Original Research

The effect of a nutrition intervention on parents living in a rural Georgia community

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ABSTRACT

Background: Childhood obesity is a concern for public health organizations. Nearly one in four children living in rural communities are obese, and children living in rural Georgia communities are no exception. For rural communities, prevention efforts are needed to address challenges to reducing childhood obesity. The objective of the present effort was to increase the knowledge of parents in a rural community of the benefits of fruit and vegetable consumption and other healthy options.

Methods: The "We Can Energize Families" curriculum, developed by the National Heart, Lung, and Blood Institute was implemented in a rural Georgia community. Pender's Health Promotion Model, which encompasses the theory of persons taking a self-management approach in their health lifestyle, provided the framework. Participating in the study were 21 parents who had at least one child between the ages of 9-13. Outcome measures, adapted from the 16 measures relevant to the original "We Can Energize Families" objectives, were assessed, incorporating measures related to energy balance, portion size, healthy eating, physical activity, and screen time. Paired-T tests were used to evaluate increases in parents' knowledge of the benefits of consumption of fruits and vegetables. Statistical significance was determined at $p < 0.05$.

Results: There were improvements in 9 of the 16 measures, including knowledge of research and energy balance; attitudes regarding energy balance, portion size, and healthy eating; and behaviors regarding healthy eating, healthy food, physical activity, and screen time. However, improvements were not evident for behaviors related to portion size, knowledge or attitudes pertaining to physical activity, or attitudes regarding screen time.

Conclusions: Particularly in rural communities, parents can contribute to prevention of childhood obesity. The present results demonstrate increases in knowledge of the importance of eating nutrient-dense foods and incorporating fruits and vegetables into daily diets.

Key Words: Health promotion, obesity, parents, nutrition programs, rural communities

doi: 10.21633/jgpha.6.106

INTRODUCTION

Childhood obesity is a complex issue that continues to be a public health concern. Obesity among children places them at greater risk for high blood pressure, breathing problems, joint problems, and psychological stress (CDC, 2015); further, it is associated with the early onset of chronic diseases, such as heart disease, stroke, diabetes, and some cancers (WHO, 2014; IOM, 2013; CDC, 2015). Obesity has financial costs as well. In the United States, the estimated medical cost of obesity was $147 billion in 2008 (Finkelstein, Trogdon & Cohen, 2009). Despite efforts to address this issue, there has been, over the past decade, little change in the prevalence of childhood obesity; currently, more than one-third of children in the United States are obese (Ogden, Carroll & Flagal, 2014). These consequences are pronounced in rural communities, where children are 25% more likely to be overweight or obese than those living in metropolitan areas (Lutfiyya, 2007).

Diet and the physical activity environment influence children's risk for obesity. Rural environments often include advertisements of unhealthy foods, limited access to healthy foods, exposure to large portion sizes and high-energy-dense foods, and lack of safe and appealing places for physical activity (CDC, 2015). To combat these negative influences, and as a result of the association between healthy food choices, maintaining weight, and preventing poor health, the USDA Dietary Recommendations of 2010 outline the benefits of daily ingestion of fruits and vegetables. Across the nation, these goals have consistently not been met (USDA, 2010). Yet, children's risk for obesity can be mediated by parents, who can be effective role models and influence the health of their children (Berlin, Norris, Kolodinsky & Nelson 2013). In rural areas, where health professionals and health resources are often scarce, relying on parents to educate their children about healthy choices, regardless of the environment, may be an effective option.

In Georgia, a predominantly rural state, the prevalence of being overweight or obese among children is 14.8% and 12.4%, respectively (Georgia Department of Community Health, 2012). The objective of the present project was to educate parents within a rural community in Georgia about the health benefits of fruits and vegetables. A nurse

practitioner familiar with the community worked in collaboration with a local Farm-to-School initiative (USDA, 2010) to develop a project to increase parent interest in the program. The hypothesis was that provision of an educational program on nutrition and the benefits of fruits and vegetables would improve the health and lifestyle behaviors of both the parents and children. Parents attended a program entitled "Healthy Options," which incorporated a curriculum from the "We Can Energize Families" developed by the National Institute of Health (NIH, 2007). This curriculum meets the standards of practice according to the guidelines by the National Heart, Lung, and Blood Institute (NIH, 2012). The specific aims of this intervention were to increase parents' knowledge of the importance of eating nutrient-dense foods and of incorporating fruits and vegetables into their daily diets to improve their health.

METHODS

Recruitment and Study Design

This study utilized the curriculum and pre/post-test questionnaires from the "We Can Energize Families" program to assess parents' improvement in nutritional choices, increased physical activity, and reduced screen time for their children ages 8-13 (NIH, 2007). "We Can Energize Families," developed by National Health and Heart, Lung, Blood Institute, has been promoted in collaboration with the National Institute of Diabetes and Digestive and Kidney Diseases, the National Institute of Child Health and Human Development, and the National Cancer Institute. Since its implementation in 2005, "We Can Energize Families" has been replicated in communities throughout the United States and is distinctive among existing youth obesity-prevention initiatives in its focus on programs and activities for parents and families for influencing youth audiences. Evaluations of outcomes conducted by the National Health and Heart, Lung, Blood Institute found that the "We Can Energize Families" was effective in the 14 founding community sites (NIH, 2007).

Pender's Health Promotion Belief Model provided the theoretical framework for this project. The guiding principle was to empower people to live healthier lives and motivate them to be self-managers. (Polit & Beck, 2012; Pender, Murdaugh, & Parsons, 2011). The goal was to give parents a simple guideline for incorporating more fruits and vegetables into their family's meals in order to achieve a healthier lifestyle and to experience lower risks for chronic disease and obesity.

Adaptation of the "We Can Energize Families" program was accomplished in a rural community, of which, according to the 2014 census, 78.7% of the population was Caucasian (US Census Bureau, 2015), and was administered in two locations: a pediatric clinic and the 4-H extension office. The program, entitled "Healthy Options," was presented via PowerPoint. The sample included 21 parents who had at least one child between the ages of 9-13 in their household. Alternatively, the participants could be caretakers of these children. Prior to recruitment of the parents/caretakers, the Institutional Review Board of the University approved the study. The principal investigator met with the local pediatrician and gained approval to access a parent group at his facility. Marketing flyers, created for the parent group at the pediatric clinic, were posted at three clinic sites. Participants were also called on a random basis by the pediatric office manager and informed of the nutrition program. For the second group, parents were selected by the Farm-to-School Camp committee Food Corps service member. Additional marketing materials were developed and distributed via email to the parents in the Farm-to-School Camp. At the beginning of the program, participants were asked to provide informed consent. Then they were given color-coded packets, one with the pre-test and the other with the post-test. Participants were informed that the surveys were anonymous and that they would not reflect names or personal information. For each study group, the questionnaires were completed during the first and last parts of the one-hour session.

Outcome Variables

Outcome measures were adapted from the 16 measures relevant to the original "We Can Energize Families" objectives and were assessed, incorporating measures related to energy balance, portion size, healthy eating, physical activity, and screen time. Outcome measures used to assess changes from pre- to post-test are listed below:

- Research Knowledge
- Energy Balance Knowledge
- Portion Size Knowledge
- Healthy Eating Knowledge
- Physical Activity Knowledge
- Screen Time Knowledge
- Energy Balance Attitude
- Portion Size Attitude
- Healthy Eating Attitude
- Physical Activity Attitude
- Screen Time Attitude
- Energy Balance Behavior
- Portion Size Behavior
- Healthy Eating Behavior
- Physical Activity Behavior
- Screen Time Behavior

Independent Variables

Demographic information collected from participants included gender; race; age in years (18–25, 26–35, 36–45, 46–55, and 55+); education (<high school, high school graduate, some college, college degree, and graduate degree); and number of adults in household (1, and 2 or more).

Data Analysis

Data analyses were performed with SPSS software, and statistical significance was determined using an alpha level of 0.05 or less. In analyzing the parents' responses, the difference between an individual's pre- and post-test score on each survey item was calculated, and the different scores of the related items were totaled. A paired t-test of the mean difference was used to determine if there were significant increases or decreases in self-reported knowledge, attitude, and behavior.

RESULTS

To evaluate the effectiveness of the curriculum, surveys from the 21 participants were analyzed. All participants were Caucasian (Table 1). Most were female (86%) and reported 2 or more adults in the household (91%). Many were in the age group of 36 to 45 (45%) and reported their highest educational level as having some college (48%) (Table 1). With regard to knowledge, behavior, and attitude, 16 measures in the areas of energy balance, portion size, healthy eating, physical activity, and screen time were evaluated.

Table 1. Participant Demographic Characteristics

Characteristic	% (n)
Gender	
Males	14 (3)
Females	86 (18)
Race	
White	100 (21)
Age	
18-25	10 (2)
26-35	20 (4)
36-45	45 (9)
46-55	5 (1)
55+	20 (4)
Educational Level	
<High School	5 (1)
High School Graduate	29 (6)
Some College	48 (10)
College Degree	9 (2)
Graduate Degree	9 (2)
Adults in Household	
1	9 (2)
2 or more	91 (19)

A summary of results demonstrating that 9 of the 16 measures were improved is presented in Table 2. Overall, parents demonstrated improvements in knowledge of issues related to childhood obesity ($p = 0.04$) and energy balance ($p = 0.01$) and reported favorable attitudes on energy balance ($p = 0.001$), portion size ($p = 0.001$), and healthy eating ($p < 0.001$). Pre/post-test scores for changes in behavior indicated that parents' scores improved on healthy eating ($p = 0.006$), healthy food ($p = 0.003$), physical activity ($p = 0.01$), and screen time behavior ($p = 0.02$).

Table 2. Summary of Participant Curriculum Findings

Measure	Pre-Test Mean	Post-Test Mean	Mean Difference	Percent Change	t Value	df	p-value
Research Knowledge	2.29	2.71	0.43	19	2.26*	20	0.04
Energy Balance Knowledge	2.24	2.71	0.48	21	2.69*	20	0.01
Portion Size Knowledge	2.38	2.38	0.00	0	0.00	20	1.0
Healthy Eating Knowledge	2.57	2.67	0.09	3	0.42	20	0.68
Physical Activity Knowledge	2.86	2.71	-0.14	-5	-1.37	20	0.19
Screen Time Knowledge	2.43	2.57	0.14	6	0.83	20	0.42
Energy Balance Attitude	7.0	8.29	1.29	18	4.05*	20	0.001
Portion Size Attitude	3.65	4.25	0.60	16	3.94*	19	0.001
Healthy Eating Attitude	11.65	13.20	1.55	13	4.23*	19	<0.001
Physical Activity Attitude	20.67	20.62	-0.05	-0.2	-0.11	20	0.92
Screen Time Attitude	12.90	12.86	-0.05	-0.4	-0.09	20	0.93
Portion Size Behavior	7.25	7.90	0.65	9	2.04	19	0.055
Healthy Food Behavior	9.76	11.67	1.91	20	3.4*	20	0.003
Healthy Eating Behavior	19.43	21.52	2.09	11	3.05*	20	0.006
Physical Activity Behavior	18.15	20.05	1.90	10	2.67*	19	0.01
Screen Time Behavior	14.30	16.10	1.8	13	2.45*	19	0.02

*Result is statistically significant at alpha=0.05

DISCUSSION

This investigation, conducted among families living in rural communities, examined the effects of the "Healthy Options" nutrition intervention on increasing parents' knowledge of the importance of eating nutrient-dense foods and incorporating fruits and vegetables into daily diets to improve their health. The intervention and pre/post-test assessments were adapted from the NHLBI's "We Can Energize Families" program. Improvements were evident in 9 of the 16 measures, including research and energy balance knowledge; attitudes regarding energy balance, portion size, and healthy eating; and behaviors regarding healthy eating, healthy food, physical activity, and screen time. However, there were no improvements among behaviors related to portion size, knowledge or attitudes pertaining to physical activity, or attitudes regarding screen time. These findings underscore the potential benefits of motivating parents living within rural communities to become more active in preventing childhood obesity.

There were improvements in parents' knowledge of energy balance, which was an assessment of their understanding of how to use it to maintain a healthy weight. Knowledge of energy balance is considered to be fundamental in helping families make healthy decisions in regard to food choices, preparation, and consumption (Dietz and Gortmaker, 2001). Furthermore, for overweight patients, increases in knowledge about nutrition and physical activity are associated with the initiation of efforts to control weight (Galuska, Will, Serdula & Ford, 1999). The present results suggest that the intervention was effective in teaching the importance of consumption of foods and its effect on weight maintenance. For families living in rural communities, an increase in knowledge of energy balance appears to be of value in preventing childhood obesity.

The pre/post test results showed increases in the attitudes relating to energy balance, portion size, and healthy eating, indicating that knowledge and self-perceived value of understanding the necessity of balancing food consumption with physical activity were increased after the intervention program. Although the knowledge of portion size and healthy eating were not appreciably affected, the attitudes in favor of reducing high-fat portions of food and the incorporation of more fruits and vegetables into their diets increased. These advances may assist families in counteracting the risk factors for childhood obesity, such as unhealthy dietary and physical activity environments, which are associated with living in rural communities.

Improvements were not made in the knowledge of portion size, healthy eating, physical activity, or screen time, meaning that the intervention did not substantially change parents' knowledge of the effects of eating high-fat portions of food, choosing a diet high in fruits and vegetables, being physically active either in multiple short periods of activity or one long period, or the effects of watching television as opposed to other forms of quality family time. After the "Healthy Options" program, the attitudes of the parents toward being more active with their families and viewing too much television as an unhealthy option for their children were not significantly changed. Children living in rural communities are less likely to be physically active and have more screen time than those living in urban areas (Anzman, Rollins & Birch, 2010; Lutfiyya, Lipsky, Wisdom-Behounek & Inpanbutr-Martinkus, 2007). The lack of improvement in this regard may be an indicator that families living in these communities may have low levels of knowledge about healthy eating habits, the importance of physical activity, and the appropriate amounts of screen time (Philips & McLeroy, 2004). Further research is needed to identify effective methods for increasing awareness of the risk factors for childhood obesity among families living in rural communities.

After the intervention, there were increases in most of the behaviors regarding health choices, including the parents' ability to determine healthy food options, set healthy eating habits for the family, and read the nutrition facts on food before purchase or consumption. Parents also reported an increased opinion on engaging the family in physical activity and the need to limit the amount of television that the family watches. The only behavioral determinant that did not change was that of portion size. Overall, there were increases in more than half of the outcome measures, which included 4 of the 5 behavioral impacts on healthy eating.

Limitations of this study include a small sample size that included only Caucasian families and the limited time frame of the intervention. The benefits demonstrate that a one-hour program can provide knowledge on healthy options to parents. Ideally, an educational program of this type should be replicated periodically utilizing methods to measure attitudes and behaviors and should target a larger and more ethnically diverse group.

CONCLUSIONS

In summary, implementation of the "Healthy Options" nutrition intervention for parents living in a rural community led to increases in knowledge of the importance of eating nutrient-dense foods and incorporating fruits and vegetables into daily diets. Study participants demonstrated improvements in 9 of 16 measures, but these was a lack of improvement in parents' knowledge of portion size, healthy eating, physical activity, screen time, and some attitude-related measures. These results indicate that interventions similar to "Healthy Options" may be effective in preventing childhood obesity in rural communities.

Acknowledgments

The author would like to thank the following people who were involved in this project: Dr. Jill Hayes, Faculty Chair; Jen Noto, Nutrition Coach; Teri Hamlin, Farm to School Coordinator; Dr. Michael Maley; Billie Gragg; Steven Patrick; Renee Smagur; and Jennie Inglis.

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