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Improving BMI in Children While Utilizing Pediatric Provider Guided Telemedicine: A Pilot Study

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Abstract

Background: Childhood obesity is dramatically on the rise throughout the world. Screening and prevention are ideal, but treatment becomes necessary when a child's body mass index (BMI) is 95% and greater. Obesity related illness leads to premature death. **Local Problem:** The current practice at the clinical site for this project is to send the child for lab work and follow up in three months after implementing lifestyle changes, including diet and exercise. Follow-up visits, often canceled or forgotten, contribute to a lack of evaluation and not being seen until the next annual well visit. **Methods:** The measurable outcomes are the pre and post BMI measurements. A paired t-test was used for data analysis. Compliance with the program was determined by the dietary logs. **Interventions:** The childhood obesity project was a self-management project, incorporating weekly telemedicine visits with a pediatric provider. The child's progress was documented via the dietary log and addressed weekly with the provider. **Results:** There were five participants at the completion of the program. The BMI levels of the pre-intervention period ($M = 21.06$, $SD = 2.86563$) and the post-intervention period ($M = 20.9$, $SD = 3.13688$) indicated that there was not a significant change in participant BMI as a result of the eight-week intervention period, $t(4) = 0.436$, $p = 0.685$. **Conclusions:** This program is feasible and can be utilized by other families and providers in futures studies. The availability of telemedicine is convenient for busy families. Further studies are recommended with a larger sample size and a longer implementation period to recognize improved change.

Keywords

Childhood Obesity, Telemedicine

1. Introduction

Childhood obesity is a health burden in the United States, leading to the development of preventable diseases, such as hypertension, diabetes, cardiovascular and respiratory disease, and orthopedic difficulties. Studies have shown atherosclerotic changes occur as early as childhood [1]. According to the Centers for Disease Control and Prevention (CDC), in 2019 [2], the prevalence of obesity in children and adolescents aged 2 to 19 years was 18.5% and affected approximately 13.7 million children and adolescents. Obesity affects multiple organ systems with linkage to depression and decreased self-esteem in children and adolescents. The prevalence of nonalcoholic fatty liver disease (NAFLD) is the most common chronic liver disease in children related to obesity. It has increased to 70% in obese children [3].

This Doctor of Nursing Practice (DNP) project aim was to decrease the body mass index (BMI) while improving health and well-being. Childhood obesity is an economic concern in addition to a medical burden. The healthcare cost is due to the increased development of related diseases requiring frequent monitoring and medical intervention, compelling parents to use sick time for medical appointments, and losing pay [4]. Obesity is on the rise globally. According to the World Health Organization (WHO) [5], obesity is becoming more prevalent in many low and middle-income countries.

The purpose of the DNP project is to improve the BMI in overweight and obese children by following their progress at home with weekly telemedicine visits assessing self-management of their weight loss program. Obtaining the child's BMI at week one and week nine using the same scale and similar weigh-in times lessened the likelihood of errors. The Electronic medical record (EMR) calculates and records the percentiles for each participant. Statistical analysis, using a paired sample t-test for pre and post-data determined each participant's outcomes.

2. Problem

Older children's wellness appointments become annual after the age of two. Often a year will pass, with the child missing their wellness visit. Screening and educating patients for obesity becomes critical at these visits. The current practice at the clinical site for this project is to send the child for lab work and follow up in three months after implementing lifestyle changes, including diet and exercise. Follow-up visits, often canceled or forgotten, contribute to the lack of implementation and evaluation of the child.

Economic changes over the past decades have contributed to the rise of obesity [6]. Contributing factors include increasing the cost of healthy foods and easier access to less costly foods with low nutritional value. The healthcare cost is due to the increased development of related diseases requiring frequent monitoring and medical intervention, compelling parents to use sick time for medical appointments, and losing pay [4].

Medical costs are on the rise throughout the country. According to the National

League of Cities (2021) [7], childhood obesity is responsible for $14 billion in direct medical costs. The primary concern with the rise in healthcare costs is due to child obesity continuing into adulthood. Businesses are suffering due to obesity-related absences at work. This cost has increased to $4.3 billion annually and will continue to rise (National League of Cities, 2021).

In this writer's experience as an advanced practice registered nurse (APRN), many wellness appointments were canceled or rescheduled during the current corona virus disease of 2019 (COVID-19) pandemic. Frequent phone call reminders assisted with scheduling, but many remained fearful of entering the medical office building during this time. Studies demonstrate the relationship between increased stress during childhood and the risk of childhood obesity [8]. COVID-19 increased the stress levels of families.

3. Practice Question

The following practice question will serve as the basis for the proposed DNP project: "For children between the ages of six to eighteen with a BMI greater than 85th percentile at small suburban pediatrician's office, does the implementation of a weight loss self-management program with weekly telemedicine visits provided by pediatric health care provider versus current practice, influence BMI percentile in 8 weeks?"

4. Literature Synthesis

The search for current, 2016-2021, peer review articles was conducted via Chamberlain University's online library. These databases included CINAHL, PUBMED, and Cochrane Library. The following terms were used to find articles specific to this study: *childhood obesity* and *at-home* and *telemedicine.* An analysis of the evidence types, level, and quality of the ten articles used to inform the Literature Synthesis was conducted using the Johns Hopkins Individual Evidence Summary Tool (**Appendix A**). The ten articles supported the Childhood Obesity Project by including telemedicine with an at home, family-centered program.

Parents of obese children are often obese themselves; therefore, a multimodule attempt of family interventions is the best practice in childhood obesity treatment [9]. Interventions include improving diet, sixty minutes of daily physical activity, and limiting sedentary lifestyles and screen time. Family-based care is ideal when treating overweight and obesity in children, and becomes imperative when treating young children [10]. Multiple studies have utilized a family-based approach during implementation, noting that involvement from both parents demonstrated significantly improved outcomes compared to one-parent involvement [11]-[14].

Pamungkas & Chamroonsawasdi's 2019 meta-analysis determined BMI of children can decrease by incorporating family-based interventions while treating obesity. The one limitation of this study was not including every home-based intervention. Home-based interventions include in-home visitations, phone calls, text messaging, or telemedicine follow-ups during the implementation process. The

continuation of care post-implementation is ideal for sustaining the progress of the child.

Lifestyle changes are delivered at home to improve the outcomes for children [11]. Parents are role models for their children and, ideally, model appropriate food and healthy eating behaviors. Addressing the child's environment is included in the implementation process and leads to a successful outcome [10]. Dietary interventions can be completed at home involving the children and parents [11]. Home visitations have been attempted in previous studies to educate and monitor progress, although parents' schedule and discomfort with people in their home was a barrier in implementation. Home visitations improve family-based lifestyle interventions [13]. Telemedicine flexibility limits the barrier with this discomfort and may lead to improved compliance with the program.

Telephone-guided care has become a powerful tool in health promotion [15]. Telephone and telemedicine allow the opportunity to monitor progress and sustainability. Deshpande *et al.* (2018) suggest eHealth and telephone-guided interventions target the risk factors to improve behavioral changes. Telemedicine decreases travel burdens for families while extending health care opportunities for high-risk communities at a low cost [10]. Although telephone interventions are convenient, parents preferred a more intimate face-to-face session [9].

Hosseini & Yilmaz's meta-analysis recommended utilizing a school environment for rural communities with poor internet access since ninety-two percent of participants met the minimum requirement of internet connectivity. Internet availability is necessary for telemedicine follow-up visitation and can be utilized by families lacking this in-home resource.

A combination of nutritional programs and physical activity effectively decreases BMI [16]. Focusing on both diet and physical activity is essential for weight loss. Physical activity improves BMI in children, although not every article supported this relationship. Hammersly *et al.* (2019) discovered that dietary improvements were noted from the dietary logs, but BMI remained the same. Physical activity improved in the meta-analysis by Jurado-Castro *et al.* (2020), but BMI scores improved minimally. All of the articles supported sixty minutes of moderate to vigorous daily physical activity for weight loss and to maintain healthy lifestyle behaviors [9]-[18].

A telehealth nutritional program is feasible in various communities and socioeconomic classes, while involvement from both parents is necessary for improved outcomes [17]. Family time commitment is essential for retention and positive results. Unfortunately, in the pilot study by Chai *et al.* (2019), BMI scores and waist circumference did not decrease; however, they remained the same in the implementation groups. Utilizing a larger sample size of participants was recommended for future studies.

EHealth reduces social barriers while increasing access to services that become difficult for rural communities to access. Davis *et al.* (2016) utilized a larger sample size and determined telemedicine or telephone implementations are feasible

and acceptable for treating pediatric obesity. Parents did request more guidance with recipes and continuing the program quarterly to ensure sustainability and support for their children. There was no significant difference in outcomes between telemedicine and telephone implementations [9].

Hammerson *et al.* (2018) incorporated multiple components in the daily log, including dietary intake, physical activity, and hours of sleep. Dietary interventions improved for each child, but again, BMI did not decrease at the culmination of six months. Self-reporting weights completed by parents were questionable and could have altered the results. Children of average weights were included since the concern of parents reporting lesser weights for their children. This discrepancy will be avoided in the Childhood Obesity Project by weighing each child in the office and documenting results in the electronic medical record (EMR).

Combining lifestyle interventions with telehealth to infiltrate patients' homes will decrease the rates of childhood obesity. McMullan *et al.* (2020) concluded technology-based interventions have the potential to impact weight in children positively. The efficacy of this systematic review was questionable since the authors utilized two databases, but twenty-seven percent of participants showed a positive outcome with technology-based intervention.

More research may be necessary for technology-based, family-centered care when treating overweight and obese children.

Incorporating a journal for dietary improvements, physical exercise, and sleep habits with telemedicine visits should assist in the implementation process [12] [13]. Technology is used routinely in healthcare. Utilizing this intervention while supporting the child and family is necessary to sustain successful outcomes.

5. Purpose

The purpose of the doctor of nursing practice (DNP) project was to improve the BMI and weight of children with obesity by following their progress at home with weekly telemedicine visits, assessing the self-management weight loss program. Children with a BMI greater than or equal to 85% met the project's inclusion criteria. The exclusion criteria include children under the age of six and over the age of eighteen. Children with a BMI less than 85% were excluded from the project. Parents and participants completed consents and assents before beginning the program. The project manager entered weight and BMI recordings in the pediatric electronic medical record and distributed dietary/physical activity logs for children to document their progress. The family received education on diet and activity and expectations for their participation in the project. This education included a copy of the food pyramid to assist in eating a balanced diet. The families received weekly links for telemedicine visits for the healthcare provider to assess the logs for dietary intake and physical activity with the patient and family. The healthcare provider provided support and formative evaluation, addressing questions and concerns. Telemedicine visits were scheduled weekly for eight weeks. The project manager completed weights and BMIs at the culmination of the

project to analyze the data. The education received by the participant and family included:

a) The participant will incorporate 30 minutes of daily physical activity.

b) The participant will be encouraged to eat balanced meals, reducing fats in the diet, incorporating more fruits and vegetables, eliminating or limiting juice, soda, energy drinks, and sports drinks.

c) The participant will get the appropriate amount of sleep each night.

d) The participant will restrict electronic use unless being utilized for physical activity (exergaming).

6. Evidence-Based Intervention

The prevalence of childhood obesity has increased dramatically over the past few decades in the United States. Obesity during adolescence is associated with significant medical morbidity during adulthood [19]. Obesity is associated with cardiovascular disease, hypertension, respiratory difficulties, and certain types of cancers.

An adolescent with a high BMI is at risk for diabetes, and coronary artery disease risks occur earlier. Of the potential health issues that could arise, Type 2 Diabetes is the most common and severe complication of childhood obesity [19]. Implementing a program to sustain a healthy diet and activity habits has effectively helped with weight loss and better self-management. The intervention should include daily exercise, education on healthy food choices, daily tracking of activity and diet, better sleep habits, and decreasing sedentary electronic use [14].

The current practice at the clinical site when treating overweight and obese children is to obtain lab work and follow up in 3 months after educating and asking parents to implement lifestyle changes. These lifestyle changes include healthy eating habits and incorporating one hour of physical activity daily. The follow-up visits are often canceled or forgotten. Lack of follow-up visits has resulted in overweight and obese children not having their health needs addressed promptly at our practice. This proposal recommends the implementation of a home-based program while monitoring and educating via telemedicine. A home-based program with telemedicine is ideal because lifestyle changes are being monitored, and support and encouragement are provided for the family. The child had a weekly scheduled telemedicine visit to review the dietary log data. See **Appendix B** for the dietary log. The importance of including family members in the intervention is significant. Having the family of an obese child involved in the weight loss interventions is necessary for the best weight loss outcomes [20].

A systematic review by Aminuddin, Azit, & Daud (2019) [21], proved home-based interventions are critical to the prevention and treatment of obesity for children. Parents play an essential role in reducing BMI for obese children [22]. Effective interventions start in-home at an early age, especially important to high-risk families. A pilot study completed in 2020 by Haire-Joshu *et al.* supported the feasibility of family-based lifestyle interventions to treat obesity. This six-month

pilot program measured pre- and post-body mass index and recognized a decrease in BMI after the program. Both caregiver and child received dietary education and were encouraged to exercise daily to improve their health. At-home visits or phone call follow-ups evaluated the child's progress every fourth week for six months. Scheduling the in-home visits became an unavoidable barrier for some patients.

Common barriers for successful obesity treatment programs include inadequate resources, including transportation, scheduling, and parents' concern with missing work and school [23]. Telemedicine allows for face-to-face contact for patients and providers while eliminating transportation difficulties and supporting a flexible schedule for families. The technological flexibility allows access to care and reaches distant communities.

A systematic review completed by Ekambareshwar *et al.* (2021) stated that participants appreciated receiving telephone calls and text messages, while sixty-three percent of the study experienced one or more improvements in behaviors related to obesity.

The home environment is the most influential on a child's diet and physical activity. According to Metzger (2020) [24], home-based interventions have strong evidence of long-term benefits compared to school-based and healthcare interventions. Home-based obesity programs encourage family involvement. Home visitations positively affect the child's diet and physical activity but scheduling an appointment becomes difficult [13]. Family accountability assisted in lifestyle changes. Parents reported that the child felt comfortable in their home setting and incorporated positive changes in their daily routine, while other families were uncomfortable with someone coming into their home [13].

Measuring pre and post BMI demonstrates the effectiveness of the program. BMI is a simple, cost-effective tool screening for obese and overweight children [25]. A systematic review by Rajjo *et al.* (2017) concluded education-based interventions have significantly lowered BMI, and a combined approach of education and physical activity led to a more significant reduction in BMI. Several childhood obesity studies demonstrated positive change in BMI with the appropriate home-based treatment program [14]. This meta-analysis reviewed 22 articles supporting the evidence that at-home family intervention assists in the treatment and prevention of childhood obesity.

The standard of care for weight loss is a healthy diet and exercise. Family-assisted at-home programs with health provider telemedicine visits will encourage the family and lead to successful outcomes for children. The family unit is involved in pediatric care when treating the patient.

7. Translational Science Model

The Knowledge to Action (KTA) is the framework used in the childhood obesity project. This model was adapted by Graham and colleagues in Canada in the 2000s after reviewing 31 planned action theories [26]. Weight-related conversations

become difficult for healthcare providers. A comfort level should exist between both the provider and patient. These conversations must be approached gently, nonjudgmental, and in a family-centered way [16]. There are two parts to the KTA framework, knowledge creation and action cycle. Knowledge creation includes the production, synthesis, and interpretation of the knowledge [27]. The action cycle includes seven stages, including identifying the problem, sustaining knowledge use, evaluating outcomes, monitoring knowledge use, selecting implement interventions, assessing barriers, and adapting knowledge to context [27]. This model has often been described as the transfer of knowledge, the diffusion of an idea, and the use of research to make an informed decision [26]. This utilization of this model is throughout healthcare.

The knowledge gaps are addressed by the author for childhood obesity prevention and treatment. The population included children ages six to eighteen years of age with a BMI of 85% and above. The implementation was a weight loss self-management program with telemedicine to ensure the child is creating lifestyle changes. Children received education and guidance on healthy foods and lifestyle behaviors and understand the importance of sleep, while limiting electronic usage. The most critical point of this translational science model is the receiving end of the knowledge shared. Evaluating the understanding of the child's knowledge was assessed during telemedicine visits. Ideally, the child needs to sustain the lifestyle changes to prevent complications of obesity and live a healthier life.

8. Organizational Setting

The clinical site is small suburban pediatric practice, privately owned by one physician. The staff includes one pediatrician, one pediatric nurse practitioner, two medical assistants, and one office manager. The office provides wellness care to newborns until young adults of age twenty-one. The local Children's hospital is one mile down the road. Common diagnoses include asthma, otitis media, strep throat, pneumonia, viral infections, allergic rhinitis, obesity, depression, and anxiety. The office is culturally diverse with multiple ethnic backgrounds including, Caucasian, African American, Hispanic, and Asian. Majority of the patients have private insurance and approximately ten to fifteen percent are on Medicaid. Approximately twenty patients are evaluated each day, including well and sick. This number has significantly decreased from the previous year by half.

This study took place during the COVID-19 pandemic. In the writer's experience, the decreased number of office visits was directly related to the pandemic. Parents were delaying well exams until they felt safe to enter the pediatrician's office. The telemedicine component to this study allowed the provider to assess the child's progress weekly without the child coming into the office.

9. Population Description

Obesity affects children of all ages. The COVID pandemic contributed to a decrease in wellness appointments at the clinical site. The range in age was broad to

ensure enough children participate in the project, including children from the ages of six to eighteen. The anticipated sample size was approximately ten to twenty children. This number was randomly assigned. The following patients met inclusion criteria: children with a BMI of 85% and above, and children between the ages of six and eighteen. The participants must have internet access.

The following patients met exclusion criteria: children with a BMI of less than 85%, less than the age of six and older than eighteen, and under the care of a dietician. Children without internet access were excluded since this is required for weekly telemedicine visits. Children were recruited during wellness exams once meeting the requirements. Each participant and parent completed a consensual form and receive a dietary log for the eight-week implementation period (**Appendix C** & **Appendix D**). Child assent allowed for information sharing and voluntariness. Consent from the child demonstrates respect and allows for expression of concerns in the study.

10. Considerations and Challenges for Implementation

The project had potential for barriers. The staff acquired more responsibility by scheduling and confirming visits and distributing dietary logs and telemedicine instructions. Encouraging staff participation was ideal for success. It was essential to be available to staff during office hours to answer their questions and concerns pertaining to the project. Engaging staff to participate in quality improvement (QI) is challenging but critical [28]. Successful outcomes are due to a strong, supportive team.

Another potential barrier was participants prematurely discontinuing the project or not adhering to the program. These barriers were prevented by encouraging both child and parent and motivating the child with a small gift card at completion of the project. It is ideal for supporting the parents and praise their improved lifestyles for their families.

11. Outcomes

The measurable outcomes are the pre and post BMI measurements. The BMI data was collected at week one of the project and again at the completion of week eight (**Appendix B**). Weigh-ins were completed using the same scale for both week one and week eight. The number of weeks for the program was randomly selected. The child's height was required to calculate the BMI. Participation in telemedicine visits assessed the child's progress and adherence and compliance. This project did not use a tool from a previous study. Children received a dietary log, constructed by the project manager, tracking their daily progress. This log tracked the child's food intake for breakfast, lunch, snacks, and dinner. It also provided documentation for sleep, electronic use, physical activity, and water intake. The log was available on the patient portal and hard copy, for the patients' choosing, for daily completion. The child and parent logged the information from Monday to Friday and had free time without documentation for Saturday and Sunday. The writer did

not want the child to feel excluded from family gatherings or parties, and wanted to teach the child occasional indulgence of dessert is acceptable.

This program was eight weeks. The pre and post-BMI values were manually entered in the EMR, automatically calculating the percentile according to the Centers for Disease Control and Prevention (CDC). Week nine and ten, the data was analyzed. The EMR calculated the BMI percentiles, and a comparison between the pre and post-values was determined. Assessment of compliance with the study occurred during the weekly telemedicine evaluations.

Home-based interventions are feasible and practical. Dietary habits and physical activity, sedentary behaviors, screen time, and sleep play a role in obesity prevention [29]. Home-based interventions are more likely to be used in every type of home. These interventions are feasible and acceptable in low-income homes [29]. Delivery of interventions via telemedicine or telephone is cost-effective. This type of intervention has equal or greater reach than face-to-face interventions [23].

Parents are the most influential to a child's health and well-being. Effective interventions for the prevention of childhood obesity should begin early on in life. It is critical to target parents as role models and empower them to play an active role in the child's obesity prevention and treatment plans. Parents play a critical role in pediatric obesity because they manage the child's weight-related behaviors by promoting healthy lifestyle changes and establish a healthy home environment [22]. Home-based interventions improve parents' knowledge and awareness, improving the lifestyle of the child. Several studies demonstrated a decrease in BMI with a home-based approach for obesity treatment and prevention [22].

12. Data Management Plan

The childhood obesity project is a quasi-experimental study with a convenience sample design. Participants are not assigned randomly but chosen because of the ease of access. The project questioned if a self-management plan will improve children's body mass index (BMI) with telemedicine. The data type is interval data since the project manager is evaluating the child's BMI.

The evaluating tool for BMI will be the electronic medical record (EMR). The child's weight and heights were assessed and manually entered into the EMR, and automatically calculate the BMI and percentile. The EMR is the evaluation tool of BMI, and the dietary log determines the adherence to the program. The data was protected in the EMR, which the provider accessed with a specific password. The dietary logs were scanned in the patient's chart and stored in the electronic medical record. Once scanned the project manager shredded hard copy with the patient information. The patient information was manually extracted for data analysis but labeled accordingly without patient identifiers. The statistician was not able to visualize patient information but had access to the pre and post-BMI values.

Extraneous variables were unable to be fully controlled in the project. Patient

adherence is an extraneous variable and was monitored through the dietary record. Providing participants with clear instructions following the implementation and explaining the lifelong benefits of following the program improved adherence for some participants. Study data was collected using the patients' medical records. All variables collected were assessed for frequency, mean, and standard deviation where appropriate. A paired t-test was used to analyze the data. A t-test is used for analysis when comparing two different groups [30]. The pre and post-BMI values were the two comparative groups. There are four criteria required for utilizing a paired t-test:

a) The data that you are studying must be numeric on a continuous scale.

b) There is a large enough sample size.

c) The data studied needs to be normally distributed.

d) The variance of the sample means needs to be homogenous.

The Shapiro-Wilks test was used to determine normality. This test demonstrated demonstrate how close the sample distribution is to the standard bell curve. Homogeneity was determined by using a t-test, looking at normality. This determined if the pre and post-BMI distributions are equally distributed.

Adherence was evaluated weekly by the project manager. Self-control deficits can explain compliance and sustainability [31]. The child and parent should make decisions based on healthy eating and incorporate physical activity in their daily lives to sustain this lifestyle change. There is evidence between high adherence and better clinical outcomes [31]. Outcomes are met when the child adheres to the program.

13. Project Management Plan and Gantt Chart

The childhood obesity project will take place over ten weeks (**Appendix E**). Participants were recruited at well visits or as needed during a sick visit. The timeframe of the project included the following breakdown:

Week one: Recruit participants for the project during annual office visits, obtain informed consent for participation and provide education on the program and expectations for participation. Assess BMI to determine if child qualifies for the project.

Week two: Provide education to patient and family and intervene where needed from the weekly log. Huddle with office staff for any questions or concerns about the project.

Week three: Provide education to patient and family and intervene where needed from the weekly log. Huddle with office staff for any questions or concerns about the project.

Week four: Provide education to patient and family and intervene where needed from the weekly log. Huddle with office staff for any questions or concerns about the project.

Week five: Provide education to patient and family and intervene where needed from the weekly log. Huddle with office staff for any questions or concerns about

the project.

Week six: Provide education to patient and family and intervene where needed from the weekly log. Huddle with office staff for any questions or concerns about the project.

Week seven: Provide education to patient and family and intervene where needed from the weekly log. Huddle with office staff for any questions or concerns about the project.

Week eight: Provide education to patient and family and intervene where needed from the weekly log. Huddle with office staff for any questions or concerns about the project.

Week nine: Provide education to patient and family and intervene where needed from the weekly log. Huddle with office staff for any questions or concerns about the project.

Week ten: The participant will return to the clinic for weight and calculation of BMI. Formative evaluation and support will be provided to improve sustainability of their weight management activities. The data will be analyzed.

See **Appendix B** for Gannt chart.

14. Proposed Budget

The required resources include the electronic medical record for telemedicine appointments. The project manager included a hard copy of the dietary log and an electronic version uploaded to the patient portal. For a complete view of the proposed budget see **Appendix F**.

15. Ethical Issues and Considerations

Each participant and guardian signed a consent prior to starting the project. The data collected was protected in the electronic medical record. The providers had access to the record with a specific login and password. The information was protected from other patients by logging off between appointments.

Telemedicine appointments were completed in the conference room to maintain the health insurance portability and accountability act (HIPPA). There was no requirement for International Review Board (IRB) approval at the clinical site, but Chamberlain University IRB prescreening was required. The IRB's goal is to protect the rights and welfare of human subjects [32].

16. Results

Ten children were enrolled in the obesity program, but five children completed to the finish. Two in-office visits were scheduled to obtain measurements at the beginning and end of the program. The sample consisted of three males and two females, ranging from the age of seven to ten years of age. The setting took place in the child's home, with weekly telemedicine visits scheduled with the health care provider.

The writer was targeting a population of children from the ages of six to eight-

teen years of age with a BMI of 85% or greater. The BMI values for the participants ranged from 90% to 98%. The female participants represented the Latino community, while the male participants were of Caucasian descent. See **Appendix I** for demographic information.

A pair t-test was used for data analysis, and the Shapiro-Wilk test was used to determine normality. Testing the normality is an important step for deciding the measures of central tendency and statistical methods for data analysis [33]. The BMI levels of the pre-intervention period ($M = 21.06$, $SD = 2.86563$) and the post-intervention period ($M = 20.9$, $SD = 3.13688$) indicated that there was not a significant change in participant BMI as a result of the eight week intervention period, $t(4) = 0.436$, $p = 0.685$. See **Appendices G-I** for results. The small sample size and the eight week intervention period did not rovide enough evidence, demonstrating a change in BMI.

17. Discussion

The results were not significant to the practice problem. Ten participants started the program, while five were available on completion. Unfortunately, the small sample size was a limitation in the study. In the writer's opinion, the shortage of participants contributed to the absence of significant change. This program attempted to individually improved the health and wellness of the children who contributed to the study. BMI values were relatively the same on start and finish days.

The participants and family members incorporated positive physical activity into their daily lifestyle routines. This was a positive lifestyle change for participants. Recommendations from previous studies included prolonging the implementation period to notice significant changes in BMI. The childhood obesity program was an eight-week implementation period.

18. Recommendations

The writer recommends this program but encouraging a larger sample size. Obesity is a preventive health concern causing multiple complex diseases. The recommended implementation period should be longer to identify changes in the child's outcomes. Pre and post laboratory values are additional variables the writer recommends for future studies.

Childhood obesity prevention and screening is recommended by the American Academy of Pediatrics. Early treatment prolongs and encourages a healthy life for the child. Nursing leaders are advocates and strongly influence healthcare policy. Programs, such as the Childhood Obesity program, should be incorporated in pediatric offices and facilitated by nursing scholars to ensure changes and outcomes are met. These programs should be shared with the medical community nationally and internationally.

The potential of this program is unlimited, but unfortunately, statistical analysis did not demonstrate the positive changes. Future programs should continue to

incorporate family involvement and supportive health care contribution. Health care providers should consider using abdominal girth measurements and laboratory values in addition to BMI values. Policy makers should make insurance coverage is included for all demographic areas. Every child and family should have the ability to improve their health.

19. Conclusions and Implications for Nursing Practice

The purpose of this project was to fabricate a self-directed program to improve the BMI of children, while incorporating weekly telemedicine visits by the health care provider. Family involvement is ideal for commencing and sustaining change. Multiple studies have recognized this statement, and documented findings in the improvement of outcomes [11]-[14].

The childhood obesity project did not demonstrate an improvement through statistical analysis but after reviewing dietary logs, it was apparent the children and families made a change in their lifestyle. Nursing scholars will continue to improve the outcomes by utilizing previous studies and altering the PICOT question. Nursing leaders will continue to collaborate with the multiple areas of medicine and influence positive changes in healthcare while, providing healthier outcomes for future generations.

20. Plans for Sustainability

This pilot study is the beginning for change. The writer will continue with the participants in this program, providing telemedicine guidance. The participants will meet monthly until stability in weight has occurred. Once stability is reached the interval timing will increase to quarterly visits. Stability is determined by BMI values remaining the same for one month. Future programs at the clinical site will continue with an ongoing recruitment progress. The intervals in between telemedicine visits will be established according to the patient's progress. Monthly in-office or online support groups are currently undergoing evaluation in this office. Many peer support interventions show significant short-term weight loss [34]. This notion will be considered for future studies.

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Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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Appendix A

Johns Hopkins Nursing Evidence-Based Practice
Individual Evidence Summary Tool

Practice Question: "For children between the ages of six to eighteen with BMI greater than 85th percentile at Shore Care Pediatrics, does implementation of weight loss self-management program versus current practice, influence BMI in 8 weeks?"

Date: 03/07/2021

Article Number	Author and Date	Evidence Type	Sample, Sample Size, Setting	Findings That Help Answer the EBP Question	Observable Measures	Limitations	Evidence Level, Quality
1	Haire-Joshu, D., Schwartz, C. Jacob, R., Kristen, P., Johnston, S., Quinn, K., & Tabak, R. 2020	Randomized controlled piolet study	63 children ages 2 - 17 years from Florida, Missouri, & Louisiana Home visitation x 3 during a 6-month period	-Lifestyle interventions (dietary changes and physical activity) can be delivered at home to reach children and parents.	-Both children and caregivers BMI decreased. -63.9% of parents decreased their BMI, while 65.1% of children either decreased or maintained their BMI.	-Low participant rates from individuals from under-resourced communities. -Initial participants dropped out of study	High
2	Pamungkas, R. & Chamroonsawasdi, K. April 2019	Meta-analysis	22 articles were included in the study	Several studies demonstrated positive changes in obesity with the decline in weight and BMI and positive changes in healthy behaviors at home among parents and children. Family-based intervention programs are more likely to reduce childhood obesity.	73% home-based interventions produced a positive change with a reduction in weight and BMI (BMI was reduced by 36%) 4 of the 22 studies demonstrated healthy changes in food choices at home. 7 studies confirmed an increase in physical activity once the study was completed.	There may have been some studies related to home-based intervention that were not included in this meta-analysis.	High

Article Number	Author and Date	Evidence Type	Sample, Sample Size, Setting	Findings That Help Answer the EBP Question	Observable Measures	Limitations	Evidence Level, Quality
3	Knierim, S., Moore, S., Raghunath, S., Yum, L., Boles, R., & Davidson, R. June 2018	Qualitative	3 patient navigators and 25 parents of low-income poverty level from Latino/Hispanic descent.	Home visitations helps family-based lifestyle interventions at home.	Content analysis of the data from the focus groups between the parents and patient navigators was completed.	Parents' schedule, discomfort with visitors in their home, and confusion about the patient navigator role.	High

Continued

4	Jurado-Castro, J., Gil-Campus, M., Gonzalez-Gonzalez, H., & Llorente-Cantarero, F. August 2020	Systematic Review and meta-analysis	Obese children from ages 6 - 12 years from a period from 1991-2018 from 10 randomized controlled studies.	Physical activity improves obesity and BMI in school age children.	BMI z-scores moderately improved in children in the moderate to vigorous physical activity groups.	Some of the studies included only improvements with physical activity and not dietary changes.	High
5	Hosseini, H. & Yilmaz 2020	Meta-analysis	Multiple communities throughout rural Pennsylvania	Telehealth services will improve and have the ability to reach lower income, high-risk families. Schools can also be utilized for internet access.	92% of Pennsylvania schools meet the minimum requirements for internet connectivity.	Schools are a great environment for internet connectivity, but districts need to adapt to the evidence-based programs and consent to utilize in school.	Good
6	Hammersly, M., Okely, A., Batterham, M., Jones, R. February 2018	Randomized Control Trial	23 parents of School age children and 24 parents of school age children in the previous piolet study	Parent-focused internet-based program used to facilitate behavior changes in at risk children (overweight and obese).	BMI was measured at baseline and then 3 and 6 months. A food diary was monitored by the parents. Physical activity and sleep habits were assess through questionnaires. Improvement was noticed in dietary intake but not a huge difference in BMI at the 6 month mark.	More children were in healthy weight that overweight or obese category. Parents were self-reporting and could have misreported information.	High
7	Deshande, S., Rigby, M., & Blair, M. April 2018	Meta-analysis	23 European Countries	Parents were survived on the apps and electronic tools, eHealth, and or telephone interventions used for treating their overweight/obese child. eHealth and telephone interventions targeted and treated behavioral modification for obesity.	Support is present and easily available to children in Europe who are being treated for overweight and obesity.	Some countries did not participate in the study originally. 23/30 countries participated.	High

Continued

Article Number	Author and Date	Evidence Type	Sample, Sample Size, Setting	Findings That Help Answer the EBP Question	Observable Measures	Limitations	Evidence Level, Quality
8	Chai, L., Collins, C., May, C., Ashman, A., Holder, C., Brown, L. & Burrows, T. July 2019	Randomized control pilot study	36 children aged 4 - 11 with a BMI of 21.5 or higher completed the 12 week program. 1 group-control 1 group-telehealth 1 group-telehealth & text messages	Family focused online dietary intervention is feasible with telehealth.	No decreased in BMI scores between groups. Telemed groups improved their dietary intake when compared to the control. The telemed with texting group had the most improved dietary intake. Both of these groups maintained BMI and waist circumference.	Time commitment was a problem for some of the families who dropped, one family was no longer interested in the middle of the study. 100% of control group remained throughout. Study recommended a larger sample size to see if a better decrease in BMI scores.	High
9	Davis, A., Sampilo, M., Gallagher, K., Dean, K., Saroja, B., Yu, Q., He, J., & Sporn, N., 2016	Randomized control	103 children ages 5 - 12 (42-telemedicine implementation 61-telephone implementation). BMI score average 94.3% 10.6% of participating parents were overweight and 42.72% were obese.	Telemedicine and telephone intervention are both feasible and acceptable ways of treating pediatric obesity care. Children met the 60 minutes of exercise daily in both groups.	No differences in outcomes on telemedicine or telephone groups	Parents wanted more personal face to face contact.	High
10	McMullan, M., Millar, R., & Woodside, J. May 2020	Systematic Review	11 studies including children ages 8 - 18.	Technology based interventions may, with further research, have the potential to positively impact weight on obese children.	27% of participants showed a positive outcome from technology based intervention.	Efficacy was difficult to determine with the use of two databases and some of the included articles were not high quality evidence.	Good

Attach a reference list with full citations of articles reviewed for this Practice question.

Appendix B

Food Journal **Date:_____**

	Food and Beverage
Breakfast	
Lunch	
Dinner	
Snacks	

WATER

Fitness	**minutes**
Screen time	**minutes**
Sleep	**hours**

Appendix C

INFORMED CONSENT FOR PARTICIPATION IN
A DNP PROJECT

Project Title:

Improving BMI among children with the utilization of telemedicine visits with a pediatric health care provider

Project Manager:

Lauren Sullivan, MSN, PNP-BC

What is the purpose of this project?

The purpose of this project is to improve the child's body mass index (BMI) and create and sustain healthy lifestyle changes.

What will I be asked to do if I choose to be in this project?

The project is an eight-week at-home program, making healthy lifestyle changes

through diet and exercise. It incorporates the importance of limiting screen time and encouraging adequate sleep. You and your child will document weekly food intake and exercise through a log, which will be given to you at the beginning of the program by the project manager. Each week you will attend a telemedicine visit, will be scheduled to review the changes, and receive feedback and recommendations to improve when needed.

How much time will I be asked to devote to this project?

The project is eight weeks long. You and your child will be asked to document food intake and exercise five days each week. The weekend will not need documentation, but you are asked to help your child continue making healthy choices.

What are the possible risks or discomforts that I might experience?

There are no foreseeable risks from this experience. You may experience muscle soreness from the increased activity. The project will require personal time and commitment.

What are the possible benefits for me or others?

The possible benefits include a decreased BMI and the education of healthy lifestyle changes.

What alternatives are available?

Alternate programs for lifestyle and diet changes and tracking.

Do I have to participate?

You are not required to participate, but it is recommended to improve the health outcomes for your child and support your child in this change.

What will happen if I do not participate?

Nothing will happen if you choose not to participate in the project. It is encouraged to incorporate healthy change for the entire family to sustain outcomes.

What will happen if I leave the project?

Nothing will happen if you leave the project. You may choose to leave at any time.

Will it cost me anything to participate?

It will not cost anything to participate in the study.

Will I get paid anything if I participate?

There is no payment for participation in the study.

How will my confidentiality and privacy rights be protected?

Confidentiality will be maintained at all times. Patient information will be secured in the electronic medical record. The healthcare provider will have access to the information with the use of a password. Telemedicine visits will be completed in-office where HIPAA will be maintained. Patient identifiers will not be used in any of the documentation.

In this project:

- Identifiable private information or specimens *(private information or specimens that can be traced back to you)* will be collected:

Yes ☐ No ☒

If yes:

- Identifiable private information or specimens may be used for future quality

improvement projects ***without*** gaining further permission:

Yes ☐ No ☐

- Identifiable private information or specimens may be used for future quality improvement projects , but ***only*** with your permission:

Yes ☐ No ☐

- Identifiable private information or specimens ***will not*** be used for future quality improvement projects:

Yes ☐ No ☐

Who do I contact for any questions about this project?

Please contact the project manager, Lauren Sullivan with any questions or concerns about the project. She can be reached at (XXX)-XXX-XXXX or by email sully129@gmail.com

What are my rights?

- If you choose to be in this project, you have the right to be treated with respect, including respect for your decision to stop being in the project.
- You are free to stop being in the project at any time.
- Choosing not to be in this project or to stop being in this project will not result in any penalty to you or loss of benefits to which you are otherwise entitled.
- You will be given any information that either the project manager or the IRB reasonably believes is important to your choice about whether or not to be in this project.
- We will make every effort to keep information obtained as part of this project confidential. However, information about abuse or neglect may be required to be reported to the appropriate local or state agency in accordance with applicable law.
- If you want to speak with someone who is not directly involved in this project, or if you have questions about your rights as a participant, contact the DNP Program Dean dnpdean@chamberlain.edu.

The following project has been reviewed by the Chamberlain College of Nursing and prescreened as a practice-change/ quality improvement project in collaboration with the Chamberlain University Institutional Review Board.

(*If Applicable*)

I give permission for photographs or videotapes of me to be used in this project:

_____ (initials)

I DO NOT give permission for photographs or videotapes of me to be used in this project:

_____ (initials)

I have read this form and the project has been explained to me. I have been given the opportunity to ask questions and my questions have been answered. If I have additional questions, I have been told whom to contact. I agree to participate in the project described above and will receive a copy of this consent form after I sign it.

_____ _____

Signature of Participant Date

Revised 10/14/2020

Appendix D

ASSENT FORM TO PARTICIPATE IN DNP PROJECT: MINOR

Project Title: Improving BMI among children with the utilization of telemedicine visits with a pediatric health care provider

Project Manager: Lauren Sullivan, MSN, PNP-BC

We are doing a project about improving body mass index (BMI) in children.

The purpose of this project is to educate you and your family about healthy lifestyle changes to live a long, healthy life.

A project is a way to learn more about people. If you decide that you want to be part of this project you, along with the help of your parents will participant to an 8-week program at home and track your food and exercise using a dietary log. Each week you will meet with the medical provider through telemedicine to discuss your weekly progression.

Not everyone who takes part in this project will benefit. A benefit means that something good happens to you. We think these benefits might be a lower BMI.

When we are finished with this project, I will write a report about what was learned. This report will not include your name or that you were in the project.

You do not have to be in this project if you do not want to be. If you decide to stop after we begin, that's okay too. Your parents know about the project too.

If you decide you want to be in this project, please sign your name.

I, ________________________________, want to be in this project.

_________________________________ ______

(Sign your name here) (Date)

Appendix E

Gantt Chart

Activity	NR702								NR705							
	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
Meet with faculty/preceptor	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
Meet with statistician	☐	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Continue to work on DNP proposal	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
Begin working on IRB approval	☐	☐	☐	☐	☐	☐	☐	☐	☒	☒	☒	☐	☐	☐	☐	☐
Balance budget	☐	☐	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Recruitment of participants	☐	☐	☐	☐	☐	☐	☐	☐	☒	☒	☒	☒	☒	☒	☐	☐
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Continued

Activity	NR707								NR709							
	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
Meet with faculty/preceptor	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
Recruit participants	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Implement project	☒	☒	☒	☒	☒	☒	☒	☒	☐	☐	☐	☐	☐	☐	☐	☐
Analyze data	☐	☐	☐	☐	☐	☐	☐	☐	☒	☒	☐	☐	☐	☐	☐	☐
Meet with statistician	☐	☐	☐	☐	☐	☐	☐	☐	☒	☒	☐	☐	☐	☐	☐	☐
Prepare for dissemination	☐	☐	☐	☐	☐	☐	☐	☐	☒	☒	☒	☒	☒	☒	☒	☐
Poster presentation	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☒	☒
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Appendix F

Budget

EXPENSES		REVENUE	
Direct		Billing telemedicine weekly visits $50/visit (10 participants)	$3500
Salary and benefits Provider $60/hr x 2.5 hrs/week x 2 providers Medical Assistant $18/hr x 2.5 hrs x 2 assistants	$2730	Grants	
Supplies Printed logs	$270	Institutional budget support	
Services			
Statistician	$500		
Indirect			
Overhead			
Total Expenses	$3500	Total Revenue	3500

Appendix G

Table G1. Age.

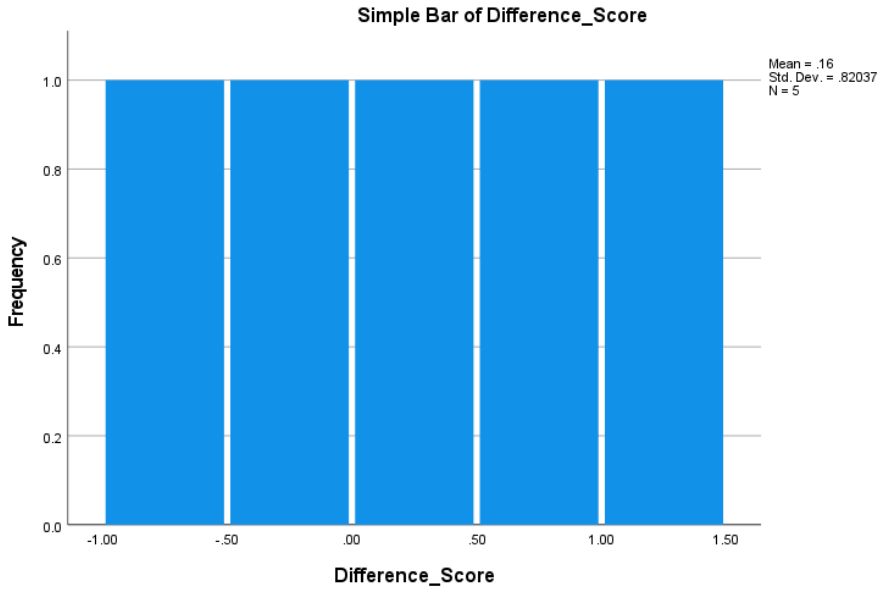
Factor	n	Min	Max.	Mean	Std. Deviation
Age	5	7	10	8.6	1.14018

Table G2. Gender breakdown.

Gender	n	Percent
Male	3	60%
Female	2	40%

Appendix H

[Normality test and Chart]



Normality Test			
Metric	Shapiro-Wilk		
	Statistic	df	Sig.
BMI Difference Score	0.916	5	0.507

Appendix I

[Results tables]

Period	Mean	N	Std. Deviation	Std. Error Mean
Pre-BMI	21.06	5	2.86563	0.28164
Post BMI	20.9	5	3.13688	1.40285

Paired Samples Test

Paired Differences	Mean	Std. Deviation	Std. Error	95% Confidence Interval of the Difference		t	df	Sig. (2-
				Lower	Upper			
Pre_BMI - Post_BMI	0.16000	0.82037	0.36688	-0.85862	1.17862	0.436	4	0.685