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Acculturation, readiness to change, and body mass index among African American Women: A community-based Study from Florida, United States

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Evidence in Context

• African American Women (AAW) had a significant obesity prevalence, with 59.4% classified as overweight or obese. • Majority of AAW reported being in the preparation, active, or maintenance stages of change (SOC) for physical activity and nutrition. • Overweight/obese AAW were more likely to be in the preparation or action stages than the maintenance stage for physical activity. • AAW show readiness to change their health behaviors, however, a gap in translating this readiness into sustained behavior change that reduces BMI exists.

To view Article

Abstract

Background: Gaining insight into African American women's health behavior desires and weight management is pivotal since they have the highest prevalence of obesity in the U.S. Exploring an association between psychological factors (e.g. acculturation status and readiness to change) and anthropometric characteristics, including body mass index (BMI) is critical for developing effective health promotion programs that improve lifestyle behaviors among this group. The purpose of this study was to ascertain nutrition and physical activity behaviors based on the stages of change (SOC) theory and its association with BMI and acculturation status among adult African American Women (AAW).

Methods: SOC, acculturation status, and BMI were analyzed using a population-based sample of 294 AAW living in Florida. Logistic regression analysis was conducted by modeling BMI as the outcome variable to assess the influence of acculturation and SOC while controlling for sociodemographic characteristics. The significance level was set at 5% and all tests were two-sided.

Results: Our findings indicated that 59.4% of AAW were overweight or obese. Among those who reported SOC for physical activity, 229 (81.5%) were in the preparation, active, or maintenance SOC for physical activity. Of 279 participants, 214 (77%) reported being in the preparation, active, or maintenance SOC for practices in good eating habits. SOC for nutrition scores, acculturation scores, and age were significantly different among categories of BMI. AAW who were overweight or obese were significantly more likely to be in the preparation or action SOC for physical activity rather than the maintenance stages of change, compared to normal weight AAW.

Conclusion: Findings suggest that while AAW are ready to change, they still struggle to engage in behaviors that reduce their BMI. SOC, along with cultural factors should be considered when developing health interventions to assist AAW improve health behaviors that subsequently reduce BMI and prevent the onset of chronic diseases.

Keywords: *obesity, acculturation, African American women, African American, nutrition, physical activity*

Introduction

The prevalence of obesity among African American Women (AAW) in the United States (U.S.) is higher than any other racial and ethnic group with a reported prevalence of 57.1% of obesity among AAW per estimates provided in 2017. Over the past few decades, the highest increase in rates of obesity was among middle-aged AAW in the U.S [1-5]. Moreover, the racial and ethnic disparities in obesity are higher among low-income, less educated, and those who self-identify as AAW living in the southern part of the U.S. [3-6]. With every 4 of 5 AAW being overweight or obese as opposed to other racial groups in the U.S., obesity-related illnesses and associated healthcare costs have been rising in this group [4-7]. There is a continuous need for effective interventions that can help reduce obesity with much focus on improving diet and physical activity practices among AAW.

Public health scholars and practitioners must continue to identify factors (e.g. cultural factors, behavioral factors, and lifestyle factors) that can effectively reduce obesity among AAW. Of these factors, behavior change is critical for health education and health promotion among AAW [8,9]. The transtheoretical model (TTM) is one of the most commonly used methods for behavior modeling (with previous studies utilizing TTM in AAW) [10-12]. The TTM is based on the premise that behavior change is a process and people are at different Stages of Change (SOC) and readiness regarding healthy behaviors [9-11]. The SOC (used interchangeably with *readiness to change)*, consists of five stages as one changes health behavior (i.e. *pre-contemplation, contemplation, preparation, action, and* the *maintenance stage) [9-13].* Studies suggest that AAW are ready to change their diet and exercise patterns and SOC is associated with behavior change and nutrition intake or physical activity among AAW [8,11,13,14] However, there is limited data on the association of SOC and obesity (i.e. body mass index [BMI]) among AAW. For instance, one can hypothesize that the BMI of AAW who are in active and maintenance SOC for practicing healthier dietary habits and physical activity will be lower compared to AAW who are not in these SOC, few empirical studies report on this association [13,14].

Acculturation, which is another factor attributed to health behaviors and conditions among AAW, explains the extent one participates in their cultural traditions, values, beliefs, and practices (traditional), or fails to participate in inherent cultural traditions or practices (acculturated) [15-19]. Thus, 'being highly traditional' equates to 'being less acculturated;' conversely, 'being less traditional' equates to 'being highly acculturated' [19-21]. The relationship between acculturation status and obesity among AAW has not been thoroughly investigated. For example, the question "*Are AAW who are traditional, significantly more likely to be obese compared with AAW who are not as traditional*?" has not been completely answered. There is an existing gap in knowledge about the association between SOC, acculturation status and obesity among AAW. Therefore, this study aims to investigate an association between SOC for healthy diet and exercise, acculturation status, and BMI among AAW in Florida.

Methods

A cross-sectional study design was used to conduct a Florida-based population study focused on measuring acculturation, health-behavior SOC, along with other sociodemographic and anthropometric characteristics. We used a community based participatory research process through partnerships with African American Sororities, faith-based organizations, non-profit and community-based groups, partnering Universities in Florida (Fort Lauderdale, Jacksonville, Miami, and Tampa) through community outreach programs, and word of mouth. The sampling strategy involved non-probability convenience sampling at several institutional settings, such as faith-based facilities and academic institutions. Only AAW, who were residents of Florida, aged 18 years or above, and having the ability to provide informed consent were included in this study. The appropriate sample was ascertained using the conventional Cohen effect sizes and the approach suggested by Green et al [22, 23].

AAW completed the survey in person at community sites like faith-based facility or university. Those who were unable to meet in person were offered the option to complete a self-administered internet-based survey. Self-reported sociodemographic and anthropometric data collected were age, education, employment, geographic region, income, marital status, height, and weight.

Age was described as a continuous variable using the response to "*What is your age?*" and was dichotomized using the median split method. Education was measured by asking *"How many years of regular school have you completed*?" and "*What is the highest degree you have earned*?" Responses were grouped by 'no more than a high school education or GED', 'some college to bachelor's degree', and at 'least a graduate degree'. Employment was measured by asking *"Do you work for pay now*?" with 'Yes' or 'No' as responses. Geographic region was measured by asking "*Where do you live*?" Responses were grouped into one of five (5) regions: Northeast; Southeast; Central; Northwest; and Southwest. Income was self-reported and measured by asking '*Are you willing to share your approximate household income*?" with responses grouped into < $50,000 and ≥$50,000. Marital status was assessed by asking "*What is your marital status?"* grouped into 'married', 'single' or 'divorced/ widowed/separated'. The BMI was the dependent variable in all analyses and was calculated using participants' self-reported weight and height measurements. Weight was measured by asking *"What is your weight?"* in lbs. Height was measured by asking "*What is your height?"* in feet and inches. BMI was then calculated or derived using the formula of weight/height for reporting in the standard units of Kg/m^{2}. Obesity was further categorized as Class I (≥ 30 – 34.9 kg/m2), Class II (≥ 35 to 39.9 kg/m2), and Class III (≥ 40 kg/m2) [1,3,4, 5, 8-10].

Acculturation status was measured using the "African American Acculturation Scale–Short Form 33 (AAAS-33)". High scores on the AAAS-33 indicate greater agreement with beliefs, practices, and values inherent in African American culture while low scores indicate less agreement with these beliefs and culture. SOC, was measured by responses to: "Indicate how ready you are to make the changes or improvements in your health in the following areas: be physically active; practice healthy eating habits." Listed responses were "haven't thought about changing" scored as 1, "plan a change in the next 6months" scored as 2, "plan to change this month" scored as 3, "recently started doing this" scored as 4, and "doing this regularly (last 6months)" scored as 5 [11-16].

This tool has robust psychometric properties with a split-half reliability of r=0.77 and internal consistency varies between 0.81-0.88 [17-20]. The AAAS-33 measures ten constructs: 1) *preference for African American things* 2) *traditional African American religious beliefs and practices* 3) *preparation and consumption of traditional foods* 4) *traditional childhood* 5) *superstitions* 6) *cultural mistrust* 7) *falling out* 8) *traditional games* 9) *family values* and 10) *family practices*. Responses range from strongly disagree to strongly agree (scored from 1 to 7). The overall acculturation level was determined by summing scores on each of the 33 items, resulting in a range of scores from 33 (low traditional) to 231 (high traditional) [17-20]. Acculturation status was also dichotomized where scores ≥ 150 were grouped as 'high' or 'traditional', and scores < 150 were grouped as 'low' or 'less traditional'.

Data Analysis

Data were analysed using descriptive univariate statistics for participants characteristics that served as covariates in logistic regression analysis. The dependent variable was BMI with readiness to change and acculturation status analysed as independent variables. Using the median split method, acculturation scores were grouped as 'high' or 'low'. Bivariate analyses (Chi-square/Fisher exact tests) were conducted to examine the association between acculturation status (high traditional vs. low traditional) with SOC and sociodemographic characteristics. In logistic regression analysis, the probability was modelled using BMI as the dependent variable by considering the influence of acculturation, SOC and sociodemographic characteristics. The Hosmer and Lemeshow goodness-of-fit test statistic was used to determine model fit for predicting BMI status. BMI was grouped into obese/overweight and overweight/normal. Sociodemographic variables associated with BMI at the $p \leq 0.20$ level during bivariate analysis were included in logistic regression analyses. The proportion of the missing data was only 5% (15/294), which was below the missing values threshold (nearly 10%) reported in the literature to apply any missing data analysis, such as mean imputation, imputation methods etc. All analyses were conducted using SAS Software and statistical significance was assumed *a priori* at the alpha level of <0.05.

Results

Of a total of 294 participants, 15 did not report the height/weight for us to categorise their BMIs. Among the remaining 279 AAW, 110 (39.4%) had a normal BMI, the majority, 59.4%, were overweight or obese, 95 (34.0%) and 71 (25.4%) respectively. The median BMI was 26.5

Kg/m2, the median acculturation score was 146.6 (SE=1.32), and the median age was 36.3 (SE=0.71) years (Table 1). Among 71 obese participants, 42 AAW were Class I obese defined as low-risk, 15 AAW were Class II obese defined as moderate risk, and 14 AAW were Class III obese considered high risk. Almost 46% stated having some college experience to having earned a bachelor's degree while 91% disclosed being employed. A little more than 60% had incomes less than $50K/year, and the majority were single (46%), followed by married (~40%). The regions most represented were the Southwest (i.e., Tampa) and Southeast (i.e., Jacksonville).

Table 1. BMI, stages of change, acculturation status, and sociodemographic characteristics of study participants (N=294)

	Total	**Underweight** < 18.5 kg/m^2	**Normal** 18.5-24.9 kg/m^2	**Overweight** 25.0-29.9 kg/m^2	**Obese** ≥ 30 kg/m^2	***P*-value**
BMI categories**	**279**	N=3	N=110	N=95	N=71	
Age, M (SE; n)	36.3 (0.71; 294)	33.6 (3.07; 17)	31.8 (1.02; 109)	39.2 (1.38; 96)	39.9 (1.20; 72)	< .0001*
Acculturation scores, M (SE; n)	146.6 (1.32; 294)	139.8 (6.48; 17)	141.6 (1.85; 109)	148.0 (2.35; 96)	153.9 (2.79; 72)	< .0001*
Stages of Change, M (SE; n)						
Nutrition, scores	3.53 (0.07; 279)	3.93 (0.37; 15)	3.43 (0.12; 106)	3.76 (0.11; 88)	3.3 (0.13; 70)	<.0001*
Physical Activity, scores	3.75 (0.07; 281)	3.87 (0.29; 15)	3.66 (0.13; 105)	3.94 (0.11; 90)	3.6 (0.13; 71)	<.0001*
Acculturation, n=294						
High	138 (46.9)	6 (35.3)	42 (38.5)	47 (48.9)	43 (59.7)	.03*
Low	156 (53.1)	11 (64.7)	42 (61.5)	49 (51.0)	29 (40.3)	
SOC – Nutrition, n=279						
Pre-contemplation	11 (3.9)	1 (6.7)	5 (4.7)	2 (2.3)	3 (4.3)	
Contemplation	54 (19.4)	3 (20.0)	24 (22.4)	12 (13.6)	15 (21.4)	
Preparation	58 (20.8)	0 (0.0)	23 (21.7)	16 (18.2)	19 (27.1)	.06*
Action	88 (31.5)	3 (20.0)	28 (26.4)	33 (37.5)	24 (34.2)	
Maintenance	68 (24.4)	8 (53.3)	26 (24.3)	25 (28.4)	9 (12.9)	
SOC – Physical Activity, n=281						
Pre-contemplation	14 (4.9)	0 (0)	8 (7.6)	3 (3.3)	3 (4.2)	
Contemplation	38 (13.5)	3 (20.0)	18 (17.1)	8 (8.9)	9 (12.7)	
Preparation	42 (14.9)	1 (6.7)	13 (12.4)	13 (14.4)	15 (21.1)	.25*
Action	97 (34.5)	6 (40.0)	29 (27.6)	33 (36.7)	29 (40.1)	
Maintenance	90 (32.0)	5 (33.3)	37 (35.2)	33 (36.7)	15 (21.1)	
Education						
≤ HS/GED	92 (33.2)	6 (40.0)	38 (38.2)	32 (35.6)	16 (23.9)	
Some College - Bachelors	128 (46.2)	7 (46.7)	45 (42.9)	38 (42.2)	38 (56.7)	.53*
> Bachelors	57 (20.6)	2 (13.3)	22 (20.9)	20 (22.2)	13 (19.4)	

Employed, n=285						
Yes	258 (90.5)	14 (87.5)	99 (90.8)	78 (86.7)	67 (95.7)	.27*
No	27 (9.5)	2 (12.5)	10 (9.2)	12 (13.3)	3 (4.3)	
Income, n=240						
< $50K/year	145 (60.4)	4 (57.1)	58 (62.4)	44 (57.9)	39 (60.9)	.94*
≥ $50K/year	95 (39.6)	3 (43.9)	35 (37.6)	32 (42.1)	25 (39.1)	
Marital Status, n=289						
Married/Partnered	115 (39.8)	7 (46.7)	38 (34.9)	42 (45.2)	28 (38.9)	
Single	132 (45.7)	7 (46.7)	64 (58.7)	34 (36.6)	27 (37.5)	.004*
Ever Married	42 (14.5)	1 (6.7)	7 (6.4)	17 (18.3)	17 (23.6)	
Region, n=287						
Northwest	3 (1.0)	0 (0)	1 (0.93)	1 (1.1)	1 (1.4)	
Southeast	107 (37.3)	7 (43.8)	43 (39.8)	38 (40.9)	19 (27.1)	
Northeast	43 (14.9)	5 (31.2)	14 (12.9)	10 (10.8)	14 (20.0)	0.28*
Central	7 (2.4)	0 (0)	1 (0.93)	2 (2.2)	4 (5.71)	
Southwest	127 (44.2)	4 (25.0)	49 (45.4)	42 (45.2)	32 (45.7)	

BMI: Body mass index; M=Mean; SE = standard error; n=observed number; *Sum may vary due to rounding; p values marked with asterisk were generated through Chi-square/Fisher-exact tests, ** BMI was reported by 279 participants

Of 279 participants, 214 (77%) reported being in the preparation, active, or maintenance SOC for practices in good eating habits. Among those who reported SOC for physical activity, 229 (81.5%) were in the preparation, active, or maintenance SOC for physical activity (Table 1). As shown in Table 1, BMI significantly differed by acculturation and marital status ($p<0.01$). Examining BMI categories by SOC for practices in good eating habits which is a marginal affect ($p=.06$) although SOC for physical activity failed to show statistical significance by BMI categories. SOC for nutrition scores, acculturation scores, and age were significantly different among categories of BMI.

In the logistic regression, the BMI was modelled as the dependent variable and acculturation scores and SOC nutrition were modelled as independent variables. This logistic regression model was run for 279 participants, who reported height/weight for deriving the BMI (Table 2). Marital status and age were retained in logistic regression analysis since they were each significantly associated with BMI at the $p < .20$ level in bivariate analysis (see Table 1). The first logistic regression modelling with BMI as the outcome with SOC for practice in good eating habits, SOC for physical activity, acculturation scores, age and marital status as independent variables produced an acceptable model fit (chi-square = 3.03, df= 8, $p=.93$). As demonstrated in Table 2, overweight or obese AAW were significantly more likely to be in the preparation or action SOC for physical activity rather than the maintenance stages of change, compared to normal weight AAW.

Discussion

This cross-sectional study aimed to investigate the association between BMI, SOC regarding healthy dietary practices and physical activity, and the level of acculturation among African American women (AAW) residing in Florida. The majority of AAW were either overweight or obese. We found that AAW were ready to change and practice healthy eating or engage in more exercise. However, AAW with high BMI (overweight/obese) were statistically more likely to be in the preparation or action stages for plans to exercise. While AAW report a readiness to change, they still struggle to achieve and maintain a normal BMI. Several contributing factors deserve mention for this finding such as lack of support (e.g. family, spousal, partner), insufficient knowledge about what is defined as good eating or physical activity practices, and unavailability of resources (e.g. finances, transportation, living around food deserts, etc.). It is well established that African Americans

Experience profound socioeconomic challenges that serve as direct and indirect determinants of health (e.g. poor health outcomes), but the finding related to AAW's willingness to engage in healthy behaviors is not well known [24,25]. Given the willingness of AAW to engage in healthy behaviors, interventions supporting healthy diet, engagement in exercise, and raising awareness are warranted for this population and a social justice perspective should be the foundation for policies and practices to improve health behaviors among AAW [5-7, 21-26]. Moreover, this study focused on a group of AAW not often asked to participate in research who have make less than $50K and single.

Our findings show positive associations of age with BMI among AAW; those who were overweight or obese exhibited a higher likelihood of adhering to traditional values or being of older age, in comparison to AAW who had a normal BMI. Findings from this study are consistent with studies showing that AAW have difficulty obtaining and maintaining a normal BMI as they age, which is due to a variety of factors (e.g. dietary deficiencies, limited physical activity, lower metabolic rates, etc.). Age-appropriate interventions to help reduce obesity among older AAW are far and few, this is an area of much-needed research [7-9, 26-28]. The findings of our analysis also indicate a statistically significant association between cultural status (i.e., being more traditional) and BMI. Nelson and colleagues hypothesized that cultural integration (i.e. being less traditional) would be inversely associated with increased risk for obesity, but in their analysis of 198 African American youth, they did not find an association between culture and obesity [27]. Consistent with Nelson and colleagues' study, acculturation status failed to reach statistical significance when controlling for other covariates although AAW who were overweight/obese has significantly higher acculturation scores (indicating that they adhere to a more traditional African American culture, values and beliefs) in bivariate analyses compared with AAW of normal weight; thus, older AAW may still practice diets that are more likely to reflect a traditional cuisine of African American or Black people in the U.S. Further research is needed to understand the influence of acculturation in an aging population on diet and physical activity behaviors, and BMI among AAW to develop effective interventions.

A major implication of this study is that further investigation is required in order to ascertain the inherent factors that drive individuals toward embracing change among AAW since our results indicate their desire and readiness to change. Research exploring intrinsic motivators for behavioral change – the concept of identifying enjoyable or fulfilling reasons to change a behavior – might provide insight for AAW regarding psychosocial approaches to improve and sustain health behaviors. Halbert and colleagues reported that African Americans who completed a diet and physical activity program were significantly more likely to have high intrinsic motivation compared with African Americans who failed to complete the health intervention program [29-32]. This study highlights the need to expand efforts to examine social determinants of health approach, motivation, and acculturation as potential avenues for interventions to improve lifestyles and health behaviors among AAW. Other experts have also suggested the use of technology, healthcare encounters, and community settings (e.g. faith-based organizations) to understand health behaviors among AAW and for health education and behavior modification [26-28].

A few major limitations of this study warrant attention. For example, AAW self-reported BMI, SOC, and acculturation; this could have introduced a bias (e.g. social desirability, reporting bias, and/or and recall bias). While we had appropriate power and sample size for this study, we recognize that a larger and more diverse sample could have further helped validate our findings. Our sample may have selection biases in that AAW more interested in improving their health might be more apt to participate. On the other hand, we believe that findings from our study may be generalizable since 59.4% of AAW in our study report being overweight or obese, which is nearly consistent with the national prevalence of obesity of 57.6% in the year 2017 [27-29]. This would further underscore the importance of developing interventions since obesity rates among AAW would be even higher than what we observed in our sample (i.e. an educated group of AAW, who arguably have the resources to change their behaviors reported). Given the cross-sectional nature of the study, cause-effect relationships cannot be established from our findings and our results suffer from all threats to reliability and validity associated with observational studies.

Table 2. SOC and Acculturation as Predictors of Overweight Status, N=279

Predictors	Overweight/ Obese Status Adjusted OR (95% CI)
Stages of Change – Nutrition	
Pre-contemplation	0.59 (0.11 – 3.29)
Contemplation	1.21 (0.49 – 2.97)
Preparation	1.89 (0.78 – 4.59)
Action	1.76 (0.82 – 3.76)
Maintenance (Reference)	1.00
Stages of Change – Physical Activity	
Pre-contemplation	1.32 (0.28 – 6.34)
Contemplation	0.77 (0.29 – 2.06)
Preparation	2.59 (1.01 – 6.67) *
Action	2.11 (1.04 – 4.30) *
Maintenance (Reference)	1.00
Acculturation	1.01 (1.00-1.02) *
Age	1.06 (1.02-1.09) **
Marital Status	
Single	0.85 (0.44 – 1.64)
Ever Married	2.39 (0.89 – 6.42)
Married/Partnered (Reference)	1.00

Note. *p < .05 **p < .01; *SOC: Stages of Change; OR: Odds ratio; CI: Confidence interval*

Conclusions

In this sample of AAW, we found a high rate of overweight and obesity, however, regardless of BMI status, AAW are ready to improve their eating practices and physical activity behaviors. Age was also found to be influential in predicting BMI. The findings suggest that SOC for nutrition and physical activity are higher among AAW who are overweight or obese, and acculturation influences BMI. Future research exploring what AAW finds intrinsically motivating for healthier nutrition and increased exercise is a logical next step to improve nutrition and physical activity health behaviors among AAW. Lastly, SOC and culture should be addressed when developing interventions designed to improve health behaviors and reduce BMI among AAW.

Supporting information

None

Ethical Considerations

Study protocols and procedures were approved by the University of Florida Institutional Review Board. Informed consent was taken from the participants. The participation was voluntary.

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Author contribution statement

All authors attest they meet the ICMJE criteria for authorship and gave final approvalforsubmission.

Data availability statement

Data included in article/supp. material/referenced in article.

Additional information

No additional information is available for this paper.

Declaration of competing interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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