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Results From an Intervention to Improve Rural Home Food and Physical Activity Environments

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Abstract

Background—Ecological models of healthy eating and physical activity emphasize the influence of behavioral settings such as homes and worksites in shaping behavior. Research on home environments suggests that both social and physical aspects of the home may impact physical activity and healthy eating.

Objective—Using a community-based participatory research (CBPR) approach, the Emory Prevention Research Center (EPRC), Cancer Coalition of South Georgia, and the EPRC's Community Advisory Board (CAB) designed and tested a coach-based intervention to make the home environment more supportive of healthy eating and physical activity for rural adults.

Methods—The 6-week intervention consisted of a tailored home environment profile, goal-setting, and behavioral contracting delivered through two home visits and two telephone calls. The study used a quasi-experimental design with data collected via telephone interviews at baseline, 2 and 4 months post-baseline. Ninety households ($n = 90$) completed all three telephone interviews.

Results—Multilevel models indicated that intervention households reported significant improvements in household food inventories, purchasing of fruit and vegetables, healthier meal preparation, meals with the TV off, and family support for healthy eating, relative to comparison households. Intervention households also reported increased exercise equipment and family support for physical activity relative to comparison households. Percent of fat intake decreased significantly, but no changes were observed for fruit and vegetable intake, physical activity, or weight among intervention relative to comparison households, although trends were generally in a positive direction.

Conclusion—Coaching combined with a focus on the home environment may be a promising strategy for weight gain prevention in adults.

Keywords

Rural; family; obesity prevention; physical activity; nutrition; intervention

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Adults generally gain weight as they age, with recent estimates approaching 1 pound per year.[1–5] Modest weight gains of 10 to 15 pounds are associated with increased risk of several chronic diseases, including diabetes and coronary heart disease.[3,6] Greater increases are associated with colon and several other cancers in both genders, and with endometrial and postmenopausal breast cancer in women.[7]

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Slowing this weight gain as people age requires improvements in physical activity and dietary behavior. Both behaviors are shaped, in part, through environmental constraints and supports.[8,9] Because 70% of caloric intake comes from foods prepared at home, homes are a particularly important intervention setting for obesity prevention.[10] The availability of healthy foods in the home is associated with healthy eating.[11,12] The availability of exercise equipment in the home and family rules that limit TV watching are associated with increased physical activity.[13,14] Family social environments are also associated with healthy eating and physical activity, albeit in both positive and negative directions. Family support can facilitate physical activity, but family obligations can limit time available for physical activity.[15,16] Similarly, family support can increase healthy eating, but family food preferences can negatively impact nutrition behavior.[17,18]

Few interventions have attempted to promote physical activity and healthy eating in adults by targeting the home environment, and only a handful have addressed childhood obesity through modifying the home environment.[9] The Healthy Homes/Healthy Families intervention study was designed to test the feasibility of a low-intensity coaching intervention to make the home environment more supportive of healthy eating and physical activity for adults living in a rural area. In addition to exploring operational aspects of feasibility, research questions included:

1. How will rural families respond to a coach-based intervention that focuses on their home environments (e.g., participation, satisfaction)?
2. Does a coaching approach lead to changes in the home environment that better support physical activity and healthy eating behaviors?
3. Does a coaching approach focused on the home environment increase physical activity and healthy eating behaviors?

METHODS

Community Partnership

Healthy Homes/Healthy Families was a CBPR project conducted by the EPRC in partnership with the Cancer Coalition of South Georgia and the EPRC's CAB. The EPRC is funded by the U.S. Centers for Disease Control and Prevention, and is part of a national network of research centers that engages in CBPR. The EPRC defines its partner community geographically to coincide with the area served by its primary partner, the Cancer Coalition of South Georgia. The coalition is a not-for-profit organization, composed of community members and providers of care whose mission is to become a national leader in rural comprehensive cancer control. The partnership, focused in 31 counties in rural southwest Georgia, began in 2004 and operates through a 20-member CAB. Members represent federally qualified health centers, local universities and colleges, YMCAs, regional public health districts, hospitals, local government, grocery stores, and several community-based organizations. The seeds for the partnership were planted when the Cancer Coalition was preparing a comprehensive cancer control proposal for state funding and approached Emory University to be its research partner. Two years later, Emory approached the coalition to be its community partner in applying for a Prevention Research Center.

The current project was the partnership's third collaborative study. Earlier work examined how rural home, work, and church environments affect tobacco use, healthy eating, and physical activity using both qualitative and quantitative methods.[19,20] Those studies established the foundation for the intervention study reported herein. Because of the high prevalence of overweight and obesity (76.4%) and the observation that home environment variables were associated with healthy eating and physical activity in the earlier studies, the

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CAB decided to develop and test a home-based intervention targeting prevention of weight gain. The CAB also recommended that coaching be used as the core intervention strategy. A CAB work group was formed to collaboratively design the intervention study, including the intervention details and data collection instruments. Major study decisions were made at full CAB meetings held quarterly.

The study used a quasi-experimental design with data collection at baseline, and 2 and 4 months after baseline. The 6-week intervention was conducted with participants in two rural counties in Georgia (Cook and Randolph); participants from a third rural county (Mitchell) served as the comparison group. An unbalanced design was used to have a sufficient number of participants experiencing the intervention because the primary purpose of the study was to obtain participant responses to the intervention strategies. The counties were selected at a CAB meeting based on similar demographic profiles (e.g., large African-American populations) and limited competing prevention activities or research.

Study Participants

Recruitment was managed by the Cancer Coalition of South Georgia and took place in a range of community settings (e.g., technical colleges, banks, libraries, health departments, churches, worksites). Two persons per household were enrolled whenever possible. The first person in the household to enroll was treated as the primary participant. Primary participants were African-American or White adults age 40 to 70 years who lived in the southwest Georgia region for 5 years or longer. The secondary participant had to be at least 18 years old, but no other inclusion/exclusion criterion was set. The study was approved by the Emory University Institutional Review Board.

Description of the Intervention

The intervention, based on social cognitive theory, goal-setting theory, and coaching models, consisted of coaching, family goal setting, and behavioral contracting for healthy actions to create a home environment that supports healthy eating and physical activity.[21–24] Participants received two home visits and two coaching telephone calls over 6 weeks. Using a “home environment profile” tailored on baseline data, locally hired residents trained as coaches by EPRC staff guided families in selecting “healthy actions” to make their homes more supportive of physical activity and healthy eating. Healthy actions were identified based on evidence linking environmental determinants to healthy eating or physical activity. Table 1 lists major intervention activities at each visit and call. Intervention materials included the home environment profile, the healthy action checklist, and a family contract. The comparison group received one mailing of educational materials on physical activity and healthy eating.

The three coaches were college-educated women, two African American and one White. Two were in their 30s and one in her 50s. Two had full-time jobs in the healthcare field, and two had prior research experience with the EPRC. Training involved 10 hours of formal training with the EPRC research team, two practice homes per coach, and biweekly meetings with the local coordinator for the duration of intervention delivery.

Process Measures

Participant satisfaction was assessed at the two-month telephone follow-up using a 4-point scale with 4 indicating a high level of satisfaction. Additionally, at each session, coaches completed a process evaluation log that documented who was present, the healthy actions and strategies chosen, and barriers and facilitators discussed.

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Outcome Measures

The long-term goal of the intervention was to prevent weight gain. Given the short-term nature of this study, however, the primary outcomes of interest were changes in the home food and physical activity environments. Other outcomes of interest included dietary and physical activity behavior, and weight/body mass index. All outcome measures were self-reported and collected at baseline and 2 and 4 months via telephone by trained interviewers.

Home Nutrition Environment

Household food availability: Items from Gattshall and colleagues,[12] Glanz and colleagues,[25] and Patterson and associates[11] were adapted to assess foods available in the home (in the past week), including items that assessed fruits and vegetables, healthy and unhealthy snacks/foods, and healthy and unhealthy drinks.

Food shopping: Using a 4-point scale, participants were asked how often, in the past month, they did the following: buy fresh vegetables, buy fresh fruits, buy a healthier version of something they liked, and buy a new healthy food to try. The mean of the first two items is reported here as "shopping for fruits and vegetables," and the mean of the remaining items is reported here as "choosing healthier foods." Cronbach's alpha was 0.63 for the baseline measure.

Restaurant use: The number of days in the past week that a family meal was purchased from a restaurant was assessed using measures adapted from Fulkerson and colleagues.[26]

Food preparation: Healthy meal preparation methods were assessed using 17 items (α = 0.82 at baseline).[27,28] Participants were asked how often, in the past month, they served healthier food options or prepared foods using healthy cooking methods.

Family meals and TV: Three items from Spurrier et al. were adapted to assess mealtime environment regarding TV watching (α = 0.89 at baseline).[28]

Family support for healthy eating: Eight items were adapted from the Social Support and Eating Habits Survey developed by Sallis and colleagues,[29] with Cronbach's α = 0.52 at baseline.

Home Physical Activity Environment

TV rules: One item adapted from Spurrier and colleagues[28] was used to assess rules pertaining to TV use.

Exercise or physical activity equipment availability: An inventory of exercise or physical activity equipment was taken for each household using 21 items adapted from instruments developed by Gattshall, Sallis, Sirard, and their colleagues.[12,13,30]

Family time spent doing physical activities: Five items adapted from Davison and associates[31] were used to assess family time spent doing physical activities such as walking or hiking, bike riding, swimming, and playing sports (α = 0.80 at baseline).[31]

Family support for physical activity: Nine items (α = 0.70) were used to assess family support for physical activity, with items adapted from the Social Support and Exercise Habits survey developed by Sallis and colleagues.[29]

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Neighborhood recreational facilities: A summed score of ten items adapted from Echeverria and associates was used to assess the neighborhood built environment.[13,32,33]

Behaviors

Fruit and vegetable intake: Fruit and vegetable intake was assessed using six items from the 2005 Behavioral Risk Factor Surveillance System.[34] Participants were asked how often they drink fruit juices; how often they eat fruit, green salad, potatoes, and carrots; and how many servings of vegetables they usually eat. Fruit and vegetable intake per day was calculated.

Fat intake: Six items from the National Cancer Institute's Quick Food Scan (Fat Screener) were used to assess percent calories from fat.[35] Participants were asked how often they usually eat the following items: regular fat bacon or sausage; regular fat cheese or cheese spread; French fries, home fries, or hash brown potatoes; regular fat salad dressing; regular fat mayonnaise; and margarine, butter, or oil. For each participant, a percent of daily calories from fat was calculated.

Physical activity: Physical activity in the last 7 days was assessed using the International Physical Activity Questionnaire.[36] Each participant was asked to recall the number of days per week and/or time spent in moderate and vigorous activities, walking, and sitting. Total metabolic equivalent of task (MET)-minutes per week were calculated using the International Physical Activity Questionnaire scoring protocol.[37]

Weight, Body Mass Index and Demographics

Weight and body mass index: Self-reported height (in feet and inches) and weight (in pounds) were used to calculate body mass index. Questions were from the 2005 Behavioral Risk Factor Surveillance System.[34]

Demographics: Participants were asked questions regarding their age, gender, race/ethnicity, marital status, annual household income, education, and employment status. Measures were adapted from the 2005 Behavioral Risk Factor Surveillance System.[34]

Food security: One item from Inglis and colleagues[38] was used to assess food security. In yes/no format, participants were asked to indicate whether they ever ran out of food in the last 12 months because they could not afford to buy more. The percentage of participants who responded "yes" is reported here.

Statistical Analyses

Data collected in this study were cleaned and analyzed using SAS (version 9.2; SAS Institute, Cary, NC) and HLM6 (Version 6.08, Scientific Software International, Lincolnwood, IL).

Because of the exploratory nature of this study, analyses were limited to primary participants with data available for all three data collection points (baseline, plus 2 and 4 months) rather than an intention-to-treat analysis. The primary outcomes of interest focused on the physical activity and nutrition home environment. Secondary outcomes were behaviors as measured by METs, intake of fruit and vegetables, percentage of caloric intake from fat, and weight.

Multilevel growth analysis, nesting time points within participants, was used to examine whether the intervention had an impact on the home environment as well as on participants' behaviors across time.[39] Multilevel analysis accounts for differences between participants in

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the treatment and comparison group at baseline owing to nonrandom assignment. The analysis also accounted for the variance in time elapsed between baseline and follow-up data collection [Δtime (baseline to 1st follow-up) = 3.61 months with a *SD* of 1.05; Δtime (baseline to 2nd follow-up) = 5.88 months with a *SD* of 1.15] with time as a continuous variable in the model. For all outcome variables, a multilevel growth model controlled for possible differences in rates of change owing to race, gender, and education both at baseline and over time. Appropriate transformations were used to normalize positively skewed variables and the transformed data were used when conducting the multilevel analyses. The interaction term between group assignment and time in the model allowed for detection of significant change due to the intervention.

RESULTS

Description of Study Participants

Figure 1 provides a flow diagram of study enrollment, intervention delivery and follow-up data collection. We assessed 283 individuals for eligibility. Of these, 31% were ineligible (n = 88), 11.7% declined to participate (n = 33), and 57.2 % were enrolled (n = 162). Of the 162 enrolled, 80 intervention and 42 comparison households completed baseline interviews (n = 122 [75.3%]). The vast majority of participants received the full intervention (63/80 [78.8%]). Interviews were completed at all three time points for participants in 73.7% (90/122) of the households. There were no demographic differences between primary participants who completed all three waves of data collection and those who did not, for either the intervention or comparison groups. Approximately 68.9% (84/122) of households included both a primary and secondary participant; data reported here are from primary participants only.

Table 2 presents demographic characteristics of primary participants (n = 90) who completed baseline and both follow-up interviews. There were no significant differences in demographic characteristics between intervention and comparison groups at baseline except for employment. In the intervention group (n = 54), 50% of primary participants were African American. In the comparison group (n = 36), 47% were African American. The majority of participants were women in both groups, and the majority of participants were 50 to 59 years old. Sixty-one percent of the intervention group participants were employed, compared with 83% of the comparison group participants. The majority were married or living with a partner in both groups. Food insecurity ranged from 14% in the comparison group to 26% in the intervention group. The majority were overweight or obese in both groups.

Feasibility and Acceptability of the Intervention

Of the 80 intervention households completing baseline data, 63 (78.8%) households completed all home visits and coaching calls, 4 (17.5%) completed both the first home visit and the first coaching call, and 3 (3.8%) did not complete any of the home visits or calls (Figure 1). Secondary participants completed at least one intervention activity in 55% of dual participant households.

Mean satisfaction scores for intervention households with three waves of data were high (1 = strongly disagree to 4 = strongly agree). Coaches were easy to understand (3.88 ± 0.47), informative (3.92 ± 0.44), and were good motivators for participants (3.85 ± 0.50) and their families (3.65 ± 0.79). Participants found the home visits interesting (3.87 ± 0.49) and relevant (3.79 ± 0.54), as well as the coaching calls (3.71 ± 0.57 and 3.83 ± 0.51 respectively), and thought that the coach spent the right amount of time with them (3.90 ± 0.45).

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Table 3 shows the percentage of households selecting each of the healthy actions. The most popular actions for healthy eating were to (1) make sure you mostly have healthy foods in your home and (2) prepare your family's foods using healthy cooking methods. The most popular action for physical activity was to increase the number of times per week families engage in physical activity together.

Changes in the Home Food and Physical Activity Environments

Nutrition—As shown in Table 4, participants in the intervention group improved their home food environment in multiple areas relative to the comparison group. Of the six environmental features assessed, trends were generally in the expected direction, with significant differences between intervention and control groups in five of the six areas despite the relatively small sample size. With respect to the household food inventory, improvements in the fruits and vegetables ($p = .03$), unhealthy snacks ($p < .01$), and healthy drinks ($p = .02$) were significantly larger in the intervention group than in the comparison group after controlling for baseline gender, race, and education differences. For example, at the first follow-up, intervention households reported 2.9 more fruits and vegetables than at baseline, compared with 0.9 more in comparison households. Even with a decrease from first to second follow-up in the intervention group, the overall increase remained significant between the two groups.

In sync with the positive changes in household food inventories, participants in the intervention group reported a significant increase in purchasing frequency of fruits and vegetables ($p < .01$) relative to the comparison group. Although they also indicated that they purchased healthier versions of foods or purchased new healthy foods more often, the difference owing to the intervention was not significant. The frequency of purchasing family meals at restaurants decreased slightly at the first follow-up, but increased between first and second follow-up, and was not different from the comparison group. Intervention households reported preparing significantly more meals using healthier preparation methods ($p < .01$) and eating significantly fewer meals while watching TV ($p < .01$) relative to the comparison group. Additionally, the intervention resulted in higher levels of family social support for healthy eating ($p = .01$).

Physical Activity—Table 4 also shows changes in the physical activity home environment. Significant differences were observed for two of the five areas (exercise equipment and family support for physical activity). Trends were in the expected direction for all areas assessed except perceived availability of neighborhood facilities. With respect to rules restricting TV usage, there were no differences between the two groups; rules increased by 20% from baseline to the first follow-up, then decreased slightly from first to second follow-up for the intervention group. For the comparison group, rules increased by 11% initially, then decreased by 14%.

Participants in the intervention group acquired more exercise equipment for the home over the duration of the study than did those in the comparison group ($p < .01$). Participants increased their home equipment by 1.1 items from baseline to follow-up 1, then by another 0.6 items from the first to the second follow-up. In contrast, the comparison group reported a small decrease (0.3 items) followed by an increase (0.6 items). Although mean scores suggest slightly more time spent in physical activity as a family (from a mean of 1.2 at baseline to 1.4 at the second follow-up), the differences due to the intervention were not significant ($p = .37$). The family support for physical activity, however, increased significantly in the intervention group, whereas it stagnated in the comparison group ($p = .04$). When asked to indicate access to neighborhood facilities, participants identified on

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average fewer options after participating in the intervention, although this change was not significant ($p = .57$).

Changes in Behaviors and Weight

The intervention group reported an average increase in fruit and vegetable intake of 0.6 servings per day while the comparison group reported a lower intake of fruit and vegetables over time ($\Delta M = -0.1$ servings per day); however, the difference was not significant between the groups ($p = .17$). Both groups reduced their percentage of calories from fat (by 2.9% in the treatment group and 1% in the comparison group; $p = .03$).

There were no intervention effects on MET minutes per week ($p = .89$) from baseline to the second follow-up. Both groups reported an increase at both follow-up interviews. The comparison group showed a greater increase in MET minutes per week at the second follow-up, whereas the intervention group reversed its earlier increase almost entirely.

The intervention group reported an average reduction in weight of 2.4 ± 10.53 pounds at the first follow-up and a total average decrease in weight of 3.2 ± 8.04 pounds. The comparison group reported an average weight loss of 0.7 ± 10.27 pounds at the first follow-up, which increased to an overall average weight reduction of 1.0 ± 10.39 pounds at the second follow-up. However, there was not a significant weight reduction because of the intervention ($p = .20$).

DISCUSSION

A major objective of this study was to assess the feasibility of a home-based coaching intervention that targeted the home environments of rural adults. The few prior studies targeting home environments for obesity prevention have focused on children.[9] Recruitment efforts were generally successful, although 25% of those enrolled did not initiate study activities. About half of these could not be reached by telephone (original recruitment was in-person), and the other half changed their minds about participating. This suggests the intervention may appeal to many people, but a subset will have limited interest in or availability to schedule home visits with a coach. Those who participated in intervention activities were very pleased with the coaching process. Additionally, once people began the intervention, participation was fairly high, with over three quarters of primary participants completing all home visits and coaching calls. Engaging a second member of each household was more challenging than expected, perhaps because the initial recruitment focused on just one member of the household. Targeting only the meal preparer and/or food shopper as the primary change agent may be a more efficient approach for changing the home environment and should be explored in future research.

Despite the fact the study was not powered to detect environmental or behavioral outcomes, we observed significant improvements in the home food environment and a trend toward weight loss. There were also some improvements in home activity environment indicators. There is little precedent in published research against which to compare these findings.

Of the behavioral outcomes, only fat intake decreased significantly. The clinical significance of this decrease is difficult to ascertain given the short timeframe of the study. A limitation of this study is the heavy reliance on self-reported measures. Even with a possible social desirability bias, however, the results are sufficiently positive to warrant additional research. Future research should include more objective instruments, such as the use of accelerometers to assess physical activity and 24-hour dietary recalls to assess caloric intake, along with longer term follow-up.

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A 6-week intervention is quite brief relative to other interventions to prevent weight gain. A recent review showed that weight gain prevention interventions ranged from 13 weeks to 5 years.[5] Results suggest the Healthy Homes/Healthy Families intervention is promising, but that the intervention might be lengthened to solidify and/or deepen the environmental changes triggered by the coaching. A longer and/or more intense intervention may also increase the likelihood that changes in the home environment lead to increased energy expenditure and decreased energy consumption over time.

The study findings were shared with the CAB and used to formulate the partnership's next research project. CAB members were enthused about the study findings and decided to collaboratively conduct a large, randomized controlled trial of a similar but more intensive intervention targeting women as gatekeepers of the home environment. Three community health centers were represented on the CAB and they suggested that recruitment be done by providers at their centers. Another work group was formed to expand and enhance the intervention strategies, and the new trial is currently underway in partnership with three community health centers. Primary outcomes for the current trial are assessed through accelerometers and two 24-hour dietary recalls.

Ultimately, the dissemination potential of these types of interventions is critical for their ability to make an impact on population health.[40] Even when interventions are proven effective, they must be compatible with organizational missions and contexts to be adopted by sufficient numbers of organizations to make a difference. Therefore, it is important to design interventions that can be adopted by existing organizational structures in communities. A major advantage of using CBPR in the progression of studies described herein is that the intervention was designed to address a health issue of major local concern, local leaders were committed to and excited about the research, and the intervention is consistent with local values and community structures. Coupling the Healthy Homes/ Healthy Families intervention with a clinic-based screening and referral system, such as we are currently testing, has the potential for widespread dissemination. This approach has the added benefit of resolving the issue of how to recruit participants into this type of intervention.

The health coach has the potential to be a low-cost bridge between the patient-centered medical home and the actual patient home. As healthcare reform provides medical homes for a greater proportion of the population, a complementary strategy would be to improve actual home environments to support healthy lifestyles. Physicians could refer patients to home-based coaching interventions to prevent obesity in their patients. The "home visit" was a traditional part of public health—originally for maternal and child health services—and could be adapted for the twenty-first century to address chronic disease prevention and management. One of the major challenges of the patient-centered medical home is that of achieving behavioral changes, especially concerning diet and physical activity. A recent article by Lianov and Johnson discusses[41] how physicians must increase their competence level in promoting lifestyle change in their patients. They recommend routine assessment of health behaviors, followed by evidence-based counseling and use of community resources. Ecologic models of obesity prevention highlight the need for multiple intervention strategies in multiple sectors of the community.[42] Intervention research that links the medical home with the actual home via a community-based intervention developed through community-engaged research is an important step in this direction.

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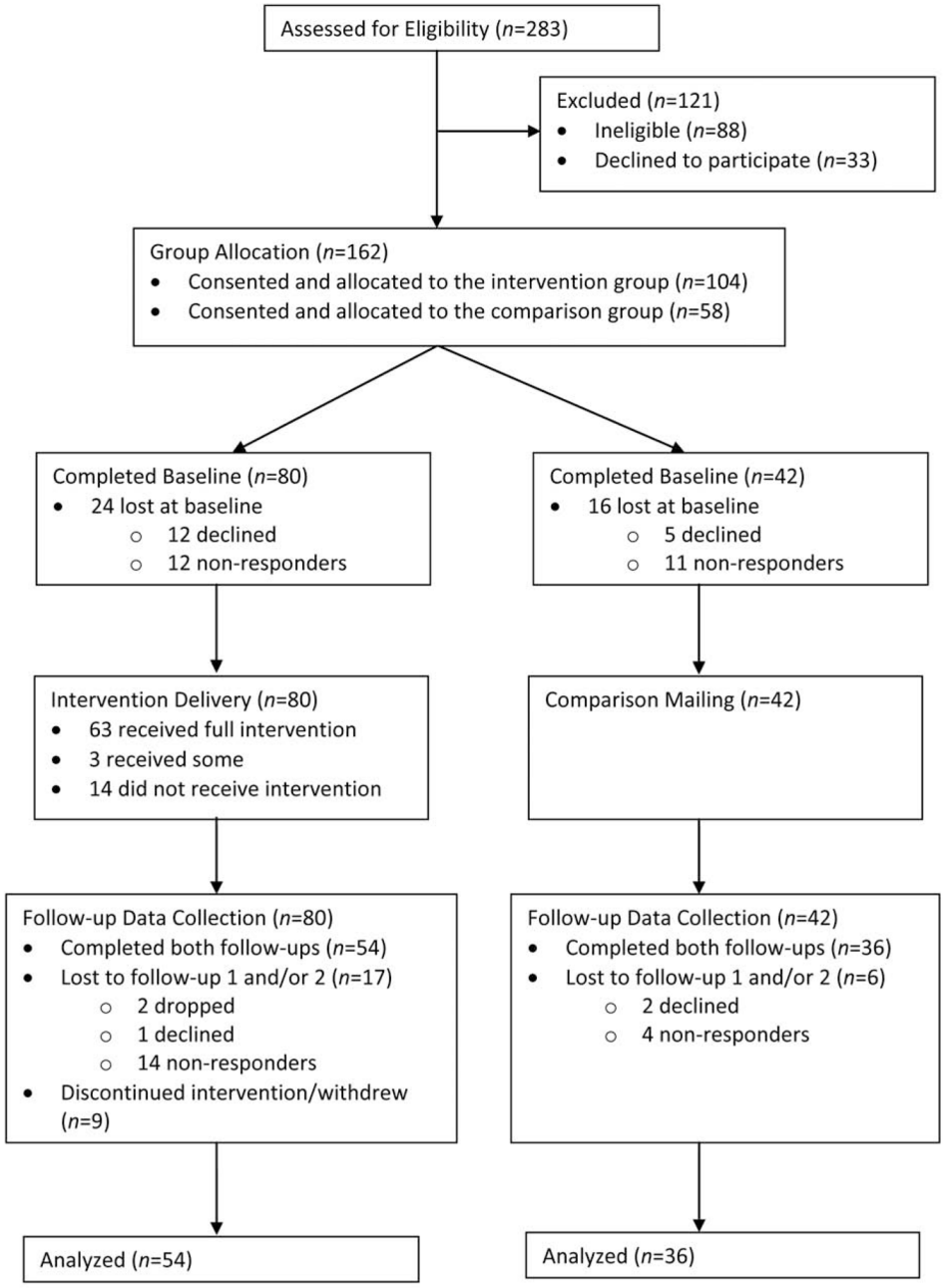

Figure 1.
Healthy Homes/Healthy Families: Study Flowchart

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Table 1

Overview of Healthy Homes/Healthy Families Intervention by Session

Coach–Household Interaction	Description
Week 1: First home visit (30–60 minutes)	Discuss with participants the results of their baseline survey by sharing a home environment profile
	Guide participants in selecting health promoting environmental changes in their homes using the Healthy Actions Checklist
	Guide participants in how to make changes in their homes
	Sign a “Family Contract”
Week 3: First phone call (15–20 minutes)	Assess progress of Healthy Actions—assess barriers and other needs and provide additional tips and encouragement
	Discuss maintenance of healthy actions and determine next steps
Week 5: Second home visit (30–60 minutes)	Discuss progress of Healthy Actions—revisit contract and tips
	Determine and address barriers to completing Healthy Actions; re-strategize if needed
	Select additional Healthy Actions
	Discuss maintenance of healthy actions and determine next steps
	Provide motivational support; provide other resources
Week 7: Second phone call (15–20 minutes)	Assess progress of Healthy Actions
	Address barriers, provide tips, and motivational support
	Encourage adoption of additional healthy actions
	Discuss maintenance of healthy actions

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Table 2

Demographic Characteristics of Primary Participants*

	Intervention		Comparison		
	n	**(%)**	***n***	**(%)**	***p* Value**
Race					
White	27	(50)	19	(53)	
Black	27	(50)	17	(47)	.80
Gender					
Male	9	(17)	3	(8)	
Female	45	(83)	33	(92)	.25
Age (yrs)					
39–49	17	(31)	11	(31)	
50–59	23	(43)	19	(53)	
60–69	14	(26)	6	(17)	.52
Income ($)					
< 10,000	8	(15)	2	(6)	
10,001–25,000	9	(17)	7	(19)	
25,001–50,000	14	(26)	8	(22)	
> 50,000	21	(39)	18	(50)	.66
Employment					
Employed	33	(61)	30	(83)	
Unemployed	21	(39)	6	(17)	.02

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	Intervention		Comparison		
	n	(%)	*n*	(%)	*p* Value
Marital status					
Married/living with partner	44	(81)	27	(75)	
Widowed/separated/divorced/not married	10	(19)	9	(25)	.46
Food security					
Ran out of food in last 12 months	14	(26)	5	(14)	.20
BMI category					
Normal/underweight	12	(22)	10	(28)	
Overweight	14	(26)	12	(33)	
Obese	28	(52)	14	(39)	.48

Note. Percentages may not add to 100% due to rounding.

*Limited to participants who completed BL, FU1, and FU2. *p*-Values are from chi-square test of independence; except for the food security item where Fisher's exact test was conducted.

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Table 3

Percentage of Families Selecting Each Healthy Action

Healthy Actions for Healthy Eating	Percentage of Households Selecting Action*	Healthy Actions for Physical Activity	Percentage of Households Selecting Action*
Foods in the home: Make sure you have mostly healthy foods in your home	68.2	Physical activity together: Increase the number of times per week your family does a physical activity together, like walking	92.4
Food preparation: Prepare your family's foods using healthy cooking methods	56.1	TV watching: Decrease the amount of time your family spends watching TV	42.4
Grocery shopping: Buy mostly healthy foods when you grocery shop	37.9	Exercise equipment: Make physical activity easier for your family by having equipment or supplies readily available	39.4
Family meals and TV: Increase the number of family meals you eat together with no TV on	36.4	Neighborhood recreational facilities: Identify and commit to using at least one facility or resources in your neighborhood for physical activity	30.3
Restaurant food: Cut down on the amount of unhealthy foods your family eats from restaurants	12.1		

Note. Percent is based on qualitative analysis of coaching logs ($n = 66$).

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Table 4

Home Environment, Behavior and Weight Changes from Baseline to Follow-Up 1 and 2 (n = 90)

		Intervention(n = 54)				Comparison(n = 36)				
		BL		BL to FU1	FU1 to FU2	BL		BL to FU1	FU1 to FU2	
Home Environment	**Range**	**Mean**	**(*SD*)**	**Δ Mean**	**Δ Mean**	**Mean**	**(*SD*)**	**Δ Mean**	**Δ Mean**	***p* Value***
Food: HH food inventory†										
Fruits and vegetables	0–26	14.1	(3.7)	2.9	−0.7	15.1	(3.7)	0.9	0.0	.03
Healthy snacks	0–7	1.8	(1.2)	0.5	−0.3	1.9	(1.3)	0.2	−0.2	.14
Unhealthy snacks	0–9	5.2	(2.0)	−1.1	−0.3	5.0	(2.1)	−0.2	0.2	< .01
Healthy drinks	0–4	2.1	(1.1)	0.5	−0.1	2.4	(1.2)	0.1	0.0	.02
Unhealthy drinks	0–3	1.7	(1.0)	−0.4	0.0	1.7	(1.0)	0.0	−0.1	.26
Food: Healthier food shopping‡										
Fruits and vegetables	1–4	3.0	(0.8)	0.4	−0.2	3.2	(0.7)	−0.1	−0.1	< .01
Healthier version/new foods	1–4	2.2	(0.8)	0.3	−0.1	2.3	(0.8)	0.0	−0.1	.10
Restaurant use for family meals§	0–28	1.5	(2.0)	−0.2	0.4	1.3	(0.6)	0.6	−0.3	.68
Healthy food preparation‡	1–4	2.0	(0.5)	0.4	0.1	2.2	(0.4)	0.2	−0.1	< .01
Family meal/snacks with TV‡	1–4	2.4	(1.1)	−0.7	0.1	2.3	(1.0)	0.0	0.0	< .01
Family support for healthy eating‡	1–4	2.8	(0.4)	0.2	0.1	2.9	(0.5)	0.0	0.1	.01
Physical activity										
Exercise equipment inventory‖	0–21	6.8	(3.3)	1.1	0.6	8.8	(3.1)	−0.3	0.6	< .01
Rules for TV¶		17%	NA	20%	−2%	22%	NA	11%	−14%	.07
Family time for PA‡	1–4	1.2	(0.4)	0.2	0.0	1.3	(0.5)	0.1	0.1	.37

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		Intervention(n = 54)				Comparison(n = 36)				
		BL		BL to FU1	FU1 to FU2	BL		BL to FU1	FU1 to FU2	
Home Environment	**Range**	**Mean**	**(*SD*)**	**Δ Mean**	**Δ Mean**	**Mean**	**(*SD*)**	**Δ Mean**	**Δ Mean**	***p* Value***
Neighborhood facilities#	0–10	2.9	(2.7)	0.1	−0.3	3.3	(3.0)	0.3	0.1	.57
Family support for PA‡	1 – 4	2.2	(0.4)	0.3	−0.1	2.4	(0.4)	−0.1	0.1	.04
Behaviors										
Fruit and vegetable intake per day**		3.4	(2.3)	0.1	0.5	3.8	(1.8)	−0.2	−0.2	.17
Dietary fat(%)		36.5	(4.2)	−1.2	−1.7	35.5	(4.6)	−0.9	−0.1	.03
Total MET, minutes per week		1354	(1673)	−389	436	925	(1271)	−61	315	.89
Weight(lbs)††		190.1	(41.4)	−0.8	−2.4	183.4	(43.26)	−0.3	−0.7	.20

Note. BL, baseline; FU1, first follow-up; FU2, second follow-up; ΔMean, change in mean; MET, metabolic equivalents; NA, not applicable; *SD*, unadjusted standard deviation.

* *p* Values are for the intervention effect tested for by multilevel growth models. Means shown are for baseline and change in means from baseline to 2-month follow-up and 2-to-4-month follow-up.

† Number of items available in past week.

‡ 1 = never/rarely; 2 = occasionally; 3 = often; 4 = very often.

§ Number of times per week.

// Number of items.

¶ Yes/No response. A binary logistic HLM analysis was conducted for this item.

Number available within a 20-minute walk.

** Frequency of fruit and vegetable consumption per day.

†† One participant who reported an unusually large amount of weight loss was excluded from the intervention group for the weight analyses. One participant in the comparison group did not provide complete weight data and was also excluded.

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