

# BELIEFS ABOUT TOBACCO USE IN AFRICAN AMERICANS

**Objectives:** The purpose of this study was to describe beliefs about the influence of genetic and environmental factors on tobacco use among African Americans and to identify factors that are independently associated with these beliefs.

**Design and Setting:** Participants were 94 adult African American men and women who were enrolled in a study on race, genetics, and smoking.

**Main Outcome Measures:** Beliefs about factors involved in smoking initiation and cessation were evaluated by self-report during a structured telephone survey.

**Results:** Smoking status was not associated significantly with beliefs about the influence of genetic or environmental factors; however, gender and education level were associated significantly with beliefs about the influence of environmental factors. Men ( $\beta = -1.71$ ,  $P = .01$ ) reported significantly greater beliefs about the influence of environmental factors on tobacco use compared to women. Higher education was also associated with greater beliefs about the influence of environmental factors ( $\beta = 1.81$ ,  $P = .01$ ). Only income level was associated significantly with beliefs about the influence of genetic factors. Respondents with incomes  $\leq \$20,000$  reported significantly greater beliefs about the influence of genetic factors compared to those with higher incomes ( $\beta = -.92$ ,  $P = .02$ ).

**Conclusions:** These results suggest that African Americans believe that biological factors such as genes play a limited role in tobacco use behaviors. Sociodemographic factors, rather than tobacco use, are important to beliefs about tobacco use among African Americans. (*Ethn Dis.* 2007;17:92–98)

**Key Words:** African Americans, Beliefs, Tobacco Use

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## INTRODUCTION

Despite knowledge about the adverse effects of cigarette smoking,<sup>1–4</sup> many African Americans smoke and have a hard time quitting.<sup>5–14</sup> Cigarette smoking is the leading cause of lung cancer among African Americans.<sup>15</sup> Cigarette smoking has been attributed to many factors among African Americans, including environmental factors such as stressful life events.<sup>11,16,17</sup> These findings are now being translated into smoking cessation programs designed to address barriers among African Americans.<sup>18,19</sup> Evidence also shows that African American smokers are likely to carry some of the genetic variants associated with smoking risk.<sup>20,21</sup> Research is also being conducted to understand responses to pharmacologic treatment for smoking cessation based on genetic variants associated with smoking risk.<sup>22</sup> This information may provide the basis for tailoring pharmacologic treatment for smoking cessation; however, African Americans may be unwilling to participate in these programs.<sup>4,23,24</sup> Attributions about factors involved in smoking may contribute to African American participation in pharmacologic smoking cessation programs, including those based on genetic risk information.

Individuals may hold a variety of beliefs about factors involved in risk behaviors. For example,  $>70\%$  of individuals with a family history of alcoholism attributed excess drinking to genetic and environmental factors.<sup>27</sup>

However, individuals who believed that they were at increased risk for alcoholism were most likely to attribute alcohol intake to genetic factors.<sup>27</sup> Other work has shown that individuals attribute many common traits, diseases, and behaviors to genetic and environmental factors.<sup>28</sup> However, African Americans may not believe that genes contribute to risk behaviors or disease.<sup>29</sup> Attributions, or beliefs about factors involved in disease and behavior, are key constructs in several models of health behavior (eg, Theory of Planned Behavior)<sup>30,31</sup>; yet, limited empiric data are available on the extent to which African Americans believe that biological factors such as genes and environmental factors such as access to tobacco products contribute to tobacco use. While attributions about cigarette smoking have been evaluated among low-income African American women,<sup>25,26</sup> studies have not evaluated how beliefs about smoking may vary among African Americans with different economic backgrounds.<sup>1,2,32–34</sup>

The purpose of this study was to describe beliefs about the influence of genetic and environmental factors on tobacco use among African American men and women. We were also interested in identifying sociodemographic and clinical factors that are independently associated with these beliefs. Because family members and friends who do not smoke may be a motivation for smoking cessation and may provide support to those who are attempting to quit,<sup>3,35,36</sup> we included nonsmokers, former smokers, and current smokers in the study. We predicted that current smokers would report greater beliefs about the influence of genetic and environmental factors on tobacco use compared to former and nonsmokers. We also hypothesized that

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gender and family history of lung cancer in a first-degree relative would be associated with beliefs about the influence of environmental and genetic factors on tobacco use. Developing a better understanding of beliefs about tobacco use among African Americans and identifying characteristics that are related to these beliefs will provide information that can be used to guide tobacco prevention and control efforts targeted to African Americans.

## METHODS

### Subjects

The sample included 94 African American men and women who were enrolled in a study on race, genetics, and smoking (see Table 1). To be eligible for participation, individuals had to self-identify as being African American or Black and be  $\geq 18$  years of age. Smokers and nonsmokers were eligible for participation in the study. Study enrollment took place between January 2004 and September 2004. Respondents were paid \$25 for participating in the study. The study was approved by the institutional review board at the University of Pennsylvania.

### Procedures

Participants were recruited into the study through self-referrals from newspaper advertisements that described the study as research designed to understand reactions to how race, genetics, and

**Table 1. Sample characteristics (N=94)**

Variable	Level	n (%)
Gender	Male	42 (45%)
	Female	52 (55%)
Marital status	Not married	71 (76%)
	Married	23 (24%)
Education level	Some college or higher	59 (63%)
	High school or lower	35 (37%)
Employment level	Employed	49 (52%)
	Not employed	45 (48%)
Income level	>\$20,000	53 (56%)
	$\leq$ \$20,000	41 (44%)
Smoking status	Current smoker	63 (67%)
	Former smoker	16 (17%)
	Never smoker	15 (16%)
Family history of lung cancer	No	79 (84%)
	Yes	15 (16%)
Exposure to tobacco in the home	Yes	48 (51%)
	No	46 (49%)

The mean (standard deviation) age was 44.1 (11.3) years.

cigarette smoking may be presented. Individuals interested in participating in the study were directed to call a study line for additional information. All data were collected by self-report during a 20-minute structured telephone interview after obtaining verbal consent. A total of 124 individuals self-referred to the study. Of those who self-referred, 25 (20%) of 124 had disconnected phone numbers or could not be reached after multiple attempts and the remaining 99 (80%) completed the telephone interview. Individuals who were missing data for tobacco beliefs ( $n=5$ ) were excluded from the analysis; thus, the final sample included 94 respondents (96% of respondents who completed the telephone interview).

### Measures

Gender, age, marital status, education, employment status, and income were obtained during the telephone interview. These variables, with the exception of age, were re-coded into dichotomous variables on the basis of the distribution of responses for analyses.

We adapted an item from the Behavioral Risk Factor Surveillance

Survey<sup>37</sup> to evaluate smoking behavior; respondents were asked if they had ever used cigarettes (1=current use, 2=quit using, 3=never used). Family history of lung cancer was assessed by asking respondents if any of their first-degree relatives had ever been diagnosed with lung cancer (yes or no). Exposure to tobacco products in the home was evaluated by one binary item that asked respondents if anyone who currently lives in their house uses cigarettes, cigars, or smokeless tobacco (yes or no).

We developed Likert-style items to evaluate beliefs about tobacco use based on theoretical models of tobacco control.<sup>38</sup> Development of these items was also informed by previous research that showed an association between race and genetic factors related to smoking behaviors<sup>20,21</sup> and attributions about cigarette smoking reported by African Americans.<sup>26,39</sup> Specifically, eight Likert-style items were developed to assess how much influence respondents thought: 1) biological factors such as genes, 2) experiencing high levels of stress, 3) being around someone who smokes cigarettes, and 4) being able to obtain cigarettes has on whether or not someone starts to smoke cigarettes (4

Table 2. Factor analysis of beliefs about tobacco use

Item	Factor Loading	
	Factor 1 Beliefs About Environmental Factors	Factor 2 Beliefs About Genetic Factors
Influence of biological factors such as genes on whether someone starts to smoke	.001	<b>.86</b>
Influence of experiencing high levels of stress on whether someone starts to smoke	.21	<b>.66</b>
Influence of being around others who smoke on whether someone starts to smoke	<b>.64</b>	.27
Influence of being able to obtain cigarettes on whether someone starts to smoke	<b>.57</b>	.17
Influence of biological factors such as genes on whether someone is able to quit smoking	.16	<b>.80</b>
Influence of experiencing high levels of stress on whether someone is able to quit smoking	<b>.67</b>	.17
Influence of being around someone who smokes on whether someone is able to quit smoking	<b>.81</b>	.10
Influence of being able to obtain cigarettes on whether someone is able to quit smoking	<b>.83</b>	-.12

Response options for questions were as follows: 1=none at all; 2=a little bit; 3=a moderate amount; 4=a lot.

items) and is able to quit smoking (4 items).

Because we used a newly developed instrument, we conducted principal components factor analysis with varimax rotation to identify the underlying factor structure of beliefs about tobacco use. Two factors were identified by using the criterion of eigenvalues greater than one. These two factors accounted for 57% of the variance in beliefs about tobacco use. The first factor accounted for 37% of the variance in tobacco use beliefs and consisted of items that measured beliefs about the influence of environmental factors on tobacco use. The second factor accounted for 20% of the variance in beliefs about tobacco use and consisted of items that measured beliefs about the influence of biological factors such as genes on tobacco use. The item loadings for each factor are provided in Table 2. One item that measured beliefs about the influence of stress on smoking initiation did not have acceptable face validity with the other items that loaded on the second factor; therefore, we did not include this item in calculating the total score for beliefs about the influence of genetic factors on tobacco use. We used the results of the factor analysis to create scales that measured beliefs about fac-

tors involved in tobacco use. Specifically, items that loaded on each factor were summed to create scales that measured beliefs about the influence of environmental and genetic factors on tobacco use. Both scales had good internal consistency (Cronbach  $\alpha$  for environmental beliefs = .76 and Cronbach  $\alpha$  for genetic beliefs = .72). The environmental beliefs scale included five items and scores ranged from 5 to 20, while the genetics belief scale included two items and scores ranged from 2 to 8.

### Data Analysis

First, descriptive statistics were generated to characterize respondents in terms of sociodemographics, smoking status, and family history of lung cancer. Next, means and standard deviations were generated for the tobacco use belief scales. We then conducted bivariate analysis with *t* tests to evaluate the association between beliefs about tobacco use and sociodemographics and clinical factors. Multivariate regression analysis was then used to identify factors having independent associations with tobacco use beliefs. Separate models were generated for each belief scale. Variables that had a bivariate association of  $P < .10$  with each scale were included in the regression models.

## RESULTS

The mean (standard deviation) level of beliefs about the influence of environmental factors was 15.7 (3.4), and the mean level of beliefs about the influence of genetic factors on tobacco use was 4.8 (1.9). Beliefs about the influence of genetic and environmental factors were not highly correlated ( $r = .24$ ,  $P = .02$ ); thus, minimal overlap (about 6% shared variance) was seen between these two scales.

As shown in Table 3, only gender and education level were associated significantly with beliefs about the influence of environmental factors on tobacco use. Specifically, men were significantly more likely than women to believe that environmental factors contribute to tobacco use. Compared to respondents with a high school education or less, those with some college education and college graduates were significantly more likely to believe that environmental factors contribute to tobacco use. Beliefs about the influence of environmental factors were also higher among respondents who lived with someone else who used tobacco products; however, this association was only marginally significant. Only family history of lung cancer was associated

**Table 3. Association between beliefs about tobacco use and sociodemographic and clinical characteristics**

Variable	Level	Beliefs about Tobacco Use			
		Genes Mean (SD)	T	Environmental Mean (SD)	t
Gender	Male	4.8 (2.0)	.19	16.7 (3.2)	2.68*
	Female	4.7 (2.0)		14.9 (3.4)	
Marital status	Not married	4.8 (1.9)	.44	15.5 (3.4)	.92
	Married	4.6 (2.0)		16.3 (3.4)	
Education level	Some college or higher	4.7 (1.8)	.35	16.4 (3.2)	2.78*
	High school or lower	4.9 (2.0)		14.5 (3.4)	
Employment status	Employed	7.4 (2.3)	1.29	15.6 (3.6)	.35
	Not employed	8.1 (2.6)		15.8 (3.3)	
Income level	>\$20,000	4.4 (2.0)	2.14†	15.5 (3.3)	.34
	≤\$20,000	5.2 (2.0)		15.8 (3.6)	
Smoking status	Current	5.0 (2.0)	1.35§	15.7 (3.7)	.16§
	Former	4.1 (2.1)		15.9 (3.1)	
	Never	4.7 (1.4)		15.3 (2.5)	
Family history of lung cancer	Yes	3.9 (2.0)	2.90*	15.5 (3.0)	.19
	No	4.9 (1.1)		15.7 (3.2)	
Exposure to tobacco	Yes	4.8 (1.8)	.34	15.1 (3.7)	1.65‡
	No	4.7 (2.1)		16.3 (3.2)	

\*  $P < .01$ ; †  $P < .05$ ; ‡  $P < .10$ ; § F value.  
SD=standard deviation.

significantly with beliefs about the influence of biological factors such as genes on tobacco use; these beliefs were higher among respondents who did not have a family history of lung cancer compared to those who did have a family history of disease. Respondents with incomes  $\leq$ \$20,000 were also more likely than those with higher incomes to believe that genetic factors influence tobacco use and age was negatively correlated with beliefs about the influence of genes on smoking behavior ( $r = -.19$ ,  $P = .07$ ). However, the associations between these beliefs and income and age were only marginally significant.

In the multivariate regression model of beliefs about tobacco use, only gender and education level had significant independent associations with beliefs about the influence of environmental factors. Men ( $\beta = -1.71$ ,  $P = .01$ ) reported significantly greater beliefs about the influence of environmental factors on tobacco use compared to women. Higher education was also associated with greater beliefs about the influence of environmental factors ( $\beta = 1.81$ ,  $P = .01$ ). The model accounted for

15% of the variance in beliefs about the influence of environmental factors on tobacco use ( $F = 5.43$ ,  $P = .002$ ). In the multivariate model of beliefs about the influence of biological factors such as genes, only the effect for income level was statistically significant. Respondents who had an annual household income  $\leq$ \$20,000 ( $\beta = -.92$ ,  $P = .02$ ) reported significantly greater beliefs about the influence of these factors on tobacco use compared to those with higher incomes. The model accounted for 12% of the variance in beliefs about the influence of biological factors such as genes on tobacco use ( $F = 3.91$ ,  $P = .01$ ).

## DISCUSSION

Reducing exposure to tobacco products by preventing smoking initiation and increasing cessation is central to tobacco control efforts in the United States.<sup>40</sup> However, smoking initiation and cessation are complex behaviors that have been attributed to both genetic and environmental factors.<sup>17-19,25,41</sup> Although African American men and women may be at risk for having these

factors,<sup>20,21,42-44</sup> few studies have evaluated beliefs about these factors on smoking initiation and cessation specifically in this population. Information on within-group variation in beliefs about tobacco use is needed among African Americans to develop more effective tobacco control strategies for this population.

Although previous research has shown that current smokers, former smokers, and nonsmokers attribute smoking behaviors to a variety of dispositional and situational factors,<sup>45</sup> smoking status did not have a significant effect on beliefs about tobacco use in the present study. Specific behaviors related to smoking initiation and cessation, rather than overall smoking status, may be more directly related to beliefs about the influence of environmental and genetic factors involved in tobacco use. Similar to other reports,<sup>28</sup> we found that respondents with incomes  $\leq$ \$20,000 reported significantly greater beliefs about the influence of biological factors such as genes on tobacco use compared to those with higher incomes. Previous research has shown that lower income is associated with more fatalistic beliefs about cancer in African Americans and lower perceptions of control over life events.<sup>32-34,46</sup> Individuals with low incomes may have been most likely to believe that biological factors are influential to smoking initiation and cessation because of a tendency to perceive less control over smoking behaviors. Stronger beliefs about the role of biological factors in tobacco use among individuals with low incomes may also indicate a propensity to hold fatalistic beliefs about the effect of genetic factors on health behaviors. Individuals with low incomes may believe that decisions about health behaviors that may be influenced by genetic factors are beyond their control because of a greater tendency toward fatalism and lower perceptions of control. However, additional research is needed to evaluate the relationship

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between income, cancer fatalism, and beliefs about the influence of genetic factors on tobacco use. Overall, beliefs about the influence of biological factors were not endorsed at a high rate, which may be due to lack of knowledge about the role of genes in disease and risk behaviors. Education programs may be needed to increase knowledge about the contribution of genetic factors to risk behaviors.

With respect to beliefs about environmental factors, we found that these beliefs were significantly higher among men compared to women. Previous studies have shown that African American women attribute smoking initiation and difficulty with smoking cessation to being around others who smoke and experiencing high levels of stress.<sup>26,47,48</sup> However, our results suggest that men may be most likely to attribute smoking behavior to access to tobacco products and experiencing stress. Previous research has shown that African American men experience a variety of health, financial, and employment stressors.<sup>49</sup> Other work has shown that men are significantly more likely than women to perceive discrimination on a daily basis and attribute experiences with discrimination to their race or ethnicity.<sup>42</sup> Racial discrimination is a stressor that is associated with smoking behaviors among African Americans<sup>16,17</sup> that may contribute to cigarette smoking among African American men. Beliefs about the influence of

environmental factors on tobacco use may be shaped by personal experiences that contribute to smoking initiation and cessation among African American men. However, additional research is needed to identify specific experiences that contribute to beliefs about the influence of environmental factors on tobacco use among African American men.

We also found that respondents with some college education and those who were college graduates reported significantly greater beliefs about the influence of environmental factors on tobacco use compared to those with less education. Respondents with greater education may attribute smoking initiation and cessation to environmental factors because of increased knowledge about smoking. Previous research has shown that individuals with more formal education have greater knowledge about the adverse effects of cigarette smoking<sup>2</sup> and report greater attempts at smoking cessation<sup>50</sup> relative to individuals with less education. Our finding suggests that education level may be associated with beliefs about factors that may contribute to tobacco use as well as actual smoking behaviors.

In considering the results of the present study, several limitations should be noted. First, the sample consisted of African American men and women who self-referred for study participation in response to newspaper advertisements. While the methods that were used to recruit participants may limit the generalizability of our findings because of self-selection bias, our sample was similar to African American Philadelphia residents included in the 2000 Census. Moreover, newspaper advertisements are commonly used to recruit African Americans to participate in smoking cessation research.<sup>51</sup> In addition, respondents were not recruited to participate in a smoking cessation program; therefore, beliefs about tobacco use found in this study are not likely to

be a biased reflection of beliefs that may be held among African Americans who are interested in smoking cessation. Nonetheless, additional research is needed to evaluate beliefs about tobacco use in samples of African Americans who have been recruited by using methods with less potential for self-selection bias. The cross-sectional nature of the study may be an additional limitation; however, conceptually, sociodemographics can be considered antecedents to health beliefs and behaviors.<sup>52</sup> An additional limitation is that the items used to measure beliefs about tobacco use were newly developed; understanding of these items may have been limited. However, both scales had good internal consistency and face validity in this sample. Moreover, data from focus groups conducted with a subset of respondents from the present study indicated that individuals understood biological factors such as genes as being traits that are passed down from generation to generation. Nonetheless, additional research is needed to evaluate the reliability, understandability, and validity of the items that we used to measure beliefs about tobacco use. Although statistically significant, our regression models accounted for a limited amount of variance in beliefs about tobacco use. This finding suggests that other beliefs may be important to tobacco use among African Americans. Additional research is needed to measure the influence of other beliefs (eg, beliefs about exposure to cigarette advertising) on tobacco use among African Americans. Future studies should also evaluate the association between smoking status and beliefs about tobacco use using more detailed measures of smoking behavior. Within these studies, it will also be important to evaluate the relationship between beliefs about tobacco use and specific behaviors related to smoking initiation and cessation. Because the sample was limited to 94 African American men and women, additional studies are needed to evaluate

beliefs about tobacco use in larger and ethnically diverse samples. Despite these limitations, the results of this study provide information on beliefs about tobacco use in African American men and women and how these beliefs vary among individuals with different socio-demographic backgrounds. Future research should focus on evaluating how these beliefs contribute to decisions about participating in smoking cessation programs among African Americans, especially those that use genetic information as the basis for tailoring pharmacologic treatment for smoking cessation.

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*Statistical expertise:* Halbert

*Acquisition of funding:* Halbert

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