Needs Assessment for A Childhood Obesity Intervention Program

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Abstract: *Objective:* The purpose of the study was to conduct a needs assessment of families of obese children to guide the development of a childhood obesity intervention program.

Method: This was a cross-sectional design that used a structured questionnaire containing closed- and open-ended questions. Interviews for data collection were conducted over the telephone. Participants included 20 primary caregivers of obese children. Main outcome measures included selected nutritional and behavioral habits of obese children.

Results: All caregivers were the biological mother of the index child. Half of the children were males, and age range was 4-13 years. Spanish was reported to be the primary language in the homes of 75% of participants. The median fruits and vegetables intake was 2.8 servings/day and 1 cup/day of sugar-sweetened beverages. The children were reported to participate in a median of 35 minutes/day of active play and 60 minutes/day of screen time.

Conclusions: The data suggest a need for a culturally sensitive intervention program with emphasis on improving nutritional and behavioral habits of obese children while ensuring cultural relevancy.

Keywords: Adolescent, child, intervention, needs assessment, obesity, overweight.

1. INTRODUCTION

Although the prevalence of childhood obesity seems to have plateaued over the past decade, it still 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 contributes 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 in later adulthood [2-5]. In response to this major public health problem, targets are set in the *Healthy People 2020* objectives by the U.S. Department of Health and Human Services 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].

Understanding the etiology of childhood obesity is important in addressing this public health problem. However, the etiology of childhood obesity is quite complex and may involve many genetic and epigenetic risk factors [7-10] as well as behavioral and environmental risk factors [7-9, 11]. The current literature suggests 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, skipping breakfast, few family meal times, 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 [11]. The authors also observed strong evidence that daily moderate/vigorous physical activity may help reduce adiposity in overweight/obese children.

To address the problem of childhood obesity in the Athens-Clarke County area of the state of Georgia Athens Regional Health System (ARHS) has partnered with pediatricians and researchers from the University of Georgia to develop a program for clinic-based childhood obesity management. This intervention program is part of a larger health initiative by ARHS called Health Matters for Families (HMFF). This paper is based on a needs assessment conducted with families of obese children within the target community to inform the development of the HMFF clinic-based program to manage the weight and health of obese children. The objective of the needs assessment study was to assess the chaildren's nutritional and behavioral habits, identify barriers that may impact the success of the program, and identify potential methods for the delivery of health and nutrition information to obese children and their families.

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2. METHODS

2.1. Study Design

This was a cross-sectional survey 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 HMFF program. At the time of the study, the HMFF program was just beginning and providing general health education to parents/caregivers and their children who are patients at the Medical Resource Center of Athens, Georgia. The education provided by the health educators of HMFF did not have any nutrition content.

2.2. Questionnaire Development and Review

A structured questionnaire containing 43 closed- and open-ended questions was developed from existing instruments to collect information about the dietary habits, physical activity patterns, and anthropometrics of children and their families participating in the HMFF program. The questionnaire also assessed each family's access to health information, access to technology, attitude toward change, access to healthy foods, demographics, and spoken as well as preferred 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 other members of the research team after further review of the literature and consultations with experts. 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 reached a consensus after pilot testing the questionnaire among mothers with obese children and finalized for administration to participants.

2.3. Questionnaire Administration

The questionnaire administration and 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 conducted from February to October 2013.

The study protocol and methods were reviewed and approved by the Human Subjects Institutional Review Board of the University of Georgia. Participants provided oral consent over the telephone after the study protocol was explained.

2.4. Participants

Participants in the study were caregivers of obese children aged 4 to 13 years who were participating in the HMFF program. Participants were recruited from the pediatrician's office where the HMFF program is based. Pediatricians who had their private practice in the Medical Resource Center of Athens, Georgia discussed the study with parents/caregivers of obese children in the age range who are patients in their practice and encouraged them to participate. Caregivers of obese children who were interested in participating in the study had their phone number sent to the study coordinator as a way of referral and were contacted within a week *via* telephone for interview and data collection between March and December 2013. For eligibility, parent/caregiver had to be 18 years or older, child between 2 and 14 years and diagnosed as obese (BMI-for-age > 95^{th} percentile) but had no comorbidities. Interviews were conducted in either English or Spanish language depending on participant's choice of language and proficiency and lasted between 20 and 30 minutes. A total of 29 caregivers expressed interest in participating in the study but only 20 were available and reached by telephone for data collection.

The study protocol and questionnaire were reviewed and approved by the Institutional Review Board of the University of Georgia. Parents/caregivers of the obese children provided oral consent over the phone after the consent process and before data collection.

2.5. Statistical Analysis

Statistical analysis was performed using IBM SPSS Statistics 21 (SPSS Inc., Chicago IL).

Descriptive statistics were used to describe the participant characteristics and health and nutritional habits.

3. RESULTS

3.1. Characteristics of Participants

Table **1** summarizes the characteristics of participants. All of the caregivers were mothers of the children. 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^{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.

Table 1: Characteristics of Children at the Time of the Survey (N = 20)

Characteristic	n	Mean (SD) or %
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%

3.2. Health Habits of the Children

3.2.1. Nutrition Habits

The median intake of fruit and vegetable of the children reported by caregivers was 2.75 (range: 0-6) servings per day, with a slightly higher intake of fruits than vegetables (Table **2**). Almost all (19/20) of the children were reported to consume breakfast daily (median: 4 times per week), with only one child never or almost never consuming breakfast. The median intake of plain, unsweetened water by the children reported by caregivers was 6 cups per day. Seventy-five percent (15/20) of the children were reported to consume sugar-sweetened beverages (SSB), with a median intake of 1 (range: 0.0 - 4.5) cup per day (Table **2**). Juice was the most commonly consumed SSB (13/20), followed by fruit-flavored drinks (Kool-Aid and/or Capri Sun; 3/20), agua fresca (water with fruit and sugar; 3/20), flavored milk (3/20), soda (2/20), and sports drinks (2/20). On average, the children were reported to eat out at least once per week (Table **2**).

3.2.2. Physical Activity, Sedentary Behavior, and Sleep Habits of the Children

Caregivers reported that 80% (16/20) 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 sports (Figure **1**). 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 **2**). The children were reported to receive a median of 9.5 hours of sleep per night (Table **2**).

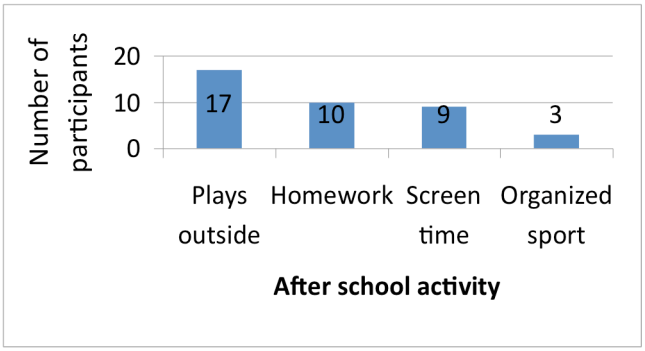

Figure 1: Child's after school activities.

Table 2: Child's Nutrition, Physical Activity, and Sleep Habits

Variable	Mean ± SD	Median	Range
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.

3.3. Family Environment

3.3.1. General Family Environment of the Children

Almost all of the children (19/20) were reported to have access to a yard for physical activity. 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 (13/20) were reported to have access to a neighborhood playground, but only nine of them used it regularly.

When asked about after school supervision of the child, caregivers reported that 85% (17/20) of the children are supervised primarily by a parent, while 5% (1/20) are supervised primarily by a grandparent. The remaining children are supervised equally by a parent or grandparent (1/20) or by a parent, older sibling, or neighbor (1/20).

Caregivers reported that less than half (9/20) 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). 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).

In most (12/20) of the families interviewed, the mother is the primary food shopper, but in other families the father (2/20) or both parents (6/20) did the grocery shopping. All caregivers reported shopping for food at grocery stores, but 25% (5/20) also shop at convenience stores and ethnic (Hispanic) markets, and 20% (4/20) reported eating out to be a major source of food in addition to shopping at a grocery store. Caregivers of almost all of the children (18/20) reported having access to a family car, while the remainder primarily walk or take a bus.

3.3.2. 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 at home, 5 reported having access to a smartphone, and 13 reported having access to a non-smartphone telephone. 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). 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).

3.3.3. 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. 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, 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). 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 (18/20) reported that they were currently working on changing, while 10% (2/20) reported that they were thinking about changing their child's poor habits. As presented in Table **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).

Table 3: Caregiver's Preferred Education Tools and/or Learning Methods

Number of Respondents	Education tools and/or learning methods
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

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% (16/20) of the children reported that participating in HMFF Program was a high priority.

4. 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.

4.1. Nutritional and Behavioral Habits

As reported in Table **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. Current recommendations for fruit and vegetable consumption for children and adolescents vary greatly with age, sex, and activity level [13]. 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 for active 18-year-old males [13]. 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. Thus, focusing on fruit and vegetable consumption should be an important component of the intervention.

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 caloric intake among U.S. children and adolescents across all time points from 1989-2010 [14]. 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 [14]. 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 **2**). This is of concern because SSBs provide calories but little to no essential nutrients, and not factored into the individual's overall daily caloric intake. In addition, there is substantial evidence that SSB intake is positively associated with higher body weight in children and adolescents [11, 13, 15, 16], potentially due to its unaccountable caloric content. In a review of 19 observational studies published between 1999 and 2004, [16] 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, 13, 17].

Physical activity is also important for the management of childhood obesity. The children in the current study were reported to participate in close to 60 minutes per day of active play on average (Table **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. Increasing physical activity has the potential to improve weight loss and management through increasing energy expenditure [11, 15]. 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 [18]. 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. 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, 13]. 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 [19-26]. The children in the current study were reported to participate in close to 2 hours per day of screen time on average (Table **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/caregivers, 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.

4.2. 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-income and minority communities such as that of the participants in the current study [15, 27]. An analysis of data from the National Longitudinal Study of Adolescent Health found that communities with low socioeconomic status and large minority populations had limited access to physical activity facilities and safe environments [27]. 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; however, at least one caregiver expressed concerns about the safety of the yard. Fewer children had access to a neighborhood playground, while only about two-thirds of those who have access to a playground were reported to use it regularly. These observations could be due to perceived safety issues, although not directly reported, and lack of playmates and resources for exercising.

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 [28]. A more recent study of 161 middle school students supported this conclusion [28]. This cross-sectional study explored the contributions of perceived parental support, involvement, and modeling to adolescent physical activity motivation and behavior. The study found significant, positive relationships between all variables, including parental modelling and adolescent physical activity motivation and behavior. The researchers concluded that mothers and fathers both play a significant role in their children's physical activity. This is therefore an area that needs improvement and focus which the HMFF program could provide within the target 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 target community is developing culturally appropriate intervention to meet the needs of the diverse population. It will be essential for the HMFF program to develop intervention that is culturally relevant for the target population, which this needs assessment study revealed to be mostly of Hispanic background. In addition, the finding that 75% (15/20) 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. The low level of acculturation is an indication that participants may be recent immigrants and calls for a better understanding of their cultural and traditional practices. This will require that program educators/counselors become familiar with the participants cultural practices as well as perceptions of weight and health as pertains in their country origin to be able to deliver any effective intervention. It is therefore important for the HMFF program and similar programs to employ a model of intervention that is culturally appropriate considering the diversity of the population in the Athens Area and surrounding communities. This is important because the population of the Athens Area and surrounding communities are heterogeneous which will require cultural specificity to any weight management intervention to be effective.

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.

4.3. 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. As a result of limited internet access, only a few caregivers reported using email and/or social media. 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.

4.4. 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, needs and expectations of the target participants. Second, participants were at different stages of the HMFF obesity intervention program at the time of data collection. 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 [30-32].

5. IMPLICATIONS FOR RESEARCH AND PRACTICE

Overall, findings from this needs assessment study suggest that the most common negative health habits among children in the target communities 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 messages 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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