8-7-2018

Determinants of Successful Weight Loss in Low-Income African American Women: A Positive Deviance Analysis.

Elaine Seaton Banerjee
Thomas Jefferson University; Lehigh Valley Health Network

Sharon J. Herring
Temple University

Katelyn Hurley
Thomas Jefferson University; ACT.md

Katherine Puskarz
Thomas Jefferson University

Kyle Yebernetsky
Thomas Jefferson University; Geisinger Health System

Original Research

Determinants of Successful Weight Loss in Low-Income African American Women: A Positive Deviance Analysis

Journal of Primary Care & Community Health
1–6

DOI: 10.1177/2150132718792136
journals.sagepub.com/home/jpc
SAGE

Elaine Seaton Banerjee[1,2], Sharon J. Herring[3], Katelyn Hurley[1,4], Katherine Puskarz[1], Kyle Yebernetsky[1,5], and Marianna LaNoue[1]

Abstract

Objective: We set out to investigate the behaviors of low-income African American women who successfully lost weight. **Methods:** From an urban, academic, family medicine practice, we used a mixed methods positive deviance approach to evaluate 35 low-income African American women who were obese and lost at least 10% of their maximum weight, and maintained this loss for 6 months, comparing them with 36 demographically similar control participants who had not lost weight. Survey outcomes included demographics and behaviors that were hypothesized to be related to successful weight loss. Interviews focused on motivations, barriers, and what made weight loss successful. Survey data were analyzed using *t* tests and linear regression for continuous outcomes and chi-square tests and logistic regression for categorical outcomes. Interviews were analyzed using a modified approach to grounded theory. **Results:** In adjusted analyses, women in the positive deviant group were more likely to be making diet changes compared with those women who did not lose at least 10% of their initial body weight. Major themes from qualitative analyses included (*a*) motivations (of health, appearance, quality of life, family, and epiphanies), (*b*) opportunity (including time and support), (*c*) adaptability. **Conclusions:** The findings of this study may be useful in developing motivational interviewing strategies for primary care providers working with similar high-risk populations.

Keywords

obesity, African American, women, mixed methods, positive deviance, motivational interviewing

Introduction

Low-income African American women have the highest rates of obesity among any subgroup in the United States. In 2011-2014, 56.5% of non-Hispanic black women in the United States had obesity (body mass index [BMI] $\geq$30 kg/m^2), compared with 34.6% of non-Hispanic white women and men.[1] Poverty status is also associated with obesity, particularly among women, with higher rates of obesity in low-income women.[2,3] African American women are also at high risk for obesity-related comorbidities. Compared with Caucasian women, African American women have higher rates of diabetes (12.2% vs 3.3%),[4] hypertension (54.4% vs 38.9%),[5] and cardiovascular disease.[6]

Fortunately, modest weight loss (5%-10% of body weight) improves markers of obesity-related comorbidities.[7,8] However, there are few published studies of successful weight loss strategies used by African American women. The National Weight Control Registry, a large study of people who lost weight, has been used to guide weight loss interventions, but included very few African American or low-income participants.[9] Results from several studies of weight loss interventions indicate that African American women lose less weight than their white counterparts.[10,11] This finding suggests that approaches to successful weight loss in African American women may be different from those used by other populations.

[1]Thomas Jefferson University, Philadelphia, PA, USA
[2]Lehigh Valley Health Network, Allentown, PA, USA
[3]Temple University, Philadelphia, PA, USA
[4]ACT.md, Boston, MA, USA
[5]Geisinger Health System, Danville, PA, USA

Corresponding Author:
Elaine Seaton Banerjee, Department of Family Medicine, Lehigh Valley Health Network, 707 Hamilton Street, 8th Floor, Allentown, PA 18101, USA.
Email: elaine_s.banerjee@lvhn.org

Because of the high risk of obesity and obesity-related illnesses and the indication that African American women may need alternative strategies for successful weight loss, we used a mixed methods, positive deviance framework to investigate the experiences and behaviors of low-income African American women who successfully lost weight in order to identify factors that may promote weight loss.

Methods

Design

Study methods were approved by the Thomas Jefferson University Institutional Review Board. Here we report previously unpublished elements of a larger evaluation.[12] Concurrent nested mixed methods were used with a positive deviance framework, a method of addressing complex problems by learning from top performers among a high-risk population to identify characteristics that result in better outcomes.[13]

Sample

We used the electronic medical record (EMR) of an urban university–based family medicine practice to identify potential participants. The following were the inclusion criteria: age 18 to 64 years, African American race, female sex, Medicaid recipient (income proxy), Philadelphia resident, and BMI $\geqslant$30 kg/m^2 at one point between 2007 and 2012 (from initiation of the EMR to the study onset). Exclusion criteria included the folowing: psychotic disorder, intellectual disability, or inability to give consent in English. Positive deviant cases were identified as those who intentionally lost at least 10% of their maximum weight (not due to bariatric surgery, a medical problem, or childbirth) and maintained this loss for at least 6 months. Participants who had not lost at least 5% of their maximum weight were categorized as controls. Of the 161 EMR-identified positive deviant cases identified, 35 agreed to participate. Those who participated in the survey were significantly older than those who did not (44.9 vs 37.3 years, $P < .001$). Thirty-six controls matched for age and maximum BMI (with one duplicate control) also agreed to participate. All participants completed a written informed consent and received modest compensation for their time and travel.

Measures

Using questionnaires, we collected demographic variables and outcome variables, which included social and emotional support using a single Likert-type scale question adapted from the Behavioral Risk Factor Surveillance System,[14] food security using the short form of the household food security scale,[15] the proportion of meals prepared at home, who prepares meals, current changes to diet, number of times participants reported lost weight, age at which they became overweight, whether or not parents were overweight, physical activity, and nutritional literacy using the Nutritional Literacy Scale.[16]

We conducted in-depth interviews with positive deviant group members to identify themes associated with successful weight loss. The 30-minute interviews were conducted in person in the Family Medicine office by a member of the research team following a semistructured interview guide. All interviews were audio recorded and transcribed. We conducted interviews until we reached thematic saturation, for a total of 20 interviews.

Analysis

Our quantitative analyses focused on detecting differences between positive deviant cases and controls using Student's *t* tests for continuous variables and chi-square analyses for categorical variables. Linear and logistic regression analyses followed to adjust for demographic differences. Quantitative data were stored and analyzed using SPSS statistics software, version 19 (IBM SPSS Statistics for Windows, IBM Corp, Armonk, NY). The questionnaire sample size provided 60% power to identify a 20% difference in behaviors or traits that may contribute to weight loss with a 2-tailed alpha of .10, chosen a priori because of the small sample size and the exploratory nature of the study.

We used a modified grounded theory approach to analyze our qualitative data, first developing a coding framework through simultaneous open coding.[17] The coding panel included 4 members of the research team (ESB, KEH, KY, ML). When the framework was finalized, we then recoded all 20 interviews independently and met to discuss. When coding decisions were not unanimous, we used discussion to reach consensus. Data were stored and analyzed using NVivo qualitative data analysis software, version 10 (QSR International Pty Ltd, Melbourne, Victoria, Australia).

Results

Quantitative Results

Women in the positive deviant group lost an average of 19 kg (19% of maximum weight) (range 10-49 kg) and maintained a 17 kg weight loss (range 8-40 kg). Women in the positive deviant group were less likely to have completed high school or be currently employed than controls (Table 1). After adjustment for demographic differences, women in the positive deviant group were more likely to report they were currently making diet changes than were controls. There were no differences between groups in regard to specific diet change, activity level, food security, or nutritional literacy (Table 2).

Table 1. Electroic Medical Record and Survey Demographics.[a]

Variable	Control (n = 36)	Case (n = 35)	*P*
Sex			N/A
Female	36 (100)	35 (100)	
Age (years) at study onset[b]	43.0 (11.6)	44.9 (10.4)	.48
Self-identified race			.31
African American	34 (94)	35 (100)	
Ethnicity			N/A
Non-Hispanic	36 (100)	35 (100)	
Marital status			.10
Single, divorced, widowed	29 (85)	24 (69)	
Married or living with partner	5 (15)	11 (31)	
Education			.03[c]
Did not complete high school	3 (8)	12 (34)	
High school graduate or GED	17 (46)	11 (31)	
Some college or beyond	16 (44)	12 (34)	
Employment			.01[c]
Currently employed	24 (67)	12 (34)	
Not currently employed	12 (33)	23 (66)	
Housing type			.95
Own home	7 (19)	7 (20)	
Renting home	26 (72)	26 (74)	
Other arrangement	3 (8)	2 (6)	
Length of time (years) at current residence[b]	8.8 (8.4)	9.2 (11.1)	.87
No. of people living in household[b]	3.3 (1.5)	4.2 (2.9)	.11
Household income (US$)[b]	24 848 (27 406)	26 613 (28 394)	.82
Federal poverty level (%)	122 (123)	110 (92)	.71

Abbreiation: N/A, not applicable.
[a] Data for all variables are reported as n (%), except where noted.
[b] Data for these variables are reported as mean (SD).
[c] Statistically significant at $P < .10$.

Qualitative Results

From the qualitative data, four major themes arose regarding factors that promoted successful weight loss: motivation, opportunity, flexibility, and creativity. We describe supporting data for each theme below.

Motivation. Participants discussed the importance of continued motivation to make weight loss successful. Common motivations were related to health, appearance, quality of life, family, and self-determined epiphanies.

Many participants reported health-related motivations to lose weight, most frequently focused on receiving a weight-related medical diagnosis, "It was finding out that I had the diabetes . . . I was in shock when they told me I had diabetes" and "So I had a sleep study done and that's when they found that I had some obstructive sleep apnea. So that encouraged me to lose the weight." Other participants lost weight in an attempt to avoid a diagnosis, "I never want to be that, because I know diabetes runs in my family."

A common appearance-related motivation was about clothing, primarily losing weight to avoid buying larger clothing, "I can't afford to keep buying new clothes after new clothes." Other appearance-related motivations occurred after a participant saw herself in a reflection or a photograph, "Yeah, I took a look at myself . . . and I went, 'Oh my God, look at you girl, you big.'"

Motivation related to quality of life was usually prompted by experiencing limitations in activities or physical discomforts due to excess weight, "My legs used to rub when I used to walk. I didn't like that." and, "With my body, if I go over 200 pounds, my back starts to hurt."

Many participants also discussed that they changed their own eating habits to act as healthier role models for their children, "It was my kids. Because, um, they was overweight too and I couldn't help them unless I helped myself." and "I can't tell [my children] to eat healthy and then I'm not doing it. So I just wanted to do it, just try to, try to eat healthier."

In addition, many participants reported an epiphany-type realization that they needed to make a change. They reported self-realizations such as, "It was something I wanted to do . . . Something I knew I had to do." and, "I had to lose the weight, *for me;* couldn't do it for nobody else, I had to do it for me."

Table 2. Survey Outcome Variables.[a]

Variable	Control (n = 36)	Case (n = 35)	Adjusted *P*[b]
Support			.12
Always or usually	14 (39)	20 (57)	
Sometimes, rarely, or never	21(58)	13 (37)	
Food security			.67
Secure	20 (56)	19 (54)	
Insecure without hunger	5 (14)	9 (26)	
Insecure with hunger	10 (28)	6 (17)	
Proportion (%) of meals prepared at home[c]	76 (25)	84 (25)	.91
Person who prepares meals is participant	35 (97)	28 (80)	.11
Currently making any diet changes	22 (61)	30 (86)	.02[d]
Limiting portions	19 (53)	23 (66)	
Limiting certain types of foods	18 (50)	24 (69)	
Counting calories or points	6 (17)	5 (14)	
Using a meal replacement	4 (11)	6 (17)	
No. of times lost 5% maximum weight[c]	2.5 (1.5)	3.3 (3.7)	.61
Age (years) became overweight[c]	31.1 (12.6)	29.1 (12.3)	.44
One or more parents overweight	13 (36)	19 (54)	.12
Regular activity			.59
Generally sedentary	22 (61)	18 (51)	
Generally active	13 (36)	14 (40)	
Minutes per week in moderate activities[c]	453 (939)	315 (329)	.60
Minutes per week in vigorous activities[c]	70 (137)	73 (115)	.58
Nutritional literacy (raw score, out of 28)[c]	22.7 (3.4)	21.4 (4.2)	.87
Adequate nutritional literacy	35 (97)	33 (94)	.97

[a] Data for all variables are reported as n (%), except where noted.
[b] Adjusted for employment status and education level.
[c] Data for these variables are reported as mean (SD).
[d] $P < .10$.

Opportunity. The major factors identified by participants that gave them the opportunity to participate in weight loss behaviors were support and time.

Participants reported that support came in many forms. One form of support included weight loss buddies, "And then what me and my neighbors do, once a week, we get together and we do Tae Bo." Other forms of support included someone who relieved them of other responsibilities. One participant describes her teenage son who took on additional familial responsibilities to allow her the opportunity to exercise, "He'll watch [my younger children] while they playing . . . He told me to keep walking, so that's what I kept doing."

Time facilitated greater opportunity for weight loss, often because many participants reported that their children got older and needed less care, "So, I'm ready to get [my] babies in school and I think I'm going to have more time to myself now." In one dramatic example, a participant described that losing her husband gave her the opportunity to live for herself:

> My husband died . . . And, having time on my hands, what was I gonna do? Stay home, and get fat!? So I went out, to the Y[MCA] . . . Well, having a husband meant that I did dinner every day. I did breakfast every day. I did that time for him and I left me out. So now, it's all about me.

Adaptability. Participants discussed learning, experimenting, and adjusting their plans as methods for successful weight loss "And I saw like ideas step-by-step and then I see which worked, and I get used to it, and then I move on to something else." This process allowed participants to learn about themselves and what they needed to stay on track, "My downfall is chocolate. So in order for me to get that piece of chocolate I have to eat a salad at least 4 times in a week" and "Monday through Friday strictly following the routine. Saturday I treat myself to whatever I want to eat. I eat whatever I want, but I eat it in moderation and I don't go past 6 o'clock." Most participants also discussed unique tricks that they used to lose weight. For example, one participant discussed satisfying herself with water by pretending it was sweetened, "This is my sugar water. I call it, I tell everybody there sugar in it, but it's not, it's just water." Another participant discussed avoiding temptations and "food pushing" by embodying diabetic restrictions, "I would kind of like treat myself as I was a diabetic, but I wasn't. I would eat like sugar-free or healthy snacks like

grains, peanuts, and stay with all of olive oils and yogurt. Things like that." A third participant discussed her tricks for picking healthier foods at the grocery store, "If something has more than 10 ingredients it goes back on the shelf, back in the freezer; it doesn't even make it to the cart."

Discussion

In this mixed methods study among low-income African American women with obesity, we found several factors affecting weight loss success among women in the positive deviant group, findings that may guide the development of future interventions to promote weight loss in this high-risk population. For example, in interviews of the positive deviant group, participants reported that increased opportunity affected their successful weight loss and survey data revealed that they were less likely to be employed than control participants. This may have resulted in more time to prepare healthy meals and exercise. Another difference identified in the quantitative self-report data was that positive deviant cases were more likely to be currently making diet changes. Positive deviant participants reported using creative tricks to which may have contributed to prolonged dietary change.

Although our positive deviant cases and our control participants did not report a difference in the age at which they became overweight, some of our participants seemed to have a difficult time recognizing their weight status, as evidenced by 2 control participants indicating they did not think they had ever been overweight. Langellier et al[18] found that, over time, the percentage of overweight black women who self-identified as overweight fell significantly between the 2 study periods (1988-1994 and 1999-2008) even as nationwide obesity rates increased. In addition, Halbert et al[19] found that participants who believed they had obesity were more likely to report receiving weight loss advice from their primary care physician than participants who did not believe they were obese. A key difference between members of the positive deviant group and control patients may be the ability to correctly recognize weight status.

The positive deviance approach was both a strength and a limitation of the study. The positive deviance approach uses a homogenous high-risk population, with the result that the findings of the study are accessible to other members of the studied population. However, this approach also resulted in a small sample size and low power for the quantitative analysis, and limits the generalizability of the findings to a larger population.

One future direction of the study is to further assess the impact of support. Our quantitative data demonstrated that, after controlling for demographics, support was not significantly different between groups. However, a single question may be an ineffective measure of support, given the multiple types of support (eg, practical, emotional, financial) that 80% of the study interviewees indicated as instrumental in achieving their weight loss and maintenance. Certain types of support may be more beneficial in weight loss than others and should be further explored.

Another future direction includes further evaluation with control participants to determine in what ways qualitative data would differ from the themes expressed by the positive deviant group, and determine what barriers prevent control participants from losing weight.

The findings of this study may be valuable in the development of primary care provider techniques to improve weight loss in this high-risk population. For example, motivational interviewing is a counseling method that helps patients develop their own motivations for behavior change.[20] Questions based on our qualitative data, such as "How has your weight affected activities that you used to enjoy?" or "How do you feel about the eating habits of your family?" may allow clinicians to help patients build sufficient internal motivation for change. Patients may need assistance in identifying sources of support and ways to schedule weight loss activities. Clinicians can use the lessons from this study to help their patients develop their own flexible and creative individualized weight loss plans and tricks.

In conclusion, positive deviant cases exist, even in high-risk populations, and clinicians and researchers can learn from their successes. We found that motivation, opportunity, flexibility, and creativity contribute to weight loss success among low-income African American women. These findings may be used to develop motivational interviewing strategies or guide treatment for other similar patients.

Acknowledgments

The authors acknowledge the contributions of Jacqueline Grove in editing and manuscript preparation.

Declaration of Conflicting Interests

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

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This work was supported by the Thomas Jefferson University Department of Family and Community Medicine.

References

1. Centers for Disease Control and Prevention. *Health, United States, 2015: With Special Feature on Racial and Ethnic Health Disparities* [Table 58]. Hyattsville, MD: National Center for Health Statistics; 2015. https://www.cdc.gov/nchs/data/hus/hus15.pdf. Accessed March 24, 2017.
2. Shaikh RA, Siahpush M, Singh GK, Tibbits M. Socioeconomic status, smoking, alcohol use, physical activity, and dietary

behavior as determinants of obesity and body mass index in the United States: findings from the National Health Interview Survey. *Int J MCH AIDS*. 2015;4:22-34.
3. Ogden CL, Lamb MM, Carroll MD, Flegal KM. *Obesity and Socioeconomic Status in Adults: United States, 2005-2008* (NCHS Data Brief No. 50). Hyattsville, MD: National Center for Health Statistics; 2010. https://www.cdc.gov/nchs/products/databriefs/db50.htm. Accessed March 24, 2017.
4. Ma Y, Hébert JR, Manson JE, et al. Determinants of racial/ethnic disparities in incidence of diabetes in postmenopausal women in the US: the Women's Health Initiative 1993-2009. *Diabetes Care*. 2012;35:2226-2234.
5. Olives C, Myerson R, Mokdad AH, Murray CJL, Lim SS. Prevalence, awareness, treatment and control of hypertension in United States counties, 2011-2009. *PLoS One*. 2013:8:e60308.
6. Ma Y, Hebert JR, Balasubramanian R, et al. All-cause, cardiovascular, and cancer mortality rates in postmenopausal white, black, Hispanic, and Asian women with and without diabetes in the United States: the Women's Health Initiative, 1993-2009. *Am J Epidemiol*. 2013;178:1533-1541.
7. Goldstein DJ. Beneficial health effects of modest weight loss. *Int J Obes Relat Metab Disord*. 1992;16:397-415.
8. Pi-Sunyer FX. Short-term medical benefits and adverse effects of weight loss. *Ann Intern Med*. 1993;119(7 pt 2): 722-726.
9. Klem ML, Wing RR, McGuire MT, Seagle HM, Hill JO. A descriptive study of individuals successful at long-term maintenance of substantial weight loss. *Am J Clin Nutr*. 1997;66:239-246.
10. Fitzgibbon ML, Tussing-Humphreys LM, Porter JS, Martin IK, Odoms-Young A, Sharp LK. Weight loss and African-American women: a systematic review of the behavioural weight loss intervention literature. *Obes Rev*. 2012;13: 193-213.
11. West DS, Elaine Prewitt T, Bursac Z, Felix HC. Weight loss of black, white, and Hispanic men and women in the diabetes prevention program. *Obesity (Silver Spring)*. 2008;16:1413-1420.
12. Banerjee ES, Herring S, Hurley K, et al. Overcoming obesity: a mixed methods study of the impact of primary care physician counseling on low-income African American women who successfully lost weight. *Am J Health Promot*. 2018;32:374-380.
13. Marsh DR, Schroder DG, Dearden KA, Sternin J, Sternin M. The power of positive deviance. *BMJ*. 2004;329:1177-1179.
14. Centers for Disease Control and Prevention. Chronic disease and health promotion data & indicators: Behavioral Risk Factor Surveillance System Historical Questions (1984-2016). https://chronicdata.cdc.gov/Behavioral-Risk-Factors/Behavioral-Risk-Factor-Surveillance-System-BRFSS-H/iuq5-y9ct. Accessed March 24, 2017.
15. Blumberg SJ, Bialostosky K, Hamilton WL, Briefel RR. The effectiveness of a short form of the Household Food Security Scale. *Am J Public Health*. 1999;89:1231-1234.
16. Diamond JJ. Development of a reliable and construct valid measure of nutritional literacy in adults. *Nutr J*. 2007;6:5.
17. Creswell JW. *Qualitative Inquiry & Research Design: Choosing Among Five Approaches*. 2nd ed. Thousand Oaks, CA: Sage; 2007.
18. Langellier BA, Glik D, Ortega AN, Prelip ML. Trends in racial/ethnic disparities in overweight self-perception among US adults, 1988-1994 and 1999-2008. *Public Health Nutr*. 2015;18:2115-2125.
19. Halbert CH, Jefferson M, Melvin CL, Rice L, Chukwuka KM. Provide advice about weight loss in a primary care sample of obese and overweight patients. *J Prim Care Community Health*. 2017;8:239-246.
20. Miller WR, Rollnick S. *Motivational Interviewing: Helping People Change*. 3rd ed. New York, NY: Guilford Press; 2013.

Author Biographies

Elaine Seaton Banerjee, MD, MPH is an associate professor at University of South Florida, Morsani College of Medicine and a physician reseracher at Lehigh Valley Health Network, Department of Family Medicine. She is a Family Physician with an interest in primary care approaches in the prevention and treatment of obesity.

Sharon J. Herring, MD, MPH is an associate professor of Medicine at Temple University. She is a board-certified internist who specializes in obesity medicine and has spent nearly a decade researching optimal strategies for the prevention and treatment of obesity.

Katelyn Hurley, MPH is director of Product at a care coordination software company based in Boston, Massachusetts. Her background is in public health research, program planning, and implementation. Her research interests include community based participatory research, and social determinants of health research. Katelyn works closely with programs using care coordination technology to test and measure new models of care.

Katherine Puskarz, MPH is an assistant public health program director at Thomas Jefferson University College of Population Health in Philadelphia, PA. Her research focuses on women, obesity prevention and the built environment.

Kyle Yebernetsky is a 3rd year emergency medicine resident at Geisinger Health System in Danville, PA.

Marianna LaNoue, PhD is a quantitative psychologist and research methodologist. Her research interests include patient-centered outcomes research (PCOR) and rigorous mixed-methods evaluation research approaches including dissemination and implementation science. Dr. LaNoue's current research focuses on the development and testing of methods for engaging patients and stakeholders in the research process. She also investigates novel patient-centered care delivery systems and the measurement of patient perceptions of health care.