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Pediatric Obesity in Primary Care

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This doctoral project, directed and approved by the candidate's committee, has been accepted by the College of Graduate and Professional Studies of Abilene Christian University in partial fulfillment of the requirements for the degree

Doctor of Nursing Practice

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A doctoral project submitted in partial satisfaction

of the requirements for the degree of

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by

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Dedication

I would like to dedicate this doctoral project to my family, my dad Lewis James Liggins II; my mom Lorraine C. Liggins; my brothers, Lewis James Liggins II and L. J. Ron Liggins; my sisters, Deneen Curry and Susan Moultrie; and my amazing daughters Sylvia Lynn May and Fallynne Yvonne Usher; my one and only nephew Anthony; my nieces Ashely and Monique. A special thank you to Dad and Mom for teaching us to strive for excellence. This accomplishment was made possible by the encouragement, prayers, and consistent support from my family.

When I became a pediatric nurse practitioner, my dad began to call me Dr. Penny. I explained to my dad many times that I was not a doctor, I was a pediatric nurse practitioner. His response was, “You see patients, your write prescription, you are a doctor.” Thank you, dad, for speaking Dr. Penny into my life, I have embraced it. Truly, God had the perfect plan for my life. Thank you, family, I love you, honey!

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Abstract

The purpose of this evidence-based quantitative quasi-experimental research was to compare if providing the parents with information on the health risk associated with childhood obesity would cause the parents to make healthier food choices and encourage their children to be involved in a full hour of physical activity a day. Participants included parents and pediatric and adolescent children 5 to 18 years of age at a solo practice primary care office in a large city in Southern California, which specializes in treating pediatric and adolescent patients. A pre- and postquantitative intervention design were used and analyzed using the paired *t* test. The educational intervention on childhood obesity had a significant effect on the pre- and postintervention mean scores for the General Nutrition Knowledge Questionnaire. The preintervention mean score was 45.40, and the postintervention mean score was 51.20, which showed clinical significance with a (p = < .001). The participants' demographics, age, weight, height, ethnicity, body mass index (BMI), and BMI percentage were analyzed using descriptive statistics. The sample size included participants (N = 54), females (n = 28), and males (n = 26). Considerations for future research may include providing parents with more resources to obtain healthier food choices to prevent childhood obesity, such as a social worker for families who lack financial resources for healthy food choices, a dietician to assist families with meal planning, and community resources for daily physical activity.

Keywords: childhood obesity, parental knowledge, parental beliefs, barriers, pediatric obesity, prevention, interventions, health risk, body mass index, exercise, bullying, self-esteem, transtheoretical model of change

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Chapter 1: Introduction

The percentage of American children and adolescents who are overweight is 21–24%, and 16–18% of these children are obese (Schwarz, 2019). Although obesity is a nutritional disorder that affects people of all ages, it is prevalent in children and adolescents (Schwarz, 2019). Ethnic and minority children in the United States have a significantly higher prevalence of childhood obesity when compared to White children (Isong et al., 2018). According to Isong et al. (2018), Asian (12.8%) and White (15.9%) children have a lower prevalence of obesity than "American Indian and/or Native Alaskan (31.2%), non-Hispanic Blacks (20.8%), and Hispanic (22.0%) children" (para. 1). In the United States, children's potential for obesity and higher body max indexes has been connected to "cultural factors, such as immigration status and English proficiency" (Zilanawala et al., 2015, p. 520).

With the rise of childhood obesity, many comorbidities associated with adult diseases are seen in this population, like adult-onset diabetes, hypertension, dyslipidemia, nonalcoholic fatty liver disease, and obstructive sleep apnea (Kumar & Kelly, 2017). According to Schwarz (2019), the health problems most seen in childhood obesity are obstructive sleep apnea and sleep-disordered breathing. In many cases, the apnea is accompanied by an impairment of cognitive function (Schwarz, 2019). When an overweight or obese child has cognitive impairment, it prevents the child from concentrating, which will affect learning and school performance.

The interaction of the environment, genetics, behavior, and development can lead to obesity. According to Mărginean et al. (2018), the development of childhood obesity is also influenced by increased birth weight, gestational diabetes, maternal smoking, the mother's nutritional status during pregnancy, feeding practices, or weight gain. Additionally, electronics like tablets, handheld games, extensive television viewing, and cellular phones have contributed

to an inactive lifestyle and reduced physical activity opportunities (Sahoo et al., 2015). The use of electronic devices can lead to unconscious eating, and television advertisements can influence a child's food preferences (Aggarwal & Jain, 2018). Children are developing adult-related diseases, which makes addressing childhood obesity a high priority. Education regarding the health risk associated with obesity, how to read food labels, portion size appropriate for age, the importance of three balanced meals, 60 minutes of physical activity a day, healthy food choice options, and resources such as MyPlate was provided in this study's intervention, which was in the form of a PowerPoint presentation. A questionnaire was given to the parents to assess their general nutrition knowledge pre- and postintervention.

Background

The increasing prevalence of obesity in children and adolescents has contributed to the growing global burden of chronic diseases (Taveras et al., 2015). Childhood obesity is influenced by obesogenic behaviors and the environment (Taveras et al., 2015). Several basic food environmental factors influence the weight of a child, including the accessibility of inexpensive food that is higher in calories, larger portion sizes, an increased amount of quick meal restaurants, and stores with limited groceries in the neighborhood (Taveras et al., 2015). Additionally, there is a lack of access to full-service restaurants, grocery stores, and vegetable and fruit markets (Taveras et al., 2015). Other environmental issues include neighbor safety, such as traffic, night lighting, crime rates, and lack of access to parks and recreation (Taveras et al., 2015). According to Conley et al. (2020), children and adolescents who are not engaging in physical activity outside the home increase their risk of sedentary behavior. Physical activity improves cognition, mental health, and self-esteem and decreases anxiety and the risk of chronic disease in children and adolescents (Conley et al., 2020).

The problem of childhood obesity has been exacerbated by the coronavirus disease–2019 pandemic in the United States. To prevent exposure and the spread of the disease, schools were closed, and all outdoor activities ceased (An, 2020). The cancellation of outdoor activities prevented children from engaging in sports and activities, which increased their risk of becoming overweight or obese (An, 2020). Meanwhile, families had to discover alternative methods to provide physical activity for their children.

The Centers for Disease Control and Prevention (CDC) defines obesity using the body mass index (BMI), which is the standard method (Centers for Disease Control and Prevention [CDC], 2019). Children who have a BMI above the 95th percentile for gender and age are defined as being obese (CDC, 2019). Overweight children are between the 85th percentile and the 95th percentile (CDC, 2019). The prevalence of obesity in childhood in the United States is significantly higher among ethnic and racial minority children compared with white children (Isong et al., 2018). For these reasons, the study findings will be essential for providing resources and education within the community for racial and ethnic minority families.

Purpose of the Project

This study's purpose was to evaluate the effectiveness of parent education on BMI and weight loss in obese children. Educating the parents, guardians, primary caregivers, and the child will bring awareness to the severity of the problem and is an effective method to ensure commitment to lasting results (Braden et al., 2015). Parents may not see their child as being overweight or obese, especially when the parents are also overweight or obese. Parents need to be aware of healthy food choices. The physical activity and dietary habits of the parents influence the children (Braden et al., 2015). Factors that may cause frequent fast-food consumption are convenience, affordability, and taste (Mohammadbeigi et al., 2018). As a result,

most children are not eating three nutritious meals and two snacks a day. Their diet is not balanced and does not consist of the four basic food groups (Mohammadbeigi et al., 2018).

Primary care providers can work with parents to identify possible barriers they may have in making healthy food choices and physical activity a priority (Durbin et al., 2018). Some barriers may include a lack of time to prepare healthy meals, financial constraints, or other preexisting medical conditions (Durbin et al., 2018).

Significance of the Problem

According to Frellick (2013), American Medical Association (AMA) physicians determined that obesity is a disease that will require a multidisciplinary intervention to treat the problem. Healthcare providers are aware of the long-term effects of childhood obesity. However, most healthcare providers have not adopted obesity as a disease (Stanford & Kyle, 2018). Along with the medical concerns of obesity, the emotional and social well-being of the obese child is another major concern (Sahoo et al., 2015). Parents and healthcare providers need to be sensitive when dealing with children and adolescents who are overweight or obese. Consequently, the lack of sensitivity can lead to eating disorders, such as bulimia nervosa and anorexia.

Problem Statement

Prior to this study, it was not known in which ethnicity or area the implementation of an evidence-based pediatric educational program on childhood obesity would impact the BMI and weight of overweight and obese children and adolescents. Throughout the intervention, the children's weight was monitored every 2 weeks for 3 months. The parents completed a questionnaire to assess their nutrition knowledge before the education and again at the end of 3 months.

This study focused on the issue of childhood obesity in primary care and addressed barriers, interventions, and recommendations. The prevalence of childhood obesity is one of the most common chronic disorders, and the incidence continues to increase (Ash et al., 2017). Developing prevention strategies to prevent obesity will require knowledge of the social and biological pathways to obesity (Campbell, 2015). The child's family environment, community environment, and social, biological, and behavioral risk are factors that decisively affect childhood obesity (Campbell, 2015). To prevent obesity in pediatric patients ages 5 to 18 years of age, primary care providers should educate parents and families regarding childhood obesity and the health risks associated with the disease. However, a busy work schedule and financial constraints may prevent parents from making healthy food choices for their children. The primary care setting focuses attention on preventive health care and the consequence of obesity rather than on the appearance of the child or adolescent. It is essential to involve the entire family to improve healthy behavior and create an environment of support.

Research Question

What are the effects of an evidence-based pediatric obesity educational program for parents and children on decreased BMI, weight loss, and increased parental knowledge of nutrition (measured by making healthy food choices) in children 5 to 18 years of age who have a BMI between the 85%–95% percentile for age and gender?

PICOT

Patient problem: The percentage of American adolescents and children who are overweight and obese is increasing (Schwarz, 2019). Overweight American children make up 21–24%, and obese American children make up 16–18%, according to Schwarz (2019). Thus,

there is an increased number of obese children seen at the primary care office in a suburb of a large city in Southern California.

Population (P): Obese pediatric patients in primary care; the gap in nursing practice and lack of a formal program to address childhood obesity.

Intervention (I): Participating in an evidence-based pediatric obesity educational program for family units (parents, children, and caregivers). Presented in a PowerPoint presentation.

Comparison (C): Pre- and postintervention of BMI, weight, and parental knowledge.

Outcome (O): Decrease in weight, lower BMI, and improvement in overall health.

Time (T): After 3 months.

(P) Obese pediatric patients (ages 5–18) in primary care; (I) participating in a 15-minute evidence-based pediatric obesity educational program for family units (parents, child, and caregivers); (C) pre- and postintervention, BMI, weight, and parental knowledge, which will be measured using the General Nutrition Knowledge Questionnaire (O); resulting in a decreased BMI, weight loss, and increased parental knowledge of nutrition measured by making healthy food choices for their children; (T) after 3 months.

A pre- and posttest design was used to evaluate the parents' general knowledge of nutrition. The independent variable was obese pediatric patients (seen in a primary care practice); it had two conditions (groups), male and female. The dependent variables were body mass index, gender, weight, height, and age, and an ordinal level of measurement was used. The statistical test appropriate to evaluate this question was a t test.

Definition of Key Terms

Body mass index. BMI is a standard method used to define and diagnose obesity. To calculate a BMI, convert the individuals' weight into kilograms divided by meters squared (Okorodudu et al., 2010).

Nutrition. Nutrition is a portion of food or nourishment (Medline Plus, n.d.). A healthy dietary intake provides benefits, namely diet, including increased energy, weight maintenance, and decreased health risk (Medline Plus, n.d.).

Nutrition science. Nutrition science includes social factors and behaviors related to food choices (Medline Plus, n.d.).

Obesity. Obesity is defined as eating more food that is high in calories without engaging in physical activity (CDC, 2019).

Overweight. Being overweight is defined as weighing more than a person's healthy weight, determined by their BMI (CDC, 2019).

Physical activity. Physical activity is a movement of the body that involves energy, namely walking, running, recreational activities, household chores, and playing (World Health Organization [WHO], 2022).

Questionnaire. A questionnaire is a tool used to gather information from an individual using a series of questions (McLeod, 2018). Data can be obtained via email, cellular phones, computers, or in person (McLeod, 2018). The General Nutrition Knowledge Questionnaire is a useful tool that was used to assess the parents' general nutrition knowledge.

Screen time. Screen time is time spent in front of a screen, which would include video games, computers, tablets, cellular phones, and televisions (LeBlanc et al., 2015).

Sedentary. Sedentary is a lack of activity while one is awake that requires little or no energy (LeBlanc et al., 2015).

Scope and Limitations

The scope of this research project was 30 parents and 30 pediatric patients in a primary care office who have a BMI between 85% and 95% for age and gender. Limitations were single-site and geographic area, the lack of the number of participants needed to complete the pre- and postintervention survey, the lack of weight documentation every 2 weeks, and participants not completing the study. Other limitations included time and financial constraints related to time taken off from work to recruit for the study.

Chapter Summary

The intake of large portions of food, decreased activity, and a high caloric intake can predispose children to obesity. Parents buy and prepare the food for the children. However, some parents are not sure what foods are healthy. When a child is obese or overweight, parents should encourage physical activity for the family. Consequently, family involvement provides support for overweight or obese children. Parents' physical activity and dietary habits influence their children (Braden et al., 2015). This study's purpose was to evaluate the effectiveness of parent education on BMI and weight loss in overweight and obese children. Educating the parents regarding childhood obesity and the health risk associated with the disease will bring awareness to the problem. Chapter 2 will discuss literature search methods, theoretical framework discussion, literature review, and summary.

Chapter 2: Literature Review

The prevalence of obesity in childhood is widespread globally (Campbell, 2015). Preschool racial and ethnic minorities have an increased prevalence of obesity (Byrd et al., 2018). When addressing obesity in distinct ethnicities, certain factors that put them at risk should be considered, specifically discrimination, environment, income, psychological factor, level of stress, physical activity, diet, and genetics (Byrd et al., 2018).

According to the CDC (2019), one in five school-aged children is obese. Obesity occurs when there is a decreased amount of physical activity and an intake of too many calories (Sahoo et al., 2015). The opportunity for physical activity has decreased due to the increased use of electronic devices and increased television viewing, leading to an inactive lifestyle and weight gain (Sahoo et al., 2015).

Children and adolescents who have obesity increase their risk of being obese adults, which will have an impact on morbidity and mortality (O'Connor et al., 2017). According to Xu and Xue (2016), the treatment for obesity includes behavioral and dietary modification and an increased level of physical activity. The goal of obesity treatment involves weight management, not weight loss. If the focus of obesity treatment is weight management, the benefits will be weight loss (Xu & Xue, 2016).

This section discusses childhood obesity prevention barriers such as parental knowledge and beliefs, obese parents, lack of quality physical activity, and financial barriers. The review of the literature addresses interventions and recommendations to prevent childhood obesity.

Literature Search Methods

A literature search was conducted utilizing the following databases: the Cochrane Library Database, Google scholar, PubMed–Medline, American Academy of Pediatrics, and the Brown

Library at Abilene Christian University. The key terms selected for the search included *childhood obesity, parental knowledge, parental beliefs, barriers, pediatric obesity, prevention, interventions, health risk, body mass index, exercise, depression, bullying,* and *self-esteem.* The highest level of evidence found was in clinical trials. I was able to locate a total of 1,151 journal articles related to my problem of interest, which is childhood obesity. A total of 70 journal articles were used for the literature review.

Theoretical Framework Discussion

The transtheoretical model (TTM) of change, according to Prochaska et al. (2015), "uses stages of change to integrate a process and principles across many theories of intervention" (p. 125). The TTM has six stages of change: precontemplation, contemplation, preparation, action, maintenance, and termination (Prochaska et al., 2015). The original TTM did not include termination. When an individual is resistant to making a behavioral change in the next 6 months, they are in the precontemplation stage. This individual is not ready to move forward (Prochaska et al., 2015). The contemplation stage is when the individual is aware of the pros and cons of a behavioral change but delays the implementation of the change for 6 months (Prochaska et al., 2015). Preparation is the stage where the individual has taken some steps toward changing behavior and plans to act within the next 30 days (Prochaska et al., 2015). Action is the stage where the individual has willingly made some changes in their lifestyle over the past 6 months (Prochaska et al., 2015). Maintenance is the stage where the individual is confident about the changes that they made to their lifestyle and is focused on preventing a relapse (Prochaska et al., 2015). See Figure 1 for a diagram illustrating the stages of change. See Appendix A for permission to use the diagram.

Figure 1

Transtheoretical Model Stages of Change

Note. Adapted from *Stages of Change Model/Transtheoretical Model (TTM) by Prochaska and DiClemente*, by Current Nursing, n.d. (http://www.currentnursing.com/nursing_theory/transtheoretical_model.html). Copyright 2004–2023 by Current Nursing. Diagram by SketchBubble. In the public domain.

The TTM of change is the best framework for this study because it addresses the different stages a person will enter when planning to change a behavior. Behavioral and dietary modification are key factors in weight loss. The TTM core construct includes the process of change, which explains when cognition, emotion, and behavior take place, the pros and cons, decisional balance, and self-efficacy that mirrors the confidence level of an individual when pursuing a desired change in their behavior in an environment that can cause a relapse (Hashemzadeh et al., 2019). The parent is the change agent and must guide the child or

adolescent through each stage of change when modifying behavior. According to Hashemzadeh et al. (2019), the method used most in behavioral change modeling is the TTM. It is not unusual for individuals to advance through the stages of the TTM out of order when the advancement through the different stages of change can begin in order (Hashemzadeh et al., 2019).

Literature Review

Overview of the barriers to the prevention of obesity in childhood included parental knowledge and beliefs, obese parents, lack of quality physical activity, weight bias, and financial barriers.

Barriers to the Prevention of Obesity in Childhood

Parental Knowledge and Beliefs. An important factor in obesity treatment and prevention is the parent's perception of obesity and their child's weight (Lundahl et al., 2014). Early in the child's life, the food that is consumed is controlled by the parents, and children will usually eat the food that is provided at home (Vittrup & McClure, 2018). It may be a belief of some parents that a child will stop eating when they are full, but if the child does not have an appropriate portion size for their age during a meal, this can affect the feeling of being full (Vittrup & McClure, 2018). Parents are essential to the success of any intervention to prevent childhood obesity because they are examples to their children and they control the child's environment (Appleton et al., 2017). Parents are change agents and provide a foundation for their children regarding attitudes toward food and eating behaviors, which can positively or negatively influence obesity (Appleton et al., 2017). Some parents believe that a sign of good parenting and good health is to have an overweight or obese child (Chatham & Mixer, 2020). Many parents overfill the plate of their children and encourage them to consume the food on the plate, even when the child attempts to push the food away. It is important to address and attempt to

understand the parenting style and cultural beliefs of families to design an effective obesity prevention strategy (Martinez et al., 2017). The parenting style of Latin mothers, according to Martinez et al. (2017), is more permissive and indulgent, with no limits on self-control. This can be associated with the child's weight status and a higher BMI (Martinez et al., 2017). Black adolescent females have the highest incidence of being overweight or obese (Winkler et al., 2017).

Obese Parents. According to O'Connor et al. (2017), obese children are positively influenced by overweight parents. Parents who are overweight or obese may not see their children as being overweight or obese. Parents want to ensure that their children are not hungry; thus, they may not always consider healthy food choices (Vittrup & McClure, 2018). According to Bahreynian et al. (2017), parents who are not obese decrease the risk of having an obese child. Throughout childhood and adolescents, opportunities for living a healthy life are influenced or inhibited by the parents (Pyper et al., 2016).

Lack of Quality Physical Activity. Physical activity is important to prevent children from becoming overweight or obese (Bhargava et al., 2016). The focus of schools is testing and academics; thus, there is no specific amount of time set aside for daily activity (Bublitz & Rhodes, 2017). The management and prevention of obesity are accomplished by physical activity. According to Pandita et al. (2016), preschool children will benefit from unstructured outdoor play. A minimum of one full hour of physical activity is required for school-aged children and adolescents (Pandita et al., 2016). The 60 minutes can be divided into increments of 30 minutes of focused activity (Pandita et al., 2016).

Weight Bias. Some of the risk factors associated with an overweight or obese child or adolescent include low self-esteem, poor body image, anxiety, bullying, and substance abuse

(Stanford & Kyle, 2018). Although the harm of being overweight or obese may not be seen immediately, the results of the harm are intense. (Stanford & Kyle, 2018).

Financial Barriers. Socially disadvantaged children have a higher prevalence of childhood obesity (Vargas et al., 2017). Ethnic and racial minorities from low-income families who have obesity are at risk of becoming obese adults, which will impact the cost of healthcare and the population's health long-term (Vargas et al., 2017).

Obesity Interventions. There have been many proposed interventions to solve different aspects of the complex problem. Mameli et al. (2017) evaluated a multidisciplinary weight loss intervention in an outpatient setting to lower the BMI in children and adolescents 2 to 18 years of age who were obese. The intervention included nutritional sessions and medical, psychological, and lifestyle modification counseling. The number of participants that showed a reduction in BMI z score at the last follow-up visit compared to baseline was 80% (Mameli et al., 2017). Support and follow-up communication are important in the maintenance and success of patients in weight management (Mameli et al., 2017).

Parent Involvement. One of the gold standards for childhood obesity treatment is a family-based weight loss treatment (FBT) for the parent and the child (Boutelle et al., 2017). In a parent-based treatment (PBT), only the parents are involved in the treatment because it is easier to implement and just as effective (Boutelle et al., 2017). Boutelle et al. (2017) sought to discover if PBT was just as effective as an FBT on the decreased weight of the child over 24 months. The dietary intake of the parent and child, parent BMI and weight loss, parenting style, physical activity of the parent and child, and parent feeding behaviors was the secondary aim (Boutelle et al., 2017). Participants included 150 children 8–12 years old who were obese and overweight and their parents. Group meetings and individualized behavioral coaching were

offered to both groups over 6 months (Boutelle et al., 2017). Weight loss of the child was the primary measured outcome by BMI and BMI z score at 6, 12, and 18 months. Parents' weight loss, BMI, child and parent physical activity, child and parent energy intake, parent feeding behaviors, and parenting style were secondary outcomes (Boutelle et al., 2017).

The child's BMI z score after 6 months was 0.25 BMI in both groups (Boutelle et al., 2017). The results indicated that PBT was effective in several secondary outcomes and weight loss for the child. When providing weight-loss treatment to children, PBT is effective (Boutelle et al., 2017).

Larsen et al. (2017) evaluated the impact of Building a Healthy me (BHM) on public health in California in a classroom-based intervention for kindergartners and their families with a focus on nutrition, using the reach, efficacy, adoption, implementation, and maintenance framework. Larsen et al. (2017) assessed the changes in pre- and postnutrition knowledge, parents' behavior, and dietary intake using a quasi-experimental design. The results indicated improved knowledge of food groups and food choices for the intervention group with a $p < .05$ (Larsen et al., 2017).

Kim et al. (2016) conducted a randomized control trial to evaluate childhood obesity that integrated a parent-involved intervention to provide parents with tools to improve the parent-child relationship and management of children's weight-related behaviors. The study included the parents and 55 overweight and obese children 7 to 12 years of age (Kim et al., 2016). The experimental group of parents received the intervention, which consisted of nutrition education, physical activity classes, text messages, and newsletters for 5 weeks (Kim et al., 2016). Postintervention results indicated increased dietary self-efficacy of children and child-parent relationships in the experimental group ($p < .05$). Interventions that involve parents were

effective in increasing the dietary self-efficacy of children and child-parent relationships (Kim et al., 2016).

Exercise and Dietary Modification. Moores et al. (2018) investigated pre- and postchanges in activity, parenting, body measurements, and eating level of the child, in a parent, eating, and activity for child health (PEACH) intervention lifestyle for families of overweight and obese children (Moores et al., 2018). The evaluation of the pre- and postprogram consisted of 388 participants, with a mean age of 8.8 years old and 9.3 years old at follow-up (Moores et al., 2018). Each domain of the PEACH program was reflected in the outcomes. Parents' self-efficacy, child eating behaviors, and physical activity improved. Results indicated a significant improvement in BMI z mean and weight ($p < .001$) Moores et al. (2018). For families of overweight or obese children who engaged in the multi-component, family-based lifestyle weight management program, PEACH is an effective program (Moores et al., 2018).

Katzmarzyk et al. (2015) studied obese children 9 to 11 years of age from 12 different countries and the relationship between vigorous and moderate to accelerated physical activity (MVPA). The activity level was measured using an accelerometer that recorded the magnitude of the physical activity, the time of activity, and inactivity (Katzmarzyk et al., 2015). The results indicate that participants that were involved in 55 minutes of MVPA had a decrease in obesity and BMI with a ($p < .001$), as reported by Katzmarzyk et al. (2015).

Community-Based Intervention. Taveras et al. (2017) conducted a randomized clinical trial to evaluate the effectiveness of a community intervention to improve the BMI z score of the child and the health-related quality of life reported by the parents. The mean age at baseline was 8.0 years. The children were randomized into two groups: Both groups included enhanced primary care (Taveras et al., 2017). Group 1 included educational material, a neighborhood

resource guide, and clinical decision support tools for weight management in children; Group 2 included health coaching to enhance behavioral change and community resources (Taveras et al., 2017). The results in both groups with enhanced primary care and community resources showed a decrease in BMI z scores from the initial BMI z score to 1 year (Taveras et al., 2017).

Wilfley et al. (2017) studied systems of care to expand payment for the treatment of childhood obesity using the recommendations of the U.S. Preventive Services Task Force. The recommendations included a multidisciplinary care team, an integrated care model, and a family-based multicomponent behavioral therapy (Wilfley et al., 2017). To achieve weight loss, evidence-based protocols, medical oversight, and a well-trained healthcare team are essential in the delivery of high-quality care (Wilfley et al., 2017). Evidence-based obesity treatment was recommended to ensure reimbursement within payment models. In conclusion, to establish a combined approach to childhood obesity treatment and to increase payment, collaboration is crucial (Wilfley et al., 2017).

Hoffman et al. (2018) conducted a randomized clinical trial for children 5 to 11 years of age seeking obesity treatment. The children were randomized to two groups: (a) clinical care and (b) clinical care plus, which included a community-based program at recreation facilities and local parks (Hoffman et al., 2018). Outcomes indicate a change in BMI in 6 months and program intensity treatment hours. The secondary outcome included improved health behaviors, quality of life, attrition, and fitness. The integrated treatment model provides improved physical activity, more treatment hours, and quality of life (Hoffman et al., 2018).

Recommendations for Preventing Obesity

Ebbeling and Antonelli (2015) recommended providing different levels of intensity for treating childhood obesity.

Stage 1: Prevention: Primary care should provide information to parents and children regarding physical activity and healthy dietary options.

Stage 2: Weight management, including documentation of progress and schedule interaction with the primary care provider.

Stage 3: A multidisciplinary approach, including a behavioral psychologist and dietician.

Stage 4: Hospitalization to manage medication for type II diabetes caused by obesity, monitor dietary intake, and reeducate regarding the importance of behavioral modification and bariatric surgery (Ebbeling & Antonelli, 2015).

Chapter Summary

The primary intervention for preventing and managing pediatric obesity is to educate parents and children. Healthcare providers should discuss height, weight, and BMI percentage. Parents should be informed that their child is overweight or obese. Resources should be given to the families to help with modifications to their activity or diet (Obesity Medicine Association [OMA], 2017). Interventions for treating pediatric obesity should begin as soon as the child has been identified as being overweight or obese (OMA, 2017). The healthcare provider should continue to provide anticipatory guidance regarding a healthy weight, the cause of weight gain, activities to control weight, and adult diseases associated with childhood obesity.

A medical examination is needed to determine if an obese or overweight child is at risk for developing comorbidities. This will allow the healthcare provider to establish a baseline of the child's overall health and to address factors that may have contributed to the child's weight status (OMA, 2017). To evaluate the cause of obesity, healthcare providers must assess the family's cultural lifestyle, attitudes, and behaviors. A model of intentional behavioral change that allows an individual to move through a process of readiness is the TTM. When modeling a

behavior, the TTM is most used (Hesketh et al., 2017). The key component of the model was used for health education regarding risk factors associated with obesity in children, nutrition knowledge, physical activity of a minimum of 60 minutes a day, intake of vegetables and fruit, and weight management.

According to Nakabayashi et al. (2020), there are some positive benefits to using the TTM, including personalizing the interventions for each participant according to their level of readiness, which is more effective when changing behavior that can affect an individual's health. Nakabayashi et al. (2020) used nutritional interventions for adolescents, which included nutritional education on a low-fat diet, healthy dietary intake, reduction of fast-food intake, improved food choices, and cooking skills. The interventions also involved digital technology, the use of websites, and dietary assessment methods, such as self-reported consumption, food diaries, food frequency questionnaires, and a 3-day food record (Nakabayashi et al., 2020).

De Freitas et al. (2020) used multiple behavior interventions to achieve greater compliance and weight control, such as portion control, decreased fat intake, vegetable and fruit intake, and physical activity. In conclusion, the TTM using nutritional interventions aimed at improving dietary intake and individualized TTM-based interventions can provide an effective strategy for weight loss in adolescents (de Freitas et al., 2020).

Chapter 2 examined literature from previous studies related to parental knowledge, beliefs, perception, exercise, dietary modifications, interventions, recommendations to prevent childhood obesity, and applying the TTM to change behavior. Kim et al. (2016) evaluated an intervention for childhood obesity that included parental involvement. According to Kim et al. (2016), parents' perceptions of the child-parent relationship scale and dietary self-efficacy were improved by the intervention that involved parents. Boutelle et al. (2017) studied a parent-based

treatment for obese children. The results indicated effective weight loss in children with parent-based involvement. Health behaviors are also improved through dietary modification and exercise (Boutelle et al., 2017). Chapter 3 will discuss the methodology used in this project.

Chapter 3: Research Methods

A significant healthcare concern in the United States for children and adolescents is obesity (CDC, 2019). According to Arteaga et al. (2018), the percentage of children 2–19 years of age who have obesity is 18.5 %, which makes this a significant public health problem in childhood. More specifically, severe obesity among Hispanic children is increasing despite previous reports that obesity may be stabilized (Arteaga et al., 2018). The percentage of American adolescents and children who are overweight is 21–24%, and 16–18% of these children are obese (Schwarz, 2019). The project's focus was to provide education and resources to parents of overweight or obese children to assist them in making healthy food choices.

Purpose

The purpose of this research was to assess the effectiveness of parental and child education on childhood obesity. It was not known in which ethnicity or area the implementation of an evidence-based pediatric educational program on childhood obesity would impact the BMI and weight status of children and adolescents who are overweight and obese.

Educating the parents and the child is an effective method to ensure commitment and lasting results, including weight loss, lower BMI, and improvement in overall health behaviors (Braden et al., 2015). Currently, in the United States, more than one-third of children are overweight or obese. A parent who is overweight puts their child at risk of being overweight (Braden et al., 2015). Involving parents in the intervention to prevent obesity and the complications associated with the disease will bring awareness to the problem and make parents aware of healthy food choices, portion sizes, and how to read food labels. This will result in weight loss and lower BMI, which will improve patient outcomes.

Project Design

A quasi-experimental pre- and posttest design was used to assess the parents' general nutrition knowledge. The quasi-experimental research design was chosen because it does not control the variables (Terry, 2018). Vaijayanthimala and Jaikumar (2019) studied the effect of communication, education, and information in preventing adolescent obesity. The sample size consisted of 50 participants with inadequate knowledge (n = 31), moderated adequate knowledge (n = 19), and adequate knowledge (n = 0). A quasi-experimental design was used to evaluate the effectiveness of the interventions. The pretest mean score was M = 11, SD = 4.05, N = 19, and the posttest mean score was M = 15.8, SD = 4.39, N = 19 for moderately adequate knowledge, which indicates the education was effective in increasing knowledge of obesity in adolescents, $t(49) = 5.48$, $p < 0.05$ (Vaijayanthimala & Jaikumar, 2019).

Methodology Appropriateness

A quantitative method was used to assess the effects of parent education on childhood obesity. Lucas-Alfieri (2015) stated a quantitative method of research analyzes the measurement of the study variables using a numerical system by reporting relationships and associations using a variety of statistical models. A research instrument used by researchers to collect primary data and information about a subject for a study is a survey questionnaire (Dalati & Marx Gómez, 2018). A General Nutrition Knowledge Questionnaire (GNKQ) was used in this study to assess the parents' knowledge of nutrition before the intervention and again at the end of the study.

Feasibility and Appropriateness

The problem of interest in the chosen clinical setting was due to the weekly exposure to childhood obesity. In the past 8 years, there has been an increase in the number of overweight

and obese children in our office. In the primary office, health education, the care of well-child, and the maintenance of chronic and acute care conditions are provided.

Ethical Considerations

All participants invited to participate in the study were informed that participating in the study was voluntary. Participants were informed that it was okay if they decided not to be involved in the study. Participants who agreed to be involved in the study were informed that they could stop at any time during the study. Participants were encouraged to ask questions, and all questions were answered.

The supervising physician agreed to allow me to conduct the research study at her office (see Appendix B). The pediatric and adolescent primary care office did not incur any financial cost for allowing me to conduct the research project at this office. Due to the increased number of COVID-19 cases in vaccinated people, telehealth was used to communicate with parents and children regarding their weight.

Institutional Review Board Approval and Process

Following approval from Abilene Christian University's Institutional Review Board (IRB), I informed the clinic employees that the study was approved by the IRB. De-identified data that was collected during this project was stored in a secure university drive under my name. Data will be owned by the university in case access is needed at a future date. This storage system is provided by the online graduate school for doctoral student research data and supported by the university's information technology department for security purposes and kept for the minimum required time according to IRB guidelines.

The potential participants were identified by their primary care provider. These included the physician and the nurse practitioner working in the pediatric primary office. The primary care

providers screened for obese and overweight patients between 5 and 18 years of age, who were overweight, with a BMI greater than or equal to the 85th percentile, or obese with greater than or equal to the 95th percentile for age according to the CDC (2019). I approached parents of children who met the inclusion criteria and asked them if they would like to participate in a study to prevent childhood obesity. Informed consent was obtained from each subject who agreed to participate in the study. A Spanish consent and an interpreter were provided in the office for Spanish-speaking parents and children. Parents who agreed to be in the study and signed the informed consent completed a GNKQ and a random number generator was used to assign each participant a number.

The participant's weight, height, and BMI were obtained and recorded on the CDC's BMI growth chart for boys 2–20 years of age (see Appendix C and Appendix D) and girls 2–20 years of age (see Appendix E and Appendix F). Epocrates (n.d.) software was utilized to calculate the BMI after the measurements were entered into the patient's chart. Parents and children were given an educational program on childhood obesity. The parents were encouraged to ask questions about the study. The parents of the children who were overweight or obese and who were not fasting were instructed to return to the office on a different day for fasting lab work. After the labs were drawn, the educational program was provided. This educational program included a brief PowerPoint presentation regarding the health risks associated with obesity in childhood, the importance of drinking plenty of water and avoiding drinks high in sugar, an example of healthy food choices, portion sizes, how to read a food label, limiting screen time, exercising, and the importance of parent involvement. Resources on meal planning, portion control, and recipes were listed in the PowerPoint presentation. The initial assessment and education program took approximately 15 minutes for each participant. The study begins at

the scheduled well-childcare appointment. Once the patient and parent entered the exam room, I reviewed the growth chart with the parent and child and reviewed any questions the parent had regarding their child's weight. A complete history and physical exam were obtained and were essential in determining the patients who were at risk for becoming obese and the complications related to obesity. If the child was fasting, blood work was obtained at the end of the exam, including a lipid panel, glucose level, and hemoglobin A1c. If the child was not fasting, they were asked to return to the office Monday through Friday at nine in the morning for fasting blood work. Anticipatory guidance was given regarding healthy food choices, eating three meals and two snacks per day, increasing the intake of water, and limiting the intake of drinks high in sugar. Patients were encouraged to limit screen time outside of schoolwork to 1 hour of screen time per day and physical activity of at least 60 minutes per day. Parents were encouraged to involve their children in meal planning, choosing an appropriate portion size for their age, and meal preparation.

Families who did not want to call the office to document their child's weight were able to send their weights to me every 2 weeks via text messaging. Bala et al. (2019) examined behavioral changes between children and parents participating in a weight management intervention for children using telehealth technology to support a behavioral change. The intervention incorporated an online community resource mapping tool to coach a family's behavioral change, video calling, and the use of text messaging. According to Bala et al. (2019), providing support to parents via digital technology was well accepted and feasible and promoted improved family involvement in the interventions. The initial weight was obtained at the annual exam appointment and then every 2 weeks to monitor progress. The consecutive weights were obtained by the parent's report every 2 weeks. Some parents preferred to come to the office

every 2 weeks for weight because the initial weight was obtained at the doctor's office. Parents and child participants agreed to follow the criteria for making healthy food choices. The initial GNKQ (see Appendix G) was given to the parents to evaluate their knowledge of nutrition at the beginning of the study and at the end of 3 months (see Appendix H for permission to use the GNKQ). The effects of educating the parents about obesity and the health risk associated with this disease showed increased parental knowledge of general nutrition, healthier food choices for the children and adolescents, and a decrease in BMI and weight reduction for some participants.

Interprofessional Collaboration

The interprofessional collaboration team at this pediatric practice consisted of a physician, a nurse practitioner, two medical assistants, and one senior medical assistant who is the office manager. The physician and the nurse practitioner (primary investigator) completed the full health history and physical exam. The medical assistants were responsible for entering the demographics, such as height, weight, and vital signs into the patient's medical record. The office manager was responsible for making appointments, billing, submitting referrals for authorizations, and problem-solving related to insurance coverage. In preventing childhood obesity, a healthcare provider might feel the need to collaborate with a healthcare team that might consist of physicians, nurses, social workers, a clinical psychologist, and a health coach (Rhee et al., 2018). The social worker, the clinical psychologist, and the health coach services were not provided at this office and an outside referral was not needed for this study.

Practice Setting for Evidence-Based Practice

Participants for this research project were selected from a pediatric primary care office in the suburb of a large city in Southern California. The suburb has a population of over 50,000 according to the U. S. Census Bureau website. The ethnic diversity in this community consists of

Whites (37.6%), Blacks/African Americans (8.0%), American Indians (0.7%), Pacific Islanders (0.5%), two or more races (8.0), and Hispanics (81.7%), according to the U. S. Census Bureau website. This primary care office includes a physician, a certified pediatric nurse practitioner, two medical assistants, and an office manager who is also a medical assistant. The office is an independent practice and sees approximately 20–32 patients daily, providing well childcare exams, illness prevention, management of chronic diseases, healthcare promotion, health education, and family counseling.

Target Population

The target population included the parents, pediatric, and adolescent patients at a primary care office who are 5 to 18 years of age, English and Spanish speaking, and had a BMI greater than or equal to the 85th percentile for age and gender (CDC, 2019). This primary care office has a diverse population, which includes Hispanics, African Americans, Pacific Islanders, Whites, and Asians who live in a suburban city in a large city in Southern California. The study population included Hispanic and African American participants. Children who had preexisting conditions such as developmental delays, autism, mental illness, or type I diabetes were excluded from this study.

Sample Size

Parents of 30 children and adolescents 5 to 18 years of age were asked to participate in the study. The parents were asked to participate in the exam room to ensure confidentiality, and informed consent was obtained. Approximately 60 patients were screened and invited to participate in the study. Thirty parents signed the consent and completed the preinterventions survey. The recruitment process initially took 3 months. The recruitment process was extended for another 3 months to obtain a larger sample size of parent participants. The sample size of

children and adolescent participants increased to 54, and the number of parent participants increased to 42. Convenience sampling was used to recruit subjects for this study from a primary pediatric adolescent office in a suburb of a large city in Southern California. According to Keele (2010), one of the most common forms of nonprobability sampling is convenience sampling because of the ease of accessibility.

Risk

There was minimal risk for patients included in this study. One potential risk to subjects was a loss of confidentiality. Weight monitoring had the potential of being a trigger for anxiety, shame, guilt, depression, or eating disorders. Participants may have become frustrated trying to find ways to be more physically active and move their bodies for at least 1 hour a day, like dancing, walking to school, riding their bikes, or playing a sport. The nurse practitioner and the physician provided the health clearance for the study participants to have 60 minutes of daily physical activity. There was no risk of sudden cardiac events.

Benefits

The benefit of the research was to bring awareness to childhood obesity and the interventions needed to prevent it. Parents may have increased knowledge of general nutrition, portion sizes, healthy food choices, how to read food labels, and the importance of physical activity of at least 60 minutes. The child might have a decreased BMI, weight loss, and improvement in their overall health.

Instrument and Measurement Tool

A GNKQ pre- and posttest was a document given to the parents of overweight and obese children to evaluate their understanding of nutrition and healthy food choices (see Appendix G). The GNKQ consists of four sections of nutrition knowledge: diet, disease, and weight

management; knowledge of healthy food choices; sources of nutrients in food; and dietary recommendations (Kliemann et al., 2016). The GNKQ was developed in the 1990s and has been widely used to evaluate nutrition knowledge (Kliemann et al., 2016). Since then, advances and increased knowledge of how disease and diet are associated have led to a change in dietary recommendations (Kliemann et al., 2016). Thus, the revised version of the GNKQ aligns with the current recommendations for nutrition (Kliemann et al., 2016). Research using the GNKQ has found that demographic characteristics, such as education level, socioeconomic status, age, and gender, are associated with nutrition knowledge (Kliemann et al., 2016). When the demographic characteristics have been adjusted, there has been a positive and significant relationship between healthy dietary habits and the GNKQ score (Kliemann et al., 2016).

Reliability and Validity

The GNKQ (GNKQ-R) is reliable, sensitive to change, and consistent, and it is a valid measure of nutrition knowledge (Kliemann et al., 2016). The internal and external reliability of the revised questionnaire was consistent with the reliability results of the original GNKQ, indicating that the knowledge of nutrition is being measured consistently (Kliemann et al., 2016). The test–retest reliability was consistent in all sections (Kliemann et al., 2016). The reliability for all sections of the GNKQ was > 0.7 (Kliemann et al., 2016). The Romanians adapted the GNKQ in their language, culture, and cuisine (Putnoky et al., 2020). The overall internal reliability was 0.878, and the external reliability was > 0.880 in all sections of the GNKQ (Putnoky et al., 2020).

Data Collection and Management

The patient identifiers were not used. A research randomizer was used to generate a random number that was assigned to the study participants to ensure their confidentiality. None

of the samples were linked to the participants' names or contact information directly. The identifiers that link to protected health information were secured in a locked file cabinet. Computer laptops containing patient data were encrypted. The database will be in Redcap or another data storage medium for 5 years.

Timeline

The timeline for this project is outlined in Table 1. This scholarly project began during the spring session of the doctor of nursing practice (DNP) program (January 2022) and was completed from October to December 2022.

Table 1

DNP Project Timeline

Project timeline	Task
January	Recruit Staff
February–March	Advertise Study in Primary Office
April	Recruit Subjects for the Study
May–July	Start Study
August–September	Evaluate Survey Results
October–November	Submit Results From the Study
December	Submit Paper for Publishing

Analysis Plan

SPSS Version 25 was utilized for statistical analysis (IBM Corp., 2017). The raw data for the pre- and posttest scores of the GNKQ and the raw demographic data were documented on an Excel spreadsheet and transferred to SPSS for statistical analysis. All identifiers were removed before analysis. The effectiveness of the intervention over 3 months was analyzed using

descriptive statistics. The pre- and posttest results of the GNKQ were evaluated using a t test. When the means of two groups that are independent are compared, a parametric statistical test used is a t test (Plichta & Kelvin, 2013). Descriptive statistics are defined as data that may include standard deviations to explain a sample population's characteristics and means, graphical or simple numerical data summaries, graphs, and charts (Plichta & Kelvin, 2013).

The data of all participants, specifically age, weight, gender, height, ethnicity, and BMI, were analyzed using descriptive statistics. Descriptive statistics attempt to describe the relationship between variables in a sample or population (Ali & Bhaskar, 2016). Descriptive statistics provide a summary of data in the form of mean, median, and mode (Ali & Bhaskar, 2016). The paired t test was used to determine if there was a significant difference between the means of the pre- and posttest of the GNKQ (Ali & Bhaskar, 2016).

Chapter Summary

The descriptive research design attempted to answer the question regarding the effects of parents participating in a 15-minute evidenced-based pediatric obesity educational program for family units on decreased BMI and weight loss in children and adolescents. A paired t test was used to evaluate the pre- and posttest means of the GNKQ results of parents. Descriptive statistics were used to analyze the data of all participants, including age, gender, weight, height, BMI, and ethnicity. The GNKQ (GNKQ-R) is a valid tool used to assess the parent's general knowledge of nutrition and has shown good internal and external reliability, in line with the reliability results of the original GNKQ (Kliemann et al., 2016). The IRB application was submitted and received full approval before the start of this research project (see Appendix I).

Chapter 4: Results

This research study's purpose was to assess the effectiveness of parental and child education on childhood obesity. This chapter's central point is to provide information on the results of this research, data analysis, and descriptive data. It is not known to what extent providing parents with education regarding childhood obesity and the health risk associated with the disease would cause the parents to encourage healthier food choices, increased daily activity, and water intake over drinks high in sugar. To determine if the parents gained increased knowledge of general nutrition, healthier food choices, portion sizes, and how to read food labels, a quantitative quasi-experimental pre- and postintervention design was used. Descriptive statistics were used for the participant's demographic data: age, gender, weight, height, BMI, BMI percentage, ethnicity, if the participant was overweight or obese, or English or Spanish speaking.

After IRB approval was obtained, parents, children, and adolescents were recruited from a primary care office in a suburb of a large city in Southern California during an annual scheduled appointment. Parents were given a handout and informed of the research project and asked to participate in the study in the exam room to ensure confidentiality. Informed consent was obtained, and the parents completed the GNKQ at the initial appointment and again after the study in 3 months. During the initial visit, the parents were encouraged to download the MyPlate application, which was a companion application to assist the parents and children in making goals for healthy food choices. During the intervention, the parents were also educated on how to read food labels and were asked to calculate the number of calories in one bag of Flamin' Hot Cheetos. All the parents and children were not aware of how to read food labels and were

surprised by the number of calories in a bag of Flamin' Hot Cheetos. Descriptive data, data analysis, data collection, limitations, and a summary will be discussed in this chapter.

Data Collection

This study consisted of 30 parents and 54 children and adolescent participants, four (7%) African American participants, and 50 (93%) Hispanic participants. There was a total of 12 (22%) overweight participants and 42 (78%) obese participants. There was a total of 28 (52%) females and 26 (48%) male participants. Parents who agreed to participate in the study provided their phone numbers and email address. I sent the GNKQ link to the parent's email address via Qualtrics. Parents were instructed to complete all sections of the GNKQ. Some parents choose to complete the GNKQ in the office on their cellular phones. After completing the questionnaire, the parents and child were given evidence-based education on childhood obesity. Some parents completed the survey at home due to time constraints and came back to the office on a different day for the evidence-based educational intervention. The initial weight was obtained at the annual exam appointment and then every 2 weeks to monitor progress. The consecutive weights were obtained by parent report every 2 weeks. Some parents preferred to come to the office every 2 weeks for weights because the initial weight was obtained at the doctor's office. All participants were encouraged to download the MyPlate application, which is a companion application that assists parents and participants in setting goals for making healthy food choices and appropriate portion sizes for age and gender. The use of the MyPlate application was explained to the parent and participant during the educational intervention. De-identified data that was collected during this project was stored in a secure university drive under my name. Data will be owned by the university in case access is needed at a future date. This storage system is provided by the online graduate school for doctoral student research data and supported

by the university's information technology department for security purposes and kept for a minimum of 3 years according to IRB guidelines.

Parents' Report

One parent reported that she was able to remove sodas and juice high in sugar from her children's diet by putting fresh fruit in their water. Another parent reported that she removed chips and Cup Noodles soup from her child's diet, and her child lost five pounds in 2 weeks. Another parent reported that the family is eating healthier and spending more time together riding bikes for 60 minutes of physical activity. Another parent stated, "We are doing everything right," and "I thought she would lose more weight." Parents were reminded that the research study was not a diet. It was to educate the parents and children about the health risks associated with childhood obesity and how to make healthy food choices and become more active. One parent realized that she was the one buying all the wrong foods because she liked them. She stated, "I am the problem."

Data Analysis

IBM SPSS Statistics (Version 25) Predictive Analysis Software was utilized for statistical analysis (IBM Corp., 2017). The raw data for the pre- and posttest scores of the GNKQ and the raw demographic data were documented on an Excel spreadsheet and transferred to SPSS for descriptive statistics analysis. The preintervention score of the GNKQ was recorded on an Excel spreadsheet. At the end of the study, the postintervention score was obtained and recorded on an Excel spreadsheet. The pre- and postintervention scores were uploaded to SPSS for a paired t test statistical analysis to evaluate the effectiveness of the intervention (see Appendix J).

Paired *t* Test

There was a total of 30 participants who completed the pre- and postintervention GNKQ. A paired-sample *t* test was used to compare the mean preintervention test score to the postintervention test score. The results of the paired *t* test were clinically significant, t(29) = 3.68, $p < .001$, indicating there was an increase in the postintervention survey scores. The pretest score was $M = 45.40$, $SD = 12.67$, $N = 30$, and the posttest score was $M = 51.20$, $SD = 13.19$, $N = 30$, according to their findings (see Table 2). The mean increase was 5.80, with a 95% confidence interval of the difference between 2.57 and 9.02 (see Table 3). The correlation between the pre- and posttest scores was estimated at $r = .78$, $p < .001$, suggesting that paired *t* test was appropriate. For the paired sample correlation (see Table 4). The null hypothesis is rejected, indicating there is a relationship between the intervention and the pre- and posttest scores.

Table 2

Paired Sample t *Test*

Survey	*M*	*N*	*SD*	*SEM*
Pre-	45.4000	30	12.67525	2.31417
Post-	51.2000	30	13.19195	2.40851

Table 3

Paired Sample Test

Paired Difference								Significance	
				95% Confidence Interval of the Difference					
Survey	*M*	*SD*	*SEM*	*LL*	*UL*	*t*	*df*	One-sided	Two-sided
Pair 1								*p*	*p*
Pre- and Post-	-5.8	8.623	1.574	-9.02	-2.57	-3.68	29	< .001	< .001

Table 4

Paired Sample Correlation

			Significance	
Survey	*N*	Correlation	One-sided *p*	Two-sided *p*
Pair 1 (pre & post)	30	.778	< .001	< .001

Descriptive Statistics

There was a total of 54 children and adolescent participants in the study, 15 (27.8%) in the age group 5–8, 23 (42.6 %) in the age group 9–12, 10 (18.5) in the age group 13–16, and six (11.1%) in the age group 17–18. Figure 1K (see Appendix K) shows a pie chart of the age distribution of children and adolescent participants. The percentage of male participants was 48% and female participants 52%. There were 50 (93%) Hispanic/Latino participants and four (7%) African American participants. The study included 14 (24%) overweight participants and 41 (76%) obese participants. The mean age of children and adolescent participants was M = 10.91, SD = 3.62, N = 54. The mean weight was M = 132.2, SD = 44.6, N = 54, and the end-of-study mean weight was M = 132.1, SD = 44.1, N = 54. The initial BMI mean was M = 26.5, SD

5.4, $N = 5.4$ and the end-of-study BMI mean was $M = 27.11$, $SD = 6.5$, $N = 54$. The participants' demographics, age, initial and end weight (see Appendix L), height, initial and end BMI, and BMI percentage were analyzed using descriptive statistics. See Table 5 for descriptive statistics of study demographics for demographic data of children. See Appendix M for descriptive statistics.

Table 5

Descriptive Statistics of Study Demographics

Demographic	*n* (%)
Age, mean (*SD*), Years	10.91 (3.62)
Gender	
Female	28 (54)
Male	26 (54)
Initial weight, mean (*SD*)	132.23 (44.63)
Height, mean (*SD*), inches	58.25 (6.93)
BMI 1, mean (*SD*), kg/m^2	26.60 (5.40)
BMI % 1, mean (*SD*), Units	96.39 (3.52)
Obese/overweight (%)	
Obese	41 (76)
Overweight	13 (24)
Ethnicity	
African American	50 (93)
Hispanic	4 (7)
Weight 2, mean (*SD*), pounds	131.62 (44.62)
Weight 3, mean (*SD*), pounds	132.00 (44.11)
Weight 4, mean (*SD*), pounds	131.86 (43.98)
Weight 5, mean (*SD*), pounds	131.81 (43.93)
Weight 6, mean (*SD*), pounds	132.10 (44.13)
BMI 2, mean (*SD*), kg/m^2	27.11 (6.57)
BMI% 2, mean (*SD*)	95.91 (4.39)

Note. $N = 54$ children

Limitations

Limitations associated with this study included a small sample size, the use of one clinical site for recruitment, having more children and adolescent participants than parent participants due to families having more than one child participating in the study, the inability to send the GNKQ due to an incorrect email address, unable to leave a message on the cellphone number provided due to the mailbox being full or not set up, and an extended recruitment process. The goal was to take 2 weeks off from work to start the recruitment process with a goal of 30 parent participants and 30 pediatric participants. The recruitment process took longer than expected. Not everyone that was invited to be a part of the study agreed to participate. A total of 60 participants were invited to participate in the study. Initially, 30 parents signed the consent and completed the questionnaire before the intervention. However, only 19 completed the end-of-study questionnaire. Thus, the study was extended for another 3 months to reach a total of 30 participants completing both the pre- and postintervention survey. A research assistant would have been beneficial in sending out text message reminders for weights. Some other challenges included getting children to decrease their screen time to 1 hour per day outside of school activities. Most of the participants were reluctant to limit their screen time. Many of the parents reported that the children only gave up 60 minutes of screen time for 60 minutes of physical activity. The most frustrating or beneficial limitation was trying to recruit participants for the study while actively seeing patients. The physician and owner of the business was very supportive during this process.

Chapter Summary

Childhood obesity continues to be a global problem. As an advanced practice nurse (APN) in primary care, early identification of overweight and obese children is important. Once

these children have been identified and an assessment of the risk factor associated with the disease, an intervention can be established to prevent obesity in children and adolescents. The focus of this research was to present parents and children with evidence-based education on the health risk associated with obesity in children and to determine if the information resulted in parents having increased knowledge of nutrition, making healthier food choices for their children, providing the appropriate portion sizes, and increasing their physical activity to 60 minutes a day. This research project answers the research question, What are the effects of an evidence-based pediatric obesity educational program for parents and children on decreased BMI, weight loss, and increased parental knowledge of nutrition (measured by making healthy food choices) in children 5 to 18 years of age who have a BMI between the 85–95% for age and gender? This project indicated that parent education and involvement could help with behavior modification associated with childhood obesity. Children will model their parents' behavior. If the parent makes healthy food choices and increases physical activity, the child will model that behavior.

Chapter 5: Discussion, Conclusions, and Recommendations

It was not known in which ethnicity or area the implementation of an evidence-based pediatric educational program on childhood obesity would impact the BMI and weight status of children and adolescents who are obese and overweight. The study addressed barriers, interventions, and recommendations for preventing childhood obesity. Obesity is one of the chronic disorders specifically related to childhood, and its prevalence continues to increase (Ash et al., 2017). The purpose of this research was to assess the effectiveness of parental and child education on childhood obesity.

Discussion of Findings

The TTM is a model of behavioral change through an intentional process of readiness. The benefit of using the TTM in this study was the ability to tailor the interventions to the participant's level of readiness. Throughout the study, via parents' reports, the younger participants were not excited about eating more vegetables, giving up their screen time, or increasing physical activity at the beginning of the study. However, as the parents began to provide healthier food choices and activities for the family, the participants were more cooperative with the plan for making healthy food choices and being more physically active. The TTM model allows participants to proceed through the different phases of readiness. Precontemplation, contemplation, preparation, action, and maintenance. There was weight loss at the beginning for some participants, with an increase in weight in the middle of the study, ending with decreased weight at the end. Some participants did not have a change in their weight, and some and an increase in their weight at the end of 3 months.

Implications

This research project helped to bring awareness to the problem of childhood obesity. This project provided health care promotions related to nutrition, how to make healthy food choices, how to read food labels, appropriate portions for age, the importance of water intake, exercise, and family involvement. Parents were encouraged to use the MyPlate application to assist with making healthy food choices and portion sizes. Parents were given resources for healthy recipes. Parents recorded the weights of the children and adolescents every 2 weeks to see their progress. Eating food that is healthy and increasing physical activity can help to prevent obesity. Family involvement provides support to an individual who is overweight and obese. It can help to support the individual's self-esteem if the family is eating healthy and exercising. Thus, the overweight or obese individual does not feel singled out.

Recommendation for Future Research

Future research can focus on addressing the nutrition knowledge of the parents. If the parents do not know what is healthy, they will not make healthy choices for their children. Future projects should address the barriers to making healthy food choices. The future project should address the deception of food labels. Future projects should address nutrition in school lunches. Future projects should address the lack of or decreased time for physical education for children in schools. MyPlate application is an excellent resource for parents. Future research should address the appropriate portion size for age and gender. Future research should address the length of time needed for obesity prevention to be successful.

Relationship to the DNP Essentials

The first DNP Essential incorporated into this research project was DNP Essential I: Scientific Underpinnings for Practice (American Association of Colleges of Nursing [AACN],

2006). This project utilized the nursing process to assess the life process and well-being of each participant as it related to the risk of being overweight or obese (AACN, 2006). This project addressed human behavior as it related to behavioral modification, provided educational interventions and resources to assist with behavior modification, and evaluated the interventions as they related to the participant's environment and normal life events, which caused a positive change in their health and well-being (AACN, 2006).

The second DNP Essential incorporated in this research project was DNP Essential VII: Clinical Prevention and Population Health for Improving the Nation's Health (AACN, 2006). Childhood obesity affects all socioeconomic levels, although obesity is more prevalent in the Hispanic-Latino population. This research project addressed the cultural and socioeconomics of health and its relationship to the availability of healthy food choices. This project addressed male and female children and adolescents between the age of 5 and 18 years of age who were either overweight or obese. In the clinical setting, education regarding the health risks associated with obesity was provided to the parents, children, and adolescents to improve population health (AACN, 2006).

Chapter Summary

In summary, with the rise of childhood obesity, many comorbidities associated with adult diseases are seen in this population. To prevent overweight and obese children from acquiring adult diseases, early identification of the problem and interventions to address this problem is important. Providing families with education about obesity and the health risk associated with the disease can bring awareness to the problem and decrease childhood obesity. Although healthcare providers provide interventions for pediatric patients who are overweight or obese, the rate of childhood obesity continues to rise. There is a need to incorporate evidence-based

practice related to obesity prevention into our clinical practice. A multidisciplinary team is needed to address this problem. The multidisciplinary team can consist of a doctor, nurse practitioner, social worker, or dietician. Anticipatory guidance is important. Providing handouts and resources for the family in the waiting room will bring awareness to the problem. Reviewing the growth chart with parents and children with each annual visit is important to identify patients who are at risk of being overweight or obese. Due to workloads and time constraints, primary care providers cannot further address the problem alone. A multidisciplinary team would be beneficial to address this growing problem. The multidisciplinary team can provide access to resources in the community to help address this problem.

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Appendix A: Letter of Permission to Use Diagram

SketchBubble Support 3:13 AM (19 hours ago)

To me

##- Please type your reply above this line -##

Your request (14001) has been updated. To add additional comments, reply to this email.

Shawn Bennett (SketchBubble)

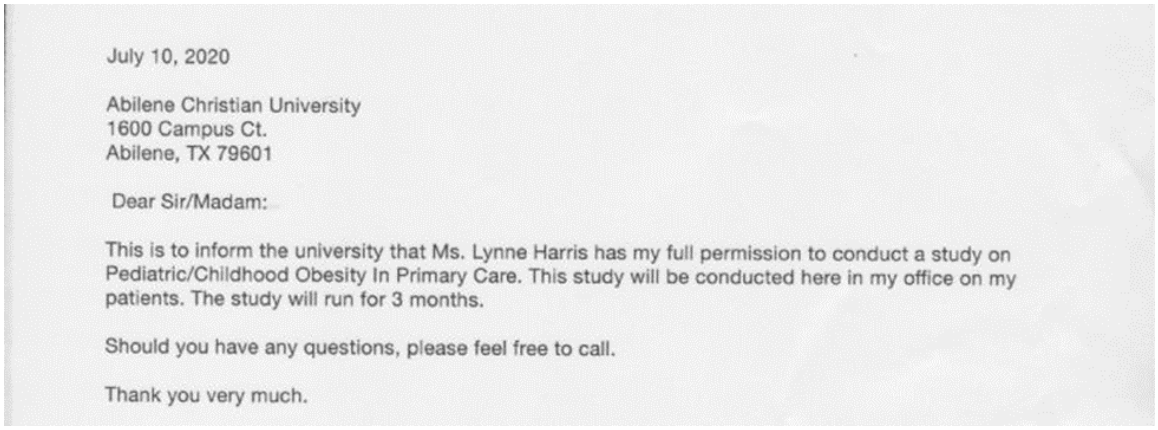
Jan 31, 2023, 4:43 PM GMT+5:30

Hello Lynne,
Thank you for reaching out to us.
Please note that we are a design company and have created this model in the form of an eye catchy infographic. We are not the owner of this model.

As long as you just need to represent via a diagram; you can use our diagram (if you will post it online, please provide a reference of our website).

Please let me know if you have any further question regarding this.
Best Regards,
Shawn Bennett
Customer Support Portal — https://support.sketchbubble.com/hc/en-us
https://www.sketchbubble.com

Appendix B: Letter of Permission



July 10, 2020

Abilene Christian University
1600 Campus Ct.
Abilene, TX 79601

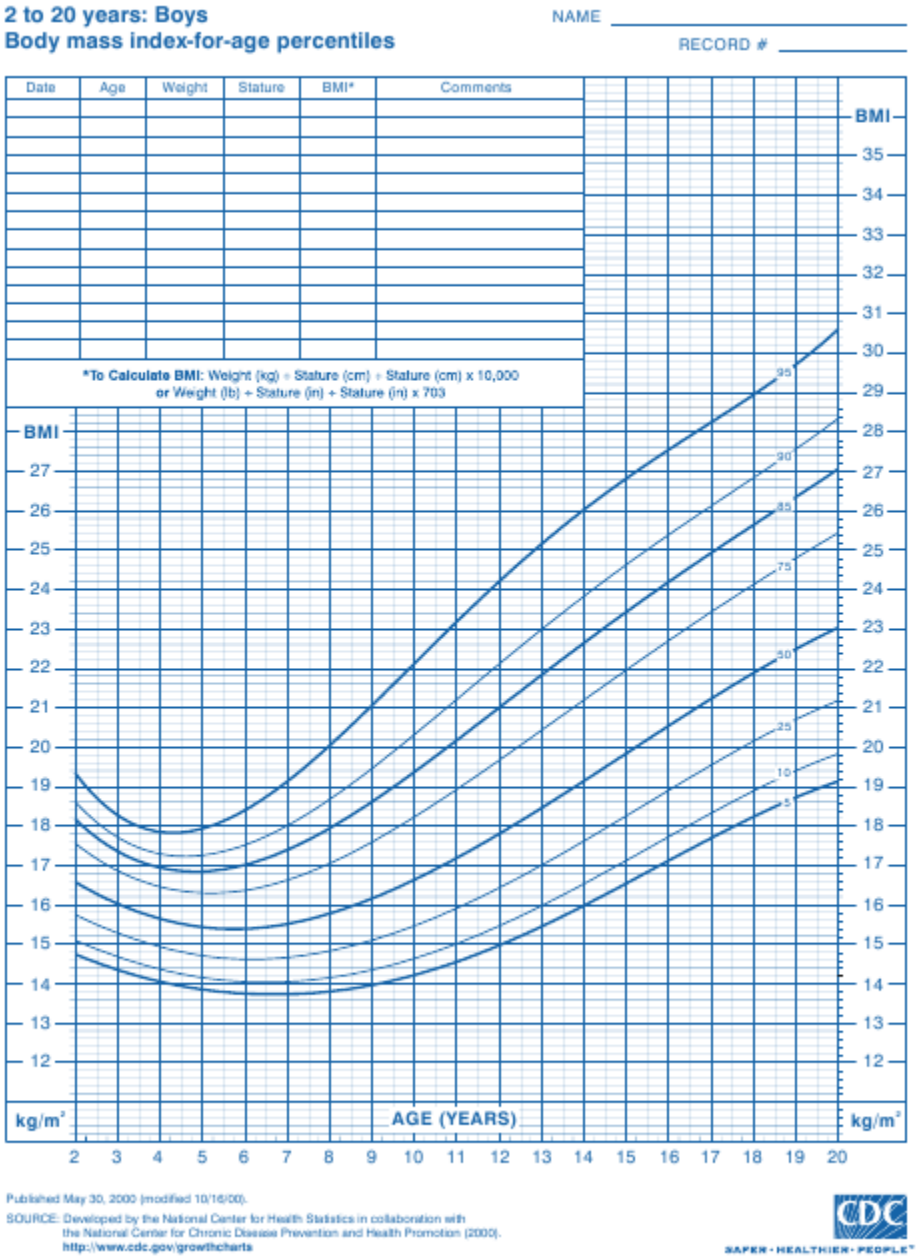
Dear Sir/Madam:

This is to inform the university that Ms. Lynne Harris has my full permission to conduct a study on Pediatric/Childhood Obesity In Primary Care. This study will be conducted here in my office on my patients. The study will run for 3 months.

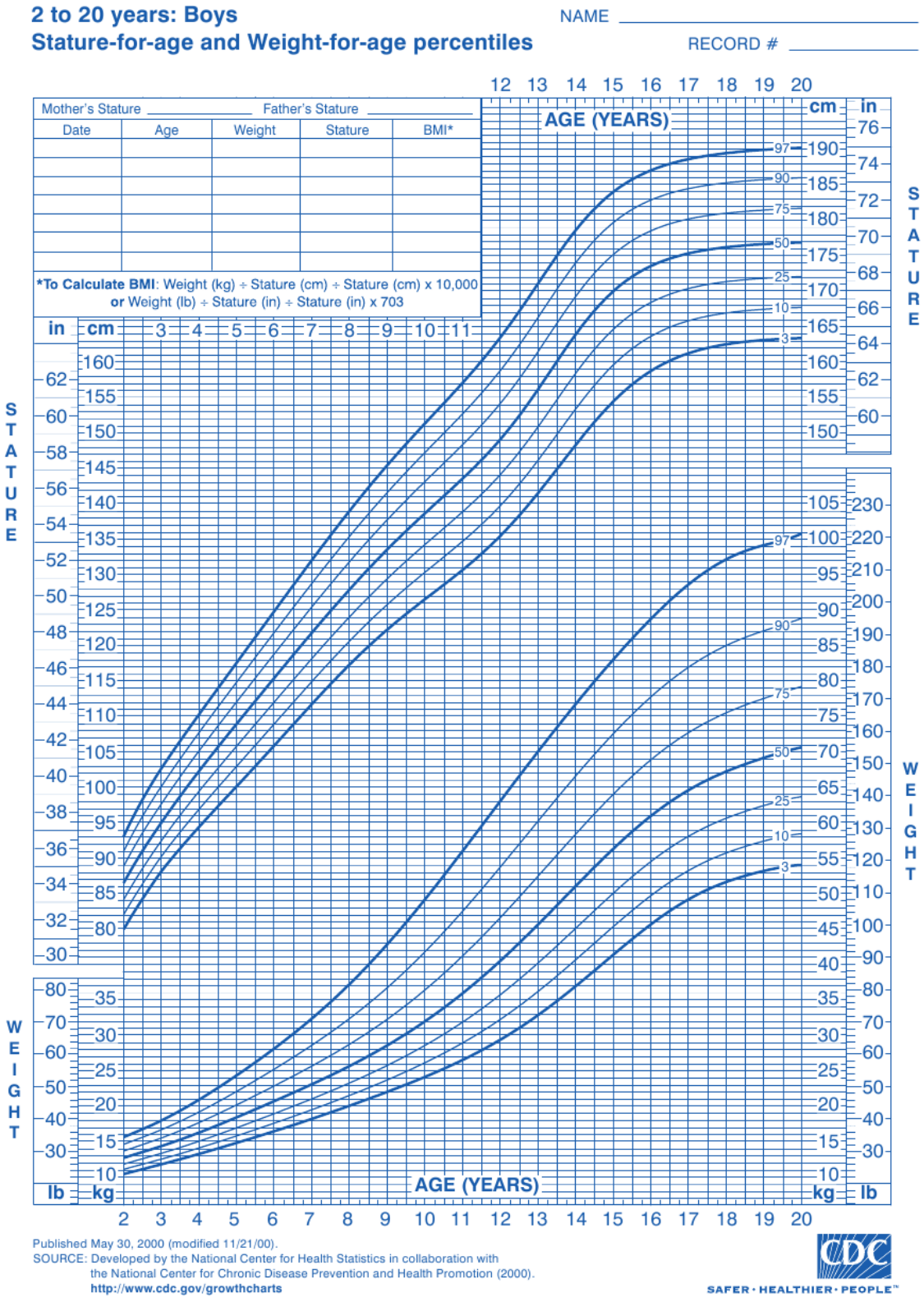
Should you have any questions, please feel free to call.

Thank you very much.

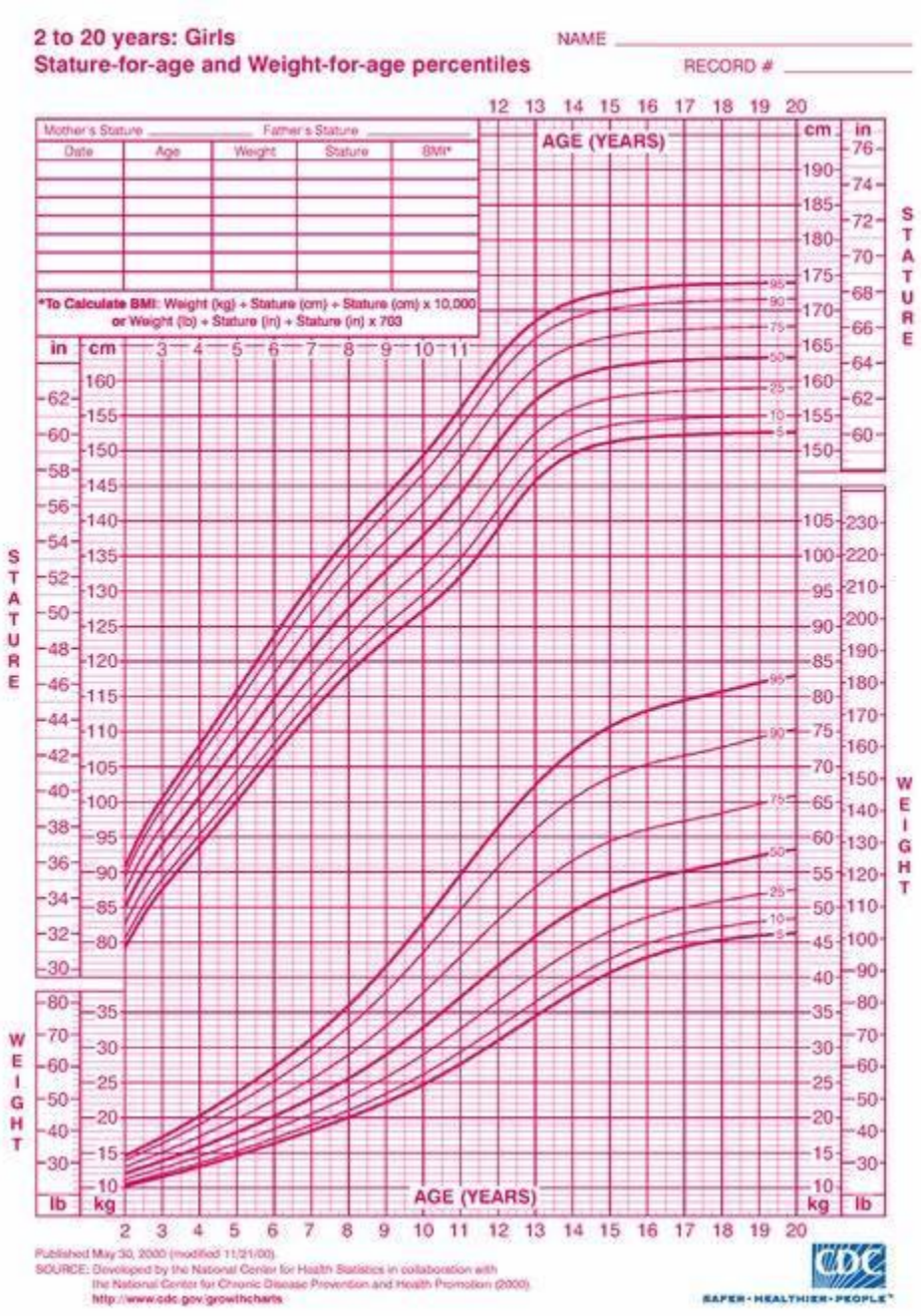
Appendix C: Body Mass Index for Boys



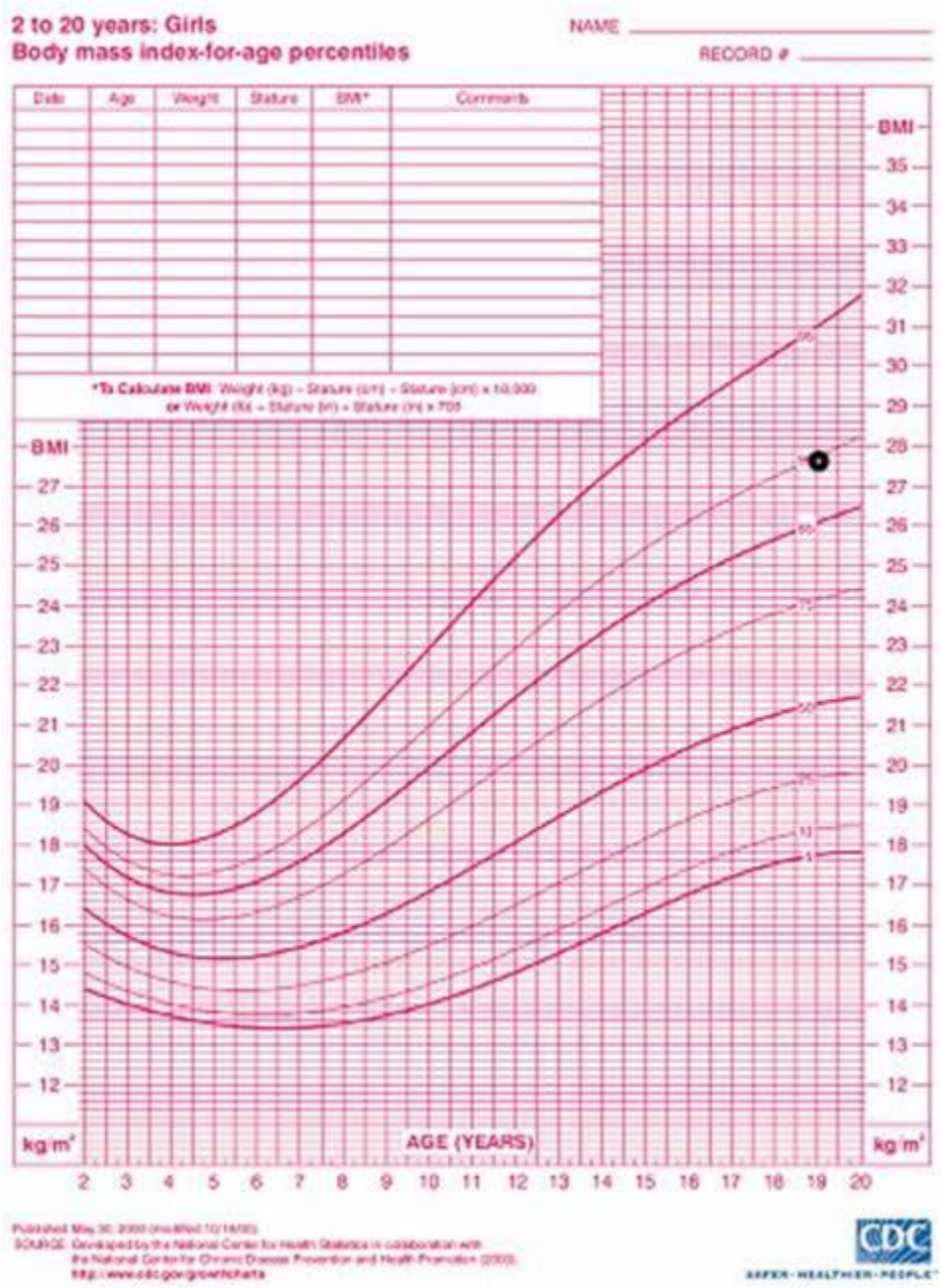
Appendix D: Growth Chart for Boys 2 to 20 Years of Age



Appendix E: Girls Growth Chart 2 to 20 Years of Age



Appendix F: Body Mass Index for Girls



Appendix G: General Nutrition Knowledge Questionnaire

GENERAL NUTRITION KNOWLEDGE QUESTIONNAIRE

This is a survey, not a test. Your answers will help identify which dietary advice people find confusing. It is important that you complete it by yourself. Your answer will remain anonymous. If you don't know the answer, mark "not sure" rather than guess.

Thank you for your time.

Section 1: The first few items are about what advice you think experts are giving us.

1. Do health experts recommend that people should be eating more, the same amount, or less of the following foods? (tick one box per food)

	More	Same	Less	Not Sure
Fruit	☐	☐	☐	☐
Food and drinks with added sugar	☐	☐	☐	☐
Vegetables	☐	☐	☐	☐
Fatty foods	☐	☐	☐	☐
Processed red meat	☐	☐	☐	☐
Wholegrains	☐	☐	☐	☐
Salty foods	☐	☐	☐	☐
Water	☐	☐	☐	☐

2. How many servings of fruit and vegetables per day do experts are advice people to eat as a minimum? (One serving could be, for example, an apple or a handful of chopped carrots) (tick one)

2	☐	
3	☐	
4	☐	
5	or more	☐
Not sure	☐	

3. Which of these types of fats do experts recommend that people should eat less of? (tick one box per food)

	Eat less	Not eat less	Not sure
Unsaturated fats	☐	☐	☐
Trans fats	☐	☐	☐
Saturated fats	☐	☐	☐

4. Which types of dairy foods do experts say people should drink? (tick one)

Full fat (e.g. full fat milk)	☐
Reduced fat (e.g. skimmed and semiskimmed milk)	☐
Mixture of full fat and reduced fat	☐
Neither, dairy foods should be avoided	☐
Not sure	☐

5. How many times per week do experts recommend that people eat oily fish (e.g. salmon and mackerel)? (tick one)

1-2 times per week	☐
3-4 times per week	☐
Every day	☐
Not sure	☐

6. Approximately how many alcoholic drinks is the maximum recommended per day (The exact number depends on the size and strength of the drink)? (tick one)

1 drink each for men and women	☐
2 drinks each for men and women	☐

Section 2: Experts classify foods into groups. We are interested to see whether people are aware of food groups and the nutrients they contain.

1. Do health experts recommend that people should be eating more, the same amount, or less of the following foods? (tick one box per food)

	More	Same	Less	Not Sure
Fruit	☐	☐	☐	☐
Food and drinks with added sugar	☐	☐	☐	☐
Vegetables	☐	☐	☐	☐
Fatty foods	☐	☐	☐	☐
Processed red meat	☐	☐	☐	☐
Wholegrains	☐	☐	☐	☐
Salty foods	☐	☐	☐	☐
Water	☐	☐	☐	☐

2. How many servings of fruit and vegetables per day do experts are advice people to eat as a minimum? (One serving could be, for example, an apple or a handful of chopped carrots) (tick one)

2	☐	
3	☐	
4	☐	
5	or more	☐
Not sure	☐	

3. Which of these types of fats do experts recommend that people should eat less of? (tick one box per food)

	Eat less	Not eat less	Not sure
Unsaturated fats	☐	☐	☐
Trans fats	☐	☐	☐
Saturated fats	☐	☐	☐

4. Which types of dairy foods do experts say people should drink? (tick one)

Full fat (e.g. full fat milk)	☐
Reduced fat (e.g. skimmed and semiskimmed milk)	☐
Mixture of full fat and reduced fat	☐

Neither, dairy foods should be avoided ☐
Not sure ☐

5. How many times per week do experts recommend that people eat oily fish (e.g. salmon and mackerel)? (tick one)

1-2 times per week ☐
3-4 times per week ☐
Every day ☐
Not sure ☐

6. Approximately how many alcoholic drinks is the maximum recommended per day (The exact number depends on the size and strength of the drink)? (tick one)

1 drink each for men and women ☐
2 drinks each for men and women ☐
2 drinks for men and 1 drink for women ☐
3 drinks for men and 2 drinks for women ☐
Not sure ☐

7. How many times per week do experts recommend that people eat breakfast? (tick one)

3 times per week ☐
4 times per week ☐
Every day ☐
Not sure ☐

8. If a person has two glasses of fruit juice in a day, how many of their daily fruit and vegetable servings would this count as? (tick one)

None ☐
One serving ☐
Two servings ☐
Three servings ☐
Not sure ☐

9. According to the 'eatwell plate' (a guideline showing the proportions of food types people should eat to have a balanced and healthy diet), how much of people's diet should be made up of starchy foods? (tick one)

¼ plate ☐
⅓ plate ☐
½ plate ☐
Not sure ☐

Section 3: The next few items are about choosing food

1. If a person wanted to buy a yogurt at the supermarket, which would have the least sugar/sweetener? (tick one)

0% fat cherry yogurt ☐
Natural yogurt ☐
Creamy fruit yogurt ☐
Not sure ☐

2. If a person wanted a soup in a restaurant or cafe, which one would be the lowest fat option?

(tick one)

Mushroom risotto soup (field mushrooms, porcini mushrooms, arborio rice, butter, cream, parsley and cracked black pepper) ☐

Carrot butternut and spice soup (carrot , butternut squash, sweet potato, cumin, red chillies, coriander seeds and lemon) ☐

Cream of chicken soup (British chicken, onions, carrots, celery, potatoes, garlic, sage, wheat flour, double cream) ☐

Not sure ☐

3. Which would be the healthiest and most balanced choice for a main meal in a restaurant?

(tick one)

Roast turkey, mashed potatoes and vegetables ☐
Beef, Yorkshire pudding and roast potatoes ☐
Fish and chips served with peas and tartar sauce ☐
Not sure ☐

4. Which would be the healthiest and most balanced sandwich lunch? (tick one)

Ham sandwich + fruit + blueberry muffin + fruit juice ☐
Tuna salad sandwich + fruit + low fat yogurt + water ☐
Egg salad sandwich + crisps + low fat yogurt + water ☐
Not sure ☐

5. Which of these foods would be the healthiest choice for a pudding? (tick one)

Berry sorbet ☐
Apple and blackberry pie ☐
Lemon cheesecake ☐
Carrot cake with cream cheese topping ☐
Not sure ☐

6. Which of these combinations of vegetables in a salad would give the greatest variety of vitamins and antioxidants? (tick one)

- Lettuce, green peppers, and cabbage ☐
- Broccoli, carrot, and tomatoes ☐
- Red peppers, tomatoes, and lettuce ☐
- Not sure ☐

7. If a person wanted to reduce the amount of fat in their diet but didn't want to give up chips, which of the following foods would be the best choice? (tick one)

- Thick-cut chips ☐
- Thin-cut chips ☐
- Crinkle cut chips ☐
- Not sure ☐

8. One healthy way to add flavour to food without adding extra fat or salt is to add: (tick one)

- Coconut milk ☐
- Herbs ☐
- Soya sauce ☐
- Not sure ☐

9. Which of the following cooking methods requires fat to be added? (tick one)

- Grilling ☐
- Steaming ☐
- Baking ☐
- Sautéing ☐
- Not sure ☐

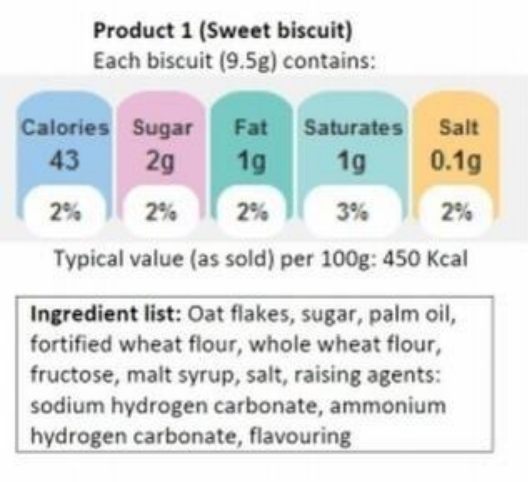
10. Traffic lights are often used on nutrition labelling, what would amber mean for the fat content of a food? (tick one)

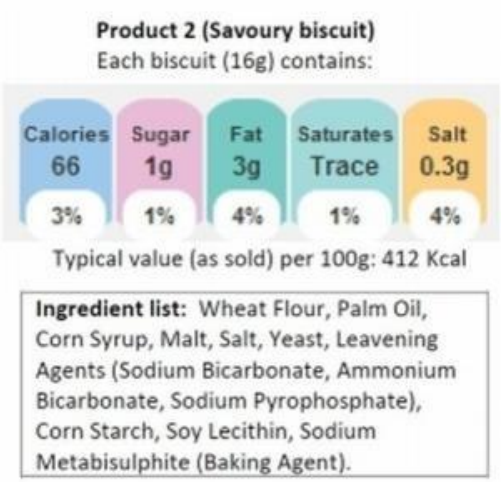
- Low fat ☐
- Medium fat ☐
- High in fat ☐
- Not sure ☐

11. "Light" foods (or diet foods) are always good options because they are low in calories. (tick one)

- Agree ☐
- Disagree ☐
- Not sure ☐

The following questions are related to food labels:





12. Looking at product 1 and 2, which one has the most calories (kcal) per 100 grams? (tick one)

- Product 1 ☐
- Product 2 ☐
- Both have the same quantity ☐
- Not sure ☐

13. Looking at product 1, what are the sources of sugar in the ingredient list? (tick one)

- Sugar and malt syrup ☐
- Sugar, fructose, and lecithin ☐
- Sugar, fructose, and malt syrup ☐
- Not sure ☐

Section 4: This section is about health problems or diseases related to diet and weight management

1. Which of the diseases is related to a low intake of fibre? (tick one)

Bowel disorders ☐
Anaemia ☐
Tooth decay ☐
Not sure ☐

2. Which of these diseases is related to how much sugar people eat? (tick one)

High blood pressure ☐
Tooth decay ☐
Anaemia ☐
Not sure ☐

3. Which of the diseases is related to how much salt (or sodium) people eat? (tick one)

Hypothyroidism ☐
Diabetes ☐
High blood pressure ☐
Not sure ☐

4. Which of these options do experts recommend to reduce the chances of getting cancer? (tick one)

Drinking alcohol regularly ☐
Eating less red meat ☐
Avoiding additives in food ☐
Not sure ☐

5. Which of these options do experts recommend to prevent heart disease? (tick one)

Taking nutritional supplements ☐
Eating less oily fish ☐
Eating less trans-fats ☐
Not sure ☐

6. Which of these options do experts recommend to prevent diabetes? (tick one)

Eating less refined foods ☐
Drinking more fruit juice ☐
Eating more processed meat ☐
Not sure ☐

7. Which one of these foods is more likely to raise people's blood cholesterol? (tick one)

Eggs ☐
Vegetable oils ☐
Animal fat ☐
Not sure ☐

8. Which one of these foods is classified as having a high Glycaemic Index (Glycaemic Index is a measure of the impact of a food on blood sugar levels, thus a high Glycaemic Index means a greater rise in blood sugar after eating)? (tick one)

Wholegrain cereals ☐
White bread ☐
Fruit and vegetables ☐
Not sure ☐

9. To maintain a healthy weight, people should cut fat out completely. (tick one)

Agree ☐
Disagree ☐
Not sure ☐

10. To maintain a healthy weight, people should eat a high-protein diet. (tick one)

Agree ☐
Disagree ☐
Not sure ☐

11. Eating bread always causes weight gain. (tick one)

Agree ☐
Disagree ☐
Not sure ☐

12. Fibre can decrease the chances of gaining weight. (tick one)

Agree ☐
Disagree ☐
Not sure ☐

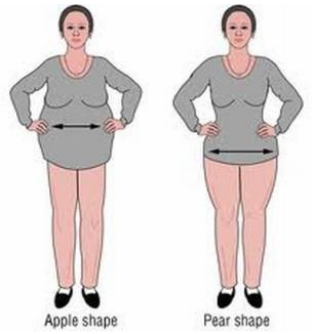
13.Which of these options can help people to maintain a healthy weight? (answer each one)

	Yes ____	No _____	Not sure _____
Not eating while watching TV	__	__	__
Reading food labels	__	__	__
Taking nutritional supplements	__	__	__
Monitoring their eating	__	__	__
Monitoring their weight	__	__	__
Grazing throughout the day	__	__	__

14. If someone has a body mass index (BMI) of 23kg/m2, what would their weight status be? (tick one)

Underweight _____
Normal weight _____
Overweight _____
Obese _____
Not sure _____

Look at the body shape below:



16. Which of these body shapes increases the risk of cardiovascular disease (cardiovascular disease is a general term that describes a disease of the heart of blood vessels, for example, angina, heart attack, heart failure, congenital heart disease, and stroke)? (tick one)

Apple shape ___
Pear shape ___
Not sure ___

Section 5: We would like to ask you a few questions about yourself

1. Are you …

Male __
Female __

2. What is your current weight approximately? Please give this in stones and pounds or kilograms.

Stones
Pounds
Or Kilograms

3. What is your current height approximately? Please give this in feet and inches or centimeters.

Feet ___
Inches ___
Or Centimeters ___

4. In general, would you say your health is …

Poor __
Fair __
Good __
Very good __
Excellent __

5. Are you

Single ☐

Married ☐
Living as married ☐
Separated ☐
Divorced ☐
Widowed ☐

6. Do you have any children?

No ☐
1 ☐
2 ☐
3 ☐
4 ☐
More than 4 ☐

7. Do you have any children under 18 years living with you?

Yes ☐
No ☐

8. What best describes your ethnic origin? (tick one)

White British ☐
White Irish ☐
Other White background ☐
Black British ☐
Black Caribbean ☐
Black African ☐
Other Black background ☐
Indian ☐
Pakistani ☐
Bangladeshi ☐
Chinese ☐
Other Asian background ☐
White and Black Caribbean ☐
White and Black African ☐
White and Asian ☐
Other mixed background other, please specify: ☐

9. What is the highest level of education you have completed?

Primary school ☐

Secondary school ☐
O level/GSCEs ☐
A level ☐
Technical or trade certificate ☐
Diploma ☐
Degree ☐
Postgraduate degree ☐

10. What is your educational qualification?

11. Do you have any nutrition-related qualifications (or are you studying to get a nutrition qualification)?

Yes ☐
No ☐
Please specify: _____

Thank you very much for taking part in this survey!

Appendix H: Permission to Use General Nutrition Knowledge Questionnaire

September 7, 2020, 5:30 AM

Dear Lynne,
You are welcome to use the questionnaire, it is freely available on our website …

https://www.ucl.ac.uk/epidemiology-health-care/research/behavioural-science-and-health/resources/questionnaires/eating-behaviour-questionnaires

This should contain all of the information that you need but feel free to contact me if you need anything else.
Best wishes,
Helen

Dr Helen Croker, RD PhD

Senior Research Fellow and Unit Manager of the NIHR Policy Research Unitin Obesity
Population, Policy and Practice Research and Teaching Department
UCL Great Ormond Street Institute of Child Health
Faculty of Population Health Sciences
30 xxxxxxx xxxxxxxx
London WC1N 1EH
Tel: xxxxxx (internal xxxx)

https://iris.ucl.ac.uk/iris/browse/profile?upi=HCROK65

https://www.ucl.ac.uk/obesity-policy-research-unit/

https://www.ucl.ac.uk/child-health/population-policy-and-practice-research-and-teaching-department

Appendix I: IRB Approval Letter

ABILENE CHRISTIAN UNIVERSITY
Educating Students for Christian Service and Leadership Throughout the World

Office of Research and Sponsored Programs
320 Hardin Administration Building, ACU Box 29103, Abilene, Texas 79699-9103
325-674-2885

Dear Lynne,

On behalf of the Institutional Review Board, I am pleased to inform you that your project titled

was approved by expedited review (Category 7) on 12/24/2021 (IRB # 21-120). Upon completion of this study, please submit the Inactivation Request Form within 30 days of study completion.

If you wish to make any changes to this study, including but not limited to changes in study personnel, number of participants recruited, changes to the consent form or process, and/or changes in overall methodology, please complete the Study Amendment Request Form.

If any problems develop with the study, including any unanticipated events that may change the risk profile of your study or if there were any unapproved changes in your protocol, please inform the Office of Research and Sponsored Programs and the IRB promptly using the Unanticipated Events/Noncompliance Form.

I wish you well with your work.

Sincerely,

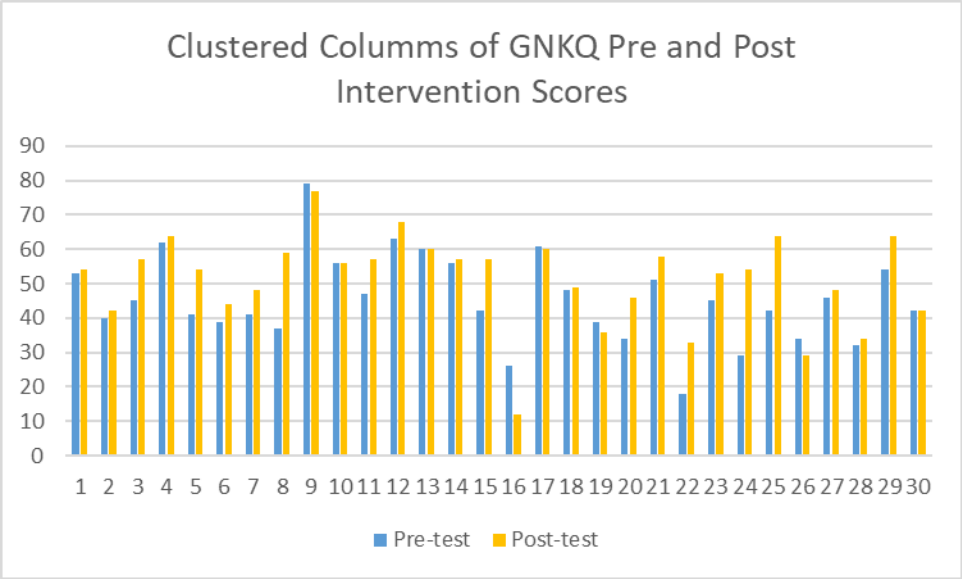
Megan Roth

Megan Roth, Ph.D.
Director of Research and Sponsored Programs

Appendix J: General Nutrition Knowledge Questionnaire Pre- and Postintervention Scores

Figure 1J

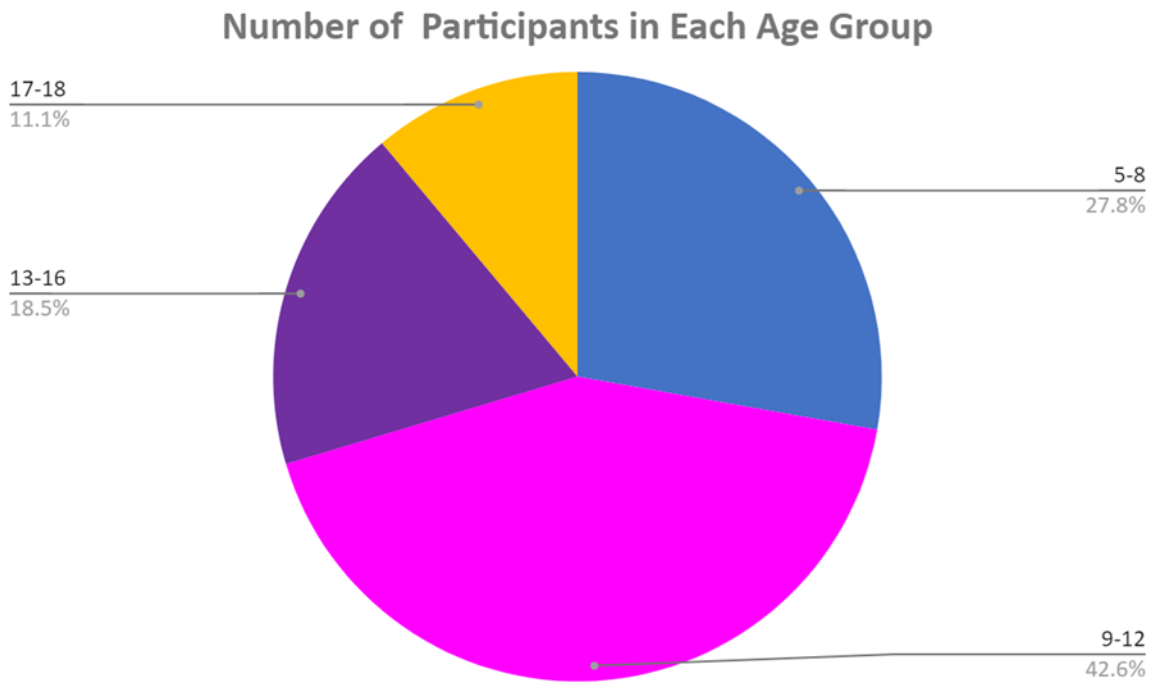
General Nutrition Knowledge Questionnaire Pre- and Postintervention Scores



This chart shows the preintervention scores in blue and the postintervention scores in yellow.

Appendix K: Number of Participants in Each Age Group

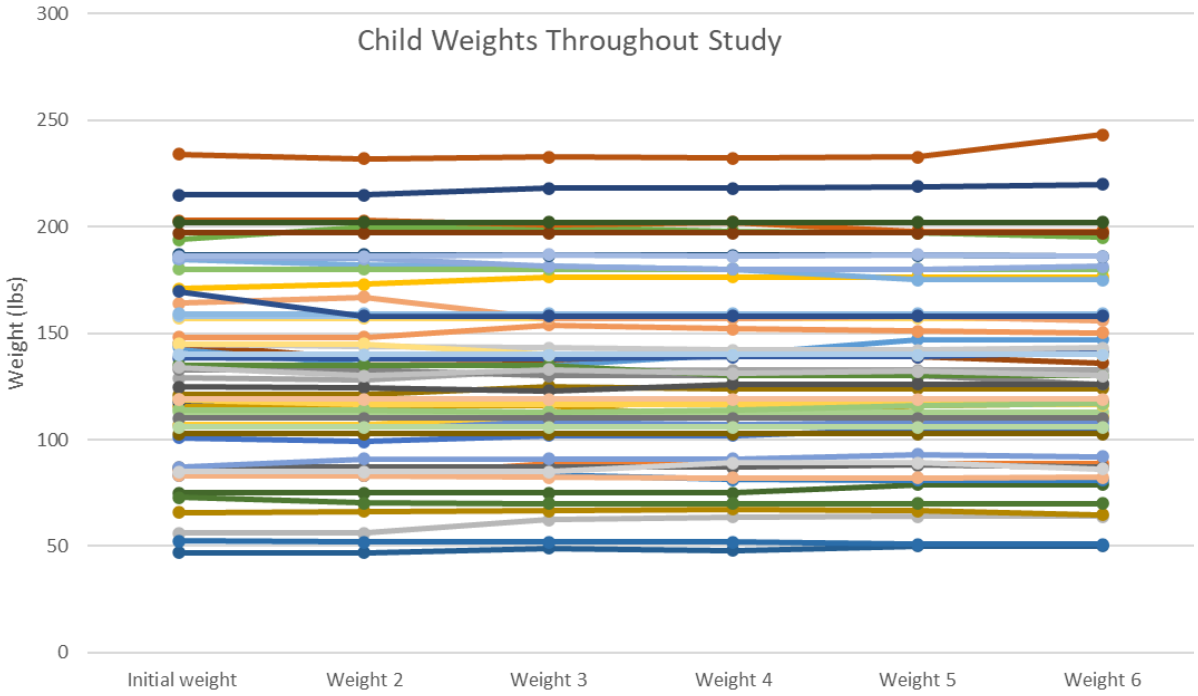
Figure 1K



Appendix L: Child Weights Throughout Study

Figure 1L

Child Weights Throughout Study



This chart shows the weights of each participant in the study over 3 months.

Appendix M: Descriptive Statistics

Descriptive Statistics

	N	Minimum	Maximum	*M*	*SD*
Age	54	5.00	18.00	10.9111	3.61917
Weight 1	54	47.00	234.00	132.2250	44.62508
Height	54	40.25	70.50	58.2472	6.92585
BMI 1	54	17.50	52.20	26.5969	5.40162
PBMI 1	54	87.00	100.00	96.3907	3.52127
Weight 6	54	50.00	243.20	132.1048	44.12658
BMI 2	54	17.30	53.50	27.1102	6.56609
PBMI 2	54	84.40	99.90	95.9111	4.39183
Valid *N* (listwise)	54				

The chart shows the study participants' initial and end height, weight, BMI, and BMI percentage.