treatment Research Center and NOVA Research staff. We thank Jennifer R. Schroeder, PhD, David H. Epstein, PhD, and Shelley S. Sehnert, PhD, for review of the manuscript.

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