

# ORIGINAL REPORTS: OBESITY

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## ASSOCIATION OF CHURCH-SPONSORED ACTIVITY PARTICIPATION AND PREVALENCE OF OVERWEIGHT AND OBESITY IN AFRICAN AMERICAN PROTESTANTS, NATIONAL SURVEY OF AMERICAN LIFE, 2001–2003

**Objective:** This study examines the relationships between participation in the African American church and overweight/obesity (body mass index (BMI)  $\geq 25$  kg/m<sup>2</sup>). **Design:** This cross-sectional analysis was based on the National Survey of American Life 2001–2003 and included 2,689 African American Protestant (AAP) adults. Multivariate logistic regression was used to calculate adjusted odds ratios (aOR) and 95% confidence intervals (CI) for overweight/obesity. Two practices were examined – frequency of participation in church activities (excluding services) and frequency of church service attendance. Each practice was analyzed in separate models. Each model included the following covariates: age, marital status, education, poverty, smoking, and region of country. We also adjusted models for sex.

**Results:** After adjustment, African American Protestant men (AAPM) who participated in church activities at least weekly were more likely to be overweight/obese (aOR=2.17; 95% CI=1.25, 3.77) compared to AAPM who did not participate in church activities. There was no statistically significant association between overweight/obesity and participation in church activities for AAPW. There was no association between overweight/obesity and attendance of church services for AAP men and women combined.

**Conclusions:** For AAPM, participation in church activities was significantly associated with overweight/obesity. Further studies are required to determine why this association occurs in AAPM but not AAPW. Studies looking at the wider application of the several successful health initiatives targeting the AAP

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community should also be considered. (*Ethn Dis.* 2013;23[3]:322–328)

**Key Words:** Religion, Obesity, Overweight, African Americans

### INTRODUCTION

Obesity reduction and prevention is a public health priority.<sup>1,2</sup> Being overweight or obese has been associated with adverse health consequences, including diabetes, cardiovascular diseases, and certain types of cancer.<sup>3,4</sup> The epidemic of obesity disproportionately affects Blacks, with approximately 77% of Black adults being overweight/obese compared to 68% of Whites.<sup>1</sup> Social, economic, and cultural factors all contribute to disparities in overweight/obesity rates.<sup>5,6</sup>

Previous studies have examined the associations between religion and weight or weight-related behaviors, although the results have been inconsistent.<sup>7–19</sup> In 2003, Kim et al found that for men but not women, belonging to a conservative Protestant denomination was associated with a slightly increased body mass index (BMI) compared to those without a religious preference.<sup>7</sup> On the other hand, Gillum and colleagues found no association between attendance at religious services during 1988–1994 and obesity after adjusting for sociodemographic factors in a large national sample including European Americans, African Americans (AA), and Mexican Americans.<sup>8</sup> However, the relationships between religious practices and obesity may be different for African American Protestant (AAP) church goers because food often plays

a central role in church fellowship activities.<sup>20–23</sup> Food can be served before, during, or after church events, and can include foods that are energy dense and/or high in saturated fats.<sup>20–24</sup> Programs aimed at improving the health of African Americans have successfully employed healthy menu changes at church events to increase healthy eating habits.<sup>20–31</sup>

The lives of many AA are influenced by the African American church, a term referring to Protestant churches with predominately AA congregations and distinct cultural traditions.<sup>22,23,32,33</sup> There are about 29 million Black Protestants in the United States.<sup>34,35</sup> About 76% of Black Protestants attend historically Black churches, which are churches with historically Black denominations, such as the African Methodist Episcopal denomination.<sup>34</sup> About 85% of members of historically Black churches say religion is very important in their lives.<sup>34</sup> Finally, 26% of historically Black church members participate in church social activities, such as meals,

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club meetings, or other gatherings, at least once a week.<sup>34</sup> Reducing overweight/obesity in this large group could help to reduce racial disparities.

To our knowledge, no published studies have examined the relationship between participation in church-related activities and overweight/obesity among AAP. Given the disproportionate number of Blacks who are overweight/obese and the success of several church-based health interventions in AA churches, links between overweight/obesity and religious practices among AA could aid in targeting interventions.

## METHODS

### Study Sample

This cross-sectional study was based on the National Survey of American Life (NSAL). The study collected data from a nationally representative sample of 6,082 adults aged  $\geq 18$  years (3,570 African Americans, 1,621 Caribbean Blacks, and 891 non-Hispanic Whites). The Program for Research on Black Americans at the University of Michigan's Institute for Social Research collected the data for the NSAL from February 2001 to June 2003. National multi-stage probability methods were used in generating the samples and have been described elsewhere.<sup>36-38</sup> Weighting, which adjusted for disproportionate sampling and non-response, was used to make the results representative of the United States AA population. The survey population was limited to households in the contiguous 48 states. Institutionalized persons, those living on military bases, and non-English speakers were excluded from the survey. The data were collected using face-to-face interviews that lasted an average of 2 hours and 20 minutes.<sup>36</sup> The majority of questions focused on mental health.

The NSAL response rate was 70.7% for the AA sample. Of the 3,570 African Americans who completed the survey, 2 did not answer the religious preference

question, 203 were Catholic, 90 were categorized as other, 344 had no religious preference, no religion, or were "agnostic or atheist," and 2,931 were Protestant (978 men and 1,953 women). We excluded pregnant women ( $n=35$ ) and participants with missing height and/or weight ( $n=196$ ), smoking status ( $n=135$ ), and marital status ( $n=7$ ) from all analyses with some participants missing multiple pieces of information, leaving a final analytic sample of 2,689 AAP (924 men and 1,765 women). In post-hoc analyses, we examined the 318 AA without a specific religion and the 190 AA Catholics (AAC) who met inclusion criteria for the study. Catholics were analyzed separately from Protestants given their different religious traditions and histories in the AA community.<sup>39</sup> The AA survey sample included only adults who self-identified as Black and reported no Caribbean ancestry.<sup>37,38</sup> We excluded Blacks with Caribbean ancestry from analyses because the Caribbean culture has different food traditions, religious traditions, and obesity rates.<sup>24,40,41</sup> The data analysis involved publicly-available de-identified data, and this study was thus exempt from the Centers for Disease Control and Prevention Institutional Review Board process.

### Variables

#### *Church Practices*

Participants were asked about how often they participated in church activities (excluding religious services) and how often they attended religious services.<sup>42</sup> For each variable, we divided frequency of involvement into three categories: a) at least once a week, b) a few times per month to a few times per year, and c) never participated in church activities or attended church services less than once a year.

#### *Sociodemographic Variables*

The covariates were sex, age, education (0-11, 12, 13-15, and  $\geq 16$  years),

region of country (South, Northeast, Midwest, and West), marital status (single or married), current smoking status (smoker or non-smoker), and income-to-needs ratio. For the marital status variable, single included those who were widowed, divorced, and non-married partners. The income-to-needs ratio was calculated by dividing the reported household income by the 2001 Census Bureau federal poverty threshold, which was determined based on household composition. The income-to-needs ratio was rounded to the nearest whole number and was a variable within the NSAL dataset. An income-to-needs ratio  $>1$  indicates the family was above the 2001 federal poverty level. All socio-demographic variables were categorical, except age and income-to-needs ratio, which were continuous.

#### *Outcome Variable*

BMI was calculated using self-reported height and weight. We categorized persons as underweight/normal weight if their BMI was  $<25.0$  kg/m<sup>2</sup>, overweight/obese if their BMI was  $\geq 25.0$  kg/m<sup>2</sup>, and obese if their BMI was  $\geq 30$  kg/m<sup>2</sup>.<sup>43</sup> In NSAL, weights lighter than 100 pounds were recorded as 100 pounds and weights heavier than 300 pounds were recorded as 300 pounds. Similarly, heights shorter than 57 inches were recorded as 57 inches and heights taller than 75 inches were recorded as 75 inches.<sup>36-38</sup> This approach minimized outliers, and all resulting BMIs were biologically plausible.

### Statistical Analyses

All statistical analyses were conducted using Statistical Analysis Software (SAS) 9.2 (SAS Institute, Cary, NC, USA), which accounted for complex sample design. Unweighted frequencies, weighted percentages, and weighted means were calculated for overweight/obesity prevalence, obesity prevalence, BMI, and sociodemographic and religious variables according to frequency of church activity participation and religion. We calculated 95% CIs for

weighted prevalence of Protestantism among AAM and AAW using Wald confidence limits. The chi-squared test and analysis of variance (ANOVA) were used to determine statistically significant differences in weighted percentages and weighted means between AAP who attended church activities at least weekly, few times a month to a few times a year, and AAP who never attended church activities.

Bivariate and multivariate logistic regression models were used to estimate crude odds ratios (OR), adjusted OR (aOR), and 95% confidence intervals (CI) for overweight/obesity according to religious practice characteristics. The two religious practices (frequency of participation in church activities excluding services and frequency of church service attendance) were analyzed in separate models. For AAP, the multivariate logistic regression models included the following covariates: sex, age, marital status, education, poverty, smoking, and region of country. In the multivariate logistic regression model examining participation in church activities, there was a statistically significant interaction between frequency of participation in church activities and sex ( $P=.02$ ). Thus all analyses examining participation in church activities were stratified by sex. However, in the multivariate logistic regression model examining frequency of church service attendance, there were no statistically significant interactions between frequency of church service attendance and the other covariates, so the sexes were analyzed together.

In post-hoc analyses of the AAC sample, we used bivariate and multivariate logistic regression models to calculate OR, aOR, and 95% CI for overweight/obesity prevalence according to religious practice characteristics, again examining frequency of participation in church activities excluding services and frequency of church service attendance in separate models. However, due to the smaller Catholic sample size, sex was the only covariate analyzed in the

**Table 1. Sociodemographic characteristics of African-American Protestant men by frequency of participation in church activities<sup>a</sup>**

Characteristics	≥Once a Week (n=159)	A Few Times/Month-few Times/Year (n=374)	Never (n=391)	<i>P</i> <sup>b</sup>
Overweight/obese, %	82.3	73.6	65.6	.001
Obese, %	38.3	28.6	27.5	.02
Mean BMI, kg/m <sup>2</sup>	29.2	28.4	27.6	.005
Mean age, years	47.6	42.0	42.5	<.001
Married, %	66.7	54.3	47.7	<.001
Current smokers, %	18.4	30.1	38.6	<.001
Mean income-to-needs ratio	3.6	3.3	2.8	.004
Education, %				
0-11 years	18.5	15.3	29.4	<.001
12 years	39.5	36.7	42.9	
13-15 years	27.1	27.8	18.4	
≥16 years	14.9	20.2	9.2	
Region of country, %				
South	62.0	61.1	58.5	.81
Northeast	11.4	15.6	13.4	
Midwest	14.6	14.3	17.4	
West	12.0	9.1	10.6	

<sup>a</sup> All percentages in this table are weighted to adjust for disproportionate sampling and non-response.

<sup>b</sup> The *P* for mean BMI, age, and income-to-needs ratio were calculated using ANOVA, while all other *P* were calculated using the chi-squared test.

multivariate logistic regression model. There were no statistically significant interactions between sex and the religious practice variables in the Catholic multivariate logistic models. Also, for AAP, AAC, and AA without a specific religion, we calculated 95% CI for the mean BMI using the Taylor expansion method and 95% CI for the prevalence of overweight/obesity using Wald confidence limits.

## RESULTS

In our study, 75.8% (95% CI, 71.9%–79.8%) of AAM and 84.3% (95% CI, 81.0%–87.5%) of AAW self-identified as Protestant. AAPM and AAPW who participated in church activities at least weekly were significantly less likely to be current smokers and more likely to be older, married, and have higher income-to-needs ratios (Tables 1, 2).

Among AAPM, a higher prevalence of overweight/obesity was seen in men who participated in church activities most frequently. The prevalence of

overweight/obesity was 82.3% among AAPM who participated in church activities at least weekly. The prevalence of overweight/obesity was 73.6% among AAPM who participated in church activities a few times a year to a few times a month and 65.6% among AAPM who never participated in church activities (Table 1). When compared to AAPM who never participated in church activities, AAPM who participated in church activities at least weekly had significantly greater odds of being overweight/obese (aOR=2.17; 95% CI=1.25, 3.77) after adjusting for age, education, region of country, marital status, smoking, and income-to-needs ratio (Table 3). However, for AAPW, there was no association between overweight/obesity and participation in Protestant church activities (Table 3). Similarly, when compared to AAP (men and women combined) who never attended church services, AAP who attended church services at least weekly did not have significantly different odds of being overweight/obese (aOR=1.12; 95% CI=0.78, 1.60) after adjusting for

**Table 2. Sociodemographic characteristics of African-American Protestant women by frequency of participation in church activities<sup>a</sup>**

Characteristics	≥Once a Week (n=390)	A Few Times/Month–few Times/Year (n=798)	Never (n=577)	P <sup>b</sup>
Overweight/obese, %	71.6	73.2	71.1	.70
Obese, %	45.6	41.3	38.8	.20
Mean BMI, kg/m <sup>2</sup>	30.0	29.5	29.4	.32
Mean age, years	46.9	43.1	41.8	<.001
Married, %	42.2	37.4	30.5	.002
Current smokers, %	10.6	24.3	31.2	<.001
Mean income-to-needs ratio	2.6	2.5	1.9	<.001
Education, %				
0–11 years	17.2	24.3	32.7	<.001
12 years	37.7	33.1	38.0	
13–15 years	29.6	26.4	21.8	
≥16 years	15.5	16.1	7.6	
Region of country, %				
South	63.4	57.7	54.2	.39
Northeast	12.5	16.3	15.9	
Midwest	17.6	17.6	18.8	
West	6.5	8.4	11.1	

<sup>a</sup> All percentages in this table are weighted to adjust for disproportionate sampling and non-response.

<sup>b</sup> The P for mean BMI, age, and income-to-needs ratio were calculated using ANOVA, while all other P were calculated using the chi-squared test.

age, sex, education, region of country, marital status, smoking, and income-to-needs ratio (results not shown).

In post-hoc analyses, we found that for the AAC sample, neither frequency of church activity participation nor frequency of church service attendance impacted the crude odds ratios or sex-adjusted odds ratios for overweight/obesity (results not shown). In post-hoc analyses, we also found that the overweight/obesity prevalence and mean BMI estimates were higher for AAP compared to AAC and AA without a specific religion, though 95% CIs overlapped (Table 4).

## DISCUSSION

We found that AAPM who participated in church activities at least once a week were more likely to be overweight/obese than AAPM who never participated in church activities. In contrast, for AAPW, frequency of church activity participation did not significantly change the odds of overweight/obesity. Moreover, there was no statistically significant relationship between frequency of church service attendance and overweight/obesity for AAP (men and women combined) or AAC, con-

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sistent with the Gillum study.<sup>8</sup> Also, there was no statistically significant relationship between frequency of church activity participation and overweight/obesity for AAC.

There are several possibilities that might explain the relationship between church activity participation and overweight/obesity for AAPM. Participation in church activities could be associated with a range of relatively unhealthy food or activity patterns inside and/or outside of the church setting. Furthermore, diet and activity patterns are likely influenced by cultural practices that are not easily captured by adjusting for common demographic variables, and participating in church activities may simply serve as a marker for this broader and subtler set of cultural practices. Future studies should explore possible explanations for the link between participation in church activities and overweight/obesity among AAPM. Studies that provide additional specific information

**Table 3. Association of church activity participation with overweight/obesity among African-American Protestant men and women using bivariate and multivariate logistic regression analysis**

	Participation in Church Activities	Crude Odds Ratio (95% CI)	Adjusted Odds Ratio <sup>a</sup> (95% CI)
Men	≥once a week	2.44 (1.47, 4.04)	2.17 (1.25, 3.77)
	A few times/month–few times/year	1.46 (.99, 2.14)	1.38 (.93, 2.05)
	Never <sup>b</sup>	Reference	Reference
Women	≥once a week	1.03 (.74, 1.42)	.92 (.64, 1.31)
	A few times/month–few times/year	1.12 (.84, 1.49)	1.14 (.85, 1.53)
	Never <sup>b</sup>	Reference	Reference

<sup>a</sup> To calculate adjusted odds ratios, each model was adjusted for age, marital status, smoking, income-to-needs ratio, education, and region of country.

<sup>b</sup> Persons who attended church service less than once a year were counted as persons who never participated in church activities.

**Table 4. Prevalence of overweight/obesity and mean BMI in African Americans by sex and religion<sup>a</sup>**

	Protestant <i>n</i> =924 Men, 1,765 Women	Catholic <i>n</i> =75 Men, 115 Women	No specific religion <sup>b</sup> <i>n</i> =158 Men, 160 Women
Overweight/obese, % (95% CI)			
Both sexes	71.9 (70.0–73.9)	62.3 (53.3–71.4)	61.0 (53.7–68.4)
Men	71.6 (68.3–75.0)	63.1 (52.1–74.1)	63.4 (53.5–73.2)
Women	72.2 (70.0–74.4)	61.7 (48.1–75.3)	57.5 (47.7–67.4)
BMI kg/m <sup>2</sup> , mean (95% CI)			
Both sexes	29.0 (28.7–29.2)	28.0 (27.0–29.0)	27.3 (26.6–27.9)
Men	28.2 (27.8–28.6)	27.6 (26.6–28.7)	27.2 (26.2–28.1)
Women	29.5 (29.2–29.9)	28.3 (26.8–29.8)	27.5 (26.4–28.5)

<sup>a</sup> All percentages and means in this figure are weighted to adjust for disproportionate sampling and non-response. The estimates are not adjusted for age, marital status, smoking, income-to-needs ratio, education, or region of country.

<sup>b</sup> The no specific religion category included those who reported they had no religious preference, had no religion, or were agnostic or atheist.

on physical activity, dietary intake, and the nature of the church activity as covariates would be useful in parsing out the individual relationships between religious practices and overweight/obesity and for targeting interventions. Such studies would also assist in explaining why church activity participation is associated with overweight/obesity for AAPM, while church service attendance is not.

Among AAPW, there was no significant relationship between overweight/obesity and frequency of participation in church activities. Other studies have also identified links between behaviors affecting weight and religion that exist for men but not for women and vice-versa.<sup>7</sup> In fact, there may be protective factors against obesity that religious behaviors confer upon women. One study found that college women who were more spiritual had lower rates of emotional eating.<sup>44</sup> Another study reported that women who attended church weekly were more likely to be physically active, while this link was not observed in men.<sup>45</sup> Also, one study found that women with a greater religious commitment were more likely to underestimate their weight, a bias that may have contributed to our finding an association between church activity participation and overweight/obesity for AAPM but not for AAPW.<sup>46</sup>

Like religious behaviors, other socio-demographic factors have been shown

to have different effects on weight for AAM compared to AAW. For instance, a study using data from the National Health and Nutrition Examination Survey found a positive association between income and obesity among AAM but not among AAW.<sup>47</sup> In general, AAW have a higher prevalence of overweight and obesity compared with AAM.<sup>1</sup> Many have suggested that cultural factors contribute to the higher overweight and obesity rate in AAW.<sup>48</sup> It is important to keep in mind that there may be a relationship between weight and participation in church activities in AAPW, which a study with a larger sample size and power may detect. Although statistically insignificant, we found that the mean BMI and prevalence of obesity (BMI  $\geq$ 30) were higher in AAPW who participated in church activities most often compared with other AAPW.

To our knowledge, this is the first study to examine the relationship between participation in church activities and overweight/obesity in African American Protestants. Our study's strengths include the use of a large, nationally representative sample and the ability to differentiate between African Americans and Caribbean Blacks in the United States. Another strength of our study was our analysis of religious behavior beyond how frequently one attends religious services. Our study was

limited by the absence of population density data. For children, population density has been positively associated with obesity,<sup>49</sup> however, for adults the effects of population density on obesity are ambiguous.<sup>50</sup> Furthermore, our study is cross-sectional; thus, we cannot determine the directionality of the associations. Finally, in post-hoc analysis we found that AAP had a higher overweight/obesity prevalence and mean BMI compared to AA without a specific religion. However, due to limited sample size, we were unable to adjust for sociodemographic factors for this analysis, which may have accounted for the differences between the religious groups.

The relationship between religion and weight is complex. Still, many programs aimed at increasing physical activity and improving nutrition have successfully used spiritual messages to make the program content culturally relevant.<sup>21,22,25,27–31,51</sup> Three African American church-based programs (Body and Soul, Eat for Life, North Carolina Black Churches United for Better Health Project) successfully increased fruit and vegetable consumption at follow-up periods ranging from 6 months to 2 years.<sup>25,27,31</sup> These programs used pastoral involvement, kick-off events, health fairs, peer counseling, educational pamphlets, cookbooks, and church-wide food policy changes to increase fruit and

vegetable consumption. Even more revealing is a study that looked at 16 Black churches in Atlanta and found that culturally-targeted physical activity and nutrition materials increased physical activity and fruit and vegetable consumption more than standard intervention materials of the same quantity.<sup>51</sup> The culturally-targeted materials included videos and audio cassettes that featured African Americans and contained Biblical themes and gospel music, as well as a cookbook of healthy recipes submitted by members of the participating church. The greater success of the culturally-targeted materials suggests that African American church congregants share cultural beliefs or motivations that can make overweight/obesity interventions more effective. Additionally, given that one's weight is affected by social networks,<sup>52</sup> social ties within a church may amplify the impact of church-based weight loss interventions. Finally, the finding of a higher prevalence of overweight/obesity in AAPM participating in church activities at least weekly compared with other AAPM could help to increase obesity awareness and target obesity interventions in church settings.

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