African-American Menthol and Nonmenthol Smokers: Differences in Smoking and Cessation Experiences

Kolawole S. Okuyemi, MD, MPH; Maiko Ebersole-Robinson, MD MPH; Niaman Nazir, MBBS, MPH; and Jasjit S. Ahluwalia, MD, MPH, MS

Kansas City, Kansas

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Background: Despite smoking fewer cigarettes per day, African Americans have lower cessation rates and experience disproportionately higher rates of smoking-related health consequences. Because of their high preference for menthol cigarettes, it has been suggested that smoking menthol cigarettes may contribute to the excess smoking-related morbidity experienced by African Americans. Smoking menthol cigarettes could increase health risks from smoking if smokers of menthol cigarettes have lower cessation rates and thereby have longer duration of smoking compared to smokers of nonmentholated cigarettes. Few studies have examined associations between smoking of mentholated cigarettes and smoking cessation among African Americans. This study examined the smoking patterns of menthol cigarette smokers and their smoking cessation experiences.

Methods: A cross-sectional survey of 480 African-American smokers at an inner-city health center. Survey examined sociodemographics, smoking characteristics, and smoking cessation experiences of participants. Menthol smokers (n=407) were compared to nonmenthol smokers (n=73) in these characteristics.

Results: Menthol smokers were younger and more likely to smoke cigarettes with longer rod length, with filters, and those high in nicotine and tar. Although both groups did not differ by number of past quit attempts, time since most recent quit attempt was shorter for menthol smokers. The durations of most recent and longest-ever quit attempts were nonsignificantly shorter for menthol, compared to nonmenthol smokers.

Conclusions: These data suggest that African-American menthol smokers are less successful with smoking cessation. Prospective studies are needed to confirm these findings and examine mechanisms underlying such differences.

Key words: smoking cessation ■ menthol cigarettes ■ African Americans

 From the Departments of Family Medicine, (Okuyemi, Ebersole-Robinson, Ahluwalia), Preventive Medicine and Public Health (Okuyemi, Nazir, Ahluwalia), Internal Medicine (Ahluwalia); Kansas Cancer Institute (Okuyemi, Ahluwalia); the University of Kansas School of Medicine, Kansas City, KS. Send correspondence and reprint requests for *J Natl Med Assoc.* 2004; 96:1208–1211 to: Kolawole S. Okuyemi, Department of Family Medicine, Mail Stop 4010, University of Kansas Medical Center, 3901 Rainbow Blvd., Kansas City, KS 66160; phone: (913) 588-1956; fax: (913) 588-2095; e-mail: kokuyemi@kumc.edu

BACKGROUND

One of the most striking differences in the smoking patterns between African Americans and whites is the preference for menthol cigarettes. Whereas approximately 80% of African-American smokers usually smoke menthol cigarettes, the proportion among whites is only about 20%.[1] African Americans also smoke fewer cigarettes per day[2] and begin smoking later in life compared to whites.[1,3] Furthermore, African Americans are more likely to attempt to quit smoking than whites in any given year.[4,5] However, the success rate is 34% lower for African Americans than it is for whites.[4,5] Despite smoking fewer cigarettes per day, African Americans experience disproportionately higher rates of smoking-related health consequences.[6] Because of their high preference for menthol cigarettes, it has been suggested that smoking menthol cigarettes may contribute to the excess smoking-related morbidity experienced by African Americans. Menthol cigarettes are also generally higher in nicotine and tar content.[7]

Menthol is a naturally occurring flavoring element[8] and one of thousands of chemicals that may be added

to cigarettes during the manufacturing process. An earlier report suggested that menthol combustion produces carcinogenic compounds, such as benzopyrenes,[9] which may contribute directly to higher lung cancer rates. However, this compound has been shown to be present in virtually all cigarettes. Research on the association between menthol cigarette use and lung cancer has produced mixed results. A case-control study[10] did not find increased lung cancer rates among menthol smokers compared to nonmenthol smokers. In contrast, a prospective study[8] found increased risk of lung cancer among male menthol smokers but not in females. While it remains unclear whether menthol directly increases the risk of lung cancer, it is possible that the relationship between menthol and tobacco-related morbidity is an indirect one. For example, due to its local anesthetic and cooling effects, menthol may affect smoking topography in a number of ways, including puff volume and depth of smoke inhalation.[11] These factors are likely to increase exposure to tobacco smoke toxins and, consequently, disease risk. Another hypothesis is that menthol makes smoking more enjoyable. Menthol cigarette smokers may therefore be less able to quit smoking and continue smoking for longer periods of time. This is consistent with findings from a recent study that suggested that menthol smokers are more likely to smoke within 30 minutes of awakening and are less likely to quit smoking compared to nonmenthol smokers.[12]

To better understand the smoking patterns of menthol cigarette smokers and their smoking cessation experiences, we conducted a secondary analysis of data from a cross-sectional study conducted to examine the smoking patterns of inner-city African Americans. We were interested in associations between smoking of menthol cigarettes and a number of intermediate measures of smoking cessation such as number and duration of previous quit attempts. We hypothesized that menthol smokers will report less success in previous attempts to quit smoking compared to nonmenthol cigarettes smokers.

METHODS

This study was conducted at an inner-city health center that has approximately 200,000 patient visits yearly and mostly serves a low-income, African-American population.

Details about study procedures have been provided elsewhere.[13,14] Briefly, all surveys were administered by trained study staff during the hours of 8:30 am and 5:00 pm on weekdays from August to November 2000. Patients were invited to participate in a study on smoking among inner-city residents, and the study was not associated with any smoking cessation program. Study eligibility criteria included age ≥18 years, smoking a cigarette in the last 30 days, and having smoked at least 100 cigarettes in lifetime. Eligible patients had the study procedure explained to them and signed an informed consent. Study protocol was approved by the institution's Human Subjects Committee. Participants subsequently completed a 186-item survey administered to them by study staff, completed an expired carbon monoxide test, and were compensated $20 for their time. Demographic data collected in the survey included, gender, education, marital status, age, income, and employment status. Smoking characteristics were assessed using measures from previously published NIH-funded studies, the Centers for Disease Control's Behavioral Risk Factors Surveillance Survey, and the California Tobacco Survey.[15,16] Participants were asked about current smoking rate, age of first cigarette, and when they started smoking regularly. Other questions asked include preferred cigarette brand (menthol or nonmenthol, strength, length, etc.) and how long they have smoked at current rate. Success in past cessation experiences were assessed by asking about participants' number of lifetime quit attempts, time since most recent quit attempt, duration of most recent, and of longest-ever quit attempts. Readiness to quit smoking was assessed using the transtheoretical stages of change questionnaire.[17] Nicotine dependence was assessed with the six-item Fagerstrom Test for Nicotine Dependence (FTND).[18] Participants were asked about their level of satisfaction with the flavor of their cigarettes. Response was measured using a 10-point Likert scale with 1=unsatisfied to 10=very satisfied. Cigarette tar, nicotine, and carbon monoxide content were established based on the 2000 Federal Trade Commission Report data.[7] Questions about illicit drug use were adopted from the National Household Survey on Drug Abuse.[19]

Statistical analyses were performed using SAS software (Copyright © 1999–2001 by SAS Institute Inc., Cary, NC). Participants were classified as menthol or nonmenthol smokers based on self-reported brand of cigarettes smoked. Categorical variables were summarized with percentages, and continuous variables were summarized by medians because the data was not normally distributed.

RESULTS

Table illustrates the sociodemographic and smoking characteristics of both groups. Compared to nonmenthol smokers, menthol smokers were younger and more likely to be uninsured.

While a predominant proportion of smokers in both groups smoked filtered cigarettes, this proportion was significantly higher for menthol smokers. Menthol smokers reported a slightly higher level of satisfaction with the flavor of their cigarette. Menthol smokers were also more likely to smoke cigarettes with longer rod lengths—100s/110s (54.1% vs. 46.5%, $p<0.05$) and those with higher tar (16.0 vs. 14.0), nicotine (1.2

vs. 1.0), and carbon monoxide (16.0 vs. 15.0; all $p<0.05$) contents than nonmenthol smokers. Menthol and nonmenthol smokers were compared for use of marijuana and other recreational drugs, such as heroin or cocaine. Menthol smokers differed only in their increased use of marijuana (21.2% vs. 11.0%, $p=0.04$). Smokers in both groups reported a similar number lifetime quit attempts and did not differ in their readiness to quit smoking, with about 60% in both groups in contemplation or preparation stages. However, success with cessation differed between the groups. Menthol smokers reported more recent quit attempts compared to their nonmenthol counterparts (12- vs. 24 days for nonmenthol, $p=0.047$). The duration of abstinence during most recent (30- vs. 36 days for nonmenthol, $p=0.187$) and longest-ever (90- vs. 157.5 days for nonmenthol, $p=0.111$) quit attempts were nonsignificantly shorter for menthol smokers.

DISCUSSION

We examined four measures of past cessation experiences: lifetime number of quit attempts, time since most recent quit attempt, and duration of abstinence for both longest-ever and most recent quit attempts. While both groups did not differ in their lifetime number of quit attempts, menthol smokers on average had a nonsignificantly (20%) higher number of more recent quit attempts compared to nonmenthol smokers. A more interesting finding, however, is that menthol smokers reported shorter periods of abstinence for both their longest-ever and most recent quit attempts compared to nonmenthol smokers. While these differences did not reach statistical significance, the consistency and direction of the three measures of success with smoking cessation suggest that menthol smokers were less successful in past quit attempts compared to nonmenthol smokers. Lack of statistical significance could be due in part to a relatively small sample of nonmenthol smokers and wide ranges (minimum to maximum) of these measures. To demonstrate a 0.05 level of statistical significance with 0.8 power will require samples of up to 300 nonmenthol and 180 menthol smokers. Our findings are consistent with findings from a recent, randomized clinical trial[20] that reported that African-American nonmenthol smokers were twice as likely as menthol smokers to quit smoking at six weeks post target quit day. However, two other studies have reported findings different from the present study. In the first study,[21] which was based on data from the Community Intervention Trial for Smoking Cessation, use of mentholated cigarettes was found to be unrelated to cessation. The other, a cross-sectional study, found that African Americans and whites who smoked mentholated cigarettes were more likely to be current smokers. However, the differences were not statistically significant. With regards to why menthol smokers may be less successful with smoking cessation, we found in the current study that compared to nonmenthol smokers, menthol smokers were more likely to smoke cigarettes that have longer rod lengths and are higher in nicotine and tar contents. Since nicotine is the main addictive component of cigarette, it is reasonable to expect that smoking of cigarettes higher in nicotine would lead to greater level of addiction. More addicted smokers are known to be less likely to quit. Although this explanation is consistent with a recent study that reported that African-American menthol smokers are more likely to smoke their first cigarette of the day within 30 minutes of awakening the current study did not find differences in addiction between menthol and nonmenthol smok-

Table. Demographic and Smoking Characteristics of Participants

	Menthol Smokers (n=407)	Nonmenthol Smokers (n=73)	P Value
Age in years, median (range)	40 (18–64)	45 (18–79)	<0.001
Gender, % male	61.2	65.8	0.459
Education < high school	24.6	27.4	0.616
Married	18.2	20.6	0.639
Spouse also smoker	67.0	65.2	0.819
Unemployed	46.3	48.0	0.796
Uninsured	42.6	28.8	0.027
Monthly income <$1,200	59.4	58.6	0.893
Age of first cigarette, years[1]	15 (3–40)	16 (5–52)	0.692
Age of regular smoking, years[1]	18 (9–44)	18 (5–59)	0.884
Cigarettes per day smoked[1]	10 (1–60)	10 (1–30)	0.351
Use of filtered cigarettes, % yes	97.8	86.3	<0.001*
Satisfaction with cigarette[2]	7 (1–10)	6 (1–10)	0.055
FTND score[3]	4 (0–10)	4 (0–8)	0.474
Used marijuana in past 30 days	21.2	11.0	0.040

[1] Median (range); [2] Likert Scale 1–10, 1=unsatisfied at all, 10=very satisfied; [3] Fagerstrom Test of Nicotine Dependence Score; * Fisher's Exact

ers. However, in one study,[20] menthol smokers rated cigarette taste and satisfaction more favorably than nonmenthol smokers. Although cigarette taste has not been shown to be predictive of smoking cessation, we believe that a more favorable rating of cigarette taste may make menthol smokers less willing to give up smoking. If smokers of mentholated cigarettes (either because of taste preference or greater nicotine addiction) are less likely to quit, a longer duration of smoking among menthol smokers who are predominantly African Americans may contribute to the excess cigarette-related morbidity and mortality experienced by African-American smokers.

Our study has limitations. First, menthol classification and measures of past smoking cessation experiences were obtained by self-report and subject to false reporting and recall bias. Second, being a cross-sectional study, causal relationship between menthol and smoking cessation cannot be implied. Sample size was also limited to that of the primary data. Third, our study was also limited to African-American smokers, and findings may not apply to smokers of other ethnic groups as there are well-documented differences in smoking patterns among various ethnic groups.

Despite these limitations, the present study makes an important contribution to the scientific literature by showing that African-American smokers of mentholated cigarettes tend to be less successful in smoking cessation. Understanding the differences in smoking patterns and smoking cessation experiences between menthol and nonmenthol smokers is an important contribution for defining the role of menthol in the excess morbidity and mortality among African Americans.

There is a need to better understand the relationship between smoking of mentholated cigarettes and the excess smoking morbidity and mortality among African-American smokers. Prospective studies are needed to examine this relationship as well as studies that include menthol smokers of different ethnic backgrounds. It is quite possible that other factors associated with smoking menthol cigarettes (e.g., age, length, and nicotine/tar content of cigarettes smoked) rather than menthol itself are responsible for the effects being attributed to menthol. Even if menthol is found not to be an independent factor, factors, such as smoking of cigarettes with high tar and higher nicotine addiction, would likely increase the health risks of smoking mentholated cigarettes.

Future studies should also examine the role of various pharmacotherapies in possible differences in smoking cessation between menthol and nonmenthol smokers. One study already reported lower cessation rates among African-American smokers treated with bupropion.[20] Whether this effect is specific for bupropion or also applies to other smoking pharmacotherapies should be examined. In summary, our study shows that African-American smokers of mentholated cigarettes tend to be less successful in previous cessation experiences. If smoking of mentholated cigarettes is confirmed to be associated with lower cessation rates, then the lower cessation rates among African Americans could be partially explained by their predominantly smoking mentholated cigarettes, which may, in turn, explain the excess smoking-related morbidity among African Americans.

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