

A Survey of HBCU Nutritional Habits and Attitudes about Health

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Abstract

Objective: Examine nutrition behavior and health risk perceptions in an HBCU population.

Design: Cross over comparison survey research utilizing the REAP-S and RPS-DD.

Setting: Rural North Carolina public university.

Participants: 262 university students (N = 262, M = 126, F = 136), 18-37 yrs., Mean = 20.92 yrs., SD = 2.725 yrs. Included all ethnicities, sex/gender and activity levels.

Main Outcome Measures: DVs: RPS-DD personal control and optimistic bias; IVs: REAP-S eating behaviors.

Analysis: Multiple regression and ANOVA analyses via SPSS version 27.

Results: Eating sweets, using processed meals, low protein diet, low grain consumption, shopping and cooking, and an unwillingness to change eating habits were predictors of "...if I am going to get diabetes there isn't much I can do about it." Grain consumption and eating sweets predicted "I feel that I have little control over my health." Males ate more meat, while females more often skipped breakfast, and added fatty oils to meals. Females "worried more about getting diabetes," and believed they were "more likely to get diabetes...more likely to get a serious disease...".

Conclusion and Implications: Dietary behaviors are strong predictors of perceived control over health and engagement in management behaviors. Interventions should center around healthy exercise and nutrition practices, with an emphasis on internal locus of control.

Keywords: HBCU; Nutritional Habits; Attitudes; Health

Introduction

Nutritional behaviors are a significant predecessor of disease states and comorbidities and are particularly compounded when paired with known health care access challenges that commonly affect certain ethnic groups [1]. The emergence of independent food choices takes on an exploratory phase during young adulthood, and the results are discouraging [2]. College-aged students are not likely to meet most healthy nutritional benchmarks such as adequate fruit and vegetable consumption [3,4]; lower refined grains [5], lower sugar and fat consumption [5], and all known correlates to unfavorable body composition [5,6] that can lead to obesity susceptibility later in life [7].

Understanding the nutritional habits of college-aged students attending an HBCU may shed light on the relationship between nutrition and later-in-life health issues. Der Ananian, *et al.* (2018) points out that most research on the perceptions of nutrition and behavior-

exacerbated diseases are currently limited to the U.S. population as a whole or certain geographical populations such as the Southeastern U.S rather than focusing on certain ethnic groups, such as African Americans (AA) [8]. Only a small subset of research is aimed specifically at examining the nutritional underpinnings of the current racial divisive health crisis in diverse college-aged students [9-12]. For example, when examining available studies, one quickly finds that nutritional habits within the AA community commonly found on an HBCU campus is a complex amalgam of interconnected issues relating to early childhood and familial experiences [13-15], cultural practices [16,17] and geographic influences [6]. Uniquely challenging factors present within this nutritional behavioral change spectrum. Socioeconomic factors impede healthy behavioral choices, often compounding frustration due to limited resources [18]. Strong influences over nutritional behaviors include sex/gender [10] and ethnic-driven “healthy” somatotypes [19]. Further complicating the picture, is the perception of the severity of modern chronic diseases [8]. While the perception of disease in relationship to nutrition choices exists within this population, research suggests that individuals are less likely to display certainty regarding the physiological consequences resulting from poor dietary and lifestyle choices [8]. This is key because the likelihood of changing one’s behavior is linked to their perception of control [20].

The collective AA community has its own unique challenges when identifying factors driving nutritional choices and behaviors. Amassing nutritional behavioral data focused on AA dominant communities that accounts for disease perception is still in its infancy and is sparse. Developing a better perspective is critical to design effective culturally sensitive and targeted intervention programs.

Purpose of the Study

The purpose of this research study was to determine the nutritional behavioral status and health related perceptions of an HBCU population and determine the relationship to their perceptions and attitudes about their health and nutritional choices.

Methods

This study evaluated 262 student subjects, ages 18 - 65, of various ethnicities and activity levels, from a rural state-funded public HBCU campus. Individuals were not eligible to participate if they were a minor, pregnant, or unable to fill out the questionnaire by themselves. Individuals were recruited by IRB approved outlined script, approved emails and flyers.

Instruments used

Rapid eating assessment of participants-short version (REAP-S)

Student responses to the REAP-S [21,22] were evaluated by published guidelines, totaling scores according to the provided questions relating to eating behaviors. Potential answers to questions to the first 13 questions include “usually/often” (1 point), “sometimes” (2 points), “rarely/never” (3 points) or “a behavior does not apply to me” (3 points). Points were totaled for each participant with the highest possible score being 39. Higher scores indicate healthier nutritional value while lower scores indicate opportunities for nutritional improvement. The reliability and validity of the REAP-S questionnaire has been established in previous research [22-24].

Risk perception survey - Developing diabetes (RPS-DD)

Student responses to the RPS-DD [14,25,26] were scored according to the published algorithm and subscales which divided the survey into seven main areas: personal control, worry, optimistic bias, personal disease risk, comparative environmental risk, composite risk score and diabetes knowledge score - risk of developing diabetes. For this study, the Attitudes About Health section which examines personal control, worry, and optimistic bias risk perception, were evaluated. Other results of the RPS-DD are reported elsewhere. The reliability and validity of the RPS-DD survey has been established in previous research [26-28].

Subject procedures

Inclusion requirements: Individual were eligible to participate in the study if they were male or female, age 18 - 65, of any activity level and from any campus location. All ethnicities and races were surveyed. **Exclusion Requirements:** Individuals were not eligible to participate in this study if they were a minor, pregnant, mentally incapacitated, require a guardian to make decisions, or had significant cognitive impairment/mental illness such that it affected their ability to answer questions freely, without undue stress.

Upon arrival at one of the ECSU Human Performance Laboratories or Kinesiology program areas, subjects filled out informed consent documents and asked any questions they had at this time. Participants filled out (2) surveys completely: Rapid Eating Assessment for Participants (REAP-S) and Risk Perception Survey for Developing Diabetes (RPS-DD). Subjects and researchers asked any clarifying questions about the survey and rechecked that all questions were answered and confirmed consent to 6-9 month follow with initials. Individual completion times varied; however, subjects took approximately 15 minutes to complete both the REAP-S and RPS-DD instruments.

Statistical evaluation

Statistical software analysis was performed with SPSS Version 27. This research was authorized by the Elizabeth City State University IRB Board, IRB Number: 18-0005. Signed, informed consent was obtained from all subjects prior to participating in the study.

Results

Demographics

Study participants included 126 males and 136 females (N = 262, M = 48.1%, F = 51.9). Ethnicity representation included 214 African Americans (81.7%), 4 Caucasians (1.5%), 23 Native Americans (8.8%), 17 Two or More races (6.5%) and 4 Participants did not identify with any given ethnicity (1.5%).

REAP-S scores

The Total REAP-S scores were 24.83 out of a range of 13 to 39 (N = 262, Min. = 13, Max. = 39, Std. Dev. = 4.71). There were no significant differences between males and females on total REAP-S scores. Multiple regression analysis revealed that skipping breakfast, eating out 4 or meals per week, eating less than 2 whole grain servings per day, eating less than 2 servings of fruit per day, eating less than 2 servings of vegetables per day, eating less than 2 servings of milk per day, eating more than 8 oz. of meat chicken or turkey, regularly using processed meal, and high fried food consumption were each individually significant predictors of the dependent variable of Total Reap Score behavior (See table 1).

Personal control predictors

A multiple regression model examining perception determined that eating sweets twice or more per day, regularly using processed meals, eating less than 8 oz. of meat chicken or turkey per day, eating less than 2 whole grain servings per day, not feeling well enough to shop or cook and being unwilling to make changes in eating habits were all individually significant predictors of the dependent variable "If I am going to get diabetes there isn't much I can do about it" (personal control). A second regression model on perception showed eating less than 2 servings of whole grains per day and eating two or more servings of sweets per day were predictors of "Control over health risk - I feel that I have little control over my health" (personal control). These results are available in table form for review (See table 1).

Optimistic bias and sex/gender differences

ANOVA results also revealed significant nutritional behaviors and risk perception differences between males and females. Males more often ate more than 8 ounces of meat per day ($F = 6.19, p = .01$). Females more often skipped breakfast ($F = 4.12, p = .04$), and added butter, margarine or oil to bread, potatoes, or vegetables at the table ($F = 8.39, p = .04$). Regression and ANOVA results also revealed a sex/gender difference in attitudes about health. Females “worried more about getting diabetes” (worry) than males ($F = 6.48, p = .01$), and believed they were “more likely to get diabetes than other people of the same age and gender” (optimistic bias) ($F = 4.06, p = .04$), and believed they “more likely to get a serious disease compared to other people of the same sex and gender”(optimistic bias) ($F = 5.99, p = .01$) (See table 1).

Dep. Variable: total Reap Score	Coefficient	Std. Error	t-Statistic	Prob.
Constant	5.364	0.85	6.309	0.001
Skip Breakfast	1.022	0.227	4.51	0.001
Eat 4 or meals out per week	0.967	0.214	4.511	0.001
Less than 2 serv. of whole grains per day	1.196	0.237	5.044	0.001
Less than 2 serv. of fruit per day	1.022	0.261	3.919	0.001
Less than 2 serv. of vegetables per day	1.024	0.247	4.147	0.001
Less than 2 serv. of milk per day	1.14	0.215	5.31	0.001
Eat more than 8 oz. meat per day	0.794	0.22	3.618	0.001
Use regular processed meals	1.061	0.221	4.8	0.001
Eat fried food	2.102	0.258	8.153	0.001
R-squared	0.719	F-Statistic	65.414	
Adjusted R-Squared	0.708	Probability	0.001	
Dep. Variable: If I am going to get diabetes there isn't much I can do about it	Coefficient	Std. Error	t-Statistic	Prob.
Constant	3.287	0.264	12.469	0.001
Eat sweets more than twice per day	0.146	0.067	2.175	0.031
Use regular processed meals	0.165	0.071	2.314	0.022
Eat more than 8 oz. meat per day	-0.186	0.072	-2.591	0.01
Less than 2 serv. of whole grains per day	0.148	0.074	1.998	0.047
Usually feel well enough to shop or cook	-0.326	0.092	-3.54	0.001
Willing to make changes in eating habits	-0.136	0.05	-2.709	0.007
R-squared	0.161	F-Statistic	7.521	
Adjusted R-Squared	0.14	Probability	0.001	
Dep. Variable: Control over health risk	Coefficient	Std. Error	t-Statistic	Prob.
Constant	2.034	0.223	9.122	0.001
Less than 2 serv. of whole grains per day	0.232	0.082	2.825	0.005
Eat sweets more than twice per day	0.171	0.073	2.347	0.02
R-squared	0.055	F-Statistic	7.304	
Adjusted R-Squared	0.29	Probability	0.001	
Dep. Variable: Male/Female	Coefficient	Std. Error	t-Statistic	Prob.
Constant	0.574	0.128	4.471	0.001
I worry about getting diabetes	-0.081	0.031	-2.649	0.009
Compared to other people of my same age and gender I am less likely to get diabetes	0.068	0.035	1.945	0.053
R-squared	0.044	F-Statistic	5.801	
Adjusted R-Squared	0.036	Probability	0.003	

Table 1: Regression analyses.

Discussion

College students, in general, are in an autonomous and exploratory phase in their lives, and this impacts their set of food choices [7]. Decrements in food preferences in young adults have been shown to have linked with increased incidence of disease [29]. Though there have been many publications about the eating behaviors of college students, there are very few that focus on students at an HBCU institution. Thus, the current study focused on documenting the self-reported nutritional behaviors (REAP-S) of college students at a minority serving public university that is designated as an HBCU institution. The second purpose of this study was to determine predictor relationships between these eating behaviors and the students' optimistic perceptions about succumbing to diabetes and their inability to control diabetes (RPS-DD).

Not surprising, the diet patterns seen observed in our participants are like other young adults in college and fit with the patterns classified as the "western diet" [5] high in sugars, processed foods, meat, and fried items. Students were likely to skip breakfast [12], consume an excess of sweets [30], processed foods [5], and consume less recommended amounts of milk, fruits, vegetables [31-33] and whole grains [5]. Sex/gender differences were also noted. Females were more likely to skip breakfast than males, a behavior that is correlated to negative health outcomes such as obesity, central obesity, hypertension and other cardiometabolic risks [34]. Females added more unhealthy oils to meals, and like other studies, males consumed more meat [35].

The data also indicate several correlational relationships among nutrition patterns. There were moderately strong relationships amongst eating fried foods with numerous other unhealthy eating habits. This included strong relationships to the regular consumption of processed meats and salty snacks, and with eating sugary snacks and candy more than two times per day. The same nutritional elements also linked to drinking 16 oz. or more of non-diet soda, fruit drinks, punch, or Kool-Aid a day and adding butter, margarine or oil to bread, potatoes, rice, or vegetables at the table. Each of these unhealthy habits moderately correlated with the other, developing a strong pattern of behavior of unhealthy eating engagement within our participants, across the board.

There is an established relationship between behavior control and behavior change [20]. As such it was important to understand the links between our participants food choices and their self-reported opinions about their control over risks to their health, their ability to intervene in their health, and their viewpoints on their risk for developing diabetes. The results of this investigation revealed unhealthy nutritional behaviors that predicted attitudes about health, potentially contributing to foundational nutrition platforms for early disease development. Responses revealed the belief that there would be little or no reward for engaging in efforts towards changing eating habits or behaviors related to food. This was demonstrated by an inverse relationship between "my personal efforts help control my risk of getting diabetes" and "if I am going to get diabetes there is not much I can do about it anyways." Participants demonstrated negative spiraling self perceptions that their efforts would not have an impact on important self-care maintenance behaviors related to cooking, such as in "usually feeling well enough to shop or cook" and "if I am going to get diabetes there is not much I can do about it anyways".

Comprehensively, participants were of the belief that diabetes was an inevitable disease that was not within their ability to manage. Our HBCU population was dominantly AA (81%), which makes this belief especially concerning. Early onset diseases (high blood pressure and diabetes) experienced by our dominant population are largely lifelong and self-managed diseases [36], requiring various degrees of personal action, including healthier nutrition choices. These powerless attitudes about their health were mirrored by consumption of sugary, processed, and lower fiber food choices. More troubling was the discovery that these attitudes were paired with their self-reported general unwillingness and unmotivated state to make changes to their eating habits. Our study aligns with previous research in that there is a lack of understanding of how present choices can and will affect their individual health outcomes [8]. Der Ananian and others (2018) noted that AA individuals in their study were not demonstrating a comprehension of the disease pathway development and connected behaviors. Further examinations should explore this phenomenon to determine the causations of this cycle of disconnection.

As we observed sex/gender differences in nutritional behaviors, we also observed nutritional attitude differences in the sexes as well. Males were less likely to be concerned about the risk of developing diabetes compared to females. This low-risk perception has been noted in previous literature specifically addressing AA who have type II diabetes [37,38]. Previous research has noted that perceived factors of a loss of masculinity or a perceived lack of control in males may contribute to reduced disease management in this population [39]. The females in our study reported concerns about developing diabetes and other diseases when compared to their peers of the same age and sex/gender. This differs somewhat from other perceptions of disease risk studies where a strong connectedness to AA culturalism has dominated perceptions of disease pathways [40]. In Cameron (2018), research indicated that BMI and other reported medical measures related to measuring obesity were deemed as unworthy measures for behavioral change, adding to resistance strategies for AA females [40]. Comparatively, our participants engaged in mindsets that foster notions that changes in nutrition related behaviors will not change health related outcomes, ultimately sending individuals towards the same pathways of resistance towards behavioral change.

Type II diabetes has strong familial presence [41-44] that is not only biological but a reinforcement of behaviors, norms, and culture [45,46]. With regards to culture, at least some contribution to nutritional behaviors that lead to higher obesity and mortality rates in the AA community can be traced to cultural norms. For example, college-aged AA are more comfortable with their bodies and visualize a larger size as the healthy body size [19]. Yet these few extra pounds are not to be dismissed as an innocuous culturalism. Current medical literature strongly indicates that weight is a strong predictor of hypertension even more so than BMI and hip: waist ratio [47].

The myriad of factors that contribute to behavioral choices are diverse, however, some are mitigatable. Education and environmental influences can and should be addressed as part of the solution pathway for a healthier future for HBCU's, albeit addressing these will certainly have challenges. College campuses may be the first opportunity that many young adults may develop health and wellness behaviors on their own. Creating health-oriented programming with accessible resources is key in promoting behavioral change on campuses [48,49]. A concerted campus wellness education initiative could set the stage for healthy habits that last a lifetime [50]. While nutrition education does have at least short-term benefits [48,49], a person's nutrient environment is obviously impactful. Access to unhealthy food options is evident in the campus environment. Reviewing literature, unhealthy food options available at fast food venues, coffee shops, and unhealthy choices at the dining facilities account for an overwhelming large majority (81.4%) while healthy dining options were considerably less (18.5%) at an HBCU [9]. Considering this, many minority-serving institutions as well as non-HBCU establishments [51] unwittingly reinforce unhealthy eating patterns in order to acquiesce to the demands of students.

Not only are the physical locale of food an issue but with whom a student socially engages with (eats, socializes, recreates) influences food choices [52]. Health behavior gaps may be bridged differently in males and females, and research has examined influences on the behaviors of black female HBCU students, suggesting that interpersonal support is a strong factor towards success [53]. Providing interventional programs with a variety of supportive influences, including social [54], peer support [55] and faith based programming [56] solutions have promise for meeting the unique needs of our population based on prior research. While engaging in designing and delivering interventions to a diverse population, care must be taken. It is important to engage in culturally sensitive programming and avoid behaviors that may appear oppressive and thereby invoke resistance to healthy changes. A strong sense of relationship and support through social means has been proposed as a mitigating factor for success in several studies, with relationship building and campus organizations being targeted as healthy supporting strategies [57,58].

Limitation of the Study

There are limitations to our study that should be considered. This study was executed on a rural campus location that emphasizes low tuition and draws various socio-economic populations from all over the state. With these considerations, it is possible that our participants may provide representation from lower income perspectives, but this cannot be accounted for with our questionnaire data. If lower income students were to have dominated the study, it is possible that our participants experienced socioeconomic challenges within their

neighborhood school system bases, providing a perspective that comes from limited resources, and limited training in diet and nutrition prior to arrival at their college institution. Whereas, possibly coming from a higher income situation could have afforded different outcomes and an alternate interpretation of the data. Due to the rural location of the campus, one should be careful about generalizing our findings to larger, more well populated areas of the country. Our study population was made of 81% AA, with 19% represented by other ethnicities, including 17 Native Americans, 16 of two or more races, 4 Caucasians and 4 who did not wish to identify, making this study largely identifiable with an AA population, but not totally so. It is important to keep this information in mind as our findings are reviewed and are compared to other HBCU campuses.

Implications for Research and Practice and Conclusion

In conclusion, this study has added valuable self-reported data from an HBCU college campus regarding nutritional habits. While the dominant ethnicity is AA, students within our population fit with the predicted norms across this age group, struggling with many of the same poor eating habits that many other college campuses face. A reduced sense of locus of control over behaviors and how they contribute to health outcomes should be addressed in this population, however, understanding why this is present and how to address this issue is key. Based on self-reporting, participants in our study did not feel in control of their health or that their actions would have impact their health outcomes, even when their actions tended towards negative food choices. Analyses reveals that these negative nutrition behaviors drive these out-of-control perceptions. Our research suggests significant opportunity for intervention, which should target building a culturally sensitive and supportive environment, emphasizing daily healthy eating, cooking and lifestyle behaviors. Respectfully addressing necessary changes while emphasizing positive health behaviors with simultaneous support is likely to foster healthier perceptions and the empowerment needed to maintain lifestyle changes. Broad cultural support mechanisms should not be overlooked. Engagement through local churches, family, and familiar culture should be engaged in when possible. Future research should focus on locus of control and sex/gender differences related to nutritional choices and health behaviors. Exploring the mitigation of even one driving behavior such as reducing eating sweets daily should not be underestimated as a significant behavioral change that could impact an individual's entire model of nutrition engagement, and this should be explored in future research efforts.

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Conflict of Interest

The authors report no conflicts of interest. The views expressed are those of the authors and not necessarily those of the journal.

Bibliography

1. Taylor J. "Racism, inequality, and health care for African Americans" (2019).
2. Aceijas C., et al. "Determinants of health-related lifestyles among university students". *Perspectives in Public Health* 137.4 (2017): 227-236.
3. Kimmons J., et al. "Fruit and vegetable intake among adolescents and adults in the United States: percentage meeting individualized recommendations". *The Medscape Journal of Medicine* 11.1 (2009): 26.
4. Small M., et al. "Changes in eating and physical activity behaviors across seven semesters of college: living on or off campus matters". *Health Education and Behavior* 40.4 (2013): 435-441.

5. Blondin SA., et al. "Cross-sectional associations between empirically-derived dietary patterns and indicators of disease risk among university students". *Nutrients* 8.1 (2016): 3.
6. Newby P. "Are dietary intakes and eating behaviors related to childhood obesity? A comprehensive review of the evidence". *The Journal of Law, Medicine and Ethics* 35.1 (2007): 35-60.
7. Das BM and EM Evans. "Understanding weight management perceptions in first-year college students using the health belief model". *Journal of American College Health* 62.7 (2014): 488-497.
8. Der Ananian C., et al. "Perceptions of heart-healthy behaviors among African American Adults: A mixed methods study". *International Journal of Environmental Research and Public Health* 15.11 (2018): 2433.
9. Begum J and NS Tettey. "Are Minority Serving Institutions Contributing to Unhealthy Eating and Health Disparities among College Students: A Pilot Study". *International Education Studies* 13.3 (2020): 1-5.
10. Boek S., et al. "Gender and race are significant determinants of students' food choices on a college campus". *Journal of Nutrition Education and Behavior* 44.4 (2012): 372-378.
11. Hill M., et al. "Lifestyle Behaviors among Students at a Historically Black University". *Undergraduate Research Journal for the Human Sciences* 14.1 (2015).
12. Kang HW., et al. "Assessing Breakfast Eating Behaviors of Historically Black College and University (HBCU) Students". *Journal of Family and Consumer Sciences* 110.2 (2018): 43-48.
13. Brooks JE and DD Moore. "The Impact of Childhood Experiences on Perceptions of Health and Wellness in African American Young Adults". *Journal of African American Studies* 20.2 (2016): 183-201.
14. Schneider EM., et al. "The associations of parenting factors with adolescent body mass index in an underserved population". *Journal of Obesity* (2013).
15. Unusan N. "University students' food preference and practice now and during childhood". *Food Quality and Preference* 17.5 (2006): 362-368.
16. Campbell M., et al. "A tailored multimedia nutrition education pilot program for low-income women receiving food assistance". *Health Education Research* 14.2 (1999): 257-267.
17. Campbell MK., et al. "Fruit and vegetable consumption and prevention of cancer: the Black Churches United for Better Health project". *American Journal of Public Health* 89.9 (1999): 1390-1396.
18. Merhout F and J Doyle. "Socioeconomic status and diet quality in college students". *Journal of Nutrition Education and Behavior* 51.9 (2019): 1107-1112.
19. Aruguete MS., et al. "Acculturation, body image, and eating attitudes among Black and White college students". *North American Journal of Psychology* 6.3 (2004).
20. Seaborn C., et al. "Utilizing genomics through family health history with the theory of planned behavior: Prediction of type 2 diabetes risk factors and preventive behavior in an African American population in Florida". *Public Health Genomics* 19.2 (2016): 69-80.
21. Dickson PM. "Identifying barriers to weight management in native Hawaiian women". 2016, Middle Tennessee State University (2016).
22. Segal-Isaacson CJ., et al. "Validation of a Short Dietary Assessment Questionnaire: The Rapid Eating and Activity Assessment for Participants Short Version (REAP-S)". *The Diabetes Educator* 30.5 (2004): 774-781.

23. Gans KM., *et al.* "Development and evaluation of the nutrition component of the Rapid Eating and Activity Assessment for Patients (REAP): a new tool for primary care providers". *Journal of Nutrition Education and Behavior* 38.5 (2006): 286-292.
24. Johnston CS., *et al.* "Rapid Eating Assessment for Participants [shortened version] scores are associated with Healthy Eating Index-2010 scores and other indices of diet quality in healthy adult omnivores and vegetarians". *Nutrition Journal* 17.1 (2018): 89.
25. Jaber LA., *et al.* "Feasibility of group lifestyle intervention for diabetes prevention in Arab Americans". *Diabetes Research and Clinical Practice* 91.3 (2011): 307-315.
26. Pinelli NR., *et al.* "Risk perception for developing diabetes among pharmacists". *Annals of Pharmacotherapy* 43.6 (2009): 1050-1056.
27. Aberra I. "Risk Perception of Developing Type 2 Diabetes Mellitus in Healthcare Related Majors at the University of Rhode Island (2015).
28. Strawn S. "The effect of education on perceived risk of diabetes in traditional-age college students (2017).
29. Mozaffarian D. "Dietary and policy priorities for cardiovascular disease, diabetes, and obesity: a comprehensive review". *Circulation* 133.2 (2016): 187-225.
30. Kumar GS., *et al.* "Sugar-sweetened beverage consumption among adults—18 states, 2012". *MMWR Morbidity and Mortality Weekly Report* 63.32 (2014): 686.
31. Downs JS., *et al.* "Helping consumers use nutrition information: Effects of format and presentation". *American Journal of Health Economics* 1.3 (2015): 326-344.
32. Miller B. "Good Food: 6 Swaps for More Fiber. (Cover story)". *Prevention* 70.4 (2018): 24-25.
33. Greene GW., *et al.* "Identifying clusters of college students at elevated health risk based on eating and exercise behaviors and psychosocial determinants of body weight". *Journal of the American Dietetic Association* 111.3 (2011): 394-400.
34. Deshmukh-Taskar P., *et al.* "The relationship of breakfast skipping and type of breakfast consumed with overweight/obesity, abdominal obesity, other cardiometabolic risk factors and the metabolic syndrome in young adults. The National Health and Nutrition Examination Survey (NHANES): 1999–2006". *Public Health Nutrition* 16.11 (2013): 2073-2082.
35. Mooney KM and L Walbourn. "When college students reject food: not just a matter of taste". *Appetite* 36.1 (2001): 41-50.
36. Stühmann LM., *et al.* "Psychometric properties of a nationwide survey for adults with and without diabetes: the "disease knowledge and information needs–diabetes mellitus (2017)" survey". *BMC Public Health* 20.1 (2020): 192.
37. Shreck E., *et al.* "Risk perception and self-management in urban, diverse adults with type 2 diabetes: the improving diabetes outcomes study". *International Journal of Behavioral Medicine* 21.1 (2014): 88-98.
38. Walker EA., *et al.* "Measuring comparative risk perceptions in an urban minority population". *The Diabetes Educator* 33.1 (2007): 103-110.
39. Long T., *et al.* "Investigation on the Role of BDNF in the Benefits of Blueberry Extracts for the Improvement of Learning and Memory in Alzheimer's Disease Mouse Model". *Journal of Alzheimer's Disease* 56.2 (2017): 629-640.
40. Cameron NO., *et al.* "The weight of things: Understanding African American women's perceptions of health, body image, and attractiveness". *Qualitative Health Research* 28.8 (2018): 1242-1254.
41. Benjamin EJ., *et al.* "Heart disease and stroke statistics—2019 update: a report from the American Heart Association". *Circulation* 139.10 (2019): e56-e528.

42. Chen Q, *et al.* "Arterial stiffness is elevated in normotensive type 2 diabetic patients with peripheral neuropathy". *Nutrition, Metabolism and Cardiovascular Diseases* (2015).
43. Frierson GM, *et al.* "Effect of race and socioeconomic status on cardiovascular risk factor burden: the Cooper Center Longitudinal Study". *Ethnicity and Disease* 23.1 (2013): 35.
44. Bhatt HB and RJ Smith. "Fatty liver disease in diabetes mellitus". *Hepatobiliary Surgery and Nutrition* 4.2 (2015): 101.
45. Claassen L, *et al.* "Using family history information to promote healthy lifestyles and prevent diseases; a discussion of the evidence". *BMC Public Health* 10.1 (2010): 1-7.
46. Valdez R, *et al.* "Family history and prevalence of diabetes in the US population: the 6-year results from the National Health and Nutrition Examination Survey (1999–2004)". *Diabetes Care* 30.10 (2007): 2517-2522.
47. Yancu CN, *et al.* "Prehypertensive Risk among African-American Undergraduates: Do the Extra Pounds Really Matter?" *Journal of Health Disparities Research and Practice* 11.4 (2018): 2.
48. Brace AM, *et al.* "Assessing the effectiveness of nutrition interventions implemented among US college students to promote healthy behaviors: A systematic review". *Nutrition and Health* 24.3 (2018): 171-181.
49. Deliens T, *et al.* "Dietary interventions among university students: A systematic review". *Appetite* 105 (2016): 14-26.
50. Ickes MJ, *et al.* "Impact of a University-based Program on Obese College Students' Physical Activity Behaviors, Attitudes, and Self-efficacy". *American Journal of Health Education* 47.1 (2016): 47-55.
51. Leischner K, *et al.* "The healthfulness of entrées and students' purchases in a university campus dining environment. in Healthcare". *Multidisciplinary Digital Publishing Institute* (2018).
52. Robinson E, *et al.* "What everyone else is eating: a systematic review and meta-analysis of the effect of informational eating norms on eating behavior". *Journal of the Academy of Nutrition and Dietetics* 114.3 (2014): 414-429.
53. Rodney A, *et al.* "Grown woman: Understanding what influences health behaviors in black female students at a HBCU". *Journal of American College Health* (2019): 1-6.
54. Heredia N, *et al.* "The Importance of the Social Environment in Achieving High Levels of Physical Activity and Fruit and Vegetable Intake in African American Church Members". *American Journal of Health Promotion* 34.8 (2020): 886-893.
55. Lee S, *et al.* "Power of peer support to change health behavior to reduce risks for heart disease and stroke for African American men in a faith-based community". *Journal of Racial and Ethnic Health Disparities* 5.5 (2018): 1107-1116.
56. James D. "Factors influencing food choices, dietary intake, and nutrition-related attitudes among African Americans: Application of a culturally sensitive model". *Ethnicity and Health* 9.4 (2004): 349-367.
57. Fergusson TM. "Obesity prevention in black college students: An evaluation of a lifestyle weight management program". Howard University (2008).
58. Mead AS. "Gender Differences In Food Selections Of Students At A Historically Black College And University (Hbcu)". *College Student Journal* 43.3 (2009): 800-806.

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