Published in final edited form as:

Addict Behav. 2011 December ; 36(12): 1321–1324. doi:10.1016/j.addbeh.2011.07.015.

Factors associated with smoking menthol cigarettes among treatment-seeking African American light smokers

Babalola Faseru, M.D., M.P.H.^{a,*}, Won S. Choi, PhD.^a, Ron Krebill, M.P.H.^b, Matthew S. Mayo, PhD.^b, Nicole L. Nollen, PhD.^a, Kolawole S. Okuyemi, M.D., M.P.H.^c, Jasjit S. Ahluwalia, M.D., M.P.H., M.S.^d, and Lisa Sanderson Cox, PhD.^a

^aDepartment of Preventive Medicine and Public Health, University of Kansas Medical Center, Kansas City, KS

^bDepartment of Biostatistics, University of Kansas Medical Center, Kansas City, KS

^cDepartment of Family Medicine and Community Health and Center for Health Equity, University of Minnesota Medical School, Minneapolis, MN

^dDepartment of Medicine and Center for Health Equity, University of Minnesota Medical School, Minneapolis, MN

Abstract

Background—Smoking menthol cigarettes is more prevalent among African Americans (AA) compared to Whites. Menthol has been found to be inversely related to smoking cessation among AA, yet little is known about the factors associated with menthol smoking among AA light smokers. This study examines baseline demographic, psychological, and smoking factors associated with smoking menthol cigarettes among AA light smokers (≤ 10 cigarettes per day).

Methods—Participants ($n=540$) were enrolled in a double blind, placebo-controlled randomized trial of bupropion in combination with health education counseling for smoking cessation. Bivariate differences between menthol and non-menthol smokers were explored and baseline factors associated with smoking menthol cigarettes were identified.

Results—Participants averaged 46.5 years in age, predominantly female (66.1%), and smoked an average of 8.0 cpd ($SD=2.5$). The majority (83.7%) smoked menthol cigarettes. In bivariate analysis, menthol cigarette smokers were younger (mean age: 45 vs. 52 years $p<0.0001$), were more likely to be female (68% vs. 52% $p=0.003$) and had smoked for shorter duration (28 vs. 34 years $p<0.0001$) compared to non-menthol smokers. While depression and withdrawal scores were slightly higher and exhaled carbon monoxide values were lower among menthol smokers, the differences were not statistically significant.

Conclusions—Among AA light smokers, younger individuals and females were more likely to smoke menthol cigarettes and may be more susceptible to the health effects of smoking.

*Address of corresponding author for proofs and reprint requests: Babalola Faseru MD, MPH, Department of Preventive Medicine and Public Health, University of Kansas Medical Center, 3901 Rainbow Boulevard, MS 1008, Kansas City, KS 66160, USA, Phone: +1-913-588-0590 Fax: +1- 913-588-2780, bfaseru@kumc.edu.

Contributors

Authors' contributions are listed below:

Drs. Choi, Mayo, Nollen, Okuyemi, Ahluwalia and Cox participated in the study design, acquisition of data, and interpretation of data. Dr. Faseru participated in acquisition of data, interpretation of data and drafting of manuscript. Ron Krebill participated in data analysis and interpretation of data. All authors read and approved the final version of the manuscript.

Conflict of interest declaration

1. Dr Ahluwalia serves on a Pfizer Pharmaceuticals Inc. national advisory board.

Appropriately targeted health education campaigns are needed to prevent smoking uptake in this high-risk population.

Keywords

African Americans; light smokers; menthol; nicotine dependence; smoking cessation

1. Introduction

Despite smoking fewer cigarettes per day than the general population, African American smokers suffer a disproportionate disease burden from tobacco use (ACS, 2009; CTFK, 2007). One potential reason for this disparity is the high rate of menthol cigarette use among AA smokers; 82% of AA smoke menthol cigarettes compared to 23% of Whites (NSDUH, 2009). Menthol cigarettes have higher tar and nicotine content, show greater nicotine dependence and nicotine intake per cigarette smoked. Because of the cooling effect that possibly leads to greater depth of inhalation (Ahijevych & Garrett, 2004; Garten & Falkner, 2004), menthol may facilitate the absorption of tobacco specific carcinogens (Henningfield et al., 2003; Okuyemi et al., 2003; Squier, Mantz, & Wertz, 2010). Furthermore, while some studies have not found an association between menthol cigarettes smoking and quitting (Cropsey et al., 2009; Fu et al., 2008; Hyland, Garten, Giovino, & Cummings, 2002; Muscat, Richie, & Stellman, 2002; Pletcher et al., 2006; Royce, Hymowitz, Corbett, Hartwell, & Orlandi, 1993; Trinidad, Pérez-Stable, Messer, White, & Pierce, 2010), others have reported lower quit rates among African American menthol cigarette smokers compared to non-menthol cigarette smokers (Gandhi, Foulds, Steinberg, Lu, & Williams, 2009; Gundersen, Delnevo, & Wackowski, 2009; Harris et al., 2004; Okuyemi, Ebersole-Robinson, Nazir, & Ahluwalia, 2004; Okuyemi, Faseru, Cox, Bronars, & Ahluwalia, 2007; Pletcher, et al., 2006). In spite of the inconsistent associations found between menthol cigarette use and smoking cessation among AA, little is known about the factors associated with menthol smoking in this high risk group. Exploration of factors among AA light smokers (≤ 10 cpd) is of particular concern because over half of all AA smokers use 10 or fewer cigarettes per day (Trinidad et al., 2009). The results from previous study among AA heavy smokers may be different from that of light smokers, and may not be applicable to a majority of AA smokers. In the only known study that examined menthol smoking among a treatment-seeking AA smokers, AA light menthol smokers (≤ 10 cpd) were younger, had smoked for fewer years, and were less confident in their ability to quit smoking than AA light non-menthol smokers (Okuyemi, Faseru, Cox, Bronars, & Ahluwalia, 2007). The purpose of the current study was to examine demographic, psychological, and smoking factors associated with menthol smoking in a sample of treatment-seeking AA light smokers. A better understanding of these factors could inform the current debate about light smokers, the safety of menthol cigarettes, including the ramifications of marketing menthol cigarettes to younger smokers and minorities.

2. Methods

2.1. Design

This is a secondary analysis of baseline data derived from a double-blind, placebo-controlled, randomized trial (Kick it at Swope III [KIS III]) designed to evaluate the efficacy of sustained release bupropion in combination with health education (HE) counseling for smoking cessation among 540 urban African American light smokers (≤ 10 cigarettes per day). Our study participants were recruited over a period of 23 months at a community-based clinic serving a predominantly African American population. The study procedures

were approved and monitored by the University of Kansas Medical Center Human Subjects Committee.

2.2. Participants

Study participants were recruited in the Kansas City Metropolitan area. We provided detailed information about the study and screened interested individuals for eligibility by telephone or in person at the community health center. Study participants were African American, aged 18 or older, smoked 10 or fewer cpd, and were interested in quitting smoking. Individuals were excluded if they had contraindications to the use of bupropion or were planning to move from the area within 6 months.

2.3. Measures

2.3.1. Demographic measures—We assessed demographic information at baseline using standardized questionnaires (COMMIT, 1995; Okuyemi, Faseru, Cox, Bronars, & Ahluwalia, 2007). Questions included age, gender, marital status, income, employment status and education. Height and weight were measured to calculate body mass index.

2.3.2. Smoking behavior measures—We assessed current number of cigarettes smoked per day, type of cigarette smoked (menthol or non-menthol); age when first cigarette was smoked, age of regular smoking, quitting history and implementation of home smoking restrictions. Participants were asked to rate their motivation and confidence for quitting smoking on a ten point scale, with higher scores reflecting greater motivation or confidence. Nicotine dependence was measured using the Fagerstrom Test of Nicotine Dependence (FTND) (Heatherton, Kozlowski, Frecker, & Fagerstrom, 1991). Nicotine withdrawal during the preceding 24 hours was assessed using the Minnesota Nicotine Withdrawal Scale (MNWS) (Hughes & Hatsukami, 1986). Urges and cravings to smoke were assessed using the brief version of the Questionnaire for Smoking Urges (Cox, Tiffany, & Christen, 2001). We also measured the proportion of participants who have a smoke free policy in their home.

2.3.3. Psychosocial measures—The Center for Epidemiologic Studies Short Depression (CESD) Scale (Radloff, 1977) was used to assess depression severity or distress associated with depressive symptoms. The 4 item (PSS-4) Perceived Stress Scale (Cohen & Lichtenstein, 1990) was used to assess participants' self-appraisal of the amount of stress they experienced in the past month.

2.3.4. Biochemical measures

2.3.4.1. Blood: Blood samples were collected at baseline for measurement of the plasma levels of cotinine.

3. Data Analysis

Baseline demographic, psychosocial, and smoking-related variables were summarized using descriptive statistics. Results were expressed as mean (standard deviation) for continuous variables. Categorical variables were dichotomized and reported in frequencies (percentages). To explore the relationships between menthol and non-menthol smokers on the variables of interest, bivariate analyses were conducted. Bivariate differences among continuous baseline demographic, psychosocial, and smoking-related variables were assessed using ANOVA. Categorical associations were assessed with chi-square test. All analyses were conducted with SAS 9.2 (SAS Institute Inc., Cary, NC, USA). A type I error rate of 5% was used to determine statistical significance.

4. Results

Participants were 46.5 years of age (SD=11.3), predominantly female (66.1%), and smoked an average of 8.0 cpd (SD=2.5). The majority (83.7%) smoked menthol cigarettes (Table 1). Baseline differences between menthol and non-menthol smokers are displayed in Table 1. Menthol smokers were younger (45 vs. 52 years of age, $p<0.0001$), more likely to be female (68% vs. 52% $p=0.003$), and had smoked for shorter duration (28 vs. 34 years $p<0.0001$) compared to non-menthol smokers. While depression and withdrawal scores were slightly higher and exhaled carbon monoxide values were lower among menthol compared to non-menthol cigarette smokers, the differences were not statistically significant.

5. Discussion

The purpose of this study was to identify factors associated with menthol cigarette smoking in African American light smokers. Similar to our previous study (Okuyemi, Faseru, Cox, Bronars, & Ahluwalia, 2007), a higher proportion (84%) of African American light smokers smoked menthol cigarettes compared to non-menthol cigarettes. Younger individuals, females and those who smoked for a shorter duration were more likely to smoke menthol cigarettes. These findings are consistent with a study examining menthol cigarettes smoking in African Americans smoking 10 or more cigarettes per day (Okuyemi et al., 2003). Moreover, in two recent population-based studies, lower level of education was associated with menthol cigarette smoking (Lawrence et al., 2010), and young adults were more likely to smoke menthol cigarettes compared to older adults (Alexander, Crawford et al. 2010). Across all races, female smokers were more likely to smoke menthol cigarettes compared to males (Cubbin, Soobader, & LeClere, 2010; Lawrence, et al., 2010) and among African American smokers, women were more likely to smoke mentholated cigarettes than men (Lawrence, et al., 2010). Because females have a harder time quitting, we do not know if menthol in cigarettes is contributing to the difficulty with quitting. Female menthol smokers may be a particularly high risk group.

We did not find a significant difference in time to first cigarette (TTFC), cigarettes per day or the Fagerstrom Test of Nicotine Dependence (FTND) score between menthol and non-menthol smokers. Results of differences in nicotine dependence between menthol and non-menthol smokers have been mixed. While some studies reported menthol smokers may be more dependent on nicotine than non-menthol cigarettes smokers (Ahijevych & Ford, 2010; Fagan et al., 2010), others do not. For instance four studies reported that menthol cigarette smokers had significantly shorter time to first cigarette (TTFC) compared to non-menthol smokers (Ahijevych & Garrett, 2004; Ahijevych & Parsley, 1999; Collins & Moolchan, 2006; Fagan, et al., 2010). However, Ahijevych and Ford reported same association between menthol brand preference and TTFC among young adult non-daily smokers but not among daily smokers (Ahijevych & Ford, 2010). Our result is consistent with a study among a multi-ethnic sample of smokers by Fu and colleagues in which there was also no significant difference in time to first cigarette between menthol and non-menthol smokers (Fu, et al., 2008).

We did not find a significant difference in serum cotinine levels between African American menthol and non-menthol light smokers. While this finding is consistent with recent studies that enrolled both African American and White smokers (Heck, 2009; Signorello, Cai, Tarone, McLaughlin, & Blot, 2009), it contradicts another study conducted by Ahijevych and Parsley in 1999 in which they found significant differences in serum cotinine between menthol and non-menthol smokers, albeit in heavier smokers (Ahijevych & Parsley, 1999). Also, similar to our previous study (Okuyemi, Faseru, Cox, Bronars, & Ahluwalia, 2007) confidence to quit were high in both menthol and non-menthol smokers (7.04-7.90 out of

10). However, there was no statistically significant difference in confidence to quit between menthol and non-menthol smoker in our current study. While the reason for the difference in confidence to quit found in our previous study is not clear, the difference may not be clinically meaningful (7.04 vs. 7.57).

Although not directly examined in our data, identification of younger smokers and females as more likely to smoke menthol cigarettes than non-menthol cigarettes suggests younger smokers and females have been successful targets of the tobacco industry. Publicly available tobacco industry documents revealed the marketing strategies used to make menthol cigarettes attractive to younger African American and women (Gardiner, 2004; Landrine et al., 2005). In 1998, tobacco industry documents were made public following the Master Settlement Agreement (MSA) between state attorneys general and the major tobacco companies (Hurt & Robertson, 1998). One of the documents analyzed by Gardiner (Gardiner, 2004) entitled “The Growth of Menthols, 1933 to 1977” written by MSA, Inc., for Brown & Williamson (MSA, 1978) revealed targeted marketing of menthol cigarettes to young urban blacks and women as “fresh and modern”, “having more taste, flavor and strength”. The tobacco companies also sponsored events of Black community organizations and civil right groups (Gardiner, 2001; Robinson, Pertschuk, & Sutton, 1992; USDHHS, 1998; Yenger & Malone, 2002). Another document described “the African American market as a new and growing phenomenon that was increasingly urban and fertile for exploitation”. Furthermore, in discussing the demographic targets of Brown & Williamson, one Phillip Morris interoffice memo pointed out “These people read less and spend more time watching television than other groups.” Therefore the tobacco companies targeted the African American media waves with menthol slogans and advertisements.

A limitation of our study is that our findings may not be generalized to all African American light smokers, as our population sample is treatment-seeking and are motivated to quit smoking. Other light and occasional smokers may not consider quitting important and therefore, not be motivated to enroll in a clinical trial. Also, smokers who were not eligible to participate in the trial due to medication contraindications were excluded from this study.

In conclusion, younger and female African American smokers are more likely to smoke menthol cigarettes. Simple and comprehensible counter-marketing messages will be needed to push back the gains of the tobacco industry among these vulnerable African American groups.

Acknowledgments

The authors would like to thank the staff at Swope Health Central, as well as Olivia Chang, Emily Kravit, Jennifer Lipari, Ian Lynam, Terri Tapp, Heather Newhard, and Cinnamon Smith for their efforts on this project. We thank Rebecca Clausius for assistance in manuscript preparation. We are also grateful to Marilyn Painter, Joanne McNair and Karisa Deculus of the KU Preventive Medicine and Public Health Department.

Role of Funding Sources: This project was supported by the National Cancer Institute (CA 091912; PI: Lisa Sanderson Cox). This research was conducted at the University of Kansas Medical Center and Swope Health Central. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

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Table 1
Baseline characteristics of AA menthol and non-menthol smokers in KIS III

	Sample (n)	Overall	Menthol	Non-Menthol	P value
Demographic Variables					
Age, mean (SD) yr	540	46.5 (11.3)	45.2 (83.7)	88 (16.3)	<.0001
Women, n (%)	540	357 (66.1)	45.4 (11.0)	52.1(11.2)	.0027
Married or living together n (%)	539	166 (30.8)	141 (19.9)	25 (16.7)	.6491
Monthly family income < \$1800, n (%)	539	327 (60.7)	276 (61.7)	51 (58.6)	.6695
Education ≥ High school, n (%)	539	454 (84.3)	376 (83.2)	78 (89.7)	.1295
Employed	539	301 (55.8)	258 (57.1)	43 (49.4)	.1880
BMI, mean (SD)	539	31.1 (7.9)	31.4 (8.1)	30.0 (6.7)	.1334
Psychosocial Variables					
Depression (CESD-10), mean (SD)	539	7.7 (5.2)	7.9 (5.2)	6.8 (4.9)	.0876
Stress (PSS-4), mean (SD)	539	5.2 (3.2)	5.3 (3.2)	4.8 (2.9)	.1513
QSU (brief), mean (SD)	539	2.9 (1.7)	2.9 (1.7)	2.8 (1.8)	.5087
MNWS, mean (SD)	539	9.6 (6.9)	9.8 (7.0)	8.5 (6.0)	.0932
Tobacco Related Variables					
No of years smoked, mean (SD)	538	28.9 (12.1)	27.9 (11.8)	34.2 (12.5)	< .0001
Age of first cigarette, mean (SD)	538	17.8 (6.6)	17.7 (6.8)	17.9 (5.8)	.6749
Age started smoking regularly, mean (SD)	538	21.3 (7.6)	21.2 (7.7)	21.7 (6.8)	.3835
Smoke-free household, n (%)	540	353 (65.4)	292 (64.6)	61 (69.3)	.3949
Cigarettes per day, mean (SD)	540	8.0 (2.5)	7.9 (2.5)	8.2 (2.4)	.3620
Serum cotinine, mean (SD) ng/ml	536	275.8 (155.8)	276.0 (158.5)	247.7 (142.0)	.9449
Exhaled CO, mean (SD)	411	16.4 (10.0)	16.0 (9.7)	18.6(10.8)	.0698
Time to first cigarette, ≤30 minutes, n (%)	540	390 (72.2)	330 (73.0)	60 (68.2)	.3550
Past Quit attempts(≥ 24 hours), mean (SD)	540	3.7 (7.7)	3.8 (8.2)	3.0 (4.2)	.3795
Recent use of pharmacotherapy to quit, n (%)	511	133 (26.0)	107 (25.1)	26 (30.1)	.2604
FTND, mean (SD)	540	3.2 (1.7)	3.2 (1.7)	3.1 (1.8)	.5223
Confidence to quit, mean (SD)	540	7.9 (2.0)	7.9 (2.0)	7.8 (2.1)	.8331
Motivation to quit, mean (SD)	540	7.3 (3.5)	7.3 (3.5)	7.2(3.5)	.8592