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SHORT COMMUNICATION

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Impact of diet adherence on weight and lipids among African American participants randomized to vegan or omnivorous diets

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Abstract

Objective: Prior research has found that plant-based diets (PBDs) are rated as acceptable and have similar levels of adherence as compared to other therapeutic dietary approaches; however, previous studies were mostly among white populations. Plant-based diets can produce clinically meaningful weight loss, but outcomes may vary by level of adherence. The goal of this study was to examine the differences in weight and lipids among participants in the Nutritious Eating with Soul study based on adherence to their diet assignment.

Methods: African American adults (n = 159; 79% female) with overweight or obesity (mean BMI 36.9 ± 6.9 kg/m^2) were recruited to participate in a 24-month intervention. Participants were randomized to a plant-based vegan (n = 77) or a low-fat omnivorous (n = 82) diet, both emphasizing soul food cuisine. Participants attended nutrition classes and had dietary intake/adherence (three 24-h recalls; adherence score 1–5), body weight, lipids, and other secondary outcomes assessed at baseline, 6-, 12-, and 24 months. Participants who met at least half of the adherence criteria (≥2.5 out of 5) were categorized as adherents.

Results: At 24 months, adherent vegans lost 5% of their body weight, non-adherent vegans lost −0.005%, adherent omnivores lost −0.03%, and non-adherent omnivores lost −0.02%. Adherent vegans lost more weight (kg) than all other participants at both 6- (−3.32 ± 0.92 (−5.14, −1.49), $p < 0.001$) and 24 months (−3.27 ± 1.49 (−6.23, −0.31), $p = 0.03$). Adherent vegans also lost more weight than less adherent vegans (−3.74 ± 1.05 (−5.82, −1.65)), adherent omnivores (−4.00 ± 1.27 (−6.51, −1.48)), and less adherent omnivores (−2.22 ± 0.98 (−4.15, −0.28)) at 6 months and lost more weight than less adherent vegans at 24 months (−4.96 ± 1.8 (−8.54, −1.37)) (all $p < 0.05$). Adherent vegans had greater improvements in cholesterol-to-HDL ratio at 24 months (−0.47 ± 0.22 (−0.92, −0.03), $p = 0.04$) and greater decreases in insulin (−4.57 ± 2.16 (−8.85, −0.29), $p = 0.04$) at 6 months than all other participants combined.

Conclusions: The study points to the benefit of the use of a PBD for reducing weight, lipids, and insulin in African American adults, but also highlights the importance of supporting adherence to the PBD.

Clinical Trials.Gov ID: Nutritious Eating With Soul (The NEW Soul Study); NCT03354377.

KEYWORDS
African Americans, dietary adherence, lipid lowering, vegan diets, weight loss

1 | INTRODUCTION

Plant-based diets (PBDs), like vegan and vegetarian diets, are a potential tool for reducing weight and improving lipid profiles.[1,2] PBDs are not widely used in clinical practice, however, potentially due to perceptions that patients will find the diets unacceptable or have difficulty with adherence.[3,4] Prior research has found that PBDs are rated as acceptable and have similar adherence compared to other therapeutic diets,[5–7] but most previous studies were among predominantly white populations.

Finding dietary approaches that can prevent cardiovascular disease through reduction of risk factors, such as being overweight and obesity, is important since heart disease is the leading cause of death in the United States.[8] Heart disease deaths[9] and obesity rates[10] are higher among non-Hispanic Black adults as compared to white adults, and these disparities are projected to increase through the year 2060.[11] Therefore, there is an urgent need to find therapeutic diets that are effective in weight and lipid lowering among African American adults. While previous studies have demonstrated that plant-based dietary interventions can produce long-term weight loss[12] and reduce cardiovascular disease risk factors,[13] very few of these studies have included an all African American population. In addition, many of these studies did not account for adherence to the intervention. There has been a call for behavioral medicine scientists to examine health outcomes in the context of behavioral adherence.[14] If dietary adherence leads to positive health outcomes, then research efforts can be focused on finding ways to support adoption and adherence to healthy diets.

The Nutritious Eating with Soul (NEW Soul) study was a 24-month randomized controlled trial comparing a low-fat, PBD to a low-fat omnivorous diet among African American adults at risk for cardiovascular disease.[15] While the primary analysis did not find any difference in outcomes between groups, that analysis did not consider dietary adherence.[16] The goal of the present study was to examine differences among adherent and less adherent participants randomized to either vegan PBD or omnivorous diet. This study hypothesized that adherent vegan participants would have greater improvements in outcomes compared to less adherent vegans, adherent omnivores, and less adherent omnivores (combined or pairwise) and that adherent omnivores would have greater improvements in outcomes than less adherent omnivores.

2 | METHODS

All study methods, including eligibility,[15] recruitment,[17] and main outcomes,[16] have been described elsewhere. Briefly, participants were randomized to follow either a plant-based vegan or omnivorous diet (following Therapeutic Lifestyle Changes recommendations[18]), both of which emphasized soul food[19] but did not restrict energy intake, and attend nutrition classes. The study was conducted in two cohorts.[16]

Measures are also described in detail elsewhere.[15,16] At baseline, 6, 12, and 24 months, dietary intake (three unannounced 24-h dietary recalls including one weekend day),[20] body weight (digital scale), lipids, glucose, insulin, and blood pressure were collected. Waist and hip circumference were collected at baseline and 6 months and body composition (DXA scan) was collected at baseline and 12 months.[16]

Dietary adherence scoring has been described elsewhere.[21] An average of the dietary recalls was used to create a score from 0 to 5 based on dietary assignment. Omnivorous participants received one point for meeting daily recommendations for eggs (≤0.3 servings/d), seafood (≥0.3 servings/d), poultry (≤3 oz/d), red meat (≤2 oz/d), and dairy (≥2 servings/d). Vegan participants received a point for each of the same food groups if they were not consumed. The scores ranged from 0 (less adherent) to 5 (adherent). To maintain adequate sample size, the score was dichotomized into adherent (≥2.5 corresponding to more adherent to the diet) or less adherent (<2.5 corresponding to those less adherent to the diet). Participants with missing dietary data were considered less adherent (missing dietary data was 4% at 3 months, 16% at 6 months, 27% at 12 months, and 37% at 24 months). The study was approved by the University of South Carolina Institutional Review Board and all participants provided written consent before beginning the study.

2.1 | Statistical methods

Changes from baseline to 6, 12, and 24 months in the main (weight and lipids) and secondary outcomes (energy intake, body composition, glucose, insulin, and blood pressure) were compared by dietary adherence. The study utilized an ANCOVA model to test differences in changes in outcomes among adherent vegans against the other three groups combined and then against each of the three other groups. A model was specified with a change of outcome as a function

of the initial value of outcome, dietary group (i.e., adherent vegan, less adherent vegan, adherent omni, and less adherent omni) and covariates (employment, education, food security status, sex, age). Lipid outcomes were adjusted for changes in lipid-lowering medications, and blood pressure outcomes were adjusted for hypertensive medications. After controlling for these variables, differences in means were compared using *t*-tests. To see if any of the overall differences among the four groups depended on the baseline value of the outcome, the study added the interaction term of group by baseline values of the outcome. Using statistical analysis system (SAS) 9.4 (SAS Institute), descriptive statistics examined baseline characteristics of study participants, with differences assessed through chi-squared or *t*-tests. The Procedure General linear model procedure analyzed ANCOVA models.

3 | RESULTS

The CONSORT diagram for NEW Soul has been published elsewhere, along with all main outcomes and baseline values.[16] The percentage of participants who were classified as adherent at each time point was similar between groups and was never greater than half of participants (n = 159 total participants; Table 1). There were few differences in baseline demographics and values for each outcome, with adherent vegan participants being older and having higher total cholesterol at baseline than less adherent vegans, and more adherent omnivores were employed for wages than less adherent omnivores (Table 2).

Main outcomes are presented as adjusted mean difference between groups ± SE (95% confidence interval), *p*-value (Table 3). Adherent vegans lost more weight (kg) than all other participants at both 6- (−3.32 ± 0.92 (−5.14, −1.49), $p < 0.001$) and 24 months (−3.27 ± 1.49 (−6.23, −0.31), $p = 0.03$). Adherent vegans also lost more weight than less adherent vegans (−3.74 ± 1.05 (−5.82, −1.65)), adherent omnivores (−4.00 ± 1.27 (−6.51, −1.48)), and less adherent omnivores (−2.22 ± 0.98 (−4.15, −0.28)) at 6 months and lost more weight than less adherent vegans at 24 months (−4.96 ± 1.8 (−8.54, −1.37)) (all $p < 0.05$). Adherent vegans had greater improvements in cholesterol-to-HDL ratio at 24 months (−0.47 ± 0.22 (−0.92, −0.03), $p = 0.04$) compared to all other participants. Other findings are presented in Table S1. Among adherent vegans at 6 months, there were greater decreases in insulin than all other participants combined (−4.57 ± 2.16 μIU/L (−8.85, −0.29), $p = 0.04$) and as compared to less adherent vegans (−6.02 ± 2.43 (−10.85, −1.20), $p = 0.01$). In addition, there were differences in energy intake at 24 months with adherent vegans (−342.07 ± 136.54 kcals (−613.46, −70.68) $p = 0.01$) and adherent omnivores (−386.44 ± 141.71 (−668.1, −104.77) $p = 0.01$) consuming fewer kcals than less adherent omnivores. The models for none of these outcomes had evidence of an interaction (all $p > 0.05$ for *F*-test) when a group-by-baseline-value term was included.

4 | DISCUSSION

This is one of the first studies to examine adherence to PBDs and weight and lipids among African American adults in a long-term 24-month study. Overall, weight, lipid, and insulin results went in the hypothesized direction, with no differences found for other outcomes.

Adherent vegan participants lost more weight than all other participants combined at both 6- and 24 months. The −4.96 kg greater weight loss among adherent vegan participants compared to less adherent vegans was similar to what was found in a meta-analysis examining weight loss in PBD interventions among study completers (−4.6 kg)[22] and is higher than meta-analyses not accounting for adherence levels with weight losses ranging from −2.52[23] to −3.4[22] to −4.1 kg.[24] The main outcomes of the NEW Soul study, which did not report outcomes by adherence, found no differences in weight loss between groups, and weight loss was lower than what was found in the meta-analysis (e.g., −2.46 kg overall in the vegan group).[16] The present study allows for an examination of how dietary adherence impacts outcomes. Adherent vegans saw greater improvements in the cholesterol-to-HDL ratio at the end of the study as compared to other groups. Other studies have demonstrated the lipid lowering effects of adopting a PBD with greater decreases in total[24] and low-density lipoprotein cholesterol[24,25] among those following a PBD.

Among other outcomes, there was only an improvement seen in insulin among adherent vegans at 6 months, but not other outcomes, such as blood pressure. Other studies have found improvements in glycemic control among participants randomized to vegan diets,[24] but meta-analyses on blood pressure changes during adoption of vegan diets have been mixed, with some finding a reduction in blood pressure[22] and others not finding a relationship.[26,27]

Several factors go into supporting dietary adherence in behavioral weight loss and nutrition interventions, including social and

TABLE 1 Percentage of participants in the NEW Soul study that were adherent to their diet at each timepoint.

	Vegan (N = 77)[a]				Omnivorous (N = 82)[a]				
	Adherent		Less adherent		Adherent		Less adherent		Chi-square
	N	%	*N*	%	*N*	%	*N*	%	*p*-value
6 months	27	35.1	50	64.9	21	25.6	61	74.4	0.194
12 months	28	36.4	49	63.6	22	26.8	60	73.2	0.196
24 months	22	28.6	55	71.4	20	24.4	62	75.6	0.550

[a]Among participants with dietary data at 12 months.

TABLE 2 Baseline demographics and laboratory outcomes of NEW Soul participants by adherence status at 12 months.

	Vegan (*N* = 77)			Omnivorous (*N* = 82)		
Variable	Adherent (*N* = 28) *N* (%)	Less adherent (*N* = 49) *N* (%)	*p*-value (difference between adherent and less adherent vegans)[a]	Adherent (*N* = 22) *N* (%)	Less adherent (*N* = 60) *N* (%)	*p*-value (difference between adherent and less adherent omnivores)[a]
Sex			0.20			0.34
Female	20 (71)	41 (84)		19 (86)	46 (77)	
Male	8 (29)	8 (16)		3 (14)	14 (23)	
Education			0.29			0.07
High school or equivalent or some college	10 (36)	11 (22)		2 (9)	18 (30)	
College graduate	11 (39)	18 (37)		6 (27)	19 (32)	
Advanced degree	7 (25)	20 (41)		14 (64)	23 (38)	
Occupation			0.10			**0.04**
Employed for wages	17 (61)	37 (76)		22 (100)	42 (70)	
Self-employed	5 (18)	6 (12)		0 (0)	8 (13)	
Retired	6 (21)	3 (6)		0 (0)	5 (8)	
Other[b]	0 (0)	3 (6)		0 (0)	5 (8)	
Marital status			0.48			0.13
Single	5 (18)	14 (29)		11 (50)	14 (23)	
Married	17 (61)	22 (45)		8 (36)	30 (50)	
Divorced or separated	5 (18)	8 (16)		2 (9)	12 (20)	
Widowed	1 (4)	2 (4)		1 (5)	1 (2)	
Partnered/living with someone	0 (0)	3 (6)		0 (0)	3 (5)	
Food security			0.86			0.08
Food secure	23 (82)	41 (84)		17 (77)	55 (92)	
Food insecure	5 (18)	8 (16)		5 (2)	5 (8)	
Number of participants on lipid medications	5 (18)	4 (8)	0.20	1 (5)	8 (13)	0.26
Number of participants on hypertension medications	11 (39)	14 (29)	0.33	6 (27)	25 (42)	0.23
Number of participants on glucose medications	0 (0)	0 (0)	N/A	0 (0)	0 (0)	N/A

	Vegan (*N* = 77)			Omnivorous (*N* = 82)		
Variable	Adherent (*N* = 28) Mean ± SD	Less adherent (*N* = 49) Mean ± SD	*p*-value (difference between adherent and less adherent vegans)[a]	Adherent (*N* = 22) Mean ± SD	Less adherent (*N* = 60) Mean ± SD	*p*-value (difference between adherent and less adherent omnivores)[a]
Age, mean (SD)	53.1 ± 7.4	46.8 ± 11.4	**0.01**	48.2 ± 11.8	47.3 ± 10.3	0.76
Body mass index, mean (SD)[b]	35.9 ± 6.0	37.7 ± 6.5	0.22	36 ± 6.7	37.1 ± 7.8	0.54
Energy intake, mean (SD), kcal/d	1842 ± 637.2	1947.7 ± 656.1	0.49	2033.8 ± 555.1	1987.6 ± 718.6	0.76

TABLE 2 (Continued)

Variable	Vegan (N = 77)			Omnivorous (N = 82)		
	Adherent (N = 28) Mean ± SD	Less adherent (N = 49) Mean ± SD	p-value (difference between adherent and less adherent vegans)[a]	Adherent (N = 22) Mean ± SD	Less adherent (N = 60) Mean ± SD	p-value (difference between adherent and less adherent omnivores)[a]
Body weight, mean (SD), kg/m^2	101.5 ± 20.5	103.7 ± 18.1	0.63	103.1 ± 24.9	102.8 ± 22.8	0.95
Total percentage body fat, mean (SD), total tissue percentage fat	45.0 ± 6.8	45.2 ± 6.7	0.91	43.1 ± 7.1	44.5 ± 8.5	0.46
Total lean mass, mean (SD), kg	54 ± 11.5	54.7 ± 8.1	0.78	56 ± 10.4	54.6 ± 12.1	0.61
Waist circumference, mean (SD), cm	105.6 ± 17.3	107 ± 14.2	0.73	105.9 ± 16.4	107.7 ± 17.3	0.66
Hip circumference, mean (SD), cm	121.5 ± 12.6	123.1 ± 12.5	0.60	121.3 ± 15.1	123.1 ± 19	0.65
Total cholesterol, mean (SD), mg/dL	194.2 ± 36.2	175 ± 30.0	**0.02**	176.6 ± 30.1	172.8 ± 30.6	0.63
Cholesterol-to-HDL ratio, mean (SD)	3.7 ± 1.1	3.4 ± 0.7	0.26	3.9 ± 0.9	3.6 ± 0.7	0.21
HDL cholesterol, mean (SD), mg/dL	55.8 ± 13.1	52.6 ± 11.4	0.30	46.8 ± 8.1	49.7 ± 11	0.22
LDL cholesterol, mean (SD), mg/dL	117.6 ± 38	106.3 ± 25.1	0.17	111.3 ± 24.3	107.1 ± 25.7	0.51
Triglycerides, mean (SD), mg/dL	85.6 ± 32.8	83.4 ± 27.4	0.77	92.5 ± 56.3	80.3 ± 23.3	0.35
VLDL cholesterol, mean (SD), mg/dL	17.1 ± 6.5	16.6 ± 5.5	0.74	18.4 ± 11.3	16 ± 4.7	0.35
Glucose, mean (SD), mg/dL	72.4 ± 24.7	69.3 ± 27	0.62	74.9 ± 32.5	71.9 ± 25.1	0.70
Insulin, mean (SD), μIU/L	9.9 ± 8.3	12.6 ± 7.1	0.17	15.4 ± 10.4	12.8 ± 9.9	0.32
Blood pressure, mean (SD), mm Hg						
Systolic	132.8 ± 17.3	132.5 ± 18.4	0.93	138 ± 19.6	131.1 ± 15	0.14
Diastolic	82.4 ± 9.9	82.1 ± 10	0.89	84.1 ± 8.9	82.7 ± 9.6	0.53

[a]*p*-value for categorical variables was calculated from chi-square and for continuous variables, *t*-tests were used.
[b]Other for employment includes being unable to work or out of work or being a student or homemaker.

cultural contexts and behavioral skills,[28] all of which were addressed in the NEW Soul study.[15,29] Participants in the NEW Soul study cited numerous factors that helped promote self-efficacy around adopting the diets, including having African American discussion facilitators, social support from group members, accountability from study staff, and respecting traditional foods.[29]

The study has several strengths, including assessing diet adherence via multiple 24-h dietary recalls over 24 months and objective measures of cardiovascular risk factors among African American adults. There are also limitations. Adherent participants were older and employed, which limits the generalizability of the findings. Adherence scores did not consider dietary quality or intake of fruits and vegetables. In addition, to retain adequate sample size, the study used a score cut point that more closely represented being at least 50% adherent versus 100% adherent (e.g., score of 2.5 out of five possible considered adherent).

5 | CONCLUSIONS

The 24-month NEW Soul study found that adherent vegan participants lost more weight than other participants at both 6- and 24 months. In addition, adherent vegan participants showed greater improvements in cholesterol-to-HDL ratio and insulin. This study

TABLE 3 Mean differences between groups in changes in main outcomes (weight, lipids) by adherent and less adherent participants randomized to the vegan ($n = 77$) or omnivorous ($n = 82$) diets in NEW Soul presented as adjusted means ± standard error (Confidence Intervals) p-values[a].

Outcome	Adherent vegan versus all other participants	Adherent vegan versus less adherent vegan	Adherent vegan versus Adherent omni	Adherent vegan versus less adherent omni	Adherent omni versus less adherent omni
Change in weight, kg					
6-month	−3.32 ± 0.92 (−5.14, −1.49) **$p = 0.0005$**	−3.74 ± 1.05 (−5.82, −1.65) **$p = 0.0006$**	−4.00 ± 1.27 (−6.51, −1.48) **$p = 0.0021$**	−2.22 ± 0.98 (−4.15, −0.28) **$p = 0.02$**	1.78 ± 1.12 (−0.44, 4) $p = 0.12$
12-month	−1.74 ± 1.39 (−4.5, 1.02) $p = 0.21$	−2.64 ± 1.62 (−5.85, 0.58) $p = 0.11$	−0.6 ± 1.84 (−4.25, 3.05) $p = 0.75$	−1.99 ± 1.49 (−4.94, 0.96) $p = 0.18$	−1.39 ± 1.61 (−4.57, 1.79) $p = 0.39$
24-month	−3.27 ± 1.49 (−6.23, −0.31) **$p = 0.03$**	−4.96 ± 1.8 (−8.54, −1.37) **$p = 0.01$**	−2.01 ± 1.94 (−5.87, 1.86) $p = 0.30$	−2.84 ± 1.66 (−6.14, 0.46) $p = 0.09$	−0.83 ± 1.76 (−4.33, 2.66) $p = 0.64$
Change in total cholesterol, mg/dL					
6-month	−7.8 ± 5.67 (−19.05, 3.45) $p = 0.17$	−4.43 ± 6.61 (−17.56, 8.69) $p = 0.50$	−13.39 ± 8.12 (−29.51, 2.73) $p = 0.10$	−5.57 ± 6.1 (−17.68, 6.54) $p = 0.36$	7.82 ± 7.43 (−6.93, 22.56) $p = 0.30$
12-month	−4.63 ± 9.27 (−23.11, 13.85) $p = 0.62$	−10.38 ± 10.87 (−32.05, 11.3) $p = 0.34$	−3.71 ± 12.35 (−28.34, 20.93) $p = 0.76$	0.19 ± 10.3 (−20.36, 20.73) $p = 0.99$	3.9 ± 11.34 (−18.73, 26.52) $p = 0.73$
24-month	−10.07 ± 9.66 (−29.52, 9.38) $p = 0.30$	−15.81 ± 12.1 (−40.17, 8.55) $p = 0.20$	−15.77 ± 12.38 (−40.69, 9.15) $p = 0.21$	1.37 ± 12.45 (−23.69, 26.44) $p = 0.91$	17.14 ± 13.22 (−9.47, 43.75) $p = 0.20$
Change in cholesterol-to-HDL ratio					
6-month	−0.12 ± 0.14 (−0.39, 0.16) $p = 0.40$	0 ± 0.16 (−0.32, 0.32) $p = 0.99$	−0.33 ± 0.19 (−0.71, 0.05) $p = 0.09$	−0.02 ± 0.15 (−0.32, 0.28) $p = 0.89$	0.31 ± 0.18 (−0.05, 0.66) $p = 0.09$
12-month	−0.23 ± 0.17 (−0.58, 0.12) $p = 0.20$	−0.29 ± 0.21 (−0.7, 0.12) $p = 0.17$	−0.25 ± 0.23 (−0.71, 0.22) $p = 0.30$	−0.15 ± 0.19 (−0.53, 0.24) $p = 0.46$	0.1 ± 0.22 (−0.33, 0.53) $p = 0.65$
24-month	−0.47 ± 0.22 (−0.92, −0.03) **$p = 0.04$**	−0.5 ± 0.28 (−1.07, 0.07) $p = 0.08$	−0.49 ± 0.29 (−1.06, 0.09) $p = 0.09$	−0.43 ± 0.3 (−1.03, 0.17) $p = 0.16$	0.06 ± 0.32 (−0.58, 0.7) $p = 0.86$
Change in HDL cholesterol, mg/dL					
6-month	−1.05 ± 1.7 (−4.43, 2.34) $p = 0.54$	−0.97 ± 1.93 (−4.81, 2.87) $p = 0.62$	−2.21 ± 2.38 (−6.94, 2.52) $p = 0.36$	0.04 ± 1.85 (−3.63, 3.71) $p = 0.98$	2.25 ± 2.13 (−1.99, 6.49) $p = 0.29$
12-month	−0.69 ± 1.73 (−4.13, 2.75) $p = 0.69$	−1.79 ± 2.05 (−5.89, 2.3) $p = 0.39$	−0.24 ± 2.34 (−4.91, 4.42) $p = 0.92$	−0.03 ± 1.91 (−3.84, 3.78) $p = 0.99$	0.21 ± 2.18 (−4.13, 4.55) $p = 0.92$
24-month	1.35 ± 2.15 (−2.98, 5.68) $p = 0.53$	0.95 ± 2.6 (−4.28, 6.19) $p = 0.72$	0.82 ± 2.73 (−4.66, 6.31) $p = 0.76$	2.27 ± 2.9 (−3.57, 8.11) $p = 0.44$	1.45 ± 2.91 (−4.4, 7.3) $p = 0.62$
Change in LDL cholesterol, mg/dL					
6-month	−8.04 ± 4.82 (−17.61, 1.54) $p = 0.10$	−3.73 ± 5.66 (−14.96, 7.49) $p = 0.51$	−12.62 ± 6.87 (−26.25, 1.02) $p = 0.07$	−7.76 ± 5.19 (−18.07, 2.55) $p = 0.14$	4.85 ± 6.33 (−7.71, 17.41) $p = 0.45$
12-month	−9.77 ± 6.77 (−23.27, 3.74) $p = 0.15$	−12.51 ± 8 (−28.46, 3.44) $p = 0.12$	−11.61 ± 9.06 (−29.68, 6.46) $p = 0.20$	−5.18 ± 7.48 (−20.1, 9.74) $p = 0.49$	6.43 ± 8.34 (−10.21, 23.07) $p = 0.44$
24-month	−15.96 ± 9.05 (−34.18, 2.26) $p = 0.08$	−20.92 ± 11.43 (−43.94, 2.11) $p = 0.07$	−21.4 ± 11.83 (−45.23, 2.43) $p = 0.08$	−5.56 ± 11.71 (−29.14, 18.02) $p = 0.64$	15.84 ± 12.84 (−10.02, 41.7) $p = 0.22$
Change in triglycerides, mg/dL					
6-month	6.63 ± 8.64 (−10.53, 23.8) $p = 0.44$	7.71 ± 10.11 (−12.37, 27.78) $p = 0.45$	−0.99 ± 12.21 (−25.24, 23.26) $p = 0.94$	13.19 ± 9.38 (−5.44, 31.81) $p = 0.16$	14.18 ± 11.39 (−8.44, 36.79) $p = 0.22$
12-month	6.14 ± 8.38 (−10.58, 22.86) $p = 0.47$	2.44 ± 10 (−17.52, 22.39) $p = 0.81$	13.64 ± 11.36 (−9.02, 36.29) $p = 0.23$	2.34 ± 9.31 (−16.23, 20.92) $p = 0.80$	−11.29 ± 10.6 (−32.44, 9.85) $p = 0.29$
24-month	−5.45 ± 15.07 (−35.79, 24.89) $p = 0.72$	−8.22 ± 18.85 (−46.15, 29.72) $p = 0.67$	−13.46 ± 19.41 (−52.54, 25.61) $p = 0.49$	5.33 ± 19.82 (−34.56, 45.22) $p = 0.79$	18.79 ± 20.93 (−23.33, 60.92) $p = 0.37$
Change in VLDL cholesterol, mg/dL					
6-month	1.44 ± 1.74 (−2.01, 4.9) $p = 0.41$	1.35 ± 2.04 (−2.7, 5.39) $p = 0.51$	0.69 ± 2.46 (−4.19, 5.57) $p = 0.78$	2.29 ± 1.89 (−1.46, 6.04) $p = 0.23$	1.6 ± 2.29 (−2.95, 6.16) $p = 0.49$

TABLE 3 (Continued)

Outcome	Adherent vegan versus all other participants	Adherent vegan versus less adherent vegan	Adherent vegan versus Adherent omni	Adherent vegan versus less adherent omni	Adherent omni versus less adherent omni
12-month	2.99 ± 1.87 (−0.73, 6.71) $p = 0.11$	2.29 ± 2.23 (−2.15, 6.73) $p = 0.31$	4.54 ± 2.53 (−0.5, 9.58) $p = 0.08$	2.14 ± 2.07 (−1.99, 6.28) $p = 0.30$	−2.4 ± 2.36 (−7.1, 2.31) $p = 0.31$
24-month	−0.58 ± 1.8 (−4.21, 3.06) $p = 0.75$	−1.79 ± 2.37 (−6.57, 2.98) $p = 0.45$	0.93 ± 2.28 (−3.66, 5.53) $p = 0.68$	−0.87 ± 2.34 (−5.58, 3.85) $p = 0.71$	−1.8 ± 2.5 (−6.84, 3.25) $p = 0.48$

[a]All models were adjusted for baseline value of the outcome and baseline socioeconomic status (education and employment), food security status, sex, age, and use of medications that may impact the examined outcome. For lipid outcomes, the use of lipid-lowering medications at the examined time point was included in the model.

highlights the importance of finding ways to facilitate adherence to PBDs for weight loss and lipid and insulin lowering among African American adults.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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