

Development and Implementation of a Childhood Obesity Protocol in a Pediatric Primary Care Practice

Danielle R. Stratton, DNP, RN, PPCNP-BC*

*St. John Fisher College, Wegmans School of Nursing, USA.

RESEARCH

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*Corresponding Author:

Danielle R. Stratton,
Assistant Professor, Department of Nursing, SUNY
Brockport, 350 New Campus Drive, Brockport, NY 14420,
USA; Tel: 585-395-5321; Fax: 585-395-5312; E-mail:
dstratton@brockport.edu

ABSTRACT

Childhood obesity is a known health problem in the United States (U.S.). A first step in a potential solution to prevent and manage childhood obesity is to develop and implement a protocol to use in the pediatric primary care setting. This will result in making a positive impact and change in U.S. pediatric primary care practice, and ultimately improve children's health into adulthood.

Aim and Objectives

Aim: Develop an evidenced-based (EB) protocol and implement it in a United States (U.S.) primary pediatric care practice that supports providers in changing practice to better manage the care of overweight or obese children.

Objectives:

- Develop and implement an EBP (evidenced-based practice) protocol from U.S. national guidelines

- Educate providers on anticipatory guidance for at risk children
- Monitor provider documentation of an established plan of care and follow-up
- Monitor early referrals to nutritional services

Methods: This project accessed a convenience sample of pediatric primary care providers. Chart reviews will be done to determine provider practices before and after the education.

This project is a mixed methods design focusing on pediatric healthcare providers. It will review implementation of the developed protocol and the impact on their change in practice, using Qualtrics. Descriptive statistics and nominal measurements will also be used.

Outcomes: Pretest and posttest assessment of education session(s) to measure providers' knowledge, attitudes, and practice. Overweight and obese patient data collected include: (1) behavior and lifestyle changes, (2) Body Mass Index (BMI) and/or weight changes, (3) change in Blood Pressure (BP) and/or Heart Rate (HR) and (4) time to refer to nutrition.

Conclusion: In conclusion, the implementation of this protocol will potentially positively impact the health of U.S. children through early identification and prevention of childhood obesity in pediatric primary care practice by preventing future obesity and the associated co-morbidities in adulthood.

Key Words: childhood obesity; prevention; protocol; quality improvement; pediatric primary care practice.



INTRODUCTION AND BACKGROUND

Childhood obesity is an identified health problem that negatively impacts children of all ages. Despite pediatric healthcare providers monitoring growth curves consistently throughout a child's lifetime, the prevalence of childhood obesity continues to rise. A first step in a potential solution to prevent and manage childhood obesity are protocols for primary care providers to use in primary care sites for children and adolescents from guidelines developed from national and government organizations. Organizations that have developed these guidelines are: the American Academy of Pediatrics (AAP), Centers for Disease Control and Prevention (CDC), the National Institute for Children's Health Quality (NICHQ), and the National Heart, Lung and Blood Institute (NHLBI). These protocols assist in providing anticipatory guidance with families whose children are recognized at risk or obese for prevention and maintenance.

Needs Assessment

Prevention of obesity is crucial and more cost effective than treating secondary diseases and future health complications. Atay and Bereket (2016), [1] found that preventative measures should start early in the primary pediatric medical home by monitoring weight and body mass index (BMI) percentile. Participating in open discussion with parents, caregivers, and the child or adolescent when they developmentally can comprehend the concept of obesity prevention and avoidance of future co-morbidities is crucial. Pediatric Nurse Practitioners (PNP) and pediatricians are key partners in this process because they monitor annual growth and development from the child's birth throughout adolescence including providing follow through care, such as setting short term goals of behavior modification and scheduling follow up appointments. It is important to engage the parents and caregivers, along with the child, to provide needed anticipatory guidance by the healthcare team to make changes to health behaviors.

Preventative measures require involvement on local, county, state, and national levels, to ensure the attention and fiscal support necessary to prevent and manage childhood obesity as a public health problem. Not one intervention can prevent or stop the rise of childhood obesity. However, everyone committing to making health a priority- can be a potential solution to one of the leading public health concerns not only in the United States but worldwide [1]. Early identification of at risk children, educating parents and caregivers, initiating early prevention strategies, providing anticipatory guidance toward behavior modifications, and adapting to change are all necessary to prevent, identify, modify, and mitigate the issue of childhood obesity [2].

Childhood obesity has been identified as a serious public health problem that can increase the future risk of diabetes, cardiovascular disease, and adult obesity. From 2011 to 2014, the prevalence of childhood obesity was 8.9% among 2 to 5 year old's compared with 17.5% of 6- to 11-year old's and 20.5% of 12 to 19 year old's [3].

Literature Review

A study done by Blizzard-Tripp, Templeton, Romney and Blood-Siegfried (2011) [4] evaluated 50 pediatric patients between the ages of 5 to 18 years of age in Duplin County, North Carolina for patient readiness and motivation for change and the patients' ideas for healthy change. All participants were identified with having a BMI in the 85th percentile or greater for their age and offered a Healthy Lifestyle Visit. Results indicated that children and families were interested in making positive choices promoting good health, but success depended upon sustained motivation and environmental influences. Implementation of standardized motivational interviewing and family-centered education regarding lifestyle changes can also impact healthy choices and maintain motivation for change. Although a small sample size, results suggested children were motivated, and complied with healthy changes after one to two months. However, consistent motivational interviewing, combined with participation in a

program, Healthy Eating and Activity Together (HEAT), lowered BMI percentile and waist measurement [4].

Klein et al. (2010) [5] examined pediatrician implementation of BMI assessment and provider interventions for prevention for childhood obesity and treatment. The study included 677 primary care clinicians that were actively practicing and was a representative survey of all nonretired AAP members across the United States. The study found that BMI percentage screening was underused in pediatric primary care practices. Most pediatricians reported they believed they could and should prevent childhood obesity or a child becoming overweight. Few pediatricians believed that there were good treatments available once a child was obese. Pediatricians also did not feel prepared to address overweight children but were aware that guidelines and resources were available. Thus, the awareness of national guidelines may improve BMI percentage rates to help prevent childhood and adolescent obesity [5].

A sample of 99 family nurse practitioners (FNPs) and pediatric nurse practitioners (PNPs) from the Intermountain West area participated in a study conducted by Larsen, Mandleco, Williams and Tiedman (2006) [6]. The purpose of the study was to describe the prevention practices of nurse practitioners (NPs) regarding childhood obesity, compare practices of NPs, increase awareness of childhood obesity prevention guidelines, identify relationships between prevention practices and demographic variables, and examine the resources for barriers in implementing interventions in practice. To obtain this information researchers created a questionnaire based on documented risk factors in relation to childhood obesity and prevention guidelines developed by the American Academy of Pediatrics (AAP). This study found that NPs were not consistently using BMI-for-age index screening for childhood obesity. However, results showed that NPs were educating parents how to promote proper nutrition and physical activity habits in their families [6].

A systematic review performed by Thomason, Lukkahatai, Kawi, Connelly and Inouye (2016), [7] evaluated self-management interventions among overweight and

obese adolescents to direct future research and practice in pediatrics. The systematic review indicated that interventions were most successful in establishing positive healthy patterns when incorporating family members. Self-management interventions included a combination of diet, physical activity and behavioral changes with a family component were recommended for better outcomes [7].

Throughout the background search, many of the studies were found to be on the medium to lower levels for the evidence synthesis and appraisal. In pediatrics, it was a common conclusion that providers are good at identifying children that are overweight, at risk or have an increased BMI. However, there is no consistency with follow through, which is a crucial step in prevention of childhood obesity worldwide. This is truly identifying that future research needs to be performed. Studies in primary pediatric care are needed overall on the topic of childhood obesity and ways of prevention. In addition, more quantitative, randomized controlled trials and systematic review studies are also lacking in this area of interest.

The limitations of the body of research surrounds around what was found to be a significant need for studying this area of interest and topic. In existing studies, time was found to be a factor to see full benefits, statistical significant differences, and significant positive outcomes in favor of interventions. All the studies were not a long-term study to see either the positive or negative outcomes with interventions and sustained motivation to see the impact on weight and/or BMI in children. This is something to take into consideration for potential future research needs.

Studies recognized that childhood obesity is a major public health concern worldwide. Healthcare providers in pediatrics are great identifiers of children at risk, but do not always know what to do or feel there are good treatments, once a child is obese. Therefore, it is crucial that this be prevented. Providers are aware there are guidelines and resources available, but do not feel prepared to address this topic with patients and their parents or families [5]. Nurse practitioners were found not consistently using the BMI for age screen for childhood obesity.

However, NPs were comfortable and found to educating parents on promotion of healthy habits in their families [6].

As for children and their families, there is a consensus that they are interested in making positive choices. Children especially are motivated for a healthy lifestyle change, however difficulty sustaining after a few months of interventions. Success is dependent on sustained motivation and outside influences. When combining motivational interviewing and HEAT, positive results were seen [4]. Interventions and self-management are found to be most successful when incorporating family members and support. Self-management that included a combination holistic approach was found to have greater outcomes [7].

Although research has been performed, there is still so much more that needs to be done to tackle and face this topic of childhood obesity head on. Children can be molded into what we want them to be, but we must be positive role models to them in this process of learning and growing. Planting the seed early for behavior modification, as stated earlier holds true and will allow children as they grow to be more adaptable to process of change when necessary. However, starting with behavior modification and healthy lifestyle changes early, is one step closer to the prevention of a major health concern of childhood obesity, for the future. In order to move forward in conquering this pediatric, worldwide, public health concern; pediatric healthcare providers will have to step out of their comfort zones for the future of our children by promoting change in their own practice. It is necessary for the pediatric healthcare world to continue researching to make these positive changes, with continual improvement in each step forward.

Project Purpose, Goals, and Objectives

The purpose of this quality improvement project was to develop a protocol for pediatric providers to encourage practice change to manage and, over time, prevent childhood obesity in children and adolescents identified at risk for obesity.

Methods

This was a quality improvement initiative that emphasized objective measurements of physicians' and advanced practice nurses' knowledge and attitudes before and after an educational session. Chart reviews were used to assess if there was a change in provider practice.

Chart reviews were done to determine provider practices before and after the education on and implementation of an evidenced-based protocol developed from the national guideline, "Algorithm for the Assessment and Management of Childhood Obesity". These guidelines were updated in 2016 based on expert committee recommendations [8].

This project accessed a convenience sample of pediatric primary care providers in one suburban practice in Western New York. IRB approval was obtained, and participants were invited to attend an education session via email. Informed consent was obtained prior to the pre-survey and educational session. The participants were physicians, advanced nurse practitioners and nursing leadership that consisted of registered nurses and a licensed practical nurse.

The participants were asked to take a researcher developed pre-survey prior to the educational session. The adapted knowledge questions for the pre-survey were based on the CDC's 2016, Childhood Obesity Facts and the AAP Institute for Healthy Childhood Weight 2016, Algorithm for the Assessment and Management of Childhood Obesity in Patients 2 Years and Older [8]. The pre-survey included demographic questions and a 16-question survey measuring knowledge, attitudes, barriers and current practice around treatment and prevention of obesity in children ages 2 to 17 years of age. A Likert scale was using strongly agree to strongly disagree and extremely comfortable to extremely uncomfortable. The educational session took place at a scheduled monthly morning provider meeting.

At the educational session, each participant received a folder that consisted of a copy of the researcher developed protocol, a compiled local nutritionist list for referrals, education resource materials for patients and parents, and billing and coding information that would relate to initial and follow up visits.

The 1-hour education session provided information about the topic of childhood obesity. It consisted of a brief overview on childhood obesity to update providers' knowledge, a needs assessment in the practice and a literature review. A needs assessment was completed by asking the providers and the managing practice physician questions regarding what health concerns in children within the practice needed to be focused on. Providers were educated on the AAP Institute for Healthy Childhood Weight 2016, Algorithm for the Assessment and Management of Childhood Obesity in Patients 2 Years and Older; followed by an in-depth review of the developed protocol that was being implemented for a step-by-step plan of care. Handouts and resources for patients and parents were provided and reviewed. The session included an overview of the electronic medical record (EMR) template that was developed by the researcher and one of the physicians in the practice for follow up visits. In addition, a local registered dietician attended to assist with nutrition education, nutrition review, resources available for providers and patients, and when a patient should be referred for further assessment and guidance.

The 1-month, 3-month and 6-month post-test/surveys were 11-questions measuring knowledge, attitudes, barriers and current practice around treatment and prevention of obesity in children ages 2 to 17 years of age. The adapted knowledge questions for the post-surveys were also based on the CDC's 2016, Childhood Obesity Facts and the AAP Institute for Healthy Childhood Weight 2016, Algorithm for the Assessment and Management of Childhood Obesity in Patients 2 Years and Older [8]. The questions that focused on attitudes and barriers were utilized with written permission from Dr. Reulaz (2007) [9] based on her research on perceived barriers to weight management in primary care from the provider's perspective [9]. The post-surveys were distributed on predetermined dates using Qualtrics software.

The post-surveys compared whether the knowledge from the educational session was retained and whether the protocol was implemented and if there were any barriers in the provider's current practice in relation to

children overweight or obese. The pre- and post-surveys were analyzed using descriptive statistics.

A progress note template was designed and linked to the EMR for ease of transition into this practice change and provider documentation. The template included the following information: chief complaint (CC), history of present illness (HPI), review of family history, vital signs (auto-populated within the progress note), assessment documentation, anticipatory check list for documentation, referral to nutrition, plan and follow up, and lab template for ease of ordering when meeting criteria. The researcher consulted with the practice's informaticist, a physician within the practice, to assist with creating this template in the EMR.

Retrospective chart reviews were completed by the researcher three-months after the protocol was implemented to identify the patients that met the criteria for being overweight or obese. The patients' biometrics were compared pre- and post-protocol implementation to monitor providers' change in practice, or if there was no change at all. This was a practice-wide change, therefore, all patients that met the criteria from implementation of the protocol in the office were reviewed pre- and post-implementation of the protocol. Chart reviews were performed using a researcher developed audit tool. Providers and patients were deidentified by randomly assigned numbers in the EMR system ensuring anonymity.

Height and weight were collected at each visit and then the EMR system's Centers for Disease Control (CDC) imbedded BMI and BMI percentile calculation curve were calculated automatically. Vital signs that included blood pressure and heart rate were supposed to be collected as they were standard of care and part of the protocol; however, heart rate was either not documented or not obtained at the patient visit. Other data collected were descriptive and anthropometric data of the children identified as overweight or obese including the following:

- Did the provider implement the AAP Institute for Healthy Childhood Weight 2016, Algorithm for the Assessment and Management of Childhood Obesity in Patients 2 Years and Older, protocol?

- o Children 2 years to 17 years of age, identified at their well visits
- Was there family involvement in behavioral modification?
- Was there a maintenance or decrease in the child's weight?
- Was there a decrease in the child's BMI percentile?
- Were the child's vital signs: BP and HR within normal range for age?
- Was lab screening obtained for those identified obese, BMI > 95th percentile: fasting glucose, HgBA1C, fasting lipid profile, ALT and AST, Vitamin D and fasting insulin?
- Was a plan of care with follow up established?
- o Setting small achievable goals
- o Schedule follow up appointment, according what stage in the algorithm the patient was at
- Was there a referral to nutritional services, when the child met the BMI of 85th percentile or above?

RESULTS

Pre- and post-survey data was analyzed using Qualtrics software (n= 14). There was a 28 percent response rate for the pre-surveys (n= 4). The post-survey response rate was 7 percent at the 1-month interval (n= 1) and a zero percent response at the 3-month and 6-month intervals (n= 0). Due to the poor response rate, the nominal, descriptive, mean, median, and mode data was not compiled.

The retrospective chart reviews were completed to identify demographics in children, as well as, after the protocol was implemented to determine if there were any changes, especially in BMI percentile. These chart reviews consisted of 350 children and adolescents ages 2 to 17 years of age, from October 2017 to January 2018. In this 3-month period, 40 percent of the time the protocol was partially implemented, and 60 percent it was not.

In Statistical Package for the Social Sciences (SPSS) software, a paired sample t-test was chosen and fit this data analysis the best, due to comparing the difference between two sets of observations. Looking at the individual variables

from the chart reviews, a trend was observed in a significant increase in weight of children ages 18 months to 5 years. Prior to 2 years of age, providers monitor height, weight, and head circumference, but not BMI percentile according to the national guidelines. Once a child becomes 2 years of age, monitoring of the BMI percentile begins. A paired samples t-test for ages 18 months to 5 years of age, post protocol implementation was statistically significant for BMI percentile, BMI, weight, and systolic blood pressure (SBP), except for diastolic blood pressure (DBP). Blood pressure is not measured in children until 3 years of age, unless a child has a renal or cardiac history. A paired samples t-test showed a significant increase from pre-protocol BMI percentile (m= 84.12, SD= 17.66) to post-protocol BMI percentile (m= 92.37, SD= 5.08) (t= -3.490, p= <0.05).

A paired samples t-test for ages 2 to 17 years of age from pre-protocol BMI percentile (m= 90.87, SD= 8.73) to post-protocol BMI percentile (m= 92.98, SD= 8.03) (t= -4.038, p= <0.05) showed statistical significance. All the individual variables from the chart reviews were statistically and clinically significant, as evidenced by an increase in all groups: BMI percentile, BMI, weight, SBP and DBP.

When analyzing whether the protocol was implemented by providers, looking at the variables yes or no and pre- and post-protocol BMI percentile; a paired samples t-test in children 2 to 17 years of age, showed a significant increase in pre-BMI percentile (m=90.18, SD= 8.48) to post-BMI percentile (m= 91.86, SD= 9.58) (t= -2.11, p <0.05) for patients who were not placed on any type of follow up care plan. For patients with the protocol implemented, a paired t-test showed a significant increase in pre-BMI percentile (m=91.84, SD= 9.00) to post-BMI percentile (m= 94.54, SD= 4.81) (t= -4.71, p <0.05).

DISCUSSION

At each patient's visit, pediatric primary care providers obtained height, weight, and blood pressure measurements. The EMR system's Centers of Disease Control (CDC) imbedded calculation curve automatically calculated BMI percentile on the child's growth curve. Heart

rate was asked as part of the implemented protocol to be obtained; however, there was no data noted in any patient's biometric; therefore, it was either not done or documented. The possible reasoning behind this, may be that prior to this protocol, heart rate was not a routine biometric performed on children and adolescents at visits, unless a child was coming in for chief complaints related to respiratory, cardiac, or neurological concerns.

Of the forty percent of providers that implemented the protocol most of the time it is was only partially implemented. There were no follow up appointments scheduled, although recommended to patients and parents. Lab work was ordered but not on a consistent basis with no documentation as to why they were or were not ordered. In some circumstances, the lab work was ordered; however, was documented as the parent declined or not completed by the patient. The nutrition and healthy lifestyle handout was always printed and handed to parents consistently and documented. The nutritionist list and referrals were completed and documented; however, there were no notes in the record that these appointments took place.

Despite the developed protocol being implemented into 40 percent of the provider's practice, there were many elements noted that were not initiated, followed, or followed through. The results of this project found that providers may be resistant to using a protocol and the reasons for this barrier is crucial and a contributing factor in the problem of childhood obesity. In addition, this could be possible reason as to why, in this project, findings showed a statistically significant increase in BMI percentile, verses a decrease. Other reasons that need to be taken into consideration was the limited time frame of the project and that a 3-month interval was not a long enough amount of time to see changes in children and adolescent's biometrics, especially BMI percentile.

The intent of this project was to promote health for children and give a foundation to a pediatric primary care setting to improve care of overweight and obese children and adolescents. Strengths of this project were that it focused on providing positive reinforcement and resources not only to pediatric primary care providers;

but also, to patients and families to promote healthy lifestyle changes. These healthy lifestyle changes include encouragement of family mealtimes, healthy eating habits by balancing intake, transitioning to fat free milk if not already done, proper sleep hygiene, increased active play, decreased screen time, increased water intake and no sugar containing drinks. It supported what the current research and literature already shows, that pediatric providers need to continue working on addressing this public health concern. Pediatric primary care providers, parents and children need to acknowledge and address the problem of childhood obesity.

There were limitations to this project that would require changes for proceeding in the future. Pediatric primary care providers were unable to attend the first or consecutive educational sessions scheduled; therefore, this was not a practice-wide quality improvement initiative in care as identified in the practice needs assessment. The practice experienced a very busy illness season due to the flu. During the study timeframe, holidays, school vacations and provider vacations fell, leading to a significant number of providers being out of the office. Holding focus groups and investigating continuing medical education (CME) credits for pediatric providers to earn would be strategies to increase participation. Sustainability is difficult to predict with limited data beyond the 3-month interval of this project; therefore, proceeding with this project in the future would benefit from a longer study time interval concentrating on a more defined age group of children. Focusing on children 18 months to 5 years of age who were trending to have the most significant increase in BMI percentile, as noted in this project, would be important for further study. Planting the seed and encouraging healthy behaviors early in this age group by educating parents is crucial in setting a healthy pathway for each child's health into their future.

CONCLUSION

This quality improvement project provided a protocol for pediatric providers to change practice to manage and, over time, prevent childhood obesity in



children and adolescents identified at risk for or being obese. Due to various limitations, not all pediatric primary care providers participated revealing barriers to practice change. Moving forward, addressing the barriers may have an impact on provider's being willing to change and make an impact on childhood obesity. Providers need to continue working on the comfort of their conversations about childhood obesity, educating parents, and demonstrating living a healthy lifestyle by being positive role models, and following up and following through with at risk children.

This project promotes changes in pediatric practice and the potential of improving overall health in children around the world. It is a step towards transforming the approach and the follow through in pediatrics, and a necessary change on the organizational level in the prevention of childhood obesity. Implementation of this will impact the health, resulting in a potential profound change in children and adolescent's lives long-term in the prevention of childhood obesity. It sets the foundation to continue building and reaching for improved health outcomes on all levels, including organizational levels. This will not only improve patient health outcomes, but also health policy changes, which is much needed in the prevention of childhood obesity. In turn, this will give sustainability, great insight and make noteworthy changes in the pediatric world. Most of all it will directly make positive changes in the healthcare of children and adolescents presently and for their future. Indirectly it will make positive changes in families and communities all around the world, something we all want for today, tomorrow and into the continual future for our children all around the world.

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