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Harvest of Hope: The impact of a church garden project on African American youth and adults in the rural American South

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Abstract

A pilot study was conducted of the feasibility of a church garden program to impact health outcomes in rural African American youth and adults. Thirty-six workdays were held at a Black church. Pre and post-intervention attitudes, diet, weight and blood pressure were measured. T-tests were used to test for significant within group differences. Spearman's rank correlation coefficients were used to test for significant bivariate associations. Youth showed improved attitudes about farming and gardening. No statistically significant changes were observed in adults. Church garden interventions can improve farming and gardening attitudes for rural, African American youth.

Keywords

Nutrition; Garden; Church; African American; Community Based Participatory Research; Health Disparities; Fruits and Vegetables; Food Access

INTRODUCTION

Racial and geographic health disparities persist in the United States. African Americans experience disproportionately higher rates of diagnosis and death from several diet-related chronic diseases (diabetes, hypertension)¹⁻⁴ as compared to Whites. Rural dwelling African

Americans are at highest risk for chronic diseases like diabetes and hypertension as compared to those who live in less rural environments.⁵⁻⁷ For example, as of 2011, African Americans in North Carolina were more likely than whites to be overweight or obese⁸ and experienced higher mortality rates from diet-related chronic diseases than their white counterparts.⁹ Diets rich in fresh fruits and vegetables are beneficial for weight maintenance and chronic disease risk reduction¹⁰, however economic difficulty and geographic isolation often make accessing and affording fresh food difficult for rural residents. This lack of fresh food access in rural, minority may contribute to health disparities.^{11, 12}

Community gardens can improve food access and provide opportunities for nutrition education and physical activity. In research conducted in the United States, participation in community gardening programs has been shown to improve nutrition related knowledge, attitudes, and behaviors in youth¹³⁻¹⁸ and adults.^{19, 20} Youth participating in garden projects have shown improved willingness to try vegetables^{13, 14}, improved ability to identify fruits and vegetables¹⁴, and increased preference for vegetables as snacks.¹⁷ Adults participating in community gardens show greater consumption of fruits and vegetables relative to home gardeners²⁰ and non-gardeners.¹⁹ The majority of these studies were conducted in urban areas (Davis, CA^{13, 14}, Philadelphia¹⁹, Denver²⁰).

Community Based Participatory Research (CBPR) is ideal for addressing health disparities. CBPR is “a collaborative approach to research that combines methods of inquiry with community capacity-building strategies”²¹ and has been used in rural populations^{22, 23} and in partnership with faith-based organizations.²⁴⁻²⁹ Harvest of Hope is a CBPR-based church garden pilot study conducted by a community-academic partnership in a rural, low resource North Carolina county.³⁰ Given that this is a pilot study, our purpose was to test feasibility for a larger study and to obtain measures of variability for our main outcomes (knowledge, attitudes, and behaviors around gardening and diet and biomarkers including blood pressure and body mass index) to inform subsequent studies.

METHODS

Harvest of Hope was a collaborative effort between an academic research institution and a church in the study community.

Recruitment and inclusion criteria

The assistant pastor recruited church members and community members known to him to participate in this pilot study. Participation was open to adults and youth older than 10 years of age. Church membership was not required. Some of the adult and youth participants were related to one another. For example, we had a few parent-child dyads.

Intervention

Study workshops were conducted approximately weekly at the garden on the campus of the church. The community research director led the workshops, which were an average of two hours long and included hands-on gardening education and nutrition education including recipe taste testing. Participants made decisions regarding the planting, harvesting, and distribution of garden produce. Academic research partners were present at every workshop,

participating under the direction of the community research director. The community research director, the academic PI, or the research assistant recorded attendance on a roster during each workday. Attendance data was entered into an electronic attendance database after each workday. The attendance for each participant was summed at the end of the intervention and an attendance percentage variable created for each participant.

Data Collection

All data were collected immediately prior to the start of the program in June 2010, and immediately after its conclusion in May 2011. Informed consent was obtained from adult participants, parents for minor participants, and from youth participants in accordance with the protocol approved by the University of North Carolina at Chapel Hill's (UNC-CH) Institutional Review Board.

Measuring food-related knowledge, attitudes, and behaviors

The innovative food alienation tool developed at UNC-CH was used to measure food-related knowledge, attitudes, perceptions and behaviors. The tool differs slightly for youth and adults and measures attitudes about farming, attitudes about gardening, and fruit and vegetable neophobia. Additional scales for adults measured cooking skills, grocery shopping attitudes, perceived food access and availability, history with gardening, and attitudes about food production. One additional scale on the youth survey measures whether youth assist with grocery shopping and preparation of family meals. All items were measured on a five-point Likert scale from 1 (strongly disagree) to 5 (strongly agree). The tool also contains a fruit and vegetable identification portion and assesses usual daily servings of vegetables for both youth and adults. The tool has been validated in two samples of adults (in a sample of adults from an academic setting the Cronbach's alphas for the scales ranged from .61 to .89; in a sample of adults similar to the study population but from another county the alphas ranged from .62 to .92, unpublished data). The tool was also validated with children of a similar demographic, but these children were in elementary school and the children in the pilot study reported on here are ten and older (alphas ranged from .61 to .81, unpublished data). We used this opportunity to validate the tool with older youth.

Measuring empowerment

To assess whether perceived control increased during the intervention, we used the Revised Perceived Control Survey (RPCS). The RPCS is a 12-item scale measuring perceived control on a four-point Likert scale. Evidence suggests that control is associated with reductions in social problems linked to inequities in distribution of resources.³¹

Anthropometric Measures

Nurses measured the weight, height and blood pressure of study participants pre- and post-intervention at the church. Body weight was measured with clothes but without shoes using an electronic scale (SECA 769 series) in 0.01 lb increments. Height was measured using a stadiometer (SECA model 220) in increments of 1mm. Resting blood pressure was assessed with a sphygmomanometer (MEDLINE model T1002) in increments of 2 mmHg. Measured

height and weight were used to calculate body mass index (BMI) for adults and BMI percentile for youth.

Data analyses

Paired samples t-tests were used to test for significant within group differences (pre/post) for youth and adults separately. Spearman's rank correlation coefficients were used to test for significant bivariate associations between program attendance and observed changes in variables. All data were analyzed using Stata version 11.2 (Statacorp, College Station, TX)

Focus groups

In addition to the quantitative data collection, a set of focus groups was held with both youth and adult participants. The four focus groups were planned and facilitated by a core group of community and academic partners and were run concurrently after a communal meal. A focus group guide was developed by the community-academic research team. During the focus groups, we asked open-ended questions such as: *What have you enjoyed about the garden project?* And *What have our challenges been?* Each focus group leader took notes. The notes from all four focus groups were summarized and reviewed to examine key themes and patterns and whether there were differences between youth and adult participants.

RESULTS

Participant Characteristics

Seventeen youth and 23 adults completed baseline data collection in June 2010. All participants were African American. As shown in Table 1, at baseline, youth had an average age of 14.4 years (range: 11–17 years), 37.5 percent were female, and 64.7% were considered at a healthy weight (with a BMI percentile of 5 to less than 85). Adults were an average of 53.5 years old (range 18–80 years), 54.5% were female, had an average blood pressure of 139.3/84 mmHg, and 73.9% were obese (BMI 30 and above). At baseline, 59% of youth reported consuming 3–4 servings of vegetables per day while 20% of adults reported consuming the same amount. A total of 36 garden workdays were held between June 2010 and May 2011. The average number of workdays attended by adults was 12, while the average number of workdays attended by youth was 15.

Fruit and Vegetable Knowledge, Attitudes, Behaviors, and Anthropometrics

Youth—Of the 17 youth who completed baseline data collection, 14 youth (82%) completed post-test anthropometric data and 13 youth (76%) completed the post-test survey.

Statistically significant pre/post improvement in attitudes about farming and gardening were observed in youth. Youth exhibited improvement in fruit and vegetable knowledge that bordered on statistical significance.

Adults—Of the 23 adults who completed baseline data collection, 20 (87%) completed post-test surveys and anthropometric data measurement. No statistically significant pre/post changes were seen in any of the variables for adults. Positive changes were observed in fruit and vegetable knowledge and farming attitudes that bordered on statistical significance.

Effect of Program Attendance

To determine if any of the observed changes were related to program attendance, Spearman rank correlation coefficients were used to test for significant bivariate associations between each participant's program attendance and the pre/post change observed for their fruit and vegetable knowledge, attitudes, behaviors, and anthropometric data. Greater youth program attendance was statistically significantly correlated with an increase in weight although that increase was not at a statistically significant level. Attendance in youth was correlated with attitudes about gardening at a trend level. Greater adult program attendance was statistically significantly correlated with a decrease in systolic blood pressure. No other variables in either youth or adults was significantly correlated with attendance. See Table 3 for more details.

To further examine program attendance we analyzed the qualitative data provided by participants on their post-intervention surveys. When asked about the benefits of attendance, youth, in particular, wrote that they enjoyed working with others and wanted "*the community involved... wanted even more of that.*" Multiple youth participants also noted that they enjoyed "*working*", the "*hard work*", and "*enjoying the fruits of their labors.*"

Program Acceptance

We also analyzed the qualitative data from the post-intervention surveys to assess program satisfaction. When asked what they enjoyed about the program, nearly all adults (14 of the 18 adults who completed a survey) mentioned "fellowship" or "working together" in their answer. Each of the 14 youth who completed the post-test survey was able to identify one or more things that they enjoyed about the program. These included enjoying socializing and being involved in the community (n = 3), getting to learn new things (n= 3), and getting to garden (n = 2).

Focus Group Findings

During the focus groups, participants shared their views on a number of issues. Many of the participants, both youth and adult, felt that we'd focused too much on growing vegetables and not enough on growing fruit. One view expressed by a number of the adult participants, but none of the youth, was that one of the benefits of the garden project and why they attended the workdays regularly was their great enjoyment of the fellowship they experienced by being out in the field planting and harvesting together, something we also saw on the post-intervention surveys. Youth participants expressed a different reason for their participation. A number of the youth participants shared their pleasure with being taught to garden, as one youth put it: '*no one ever teaches me anything. I don't know how to work on lawn mowers or anything.*' The youth participants did, however, note a number of challenges to gardening including having to deal with the heat, insects, not over-watering or under-watering the plants, and knowing how to move through the garden without stepping on the vegetable plants. The adult participants did not express these same challenges.

DISCUSSION

A healthy diet including ample servings of fruits and vegetables is essential for good health. Although previous research has provided evidence that participating in gardening can positively impact nutrition related knowledge, attitudes, and behaviors^{13–18}, in this pilot study we found only limited impact. The majority of youth (64.7%) started the study at a healthy weight, while only 8.7% of adults did. Adults saw slight increases in their weight and BMI following the intervention. We also saw a slight increase in blood pressure in adults following the intervention, though we did not collect data on whether participants were taking blood pressure medication. To our knowledge, few studies have examined the impact of garden project participation on biomarkers such as BMI and blood pressure.

In youth, we saw improvements in attitudes toward farming and gardening. With regard to knowledge and attitudes, adults did have positive changes in knowledge of fruits and vegetables and farming attitudes that bordered on significance. We did not, however, find any improvements in fruit and vegetable consumption as other studies have.^{17, 33, 34}

We also assessed whether regularity of program attendance was correlated with changes in knowledge, attitudes, behaviors, and biomarkers in youth and adults. We found that greater attendance in adults was correlated with decreased systolic blood pressure from pre to post-test and that greater attendance in youth was correlated with increase in positive attitudes about gardening. Factors outside of our intervention may very well have positively affected adult systolic blood pressure including that there may have been changes in the environment making it more conducive to obtain physical activity and/or participants may have started taking blood pressure medication or may have stopped smoking. We did not collect data on these factors, however.

This was a pilot study, however, and was not powered to detect significant changes. For example, we were unable to assess if differences were related to gender. There are challenges to carrying out a research intervention in a real world setting like a church. An ideal research design would have included a randomized, controlled trial with a larger sample size. In addition, this study involved only African Americans dwelling in a rural community and so the results may not be generalizable to other populations.

Attendance was a challenge during the intervention. When asked about reasons for missing workdays, the most often given reason by adults was that the workdays conflicted with work (n = 6). The next most common reason for missing a workday was having health issues (n = 2). Six of the 12 youth cited busyness with school, afterschool work, or extracurricular activities. In addition, the pilot study was conducted in a rural community and although most participants attended the church, their residences were dispersed over a wide geographical area making provision of transportation challenging and without more funds for gas we had to rely on participants to find their own transportation. Workdays were held on a weekday evening as that was chosen by the community-academic partnership as the time that would work best for all parties. It is possible that a weekend workday, perhaps directly after church services, would have led to better attendance due to fewer competing demands among participants.

Our qualitative findings, however, did suggest that both adults and youth enjoyed the gardening intervention. In the post-tests, groups were most likely to cite enjoyment of the social and community aspects of the garden intervention. These findings are similar to other studies, which have found that garden project participants felt that they had built a sense of community and developed stronger social relationships through community gardening.^{35, 36} Further, the youth reported enjoying getting to learn through the intervention.

IMPLICATIONS for FUTURE RESEARCH

Future studies would benefit from efforts to boost attendance such as incentivizing attendance with meals, raffle drawings, or a stipend. In a subsequent study focused on youth, we have been able to pay youth for the hours they participate, boosting attendance. Attendance could also be increased through greater provision of transportation through activities such as arranging for carpools and holding garden workdays before or after existing church activities such as Wednesday bible study or weekend services.

This is one of the first studies to rigorously examine the impact of a church garden intervention using both quantitative methods with innovative and validated tools and qualitative methods. A further strength is that this pilot study included both adults and youth. Our results lend partial support for the use of church based gardening programs to improve diet. Gardening has been shown to have positive affects on adults and youth in other settings. A church setting has the advantage of being the natural meeting place in many rural, Southern communities. This combined with the fact that in these communities churches often have land for gardening and faith community members with gardening and farming expertise suggests that a church setting may be ideal for an intervention such as this. A larger scale study is warranted to provide further support.

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Table 1
Baseline Demographic Information for Participants in Harvest of Hope, a Church Garden-Based Nutrition Intervention.

Variable	YOUTH				ADULTS			
	N (%)	Mean	SD	Range	N (%)	Mean	SD	Range
Gender								
Female	6 (37.5)				12 (54.5)	--	--	--
Male	10 (62.5)				10 (45.5)	--	--	--
Age (years)	17	14.4	1.8	11 – 17	25	53.5	17.5	18 – 80
Weight (lbs)	17	146.5	38.8	66.7 – 233.2	23	203.6	44.0	145.6 – 341
BMI*	--	--	--	--	24	32.3	7.2	21 – 54.5
BMI Percentile**	17	71.6	24.8	14 – 97	--	--	--	--
Systolic Blood Pressure	17	120.4	9.8	100 – 132	25	139.3	19.6	110 – 196
Diastolic Blood Pressure	17	73.9	11.7	60 – 98	25	84.0	12.9	62 – 110
Workday Attendance [#]	--	15	12.1	1 – 35	--	12.1	10.3	0 – 34

Table 2
 Weight, Blood Pressure, and Nutrition Knowledge and Attitudes of Youth and Adults Before and After Participating in Harvest of Hope, a Church Garden-Based Nutrition Intervention.

Variables	YOUTH				ADULTS			
	N	pre	post	p	N	pre	post	p
Weight (lbs)	14	148.5	151.9	0.52	19	204.7	202.2	0.40
BMI	--	--	--	--	18	32.5	31.7	0.14
BMI Percentile	14	71.3	71.7	0.91	--	--	--	--
Systolic Blood Pressure (units)	14	120.5	113.6	0.37	20	137.5	136.6	0.75
Diastolic Blood Pressure (units)	14	74.6	73.3	0.65	20	84.3	83.8	0.78
FV Knowledge	13	12.9	14.5	0.08	20	20.3	21.1	0.09
Help with Meals	12	6.5	6.5	1.00	--	--	--	--
Grocery Shopping Attitudes (kids)	13	2.6	2.5	0.72	--	--	--	--
Grocery Shopping Attitudes (adults)	--	--	--	--	13	3.3	3.4	0.47
Farming Attitudes	13	3.0	3.5	0.02	19	3.8	4.0	0.06
Gardening Attitudes	11	3.0	3.5	0.0005	19	3.5	3.5	0.96
History with Gardening	--	--	--	--	20	3.7	3.8	0.46
Cooking Skills	--	--	--	--	16	3.9	3.9	0.94
FV Neophobia	12	3.3	3.2	0.23	19	3.7	3.7	0.96
Attitudes about Church	13	3.6	3.8	0.21	20	3.9	3.9	0.93
Attitudes about Food Production	--	--	--	--	19	3.4	3.5	0.64
Empowerment	12	3.8	3.6	0.52	20	3.8	3.7	0.41
Community Involvement	13	1.5	1.5	1.00	20	2.4	2.1	0.17
FV Access	--	--	--	--	6	3.5	3.8	0.46
FV Availability	--	--	--	--	17	2.8	2.9	0.81
Self-report daily servings of vegetables	12	2.25	2.5	0.08	21	2.3	2.5	0.10

Table 3

Spearman's Rank Order Coefficients Estimating Correlation Between Program Attendance and Observed Changes in Measured Variables for Participants in Harvest of Hope, a Church Garden-Based Nutrition Intervention.

Variables	YOUTH		ADULTS	
	coefficient	p	coefficient	p
Weight (lbs)	0.71	0.005	0.29	0.23
BMI	--	--	0.55	0.02
BMI Percentile	0.41	0.13	--	--
Systolic Blood Pressure (units)	0.06	0.84	-0.46	0.04
Diastolic Blood Pressure (units)	0.10	0.73	-0.16	0.50
FV Knowledge	0.06	0.85	-0.22	0.36
Help with Meals	-0.31	0.32	--	--
Grocery Shopping Attitudes (kids)	-0.33	0.27	--	--
Grocery Shopping Attitudes (adults)	--	--	-0.17	0.59
Farming Attitudes	0.24	0.43	0.04	0.86
Gardening Attitudes	0.57	0.07	-0.17	0.49
History with Gardening	--	--	-0.01	0.97
Cooking Skills	--	--	-0.17	0.53
FV Neophobia	0.10	0.75	-0.05	0.83
Attitudes about Church	-0.11	0.71	-0.35	0.13
Attitudes about Food Production	--	--	0.24	0.32
Empowerment	-0.20	0.53	-0.38	0.10
Community Involvement	0.23	0.45	0.43	0.06
FV Access	--	--	0.60	0.21
FV Availability	--	--	-0.40	0.11
Daily servings of vegetables	-0.25	0.43	0.04	0.85