

Utilization of a Community-based Participatory Approach to Design and Implement a Peer-led Parenting Pilot Intervention to Influence Child Nutritional and Physical Activity Behaviors

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ABSTRACT

Parents and primary child guardians within the household play critical roles in shaping their children's nutritional and physical activity behaviors, which are among the individual-level determinants of childhood obesity and other chronic conditions. There are well-established correlations between race, socioeconomic status and the risk for obesity calling for both contextually- and individual-centered interventions that are community-driven. The Using Quality Parenting (UQP) pilot intervention was a peer-led, parenting education intervention developed in collaboration with community residents in Atlanta, Georgia to influence child nutritional and physical activity behaviors in African American low socioeconomic status communities. A community-based participatory research (CBPR) framework was used to conduct a mixed-methods needs assessment designed to the UQP curriculum. The UQP program targeted parents of children ages 6-14. The overarching aim was to increase quality parenting and address community identified child obesity disparities and inequities in early and middle childhood. The topics pertaining to parenting to children's health/well-being addressed by the UQP included nutrition, physical activity, socio-emotional development, positive parenting, coping skills, child advocacy, and community development. Analyses were conducted using PSAW 18 statistical software. Descriptive statistics, including frequencies, means, standard deviations, and ranges for the individual survey items were conducted. A t-test was performed comparing pre- and post-program participation. A repeated measure analysis of variance was conducted on the items that demonstrated a significant t-test. The analytic sample was composed of 46 African American parents, with over 50% of the sample earning an annual household income of \$25,000 or less. Participating parents reported significantly higher levels of water consumption for their children post-program in comparison to pre-test reports ($p = .010$). Additionally, based on t-test analyses, parents reported that their children consumed significantly higher levels of proteins, grains, fruits and vegetables at each meal, post-program ($p=0.03$). These findings highlight the potential efficacy of community-informed, parent-led interventions in improving health disparities and related outcomes for children.

Keywords: Community-based participatory research, parenting, peer leadership, child health

BACKGROUND

Parents and primary child guardians within the household play critical roles in shaping their children's nutritional and physical activity behaviors. They have a direct influence on access to and involvement in physical activity (Albanese, Russo, & Geller, 2019; Bronfenbrenner, 1979). They play a particularly salient role in shaping children's eating behaviors (Demir, Bektas, 2017; Mallan & Miller, 2018; Golan, 2006a). Childhood obesity interventions have proven effective when parents are targeted as change agents for the adoption of healthful behaviors among children (Hammersley, Jones, Okely, 2016; Cavaleri, Olin, Kim, Hoagwood, & Burns, 2011; Hoagwood et al., 2010). Some empirical studies support exclusive engagement of parents to achieve desired child health outcomes (Ewald, Kirby,

Rees, Robertson, 2014; Niemeier, Hektner, Enger, 2012; Golan, 2006b).

The role of parents or child guardians in influencing nutrition and physical activity behaviors is critical because these individual-level factors are among the determinants of childhood obesity. Childhood obesity is a major public health issue in the United States (Centers for Disease Control and Prevention, 2019). As early as the preschool years, ethno-racial disparities in obesity are evident and significantly add to risks for chronic conditions including diabetes and cardiovascular disease (Isong, Rao, Bind, Avendaño, Kawachi, & Richmond Taveras, Gillman, Kleinman, Rich-Edwards, & Rifas-Shiman, 2018). Between 2015 and 2016, Non-Hispanic Black (22.0%) and Hispanic (25.8%) youth 6-11 years old maintained significantly

higher obesity prevalence rates than both non-Hispanic white (14.1%) and non-Hispanic Asian (11.0%) youth (Hales, Carroll, Fryar and Ogden CL, 2017). A recent meta-analysis conducted by Weaver, Brazendal, Hunt, Sarzynski, Beets and White (2019) indicated that children and adolescents from middle-income and high-income households were significantly less likely [0.78 (95% CI = 0.72, 0.83) and 0.68 (95% CI = 0.59, 0.77), respectively] to be overweight and obese compared to those in low-income households. Regular physical activity and a healthy diet help prevent and control cardiometabolic diseases like type 2 diabetes, obesity, cardiovascular disease, and hypertension, all of which are more common in minority populations (Bull, Goenka, Lambert, & Pratt, 2017; Myers, Kokkinos, & Nyelin, 2019). These findings confirm a now well-established correlation between race/ethnicity, socioeconomic status, the risk for obesity and the importance of prevention and risk reduction. These factors are systemic and require contextually- and individually-centered interventions that are community-driven (Satcher, 2017).

The utilization of community knowledge can be extremely beneficial when developing interventions addressing health disparities. Community-based Participatory Research (CBPR) emphasizes an equal partnership, power sharing in decision-making, and data ownership between community and academic partners. Among the advantages of CBPR are strengthened neighborhood-campus relationships, improved research question relevance, enhanced research recruitment, implementation, collective dissemination, sustained intervention and mutual benefit for a diverse group of stakeholders (Braithwaite, Akintobi, Blumenthal, & Langley, 2020; Anderson et al, 2015; Drahota et al, 2016; O-Mara Eaves et al, 2015; Wallerstein et al, 2018; Jagosh et al., 2012). This partnership fosters involvement from community members in the development, implementation, and evaluation of programs that address health disparities. This collaborative approach enables the creation of interventions specifically tailored to a community's most significant identified needs and existing resources.

Despite the evidence regarding the influence of parents on their children's health-related behaviors, a noteworthy gap exists in the literature. Within the last decade, the evidence has steadily expanded to suggest that standardized, peer-led, parenting programs impact both behavioral and health related outcomes for children including, but not limited to, the reduction of externalizing/disruptive behaviors (Day, Michelson, Thomson, Penney, & Draper, 2012a; Gyamfi, Burns, Stephens, Geng, & Stambaugh, 2010; Butler & Titus, 2017) and improved infant feeding practices. Fewer have explicitly employed CBPR through engaging parents in development, conceptualization and marketing of programs that prioritize parent participation (Hill, Zoellner, You, Brock, Price, Alexander, Frisard, Brito, Hou, & Estabrooks, 2019; Green Mills, Davison, Gordon, Li, & Jurkowski, 2013). We have not identified any CBPR-driven studies led

by parent facilitators in low-resourced urban settings. The purpose of this manuscript is to detail the processes and outcomes of a CBPR-driven approach to design and implement a peer-led, parenting, pilot intervention to influence child nutritional and physical activity behaviors in African American low socioeconomic status communities.

METHODS

Community-based Participatory Research Partnership Approach

The Morehouse School of Medicine Prevention Research Center (MSM PRC) and the Satcher Health Leadership Institute (SHLI) [hereafter collectively referred to as Academic University Partners] collaborated with community leaders and organizations to conduct a CBPR-driven formative research project to inform the development of a peer-led, parenting, pilot intervention strategy. This approach built upon their previous leadership in community-engaged research and peer-to-peer parenting interventions. The MSM PRC is a CBPR infrastructure where community health needs assessments (CHNAs) are conducted with community stakeholders. They are designed to 1) identify health needs, priorities, and community-engagement strategies and (2) use recommendations for planning and implementing research projects, disease prevention activities, health promotion outreach, and other evaluation initiatives (Holliday, Phillips, Henry Akintobi, 2020; Rollins, Akintobi, Hermstad, Cooper, Goodin, Beane, Spivey, Riedesel, Taylor & Lyn, 2017; Hoffman, Rollins, Akintobi, McAllister, Hernandez, Erwin, & Miller, 2017). The SHLI previously developed and implemented the Smart and Secure Children (SSC) parenting intervention utilized in 17 states across the United States. The SSC is a 10-week manualized intervention developed in collaboration with community residents in neighborhoods characterized by high rates of poverty. The SSC intervention was designed to increase parenting knowledge, parenting skills and parental mental well-being as protective factors to reduce the negative impact of poverty and related risk factors affecting children's mental health. The SSC's intervention history and theoretical basis are detailed elsewhere (Okafor, Sarpong, Ferguson, & Satcher, 2014).

A CBPR mindset necessitated leveraging existing and strategic community leadership alliances of MSM (Academic University Partners) in the City of Atlanta Neighborhood Planning Units (NPU). The formal community leadership structure conceptualized by Maynard Jackson in the 1970s, NPUs are citizen advisory councils through which to partner in developing and implementing interventions (City of Atlanta. Department of Planning and Community Development Office of Planning, 2015 and 2016). Academic University Partners, NPU residents and organizations developed a community-majority governing body, adapted from the MSM PRC community governance board model described elsewhere (Blumenthal, 2006; 2011).

Strategically identified NPUs reflected health disparity risk and opportunity for strategic CBPR partnership. At the aggregate level, 88% of the residents are young African Americans (median age = 30 years) with low educational attainment (26% of adults have not completed high school), and were ranked among the lowest with respect to a constellation of neighborhood health and quality of life indicators when compared to other NPUs (Akintobi et al., 2018; Botchwey, Guhathakurta, & Zhang, 2014). The board was called ARCH, an acronym standing for Accessible Resources for Community Health.

Community Health Needs Assessment Informing Pilot Intervention

The ARCH Board implemented an iterative CBPR approach to, first, identify health inequalities and disease priorities that could be addressed through a parenting intervention through adaptation of a previously administered MSM PRC community health needs assessment tool (Henry Akintobi, Lockamy, Goodin, Hernandez, Slocumb, Blumenthal, Braithwaite, Leeks, Rowland, Cotton, & Hoffman, 2018). ARCH Board members reviewed survey length, ensured culturally relevant and resonant wording, and worked with Academic University Partners to infuse child health-specific questions. The updated CHNA was then pilot-tested during an ARCH Board meeting. Board members participated in a one-hour training to ensure consistent survey administration at community venues. Focus groups were also conducted among African American parents or child-care givers with results detailed elsewhere (Bolar, Hernandez, Henry Akintobi, McAllister, Ferguson, Rollins, Wrenn, Okafor, Collins, & Clem, 2016). Among the top three child health priorities collectively identified from surveys and focus groups were child overweight and obesity and safe places to play and engage in physical activity. Engagement of the ARCH Board resulted in prioritizing an intervention to address parenting skills and leadership to influence their children’s nutritional and physical activity behaviors.

Pilot Intervention Curriculum

The ARCH Board and Academic University Partners worked collaboratively to engage the community to gain input on the content and approach for effective child health intervention, based on the CHNA results. This involved the decision to revise the SSC parenting program curriculum. A sample curriculum was developed based on initial community input. The curriculum was then refined and updated by the community through a series of 5 work-groups involving 122 community residents, many of whom had previously participated in the community needs assessment process. While participants favored the peer-to-peer educational approach employed by the SSC parenting education model for parents with children ages 0-5, they decided to focus on parents of children ages 6-14 to address the gap for programming for parents of children in elementary and middle school.

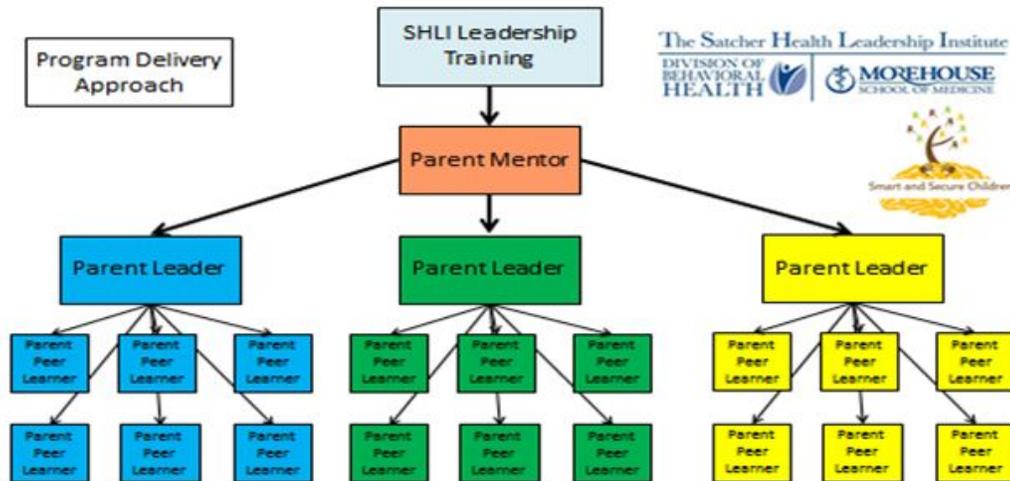
Pilot Intervention: Using Quality Parent Program

The adapted version of the SSC curriculum was called Using Quality Parenting (UQP). Quality parenting includes establishing clear standards and limits; utilizing positive discipline strategies; engaging in positive, supportive interactions; understanding child development; and providing proper healthcare. For children, quality parenting is associated with higher self-esteem, lower risk of antisocial behavior, better social skills and psychological adjustment, and a lower incidence of internalizing behaviors (Grusec & Davidov, 2006). These outcomes are the same for children who remain resilient in the face of adversity. This name encapsulates the overarching aim of UQP, which is to utilize parent-focused strategies with the goal of influencing child health outcomes. The community-academic collaboration central to the CBPR leadership, planning and adaptation of the SSC to the UQP is summarized in Figure 1.

Figure 1
Using Quality Parenting CBPR Community-Academic Partnerships



Figure 2
Using Quality Parenting Program Delivery Approach



The overarching aim of the UQP program was to increase quality parenting skills to improve health and socio-emotional outcomes for children. UQP utilized a peer-to-peer model for program delivery – facilitators (parent leaders) were residents in the community, supported by a parent mentor who also resided in the target community. The UQP pilot intervention consisted of six educational modules including physical activity, nutrition, sleep hygiene, quality parenting, community resources, and community safety. The duration for each module was 1.5 to 2 hours. The 6 modules were completed, in-person on a weekly basis. The total duration of the program was 8 weeks to account for the 6 modules and pre- and post-evaluation sessions. To foster interaction and engagement, the learning groups included 6-8 program participants (parent peer learners).

Parent leadership was strategically fostered at three levels in delivery of the intervention. All parents in leadership were residents of the NPUs prioritized for UQP and detailed earlier. First, parent mentors provided administrative and technical support for parent leaders. They also ensured program fidelity through observation of parent leaders in delivery of the intervention sessions. Second, parent leaders were recruited from an eligible pool of parent participants. They were subsequently referred for leadership development based on their communication skills, interpersonal skills/sensitivity, and interest in leading a class. They received a certification upon satisfying the knowledge and facilitation requirements of UQP and core competencies, including interpersonal skills to engage parent peer learners (see Figure 2).

UQP Pilot Study Intervention Recruitment

Following Institutional Review Board approval (#404790-50) for the pilot study, parents were recruited through established relationships or partnerships with community-based organizations, as well as outreach efforts into community settings made by research staff, past SSC

parent participants, and student interns. Participant eligibility criteria were: 1) residence in one of the target NPUs; 2) working and or spending the majority of time in targeted communities; 3) having a child in their direct care aged 6–14; and 4) African American race/ethnicity.

At outreach events, printed flyers, or past SSC participants discussed their experience with the program. Interested parents were asked to share their contact information (email and phone number) if interested in enrollment into the next scheduled 8-week sessions. The invitation to enroll included a follow-up phone call and email. Official enrollment occurred during an orientation session where new participants received a full background of the study, what it meant to participate, as well as risks and benefits. After review and discussion of the consent forms, parents either signed up during the orientation or took information documents home and returned them later. All new participants were given the schedule of upcoming workshop sessions and the contact information of the study team for any follow-up questions.

Intervention sessions were held at community sites in which participants had prior affiliation, e.g. students at an area college attended sessions at their college, parents of children at a specific school attended at their school. Other sites included public libraries, recreation centers, barber shops, and faith-based centers. With respect to transportation, some participants were close enough to walk, while others used private or public transportation. All session locations were in their communities, with strategic participatory discussion at orientation sessions or during outreach by phone on the time of day, day of week, and locations that were most convenient.

Measures

Assessing Nutrition and Physical Activity Behaviors Scale

Data were collected by direct administration of paper questionnaires that completed pre- and post-program participation. This measure was based on questions from We Can! (Ways to Enhance Children's Activity & Nutrition), a turn-key national education program launched by the National Institutes of Health (National Institutes of Health, 2013), and the 2013 Behavioral Risk Factor Surveillance System (BRFSS) (Pierannunzi, Hu, & Balluz, 2013). The psychometric properties were adequate. Good internal consistency for the behavior scale (Cronbach's $\alpha=0.896$), which correlates with satisfactory internal validity, was ascertained.

In order to assess the nutrition and physical activity behaviors questionnaire, participants answered nine questions on nutritional behaviors, and five questions in the physical activity behaviors. The nutritional behaviors section of the survey included the following assessment items: 1) *I often make sure that healthy snacks are easily available for my family;* 2) *In my family, we have set some rules on foods and eating that we try to follow;* 3) *I have increased the number of cups of plain water my child (children) drink daily;* 4) *Each meal I serve to my child (children) has more proteins, grains, fruits and vegetables;* 5) *I choose and serve less fatty, fried and salty foods;* 6) *I ensure that my child (children) eats fruits and vegetables at home every day;* 7) *The fruits and vegetables that my family eats daily are fresh;* 8) *I serve my family fresh fruits and vegetables at least three times a week;* and 9) *My child (children) eats foods without added sugar.* The physical activity behaviors portion of the survey had the following items: 1) *I found creative ways for my family to be physically active;* 2) *I involve my child (children) in physical activities for at least 30 minutes per day for at least three times a week;* 3) *I limit my child's total time spent each day on TV, DVD /video, computer game and recreational computer use;* 4) *I have been using TV watching as a learning experience for my child (children);* and 5) *I have found several ways other than TV watching that my family can use as a teaching and learning experience for my child (children).* The participants rated their level of agreement with specific nutritional and physical behaviors on a Likert scale ranging from (1) strongly disagree to (3) neither disagree nor agree to (5) strongly agree.

Data Analysis

Survey data were entered directly into a Statistical Package for Social Sciences (SPSS) database and analyses were conducted using PASW 18 statistical software. Descriptive statistics, including frequencies, means, standard deviations and ranges for the individual survey items were conducted. A paired t-test analysis was performed for all nutrition and physical activity behavior items, comparing the means of

the individual responses pre- and post-program participation. Additionally, a repeated measure analysis of variance RMANOVA was conducted on the items that demonstrated a significant t-test.

RESULTS

Intervention Sample

Initially, 108 participants enrolled into the UQP program. Among them, eighty-six completed a pre-test survey. Subsequently, over half completed the entire program (N=46, 53.3% response rate). All participants identified as Black/African American. Table 1 summarizes the demographic characteristics of UQP completers. Most (82.2%) participants were mothers with a mean age of 43.2 years. More than 70% of the parents earned less than a bachelor's degree and reported annual household incomes less than \$55,000.

Table 1
Demographic Characteristics of Study Participants

Demographics	N (%)
Age, years [mean (SD)]	43.2 (13.4)
Parent	
Male	8.0 (17.8)
Female	37.0 (82.2)
Education	
Less than high school	7 (15.6)
GED/High school diploma	12 (26.7)
Some college or vocational school	11 (24.4)
Associate's degree	4 (8.9)
Bachelor's degree	4 (8.9)
Some graduate school	2 (4.4)
Master's degree/Professional degree	3 (6.7)
Annual household income (\$)	
< 10,000	18 (40.0)
10,001-25,000	5 (11.1)
25,001-40,000	12 (26.7)
40,001-55,000	5 (11.1)
> 55,000	-
Prefer not to disclose	4 (8.9)
Program completion	
Completers	46 (53.5)
Non-completers	40 (46.5)

Attrition

The pre-test group comprised a sample size of 86 parents. The post-test group comprised 46 parents. Forty parents did not complete all required sessions and, therefore, did not complete a post-test survey. Paired t-tests were analyzed for participants who completed the entire 8-week program (with these pre- and post-test surveys included into the analysis for this report). Chi-square statistics indicated that participants who completed post-surveys and those who did not were not different with regards to their age, gender, level of education, and income. Parents did not have statistically significant differences in sociodemographic factors and pre-test answers.

T-tests were conducted to compare the pre- and post- UQP training means for each item on the child nutrition and

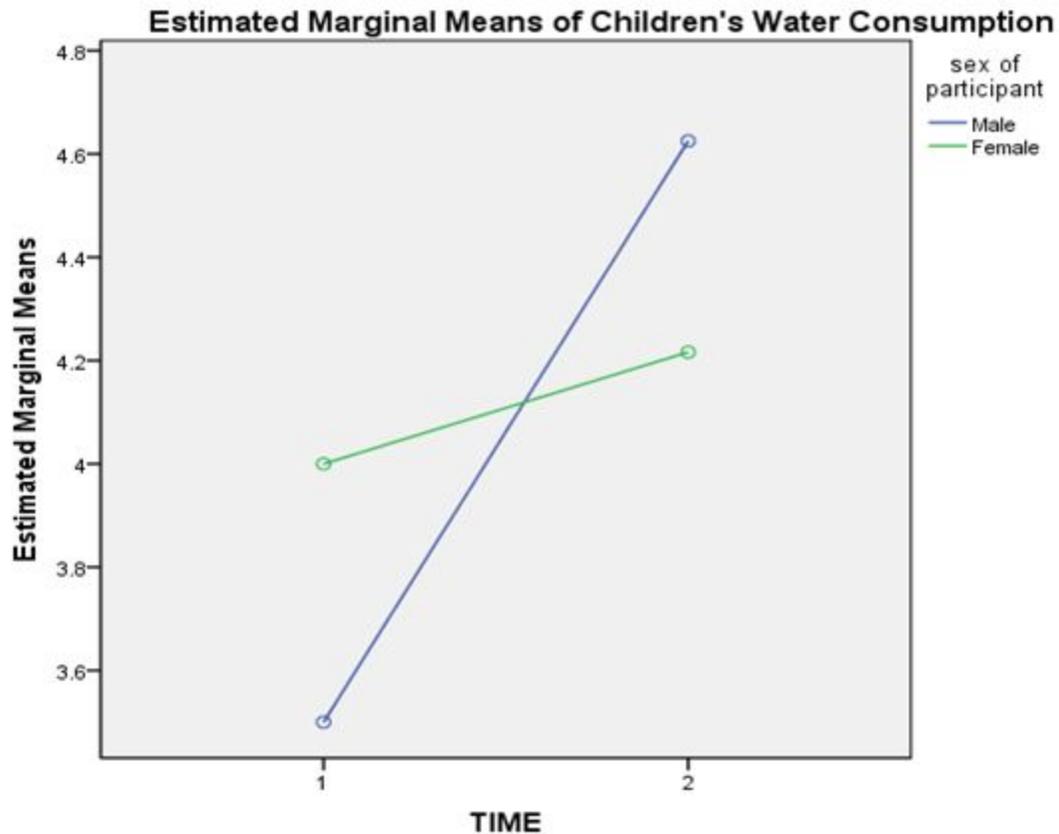
physical activity assessment, which are presented in Table 2.

Table 2

Pre/Post Comparison of Parental Perception towards Child Nutritional and Physical Activity Behaviors

	Pre-test means N=46	Post-test means N=46	Mean difference (SD)	95% CI	P value
Nutrition					
I often make sure that healthy snacks are easily available for my family	4.33	4.33	-0.11 (1.21)	-0.47- 0.25	0.54
In my family, we have set some rules on foods and eating that we try to follow	3.76	4.06	-0.35 (1.41)	-0.78 - 0.08	0.11
Each meal I serve to my child has more proteins, grains, fruits, and vegetables	3.96	4.24	-0.43 (1.32)	-0.83 - 0.03	0.03
I choose and serve less fatty, fried and salty foods	3.73	3.71	0.08 (1.24)	-0.33 - 0.48	0.70
I ensure that my child eats fruits and vegetables at home every day	4.08	4.00	-0.04 (1.24)	-0.42 - 0.33	0.81
The fruits and vegetables that my family eats daily are fresh	3.88	4.02	-0.16 (1.41)	-0.59 - 0.27	0.46
I serve my family fresh fruits and vegetables at least three times a week	4.04	4.06	-0.15 (1.51)	-0.61 - 0.29	0.49
My child eats food without added sugar	3.69	3.67	-0.04 (1.52)	-0.49 - 0.41	0.85
I have increased the number of cups of plain water my child (children) drink daily	3.90	4.24	-0.38 (1.30)	-0.77 - 0.01	0.05
Physical Activity					
I involve my child in physical activities for at least 30 minutes per day for at least three times per week	3.81	3.98	-0.35 (1.25)	-0.72 - 0.02	0.07
I limit my child's total time spent each day on TV, DVD/video, computer game and recreational computer use	3.78	4.02	-0.36 (1.45)	-0.80 - 0.08	0.10
I have been using TV watching as a learning experience for my child	3.44	3.31	0.07 (1.60)	-0.41 - 0.55	0.78
I have found several ways other than TV watching that my family can use as a teaching and learning experience for my child	3.81	3.92	-0.09 (1.55)	-0.55 - 0.38	0.70

Figure 3
Estimated Marginal Means of Children's Water Consumption



For parental behavior related to serving proteins, grains, fruits, and vegetables, parents reported serving higher levels of these foods, post-program when compared to pre-test scores that were statistically significant ($p=0.03$). Similarly, parents reported increases of 0.38 in the mean difference for their children's daily consumption of plain water ($p=0.05$). Post-UQP training, we found that more parents indicated that their children were engaged in physical activities for at least 30 minutes per day, 3 times per week (mean difference, -0.35 ; $P = 0.07$). This change was approaching, but not statistically significant.

A repeated measure analysis of variance (RMANOVA) was conducted to assess change across time for water consumption and the intake of proteins, grains, fruits, and vegetables. The RMANOVA for serving proteins, grains, fruits, and vegetables was not significant. However, time was a significant predictor of water consumption scores pre- to post-program ($F(1,43) = 7.36, p = .010$) participation. However, the time by gender interaction was not significant ($F(1,43) = 3.79, p = .07$). The results indicate that, post-program, children's water consumption scores were significantly higher than pre-test scores, and this increase, across time, did not vary by a parent's gender (Figure 3).

DISCUSSION

Findings from the current study provide preliminary evidence for the effectiveness of CBPR-driven, peer-led, parenting interventions in influencing children's eating behaviors and water consumption. Despite the small sample size, parents reported significantly higher consumption levels of water, proteins, grains, fruits and vegetables for their children, post-program. Additionally, it appears that children may have had higher engagement in physical activity post-program. This finding is speculative in nature due to this outcome only approaching significance. Formative research conducted through focus groups in intervention may help to explain non-significant results for physical activity behaviors. Parental concerns related to community violence and unrest made them feel unsafe and less secure in their children going outside to play and be physical active (Bolar, Hernandez, Henry Akintobi, McAllister, Ferguson, Rollins, Wrenn, Okafor, Collins, & Clem, 2016). This issue was not addressed through the UQP intervention but is an important consideration and community-contextual issue that may be relevant in the development of subsequent programs in low-resourced urban communities.

The results of this investigation aligns with empirical evidence that supports building effective parenting skills as a means to positively influence various child behaviors (Day, Michelson, Thomson, Penney, & Draper, 2012b). Peer-led, parenting interventions demonstrate positive outcomes for parenting and children's behavior. For example, a meta-analysis of 10 random control trials (RCTs) and three quasi experimental trials demonstrated that parenting interventions, delivered in group settings, are effective in improving child conduct, parental mental health, and parenting skills (Furlong et al., 2012). Hill et al. (2019) engaged local healthcare, public health, recreation organizations and academic partners to select evidence-based programs designed to reduce pediatric obesity risk through assessment of program, adoption and implementation factors. While community relevance of the programs was assessed through a multidisciplinary stakeholder group, none of the prioritized evidence-based interventions were directly informed or led by parent peer leaders. We postulate that when parents feel empowered, they are endowed with the motivation, knowledge and skills to make a meaningful impact on their children's health behaviors.

This study also extends the few studies that explicitly purported CBPR approaches designed to develop and implement interventions addressing child health obesity or related physical activity and nutritional intake behaviors. Korn et al. (2018) conducted a meta-analysis on the role of coalitions in the development of childhood obesity prevention programs. Thirteen studies detailed CBPR approaches, with some engaging parents in planning, implementation and recruitment or participation. None detailed the role of parents in intervention delivery or as peer leaders. Green Mills et al. (2013) implemented the most noteworthy parent-centered CBPR approach to development of a childhood obesity risk reduction program. Parents were engaged as research experts and participants on a community advisory board guiding the development of intervention key components and informed by a mixed-methods needs assessment. They were subsequently trained to lead the intervention with significant pre- to post-test improvements in parent-reported obesity, physical activity, daily TV viewing, and dietary intake. Their parent-empowerment approach is extended by the UQP CBPR methods whereby parents engage in formative research informing the adaptation of a pre-existing curriculum to address the gap in programming for parents of elementary and middle school children (rather than those 0-5 years of age). In summary, the UQP intervention contributes an in-depth understanding of the utilization of CBPR in the integration of not only community wisdom, but parent leadership infrastructures in the facilitation, modeling and diffusion of skills toward influencing child nutrition and physical activity behaviors in low-resourced settings.

Limitations

The current study design did not consist of a randomized control trial, therefore causation cannot be inferred by the findings. Additionally, the sample size ($N = 46$) was small and homogeneous with respect to race, socio-economic status and geography; therefore, the findings may not generalize to other populations. This study relied on self-report of participants. Subsequent studies will include objective measurements of obesity-related outcomes including blood pressure, obesity, high-density lipoprotein cholesterol, low-density lipoprotein cholesterol and triglycerides, as many contribute to not only obesity but other resulting comorbidities including diabetes and cardiovascular disease (Hannon, Saha, Carroll, Palmer, O'Kelly Phillips, & Marrero, 2018). An additional limitation was lack of a control group to ensure preliminary changes were due to the intervention, instead of extraneous factors. Future investigations will be bolstered through qualitative data collection among participants who did not complete the intervention to understand reasons for attrition towards intervention improvement and other contextual barriers to participation.

Strengths

The unique contribution of this study is the peer-to-peer delivery method that focused on improving quality parenting skills as a means to improve child health outcomes within an urban minority low-resource population. Furthermore, the current intervention was true to the CBPR approach, with the curriculum developed with and delivered by residents in the target population. The community had a direct influence on the content, delivery, and evaluation of the current intervention through the ARCH Board, which provided on-going insights on best practices for working with the target population. Due to the ARCH Board's strategic residence in the at-risk communities prioritized for this study, their roles in marketing and awareness of this study resulted in all participants being representative of the target population. This study highlights the processes involved in establishing strong academic-community partnerships that result in effective programming and improved child health behaviors.

Overall, this research contributes to the growing body of literature documenting benefits of CBPR-driven trained parent peers in delivering interventions to parents of young children. Future studies should include a comparison model of peer- versus professionally-led parenting programs in similar populations to ascertain which method may be more efficacious for childhood obesity interventions. This comparison model should also be a randomized control trial. It would also be important to delineate the specific parenting practices that have an impact on children's nutrition and physical activity. The ability to tease apart which parenting aspects have a more direct influence on child health outcomes will inform modifications to the curriculum content, which could be used to enhance program benefits.

Not only is there a need to determine factors that contribute to the long-term effectiveness of childhood health interventions through a peer-led parent focused intervention, but more empirical work is needed to determine process factors that contribute to optimal programmatic outcomes. By this process, the community gains a true sense of ownership and responsibility for improving health disparities among children within their respective neighborhoods (Chung et al., 2009). Conceptually, it is anticipated that through utilizing CBPR, outcomes will not only answer a research question and reap associated statistical outcomes, but will also address community-identified social, economic or policy priorities (Anderson et al., 2015; Drahota et al., 2016; Wallerstein et al., 2018; Blumenthal, 2006; 2011; Israel, Schulz, Parker, & Becker, 1998; 2013).

This study particularly aligns with three of the T^X™ tenets of translational research scholarship (Henry-Akintobi, Hopkins, Holden, Hefner & Taylor, 2019) and the theme of this special issue. First, the intervention conceptualized strategic engagement of community residents, first, in the establishment of a neighborhood community governance infrastructure, needs assessment and the subsequent planning and training of parent peer-leaders. This was the result of leveraging the long-standing leadership of neighborhood resident leaders in collaboration with Academic University Partners. Second, governed by the ARCH Board and an interdisciplinary team of faculty and staff (public health, psychology, behavioral health and public health professionals and community health workers) worked together to plan and deliver the UQP intervention. Third, the approach utilized community-wisdom and voice through needs assessment and pre-, post-intervention data collection to develop a foundation for data-driven proof-of-concept in subsequent studies in underserved populations where advancing health equity is imperative.

CONCLUSIONS

Parents and child guardians serve as their children's first teachers, influencing life skills and behaviors that are among the individual-level determinants of their health. It is important for researchers and practitioners to acknowledge the valuable impact parents can have in interventions that aim to improve child outcomes. Engaging parent leadership in intervention development and implementation to influence children's health should be a standard practice - not an afterthought - due to the substantial influence parents have on shaping children's eating habits and health behaviors. Furthermore, utilizing a CBPR approach to gather input from potential program participants prior to program development and implementation will potentially provide programmatic insights that lead to enhanced outcomes and sustained implementation, especially within vulnerable populations. The current research highlights the peer-to-peer educational approach as a promising model for parenting interventions that target communities at-risk for

adverse health outcomes based on individual behaviors and neighborhood contexts that serve as barriers or facilitators to their health. As practitioners and researchers, it is important that we join with potential participants to discover more comprehensive solutions that are relevant and culturally sensitive. Not only will this method lead to more sustainable outcomes, but it will also result in community residents who are empowered and better positioned to make a meaningful impact on the health and well-being of their children.

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References

- Akintobi, T.H., Hoffman, L., McAllister, C., Goodin, L., Hernandez, N., Rollins, L., & Miller, A. (2016). Assessing the oral health needs of black men in low-income, urban communities. *American Journal of Men's Health*, PMID:27008993
- Albanese AM, Russo GR, & Geller PA (2019). The Role of Parental Self-Efficacy in Parent and Child Wellbeing: A Systematic Review of Associated Outcomes. *Child Care Health Dev.* 2019 Mar 14. doi: 10.1111/cch.12661.
- Blumenthal, D. S. (2006). A community coalition board creates a set of values for community-based research. *Prev.Chronic.Dis.*, 3, A16.
- Blumenthal, D.S. (2011). Is community-based participatory research possible?. *American Journal of Preventive Medicine*, 40(3),386-389.
- Botchwey, N., S. Guhathakurta, G. Zhang, G. 2014. Atlanta's Neighborhood Quality of Life and Health Project." Center for Geographic Information systems. Accessed Tue Jun 16 2020 07:39:41 GMT-0400 (Eastern Daylight Time), from <http://www.cgis.gatech.edu/NQOLH/>
- Braithwaite, R., Akintobi, T., Blumenthal, D., & Langley, D. (Eds). (2020). *Morehouse Model: How One School of Medicine Revolutionized Community Engagement and Health Equity* Johns Hopkins University Press: Baltimore, Maryland
- Bronfenbrenner, U. (1979). *The Ecology of Human Development: Experiments by Nature and Design*. Harvard University Press.
- Bull, F., Goenka, S., Lambert, V., & Pratt, M. (2017). Physical activity for the prevention of cardiometabolic disease. *Disease Control Priorities*, 5.
- Butler, A. M., & Titus, C. (2017). Pilot and feasibility study of a parenting intervention delivered by parent peers. *Vulnerable children and youth studies*, 12(3), 215-225.
- Cavaleri, M. A., Olin, S. S., Kim, A., Hoagwood, K. E., & Burns, B. J. (2011). Family support in prevention programs for children at risk for emotional/behavioral problems. *Clinical child and family psychology review*, 14(4), 399-412.
- Centers for Disease Control and Prevention (2019). *Childhood Obesity Facts*. Retrieved from <https://www.cdc.gov/obesity/data/childhood.html>

- City of Atlanta. Department of Planning and Community Development Office of Planning. Office of Zoning and Development; 2016. Available from: www.atlantaga.gov/index.aspx?page=739 [cited 2016 Jul 25]
- City of Atlanta: Department of Planning and Community Development Office of Planning; 2010. Census Summary Report Neighborhood Planning Unit V. Available from: www.atlantaga.gov/modules/showdocument.aspx?documentid=3897 [cited 2015 Mar 10]
- Chung, B., Jones, L., Jones, A., Corbett, C. E., Booker, T., Wells, K. B. et al. (2009). Using community arts events to enhance collective efficacy and community engagement to address depression in an African American community. *Am.J Public Health*, 99, 237-244.
- Day, C., Michelson, D., Thomson, S., Penney, C., & Draper, L. (2012a). Evaluation of a peer led parenting intervention for disruptive behaviour problems in children: community based randomised controlled trial. *BMJ*, 344, e1107.
- Day, C., Michelson, D., Thomson, S., Penney, C., & Draper, L. (2012b). Evaluation of a peer led parenting intervention for disruptive behaviour problems in children: community based randomised controlled trial. *BMJ*, 344, e1107.
- Demir D & Bektas M. (2017). The effect of childrens' eating behaviors and parental feeding style on childhood obesity. *Eat Behav.* 2017 Aug;26:137-142.
- Denney-Wilson E, Laws R, Russell CG, Ong KL, Taki S, Elliot R, Azadi L, Lymer S, Taylor R, Lynch J, Crawford D, Ball K, Askew D, Litterbach, EK, & Campbell, K. (2015). Preventing obesity in infants: the Growing healthy feasibility trial protocol. *BMJ Open*. Nov 30;5(11):e009258. doi: 10.1136/bmjopen-2015-009258.
- Ewald H, Kirby J, Rees K, Robertson W. Parent-only interventions in the treatment of childhood obesity: a systematic review of randomized controlled trials. *J Public Health (Oxf)* 2014 Sep;36(3):476–89.
- Ferre, C. D., Jones, L., Norris, K. C., & Rowley, D. L. (2010). The Healthy African American Families (HAAF) project: from community-based participatory research to community-partnered participatory research. *Ethn.Dis.*, 20, S2-S8.
- Furlong, M., McGilloway, S., Bywater, T., Hutchings, J., Smith, S. M., & Donnelly, M. (2012). Behavioural and cognitive-behavioural group-based parenting programmes for early-onset conduct problems in children aged 3 to 12 years. *Cochrane.Database.Syst.Rev.*, 2, CD008225.
- Golan, M. (2006a). Parents as agents of change in childhood obesity--from research to practice. *Int.J.Pediatr.Obes.*, 1, 66-76.
- Golan, M. (2006b). Parents as agents of change in childhood obesity--from research to practice. *Int.J.Pediatr.Obes.*, 1, 66-76.
- Golan, M. & Crow, S. (2004). Targeting parents exclusively in the treatment of childhood obesity: long-term results. *Obes.Res.*, 12, 357-361.
- Golley RK, Hendrie GA, Slater A, Corsini N. (2011) Interventions that involve parents to improve children's weight-related nutrition intake and activity patterns - what nutrition and activity targets and behaviour change techniques are associated with intervention effectiveness? *Obes Rev.* 12(2):114–30.
- GreenMills, L. L., Davison, K. K., Gordon, K. E., Li, K., & Jurkowski, J. M. (2013). Evaluation of a childhood obesity awareness campaign targeting head start families: designed by parents for parents. *Journal of health care for the poor and underserved*, 24(2 Suppl), 25–33. <https://doi.org/10.1353/hpu.2013.0096>
- Gyamfi, P, Walrath, C., Burns, B., Stephens, R., Geng, Y., Stambaugh, L. (2010). Family Education and Support Services in Systems of Care *Journal of Emotional and Behavioral Disorders*, vol. 18, 1: pp. 14-26.
- Grusec, JE & Davidov, M. (2010). Integrating different perspectives on socialization theory and research: a domain-specific approach. *Child Dev.* May-Jun;81(3):687-700.
- Hales CM, Carroll MD, Fryar CD, Ogden CL. Prevalence of obesity among adults and youth: United States, 2015–2016. NCHS data brief, no 288. Hyattsville, MD: National Center for Health Statistics. 2017.
- Hammersley, ML, Jones, RA, & Okely, AD (2016). Parent-Focused Childhood and Adolescent Overweight and Obesity eHealth Interventions: A Systematic Review and Meta-Analysis. *J Med Internet Res.* 18(7): e203. doi: 10.2196/jmir.5893.
- Hannon, T. S., Carroll, A. E., Palmer, K. N., Saha, C., Childers, W. K., & Marrero, D. G. (2015). Rationale and design of a comparative effectiveness trial to prevent type 2 diabetes in mothers and children: The ENCOURAGE healthy families study. *Contemporary clinical trials*, 40, 105-111.
- Hannon, T. S., Saha, C. K., Carroll, A. E., Palmer, K. N., O'Kelly Phillips, E., & Marrero, D. G. (2018). The ENCOURAGE healthy families study: a comparative effectiveness trial to reduce risk for type 2 diabetes in mothers and children. *Pediatric diabetes*, 19(6), 1041-1049
- Henry Akintobi, T., Lockamy, E., Goodin, L., Hernandez, N., Slocumb, T., Blumenthal, D., Braithwaite, R., Leeks, L., Rowland, M, Cotton, T., & Hoffman, L (2018). Processes and outcomes of a community-based participatory research-driven health needs assessment: A tool for moving health disparity reporting to evidence-based action. *Progress in Community Health Partnerships: Research, Education, and Action*, (12)139-147.
- Henry Akintobi, T., Hopkins, J., Holden, K., Hefner, D., & Taylor, H. (2019) Tx™: An Approach and Philosophy to Advance Translation to Transformation. *Ethnicity & Disease* ;29(Suppl 2): 349- 354. doi:10.18865/ed.29.S2.349
- Hill, J. L., Zoellner, J. M., You, W., Brock, D. J., Price, B., Alexander, R. C., Frisard, M., Brito, F., Hou, X., & Estabrooks, P. A. (2019). Participatory development and pilot testing of iChoose: an adaptation of an evidence-based paediatric weight management program for community implementation. *BMC public health*, 19(1), 122. <https://doi.org/10.1186/s12889-019-6450-9>
- Hoagwood KE. (2005) Family-based services in children's mental health: A research review and synthesis. *Journal of Child Psychology and Psychiatry.* 46(7):670–713.
- Hoffman, L.M., Rollins, L., Akintobi, T.H., McAllister, C., Hernandez, N., Erwin, K., & Miller, A. (2017). Evaluation of a community-based participatory oral health intervention for low-income African American men. *American Journal of Public Health*, Supplement 1(107), 104-110. PMID: 28661811
- Holliday, R. Phillips, R. & Henry Akintobi, T. (2020). A Community Based Participatory Approach to the Development and Implementation of an HIV Health Behavior Intervention: Lessons Learned in Navigating Research and Practice Systems from Project HAPPY. *International Journal of Environmental Research and Public Health.* 17(2), 399. <https://doi.org/10.3390/ijerph17020399>
- Israel, B. A., Schulz, A. J., Parker, E. A., & Becker, A. B. (1998). Review of community-based research: assessing partnership approaches to improve public health. *Annual review of public health*, 19, 173–202. <https://doi.org/10.1146/annurev.publhealth.19.1.173>
- Israel, B. A., Eng, E., Schulz, A. J., & Parker, E. A. (2012). *Methods for Community*

- Based Participatory Research for Health. Somerset : John Wiley & Sons, Incorporated.
- Isong, I., Rao, S., Bind, M., Avendaño, M., & Kawachi, I., Richmond, T., (2018). (Racial and Ethnic Disparities in Early Childhood Obesity. *Pediatrics*, 141 (1) e20170865; DOI: <https://doi.org/10.1542/peds.2017-0865>
- Jagosh, J., Macaulay, A. C., Pluye, P., Salsberg, J., Bush, P. L., Henderson, J. et al. (2012). Uncovering the benefits of participatory research: implications of a realist review for health research and practice. *Milbank Q.*, 90, 311-346.
- Jones, L. & Wells, K. (2007). Strategies for academic and clinician engagement in community-participatory partnered research. *JAMA*, 297, 407-410.
- Korn, A. R., Hennessy, E., Tovar, A., Finn, C., Hammond, R. A., & Economos, C. D. (2018). Engaging Coalitions in Community-Based Childhood Obesity Prevention Interventions: A Mixed Methods Assessment. *Childhood obesity (Print)*, 14(8), 537–552. <https://doi.org/10.1089/chi.2018.0032>
- Lytle, L. A., Seifert, S., Greenstein, J., & McGovern, P. (2000). How do children's eating patterns and food choices change over time? Results from a cohort study. *Am.J.Health Promot.*, 14, 222-228.
- Mallan, K. & Miller, N. (2018). Early Eating Behavior and Taste Development Influence in Children (vol 91, pp 21-30) in Henry CJ, Nicklas TA, Nicklaus S (eds): *Nurturing a Healthy Generation of Children: Research Gaps and Opportunities*. Nestlé Nutr Inst Workshop Ser. Nestlé Nutrition Institute, Switzerland/S. Karger AG., Basel.
- Myers, J., Kokkinos, P., & Nyelin, E. (2019). Physical activity, cardiorespiratory fitness, and the metabolic syndrome. *Nutrients*, 11(7), 1652.
- Mosack, K. E., Patterson, L., Brouwer, A. M., Wendorf, A. R., Ertl, K., Eastwood, D. et al. (2013). Evaluation of a peer-led hypertension intervention for veterans: impact on peer leaders. *Health Educ.Res.*, 28, 426-436.
- Niemeier BS, Hektner JM, Enger KB. (2012). Parent participation in weight-related health interventions for children and adolescents: a systematic review and meta-analysis. *Prev Med*. 55(1):3–13.
- National Institutes of Health. (2013). We Can! (Ways to Enhance Children's Activity & Nutrition). <https://www.nhlbi.nih.gov/health/educational/wecan/tools-resources/index.htm> . Retrieved October 2, 2017
- Office of President, US Department of Health and Human Services, US Department of Agriculture, US Department of Education, & US Department of the Interior (2015). Let's Move Web site. <http://www.letsmove.gov/> [On-line]. Available: <http://www.letsmove.gov/>
- Ogden, C. L., Carroll, M. D., & Flegal, K. M. (2008). High body mass index for age among US children and adolescents, 2003-2006. *JAMA*, 299, 2401-2405.
- Ogden, C. L., Troiano, R. P., Briefel, R. R., Kuczmarski, R. J., Flegal, K. M., & Johnson, C. L. (1997). Prevalence of overweight among preschool children in the United States, 1971 through 1994. *Pediatrics*, 99, E1.
- Okafor, M., Sarpong, D. F., Ferguson, A., & Satcher, D. (2014). Improving health outcomes of children through effective parenting: model and methods. *Int.J.Environ.Res.Public Health*, 11, 296-311.
- Pierannunzi, C., Hu, S. S., & Balluz, L. (2013). A systematic review of publications assessing reliability and validity of the Behavioral Risk Factor Surveillance System (BRFSS), 2004GÇö2011. *BMC Medical Research Methodology*, 13, 49.
- Peirson L, Fitzpatrick-Lewis D, Morrison K, Warren R, Usman AM, Raina P. (2015). Treatment of overweight and obesity in children and youth: a systematic review and meta-analysis. *CMAJ Open*. 3(1): E35–46.
- Rempel, L. A. & Moore, K. C. (2012). Peer-led prenatal breast-feeding education: a viable alternative to nurse-led education. *Midwifery*, 28, 73-79.
- Rollins, L., Akintobi, T.H., Hermstad, A., Cooper, D., Goodin, L., Beane, J., ... Lyn, R. (2017). Community-based approaches to reduce chronic disease disparities in Georgia. *Journal of the Georgia Public Health Association*, 6(4), 402-410. ISSN:2471-9773.
- Satcher, D. (2017). Childhood Obesity in Georgia. *Public Health Rep*. Nov/Dec;132(2_suppl):7S-8S. doi: 10.1177/0033354917719442.
- Sung-Chan P, Sung YW, Zhao X, & Brownson RC. (2013). Family-based models for childhood-obesity intervention: a systematic review of randomized controlled trials. *Obes Rev*. Apr;14(4):265–78.
- Wallerstein, N. & Duran, B. (2010). Community-based participatory research contributions to intervention research: the intersection of science and practice to improve health equity. *Am.J Public Health*, 100 Suppl 1, S40-S46.
- Weaver RG, Brazendale K, Hunt E, Sarzynski MA, Beets MW, & White K (2019). Disparities in childhood overweight and obesity by income in the United States: an epidemiological examination using three nationally representative datasets. *Int J Obes (Lond)*. Feb 4. doi: 10.1038/s41366-019-0331-2. [Epub ahead of print]
- Yavuz, H. M., van Ijzendoorn, M. H., Mesman, J., & van, d., V (2015). Interventions aimed at reducing obesity in early childhood: a meta-analysis of programs that involve parents. *J Child Psychol.Psychiatry*, 56, 677-692.

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