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An Evaluation of the Screening and Management of Childhood Overweight and Obesity in the Primary Care Setting

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Final DNP Project Report

An Evaluation of the Screening and Management of Childhood Overweight and Obesity in the
Primary Care Setting

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Fall 2016

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Dedication

I dedicate this work to Matthew and Moxie. Matthew, thank you for your unwavering support and talking me off the ledge time and time again. Moxie, remember how we measured time in the beginning to know when this would be over? Well, you're eight years old and it's almost Christmas. Momma's done with school now! I also dedicate this to my best friend Laura. I'm so glad that we were able to take this journey together.

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Abstract

Background: Worldwide, the World Health Organization (2016) estimates that forty-two million children from two to five years of age are overweight or obese. In the United States, Kentucky ranks sixth for the highest rate of overweight youth in the nation (Partnership for Fit Kentucky, 2009). The long term consequences of overweight and obesity are early onset of adult chronic diseases as well as social and psychological issues in childhood and adulthood.

Purpose: The objective of this gap analysis was to assess BMI screening and weight management of children ages two to five who presented for a well-child check (WCC). A primary care office associated with a large medical center was used for this analysis.

Methods: Utilizing a retrospective medical review, the screening and management of childhood overweight and obesity in the two to five year age range was reviewed. This included if a diagnosis was made for a BMI above the 85th percentile. The review included if an assessment and management plan were present for elevated BMI percentile.

Results: Approximately 97% had a current documented BMI percentile. None had a weight diagnosis classification for weight status. No documentation was made for the majority of risk factors, nor any recommendations on specific dietary changes and/or physical activity. Only 6.1% were recommended to follow-up sooner than the next WCC and no follow-up appointments were attended. BMI percentiles increased between WCC.

Conclusion: Although providers did exceptionally well with screening using BMI percentile, there were many missed opportunities for weight management. The electronic medical record can be used to increase adherence to current guideline recommendations for better patient outcomes.

Keywords: overweight, obesity, childhood, BMI percentile, screening, management

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Introduction

Despite public attempts at raising health awareness, the prevalence of overweight (BMI > 85th percentile) and obesity (BMI > 95th percentile) in children has become alarmingly common. Although the prevalence of obesity for preschool children decreased from 13.9% to 8.4%, obesity is still a serious health challenge. In Kentucky, approximately 16.0% of preschool children are considered overweight and 15.6% are obese (Centers for Disease Control and Prevention, 2010). These figures underscore the importance of primary prevention and early identification to prevent unhealthy weight gain and the difficulties that ensue. Although the primary care setting seems well suited to create an impact, current literature suggests that providers may not be adequately addressing childhood overweight and obesity (Kentucky Cabinet for Health and Family Services, 2015; Rausch, Perito, & Hametz, 2011). This gap analysis was conducted to gain a better understanding of how overweight and obese children are being screened and managed within the primary care setting.

Background

Worldwide, the World Health Organization (2014) estimates that forty-two million children from two to five years of age are overweight or obese. At this rate, it is expected that childhood overweight and obesity could reach a staggering seventy million by 2025. In the United States, Kentucky ranks sixth for the highest rate of overweight youth in the nation (Partnership for Fit Kentucky, 2009).

The negative effects of childhood overweight and obesity are well-known. More children are presenting with health conditions that until now, were commonly associated with adults such as hypertension, high cholesterol, pre-diabetes, and musculoskeletal problems (Centers for Disease Control and Prevention, 2015). According to Kalra, De Sousa, Sonavane, and Shah

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(2012), being overweight or obese as a child can also have a negative impact on mental health. In fact, many children experience teasing and isolation from others, increasing the risk for psychosocial harm.

Unfortunately, obesity is not a problem that all children outgrow. Approximately half of all children that are overweight or obese before puberty, become overweight adults (Rabbitt & Coyne, 2012). Being overweight or obese contributes to health conditions such as cardiovascular disease, stroke, diabetes, cancer, and depression, leading to costly healthcare utilization, diminished worker productivity, and premature death (Hammond & Levine, 2010; (Rabbitt & Coyne). This is especially concerning for the future considering that today's obese children will more than likely become tomorrow's obese and chronically ill adults further burdening the healthcare system (Wang, Chyen, Lee, & Lowry, 2008).

Childhood overweight and obesity are multifactorial, with genetics playing a strong role. Genetic association studies on families and twins revealed a genetic variant or inheritability of up to 70 percent (Lyon & Hirschhorn, 2005). Although not well understood, these genetic variations are thought to influence the amount of stored adipose tissue and body weight that may affect an individual's risk for obesity (Garver et al., 2013). The interaction of this genetic component with certain environmental and behavioral factors such as a high-fat diet, sugar-sweetened beverages, and decreased physical activity predisposes children to unhealthy weight gain (Garver et al.).

Promoting healthy nutrition early on is important in preventing childhood overweight and obesity. The World Health Organization (2016) encourages the high intake of fruits and vegetables, as well as legumes, whole-grains and nuts, while limiting the intake of fats and

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sugars. Lifetime eating habits are established early in childhood and it is at this time point that parents have considerable control over what their child eats and does.

Establishing healthy feeding patterns in infancy is essential as well. The American Academy of Pediatrics (2016) supports exclusively breastfeeding for at least six months from birth. This can reduce the risk for childhood obesity because it helps stop the early introduction of solid foods that could lead to unhealthy weight gain (American Academy of Pediatrics, 2016; World Health Organization, 2014). Further, it may offer other protective measures against childhood obesity. For example, infants learn to regulate their own intake based on hunger cues rather than finishing a bottle. Studies also suggest that formula-fed infants take in more energy and protein, leading to greater insulin production. Higher insulin levels lead to the early production of adipocytes and weight gain (World Health Organization, 2014).

In general, obesity has been associated with poor eating habits and a downward trend for physical activity (DeBate, Zhang, & Thompson, 2007; Sahoo et al., 2015). According to Bishop, Middendorf, Babin, and Tilson (2005), children spend more time indoors with interactive media or “screen time” instead of playing outside. The researchers also found that children are spending 25 percent of their day watching television and those that watch more television had the highest prevalence of obesity. Further, an adequate amount of sleep in young children is important to consider when determining health and risk for obesity. Children who sleep less have an increased risk of overweight and obesity (Fitch et al., 2013).

Therefore, although genetics can predispose individuals to obesity, consideration must be given to environmental and behavioral factors as they too affect weight (Sahoo et al., 2015). It is important to assess for medical and behavioral risks at all WCC. This should include familial obesity, nutrition, physical activity, screen time, and sleep (Fitch et al., 2013). Parents strongly

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influence the home environment as role models with healthy or unhealthy habits and are a pivotal piece to intervention.

Several guidelines have been developed that encourage providers to screen for overweight and obesity risk using the BMI percentile (Fitch et al., 2013). The BMI, which measures weight relative to height, should be calculated and then plotted to determine percentile at each WCC (Fitch et al.; Kentucky Cabinet for Health Services, 2015). Regularly assessing and recording the BMI percentile is necessary for tracking changes because it presents the opportunity for early detection and intervention.

The healthcare guideline: Prevention and Management of Obesity for Children and Adolescents from the Institute for Clinical Systems Improvement (ICSI) provides evidence-based recommendations for providers. The focus is on a multi-disciplinary approach. Family collaboration for improved patient outcomes is also strongly recommended (Fitch et al., 2013).

A number of strategies are available for management purposes. Those most successful incorporate the family. The underlying factor is to engage parents in making meals nutritionally sound, recognizing that they are the key to establishing and promoting healthy habits at home. West, Sanders, Cleghorn, and Davies (2010), studied the effect of parent-centered interventions to advocate lifestyle changes for weight management and found an improvement in treatment outcomes when parents were involved.

There are several programs that could be implemented within a primary care practice. The 5210 Let's Go! is a nationally recognized childhood obesity prevention program aimed at increasing healthy eating and physical activity. It encourages parents and their children to regularly consume five fruits and vegetables, limit recreational screen time to no more than two hours, engage in one or more hours of physical activity, and avoid sugar-sweetened beverages

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(Maine Center for Public Health, n.d). Intrinsic to the program is the use of motivational interviewing wherein providers and parents help to incorporate all or some of the recommendations. This program also recognizes that although parents are instrumental, it takes a collaborative effort by the community to advocate and sustain health awareness changes (Rogers et al., 2013).

The Healthy Active Living for Families: Right From the Start (HALF) program can also be used to meet provider and parent needs in preventing childhood overweight and obesity. This unique program is well received as it combines parents' perspectives about early obesity prevention with evidence-based health guidance. Focus groups revealed that, overall, parents preferred realistic strategies and individualized information that was easy to understand. This program also provides interactive tools and resources for both providers and parents to help improve communication related to obesity prevention (American Academy of Pediatrics, 2016).

Purpose

This gap analysis was conducted at a primary care office associated with a large medical center from January 2012 to December 2015. This suburbanly located primary care office has five family prepared providers (four medical doctors and one nurse practitioner). Interest was expressed by the providers in helping to understand how childhood overweight and obesity was being managed in their clinic.

Therefore, a gap analysis was designed to assess BMI screening and weight management of children ages two to five who presented for a WCC at the primary care office. The gap analysis consisted of an in-depth electronic medical record review. The most recent BMI percentile was compared to the recorded BMI percentile of a previous WCC. For two-year olds, the height/weight graph from a previous WCC was used for comparison.

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The following questions were addressed in the review:

1. What percentage of children had a BMI percentile calculated?
2. If the BMI percentile was calculated above the 85th percentile, what percentage of children had a diagnosis of “Overweight” assigned as a problem, or if the BMI percentile was calculated above the 95th percentile, what percentage of children had a diagnosis of “Obesity” assigned as a problem?
3. If a diagnosis was or was not assigned to the weight problem, was weight discussed as part of a management plan? What resources were utilized to aid in management? Was a plan for a follow-up established and did the follow-up occur?
4. What assessments of overweight or obesity risk factors were reviewed to assist in developing an individualized plan, including familial obesity-specific history, consumption of sugar-sweetened beverages, fruit and vegetables, amount of daily screen time, amount of sleep, and amount of daily physical activity?
5. How did the BMI percentile compare to the BMI percentile from a previous WCC?
6. What percentage of those with an elevated BMI percentile at age two, where records are available, were either breast-fed or formula fed, and at what age were solid foods introduced?

Methods

Design

This nonexperimental descriptive study design utilized a retrospective electronic medical record review. The screening and management for childhood overweight and obesity was assessed for those in the two to five year age range. Patient data that were obtained included: the child’s BMI history, familial risk factors, demographic data, and treatment approaches.

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Examining social demographic factors such as primary caregiver, type of medical insurance, primary language, ethnicity, and infancy feeding practices for those two years of age was essential for a more robust gap analysis.

Data were collected from the most recent and previous WCC. The data for the two-year old WCC, were retrospectively examined to identify if child was breastfed versus formula-fed and to identify the age of introduction of solid foods, where available. The electronic medical record (EMR) was available from 2012 forward.

Approval Procedures

Data collection began following University of Kentucky Institutional Review Board (IRB) and Norton Healthcare Office of Research Administration (NHORA) approval. No identifying information was obtained from patient records or reported in the gap analysis results. Only the PI of the project and the Project Chair, had access to the data collected from the EMR. A waiver of informed consent was requested because this study used existing patient records.

Study Procedures

A total of 157 WCC for children between the ages of two to five met the inclusion criteria of having a WCC within the study period. From that initial list, 33 patients were identified whose BMI was above the 85th percentile and were included in the medical record review. Exclusion criteria were elevated BMIs at episodic visits, developmental disorder, and/or any child diagnosed with Down's Syndrome or Autism. Every eligible patient was assigned a study number.

A cross-walk table of the study numbers and their correlated medical record numbers were kept in a separate spreadsheet not available to anyone other than the PI. It was kept in a

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personal password protected computer. The PI conducted the electronic medical record review in a private workroom within a Norton Healthcare facility.

Data Collection

The spreadsheet was utilized for data collection. Each record was examined for a BMI percentile at two consecutive visits. Data were collected to include family risk factors, current assessment of dietary and physical activity, and if there was documentation of a plan that addressed the weight issue. The study time frame was between January 2012 to December 2015.

Data Analysis

The data were analyzed using IBM SPSS Statistics version 24. Statistical analysis involved descriptive statistics with frequency distribution, mean, and standard deviations to summarize study variables. A paired *t*-test with an alpha level of 0.05 was used to compare changes in BMI percentile. Data collected from the review were analyzed in the aggregate.

Results

Sample Characteristics

There were 157 WCC during the study time frame of which 33 met the inclusion criteria. The patient age range was three to five with a mean of 4.21 years. The sample included 45.5% males with 81.9% being Caucasian. English was the primary language for all patients. The majority of the sample had private insurance, 9.1% had Medicaid, and 3% had no insurance documented. Social setting demographics were unable to be evaluated due to lack of documentation in the EMR.

Screening and Diagnosis

Approximately 97% had a current documented BMI percentile within the vital sign section of the EMR. For this sample, the average BMI percentile was 92.06% where 72.7% were

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overweight and 27.3% were obese. None had a weight diagnosis classification for weight status (see Table 1). Results from a paired *t*-test indicated a significant increase in BMI percentile compared to a previous WCC ($p=.013$; see Table 5).

History Evaluation and Nutritional Assessment

There was no documentation of family risk factors for the majority of the sample. Table 2 is a representation of family risk factors that were assessed. Only hypertension and diabetes was reported in nine percent of the sample.

Included in the review was provider assessment of dietary habits and behavioral risk factors as displayed in Table 3. Based upon the limited narrative, it appeared that 72.7% consumed less than five servings of daily fruits and vegetables and 3% consumed five or more. In 24.2% of the sample the provider made a general notation of the parent reporting a well-balanced diet. Regarding sugar-sweetened beverages, 93.9% consumed more than or equal to one serving daily. In this sample, sleep was reported by 69.7% as having eight hours or more per night. Data regarding documentation of physical activity and screen time were missing 81.8% and 93.9%, respectively.

Management and Treatment Approaches

This sample was reviewed to evaluate management and treatment approaches. Approaches that were assessed included increasing fruits and vegetables, physical activity, and sleep, while limiting sugar-sweetened beverages and screen time. Recommendations on dietary changes and physical activity were general and non-specific. Only 12.1% of the sample were recommended to increase fruits and vegetables. Three percent were advised to limit sugar-sweetened beverages and 6.1% were advised to increase physical activity. There were no documented management recommendations noted for sleep or screen time.

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With regard to treatment approaches, printed handouts and counseling were frequently used by providers 72.7% and 87.9%, respectively. Providers discussed dietary 81.8% of the time, and physical activity 66.7%. No referrals for weight management or dietician were provided. Only 6.1% were recommended to follow-up sooner than next WCC and no follow-up appointments were attended.

Discussion

This gap analysis provided insight for how overweight and obese children were being screened and managed in the primary care setting. At this practice, the rates of BMI screening were very high, due to the electronic medical record which automatically calculated and plotted the percentile. However, despite the relatively high number of overweight and obese children, none had a formal weight diagnosis recognizing the problem. This is not an unusual finding. Previous research shows that overweight and obesity remains underdiagnosed in young children within the outpatient setting (Patel et al., 2010).

This study did not assess provider insight so it is unclear why providers failed to diagnose and initiate treatment. Providers should not only screen using BMI percentile, but also formally diagnose those identified as overweight or obese to ensure proper management and treatment (Fitch et al., 2013; Kentucky Cabinet for Health Services, 2015). Those identified as overweight or obese should also be monitored to track ongoing progress and follow-up. Having providers initiate conversation with parents is difficult, yet ever important. According to Etelson, Brand, Patrick, and Shirali (2003), initiating conversation can be problematic for providers especially since parents do not typically perceive a weight problem in their child.

In this gap analysis, there was little documentation on the patient assessment of dietary and physical activity habits. Nor were family risk factors evaluated; yet in the management plan,

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the majority had documentation that nutrition and physical activity was discussed. The discussion was not in-depth, but presented a more general approach to consuming a healthy diet and becoming more physically active. In this clinic there is no standardized format in the EMR for a WCC. It is left to the individual provider to design their own template. This most likely contributed to provider inconsistency in addressing the problem.

Despite recommendations, research shows that providers may have a defeatist attitude regarding the success of counseling and obesity interventions (Silberberg et al., 2012; Walker et al., 2007). Reported barriers include insufficient time for counseling on weight issues, lack of knowledge regarding available community resources (e.g., dietician, weight management services), and low comfort level with counseling families (Rausch, Perito & Hametz, 2011; Vine, Hargreaves, Briefel, & Orfield, 2013). It is possible that providers have conflicting thoughts on weight management and are reluctant to diagnose or label a child as overweight or obese for fear of attaching a stigma.

Clinician inertia and frustration contributes to lack of management and opportunities are often missed when barriers are perceived (Aujoulat et al., 2014). Interestingly, the one significant statistical finding was that the weight did increase between the two data points. Coupling this with the lack of documentation about weight only emphasizes the need to recognize a problem that does not go away. Early prevention and intervention is ever-importance as studies show that the incidence of overweight and obesity starts early in childhood and continues to increase with subsequent visits (Cunningham, Kramer, & Narayam, 2014).

In addition to supporting the maintenance of their patients' health and safety, primary care providers are burdened with addressing multiple social issues such as anti-vaccination, behavioral problems, child abuse, and socioeconomic constraints. The growing demands that

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providers face further emphasize the need for a formal, user-friendly EMR program that facilitates consistent screening and documentation of overweight and obesity. As they are, WCC are “quite variable, and the needs of many children and parents are not being met” (Schor, 2004, p. 215).

Limitations

The study was a retrospective medical record review which has its limitations. Due to the recent transition from paper to electronic medical record, some records were unavailable. This may explain why records were minimal for patients age two. There were differences noted between providers in the degree of information that was recorded. Much of the information was retrieved from narrative notes in the medical record, leaving room for inconsistency and interpretation bias. Generalizability of the study’s findings is limited due to the small sample size, lack of diversity, and lack of provider and parent insight.

Recommendations

Future recommendations should focus on provider facilitation of screening and management of childhood overweight and obesity. Interventions using the EMR should integrate provider notifications or “Best Practice” advisories for patients with elevated BMI percentiles. This tool would alert providers and prompt discussion with families.

Increasing conversations between providers and families may improve management and quality of care, leading to better patient outcomes. Adapting an electronic version of the 5210 program would standardize screening and give providers an avenue for discussing healthy habits during each WCC. It is important that providers, not only impart education, but individualize recommendations that emphasize family involvement.

Follow-up care is an essential piece to managing overweight and obesity in children. Families need continued counseling, support and education on their journey toward healthy

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habits. Having a structured follow-up plan to monitor dietary and behavioral progress allows providers and families to continually evaluate treatment.

Conclusion

The purpose of this gap analysis was to gain a better understanding for how overweight and obese children were being screened and managed in the primary care setting. Although primary care providers are uniquely positioned to detect early overweight and obesity, there were many missed opportunities for weight management at this site. Providers need tools that will help them create meaningful conversation around healthy eating and physical activity. The EMR can be used to standardize screening and management and increase adherence to current guideline recommendations for better patient outcomes.

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References

- American Academy of Pediatrics (AAP). (2016). Institute for healthy childhood weight. Healthy active living for families (HALF) program. Retrieved from <https://ihcw.aap.org/programs/healthforfamilies/Pages/default.aspx>
- Aujoulat, I., Jacquemin, P., Rietzschel, E., Scheen, A., Tréfois, P., Wens, J., Darras, E., & Hermans, M. (2014). Factors associated with clinical inertia: an integrative review. *Advances in Medical Education and Practices*. May, 2014(5), 141-147. doi: 10.2147/AMEP.S59022. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4028485/>
- Bishop, J., Middendorf, R., Babin, T., & Tilson, T. (2005). U.S. Department of health & human services. ASPE research brief. Childhood obesity. Retrieved from <https://aspe.hhs.gov/basic-report/aspe-childhood-obesity-white-paper>
- Centers for Disease Control and Prevention (CDC). (2010). CDC: Growth charts, U.S. Retrieved from <http://www.cdc.gov/growthcharts/background.htm>
- Centers for Disease Control and Prevention (CDC). (2011). CDC: Safer healthier people. Using the BMI-for-age growth charts. Retrieved from <http://www.cdc.gov/nccdphp/dnpa/growthcharts/training/modules/module1/text/module1print.pdf>
- Centers for Disease Control and Prevention (CDC). (2015). CDC: Childhood obesity causes and consequences. Retrieved from <https://www.cdc.gov/obesity/childhood/causes.html>
- Cunningham, S., Kramer, M., & Narayan, K. (2014). Incidence of childhood obesity in the united states. *The New England Journal of Medicine*. 2014(370), 403-411. Retrieved from <http://www.nejm.org/doi/full/10.1056/NEJMoa1309753#t=article>
- DeBate, R., Zhang, Y., & Thompson, H. (2007). Changes in commitment to physical activity among 8-11 year-old girls participating in a curriculum-based running program. *American Journal of Health Education*, Sept/Oct, 38(5), 276-283.

EVALUATION OF SCREENING AND MANAGEMENT

- Etelson, D., Brand, D., Patrick, P., & Shirali, A. (2003). Childhood obesity: Do parents recognize this health risk? *Obesity*, 11(11), 1362-1368. Retrieved from <http://onlinelibrary.wiley.com/doi/10.1038/oby.2003.184/full>
- Fitch, A., Fox, C., Bauerly, K., Gross, A., Heim, C., Judge-Dietz, J., Kaufman, T., Krych, E., Kumar, S., Landin, D., Larson, J., Leslie, D., Martens, N., Monaghan-Beery, N., Newell, T., O'Connor, P., Spaniol, A., Thomas, A., & Webb, B. (2013). *Prevention and management of obesity for children and adolescents*. Institute for Clinical Systems Improvement. Retrieved from https://www.icsi.org/_asset/tn5cd5/obesitychildhood.pdf
- Garver, W., Newman, S., Gonzales-Pacheco, D., Castillo, J., Jelinek, D., Heidenreich, R., & Orlando, R. (2013). The genetics of childhood obesity and interaction with dietary macronutrients. *Genes & Nutrition*, 8(3), 271-287. Retrieved from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3639324/>
- Hammond, R. & Levine, R. (2010). The economic impact of obesity in the United States. *Journal of Diabetes, Metabolic Syndrome and Obesity: Targets and Therapy*, 2010(3), 285-295. doi: 10.2147/DMSOTT.S7384. Retrieved from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3047996/>
- Kalra, G., DeSousa, A., Sonavane, S., & Shah, N. (2012). Psychological issues in pediatric obesity. *Industrial Psychiatry Journal*, 21(1), 11-17. doi: 10.4103/0972-6748.110941. Retrieved from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3678172/>
- Kentucky Cabinet for Health and Family Services. Commonwealth of Kentucky Department for Medicaid Services Division of Program Quality and Outcomes. (2015). *Assessment, prevention and treatment of child and adolescent overweight and obesity among the kentucky medicaid managed care population clinical focus study 2015*. Retrieved from http://chfs.ky.gov/NR/rdonlyres/7C06FCAA-469E-4358-9E56-D64A483927D3/0/KYObesityReport_Final_09_02_15.pdf
- Lyon, H. & Hirschhorn, J. (2005). Genetics of common forms of obesity: A brief overview. *The American Journal of Clinical Nutrition*, 82(1), 2155-2175. Retrieved from

EVALUATION OF SCREENING AND MANAGEMENT

<http://ajcn.nutrition.org/content/82/1/215S.full>

Maine Center for Public Health. (n.d.). 5210: Let's go. Retrieved from <http://www.lets-go.org/>

Partnership for a Fit Kentucky. (2009). Shaping Kentucky's future: Policies to reduce obesity.

Retrieved from

<http://www.csg.org/knowledgecenter/docs/Partnership%20policy%20document.pdf>

Patel, A., Madsen, K., Maselli, J., Cabana, M., Stafford, R., & Hersh, A. (2010). Underdiagnosis

of pediatric obesity during outpatient preventive care visits. *Academic Pediatrics*. 10(6),

405-409. Retrieved from [https://www-clinicalkey-](https://www-clinicalkey-com.ezproxy.uky.edu/#!/content/playContent/1-s2.0-S1876285910002536?returnurl=null&referrer=null)

[com.ezproxy.uky.edu/#!/content/playContent/1-s2.0-](https://www-clinicalkey-com.ezproxy.uky.edu/#!/content/playContent/1-s2.0-S1876285910002536?returnurl=null&referrer=null)

[S1876285910002536?returnurl=null&referrer=null](https://www-clinicalkey-com.ezproxy.uky.edu/#!/content/playContent/1-s2.0-S1876285910002536?returnurl=null&referrer=null)

Rabbitt, A. & Coyne, I. (2012). Childhood obesity: Nurses' role in addressing the epidemic.

British Journal of Nursing, 21(12), 731-735.

Rausch, E., Perito, E., & Hametz, P. (2011). Obesity prevention, screening, and treatment:

Practices of pediatric providers since the 2007 expert committee recommendations.

Clinical Practices, 50(5), 434-441.

Rogers, V., Hart, P., Motyka, E., Rines, E, Vine, J. & Deatrck, D. (2013). Impact of let's go! 5-

2-1-0: A community-based, multisetting child obesity prevention program. *Journal of Pediatric Psychology*. 1-11. Retrieved from

<http://jpepsy.oxfordjournals.org/content/early/2013/08/10/jpepsy.jst057.full.pdf+html>

Sahoo, K., Sahoo, B., Choudhury, A., Sofi, N., Kumar, R., & Bhadoria, A. (2015).

Childhood obesity: Causes and consequences. *Journal of Family Medicine and Primary Care*, 4(2), 187-192. doi: 10.4103/2249-4863.154628. Retrieved from

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4408699/>

Schor, E. (2004). Rethinking well-child care. *American Academy of Pediatrics*. 114(1), 210-216.

Retrieved from

[http://web.b.ebscohost.com.ezproxy.uky.edu/ehost/pdfviewer/pdfviewer?sid=88ce6b11-](http://web.b.ebscohost.com.ezproxy.uky.edu/ehost/pdfviewer/pdfviewer?sid=88ce6b11-2184-4833-86fc-174afe074f3c%40sessionmgr120&vid=2&hid=116)

[2184-4833-86fc-174afe074f3c%40sessionmgr120&vid=2&hid=116](http://web.b.ebscohost.com.ezproxy.uky.edu/ehost/pdfviewer/pdfviewer?sid=88ce6b11-2184-4833-86fc-174afe074f3c%40sessionmgr120&vid=2&hid=116)

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- Silberberg, M., Carter-Edwards, L., Murphy, G., Mayhew, M., Kolasa, K., Perrin, E., Armstrong, S., Graham, S., & Menon, N. (2012). Treating pediatric obesity in the primary care setting to prevent chronic disease: Perceptions and knowledge of providers and staff. *North Carolina Medical Journal*. 73(1), 9-14. Retrieved from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3368341/>
- Tyler, J., Fruh, S., Mulekar, M., Smith, E., & Rice, K. (2014). Pediatric obesity screening and prevention strategies. *Journal of Continuing Education in Nursing*. 45(5), 199-200.
- Vine, M., Hargreaves, M., Briefel, R., & Orfield, C. (2013). Expanding the role of primary care in the prevention and treatment of childhood obesity: A review of clinic- and community-based recommendations and interventions. *Journal of Obesity*, 2013(11). doi: 10.1155/2013/172035. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3655557/>
- Walker, O., Strong, M., Atchinson, R., Saunders, J., & Abbott, J. (2007). A qualitative study of primary care clinicians' views of treating childhood obesity. *BMC Family Practice*. 8(50). doi:10.1186/1471-2296-8-50. Retrieved from <http://old.biomedcentral.com/1471-2296/8/50>
- West, F., Sanders, M., Cleghorn, G., & Davies, P. (2010). Randomised clinical trial of a family-based lifestyle intervention for childhood obesity involving parents as the exclusive agents of change. *Behaviour Research and Therapy*. 48(12), 1170-1179. Retrieved from <http://dx.doi.org.ezproxy.uky.edu/10.1016/j.brat.2010.08.008>
- World Health Organization (WHO). (2014). Commission on ending childhood obesity (ECHO): Securing the future for our children. Facts and figures on childhood obesity. Retrieved from <http://www.who.int/end-childhood-obesity/facts/en/>
- Wang, L., Chyen, D., Lee, S., & Lowry, R. (2008). The association between body mass index in

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adolescence and obesity in adulthood. *Journal of Adolescent Health*. 42(5), 512-518.

Retrieved from

<http://www.sciencedirect.com.ezproxy.uky.edu/science/article/pii/S1054139X07004272>

World Health Organization (WHO). (2014). Exclusive breastfeeding to reduce the risk of childhood overweight and obesity. Biological, behavioural and contextual rationale.

Retrieved from http://www.who.int/elena/titles/bbc/breastfeeding_childhood_obesity/en/

World Health Organization (WHO). (2016). Global strategy on diet, physical activity and health: Children's diet. Retrieved from

http://www.who.int/dietphysicalactivity/childhood_diet/en/

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Table 1

Sample Characteristics: Demographics (N = 33)

Variable	n (%)	Mean, (SD)
Age		4.21 (.857)
BMI %		92.06 (4.49)
Gender		
Male	15 (45.5%)	
Female	18 (54.5%)	
Ethnicity		
White	27 (81.8%)	
Other	6 (18.1%)	
Primary Language		
English	33 (100%)	
Primary Insurance		
Private	29 (87.9%)	
Medicaid	4 (12.1%)	
Primary Caregiver		
Parent	33 (100%)	
Weight Status		
Overweight	24 (72.7%)	
Obese	9 (27.3%)	
Weight Diagnosis		
None	33 (100%)	
BMI % Documented		
Yes	32 (97%)	
No	1 (3%)	

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Table 2

Evaluation of Familial Obesity-Specific Factors (N = 33)

Variable	n (%)
Obesity	
None	33 (100%)
Hypertension	
None	30 (90.9%)
One parent	3 (9.1%)
Hyperlipidemia	
None	32 (97%)
One parent	1 (3%)
Diabetes	
None	30 (90.9%)
One parent	3 (9.1%)

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Table 3

Evaluation of Behavioral Risk Factors (N = 33)

Variable	<i>n</i> (%)
Fruits and Vegetables	
Less than five	24 (72.7%)
Five or more	1 (3%)
Consumed, amount unknown	8 (24.2%)
Sugar Beverages	
More than or equal to one	31 (93.9%)
Consumed, amount unknown	2 (6.1%)
Sleep	
Eight hours or more	23 (69.7%)
Discussed, amount unknown	3 (9.1%)
Data missing	7 (21.2%)
Physical Activity	
One hour or more	3 (9.1%)
Discussed, amount unknown	3 (9.1%)
Data missing	27 (81.8%)
Screen Time	
Two hours or less	2 (6.1%)
Data missing	31 (93.9%)

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Table 4
Management/Treatment Approaches (N = 33)

Variable	n (%)
Increase fruits and vegetables	
Yes	4 (12.1%)
No	29 (87.9%)
Limit sugar beverages	
Yes	1 (3%)
No	32 (97%)
Increase sleep	
No	33 (100%)
Increase physical activity	
Yes	2 (6.1%)
No	31 (93.9%)
Limit screen time	
No	33 (100%)
Dietary	
Yes	27 (81.8%)
No	6 (18.2%)
Activity	
Yes	22 (66.7%)
No	11 (33.3%)
5210	
No	33 (100%)
Printed handouts	
Yes	24 (72.7%)
No	9 (27.3%)
Counseling	
Yes	29 (87.9%)
No	4 (12.1%)
Referral	
No	33 (100%)
Follow-up	
Yes	2 (6.1%)
No	31 (93.1%)
Follow-up attended	
No	33 (100%)

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Table 5

Paired t-test for variables: Current BMI to previous BMI (N = 19)

Paired Variable	Mean, (SD)	t (p)
Current BMI	91.63 (3.64)	2.8 (.013)
Previous BMI	81.16 (16.79)	