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Predictors of cessation in African American light smokers enrolled in a bupropion clinical trial☆

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ABSTRACT

Background: This is the first study to examine predictors of successful cessation in African American (AA) light smokers treated within a placebo-controlled trial of bupropion.
Methods: We analyzed data from a randomized, double-blind, placebo-controlled trial of bupropion and health education for 540 African American light smokers. African American light smokers (≤10 cigarettes per day, cpd) were randomly assigned to receive 150 mg bid bupropion SR (n = 270) or placebo (n = 270) for 7 weeks. All participants received health education counseling at weeks 0, 1, 3, 5 and 7. Using chi-square tests, two sample t-tests, and multiple logistic regression analyses, we examined baseline psychosocial and smoking characteristics as predictors of cotinine-verified 7-day point prevalence smoking abstinence among study participants at the end treatment (Week 7) and at the end of follow-up (Week 26).
Results: Participants who received bupropion were significantly more likely to quit smoking compared to those who received placebo (OR = 2.72, 95% CI = 1.60–4.62, P = 0.0002). Greater study session attendance (OR = 2.47, 95% CI = 1.76–3.46, P = 0.0001), and smoking non-menthol cigarettes increased the likelihood of quitting (OR = 1.84, 95% CI = 1.01–3.36, P = 0.05); while longer years of smoking (OR = 0.98, 95% CI = 0.96–1.00, P = 0.05) and higher baseline cotinine (OR = 0.97, 95% CI = 0.95–0.99, P = 0.002) significantly reduced the odds of quitting at Week 7. Conversely, at the end of follow-up (Week 26), treatment with bupropion vs. placebo (OR = 1.14, 95% CI = 0.65–2.02, P = 0.64) was not significantly associated with quitting and type of cigarette smoked (menthol vs. non-menthol) did not appear in the final logistic regression model. Greater study session attendance (OR = 1.96, 95% CI = 1.44–2.66, P = 0.0001); BMI (OR = 1.03, 95% CI = 1.00–1.07, **P** = 0.04); and weight efficacy (OR = 1.03, 95% CI = 1.01–1.05, P = 0.01) increased the likelihood of quitting at Week 26. Similar to our findings at Week 7, longer years of smoking (OR = 0.96, 95% CI = 0.94–0.99, P = 0.01) and higher baseline cotinine (OR = 0.97, 95% CI = 0.95–0.99, P = 0.02) significantly reduced the odds of quitting at Week 26.
Conclusions: Baseline cotinine levels, number of years smoked and study session attendance are associated with both short- and long-term smoking cessation, while bupropion and the type of cigarette smoked were associated with quitting on short term only.

1. Introduction

Despite robust smoking cessation intervention programs in the United States, over 1200 Americans die from smoking-related illnesses daily (CDC, 1990; Cinciripini, Hecht, Henningfield, Manley, & Kramer,

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1997) and 19.3% of adult Americans still continue to smoke (CDC, 2011). Of the 45.3 million current adult smokers in the U.S. in the year 2010, 68.8% were interested in quitting smoking, over half had made a quit attempt in the past year but fewer than 5% who tried to quit on their own succeeded in quitting (CDC, 2007, 2011). According to the US clinical practice guidelines, pharmacotherapy and counseling have been shown to increase the odds of quitting cigarette smoking both in placebo-controlled trials (Fiore, Bailey, & Cohen, 2000; Fiore & Jaen, 2008) and in clinical settings (Ranney, Melvin, Lux, McClain, & Lohr, 2006; Rigotti, Munafo, & Stead, 2007; Rigotti et al., 2006). The majority of African American (AA) smokers smoke fewer cigarettes per day (cpd) than Whites (Benowitz, Bernert, Caraballo, Holiday, & Wang, 2009; Caraballo et al., 1998), are more likely to smoke mentholated cigarettes (Allen & Unger, 2007; Castro, 2004), have slower rates of nicotine metabolism (Ho et al., 2009), and show higher levels of cotinine per cigarette smoked (Benowitz et al., 1999, 2009; Ho et al., 2009). Despite smoking fewer cigarettes per day, African Americans find it more difficult to quit smoking compared to Whites (Gariti et al., 2009; Lawrence, Graber, Mills, Meissner, & Warnecke, 2003; Robles, Singh-Franco, & Ghin, 2008). While African American smokers are more likely than White smokers to have quit for at least 1 day during the previous year, the percentage of smokers who quit smoking successfully is higher among Whites than among African Americans (Lawrence et al., 2003; Robles et al., 2008). Furthermore, African Americans bear excess burden of tobacco-related morbidity and mortality compared to Whites (CDC, 2005; USDHHS, 1991).

Because African Americans are underrepresented in smoking cessation research, and little is known about effective cessation treatments in this and other under-represented minority populations (Webb, 2008), there is a critical need to investigate how best to treat racial and ethnic minority smokers (Fiore & Jaen, 2008). The *Clinical Practice Guidelines* specifically call for tobacco use treatment research targeting racial minorities including African Americans (Fiore et al., 2008) and there is paucity of data on treatment of light smokers (Cox, Okuyemi, Choi, & Ahluwalia, 2011; Hughes, Stead, & Lancaster, 2007; Shiffman, 2005). The majority of African American smokers are light smokers (smoke ≤10 cigarettes per day; cpd) (Schoenborn, Adams, Barnes, Vickerie, & Schiller, 2004; Trinidad et al., 2009), and live below federal poverty level (CDC, 2008). In general, smokers with low socioeconomic status (SES) are less likely to quit smoking than the more affluent, partly because smokers of low SES generally have scarce resources for smoking cessation pharmacotherapy (Hiscock, Bauld, Amos, Fidler, & Munafo, 2011), and multiple cycles of treatment are often needed for an individual to successfully quit (Ellerbeck et al., 2009). Differential response to smoking cessation treatment by SES and among various disadvantaged ethnic groups provides a rationale for identifying specific factors that may predict and facilitate efficient and effective tailoring of smoking cessation treatment for African American light smokers.

We define "light smokers" as those who smoke ≤10 cpd (Coggins, Murrelle, Carchman, & Heidbreder, 2009; Husten, 2009; Shiffman, 2009). Like heavy smokers, light smokers report nicotine dependence and experience substantial tobacco-related diseases (Bjartveit & Tverdal, 2005; Fletcher, Peto, & Tinker, 1976; Garfinkel & Stellman, 1988; Luoto, Uutela, & Puska, 2000; Rosengren, Wilhelmsen, & Wedel, 1992; Schane, Ling, & Glantz, 2010). Unfortunately, light smokers perceive less risk of disease compared to heavier smokers (Ayanian & Cleary, 1999), and the proportion of those who are light smokers continues to increase in the United States (Schane et al., 2010). Ahluwalia and colleagues previously treated African American light smokers, evaluating nicotine gum versus placebo combined with health education (HE) counseling or motivational interviewing (MI) within a 2×2 factorial design randomized trial (Ahluwalia et al., 2006). Findings demonstrated the efficacy of HE counseling in doubling smoking abstinence relative to MI, but found no measurable benefit of nicotine gum (Ahluwalia et al., 2006). The sample of light smokers demonstrated variations in daily smoking patterns and a wide range of baseline cotinine levels, suggesting that dosing using nicotine replacement might be challenging. Advancing the treatment of light smokers is therefore crucial. The current study evaluated the use of sustained release bupropion, a non-nicotine medication shown to be effective in producing abstinence in African American moderate to heavy smokers (≥10 CPD) (Ahluwalia, Harris, Catley, Okuyemi, & Mayo, 2002), for light smokers. Bupropion is an effective first-line medication for tobacco use treatment, shown to approximately double abstinence rates at 6 months compared to placebo (Ahluwalia et al., 2002; Fiore et al., 2008; Hughes et al., 2007).

Several predictors of successful smoking cessation treatment have been identified. These include gender, age, age at smoking initiation, history of previous quit attempts, depression, anxiety, nicotine dependence including amount of cigarettes smoked, alcoholism, motivation, social/familial environment, and presence of smokers in the household and workplace (Boardman, Catley, Mayo, & Ahluwalia, 2005; Chandola, Head, & Bartley, 2004; Coppotelli & Orleans, 1985; Curry, Grothaus, & McBride, 1997; Scharf & Shiffman, 2004; Venters, Jacobs, Luepker, Maiman, & Gillum, 1984; Venters, Kottke, Solberg, Brekke, & Rooney, 1990). Among African American smokers who smoked more than 10 cigarettes per day enrolled in a placebo controlled trial, participants who received bupropion treatment were more than twice as likely to quit smoking at the end of treatment compared to participants who received placebo; smoking within 30 min of waking and higher salivary cotinine levels at baseline reduced the likelihood of quitting (Harris et al., 2004). Among African American light smokers enrolled in a 2×2 factorial, randomized clinical trial to evaluate the efficacy of nicotine gum (2 mg versus placebo) and counseling (motivational interviewing versus health education), factors which significantly increased the likelihood of quitting included health education rather than motivational interviewing counseling, older age and higher body mass index, while female gender, lower income, higher baseline cotinine and not completing all counseling sessions reduced the odds of quitting (Nollen et al., 2006).

The current study is the first to examine predictors of successful cessation in African American light smokers treated within a placebo-controlled trial of bupropion. A better understanding of the predictors of smoking cessation could help identify AA light smokers most likely to benefit from standard treatment and help recognize individuals for whom additional treatment resources may be needed.

2. Methods

2.1. Study design

Data were obtained from the Kick It at Swope III (KIS-III) trial, a randomized, placebo-controlled trial of bupropion in combination with health education counseling (HE) for smoking cessation among African American light smokers (≤10 cigarettes per day; cpd) (Cox et al., 2012). Five hundred forty African American light smokers were randomly assigned to an active bupropion and HE counseling condition (n = 270) or to a placebo and HE comparison condition (n = 270). All participants received a 7-week supply of sustained release bupropion (150 mg daily for 3 days, then 150 mg twice daily) or placebo, six sessions of HE counseling, and a culturally targeted smoking cessation guide developed for African American light smokers and used previously (Ahluwalia et al., 2006). Participants were followed for a total of 6 months.

Health education (HE) included providing information about the risks of continued smoking and the benefits of quitting, developing a quit plan, outlining a concrete quit day preparation plan, discussing strategies for successful quitting, building social support, reducing stress, recognizing and managing withdrawal and craving, overcoming barriers to abstinence, and using pharmacotherapy. Recruitment methods, study methodology, and smoking abstinence outcomes are