

NEEDS ASSESSMENT FOR A CHILDHOOD OBESITY INTERVENTION PROGRAM

By

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(Under the Direction of Alex Kojo Anderson)

ABSTRACT

The purpose of this cross-sectional study was to assess the needs of families of obese children to inform the development of a childhood obesity intervention program. Using a structured questionnaire containing closed- and open-ended questions, selected nutritional and behavioral habits of 20 obese children were assessed through telephone interviews with primary caregivers. Half of the children were males, and the average age was 9.2 years. Spanish was reported to be the primary language in the homes of 75% of participants. On average, the children consume 3.2 ± 1.9 servings/d of fruits and vegetables and 1.9 ± 1.6 cups/d of sugar-sweetened beverages. The children were reported to participate in 54.3 min/d of active play and 114.3 minutes/d of screen time on average. The data suggest a need for an intervention program with emphasis on improving nutritional and behavioral habits of obese children while ensuring cultural relevancy.

INDEX WORDS: child, adolescent, overweight, obesity, intervention, needs assessment

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DEDICATION

This work is dedicated to my parents, Stanley and Dee Harper, for always supporting me and encouraging me to achieve my dreams.

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I must first thank God for His immeasurable grace and blessings. I would not have made it this far without the provision and strength He gives me daily.

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CHAPTER 1

INTRODUCTION

It is widely known that childhood obesity is a major health problem in the United States. Although it has not increased significantly over the past decade, the prevalence of childhood obesity remains high at around 17% for children and adolescents aged 2 through 19 years (1). This is an important public health problem as obese children have increased risk of developing chronic health conditions such as hypertension, type 2 diabetes mellitus, and dyslipidemia (2). Obese children are also at increased risk of developing obesity during adulthood, which puts them at risk for additional chronic health conditions, including cardiovascular disease and some cancers (3). In response to this major public health problem, the U.S. Department of Health and Human Services established objectives in *Healthy People 2020* to reduce the proportion of children and adolescents who are considered obese, with the specific goal of reducing the prevalence of obesity among children and adolescents aged 2 to 19 years to 14.5 percent (4).

Risk factors for childhood obesity include many genetic, behavioral, and environmental factors (5 – 8). The current literature indicates that specific behaviors and environmental factors may influence obesity, even among genetically at risk individuals (9). As part of a larger effort to update the 1998 Expert Committee recommendations on the prevention, assessment, and treatment of childhood obesity, A recent review (6) found consistent evidence supporting a strong association between childhood obesity and frequent eating out at restaurants, unlimited screen time, not eating breakfast daily, eating few family meals, not controlling portion sizes, and unlimited sugar-sweetened beverage intake as well as mixed evidence regarding the relationship between childhood obesity and low intake of fruits and vegetables. The authors also

observed strong evidence that daily moderate/vigorous physical activity may help reduce adiposity in overweight/obese children.

In order to address the many underlying causes of childhood obesity, experts on childhood obesity recommend taking a multi-component approach to childhood obesity treatment (9 – 13). The American Academy of Nutrition and Dietetics recommends that pediatric overweight interventions combine family-based and school-based components that promote physical activity, parent training/modeling, behavior counseling, and nutrition education (10). The Cochrane Review of interventions for treating childhood obesity revealed that combined lifestyle interventions were more effective than standard care or self-help at reducing overweight in children and adolescents (11). The Cochrane Review also reported that the use of orlistat or sibutramine may be effective in the treatment of obesity in adolescents; however, the use of medications for pediatric weight loss remains controversial, and at this time only orlistat has been approved for use in adolescents aged 12 to 16 years (14, 15). The 2007 Expert Committee Recommendations regarding the prevention, assessment, and treatment of child and adolescent overweight and obesity (9) recommends a 4-staged approach for childhood and adolescent weight management. This approach encourages the use of motivational techniques to bring about behavioral, social, and environmental change to decrease overweight/obesity for patients and their families. A 2011 review found that interventions including dietary, exercise, and behavioral components, supported by family involvement, and delivered by trained interventionists appeared to be effective for treatment of childhood obesity (13). A recent meta-analysis, which evaluated the efficacy of obesity interventions among U.S. minority children, reported that obesity interventions comprised of 3 or more components may be more effective than those

using fewer components (16). The authors emphasized parental involvement, lifestyle change, and culturally-based adaptation to improve outcomes for obese minority children in the U.S.

Study Rationale

To address the problem of childhood obesity in the Athens-Clarke County, Georgia area, Athens Regional Medical Center (ARMC) is developing a clinic-based childhood obesity intervention program called Health Matters for Families (HMFF). This needs assessment study seeks to evaluate the knowledge, health behaviors, dietary habits and needs for obesity treatment/management of HMFF program participants. The information gathered through this study will allow the HMFF program to develop an effective intervention to address the specific needs of the program participants.

Hypothesis

We hypothesized that obesity in children participating in the HMFF program would be associated with negative health and nutrition habits and the presence of barriers to healthy weight in the family environment.

Objectives

The main purpose of the present study was to assess the needs of families of obese children to inform the development of a clinic-based program to manage the weight and health of obese children.

Specific aims

1. To determine the nutritional and behavioral habits of obese children participating in HMFF.
2. To identify barriers in the family environment of HMFF participants that may impact the success of the program.

3. To identify potential methods for the delivery of health and nutrition information.

Chapter 2 provides a literature review regarding the state of childhood obesity in the United States, including racial/ethnic differences. A review of childhood obesity risk factors will also be included. This chapter will also examine the reliability of using parents/caregivers as proxies for reporting dietary and behavioral habits of children. Finally, this chapter will provide a review of intervention programs used to treat and manage childhood obesity.

Chapter 3 is a manuscript to be submitted to a peer-reviewed journal. It includes the methods, results, and a discussion of the key findings from the needs assessment study.

Chapter 4 is a summary of the key findings from the needs assessment study. This chapter will also include recommendations for the development of the HMFF childhood obesity intervention.

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CHAPTER 2

LITERATURE REVIEW

Introduction

Childhood obesity is an important public health problem in the U.S. Obese children are at increased risk of developing chronic health conditions and obesity during adulthood, which can lead to further health problems (1,2). The current literature indicates that specific behaviors and environmental factors influence obesity, even among genetically at risk individuals (3).

The next sections review the literature regarding the state of childhood obesity in the United States, racial/ethnic differences in childhood obesity in the U.S., childhood obesity risk factors, the reliance on parents/caregivers as proxies for reporting dietary and behavioral habits of children, and intervention programs to treat and manage childhood obesity.

Childhood obesity in the United States

Obesity in children and adolescents aged 2 through 19 years is defined as at or above the 95th percentile of the Centers for Disease Control and Prevention (CDC) body mass index (BMI)-for-age growth charts (4). Using measured height and weight data from the National Health and Nutrition Examination Survey (NHANES) to calculate BMI, the authors observed significant increases in obesity prevalence among children and adolescents during the 1980s and 1990s (5). The obesity prevalence among U.S. youth appears to have leveled off over the past decade, with no significant changes between 2003-2004 and 2011-2012 (1). However, obesity prevalence remains high for this age group. It was estimated from the 2011-2012 NHANES that 16.9% of children and adolescents aged 2 through 19 years were obese, and around one-third of children and adolescents were considered overweight or obese (1).

The high prevalence of childhood obesity in the U.S. is a major public health concern as childhood obesity may lead to many health problems, potentially resulting in decreased quality of life for children and adolescents and increased medical costs (6). Childhood obesity may have short-term consequences, which occur during childhood and adolescence, as well as long-term consequences, which occur after the obese child reaches adulthood. Short-term effects of childhood obesity may include chronic health conditions that were once considered predominantly adult conditions, such as hypertension, type 2 diabetes mellitus, and dyslipidemia (2, 6, 7). Cross-sectional analyses ($n = 10,099$) of 5- to 17-year-olds from the Bogalusa (Louisiana) Heart Study showed that as BMI-for-age increased, the proportion of children with at least two cardiovascular disease risk factors increased from 5% (BMI <25th percentile) to 59% (BMI \geq 99th percentile) (8). The study included only children who were fasting at the time of measurement and had measured recorded values for weight and height, and measures of six cardiovascular disease risk factors: triglycerides, low-density lipoprotein (LDL) cholesterol, high-density lipoprotein (HDL) cholesterol, fasting insulin, systolic blood pressure (SBP), and diastolic blood pressure (DBP). National data from the third NHANES, 1988-1994, also indicated that overweight adolescents are more likely to have two or more cardiovascular disease risk factors than those with a BMI <85th percentile (9). Other short-term consequences of childhood obesity include asthma, chronic inflammation, and psychological co-morbidities, such as low self-esteem and behavioral problems (6).

Long-term consequences of childhood obesity include social and economic disadvantages, persistence of obesity into adulthood, persistence of cardiovascular risk factors into adulthood, adult morbidity, and risk of premature mortality (6, 7). Obesity during adulthood increases the risk for many diseases, including type 2 diabetes mellitus, cardiovascular disease,

pulmonary diseases, osteoarticular diseases, psychiatric illness, and several types of cancer (10, 11), including cancers of the esophagus, kidneys, colon, and liver (12). Longitudinal analyses of data from the Bogalusa Heart Study examined the relationship of childhood BMI with adult obesity for a cohort of 2,392 children (8). This study showed that while only 5% of the children with a BMI <50th percentile became obese adults, 84% of the children with a BMI between the 95th and 98th percentiles and all of the children with a BMI \geq 99th percentile were obese in adulthood. A recent review of the literature involving 25 studies also found strong evidence that obese children are at risk of persistence of obesity into adulthood compared with normal-weight children (13).

Racial/ethnic differences in childhood obesity in the U.S.

NHANES data has consistently shown differences in obesity prevalence by race/ethnicity (1, 10, 5, 14). In 2011-2012, 20.2% of non-Hispanic black youth and 22.4% of Hispanic youth were obese, while only 14.1% of non-Hispanic white youth were obese (1). Non-Hispanic Asian youth had the lowest obesity prevalence at 8.6%. Based on 2009-2010 NHANES data (10), the odds of being obese were significantly higher for Mexican American males (odds ratio [OR]: 1.81 [95% confidence interval (CI): 1.56-2.09]) and females (OR: 1.47 [1.23-1.76]) and non-Hispanic black males (OR: 1.27 [1.09-1.48]) and females (OR: 1.99 [1.69-2.35]) compared with non-Hispanic white males and females. The reasons behind the increased prevalence of obesity observed among U.S. minority children are complex and not well understood, but potentially involve interactions between genetics, physiology, socioeconomic status, culture, and environment (15).

There is also evidence that Hispanics and non-Hispanic blacks may be at greater risk for obesity-related comorbidities, including insulin resistance and type 2 diabetes, compared with

non-Hispanic white children (16, 17). For this reason, the increased prevalence of obesity among Hispanic and non-Hispanic black youth is even more alarming. However, it is important to note that BMI does not perfectly correlate with body fat as it does not account for differences in distribution of body fat or variations seen by race/ethnicity (18). Research has suggested that different race/ethnicity groups may have different amounts of body fat at the same BMI (18 – 20). For example, research has suggested that non-Hispanic black children have lower levels of body fat than do non-Hispanic white or Mexican-American children at the same BMI level (18). Research has also suggested that non-Hispanic Asians may have higher levels of body fat than non-Hispanic whites at the same BMI (20). Therefore, BMI cut points may not accurately predict risk of morbidity and mortality across racial/ethnic groups.

Childhood obesity risk factors

Risk factors for childhood obesity include genetic, behavioral, and environmental factors. There is substantial evidence that some individuals possess a genetic predisposition for obesity (21, 22). In a 1997 meta-analysis (21), results from twin studies suggest that 50 to 90% of the variance in BMI can be explained by genetic factors. The authors found that the weighted mean correlation of BMI for monozygotic twins is 0.74, for dizygotic twins 0.32, for siblings 0.24, for parents and offspring 0.19, and for spouses 0.12. These data suggest that genetic factors play a substantial role in the etiology of individual differences in BMI. Recent research also suggests that epigenetic influences, defined as heritable changes in gene activity that occurs without a change in the DNA sequence, may also play a role in obesity (22). As previously mentioned, some individuals are more predisposed than others to obesity-related diseases in addition to possessing a genetic predisposition for developing obesity (22).

Parental obesity may be a risk factor for childhood obesity due to family environmental influences in addition to genetic or epigenetic influences (23, 24). Environmental and behavioral risk factors for childhood obesity include socioeconomic status (SES), birth weight, physical activity, and diet (23, 24). A prospective study of 150 children from birth to 9.5 years of age identified parental overweight, child temperament, low parent concerns about their child's thinness, persistent child tantrums over food, and less sleep time in childhood (24). Regular consumption of fast food and sweetened drinks and sedentary behavior have also been identified as risk factors for childhood overweight (23). A recent review (11) found consistent evidence supporting a strong association between childhood obesity and frequent eating out at restaurants, unlimited screen time, not eating breakfast daily, eating few family meals, not controlling portion sizes, and unlimited sugar-sweetened beverage intake. The group found mixed evidence regarding the relationship between childhood obesity and low intake of fruits and vegetables. They also observed strong evidence that daily moderate/vigorous physical activity helps reduce adiposity in overweight/obese children. Due to the large number of possible risk factors for obesity in children, it is challenging to measure the impact of any one risk factor as many risk factors may coexist (11).

Reliance on Caregivers as Proxy Reporters of Children's Behaviors

One of the challenges of identifying childhood obesity risk factors is obtaining accurate assessments of dietary and behavioral habits of children. The literature shows that children under the age of 8 years may not possess the cognitive abilities necessary to accurately report dietary intake (25). The same cognitive challenges exist with children self-reporting physical activity (26, 27). Although doubly labeled water (DLW) is considered to be the gold standard for estimating energy intake (EI) and expenditure (EE), it is seldom used due to high costs, high participant burden, and the high level of skill necessary for accurate analysis (28). For these

reasons, parents are often used as proxy reporters for their children's dietary and behavioral habits. The method of using parents as proxy reporters for children's behaviors is also subject to error, especially considering that parents are often not with their children twenty-four hours a day, seven days a week. However, many studies have validated this method (28 – 31). A study of 24 children aged 4 to 7 years evaluated the accuracy of the multiple-pass 24-hour recall method for estimating EI in young children by comparing it with total energy expenditure (TEE) measured by DLW over a 14-day period (29). The 24-hour recall was conducted by a trained researcher with the caregivers of the children. Three recalls per child were completed on nonconsecutive days to estimate the energy intake of the children. The results of the study showed no difference between the 3-day mean EI and TEE for the group, demonstrating that parent proxy-reported multiple-pass 24-hour recalls are sufficient for estimating energy intakes of groups of children. A systematic review of the validity of dietary assessment methods in children compared with DLW determined that the 24-hour multiple pass recall conducted over at least a 3-day period that includes weekdays and weekend days and uses parents as proxy reporters was the most accurate method (28).

Objective measures of physical activity, such as the use of pedometers or accelerometers, are more accurate than subjective self-reported or proxy-reported measures, but some studies have shown strong associations between direct observation and proxy-reported measures of children's activity levels (13, 30 – 32). A 2010 study (30) of students in Grades 7 – 12 investigated the levels of agreement between student self-report and parent proxy-report of hypothesized correlates of physical activity behavior (n = 531). The study also investigated the relationship between an objective measure of students' moderate-to-vigorous physical activity (MVPA) (measured by accelerometer) and student self-report and parent proxy-report of

hypothesized correlates of physical activity (n = 177). The study found that for eight out of nine correlates of physical activity the agreement between student and parent physical activity correlates was moderate to good, with Spearman correlations ranging from 0.34 to 0.64. The study also found that student-reported and parent-reported physical activity correlates were similarly related to students' objectively measured MVPA. Spearman correlations between measured MVPA and physical activity correlates ranged from -0.04 to 0.21 for student self-report and -0.14 to 0.32 for parent proxy-report. There was no significant difference between student- and parent-reported correlates with objective measures of MVPA for eight out of nine physical activity correlates. The authors concluded that parents can provide useful data on physical activity for students in Grades 7 – 12. To obtain more accurate measurements of children's physical activity, a combination of objective and subjective measures may be used (27, 30, 33). Nevertheless, proxy-reported physical activity methods are suitable for studies where precise accuracy in estimation of children's physical activity levels is not necessary.

Intervention programs to treat and manage childhood obesity

Considering the complex etiology of childhood obesity, the treatment of childhood obesity must also be complex. There is no “one-size-fits-all” treatment that will be effective for every obese child. In order to address the many underlying causes of childhood obesity, many experts on childhood obesity recommend taking a multi-component approach to childhood obesity treatment (21, 34 – 37). It is the position of the American Academy of Nutrition and Dietetics that “pediatric overweight intervention requires a combination of family-based and school-based multi-component programs that include the promotion of physical activity, parent training/modeling, behavioral counseling, and nutrition education”, a position based on findings from a systematic evidence-based analysis of the literature on childhood overweight intervention

programs (34). The Academy's review of the literature revealed that family-based intervention programs were successful for children between the ages of 5 and 12 years, while school-based intervention programs were successful for adolescents. The Academy also recommends that community-wide interventions should be undertaken to support and enhance family- and school-based interventions due to the potential of community-wide programs to impact the greatest numbers of children and their families. The Cochrane Review of childhood obesity interventions also supports the multi-component approach to pediatric obesity treatment (35). This review, which included 64 randomized controlled trials (RCTs) of lifestyle and pharmacotherapy pediatric obesity interventions, revealed that combined lifestyle interventions were more effective than standard care or self-help at reducing overweight in children and adolescents. Another recent review, which included 21 RCTs and 40 non-RCTs, concluded that interventions that were comprised of dietary, exercise, and behavioral components, supported by family involvement, and delivered by trained interventionists appeared to be most effective for treatment of childhood obesity (37).

The 2007 Expert Committee Recommendations regarding the prevention, assessment, and treatment of child and adolescent overweight and obesity recommends a 4-staged approach for childhood and adolescent weight management (3). This approach encourages the use of motivational techniques to bring about behavioral, social, and environmental change to decrease overweight/obesity for patients and their families. Spear et al, 2007 (36) provide detailed recommendations for each stage of treatment. The first stage, called Prevention Plus, consists of brief counseling that focuses on behavior change and can be delivered in a health care office. The health behaviors addressed during this stage of treatment include fruit and vegetable intake, sugar-sweetened beverage intake, water intake, consumption of breakfast, sleep habits, physical

activity, eating out, and screen time. The subsequent stages are structured weight management, comprehensive multidisciplinary intervention, and tertiary care intervention; each more intensive than the last. Progression to each stage of treatment depends on the patient's age, degree of obesity, and response to previous stages of treatment. Stage 2, structured weight management, includes referral to a dietitian for diet planning in addition to addressing the behavior changes emphasized in Stage 1. Stage 3 includes many of the same components as Stage 2, but is a more intensive approach which also involves the healthcare provider. At this stage the primary care office may choose to coordinate with a pediatric weight management center. Stage 4, reserved for only severe cases that have not responded well to the other stages of treatment, is the most intensive stage and should be implemented at a pediatric weight management center. In addition to diet and behavior counseling, other approaches may be considered, including meal replacement, very-low-energy diet, medication, and surgery. The report also provides recommendations for healthcare offices to streamline office-based childhood obesity treatment and management. Future studies are needed to evaluate the effectiveness of childhood obesity interventions that use a staged approach in a clinic-based setting.

A 2012 retrospective cohort study (2) evaluated the effectiveness of the Duke University Healthy Lifestyles Program (HLP), a primary-care-based pediatric obesity treatment program. In this study, a team of pediatricians, registered dietitians, physical therapists, and mental health professionals trained in motivational interviewing methods were involved in the delivery of the multi-disciplinary care. The HLP patient pool consisted of overweight or obese patients under the age of 22 years who were referred by physicians. The primary phase of HLP treatment consisted of one initial visit and five or more follow-up visits at intervals of 4 to 6 weeks. Upon completion of the primary phase, the patient entered the maintenance phase, which consisted of a

HLP visit every 6 months until the patient reached 23 years of age. At each visit during the primary phase, the patient and caregiver would meet with the pediatrician for about 30 minutes for ongoing management of obesity-related comorbidities and lifestyle modification. Thereafter, the patient and caregiver would meet with a registered dietician for 30 minutes of medical nutrition therapy. Each visit also included a lifestyle history, anthropometric and blood pressure measurements, a physical exam, targeted goal setting, and referral to other health professionals as needed. A retrospective analysis of a cohort of 282 patients who entered the HLP between October 2006 and December 2008 was conducted. Using baseline data and data from a follow-up visit 6 to 8 months after the initial visit, the researchers assessed changes in BMI and obesity-related comorbid conditions. At the time of the follow-up assessment, 80% of the subjects had completed at least 4 follow-up visits. The authors observed a reduction in BMI of about 0.10 standard deviation score (SDS). Although the reduction in BMI SDS was small, there were observed improvements in obesity-related comorbid conditions, including triglycerides, total cholesterol, and blood pressure among the cohort. These results suggest that significant changes in obesity-related comorbid conditions may occur with only small changes in BMI SDS. Based on these findings, the researchers recommend the inclusion of the measurement of these comorbid conditions in addition to BMI in order to more comprehensively assess the health of the child and evaluate the effectiveness of the primary care-based childhood obesity program. These results demonstrate that a primary-care-based, comprehensive pediatric obesity intervention program is feasible and can be effective in managing childhood obesity and obesity-related comorbid conditions.

A recent meta-analysis of 40 studies evaluated the efficacy of obesity interventions among U.S. minority children, defined as American Indian, Alaska Native, Asian American,

black, African American, Hispanic, Latino, Native Hawaiian, or other Pacific Islander (16). A total of 10,725 children, including 6,602 minority children, aged 6-19 years were included in the meta-analysis. As previously discussed, racial/ethnic minority children in the U.S. appear to be at greater risk for childhood obesity and certain obesity-related diseases (1, 16, 17 – 20). Therefore, it is of the utmost importance to ensure that obesity interventions are relevant for these groups. The meta-analysis (16) revealed that obesity interventions comprised of 3 or more components, such as physical activity, nutrition, sedentary behavior reduction, and counseling, were more effective than those comprised of fewer components. In addition, interventions with parental involvement were more successful than those that targeted only the children. Furthermore, lifestyle interventions that addressed physical activity and dietary habits were more successful than non-lifestyle interventions. Finally, the meta-analysis revealed that culturally-tailored interventions were more efficacious than those in which culture was not incorporated.

Yale Bright Bodies weight management program, a three-component randomized controlled trial included in the meta-analysis, was conducted among 174 children aged 8 to 16 years, 64 percent of whom were minorities (38). The control group (n=69) received traditional clinical weight management counseling every 6 months, while the intervention group (n=105) received an intensive family-based intervention that included exercise, nutrition, and behavior modification. The intervention was delivered biweekly for the first 6 months, then bimonthly for an additional 6 months. Educational materials, behavior modification techniques, and exercise components were developed to be relevant and accessible to their low-income, multiethnic population. At 12 months, the intervention group versus control maintained improvements in BMI (mean: -1.7 kg/m^2 [95% CI: -2.3 to -1.1] vs. $+1.6$ [0.8 to 2.3]), body fat (-3.7 kg [-5.4 to -2.1] vs. $+5.5 \text{ kg}$ [3.2 to 7.8]), and homeostasis model assessment of insulin resistance (HOMA-

IR) (-1.52 [-1.93 to -1.01] vs. +0.90 [-0.07 to 2.05]). The results of the Bright Bodies weight management program demonstrate that a pediatric obesity intervention can be successful through addressing multiple components while ensuring cultural relevancy.

Pharmacological treatment for childhood obesity

The Cochrane Review reported that the use of orlistat or sibutramine may be effective in the treatment of obesity in adolescents (35); however, the use of medications for weight loss remains controversial, particularly for the pediatric population. Several medications that were once approved for weight loss have since been removed from the market due to dangerous side effects (36). It is possible that medications could have greater side effects in children, potentially affecting long-term growth and development; however, this has not been extensively studied. While pharmacotherapy alone does not appear to be an effective treatment for obesity, it has been shown to be effective when combined with diet, exercise, and behavior therapy (36). Currently, the Food and Drug Administration (FDA) approves only a handful of drugs for weight loss treatment (39), only one of which, orlistat, is approved for use in severely obese adolescents aged 12 to 16 years (40, 41). Preliminary research suggests that medications used to treat insulin resistance, such as metformin, may also be effective in the treatment of obesity, but these medications are currently not approved for this indication (36, 41).

Surgical treatment for childhood obesity

Bariatric surgery has proven to be an effective treatment for adult obesity (42); however, the use of surgical treatments for pediatric obesity remains controversial. Short term outcomes of bariatric surgery in children and adolescents are comparable to those seen in adults, but research on the long-term outcomes of bariatric surgery in children and adolescents is limited (36, 40). In 2004, an expert panel comprised of pediatricians and pediatric surgeons recommended a set of

selection criteria for bariatric surgery in adolescents (43). The panel recommended that adolescents being considered for bariatric surgery should have failed a 6-month, organized attempt at weight management, have reached physical maturity, have a BMI of ≥ 50 kg/m² or ≥ 40 kg/m² with significant comorbidities, and demonstrate commitment to adhering to the long-term lifestyle changes required after surgery. In a study which used cross-sectional and longitudinal analyses of data on over 10,000 children and adolescents from the Bogalusa Heart Study, the authors concluded that children and adolescents above the 99th percentile BMI should be considered for more aggressive treatment, such as bariatric surgery (8). Bariatric surgery has the potential to improve many obesity comorbidities, but the decision for a child or adolescent to undergo this procedure should not be taken lightly considering the risks involved with surgery and the lifelong medical supervision that will be required following the procedure (36, 43).

Rationale, Hypothesis, and Specific Aims

Pediatric obesity is a complex problem, and as such it requires complex interventions. Interventions should be comprised of multiple components, including diet, physical activity, and lifestyle interventions. Considering the racial/ethnic disparities in the prevalence of childhood obesity in the U.S., as well as the increased risk for certain obesity-related diseases among minorities, it is important to develop culturally-appropriate interventions. It is crucial to decrease the prevalence of childhood obesity in the U.S. in order to avoid the associated short- and long-term consequences. In order to address this issue in the Athens-Clarke County, Georgia area, Athens Regional Health System (ARHS) is developing a clinic-based childhood obesity intervention component as part of the Health Matters for Families (HMFF) program. This needs assessment study seeks to assess the needs of families of obese children to inform the development of this clinic-based program to manage the weight and health of obese children.

Our working hypothesis is that obesity in children participating in the HMFF program would be associated with negative health and nutrition habits and the presence of barriers to healthy weight in the family environment. The first specific aim of this study is to determine the nutritional and behavioral habits of obese children participating in HMFF. The second specific aim is to identify factors in the family environment of HMFF participants that may impact the success of the program. The third specific aim is to identify potential avenues for the delivery of health and nutrition information.

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CHAPTER 3

NEEDS ASSESSMENT FOR A CHILDHOOD OBESITY INTERVENTION PROGRAM ¹

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Abstract

The purpose of this cross-sectional study was to assess the needs of families of obese children to inform the development of a childhood obesity intervention program. Using a structured questionnaire containing closed- and open-ended questions, selected nutritional and behavioral habits of 20 obese children were assessed through telephone interviews with primary caregivers. Half of the children were males, and the average age was 9.2 years. Spanish was reported to be the primary language in the homes of 75% of participants. On average, the children consume 3.2 ± 1.9 servings/d of fruits and vegetables and 1.9 ± 1.6 cups/d of sugar-sweetened beverages. The children were reported to participate in 54.3 min/d of active play and 114.3 minutes/d of screen time on average. The data suggest a need for an intervention program with emphasis on improving nutritional and behavioral habits of obese children while ensuring cultural relevancy.

INDEX WORDS: child, adolescent, overweight, obesity, intervention, needs assessment

Introduction

Although the prevalence of childhood obesity has plateaued over the past decade, childhood obesity remains a major public health problem in the United States with approximately 17% of youth ages 2 through 19 years classified as obese (1). It is widely known that obesity in children may contribute to the development of many short- and long-term health consequences, including hypertension, dyslipidemia, type 2 diabetes, and sleep apnea in childhood, as well as obesity and obesity-related diseases during adulthood (2 – 3, 5). In response to this major public health problem, the U.S. Department of Health and Human Services established objectives in *Healthy People 2020* to reduce the proportion of children and adolescents who are considered obese, with the specific goal of reducing the prevalence of obesity among children and adolescents aged 2 to 19 years to 14.5 percent (6).

It is important to understand the etiology of childhood obesity in order to address the problem. However, the etiology of childhood obesity is quite complex and may involve many genetic and epigenetic risk factors (7 – 9) as well as behavioral and environmental risk factors (7, 8, 10, 11). The current literature indicates that specific behaviors and environmental factors may influence obesity, even among genetically at risk individuals (12). A recent review of the literature found consistent evidence supporting a strong association between childhood obesity and frequent eating out at restaurants, unlimited screen time, not eating breakfast daily, eating few family meals, not controlling portion sizes, and unlimited sugar-sweetened beverage intake as well as mixed evidence regarding the relationship between childhood obesity and low intake of fruits and vegetables (10). They also observed strong evidence that daily moderate/vigorous physical activity may help reduce adiposity in overweight/obese children.

In order to address the many underlying causes of childhood obesity, experts on childhood obesity recommend taking a multi-component approach to childhood obesity treatment (12 – 14). The American Academy of Nutrition and Dietetics recommends that pediatric overweight interventions combine family-based and school-based components that promote physical activity, parent training/modeling, behavior counseling, and nutrition education (13). The 2007 Expert Committee Recommendations regarding the prevention, assessment, and treatment of child and adolescent overweight and obesity recommends a 4-staged approach for pediatric weight management which utilizes motivational techniques to bring about behavioral, social, and environmental change (12). The multi-component approach to pediatric obesity interventions is supported by a 2011 review which found that interventions that included dietary, exercise, and behavioral components, supported by family involvement, and delivered by trained interventionists were effective for treatment of pediatric obesity (15). Another recent meta-analysis, which evaluated the efficacy of obesity interventions among U.S. minority children, reported that obesity interventions comprised of 3 or more components may be more effective than those using fewer components (16). The authors emphasized parental involvement, lifestyle change, and culturally-based adaptation to improve outcomes for obese minority children in the U.S.

To address the problem of childhood obesity in the Athens-Clarke County, Georgia area, Athens Regional Health System (ARHS) has partnered with Athens Pediatrics at Resource Medical and the University of Georgia to develop a pilot program for a clinic-based childhood obesity intervention. This intervention program is part of a larger health initiative by ARHS, called Health Matters for Families (HMFF). This needs assessment study seeks to assess the needs of families of obese children to inform the development of this clinic-based program to

manage the weight and health of obese children. Specifically, we examined the children's nutritional and behavioral habits, identified barriers that may impact the success of the program, and identified potential methods for the delivery of health and nutrition information. We hypothesized that obesity in children participating in HMFF would be associated with negative health and nutrition habits, as well as the presence of barriers to healthy weight in the family environment.

Methods and Design

Study design

This cross-sectional survey was designed to assess obesity-related nutritional and behavioral habits as well as barriers to healthy weight in the family environment of obese children participating in the Health Matters for Families (HMFF) program.

Questionnaire development and review

A structured questionnaire containing 43 closed- and open-ended questions was developed to collect information about the dietary habits, physical activity patterns, and anthropometrics of children and their families participating in the HMFF program (Appendices D and E). The questionnaire also assessed the family's access to health information, access to technology, attitude toward change, access to healthy foods, demographics, and native language. The initial questionnaire draft was developed by the HMFF program coordinators at Athens Regional Medical Center (ARMC) after a review of the literature. The draft questionnaire was subsequently revised by the co-principal investigator (co-PI) after further review of the literature. The draft questionnaire was reviewed by several experts in areas such as maternal and child nutrition, community nutrition, nutrition/health education and interventions, child psychology, and nursing. The investigators then came to a consensus and finalized the questionnaire for

administration to participants. The final questionnaire was then translated to Spanish by a research assistant.

Questionnaire administration

Interviews were conducted via telephone with the primary guardians of participating children in the HMFF program. The duration of the interviews were between 20 and 30 minutes and were conducted by the co-investigator and a research assistant from February – October 2013.

The study protocol and methods were reviewed and approved by the Human Subjects Institutional Review Board of the University of Georgia. Consent of participants was obtained through an oral consent process over the telephone after the study protocol and responsibility of the respondent were explained. Responses to the questions were captured on the study questionnaire and later entered into the statistical database (SPSS).

Participants

Participants in the study were caregivers aged 18 years and older of obese children aged 2 to 18 years who were participating in the HMFF program. Participants were recruited from a pediatrician's office in Athens, Georgia, where the HMFF's program is based. Caregivers of obese children were referred to the study coordinator by the office staff of the pediatrician after being presented with a recruitment script which explained the study protocol. Contact information for caregivers interested in participating in the survey was passed on to the study coordinator. The coordinator and a research assistant contacted the potential participants via telephone to conduct interviews for data collection. Interviews were conducted in either English or Spanish language depending on participant's choice and proficiency. A total of 29 caregivers expressed interest in participating in the study but 20 were available for data collection.

Statistical Analysis

Statistical analysis was performed using IBM SPSS Statistics 21 (SPSS Inc., Chicago IL). Descriptive statistics were used for categorical variables with results reported as frequencies and percentages, while analysis of variance (ANOVA) was used for continuous variables with results reported as means and standard deviations.

Results

Characteristics of participants

Table 3.1 summarizes the characteristics of survey participants. A total of 16 caregivers of 20 obese children completed the survey. Two caregivers each had two children participating in HMFF, and another caregiver had three children participating, bringing the total number of children represented in the survey to 20. All of the caregivers were mothers of children participating in HMFF. The average age of caregivers was 34.9 ± 6.6 years (range: 22 - 48 years). The children ranged in age from 4 to 13 years, with a mean age of 9.2 ± 2.9 years. Half (50%) of the children were male. All of the children were classified as obese (BMI-for-age $>95^{\text{th}}$ percentile) according to the CDC BMI-for-age growth charts. Caregivers of almost all of the children (90%) reported Spanish to be their native language, but only 75% of the children were reported to speak Spanish as their primary language at home.

Child's health habits

Nutrition habits

Caregivers reported the children's fruit and vegetable intake to be an average of 3.2 ± 1.9 servings per day, with a slightly higher intake of fruits (1.8 ± 1.2 servings/day) than vegetables (1.6 ± 1.0 servings/day) (Table 3.2). Almost all ($n = 19$) of the children were reported to consume breakfast every day, with only one child never or almost never consuming breakfast.

Children were reported to drink an average of 5.7 ± 2.1 cups of plain, unsweetened water per day. Seventy-five percent (75%) of children were reported to consume sugar-sweetened beverages (SSB) (Figure 3.1a), with an average intake of 1.9 ± 1.6 cups per day (range: 0.0 - 4.5 cups/d) (Table 3.2). Juice was the most commonly consumed SSB ($n = 13$), followed by fruit-flavored drinks (Kool-Aid and/or Capri Sun; $n = 3$), agua fresca (water with fruit and sugar; $n = 3$), flavored milk ($n = 3$), soda ($n = 2$), and sports drinks ($n = 2$) (Figure 3.1b). On average, the children were reported to eat out around one time per week (Table 3.2).

Physical activity, sedentary behavior, and sleep habits

Caregivers reported that 80% of the children regularly participate in physical activity. When asked about their child's after school activities, caregivers reported playing outside to be the most common activity, followed by homework, screen time (television, video games, computer, etc.), and organized sport (Figure 3.2). However, the children were reported to spend more of their daily leisure time on screen time activities (median: 60 minutes per day) than in active play (median: 35 minutes per day), defined as activities which use the large arm and leg muscles (Table 3.2). The children were reported to receive an average of 8.6 ± 0.3 hours of sleep per night, with a range of 6 to 10 hours per night.

Family environment

General family environment

Almost all of the children ($n = 19$) were reported to have access to a yard for physical activity (Figure 3.3). Of those 19, only one child was reported to not use the yard. Reasons cited for not utilizing the yard were that it was too dangerous and that it was too close to a street. The majority of the children ($n = 13$) were reported to have access to a neighborhood playground, but only nine of them were reported to use it regularly.

When asked about after school supervision of the child, caregivers reported that 85% of the children are supervised primarily by a parent, while 5% are supervised primarily by a grandparent (Figure 3.4). The remaining children are supervised equally by a parent or grandparent (5%) or by a parent, older sibling, or neighbor (5%).

Caregivers reported that less than half (45%) of the children have a family member who exercises regularly. Other than the child, family members who regularly exercise included the mother (n = 4), an aunt (n = 2), and older siblings (n = 1) (Figure 3.5a). Two caregivers reported that the whole family exercises together. The most common location for exercise was within the participants neighborhood (n = 12), followed by a gym (public, private, or school; n = 8) and a park (n = 7) (Figure 3.5b).

In most of the families interviewed (60%), the mother is the primary food shopper, but in other families the father also participates in food shopping (Figure 3.6a). All caregivers reported shopping for food at grocery stores, but 25% also shop at convenience stores and ethnic (Hispanic) markets, and 20% reported eating out to be a major source of food in addition to shopping at a grocery store (Figure 3.6b). Caregivers of almost all of the children (90%) reported having access to a family car, while the remainder primarily walk or take a bus (Figure 3.7).

Access to technology and/or health-related information

When asked about access to technology, caregivers of 6 children reported having access to a computer with internet access, 5 reported having access to a smartphone, and 13 reported having access to a non-smartphone telephone (Figure 3.8). As can be seen in Figure 3.9, Caregivers of 17 children reported using telephone calls as a form of communication, and 12 reported using text messaging. Caregivers of only 5 children reported using email, while even fewer reported using social media (n = 4). As can be seen in Figure 3.10, the most popular

sources of health information were doctors (n = 8) and nurses (n = 5), followed by internet (n = 3), books (n = 3), family (n = 2), and friends (n = 1).

Caregiver's attitude toward change

When asked about their top health concerns for their child, caregivers of 17 children reported that they were most concerned about their child's weight (Figure 3.11). This was followed by obesity-related illness (n = 6), child's health/nutrition habits (n = 4), and child's activity level (n = 1). When asked which of their child's health habits they wish to improve (Figure 3.12), the most common response was fruit and vegetable consumption (n = 14), followed closely by active play (n = 13). Other notable responses were reduction in screen time (n = 9), reduction in SSB consumption (n = 6), and increase in water consumption (n = 6). Health habits that received the lowest responses were eating out (n = 2), sleep habits (n = 1), and eating breakfast (n = 1). When asked why they would like to improve these health habits, most caregivers responded that they want to prevent health problems and/or improve their child's overall health. One caregiver also expressed concern about her child being picked on because of his weight, and she felt that improving these health habits would help her child lose weight.

Caregivers of most of the children (90%) reported that they were currently working on changing, while 10% reported that they were thinking about changing their child's poor habits. As presented in Table 3.3, when asked about what would help their family in making changes in health habits, the most popular response was "getting text or email reminders from a health coach" (n = 12), followed by "learning health facts from a health coach" (n = 8), and "making a plan specifically for my family with a health coach" (n = 6). The least popular responses were "learning health facts on my own" (n = 2) and "tracking my family's habits on a confidential website" (n = 3). Only four caregivers reported that setting goals and reporting back on progress

to a health coach would be helpful. However, caregivers of 80% of the children reported that participating in HMFF was a high priority.

Discussion

The main purpose of this study was to assess the needs of families of obese children to inform the development of a clinic-based program to manage the weight and health of obese children. This study also aimed to identify potential avenues for delivery of health and nutrition information. We hypothesized that obesity in children participating in the HMFF program would be associated with negative health and nutrition habits and the presence of barriers to healthy weight within the family environment.

Nutritional and Behavioral Habits

Current recommendations for fruit and vegetable consumption for children and adolescents vary greatly with age, sex, and activity level (17). The 2010 Dietary Guidelines for Americans (DGAs) fruit and vegetable recommendations range from 1 cup of fruits and 1 cup of vegetables per day for children ages 2 to 3 years to 2½ cups of fruits and 4 cups of vegetables per day for active 18-year-old males (17). Considering that the serving size for most fruits and vegetables is around ½ cup, the recommendations for 2 to 3 year olds would translate to 2 servings each of fruits and vegetables per day. As reported in Table 3.2, the average fruit and vegetable intake reported in this needs assessment survey was less than two servings each of fruits and vegetables per day, which indicates that most of the children in this needs assessment study are not meeting the recommendations for fruit and vegetable intake.

Another area of concern in the diets of children and adolescents is sugar-sweetened beverage (SSB) intake. A recent study examining six nationally representative surveys (Continuing Survey of Food Intakes by Individuals 1989-1991 and 1994-1996, 1998; National

Health and Nutrition Examination Survey 2003-2004, 2006-2006, 2007-2008, and 2009-2010) found that SSBs were consistently a major source of energy intake among U.S. children and adolescents across all time points from 1989-2010 (18). Declines in intakes of SSBs have been observed since 2003-2004; however, energy intake from SSBs remains high at around 120 kcals per day in the most recent estimates from 2009-2010 NHANES data (18). The children in this needs assessment study were reported to consume an average of almost 2 cups per day of SSBs with a range of 0 to 4.5 cups per day (Table 3.2). This is of concern because SSBs provide calories but little to no essential nutrients. In addition, there is substantial evidence that SSB intake is positively associated with higher body weight in children and adolescents (10, 14, 17, 19). In a review of 19 observational studies published between 1999 and 2004 (19), the Academy of Nutrition and Dietetics found evidence that supported a relationship between SSB intake and overweight among children. In light of the evidence, several expert committees and regulatory agencies recommend that SSB intake among children and adolescents be minimized or eliminated (12, 17, 20).

Physical activity is also important for the management of childhood obesity. Increasing physical activity has the potential to improve weight loss and management through increasing energy expenditure (10, 14). The 2008 Physical Activity Guidelines for Americans recommend 60 minutes (1 hour) or more of physical activity per day for children and adolescents aged 6 to 17 years (41). Most of the 60 minutes should be moderate- or vigorous-intensity aerobic physical activity, but muscle-strengthening physical activity and bone-strengthening physical activity should also be included at least 3 days of the week. The children in the current study were reported to participate in close to 60 minutes per day of active play on average (Table 3.2). However, it is important to point out that there was a wide range of active play reported (0-200

minutes/day); for this reason, the median of 35 minutes per day of active play may be a more accurate indication of the activity level of the study population. These results suggest that many of the children participating in HMFF are not engaging in adequate daily physical activity. Therefore, it will be important to include a physical activity component in the HMFF obesity intervention program.

In addition to increasing physical activity, it is recommended that screen time be limited to no more than 1 to 2 hours each day (12, 17). Many studies over the past few decades have shown strong evidence of an association between screen time, particularly television viewing, and childhood overweight and obesity (22 – 29). The children in the current study were reported to participate in close to 2 hours per day of screen time on average (Table 3.2). This is technically within the recommendations for screen time (<1 to 2 hours per day); however, there is the possibility of underreporting of the children's screen time by parents/caregiver, particularly for children who have televisions and other video games in their bedrooms. It is also important to note that the term 'screen time' is not inclusive of other sedentary activities, such as reading. Therefore, reducing screen time could be an effective strategy for reducing childhood overweight and obesity for many participants in HMFF.

Barriers within the Family Environment

A common barrier to physical activity for children and adolescents is lack of access to safe exercise environments. This is of particular concern in low socioeconomic status and minority communities (14, 30). An analysis of data from the National Longitudinal Study of Adolescent Health ($N = 20,745$) found that communities with low socioeconomic status and large minority populations had limited access to physical activity facilities (30). In addition, the analysis demonstrated a direct relationship between limited access to physical activity facilities

and childhood overweight. Almost all of the children in the current study were reported to have access to a yard for physical activity (Figure 3.3); however, at least one caregiver expressed concerns about the safety of the yard. Fewer children had access to a neighborhood playground (Figure 3.3), while only about two-thirds of those who have access to a playground were reported to use it regularly. This observation could be due to perceived safety issues, although not reported, and lack of playmates.

Another barrier present in the family environment of many HMFF participants is the lack of physically active role models in the family. Less than half of the children in the study were reported to have a family member who exercises regularly. A 2005 study of 152 French children and their parents found that parents can positively affect their children's involvement in physical activity through their role modeling of physical activity (31). A more recent study of 161 middle school students supported this conclusion (32). This cross-sectional study explored the contributions of perceived parent support, involvement, and modeling to adolescent physical activity motivation and behavior. The study found significant, positive relationships between all variables, including parent modeling, and adolescent physical activity motivation and behavior. The researchers concluded that mothers and fathers both play a significant role in their adolescent's physical activity. This is therefore an area that needs improvement within the studied households to ensure improved physical activity habits among household members, including the index child.

Perhaps one of the most significant barriers that may impact the success of the HMFF program in the management and prevention of childhood obesity in the study community is developing culturally appropriate interventions. It will be essential for the HMFF program to develop interventions that are culturally relevant for the target population, which this needs

assessment study revealed to be mostly of Hispanic background. In addition, the finding that 75% of the children in this needs assessment study were reported to live in a home in which Spanish is the primary language suggests that these families may have low levels of acculturation. A recent meta-analysis evaluated the efficacy of interventions designed to prevent or treat obesity among U.S. minority children (16). The meta-analysis, which included 40 obesity intervention trials, found that obesity interventions with three or more components, including parental involvement, lifestyle interventions, and culturally-tailored interventions, were more efficacious than those using fewer components and those that did not incorporate these strategies. It is therefore important for the HMFF program employ an intervention that is multi-component in nature and culturally appropriate considering the diversity of the population in the Athens Area and surrounding communities.

An encouraging finding in this needs assessment study is the overall positive attitude of caregivers toward improving their child's health habits. Many caregivers recognized that their child's obesity could lead to poor health and illness, and were already in search of effective ways to improve their child's weight status. Caregivers also recognized the importance of improving nutrition and health habits in order to improve their child's weight and overall health. Almost all of the caregivers reported that they were currently working on improving their child's health habits and that the services of HMFF would be a high priority for their family, particularly the index child.

Methods for Delivery of Health and Nutrition Information

Many recent approaches to managing childhood obesity have involved the use of computer-based programs and/or websites. However, this may not be an effective strategy for the HMFF program as the participants in this needs assessment study reported low access to a

computer with internet access and/or a smartphone (Figure 3.8). As a result of limited internet access, few caregivers reported using email and/or social media (Figure 3.10). However, almost all caregivers had access to and regularly used a telephone. Many caregivers expressed interest in receiving reminders and health tips from a health coach via text messaging or email. Considering the limited use of email among this population, text messaging or telephone calls may be the best method for sending these reminders and health tips if the HMFF program wishes to provide support to families between HMFF clinic appointments. Most importantly, individual or group face-to-face intervention delivery seems to be the preferred method of delivery to HMFF's target population.

Limitations

The design and conduct of this needs assessment study have several limitations that should be considered in the interpretation of the findings. First, the study used a small, convenience sample. For this reason, the study results cannot be generalized to a larger population. However, the sample size is adequate for the purpose of this needs assessment, which was to inform the HMFF program developers on the health behaviors and expectations of the target participants. Second, participants were at different stages of the HMFF obesity intervention program at the time of recruitment. Their stage in the intervention could have potentially affected the participants' health behaviors; hence the not-so-poor nutrition and physical activity habits observed among our participants. Third, this study was cross-sectional in design; consequently, assumptions about causality cannot be made. Finally, the caregivers in this study were proxy reporters of their children's behaviors. This could possibly have introduced information bias of over- or under-reporting of certain habits, particularly since they are not with

their children during school hours. However, previous studies provide support for the use of parents as proxy reporters in observational studies of children (33, 34, 35).

Conclusion

Overall, findings from this needs assessment study suggest that the most common negative health habits among HMFF participants are low fruit and vegetable consumption, intake of SSBs, low levels of physical activity, and excess screen time. This needs assessment study also revealed the lack of access to safe exercise environments as a barrier to healthy weight for some children, even though most of the participants were reported to have access to a yard or a neighborhood park for physical activity. Furthermore, the lack of physically active role models in the family may negatively impact children's physical activity habits. In addition to the regularly scheduled visits at the HMFF clinic, the participants may benefit from text message or telephone reminders and health tips as a means of support between appointments. The overall positive attitude that caregivers possess toward the HMFF program and the improvement of their child's health habits is encouraging and assuring of their readiness for some sort of support in managing their child's weight problem. Through addressing the health and nutrition habits and barriers in the family environment that were outlined in this needs assessment, as well as ensuring the intervention is culturally-appropriate, the HMFF program will have the potential to make a positive impact on the health of the program participants and the Athens community.

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Table 3.1 Characteristics of children at the time of the survey (N = 20)

<i>Characteristic</i>	<i>n</i>	<i>Mean (SD) or %</i>
Age (years)	20	9.2 (2.9)
Sex		
Male	10	50.0%
Female	10	50.0%
Height (cm)	16	145.0 (17.0)
Weight (kg)	20	56.5 (25.1)
Native language		
English	2	10.0%
Spanish	18	90.0%
Language spoken at home		
English	5	25.0%
Spanish	15	75.0%

Table 2.2 Child's nutrition, physical activity, and sleep habits

	<i>Mean ± SD</i>	<i>Median</i>	<i>Range</i>
Active play (minutes/day)	54.3 ± 50.9	35.0	0 – 200.0
Water intake (cups/day)	5.7 ± 2.1	6.0	1.5 – 8.0
Fruit and vegetable intake (servings/day)	3.2 ± 1.9	2.8	0 – 6.0
Fruit intake (servings/day)	1.8 ± 1.2	2.0	0 – 4.0
Vegetable intake (servings/day)	1.6 ± 1.0	1.3	0 – 3.0
Screen time (minutes/day)	114.3 ± 96.7	60.0	0 – 270.0
SSB* consumption (cups/day)	1.9 ± 1.6	1.0	0 – 4.5
Hours of sleep per night	8.6 ± 0.3	9.5	6.0 – 10.0
Frequency of eating out per week	1.17 ± 0.7	1.0	0 – 2.5

*SSB = *sugar-sweetened beverage*

Table 3.3 Caregiver's preferred education tools and/or learning methods

<i>Number of Respondents</i>	<i>Education tools and/or learning methods</i>
2	Learning health facts on my own
8	Learning health facts from a health coach
6	Making a plan specifically for my family with a health coach
12	Getting text or email reminders from a health coach
4	Setting goals and reporting back on progress to a health coach
3	Tracking my family's habits on a confidential website
1	Other: Receiving handouts with recipes and healthy cooking methods

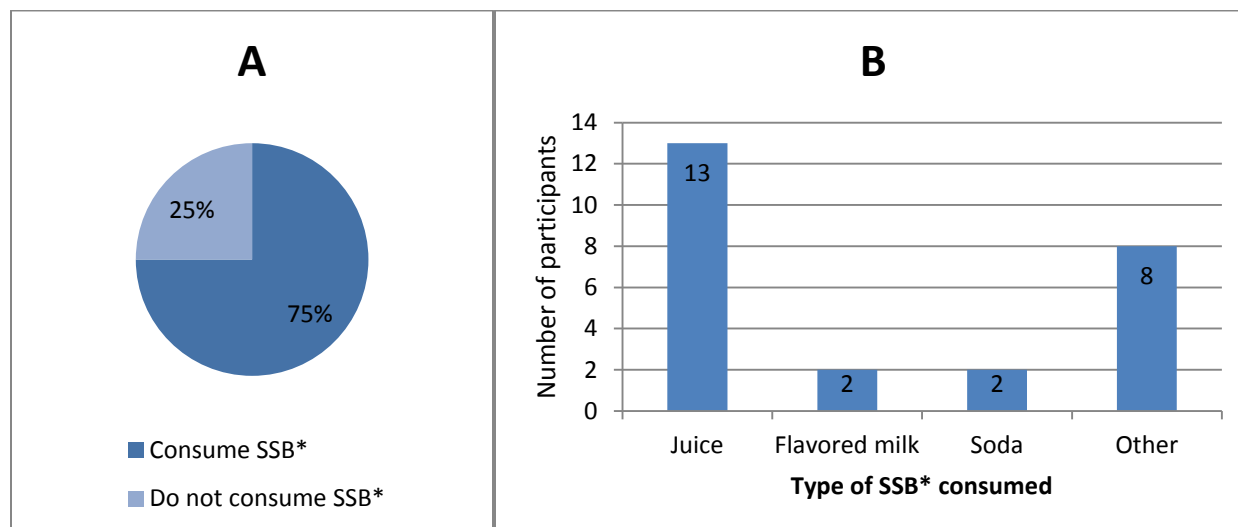


Figure 3.1 Sugar-sweetened beverage consumption by child

*SSB = sugar-sweetened beverage

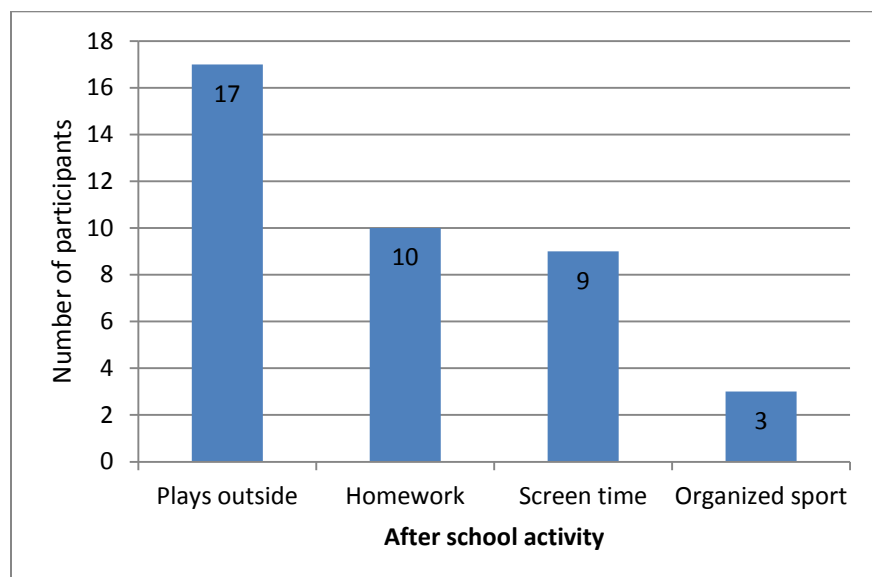


Figure 3.2 Child's after school activities

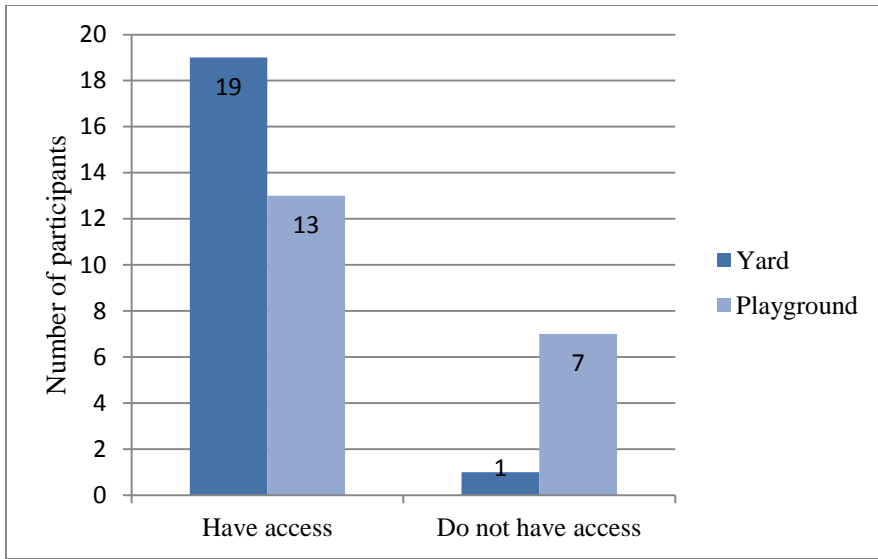


Figure 3.3 Child's access to yard and/or playground

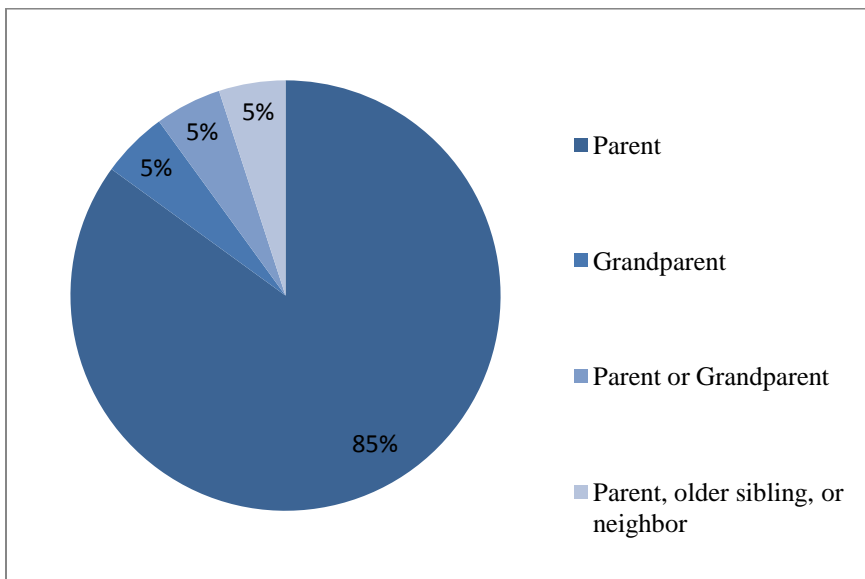


Figure 3.4 Care of child after school

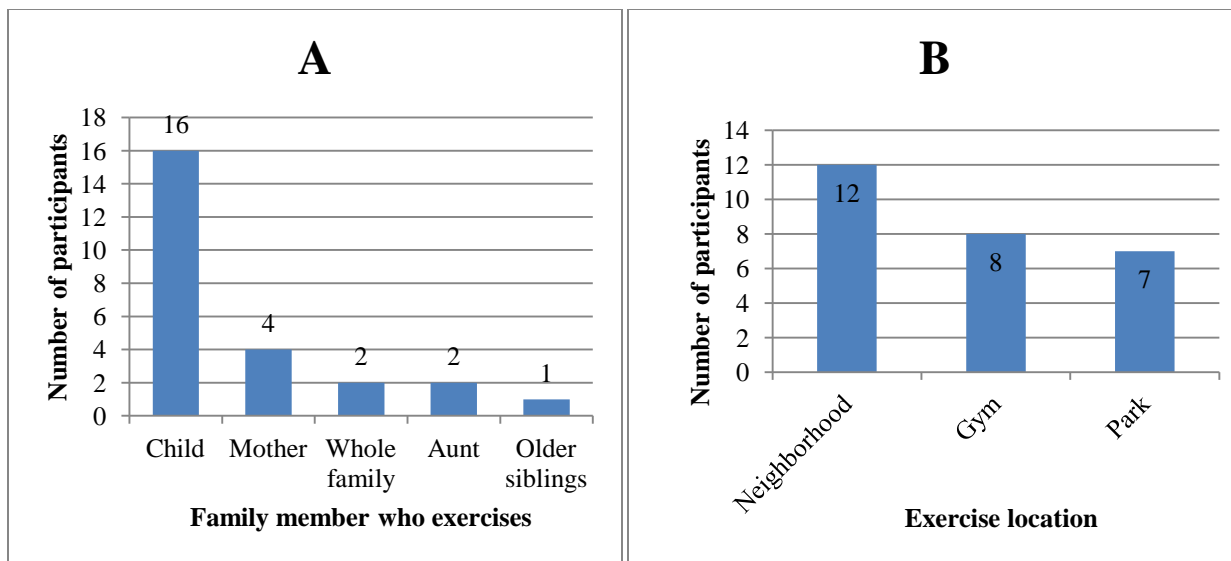


Figure 3.5 Family exercise habits

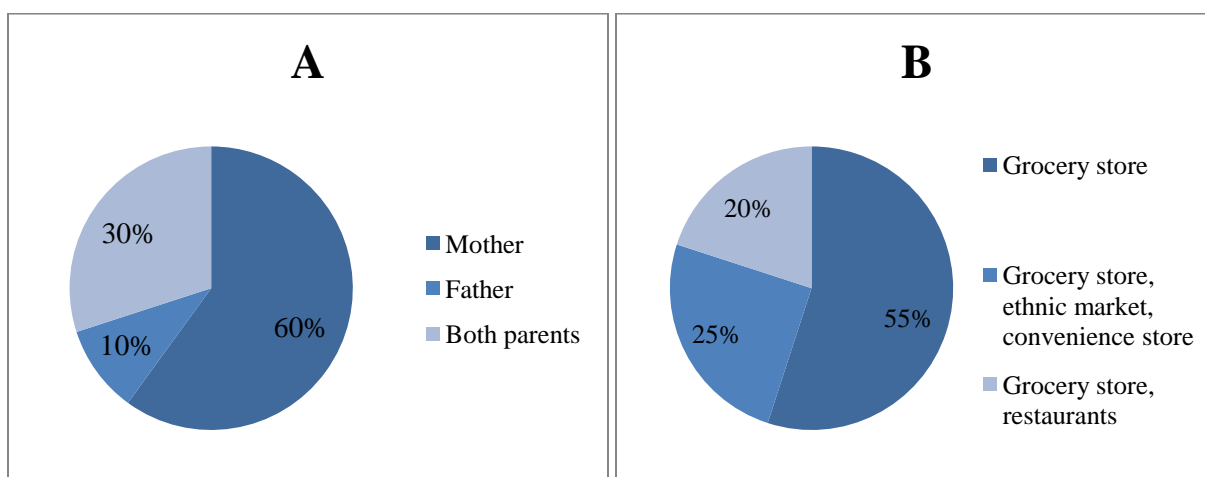


Figure 3.6 Household food acquisition

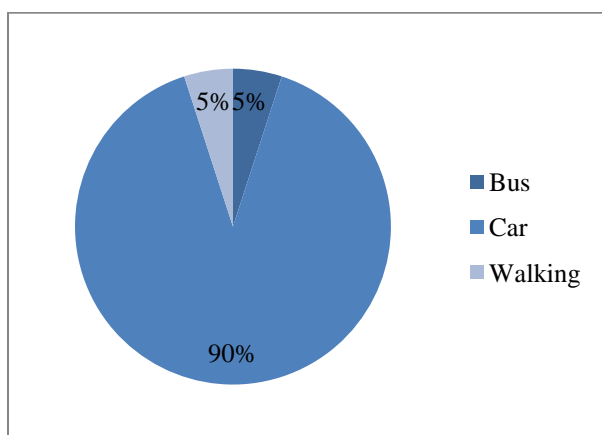


Figure 3.7 Form of transportation used most often by caregiver

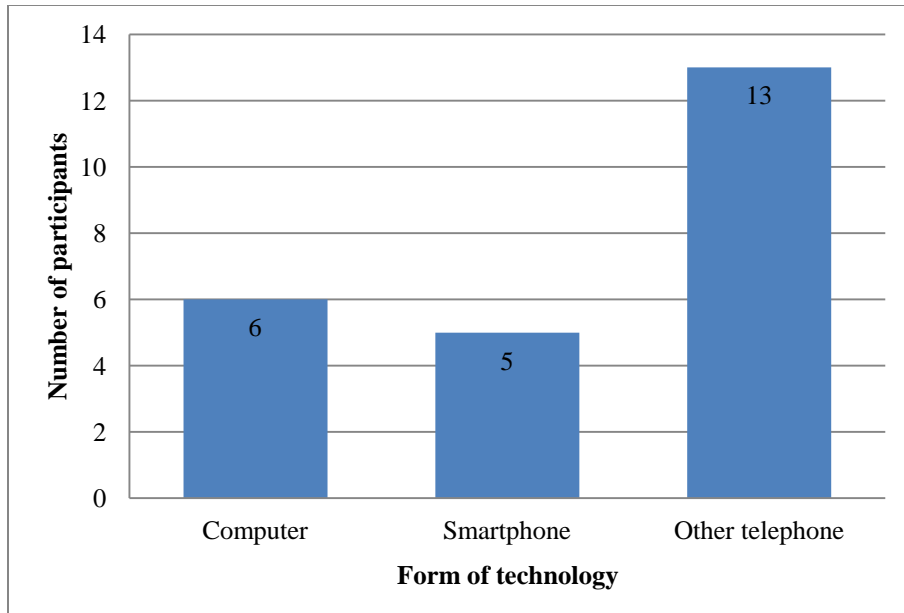


Figure 3.8 Caregiver's access to technology

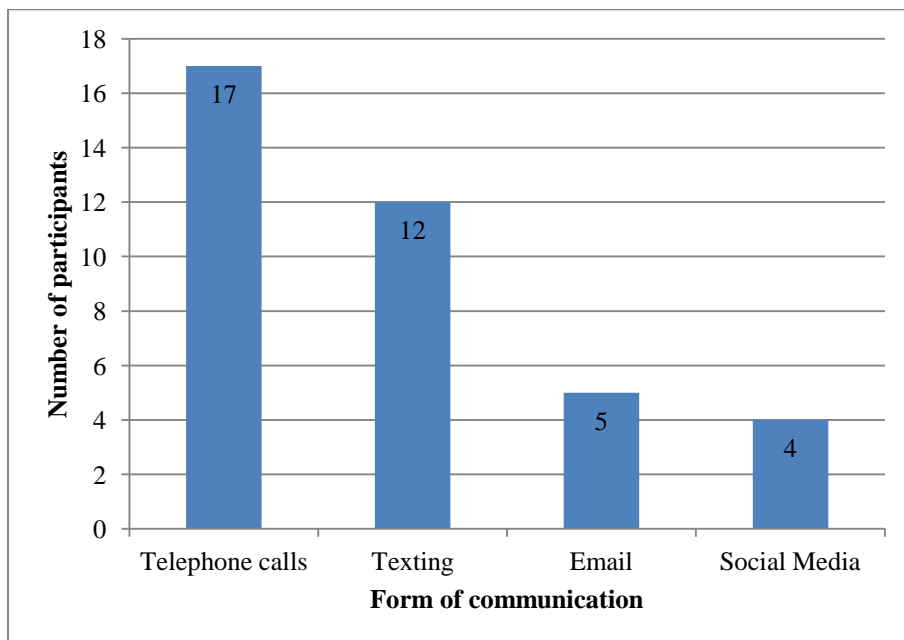


Figure 3.9 Forms of technology used for communication by caregivers

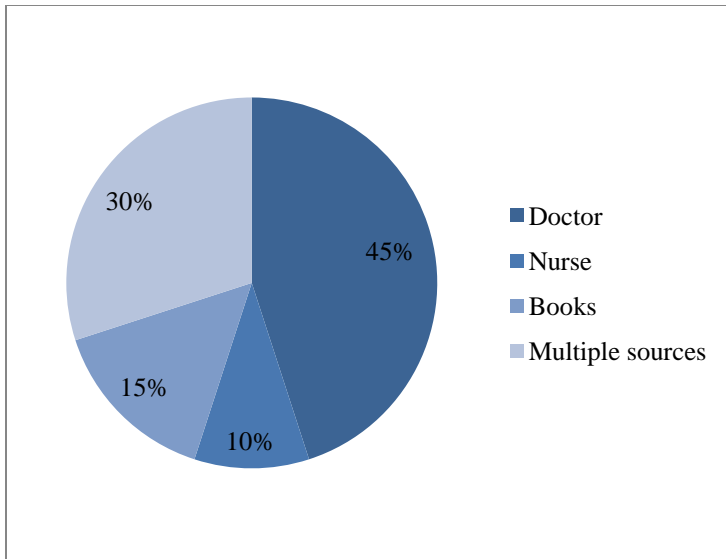


Figure 3.10 Sources for health information

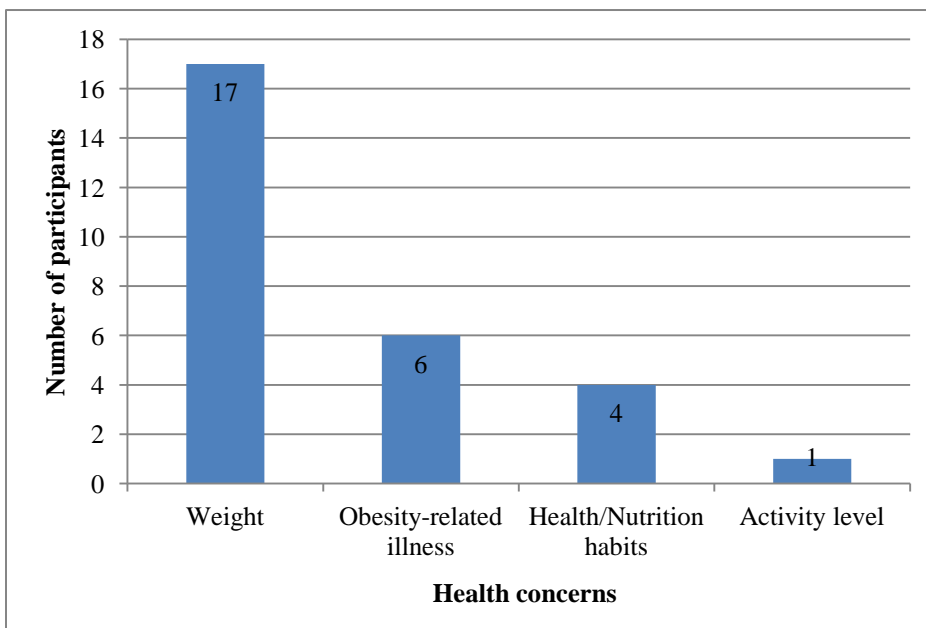


Figure 3.11 Caregiver's top health concerns for child

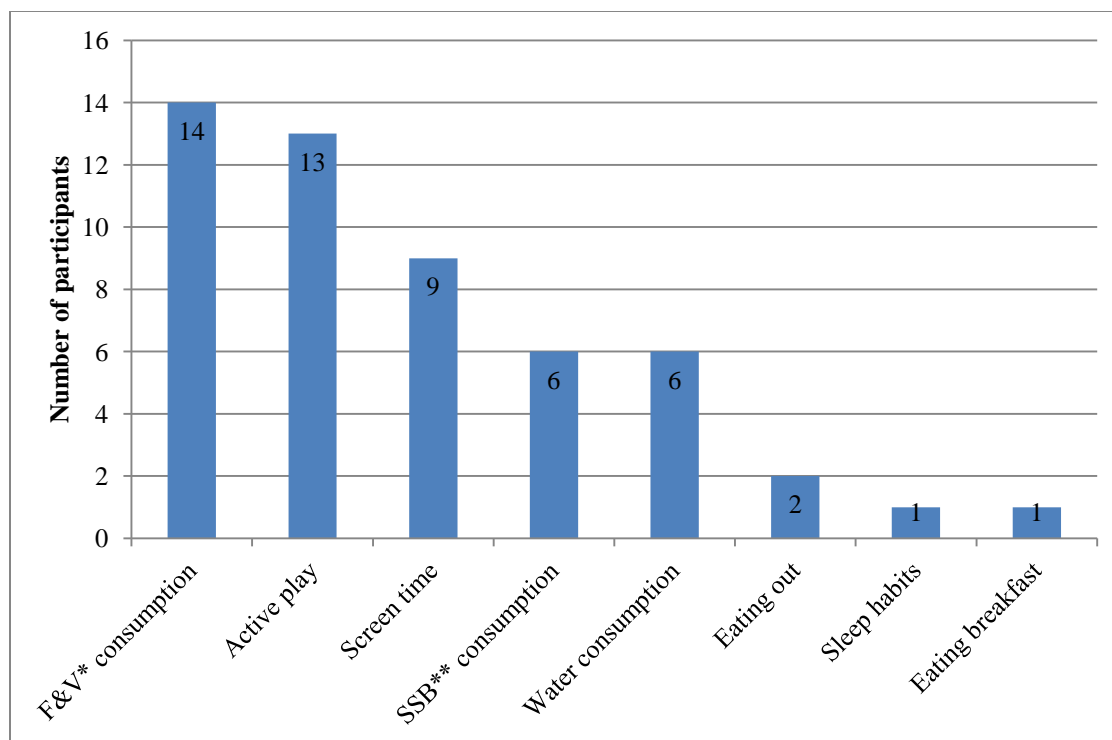


Figure 3.12 Child's health habits caregivers wish to improve

*F&V = fruit and vegetable

**SSB = sugar-sweetened beverage

CHAPTER 4

CONCLUSION

The main purpose of this needs assessment study was to assess the needs of families of obese children to inform the development of a clinic-based program to manage the weight and health of obese children. The overall hypothesis was that obesity in children participating in the HMFF program would be associated with negative health and nutrition habits and the presence of barriers to healthy weight in the family environment. The first specific aim was to determine the nutritional and behavioral habits of obese children participating in the HMFF program, with the hypothesis that these children will participate in negative nutritional and behavioral habits. The second specific aim was to identify barriers in the family environment of HMFF participants that may impact the success of an obesity intervention. It was hypothesized that barriers to developing healthy habits will be present in the family environment of HMFF participants. The third specific aim was to identify potential methods for the delivery of health and nutrition information, with the hypothesis that parents/caregivers of obese children participating in the HMFF obesity intervention will value individual or group face-to-face intervention delivery.

As hypothesized, most children in this needs assessment study exhibited negative nutritional habits. The results of this study suggest that the nutritional habits that most need addressing among obese children participating in the HMFF program are fruit and vegetable consumption and sugar-sweetened beverage (SSB) intake. The reported fruit and vegetable intake of most children in this study was well below recommendations. In addition, the results suggest that many children in this study are consuming empty calories from SSBs. This is of concern because research has found an association between these negative nutritional habits and

overweight in children and adolescents (1, 2). Several expert committees and regulatory agencies recommend increasing fruit and vegetable intake and decreasing SSB intake to be included in the treatment of obesity among children and adolescents (3 – 5).

Other priority health habits that should be addressed are physical activity and screen time. Although many children in the current needs assessment study were reported to participate in adequate daily physical activity, others were reported to engage in little to no physical activity on a daily basis. In addition, children in this study were reported to engage in close to 2 hours of screen time per day on average. Previous studies have indicated that an increase in screen time and a decrease in physical activity are contributing to increased overweight and obesity among children and adolescents (1, 2). For this reason, physical activity must remain an important component of the HMFF obesity intervention program.

The present study also identified barriers to developing healthy habits in the family environment of HMFF participants. Although most children in this study had access to a yard or a neighborhood park, our findings revealed that the lack of access to safe exercise environments may be a barrier for some children to participate in physical activity. Another barrier to developing positive physical activity habits present among HMFF participants is the lack of physically active role models in the family. Fewer than half of the children in the study were reported to have a family member who exercises regularly. Perhaps one of the most significant barriers that may impact the success of the HMFF program is ensuring that the intervention is culturally appropriate for the target population as almost all of the children studied were of Hispanic background. It will be important for the intervention to be delivered by health educators who are familiar with Hispanic culture and fluent in Spanish. At the very least, a translator should be present at the counseling sessions of Spanish-speaking families.

The present study revealed that most participants do not have access to a computer or a smartphone; therefore, an internet- or computer-based component of intervention would not be useful for this population. However, the participants may benefit from text message or telephone reminders and health tips as a means of support between appointments as most participants have access to cellphones with texting capabilities. Most importantly, individual or group face-to-face intervention delivery seems to be the preferred method of delivery to HMFF's target population.

The overall positive attitude that caregivers have toward the HMFF childhood obesity intervention program and the anticipated improvement of their child's health habits is encouraging and assuring of their readiness for some sort of support in managing their child's weight problem. Through addressing the outlined health habits and barriers, the HMFF childhood obesity intervention program will have the potential to make a positive impact on the health of the program participants and the Athens community. Once the program is in place, future research should be conducted to evaluate the effectiveness of the obesity intervention in order to continually improve the program's impact.

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APPENDICES

APPENDIX A

RECRUITMENT FORM

Recruitment Form
Formulario de reclutamiento

Researchers in the Department of Foods and Nutrition at the University of Georgia, in collaboration with Athens Regional Medical Center, are conducting a survey to learn about the health habits, access to health resources, barriers, and challenges of families with children. They are looking for parents or primary caregivers who have children whose weights are considered overweight or obese to participate in a study to answer questions about the child's eating habits, physical activity patterns, and daily routine, as well as the general family environment. The information collected through this survey will be used in the development of a program that will help families make healthy habit changes. Your input will help make the program more meaningful. The survey should take about 20-30 minutes and will be conducted over the phone. If you agree to participate, your name and telephone number will be given to the researchers. The researchers will then contact you by phone sometime within the next few weeks. Thank you for considering participating.

Investigadores en el departamento de Comida y Nutrición de la Universidad de Georgia, conjunto con el Centro Medical Regional de Athens, están conduciendo una prueba para aprender sobre los hábitos de salud, el acceso a recursos de salud, obstáculos, y dificultades de familias con niños. Buscan a padres o guardianes primarios que tienen hijos cuyos pesos son considerados sobrepeso o obeso, para participar en un estudio sobre los hábitos dietarios de los niños, rutinas de actividad física, y rutinas cotidianas, y también el ambiente familiar. La información colectada por la prueba será utilizada en el desarrollo de un programa que ayudará a estas familias a hacer cambios saludables. Su contribución dará valor al programa. La prueba tomará 20-30 minutos y estará hecha por teléfono. Si Usted asienta a participar, su nombre y número de teléfono será proveído a los investigadores. Los investigadores le contactarán por teléfono en las próximas semanas. Gracias por su consideración en participar.

Caregiver's name (nombre del guardiana): _____

Telephone number (número de teléfono): _____

Language preferred (English or Español): _____

APPENDIX B

TELEPHONE SCRIPT (ENGLISH)

Health Matters for Families Needs Assessment Study

Telephone Script

“Hello, may I speak with [*name of caregiver* or ‘*the primary caregiver of* (*patient’s name*)’]. My name is [*name of research assistant*] and I am a [*graduate* or *undergraduate*] research assistant working under the supervision of **Dr. Alex Anderson** in the **Maternal and Child Nutrition Research Lab** in the **Foods and Nutrition Department** at the **University of Georgia**. The reason I am contacting you is that we are conducting a survey to learn about the health habits, access to health resources, and challenges of families with children. We are working in collaboration with **Athens Regional Medical Center** and the **Health Matters for Families program**. We received your contact information after you expressed interest in participating in the survey at your child’s recent visit to the pediatrician. Are you still interesting in participating in the survey?”

[IF NO] “Thank you for your time. Good-bye.”

[IF YES] Continue...

“The survey should take about 20-30 minutes and will ask questions about your child’s eating habits, physical activity patterns, and daily routine, as well as the general family environment. The information collected through this survey will be used in the development of a program that will help families make behavioral and lifestyle changes. Your input will help make the program more meaningful. I would like to assure you that this study has been reviewed and has received ethics clearance from the Institutional Review Board of the University of Georgia. Would you like to complete the survey now?”

[IF NO] “When would be a better time to contact you?” (Record reply on contact sheet.) “Thank you for your time and participation. I look forward to speaking with you again on [*day and time of telephone appointment*]. Good-bye.”

[IF YES] “Thank you; we appreciate your participation. Your input is voluntary, and at any time during the survey you may choose to not answer a question or to end the survey. Do you have any questions before we begin?”

(Answer questions and then conduct the survey.)

[AFTER SURVEY] “Thank you very much for helping us with our research. Your input will help make Health Matters for Families a more successful program. Have a wonderful day! Good-bye.”

APPENDIX C

TELEPHONE SCRIPT (SPANISH)

Guión Telefónica

Hola, puedo hablar con [nombre del guardiana de (nombre del paciente)]. Mi nombre es [] y yo soy una investigadora de licenciatura trabajando conjunto con Doctor Alex Anderson en el laboratorio de la Nutrición de Maternidad y de Niñez en el departamento de Comida y Nutrición a la Universidad de Georgia. Le estoy llamando porque estamos haciendo una prueba para aprender sobre los hábitos de salud, acceso a recursos de salud, y obstáculos de los familias con niños. Trabajamos con el Centro regional medical de Athens y el programa Salud le importa a familias. Recibimos su información de contacto después de que Ud. indicara su interés en participar en la prueba en la cita al pediatra mas reciente para su niño. Está Ud. todavía interesada en participar en la prueba?

[IF NO] Gracias por su tiempo. Adios.

[IF YES]

La prueba debe tomar 20-30 minutos y preguntará sobre los hábitos de comer de su niño, hábitos de actividad física, rutina diaria, y el ambiente familiar en general. La información coleccionada por la prueba será utilizada en el desarrollo de un programa que ayudaría a familias a hacer cambios al comportamiento y al estilo de vida. Su contribución dará significado al programa. Quisiera asegurarse de que Ud. sepa que ese estudio ha sido criticada y ha recibido acreditación ética por la Junta de revisión Institucional de la Universidad de Georgia. Quisiera tomar la prueba ahorra?

[IF NO]

Cuando sería un mejor tiempo para llamarse? Gracias por su tiempo y participación. Espero hablar con Ud. [día y tiempo de la cita]. Adios.

[IF YES]

Gracias, nos agradece su participación. Su contribución es voluntario, y Ud puede elegir de no contestar cualquier pregunta o terminar la prueba en cualquier momento de la prueba. Tiene Ud. cualquier pregunta antes de que empecemos?

[AFTER SURVEY]

Muchas gracias por ayudarnos con nuestra investigación. Su contribución ayudara al programa El salud le importa a familias a ser mas exitoso. Que tenga un buen día. Adiós.

APPENDIX D

QUESTIONNAIRE (ENGLISH)

Needs Assessment...Health Matters for Families

We are in the process of creating a program to support families in healthy habits and would want to know what type of support parents/caregivers need for their families. Thank you for agreeing to answer the questions below. Your input will help us to make the program more meaningful in helping families.

Age of the child: _____

Age of the caregiver: _____

Relation of the caregiver to the child: _____

Weight of child: _____

Height of child: _____

Weight of caregiver: _____

Height of caregiver: _____

Where do you get information about health for you and your family? Check all that apply.

- Internet
- Books
- Doctor
- Nurse
- Friends
- Family
- Other: _____

What technology do you have access to? Check all that apply.

Desktop or laptop computer

- Tablet/pad computer
- Smartphone
- Other cell phone
- Home phone
- Other: _____
- None

Which forms of communication do you use regularly? Check all that apply.

- Telephone calls
- Text messaging
- Email
- Facebook
- Twitter
- Other: _____
- None

Where does your family get your food? Check all that apply.

- Grocery store
- Convenience store
- Eating out
- Farmer's market
- Home/community garden
- Food bank
- Other: _____

Who in the family buys the food? _____

What does your child do after school? _____

What type of transportation do you use most often?

- Bus
- Car
- Get rides from others
- Walk
- Bike
- Other: _____

Does anyone in your family exercise/play regularly? Who? _____

Where do they exercise? Check all that apply.

- School gym
- Public gym
- Neighborhood
- Park
- School playground
- Home
- Other: _____

Does your child have access to a backyard or driveway?

- Yes
- No

If yes, does he or she use it? _____

Does your child have access to a neighborhood playground?

- Yes
- No

If yes, does he or she use it? _____

On average, how many minutes per day does your child play actively (using arm & leg muscles, breathing hard)? _____

Outside of school, with whom does your child spend the most time?

- Parent

- Grandparent
- Older sibling
- Neighbor
- Babysitter
- Other: _____

What are your top health concerns for your child?

On average, how many cups of plain (unsweetened) water does your child drink each day?

On average, how many servings of fruits and vegetables does your child eat each day?

How many servings of fruits each day? _____

How many servings of vegetables each day? _____

How often does your child eat breakfast?

- Never, or almost never
- Some days
- Most days
- Every day

On average, how much time does your child spend watching TV, on the computer, playing video games, etc. each day? _____

Does your child consume sugar-sweetened drinks (flavored milk, juice, soda, sweet tea, Kool-Aid®, sports drinks, etc.)?

- Yes
- No

If yes, how many cups per day? _____

What types of sugar-sweetened drinks does your child consume? _____

On average, how many hours of sleep does your child get each night? _____

On average, how many times does your child eat out each week? _____

Which of your child's health habits would you like to improve? Check all that apply.

- Drinking water
- Eating fruits and vegetables
- Eating breakfast
- Screen time

- Consumption of sweet drinks
- Active play
- Sleep
- Eating out

Do you feel it is important to improve these health habits? Why or why not? _____

How ready is your family to make changes in habits?

- We have no plans to change
- We are thinking about changing
- We have specific plans for how to change
- We are working on changing

What would help your family in making changes in health habits? Check all that apply.

- Learning health facts on my own
 - Learning health facts from a health coach
 - Making a plan specifically for my family on my own
 - Making a plan specifically for my family with a health coach
 - Getting text or email reminders from a health coach
 - Setting goals and reporting back on progress to a health coach
 - Tracking my family's habits on a confidential website
 - Other: _____
-

Would you and your child be interested in coming to six 20-minute appointments at your pediatrician office every 2-4 weeks to work on health habit changes?

- No
Please tell us why not: _____
- Yes, but it would be a low priority
Please tell us why: _____
- Yes, it would be a high priority
Please tell us why: _____

What is your native language?

- English
 - Spanish
 - Other: _____
-

What language is most often spoken in your home?

- English
 - Spanish
 - Other: _____
-

What language do you prefer for reading materials?

- English
- Spanish

- Other: _____

Do you have any comments that you would like to share?

APPENDIX E

QUESTIONNAIRE (SPANISH)

Valoración de Necesidades...Salud le importa a familias

Estamos en el proceso de crear un programa para apoyar familias en hábitos saludables y quisiéramos saber que tipo de ayuda padres/guardianas necesitan para sus familias. Gracias por consentir a contestar las siguientes preguntas. Su contribución nos ayudará a dar más significado al programa para ayudar a familias.

Edad del niño: _____

Edad del guardián/la guardiana: _____

Relación del guardián o la guardiana al niño: _____

Peso del niño: _____

Altura del niño: _____

Peso del guardiana: _____

Altura del guardiana: _____

De donde recibes información sobre salud para Ud. y su familia? Indique todos que apliquen.

- Internet
- Libros
- Doctor
- Enfermera
- Amigos
- Familia
- Otro: _____

A que tecnología tiene Ud. acceso? Indique todos que apliquen.

- Computadora portatil.
- Tableta/computadora
- Smart-teléfono
- Otro tipo de teléfono portatil
- Teléfono de casa
- Otro: _____
- Nada

Que tipos de comunicación usa Ud. regularmente? Indique todos que apliquen.

- Llamadas telefónicas
- Mensajes de text
- Correo electrónico
- Facebook
- Twitter
- Otro: _____
- Nada

De donde recibe su familia comida? Indique todos que apliquen.

- Mercado
- Mercado Conveniente
- Restaurantes
- Feria
- Jardín a casa/de la comunidad
- Despensa comunitaria
- Otro: _____

Quien en la familia compra la comida? _____

Que hace su niño después de escuela? _____

Que tipo de transportación usa Ud. más frecuentemente?

- Autobus
- Coche
- Compartir transportación con otros
- Andar
- Bicicleta
- Otro: _____

Juegan/Hace miembros de su familia ejercicio regularmente ? Quien? _____

Donde hacen ejercicio? Indique todos que apliquen.

- Gimnasio a la escuela
- Gimnasio público
- Barrio/vecindad
- Al parque
- Parque infantil a la escuela
- En casa
- Otro: _____

Tiene su niño acceso a un patio trasero o entrada para el auto?

- Si
- No

Si afirmativo, es que su niño lo usa? _____

Tiene su niño acceso a un parque de vecindad?

- Si
- No

Si afirmativo, es que su niño lo usa? _____

En promedio, cuantos minutos al día juega su niño activamente? (usando músculos de los brazos/piernas o respirando fuerte) _____

Afuera de la escuela, con quien pasa su niño la mayoría del tiempo?

- Padre
- Abuelo
- Hermano mayor
- Vecino
- Niñera
- Otro: _____

Que le preocupa mas sobre la salud de su niño?

En promedio, cuantos vasos de agua (sin azucar) bebe su niño cada día? _____

En promedio, cuantas porciones de frutas y verduras come su niño cada día?

Cuantas raciones de frutas cada día? _____

Cuantas raciones de verduras cada día? _____

Con cual frecuencia come su niño el desayuno?

- Nunca, o casi nunca
- Algunos días
- Casi todos los días
- Cada día

En promedio, cuanto tiempo pasa sus niño mirando televisión, en la computadora, jugando videojuegos, etc. cada día? _____

Bebe su niño bebidas dulces? (leche sazónada, jugo, soda, té dulce, Kool-Aid®, bebidas de deportes, etc)

- Si
- No

Si afirmativo, cuantos vasos al día? _____

Que tipos de bebidas endulzadas por azúcar bebe su niño?

En promedio, cuantas horas duerme su niño cada noche? _____

En promedio, cuantas veces come su niño en un restaurante? _____

Cual de los hábitos de salud de su niño quisiera Ud. mejorar? Indique todos que apliquen.

- beber agua
- comer frutas y verduras
- comer el desayuno
- Tiempo frente la televisión o computadora
- beber de bebidas con azucar
- Tiempo activo
- dormir
- Comer en restaurante

Cree Ud. que es importantnte mejorar esos hábitos de salud? Porque o porque no?

Como dispesta está su familia para hacer cambios en hábitos?

- No planeamos en cambiar
- Pensamos en cambiar
- Tenemos un plan para cambiar
- Estamos trabajando hasta cambiar.

Que ayudaría a su familia en hacer cambios en hábitos de salud? Indique todos que apliquen.

- Aprendiendo hechos por mi mismo
- Aprendiendo hechos de un entrenador de salud
- Haciendo un plan especifico para mi familia por mi mismo
- Haciendo un plan especifico para mi familia con un entrenador de salud
- Recibiendo avisos por mensajes de texto o correo electrónico de un entrenador de salud
- Estableciendo metas y reportando progreso a un entrenador de salud
- Siguiendo los hábitos de mi familia en un sitio de web confidencial
- otro: _____

Están Ud y su niño interesados en atender a seis citas de 20-minutos en la oficina de su pediatra cada 2-4 semanas para trabajar en cambiar los hábitos de salud?

- No
- Por favor, diganos porque no: _____
- Si, pero sería de baja prioridad
- Por favor, diganos porque no: _____
- Si, tendría alta prioridad
- Por favor, diganos porque no: _____

Cual es su lengua materna?

- Inglés
- Español
- Otro: _____

Cual lengua se habla más en su casa?

- Inglés
- Español
- Otro: _____

Que lengua prefiere Ud. para materiales de lectura?

- Inglés
- Español
- Otro: _____

Tiene Ud. cualquier comentario que quisiera compartir?
