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# Perceived Susceptibility and Prevention Attitudes of African-American College Students' toward Type 2 Diabetes

Chauneva Glenn Jones, MPH, Torhonda C. Lee, PhD, Ivette A. Lopez, PhD, MPH

## ABSTRACT

*Whereas type 2 diabetes is the seventh leading cause of death in the general United States, it is the fourth leading cause of death for African Americans. This health disparity remains a serious and costly public health issue. This study investigated the type 2 diabetes preventive behaviors and intentions among 130 African-American college students. Data collection for this cross-sectional study included administration of a 23-item survey that measured knowledge, attitudes, perceived susceptibility, and social norms. We found that only 19% of the respondents perceived themselves at risk for developing diabetes. Students who had been told by a health professional that they were pre-diabetic or diabetic were more likely to perceive an increased risk for developing diabetes than their counterparts. Despite low risk perception in this group, 95% reported a favorable attitude towards preventing diabetes. These results underscore the need to enhance college students' knowledge and understanding of type 2 diabetes risk, while capitalizing on positive student attitudes toward prevention. Social and environmental influences on type 2 diabetes preventive behaviors also should be considered.*

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## BACKGROUND

In the United States, diabetes is the seventh leading cause of death (National Diabetes Information Clearinghouse [NDIC], 2011). As of 2012, an estimated 29.1 million people have been affected with diabetes – 21 million were diagnosed with the disease, and 8.1 million went undiagnosed (Centers for Disease Control and Prevention [CDC], 2014). In 2013, it was estimated that \$245 billion were spent on direct and indirect diabetic needs (American Diabetes Association [ADA], 2013). Moreover \$176 billion went toward direct medical needs. The remaining \$69 billion went towards indirect costs attributed to job loss, disability, and premature death (ADA, 2013).

Historically, type 2 diabetes has been referred to as adult onset diabetes and non-insulin dependent diabetes mellitus (NIDDM). Of all the diagnosed diabetes cases, 90% - 95% are type 2 (CDC, 2014). The risk factors associated with type 2 diabetes are obesity, older age, race/ethnicity, gestational diabetes, impaired glucose metabolism, physical inactivity, and family history (CDC, 2014). African Americans are disproportionately affected by diabetes. Compared to Whites, rates are 77% higher among non-Hispanic Blacks compared to non-Hispanic Whites, whereas rates among Hispanics and Asian Americans are 66% and 18% higher than Whites respectively (CDC, 2011). African Americans also tend to have higher rates of

complications from diabetes. These complications include heart disease, stroke, vision loss, kidney disease, and nerve damage (Agency for Healthcare Research and Quality [AHRQ], 2001). According to Hillier and Pedula (2003) compared to their peers, young adults diagnosed with type 2 diabetes were 14 times more likely to have a heart attack and 30 times more likely to have a stroke. During young adulthood, certain lifestyle decisions that are made will have a long-term influence on health later in life (McKenzie, Pinger, & Kotecki, 2008). Onset of type 2 diabetes at a younger age means that the seriousness of complications will begin earlier in life and create a larger societal burden (Hillier & Pedula, 2003). Because type 2 diabetes is preventable, diabetes prevention programs should be implemented early, especially for those with a family history of the disease and for persons who are overweight (National Diabetes Information Clearinghouse [NDIC], 2012).

Obesity is a prevalent condition that is linked to numerous health problems and chronic diseases, including type 2 diabetes (Mokdad, Ford, Bowman, Nelson, Engelgau, & Vinicor, 2003). The rates of obesity among college-aged men and women are increasing, although many young people do not consider themselves to be at risk for chronic diseases (Morrell, Lofgren, Burke, & Reilly, 2012). Most college students may not achieve the nutrition and

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exercise guidelines designed to decrease the risk of chronic disease (Hiza & Gerrior, 2002). College campuses may have the potential to serve as a critical setting to influence perceived barriers to healthy eating and exercise, and to implement effective interventions (Wallace, Buckworth, Kirby, & Sherman, 2000). If college-aged students make changes in eating and exercise, these changes could continue throughout their adult years (Morrell et al., 2012).

Although the risk factors for type 2 diabetes are widely known, the incidence for type 2 diabetes continues to rise, as well as disproportionately affect racial and ethnic groups (CDC, 2012). The impact of type 2 diabetes on young adults and adolescents coincides with the increasing rates of obesity within this population (National Diabetes Education Program [NDEP], 2014). Thus, African American college students face a unique set of risks for type 2 diabetes, especially if they are overweight or obese.

According to the Health Belief Model (HBM), people may act to prevent a disease if they believe they are susceptible to a condition that they also believe is serious (Glanz & Rimer, 2005). However, some studies have indicated that people underestimate their risk of developing diabetes (low perceived susceptibility), even though they acknowledge the seriousness of the disease (Adriaanse, Snoek, Dekker, Spijkerman, Nijpels, & van der Ploeg, 2003; Gallivan, Brown, Greenberg, & Clark, 2009). Studies have specifically examined the type 2 diabetes risk perceptions of college students (Seo, Torabi, Li, Priya, Woodcox, & Perera, 2008; Reyes-Velázquez, & Hoffman, 2011). The Theory of Reasoned Action suggests that attitude toward behavior influences behavioral intention which in turn affects health behavior. The theory also considers subjective norms, which influence and are influenced by attitude as well as independently predict behavioral intention (Ajzen, 2011). In the current study, we examined the perceived susceptibility to and attitudes towards preventing diabetes among college students at an Historically Black College or University (HBCU) in Florida.

We hypothesize that students may be more likely to perceive type 2 diabetes as a threat if they are aware of their personal risk factors (family history, pre-diabetes/diabetes diagnosis), and have a higher diabetes risk score. In addition, we anticipated similar predictors would be associated with positive attitudes toward prevention, and that students who have a more positive attitude toward prevention may have a greater likelihood of engaging in preventive behaviors for type 2 diabetes. Finally, we also were interested in exploring the influence of the social environment (especially considering the influence of familial

history) on attitudes and behaviors through the normative influence of family, peers, and health care providers.

## **METHODS**

### **Participants/Procedures**

The study was approved by the University's Institutional Review Board. The sample size for this study was 130. Participants were eligible for the study if they met the following criteria: (1) African American, (2) young adult (ages 18-25), (3) students enrolled for the spring 2011 term at a large HBCU in Florida. Participants were obtained through convenience sampling. The investigators gained permission for the questionnaire to be administered during required elective classes were likely to have a good cross section of undergraduate students. In addition, students participated in the survey at a central intercept location on campus. An information letter was attached to the questionnaire, and included a full description of the study for participants to keep. Participation was voluntary and no incentives were provided. In addition to the information letter, the participants were given a diabetes informational brochure provided by the University's student health center.

### **Instrument**

This cross sectional study used a survey 23-item survey instrument. This instrument was developed and piloted with a small subset (n = 25) of eligible students from this population. The questionnaire was developed to assess the factors associated with perceptions of susceptibility of African-American college students related to type 2 diabetes and prevention. Employing constructs of both the Theory of Reasoned Action and the Health Belief Model, the instrument was developed based on a comprehensive review of the literature and built upon the recommendations from other studies (Hivert, Warner, Shrader, Grant & Meigs, 2009; ADA, 2010; Seo et al., 2008). An expert review (n = 3) was also applied to assess the instrument for content validity. The experts included a public health educator, a survey specialist, and a university health services director.

The dependent variables were perceived susceptibility and attitudes toward type 2 diabetes preventive behaviors. Perceived susceptibility was assessed using a five-point scale labeled Strongly Agree to Strongly Disagree by asking questions related to personal risk of developing diabetes now or in the future e.g., "I am at risk for developing type 2 diabetes."

For the attitude measure, participants were asked to rate their agreement with statements related to type 2 diabetes prevention such as: “Preventing type 2 diabetes through activities such as eating right and exercising will save my life.”

The questionnaire included questions relating to demographics, family history, and health status/history. These included an item that rated personal risk factors which was modeled after questions from the American Diabetes Association Diabetes Risk Test (ADA, 2010) and the 2010 Behavioral Risk Factor Surveillance System Survey diabetes module (CDC, 2009). A risk assessment score was calculated from an item which read: “I am more likely to develop type 2 diabetes if...” followed by a list of six risk factors adapted from the ADA risk test and stated in the first person including: “I am overweight” and “I do not exercise regularly.” The respondents rated each risk factor from Strongly Agree to Strongly Disagree. The risk variable was then computed by adding the six responses together for a combined risk score.

Other independent variables included key demographic and health status measures including BMI (calculated from self-reported height and weight), family history of diabetes, and lifetime diagnosis with pre-diabetes/diabetes. Type 2 diabetes preventive behaviors were also examined. Nutrition and physical activity were both assessed separately. Healthful eating habits were measured by a single question regarding the number of fruits and vegetables consumed daily. Physical activity was assessed with the question “...how many days per week do you participate in physical activities such as running, weight lifting, aerobics or walking for exercise?” to which participants responded to five answer options between 0 days and 5 days or more.

In the HBM, when perceived susceptibility is combined with perceived seriousness, it results in perceived threat (Glanz & Rimer, 2005). Perceived severity (seriousness) was measured by asking participants to rate their agreement with statements regarding the personal impact of type 2 diabetes e.g., “Finding out I have pre-diabetes or type 2 diabetes would significantly affect my life.”

Subjective norms also were calculated based on a combined score of normative belief (“The following person(s) would approve if I adopt healthier eating habits or exercise more often.”) and motivation to comply (“The person(s) whose opinion matter most about what I do is...”) using the Strongly Agree to Strongly Disagree rating scale for each of the following referents for both questions: parents,

siblings, friends, boyfriend/girlfriend, and healthcare provider.

### Research Questions

The three research questions under investigation were:

- What are the predictors of perceived susceptibility to type 2 diabetes among African-American college-age students at an HBCU?
- What are the predictors of attitudes toward type 2 diabetes prevention among African American college-age students at an HBCU?
- What is the role, if any, of normative influences on type 2 diabetes prevention perceptions for African American college-age students at an HBCU?

### Data Analysis

The data were analyzed using the Windows version 17.0 SPSS. Descriptive statistics calculated included frequencies, percentages, and means. Correlations were calculated to test the relationships between the outcome variables and potential predictors. Five response options of the outcome variables were scored from 1 to 5 (e.g., agree-disagree, favorable-unfavorable) and the score for each question measuring that construct was combined to create a single score. Bivariate correlations tested relationships between the outcomes and predictor variables at a statistical significance of ( $p \leq .05$ ) using the Pearson  $r$  statistic.

## RESULTS

### Sample Characteristics

The sample size consisted of 130 African-American young adults (ages 18-25). Sixty-seven percent of the participants were female and 33% were male. Most of the participants were between the ages of 22-25 (80%) and reported a BMI that indicated being overweight or obese BMI (52.3%), as seen in Table 1. With regards to family history of type 2 diabetes, about 47% of the respondents reported having diabetes in their family. Close to 90% self-assessed their overall health at the good to excellent level.

Perceived susceptibility to type 2 diabetes and attitude toward preventing type 2 diabetes were the dependent variables. Perceived susceptibility to type 2 diabetes was measured in part by the statement: “I am at risk for developing type 2 diabetes”? Roughly 58.9% ( $N = 76$ ) of the respondents felt that they were at no risk for developing type 2 diabetes (Table 1).

One component of attitude was measured with a statement: “Preventing type 2 diabetes through activities such as eating right and exercising will save my life.” Ninety-three percent of respondents replied positively to this statement (Table 1).

### **Bivariate Analyses of Predictors**

Bivariate correlations using the Pearson product-moment correlation were used to assess the associations of perceived susceptibility and attitude towards prevention with the selected predictors. As seen in Table 1, being diagnosed as pre-diabetic or diabetic ( $r = 0.283$ ,  $p \leq .001$ ) was significantly positively associated with perceived susceptibility. Family history of diabetes also had a positive, significant correlation with perceived susceptibility ( $r = .270$ ,  $p \leq .002$ ). Knowledge of type 2 diabetes risk was significantly correlated with susceptibility as well ( $r = .187$ ,  $p \leq .037$ ). The calculated risk score was also strongly predictive of perceptions of susceptibility ( $r = .830$ ,  $p \leq .000$ ).

The outcome of attitude toward prevention was assessed and showed no significant relationship to any predictor variables. In addition, there was no significant relationship ( $r = .043$ ,  $p \leq .316$ ).

The subjective norms assessed in this study were influences of parent(s), sibling(s), friend(s), girlfriend/boyfriend, and healthcare provider. When the relationship between subjective norms and perceived susceptibility and attitude was analyzed, only two of five subjective norms were found to be significantly positively correlated with attitudes, although relatively weakly. For the combined attitude score, significant subjective norms were parent(s) ( $r = .287$ ,  $p \leq .001$ ) and sibling(s) ( $r = .309$ ,  $p \leq .000$ ). Parent(s) as a normative influence was also a significant predictor of perceived susceptibility ( $r = .191$ ,  $p \leq .032$ ), but no other referent group was significant.

We also evaluated the perceived barriers to type 2 diabetes prevention through an open-ended survey question which elicited qualitative responses. The researchers used a constant comparative method of analysis to identify and code themes in the response data. Two coders' analyses rendered the same core themes. The themes identified were cost of food, cost of recreation, food options, education, social influences, time, lack of perceived susceptibility, and education. These themes are illustrated by direct quotes from participants. Table 2 shows selected statements as expressed by respondents.

### **DISCUSSION**

Young adults are the fastest growing population with increased rates of obesity and type 2 diabetes

(Hillier et al., 2003). Few studies have assessed the perceived susceptibility and attitudes toward preventing type 2 diabetes in young adults (Seo et al., 2008). To our knowledge, this is one of few studies to examine African-American college students and type 2 diabetes.

These results indicate that perceived susceptibility is low even when students report having a favorable attitude toward diabetes prevention. Therefore, early intervention programs that capitalize upon the positive attitude of students toward healthy eating and exercise may seem intuitive. However, positive attitudes toward prevention were not significantly predicted by any of the factors considered in the current study. It is imperative to address the perceived barriers in the physical and social environment as reported by students in this study – including access to low cost, healthy foods.

Public health professionals should develop early intervention programs catered toward this population that focus on understanding family history and personal risk factors. African-American young adults are knowledgeable about type 2 diabetes, but they may need help in personalizing their risk.

Research on the correlates of perceived susceptibility to a specific disease is important because previous research indicates that those with a higher susceptibility are more likely to partake in a diabetes prevention program compared with their counterparts (Johnson, 2006; Seo et al., 2008). The results indicate that perceived susceptibility within this population was low, despite the presence of risk factors. Whereas susceptibility was correlated to family history and high risk scores, the absence of a link to preventive behaviors may indicate some level of fatalism or diminished behavioral capability for prevention among students at greatest risk. These factors should be further studied in this population.

Although the majority of students in this sample indicated having positive attitudes towards type 2 diabetes prevention, attitudes were not associated with preventive behaviors. However, students reported several perceived barriers that indicated that a supportive environment is necessary for students to engage in preventive behaviors. Also, the parental influence was clear in this study.

### **Limitations**

We recognize several limitations to the study. First, due to the cross sectional design of this survey, causality cannot be determined. Second, due to the small sample size, chances for Type II error could have been increased, not allowing for all of the multinomial and bivariate relationships to be identified. Future

studies should use a larger sample size to allow for more reliable subgroup analyses. Third, there is limited generalizability due to the lack of racial/ethnic diversity, although the sample was chosen based on the selected demographics of the target population. Fourth, self-reported measures, including those used to compute BMI could have been biased due to social desirability of responses.

Despite the limitations, the study also has strengths: it contributes to the literature in that it provides descriptive knowledge about African American college students' beliefs about diabetes, attitudes, and behaviors, as well as perceived susceptibility to diabetes and attitudes towards diabetes prevention.

We recommend that qualitative study be performed to gain further insight to the intrapersonal and interpersonal factors that influence this population. Conducting focus groups or face to face interviews will allow the researcher to gain in depth responses and be able to determine what factors prohibit this population from viewing themselves as susceptible to type 2 diabetes and what would make them more favorable to diabetes prevention.

In addition, it is not sufficient to identify and change individual-level measures alone. Due to the influential role of family history and of parents as a normative influence on health behavior, it may be important to incorporate these factors into health promotion activities for students, such as learning one's family health history. Finally, this study suggests that HBCU college campuses may be an appropriate setting to reach young adults at greatest risk for diabetes prevention efforts.

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**Table 1. Demographic Variables**

	N	%
<b>Gender</b>		
Male	43	33
Female	87	67
<b>Age (<math>\mu = 23</math>)</b>		
18-21	24	19
22-25	104	80
<b>Race/Ethnicity</b>		
Black/non-Hispanic	118	91
Hispanic, Latino, Spanish	9	7
<b>BMI Group</b>		
$\leq 18.49$ (underweight)	0	0
18.50-24.99 (normal weight)	60	46
25.00- 29.99 (over weight)	39	30
$\geq 30.00$ (obese)	29	22
<b>I am at risk for developing type 2 diabetes.</b>		
Strongly agree/ agree	25	19.6
Strongly disagree/ disagree/ neutral	102	80.3
<b>Preventing type 2 diabetes through activities such as eating right and exercising will save my life.</b>		
Strongly agree/ agree	116	89.2
Strongly disagree/ disagree/ neutral	14	7.7

**Table 2. Bivariate Correlations between Dependent Variables and Predictors**

	Perceived Susceptibility			Attitude		
	r	p-value	N	r	p-value	N
There is a history of type 2 diabetes in my family.	.270	.002*	130	.048	.592	129
Body Mass Index	.124	.162	128	.029	.075	129
Other than your regular job or school activities, how many days per week do you participate in	-.200	.023*	130	.025	.778	129
How many fruits and vegetables do you consume in one day?	.048	.587	129	.030	.735	128
Have you ever been told by a doctor that you have either pre-diabetes or diabetes?	.264	.002*	130	.064	.473	129
How would you rate your overall health?	.064	.472	130	.001	.992	129
Seriousness (score)	.180	.045*	125	.056	.539	124

\*p &lt; .05

**Table 3. Perceived Barriers to Type 2 Diabetes Prevention**

Costs (Food, Recreation)/Food Options Cost	<p>“Food stamps given to students and healthier food options with meal plan”</p> <p>“Finances, time, and bad personal habits. Most college students are ‘broke and cannot afford healthier foods, i.e., organic, thus having to buy less expensive foods which involve \$.99 cheeseburgers, microwave dinners, etc. that are high in fat and cholesterol, thus affecting our health.”</p>
Education/Social Influence	<p>“More health seminars to education them more. Also maybe even real life stories of individuals going through health issues.”</p> <p>“Classes that rate current obesity in the class being taught to show awareness and possibly scare students toward making the correct choices. Making group activities out of programs on campus through every on-campus club. Have giveaways or have promotions at the on-campus gym which is free. Push intramural sports that are on campus.”</p>

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