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Smoking Urges During Treatment and Long-Term Cessation among Low-Income African Americans

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Objective: The urge to smoke is a predictor of smoking relapse. Little research has focused on the impact of acute urges during treatment among African Americans. This study examined the relationship between smoking urges and long-term abstinence among treatment seekers.

Design: Longitudinal prospective investigation. Urges to smoke were assessed at the initial (session 1) and final (session 8) sessions among adult smokers (N=308) enrolled in a 4-week group intervention trial. Nicotine patch use was assessed over 30 days.

Main Outcome Measures: Biochemically verified 7-day point prevalence abstinence (7-day ppa) was assessed immediately post-intervention, and at 3-, 6-, and 12-month follow-ups. Hierarchical logistic regressions tested associations between session 1 and session 8 urges and 7-day ppa at each smoking status assessment.

Results: There was a significant overall decrease in smoking urges (M=29, SD=15 at session 1; M=17, SD=11 at session 8). After controlling for covariates, urges to smoke at session 1 were unrelated to 7-day ppa at any of the assessment points. However, session 8 urges were inversely associated with 7-day ppa post-intervention (AOR=.94, CI:.92-.97), at 3-months (AOR=.93, CI: .89-.97), 6-months (AOR=.93, CI: .90-.97), and 12-months (AOR=.96, CI: .96-.99). Nicotine patch use was positively associated with 7-day ppa at each assessment.

Conclusions: The most robust predictors of abstinence through 12-months post-intervention were decreased urges over the 4-week, 8-session group intervention and the frequency of nicotine patch use. Interventions aimed at addressing the needs of African American smokers should address urges and encourage nicotine replacement adherence to increase abstinence rates. *Ethn Dis.* 2017;27(4):395-402; doi:10.18865/ed.27.4.395.

Keywords: Cravings; Urges; Tobacco; Smoking Cessation; African Americans; Nicotine Replacement Therapy

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Introduction

Tobacco smoking persists as a major public health problem in the United States overall. However, specific subpopulations categorized by race/ethnicity bear a greater disease burden due to smoking. African Americans suffer a disproportionate incidence and mortality from tobacco-related illnesses, including lung cancer.[1-3] African American smokers are less likely to quit successfully compared with White Americans,[4,5] and there is evidence of greater nicotine dependence.[6] Research has begun to explore possible racial differences in manifestations of nicotine withdrawal symptoms,[7,8] which may provide insight on smoking cessation disparities.

Nicotine withdrawal is an important predictor of relapse during quit attempts,[9] and increasing our understanding of how its symptoms affects treatment-seeking African American smokers can inform interventions designed for this population.

The urge, or craving, to smoke is a key psychological factor that may influence tobacco cessation and relapse. Indeed, smokers cite urges as being primary reasons for failed quit attempts[10] and urges have been shown to influence the level of smoking satisfaction.[11] Though meta-analytic findings have questioned the strength of the craving-smoking cessation relationship,[12] multiple studies suggest that urges

are, under certain conditions, associated with relapse and other cessation-related events.[13-16] For example, previous research found that the strength or severity of smoking urges on a typical day was inversely associated with successful cessation.[17] Additionally, intervention studies have demonstrated that urges/cravings, particularly those measured after a cessation attempt, were predictive of abstinence.[15,18]

Smoking urges and their relationship to quitting have been a major focus of research, yet less attention has been directed toward understanding the role of acute urges among African Americans, a high-risk group for unsuccessful quitting efforts.

Smoking urges and their relationship to quitting have been a major focus of research, yet less attention has been directed toward understanding the role of acute urges among African Americans, a high-risk group for unsuccessful quitting efforts. A few studies, which have included the assessment of urges, have explored the issue of withdrawal in this population. An ecological momentary assessment study found that African American smokers experienced stronger urges at random points over the course of a day and after smoking compared with Whites, suggesting that urges may be more difficult for African American smokers to extinguish.[19] Another study found no abstinence-induced changes in urges between African American and White smokers, yet African American smokers did appear to exhibit significantly higher levels of non-abstinent, baseline cravings than Whites.[8] The complexity of these results warrant further research, yet they suggest that this group may face a greater frequency of these urges/cravings and more difficulties dealing with them.

There is a gap in knowledge on the relationship between urges to smoke and long-term abstinence among African American smokers in the intervention context. Our study investigated this relationship over time in a sample of smokers who received a behavioral tobacco cessation intervention combined with nicotine patches. We hypothesized that: a) the strength of smoking urges would decrease significantly over the course of the 4-week group intervention; and b) participants experiencing strong urges to smoke immediately post-intervention would be significantly less likely to achieve abstinence through the 12-month follow-up period. To account for the attenuation of urges due to nicotine patch use,[20] adherence to nicotine patch therapy was considered in our analyses.

Methods

Sample and Data Collection

Data for our study were drawn from a randomized controlled trial testing the efficacy of culturally specific cognitive behavioral therapy (CBT) for tobacco cessation. Participants received either group-based culturally specific CBT or standard CBT. The complete methodological details are described elsewhere.[21] In short, participants were recruited through a variety of community outreach efforts including alliances with clinics and neighborhood organizations, advertisements on public transportation, neighborhood canvassing, and word of mouth. Eligible participants were between the ages of 18 – 65 years, had permanent contact information, were able to read 6th grade English, and self-identified as African American/Black. Because this population tends to include light smokers[6,22] and may be excluded from trials that require 10 daily cigarettes, participants were eligible if they smoked ≥ five cigarettes per day. Exclusions were current illicit drug use or alcohol abuse/dependence, current treatment for smoking cessation, or contraindications for nicotine patch therapy. This study sought to test relationships at the beginning and end of the intervention; thus, participants included those who completed assessments of smoking urges at the beginning of the intervention (session 1, N=308, [Standard = 157, culturally specific CBT = 151]), representing 90% of the full sample. Assessment of smoking urges at the end of the intervention (session 8)

represented 81% of the full sample. Assessments of smoking status were conducted immediately post intervention, and at 3-, 6-, and 12-month follow-ups, with high retention (all time points exceeded 80%). The study was approved by the University of Miami Institutional Review Board and written consent was obtained from all study participants.

Interventions

Participants in the randomized trial received group CBT for smoking cessation delivered in its standard or culturally specific form, both supplemented by eight weeks of nicotine patch therapy. Intervention conditions were matched for attention and time, and included eight group sessions over a four-week period. Groups were led by a trained co-therapy pair and lasted 90-120 minutes per session. Group CBT in both conditions focused on the health consequences of tobacco smoking, the benefits of cessation, managing nicotine withdrawal symptoms, identifying risky situations, coping response training, negative affect management, and lifestyle change. In the culturally specific CBT group, the standard content was adapted to reflect factors that may uniquely affect African American smokers, such as menthol tobacco products, religion/spirituality, and racism/discrimination.

Measures

Demographics

Participants reported age, sex, household income, education, and marital status.

Smoking History and Nicotine Dependence

Participants reported the number of years smoked, cigarettes per day, and completed the Fagerström Test of Nicotine Dependence (FTND[23]; (range = 0-10; internal consistency = .65, which is acceptable).

Smoking Urges

The Questionnaire of Smoking Urges – Brief (QSU) is an established 10-item measure assessing cravings or urges to smoke in the moment.[24] This measure has also been validated among African American smokers.[22] Items include "I have a desire for a cigarette right now" and "All I want right now is a cigarette." In response to the items, participants report their degree of agreement with the statements on a 7-point scale ranging from very strongly disagree to very strongly agree. The total score was used in analyses (range = 10-70; internal consistency = .85, which is acceptable).

Nicotine Patch Adherence

Participants reported daily use of the nicotine patches using timeline follow back calendars.[25] We verified whether participants were wearing patches at each intervention session. Adherence was computed as total days of patch use during the 4-week group intervention (range = 0-30 days).

Smoking Cessation

Participants self-reported 7-day point prevalence abstinence (ppa), as established measure of smoking status[26] using timeline follow-back calendars[25] at each assessment. Criterion was met if participants reported total smoking abstinence for the past seven days. Self-reported abstinence was biochemically confirmed using breath carbon monoxide (CO) immediately post-intervention (due to continued use of nicotine patches), and via saliva cotinine at the 3-, 6-, and 12-month follow-ups. CO and cotinine readings of < 8ppm[27] and 7ng/ml,[28] respectively, were considered abstinent.

Statistical Analyses

Sample characteristics were analyzed using descriptive statistics (means, median, standard deviations, proportions, interquartile ranges). Bivariate analyses (correlations, t-tests, analyses of variance) examined relationships between session 1 and session 8 urges to smoke and demographics and smoking history variables. Intervention condition and significant correlates were included as covariates in adjusted models. A paired samples t-test evaluated whether smoking urges changed significantly from session 1 to session 8. Hierarchical logistic regression models tested the independent associations between: a) session 1 urges and 7-day ppa immediately post intervention, and at the 3-, 6-, and 12-month follow-ups; and b) session 8 urges and 7-day ppa at each time point. In both models, intervention condition, demographics, and smoking history were entered in block 1. In models testing associations with session 1 urges, QSU-B scores were entered in block 2. In models testing associations with session 8 urges, session 1 QSU-B scores were entered in block 2, and session 8 scores were entered in block 3.

Table 1. Sample characteristics and correlation with smoking urges, N= 308

	Overall	Session 1 urges	Session 8 urges
	Mean (SD)	r	r
Age (years)	49.5 (9.1)	-.04	-.02
Cigarettes per day	18.2 (10.9)	.13[c]	.12[c]
Years of smoking	26.3 (12.0)	-.03	.01
Nicotine dependence (FTND, 0-10)	5.4 (2.4)	.26[a]	.08
	% (n)	Median (IRQ)	
Sex			
Male	55% (169)	26 (20)	10 (10)
Female	45% (137)	26 (23)	11 (10)
Marital status			
Single	64% (195)	28 (22)	11 (10)
Married	11% (35)	29 (17)	10 (7)
Separated/divorced/widowed	25% (76)	23 (21)	11 (12)
Total annual household income			
< $10,000	61% (186)	28 (22)	12 (13)
$10,000 to $20,000	22% (68)	24(25)	10 (7)
$20,001 to $40,000	10% (33)	26 (21)	10 (4)
>$40,000	7% (21)	24(18)	10 (8)
Education			
< High school	19% (58)	23 (22)	11 (10)
High school	49% (149)	25 (19)	10 (10)
Business or technical training	7% (22)	31 (23)	10 (9)
Some college, no degree	19% (57)	32 (21)	10 (12)
College degree	6% (20)	28 (37)	12 (9)
	Mean (SD)	r	r
Session 1 QSU scores (10-70)	29 (15)	-	.20[b]
Session 8 QSU scores (10-70)	17 (11)	.20[b]	-
Patch use days (0-30)	17 (7)	.05	-.23[a]

a. P<.001.
b. P<.01.
c. P<.05.

Results

We were interested in the relationship between smoking urges and the odds of abstinence at each time point over and above all other factors. Alpha was set at P<.05. Analyses were conducted using SPSS version 24. As shown in Table 1, most participants reported 12 or more years of education (81%) and an annual household income of <$10,000 (61%). Participants were mostly single (64%), male (55%), and middle-aged (M = 49.5 years, SD = 9). Participants averaged 18 cigarettes per day (SD = 11, range = 5-60) for 26 years (SD = 12), and reported moderate nicotine dependence (M FTND = 5.4, SD = 2, range 0=10). At session 1, the average QUS-B score was 29 (SD = 15.3), which decreased to 17 (SD = 10.9) at session 8, t(253)=11.8, P<.001. Biochemically verified abstinence rates were 52% at the end of the 4-week group intervention, 36% at 3- months, 33% at 6-months, and 22% at 12-months. Bivariate analyses examined correlations between session 1 and 8 urges to smoke and demographics and smoking history (Table 1).

Urges to smoke at session 1 were positively associated with nicotine dependence (r = .26, P <.001), and baseline cigarettes per day (r = .12, P = .03). Urges at session 8 were positively related to baseline cigarettes per day (r = .13, P = .045) and inversely associated with the frequency of nicotine patch use (r = .23, P < .001). No other significant relationships were found.

Table 2. Hierarchical logistic regressions of smoking urges and 7-day PPA

	Post intervention		3-Month follow-up		6-Month follow-up		12-Month follow-up	
7-day PPA (abstinent) at:	**AOR**	**(95% CI)**	**AOR**	**(95% CI)**	**AOR**	**(95% CI)**	**AOR**	**(95% CI)**
Logistic regression models[a]								
Intervention condition	.44	(.24-.80)	.85	(.52-1.40)	.96	(.58-1.59)	.83	(.49-1.40)
Education	1.13	(.91-1.42)	1.06	(.88-1.29)	1.06	(.88-1.29)	1.04	(.86-1.27)
Cigarettes per day	.97	(.94-.99)	.99	(.97-1.01)	1.00	(.98-1.02)	.98	(.96-1.00)
Patch use	1.36	(1.17-1.58)	1.17	(1.03-1.33)	1.23	(1.08-1.40)	1.23	(1.08-1.41)
Smoking urges session 1	.99	(.97-1.00)	.99	(.98-1.01)	.99	(.97-1.00)	.99	(.98-1.01)
Logistic regression models[b]								
Intervention condition	.47	(.25-.92)	1.67	(.96-2.92)	1.28	(.73-2.25)	.89	(.51-1.55)
Education	1.08	(.84-1.38)	1.07	(.87-1.32)	1.05	(.85-1.30)	1.01	(.81-1.25)
Cigarettes per day	.98	(.95-1.00)	.99	(.97-1.02)	1.01	(.98-1.03)	.98	(.96-1.01)
Patch use	1.32	(1.13-1.55)	1.17	(1.01-1.37)	1.14	(.98-1.32)	1.16	(1.00-1.35)
Smoking urges session 1	.99	(.98-1.02)	.99	(.97-1.00)	.99	(.97-1.01)	.99	(.98-1.01)
Smoking urges session 8	.94	(.92-.97)	.93	(.89-.97)	.93	(.90-.97)	.96	(.93-.99)

Multivariable models testing associations between Brief Questionnaire of Smoking Urges (QSU-B) scores at session 1[a], session 8[b] and 7-day PPA.
PPA, point prevalence abstinence; AOR, adjusted odds ratio; CI, confidence interval.
Models examined odds of abstinence in the past 7 days; OR <1.0 indicates decreased odds of abstinence.

Hierarchical logistic regression analyses modeled smoking urges as predictors of 7-day ppa after adjusting for covariates and intervention condition (Table 2). The first set of models tested urges to smoke at session 1 as independent predictors of cessation at each time point. There were no associations between session 1 urges and smoking status at any of the assessment points. The frequency of nicotine patch use, however, was positively predictive of cessation at each time point. That is, the likelihood of cessation was increased significantly with greater days of patch use. The second set of models tested urges to smoke at session 8 as predictors of cessation.

Results demonstrated significant relationships – specifically, inverse associations between urges to smoke at session 8 and 7-day ppa immediately post intervention, and at the 3-,6-, and 12-month follow-ups. Participants whose urges were higher at session 8 (ie, no reduction over time), were significantly less likely to quit smoking. Again, nicotine patch use was positively associated with cessation at each assessment point.

Discussion

Our study is among the first to test relationships between urges to smoke and long-term tobacco cessation among African American treatment seekers. We found that, overall, urges to smoke were strong at the start of the group intervention, and decreased significantly over the 4-week intervention period. Urges at the initial session were not predictive of smoking abstinence at any of the assessment time points, suggesting that the strength of urges at the outset of the intervention was not indicative of cessation potential. However, strong urges reported at the end of the intervention, demonstrated a consistent, inverse association with cessation. That is, a lack of reduction in smoking urges decreased the likelihood of cessation, both short- and long-term. Importantly, these observations were found after controlling for sociodemographics, smoking history and nicotine dependence, nicotine patch adherence, and intervention condition. The frequency of nicotine patch use was a robust predictor of smoking cessation at each assessment, independent of the degree of smoking urges. Overall, findings suggest that both stronger cigarette urges and less adherence to nicotine patch use may place African American smokers at greater risk for failed cessation or relapse, even in the context of an intensive intervention.

A goal of our study was to better understand whether and at what point smoking urges influence tobacco cessation among African

Americans. These data suggest that the reduction in urge strength over the 4-week intervention period may be more important than urge level at the beginning. The lack of association between session 1 urges to smoke and future cessation is in contrast to previous research in mainstream samples, which found that urges assessed early in the quitting process were related to subsequent outcomes.[13-15] A systematic review found that the relationship between post-quit measures of craving/urges (which include assessments on quit day and after) was inconsistently related to later cessation outcomes.[12] Indeed, 40% of studies found no association between post-quit urges and cessation.[12] Possible reasons for the contrast between this and previous research include the different instruments used to assess smoking urges,[12] and differences in the sociodemographics and smoking histories of the samples. Our study highlights the significance of smoking urges/cravings in low-income African American smokers enrolled in an intensive intervention, and warrants further investigation to understand mechanisms that facilitate urge reduction.

We found that, overall, urges to smoke were strong at the start of the group intervention, and decreased significantly over the 4-week intervention period.

Findings also extend the literature on smoking cessation pharmacotherapy among African American smokers. Previous research has documented the lower likelihood of medication aids in this population,[4,5,29,30] which may play a role in cessation disparities. Conclusions drawn from the few published studies focused on pharmacotherapy use and cessation among African Americans have been equivocal, with some research finding a positive short-term impact of bupropion,[31] and others finding no difference between nicotine gum and placebo.[32] In addition, some research has found no racial/ethnic differences in cessation among smokers treated with nicotine replacement.[33] Thus, our study is among the first to show consistent, and positive, associations between nicotine patch use frequency and cessation through 12 months.

This study has both strengths and limitations. Strengths include the longitudinal design with assessments through 12 months. We used a measure to assess smoking urges with prior validation among African Americans, and biochemically verified self-reported abstinence at each time point. We also considered the role of nicotine replacement in the experience of urges among treatment seekers in each model, which allowed examination of their independent relationships.

The use of a Federal Drug Administration (FDA)-approved cessation aid is recommended during quit attempts,[34] as they assuage withdrawal symptoms. However, our current findings showed the urge reduction-cessation relationship remained significant even after accounting for variation in the frequency of patch use. The main study limitations include potential differences between these participants and African American smokers at the population-level. These participants may differ from smokers with less motivation to quit, who would not seek tobacco cessation treatment, and who are of a different socioeconomic status. These factors may limit generalizability.

Conclusion

In conclusion, this study extends the literature and suggests directions for future research. The assessment of urges to smoke is recommended at the beginning and termination of treatment minimally, with intra-treatment monitoring when possible. It is important that public health and clinically based interventions address the management of urges during treatment, and seek meaningful improvement by the end of the program. As part of a comprehensive strategy to address the needs of this population, providing and encouraging the use of pharmacotherapy is also important to facilitate successful long-term cessation. Future research to develop and test interventions focused on nicotine withdrawal mitigation, specifically urges and cravings, is warranted.

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Conflict of Interest

No conflicts of interest to report.

Author Contributions

Research concept and design: Webb Hooper; Acquisition of data: Webb Hooper; Data analysis and interpretation: Webb Hooper, Dietz, Wilson; Manuscript draft: Webb Hooper, Dietz, Wilson; Statistical expertise: Webb Hooper, Dietz; Acquisition of funding: Webb Hooper; Administrative: Webb Hooper, Wilson; Supervision: Webb Hooper

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