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Motivational Interviewing in Primary Care to Improve Lifestyle Choices for School Age Children

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Motivational Interviewing in Primary Care to Improve Lifestyle Choices for School Age Children

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By

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Abstract

Childhood obesity is an epidemic in the United States placing children at risk for immediate and long-term health problems. Primary care providers are optimally placed to address this high-priority health issue. The purpose of the project was to implement a practice change in the delivery of nutrition and physical activity information during well child visits. The *5-2-1-0* healthy habits message was delivered via motivational interviewing to the parent/guardian of overweight/obese children. A sample of seven parents/guardians participated in the educational program, which included an initial visit, two-week follow-up phone call, and one-month follow up visit. An initial assessment of family nutrition and physical activity was completed pre education. Change readiness was assessed at the end of the initial visit. Paired t-tests were conducted to assess means differences in family nutrition and physical activity behavior scores. Although there was no statistical significance, the magnitude of effect was large (eta squared .417). Mean differences for pre and post readiness rulers scores were -0.29 ($p = 0.356$). Although not statistically significance, the magnitude of effect was large (eta squared 0.143). Findings of this project suggest there is value in addressing obesigenic behaviors in primary care settings with parents/guardians of overweight and obese children.

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Capstone Advisor — Date 11/17/17

Capstone Project Committee Member — Date 11/17/17

DNP Coordinator — Date 11/17/17

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Background and Significance

Problem Identification

Childhood obesity is a serious health problem in the Unites States (US) that places children at risk for poor health. The percentage of children with obesity in the US has more than tripled since the 1970s (Fryar, Carroll, & Ogden, 2014). Furthermore, about one in five school-aged children (6-19 years) are obese (Fryar, Carroll, & Ogden, 2014). Obesity in children within the US, ages two to nineteen, was tracked from 2011-2014. Analysis revealed the prevalence of obesity in approximately 17% of the sample. This translates to approximately 12.7 million children and adolescents (Ogden, Carroll, Frayer, & Flegal, 2015). Furthermore, the prevalence of obesity was higher among Hispanics (21.9%) and African Americans (19.5%) than Caucasians (14.7%), with the lowest prevalence among Asian Americans (8.6%). Additionally, the prevalence of obesity was reported by age range: 8.9% among two to five year olds, 17.5% among six to eleven year olds, and 20.5% among twelve to nineteen year olds. Specifically, Kentucky's childhood obesity prevalence is at 13.3% for two to four year olds and 19.7% for ten to seventeen year olds (Trust for America's Health and Robert Wood Johnson Foundation: *The State of Obesity*, 2016).

Context and Scope of the Problem

Overweight is defined as excess body weight for a particular height from fat, muscle, bone, water, or a combination of these factors (National Heart Lung and Blood Institute, 2017). Obesity is defined as having excess body fat and is measured by a screening tool termed body mass index [BMI]. Health professionals use BMI, since it takes into account that children

continue to grow and at differing rates based on age and gender. The American Academy of Pediatrics (AAP) recommends the use of BMI measurements annually to classify patients into weight categories (Barlow, 2007). Overweight is defined as BMI percentile > 85^{th} - 94^{th} and obese is defined as >95^{th}. Multiple factors affect childhood obesity and include, genetics, metabolism, nutrition environmental factors, social and individual psychology and activity behaviors, (Centers for Disease Control and Prevention, 2017). Primary care providers have the opportunity to avert and manage obese youth during health care visits by addressing lifestyle behaviors that lead to obesity (Christison et at., 2014). Families that understand the health consequences related to obesity are likely to make a health behavior change (Rhee, DeLago, Arscott-Mills, Mehta, & Davis, 2005). Yet, pediatric primary care providers are often not equipped with the appropriate resources to address childhood obesity in the primary care setting (Talmi & Frazio, 2012).

The AAP recommends that primary care providers address dietary and activity assessments, afterwards counseling for prevention and management of excessive weight gain (Barlow, 2007). The United States Preventive Services Task Force (USPSTF) recommends behavior intervention programs to treat childhood obesity (2017). The USPSTF determined that behavior interventions with a minimum of 26 hours over a minimum of two to twelve months, results in weight loss. The behavior intervention sessions often targeted the parent and child. Furthermore, weight management programs should incorporate counseling, dietary changes, and increased physical activity. Addressing identified obesity related behaviors such as physical activity level, limiting screen time, eating fruits and vegetables, and limiting soda intake is essential in improving childhood obesity.

Consequences of the Problem

Children with obesity have associated chronic health conditions and diseases which may include asthma, sleep apnea, bone and joint problems, type two diabetes, and risk factors for heart disease (United States Department of Health and Human Services, 2010). Furthermore, obese children are teased and bullied more than their normal weight peers are more likely to suffer from social isolation, depression, and have lower self-esteem (Puhl & Luedicke, 2012). Childhood obesity is not only associated with immediate poor health but also long-term impacts. Children with obesity are more likely to have obesity as an adult (Puhl & Luedicke, 2012) and the obesity and disease risk factors are likely to be more severe in adulthood (Bass, 2015). Adult obesity is associated with multiple, chronic problems such as heart disease, diabetes type two, hypertension, and certain cancers including endometrial, breast, colon, kidney, gallbladder, and liver (Jensen, Ryan, Apovian et al., 2013).

Kentucky's current adult obesity rate is 34.6%, which is up from 21.7% in 2000 and 12.7% in 1990 (Trust for America's Health and Robert Wood Johnson Foundation: *The State of Obesity*, 2016). Data shows children with obesity miss more days of school compared to students with normal weights (Geier et al., 2007) and missed days of school, either due to illness or to avoid weight-based bullying (Puhl & Luedicke, 2012) which may affect academic performance. In addition to the enormous medical and emotional implications, the costs of obesity among adults are estimated at 147 billion dollars to nearly 210 billion dollars annually (Trust for America's Health and Robert Wood Johnson Foundation: *The State of Obesity*, 2017).

Evidence-Based Intervention

The Healthy People 2020 report maintains that the reduction of childhood obesity is a high-priority health issue (Office of Disease Prevention and Health Promotion (2017). To help

meet the Healthy People 2020 high priority goal for reducing childhood obesity, an evidence-based educational program using motivational interviewing was used to address obesity in primary care.

The *5-2-1-0* healthy habits originated from the Maine Youth Overweight Collaboration (Rogers, Hart, Motyka, Rines, Vine, & Deatrick, 2013). The evidence-based intervention delivered the *5-2-1-0* healthy habits message via motivational interviewing techniques to the parent or guardian of overweight or obese children, to improve lifestyle choices, related to nutrition and physical activity, in school ages children. In 2006, the United Way of Greater Portland assembled six of the areas largest employers and introduced a community-based program to address the healthy behaviors that are known to influence childhood obesity. The program was formerly known as the Keep Me Healthy *5-2-1-0* and is now known as the "Let's Go *5-2-1-0"* program. The mnemonic, *5-2-1-0* represents healthy eating and physical activity habits each day: five or more fruits and vegetables per day, two hours or less screen time per day, one hour or more of physical activity per day, and zero sugar drinks coupled with more water and low-fat milk consumption. Findings from the five-year project demonstrated increased parental awareness of the *5-2-1-0* message and positive reactions (Rogers, Hart, Motyka, Rines, Vine, & Deatrick, 2013). Tucker and colleagues (2011) reported significant effects on self reported *5-2-1-0* healthy habits and objectively measured physical activity levels with fourth and fifth grades. The *5-2-1-0* message has been demonstrated to be effective as an intervention for addressing overweight/obese children in the pediatric primary care setting (Polascsek, Orr, Letoumeau, Rogers, Holmberg, & O'Rourke, 2009; Tucker et al., 2013). The *5-2-1-0* outlines simple steps clinicians could follow in their practices to reduce childhood obesity. The Center

for Disease Control and Prevention supports the *5-2-1-0* message as an effective plan for tackling overweight youth (CDC, 2011).

Motivational interviewing is an evidence-based method that supports engagement and motivation of patients/parents (Resnicow et al., 2016). Motivational interviewing is a person-centered method for strengthening an individual's own motivation and commitment to change. The foundation of motivational interviewing is from the Transtheoretical Model of Behavior Change by Prochaska and Climente (1983) that supports individual movement from precontemplation to contemplation to take action. There are five stages of readiness to include precontemplation, contemplation, action, maintenance, and relapse. One must assess the patient's readiness to change before working toward change plans. Patients present at different levels of readiness, assessing the patient's stage of change will help the provider decide the best approach for facilitating behavior change. The basic techniques of motivational interviewing are described by the acronym OARS which stands for: open-ended questions, affirmations, reflective listening, and summary (Miller & Rollnick, 2013). Healthcare education or health behavior goal setting, coupled with motivational interviewing may be most beneficial to improve client communication and counseling associated with lifestyle-related issues in general health care (Soderlund, Madson, Rubaak, & Nilsen, 2011).

Purpose of the Project

The purpose of the project was to implement a practice change in the way providers deliver nutrition and physical activity information during well child visits with overweight/obese children. The aim of the project was to assess change readiness and improve lifestyle choices, related to nutrition and physical activity. Outcomes were measured using the Readiness to Change Ruler and the Family Nutrition and Physical Activity Screening Tool (FNPA). Parents

have a direct influence on the nutrition and physical activity behaviors of children, therefore, the FNPA screening tool was used to assess family environment and behavioral factors that may contribute to childhood obesity.

Theoretical Framework

Theory provides a framework that helps guide evidence-based practice changes. The AAP expert committee recommended the use of the Chronic Care Model (Appendix B) in the management of overweight children due to the complexities and chronic-nature of the disease process (Barlow, 2017). Therefore, Wagner's (1998) Chronic Care Model (CCM) was the guiding framework that helped develop, understand, and promote successful evidence–based practice change with the childhood obesity project. The basis for the CCM is to improve the delivery of care related to chronic disease. The CCM encompasses environment, health care, and patient self-management for a more comprehensive approach. The CCM is applicable in childhood obesity and incorporates environment (family, school, worksite, and community) with the medical system (information systems, decision support, delivery system design, and self-management support). The project focused on the medical system that includes change in the environment for successful family/patient self-management. Specifically, this project focused on the medical system (decision support, delivery system design, and self management) and changes in the family environment that promote family/patient self-management.

Review of Literature

The literature was searched for motivational interviewing as it relates to childhood obesity. Four databases were queried using Eastern Kentucky University's (EKU) online library including Cochrane Collaboration, PubMed, Cumulative Index of Nursing and Allied Health Literature and MEDLINE, along with manual reference list check. Keywords included on the

initial search were: motivational interviewing, childhood obesity, behavior modification or lifestyle changes, and primary care. Multiple research studies were critically appraised for relevancy and support in using motivational interviewing with overweight and/or obese children. Ten studies were included and ranked using Melnyk and Fineout-Overholt's (2015) evidence-hierarchy.

Christison et al. (2014) evaluated acceptability and feasibility of the Family Nutrition and Physical Activity (FNPA) Assessment Tool when paired with motivational interviewing. The nonrandomized observational study included 100 children, age four to sixteen years, (regardless of weight status) who were counseled on motivational interviewing during well child visits at one university-based pediatric primary care office in Illinois. Providers (6 pediatricians and 1 nurse practitioner) counseled using motivational interviewing techniques based on the results of the FNPA. There was a mean increase of 4.2 ($\pm$5.7) in the FNPA score from baseline to six months (p=0.0001) and 68% of parents reported success of primary lifestyle goals at one month and 46% at six months. Patient acceptability was high, 4.0 to 4.8 on a 5-point scale. Provider acceptability was also good with a 4 rating on a 5-point scale. A secondary outcome included the achievement of stated health behavior goals, change in body mass index (BMI), and improvement in obesity behaviors. The mean BMI change of 0.28 kg/m^2 ($\pm$ 0.86) and z-score change of 0.04 ($\pm$ 0.28) were not statistically significant at 6 months. However, the z-score change for the obese category was – 0.04 ($\pm$ 0.18), which could be clinically important even though it was not statistically significant. The study did not compare BMI classification of the participants to the clinic population. Surveys were parent-reported, therefore, there is potential for social-acceptability bias, which would inflate the outcome measures. The FNPA assessment coupled with Motivational interviewing-based counseling was shown to be effective in

identifying and addressing obesity behaviors during pediatric well child visits. Longer-term follow-up with more participants was recommended to evaluate the effect of this intervention on the trajectory of weight status in children.

Tucker et al. (2013) evaluated the feasibility and outcomes of addressing childhood obesity in the primary care setting using a registered nurse-delivered health habits message (*Let's Go 5-2-1-0*) via motivational interviewing. The participants were overweight, four to eighteen years of age presenting to a Midwestern pediatric primary care office in an academic center for a well child visit. This quasi-experimental study compared 60 families receiving usual care to seventy families who received usual care plus the *5-2-1-0*-health habits message through motivational interviewing. Intervention effects were found for self-reported fruit/vegetables consumption, physical activity, and screen time at the 12-month follow up, compared to the control families. There was a significant increase in the number of fruits and vegetables consumed per day from baseline to six month follow up among the intervention families compared to the control families ($p < .001$). The intervention families decreased the hours of television viewing per day compared to the control families (63% versus 39%; $p = 0.035$). Additionally, the intervention families increased the hours of activity per day compared to the control families (61% versus 27%; $p = .004$). After the nurse-lead intervention, BMI percentile trended toward decline but was not statistically significant ($p = 0.057$). It is important to note the dropout rates were 35% at six months and 41% at twelve months. Intervention effects included several significant healthy habit changes among the intervention families and BMIs trended down in both groups. Long-term follow up was suggested since behavior change takes time.

In a clustered, randomized controlled trial, Resnicow et al. (2017) tested the efficacy of Motivational interviewing delivered by providers and registered dieticians (RDs) to parents of

overweight children ages two to eight years of age. Forty-two pediatric practices from the Pediatric Research in Office Settings Network of American Academy of Pediatrics were randomly assigned to one of three groups: group one, usual care that measured BMI percentile at baseline and one and two-year follow up; group 2, provider only delivered four motivational interviewing counseling sessions to parents of the index child over two years; group 3, provider plus RDs, which delivered four provider motivational interviewing sessions plus six RD sessions. Adjusted BMI percentile was measured at two-year follow up with group one at 90.3, group two 88.1, and group three 87.1; $p = 0.049$. The mean for group three was significantly lower than group one ($p = .02$). The randomized controlled trial's large sample showed significant reductions in BMI, supporting motivational interviewing delivered by trained providers. Specifically, motivational interviewing is feasible and can improve patient outcomes when addressing childhood obesity in primary care.

Schwartz et al. (2007) sought to determine whether pediatricians and dieticians could implement an office-based prevention program using motivational interviewing as the primary intervention. This nonrandomized controlled trial included 91 children ages three to seven who were overweight or normal weight (if one parent had BMI 30 or greater) participants from 14 primary practices affiliated with the Pediatric Research in Office Settings Network of American Academy of Pediatrics. The control group received usual care, the minimal intervention group received one motivational interviewing session of 10-15 minutes duration and the intensive intervention group received two motivational interviewing sessions (one of 1-15 minutes duration and the second 45-50 minutes in duration). BMI percentiles at six-month follow up decreased, 0.6, 1.9, and 2.6 in the control group, minimal group, and intensive group, respectively. There was no significant change in BMI percentiles between the three groups. It is

important to note the dropout rate of 10%, 32%, and 25% for the control, minimal, and intensive groups, respectively. Even though there were not significant changes in BMI, 94 percent of the parents reported the intervention helped them think about changing their families eating habits. Parents in the minimal group reported a significant decrease in their child/s intake of snacks *(p* = .01). The intensive group parents reported a significant net decrease in dining out compared with the minimal group ($p = .04$). There was no significant change within or between-groups differences with sweetened drinks, intake of fruits/vegetables, and television viewing ($p > 0.05$). Parental, physician and RD satisfaction with the motivational interviewing intervention was high. Providers can be instructed on the use of motivational interviewing tools and techniques. Parents of overweight and obese children have high satisfaction and positive views regarding motivational interviewing-based intervention. Future recommendations from this study include elimination of parent self-reported height and weight to determine BMI, expand BMI criteria to include children who are heavier but not morbidly obese, address BMI during acute care (ill) visits (not just well child visits), and suggest ways to improve participant retention and allow telephone follow up.

In a clustered, randomized controlled trial, Woo Baidal et al. (2013) investigated correlations of parental perceptions of helplessness and satisfaction with motivational interviewing-based pediatric obesity prevention intervention in primary care. Ten primary care offices at Harvard Vanguard Medical Associates in Massachusetts were included. Participants included 253 children age 2 to 6 years in the intervention arm of the High Five for Kids. Eligibility included a BMI indicating obesity or an overweight child who has at least one overweight parent. The intervention arm received counseling from nurse practitioners (NPs) trained in motivational interviewing, comprised of four 20-40 minute in-person visit and brief

telephone calls in the first year of the intervention. Participants who were more likely to identify motivational interviewing-based visits as helpful in improving children's obesity-related behaviors after the first year of the intervention included parents born outside the United States (odds ratio [OR] = 8.81 and 95% CI = 2.44, 31.8), lower household income, ≤ 50,000 (OR = 3.60; 95% CI 1.03, 12.55), and higher BMI at baseline (OR = 2.86; 95% CI 1.07, 7.65). Lower intervention satisfaction was found with parents of female children, black children, and Latino children. The findings emphasize the importance of adapting pediatric obesity prevention efforts to address specific populations.

Taveras et al. (2011) examined the effectiveness of a primary care-based obesity intervention over the first year that included six intervention contacts in two years. The setting was Harvard Vanguard Medical Association in Massachusetts, which included ten pediatric practices (5 usual care and 5 intervention). A sample of 475 overweight (with one parent obese) and obese children, ages two to six years, were included in the study of whom 204 received usual care and 271 received the intervention. Intervention clinics received primary care restructuring and families received motivational interviewing from NPs (trained in motivational interviewing) and education modules targeting television viewing, fast food, and sugar sweetened beverage intake. Over the first year the intervention included four 25-minute person visits and three 15-minute phone calls in the first year. In comparison to usual care the intervention group had smaller, non-significant change in BMI (-0.21; 95% CI, -0.50 to 0.07; $p = 0.15$), greater decreases in TV viewing (-0.36h/d; 95%CI, -0.64 to -0.09; $p = 0.01$), slightly greater decrease in fast food (-0.16 servings/week; 95% CI, -0.33 to 0.01; $p = 0.07$) and sugar-sweetened beverages (-0.22 serving/d; 95% CI; -0.52 to 0.08; $p = 0.15$) intake. The post hoc analyses noted statistically significant intervention on BMI among girls (-.38%; 95% CI, -0.73 to -0.03; $p =$

0.03) but not boys (0.04; 95 % CI, -0.05 to 0.63; p = .89). Also observed were significant lowering of BMI among participants in households with annual incomes of $50,000 or less (-0.93; 95% CI -1.60 to -0.25; p = .01) but not in higher-income households (0.02; 95% CI, -0.30 to 0.33; p =.92).

Davoli et al. (2013) used the Transtheoretical Model in a randomized controlled trial to evaluate the effect of family pediatrician-led motivational interviews on BMI of overweight children age four to seven years. The study was based in Italy and included 185 participants in the usual care group and 187 participants in the intervention group. The intervention consisted of five motivational interviewing family meetings, which required the family to agree on two objectives: one on food and one on physical activity. BMI percentile and information related to four topics: health behaviors, general dietary habits, specific dietary habits, and physical activity, were measured at baseline and 12 months. There was a significant difference in BMI between intervention and control groups (difference = -0.30, p = 0.007). Motivational interviewing had an effect in children whose mothers had a high education level (-1.04 kg/m^2; p = 0.008) and in girls (0.51 kg/m^2; p = 0.072). Positive changes in parent-reported lifestyle behaviors occurred more frequently in the motivational interviewing group. No effect was observed in boys or when the mother's education level was low. The study strengths include: population based, length of time was 12 months, and 95.4% compliance. The pediatrician-led motivational interviewing was overall effective in managing BMI in the target population.

A randomized controlled trial by Small, Bonds-McClain, Melnyk, Vaughn and Gannon (2014) determined the feasibility and preliminary effects of a primary care intervention on physical outcomes. The study included 67 overweight or obese children, four to eight years from 14 primary care offices that were randomly assigned to a control group or treatment group. The

treatment group received four brief motivational interviewing sessions. BMI percentile, waist circumferences, and waist by height ratio were collected at baseline, three months, and six months. Using ANOVA models, the intervention group showed reduced waist circumference and waist to weight ratio immediately after the intervention that persisted for 3 ($f = 0.33$) and 6 months ($f = 0.35$), despite a small sample. BMI and BMI percentile were not differentially affected. Although the study included overweight and obese children the majority of the children were at the 96th BMI percentile. The sample had higher BMI percentiles than the US population, since more children in the US are overweight than obese. The study findings suggest that a primary care-based, parent-focused overweight/obesity intervention is feasible and established positive effects.

Wong and Cheng (2013) assessed the effects of motivational interviewing for obese children with telephone consultation for parents to promote weight loss in obese children. This pre-post quasi-experimental study included four primary schools in Hong Kong over an 11-month period. Participants included obese children in the fifth and sixth grades divided into three groups: control group ($n = 49$), MI group ($n = 70$) and, MI plus group ($n = 66$). Children in the motivational group received motivational interviewing sessions; the motivational interviewing plus group received five motivational interviewing sessions and five telephone consultation calls with parents. Multiple measures were collected at baseline, four months and eleven months including weight for height percentage, weight related behaviors (calorie consumption), body height, bodyweight, BMI, fat percentage, MWH percentage (sex-specific reference chart), triceps skinfolds thickness, abdominal thickness, waist circumference, hip circumference, systolic blood pressure, and diastolic blood pressure. Children in the motivational interviewing and motivational interviewing plus groups showed significant

improvement in their weight-related behaviors and obesity-related anthropometric measures. The control group showed significant deterioration in their anthropometric measures. Although this was a school-based intervention outside of the US, this study supports motivational interviewing as a useful method for improving nutrition, physical activity and weight loss for obese children.

Resnicow et al. (2016) summarizes the methods, outcomes, and process from the BMI^2 trial conducted in pediatric primary care offices and discusses recommendations for intervention improvement and increased dissemination. The clustered randomized controlled trial included overweight and obese children age 2 to 8 years from 42 primary care practices. The participants were randomly assigned to three groups: group one received usual care (n = 158), group two received three motivational interviewing sessions form a primary care provider in the first year and one booster visit in year two (n = 145), and group three received the same three motivational interviewing sessions from a primary care provider plus six registered dietician-delivered motivational interviewing sessions over two years (n = 154). At the two-year follow up, the BMI percentile rates were 90.3, 88.1, and 87.1 for group one, two, and three, respectively. There was an overall group effect ($p = 0.049$). The planned post hoc analysis showed that group 3 mean was significantly ($p = 0.02$) lower than the usual care group. Group three mean was statistically significant ($p = .02$) lower than group one. The net difference in BMI percentile between groups three and one was 3.2 percentile units and 2.2 percentile units between groups two and one. The BMI^2 intervention achieved statistical significance and clinically meaningful reductions in BMI percentile between group one and three. Child gender, child age, child race, baseline BMI, parent income, parent education, or parent BMI moderated intervention effects. Parent self-reported fruit and vegetable intake of the index child was higher with group three

compared to group two and one ($p < .05$). Hours of screen time were significantly lower with group three compared with group two and one. Physical activity and sweetened beverages values were lower in group three but the differences were not statistically significant. The findings of this study support provider and RD-delivered motivational interviewing in the primary care setting to reduce BMI percentiles.

Synthesis of Research Findings

The literature review supports motivational interviewing to improve patient outcomes related to BMI reductions and lifestyle modifications. A total of ten studies were included that examined motivational interviewing to address childhood obesity. Nine of the studies were based in the primary care setting except one, which was school based. Eight of the studies were conducted in the US; one was based in Italy (Davoi et al. 2013) and the other in Hong Kong (Wong et al., 2013). Six of the studies were randomized controlled trials, three controlled trials without randomization, and one descriptive study. All studies included overweight and/or obese children with ages ranging from two to eighteen years. Motivational interviewing training varied greatly with the types of provider/s trained and how providers were trained. The delivery method of motivational interviewing to the study participants also varied greatly. Eight of the studies used BMI and/or BMI percentile as an outcome measure, with seven showing a decrease in BMI and two reaching statistical significance (Resnicow, 2016 & Resnicow, 2017). The study by Small et al. (2014) also included waist circumference and height by weight ratio. The study by Wong et al. (2013) included numerous anthropometric measures. Eight of the studies had a positive impact on lifestyle modification with various tools related to nutrition and/or activity.

The evidence of this analysis supports motivational interviewing has the potential to improve the overall health trajectory for children. Parents have positive perceptions and

satisfaction with motivational interviewing-delivered obesity information (Tucker et al., 2013; Schwartz et al., 2007). The study by Woo Baidal et al. (2013) demonstrated a higher motivational interviewing effect with parents born outside the US and lower household income. Furthermore, Davoli et al. (2013) demonstrated motivational interviewing had effect in children whose mothers had higher education and in girls.

The body of evidence suggests the use of motivational interviewing in the primary care setting as an effective method for addressing childhood obesity by improved patient outcomes. Primary care providers trained in motivational interviewing can be an important and feasible component to address this chronic disease. The literature supports provider and patient satisfaction with motivational interviewing demonstrating a well-accepted intervention. Parent-focused interventions were found to be feasible and demonstrate positive effects. The evidence supports tailoring pediatric obesity prevention and treatment efforts to target populations. Motivational interviewing is a useful method for improving the overall health trajectory for children.

Agency Description

Setting

The agency for project implementation is an outpatient primary care clinic in Central Kentucky and is one of many outpatient practices under the umbrella of a larger organization. Although, the clinic is family based the majority of the patient population is pediatrics. The primary care clinic has a full-time physician boarded in family medicine and a part-time nurse practitioner double boarded in family and pediatrics. Clinical staff includes two certified medical assistants and two administrative clerks. Stakeholders include the project leader, providers, clinical staff, organizational leaders, and pediatric patients of the clinic.

Target Population

The target population for the *5-2-1-0* healthy habits message via motivational interviewing were adult parents or guardians accompanying an overweight/obese child age 4-12 years to the primary care clinic for a scheduled well child visit.

Congruence of Capstone Project to Organization's Mission, Goals and Strategic Plan

KentuckyOne Health's mission is "to nurture the healing ministry of the Church by bringing it new life, energy and viability in the 21st century by striving for excellence within our profession through dedication to evidence based practice and fostering an environment that embraces nurses through coaching, mentoring and providing advancement of knowledge" (KentuckyOne Health, 2016). The vision of the organization is "to transform the health care communities, care delivery and health care professions so that individuals and families can enjoy the best of health and wellbeing" (KentuckyOne Health, 2016). The project incorporated evidence-based practice, healthcare providers' clinical expertise, and patient preferences to make improvements in childhood obesity outcomes. The project aligns with the mission and vision of the health care organization.

Description of Stakeholders

The project was dependent upon key stakeholders' active involvement. Stakeholders were those with a perceived benefit in participating in the project. Key stakeholders for this project included the participants (parents/guardians) and the overweight/obese child through family focused intervention. The providers and clinical staff were stakeholders as they were a vital component to the delivery of the intervention. Additionally, stakeholders include the health care agency and healthcare economy as a whole.

Statement of Mutual Agreement with Agency

The Division Research Manager for KenuckyOne Health completed the statement of mutual agreement.

Project Design

The primary care clinic providers were interested in the development of an evidence-based practice plan for preventing and managing childhood obesity. Since the providers identified the problem, "buy in" was easily established. For pediatric patients identified as overweight or obese, an evidence-based practice protocol for care was implemented. The intervention entailed interviewing the parent or guardian of overweight or obese children, to improve lifestyle choices, related to nutrition and physical activity, in school age children. Outcome measures included improvement in change readiness and family nutrition and activity. The project design was based on a pre-test, post-test design.

Project Methods

Description of Evidence-Based Intervention

The evidence-based intervention included two components: provider training related to the *5-2-1-0* message and motivational interviewing. The second part of the intervention involved implementation. Participants were parents/guardians of overweight/obese school age children presenting for a well child visit in the primary care setting. During the well child visit, providers presented the nutrition and physical activity information (*5-2-1-0*) to the parent/guardian. Participants were contacted two weeks post well child visit for a phone consultation, which reinforced the *5-2-1-0* message and answered any questions. A one-month follow-up visit with the provider allowed for reinforcement of improving lifestyle choices related to nutrition and physical activity.

Procedure

IRB Approval

After agency deferment, an application for expedited review was submitted to Eastern Kentucky University Internal Review Board (IRB) and project approval was granted July 24, 2017. (Appendix C).

Measures and Instruments

The Family Nutrition & Physical Activity (FNPA) Screening Tool was used to examine behavior modification related to nutrition and activity (Appendix D). Because parents have a direct influence on the nutrition and physical activities of children both the AAP (2007) and USPSTF (2010) recommend involving parents in the process. The FNPA was designed and validated to assess family environment and behaviors that may predispose a child to becoming overweight (Ihmels, Welk, Eisemnann, & Nusser, 2009). An Iowa State University research team in the Physical Activity and Health Promotion Lab designed the FNPA tool. The FNPA is a 20-question survey identifying obesigenic behaviors in ten areas: family meal patterns, food choices, restriction/reward, family activity involvement, family eating habits, beverage choices, screen time, family routines, and healthy environment. A 4-point Likert scale is used for each question and ranges from almost never, sometimes, usually, and almost always. A lower total score indicates more prevalent obesigenic lifestyle behaviors. The FNPA is a psychometrically sound, valid instrument including all subscales (Ihmels, Welk, Eisenmann, & Nusser, 2009). The preliminary validation of the tool included school age children of varying ethnicities (Whites, African Americans, Hispanics, Asians, Native Americans, and mixed ethnicities). According to Ihmel and colleagues (2009) the FNPA Screening Tool has established reliability with a Cronbach's alpha of .72. The FNPA Screening Tool is efficient to administer and score

with a length of time to complete of about five minutes. There is open access to the FNPA Screening Tool with a download version. The tool allows for ease of use and does not require additional training. In a study by Christison et al. (2014) the FNPA was "facile, efficient, and acceptable among patients and providers" (*p*. 438). In the current project, the Cronbach's alpha was 0.82.

The Readiness Ruler was used to examine the effectiveness of motivational interviewing by assessing change readiness (see Appendix E). This tool was developed by the Maine Overweight Collaboration (2017) and is part of the *Keep Me Healthy Toolkit*. The toolkit is based on the *5-2-1-0* healthy habits. The Readiness Ruler is comprised of a willingness/importance ruler and a confidence ruler. Both rulers are based on a 0-10 scale. Lower numbers represent "not willing" to change and "not confident", middle numbers (5-6) representing "somewhat" ready to change/confident, and the higher numbers represent "very willing" to change and "confident". The ruler is part of the clinical decision support section of the toolkit since assessing the patient's stage of change will help the provider decide the best approach for facilitating behavior change. A score from 0-3 represents "not ready" to change, therefore, the provider raises awareness, elicits change talk, and advises/encourages. Scores between 4-5 represent "unsure" about change, therefore, the provider evaluates ambivalence, elicits change talk, and builds readiness. A score from 7-10 represents ready to change, therefore, the provider strengthens commitment, elicit change talk, and facilitates action planning.

Implementation Framework

The Model for Improvement Plan-Do-Study-Act cycle (Institute for Healthcare Improvement, 2015) was implementation framework used in this project (Appendix F). This

model is "simple, effective, and achieves improvements in healthcare delivery and outcomes quickly". Improvement is seen quicker within an organization by focusing on creating small tests and measuring change (Crowl, Sorge, & Sorensen, 2015). The Model for Improvement has two parts. Frist, are three fundamental questions and the second part is the Plan-Do-Study-Act (PDSA) cycle, which guides the test of a change to determine if the change is an improvement. The first step of the PDSA Cycle is "*Plan",* which includes aim-setting, "What are we trying to accomplish?" The next step of the PDSA Cycle is *"Do",* "How will we know that a change is an improvement?" The third step of the PDSA Cycle is *"Study.* The next step is collection of data. Measurement is an essential part of implementing and testing changes. The measures let the team know whether the changes lead to an improvement. The final step of the PDSA Cycle is *"Act",* "What changes can we make that will result in improvement?" In this final step of the cycle, the team is ready to apply the information gained from the "study" phase of the initial test. Modifications will be made to the improvement process in preparation for the next test.

Implementation and Data Collection

The project leader presented providers with the *5-2-1-0* healthy habits educational information. Motivational interviewing educational materials (two 15-minute PowerPoint modules) were developed by a licensed clinical psychologist with specialized training on motivational interviewing and a doctorally-prepared advanced practice registered nurse (APRN) with experience educating healthcare professionals on motivational interviewing. The providers also participated in a one-hour role-play session presented by the clinical psychologist and APRN. Written materials on motivational interviewing were provided to the providers as an additional resource.

Clinical staff notified the project leader, who was the doctorate of nursing candidate, when the parent or guardian of an overweight/obese child age 4-12 years registered for a scheduled well child visit. As part of a routine well child visit, clinical staff obtained the child's height and weight. Any child with a body mass index greater than or equal to 85% would qualify as overweight/obese. The project leader provided a verbal explanation of the project using a verbal recruitment script. If the parent/guardian showed interest informed consent was obtained emphasizing participation in the project is voluntary and withdrawal from the project may occur at any time. Furthermore, the decision to participate or not participate would not affect healthcare or benefits.

Once informed consent was obtained, the participants provided the project leader with their name, name of child, and telephone number for the master identification list. Each participant was assigned a consecutive number starting at one hundred. The assigned number linked each participant to the master list for follow-up a phone call and clinic visit. No identifying information was included on any of the data collection instruments. The parent/guardian received an envelope containing a demographic survey and the FNPA which were completed prior to the well child visit and returned to the project leader in a sealed envelope. Each envelope had a random number assignment that linked the parent/child names, telephone number, and one-month follow up visit. The provider proceeded with the well child exam as usual and at the end of the visit presented the *5-2-1-0* healthy habits educational information via motivational interviewing techniques. Additionally, the participant was given written materials related to the *5-2-1-0* healthy habits message that outlined the importance of each recommendation and provided examples. Once the well child visit was completed the participant completed the Readiness Rule to assess change readiness and schedule a one-month

follow-up visit. Two weeks post well child visit, parent/guardian follow up phone calls were completed by the project leader to reinforce the *5-2-1-0* healthy habits, answer parent/guardian questions, provide a one-month follow up visit reminder. At the one-month follow up visit participants completed the Readiness Ruler and FNPA to assess change readiness level and behavior modifications.

Results

Data were entered into the Statistical Package for Social Services (SPSS) Version 24. Descriptive statistics were summarized and paired *t*-tests were calculated on mean pre- and post-intervention scores for the FNPA screening tool, and for each of the ten subscales. A paired *t* test was also calculated for the Readiness Ruler at the end of the initial office visit and again following the second office visit.

Seventeen participants were initially enrolled in the project and seven attended the follow up visit and completed the post intervention screening tools. All seven participants had a high school education or above. Less than half, 43% (n = 3) completed high school and 57% (n = 4) had post-secondary education. Specifically, of the four with post-secondary education, 28% (n =2) had additional post-secondary education and 29% (n = 2) obtained a bachelors degree. The family household income per year ranged from $31,000 – $300,000, with a mean of $89,000 (n = 6). Of the six participants who reported annual household income, one was an outlier at $300,000. The annual household income excluding the outlier, ranged from $31,00 to $65,00 with a mean of $46,000. Of the seven participants, 71% (n = 5) had a female child. The majority of children were white 57% (n = 4) and 43% were Hispanic (n = 3). The age range of children was 5 to 12 years with a mean of 9.1 years.

A paired samples t-test (Table 1) was conducted to evaluate the impact of the *5-2-1-0* toolkit via motivational interviewing on participants' FNPA scores. The change in participants' mean FNPA scores from pre-intervention (56.4 ± 5.3) to post-intervention (58.9 ± 6.8) was nonsignificant, $t(6) = -2.1$, $p=.08$, two-tailed). The effect size was large (eta squared = .417). Results are presented in Table 1.

Table 1
Paired t-test (n=7) Comparison of Mean scores on Family Nutrition and Physical Activity

Score	Mean ± SD	t	df	p
FNPA, Pretest	56.4 ± 5.3	-2.07	6	.084
FNPA, Posttest	58.9 ± 6.8			

The majority of the FNPA ten subscales showed an increase in the mean scores on family eating habits, beverage choices, screen time, healthy environment, family activity, and family schedule/sleep routine. Although not statistically significant, five of the subscales had a large magnitude of effect and the healthy environment subscale had a small magnitude of effect. Two subscales, restriction/reward and child activity, showed no change in the mean scores. There was a decrease in the mean scores for the family meals and food choices subscales.

A paired samples *t*-test (Table 2) was conducted to evaluate the Readiness Ruler scores of participants between Time 1 and Time 2. The change in the Readiness Ruler score mean of participants from Time 1 (5.71 ± .29) to post-intervention (6.0 ± .0) was nonsignificant, $t(6) = -1.0$, $p = .356$, two-tailed). The effect size was large (eta squared = .143). Results are presented in Table 2.

Table 2
Paired T-test (n=7) Comparison of Mean scores on Readiness Ruler

Score	Mean ± SD	t	df	p
Readiness Ruler, Pretest	5.71 ± .755	-1.00	6	.356
Readiness Ruler, Posttest	6.00 ± .000			

An independent *t*-test was computed to compare the mean Family Nutrition and Physical Activity (FNPA) scores for participants who completed the intervention (Completers) and those who did not complete the intervention (Non-Completers). There was no significant difference in mean FNPA scores between those who completed the intervention (56.4 ± 5.3) and those who did not complete the intervention (54.7 ± 10.3); $t(15) = .40$ $p = 0.69$, two-tailed). The effect size was small (eta squared = .011). Results are presented in Table 3.

Table 3
Independent *t-test Comparison of Mean Family Nutrition and Physical Activity with Intervention Completers and Non-Completers*

Variable Group	Mean ± SD	t	df	p
Completers (n=7)	56.4 ± 5.3	.40	15	.69
Non-Completers (n=10)	54.7 ± 10.3			

An independent *t*-test was computed to compare the mean Readiness Ruler (RR) scores for participants who completed the intervention (Completers) and those who did not complete the intervention (Non-Completers). There was no significant difference in mean RR scores between those who completed the intervention (5.7 ± .76) and those who did not complete the intervention (5.7 ± .67); $t(15) = .04$ $p = 0.97$, two-tailed). There was no magnitude of effect with eta squared of .0001. Results are presented in Table 4.

Table 4
Independent t-test Comparison of Mean Readiness Ruler with Intervention Completers and Non-Completers

Variable Group	Mean ± SD	t	df	p
Completers (n=7)	5.71± .76	.04	15	.97
Non-Completers (n=10)	5.70 ± .67			

Discussion

After completing the intervention, overweight/obese school-age children demonstrated improvement in lifestyle choices related to nutrition and physical activity. Although not statistically significant, the results are clinically meaningful. Results indicate the clinical importance of addressing nutrition and physical activity via motivational interviewing during well child visits. Specifically, the largest improvement was with reduction in screen time. Family eating habits and beverage choices had the next largest improvements. Furthermore, family activity and family schedule/sleep routine also improved. Healthy environment demonstrated the least improvement.

The willingness and confidence to change was measured at the end of the initial well child visit (M=5.71 + 7.55) and again at the end of the one-month follow-up (M= 6.00 ± .000). Participants demonstrated improvement in their willingness to change and the confidence to change pre and post intervention demonstrating a mean difference in scores of -0.29 (p=0.356). Although not statistically significant, the results are clinically meaningful and indicate the effectiveness of motivational interviewing.

Comparisons among the pretest FNPA mean scores for the participants who completed the intervention (M=56.4 ± 5.3) and the participants who did not complete the intervention

(M=54.7 $\pm$ 10.3) found a higher mean score in the group that completed the intervention, although the mean difference of 0.01(p=0.97) was not statistically significant. However, the results demonstrated higher obesigenic behaviors in the non-completer group. The willingness and confidence to change was measured among the intervention completers and non-completers. The mean readiness ruler pretest scores demonstrated no difference in the mean scores.

The *5-2-1-0* educational materials and motivational interviewing training were delivered to the providers, which allows for sustainability. Not only are the tools useful during well child exams to address and manage overweight and obese children, the tools are also useful in the prevention of obesity with normal weight children. Motivational interviewing is an evidence-based skill that can be used in a variety of patient encounters such as smoking cessation and other chronic diseases, which allows for extension.

The project's limitations included: (a) a small sample; (b) attrition of participation for the one-month follow-up visit; (c) self-report method and (d) timing of project implementation. Of the seventeen participants enrolled in the project, seven returned for follow-up and completion of post data. Parent-reported surveys have potential for social-acceptability bias which could increase the outcome measures. Project implementation occurred during the month of August, which is during the start of the school year. At the time of the follow up visit school was in session which may have increased the attrition rate. Documentation of well child exams is a state requirement for kindergarten and sixth grade, therefore, most parents/guardians obtained well child visits during the summer which limited potential enrollment.

The Chronic Care Model supports the improvement of care related to chronic disease, such as childhood obesity. Childhood obesity is a chronic disease that is addressed frequently over time. Longer-term follow-up with more participants is needed to evaluate the effect this

intervention may have on sustainable behavior changes and weight status in children. Future projects are warranted that incorporate the school and community to tackle this chronic disease.

The *5-2-1-0* educational materials and motivational interviewing training were taught to the providers which allows for sustainability of the method. Motivational interviewing is an evidence-based skill that can be used in a variety of patient encounters such as smoking cessation and other chronic diseases which allows for extension. Additionally, there is no need for additional personnel or significant resources. The providers found motivational interviewing feasible, accepted by patients, and an effective method with well child visits. Furthermore, the providers have extended the use of motivational interviewing to motivate other behavior changes in order to prevent and manage chronic diseases.

Implications

Despite the project's limitations, the findings have important implications for clinical practice. The *5-2-1-0* healthy habits education is available to all children presenting for a well child visit to prevent childhood obesity. As overweight and obese children are identified, the providers are now equipped to deliver an evidence-based method of motivational interviewing. This method, delivered by trained providers, in the primary care setting has shown to be feasible and important by influencing health behaviors and decrease childhood obesity.

Summary

The project supports that a primary care-based, parent-focused, overweight/obesity program is feasible and established positive effects on improving lifestyle choices related to nutrition and physical activity. Specifically, the project supports motivational interviewing as a useful method for improving nutrition and physical activity with overweight and obese children in the primary care setting. Behavior changes are more successful when the family is on board.

Therefore, this evidence-based intervention included the parent/guardian of overweight/obese children to address lifestyle choices. Woo and colleagues (2013) emphasize the importance of tailoring pediatric obesity prevention efforts to target populations.

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Appendix A

5-2-1-0 Healthy Habits Education

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Appendix B

Chronic Care Model

Wagner, E.H. (1998). Chronic disease management: What will it take to improve care for chronic illness? *Effective Clinical Practice*, *1*(1), 2-4.

Appendix C

Eastern Kentucky Univeristy Institutional Review Board Approval

Appendix D

The Family Nutrition & Physical Activity Screening Tool

Family Nutrition and Physical Activity [FNPA] (2017). FNPA Screening Tool. Retrieved from: http://www.myfnpa.org/index.html

Appendix E

Readiness Ruler

University of New England Innovation for a Healthier Planet: Maine Prevention Research Center (2017). Keep ME healthy toolkit. Retrieved from: http://www.une.edu/mhprc/projects/maine-youth-overweight-collaborative/keep-me-healthy-tool-kit

Appendix F

The Model for Improvement Plan-Do-Study-Act (PDSA) Cycle

Institute for Healthcare Improvement (2015). Plan-Do-Study-Act (PDSA) Worksheet. Retrieved from: http://www.ihi.org/resources/Pages/Tools/PlanDoStudyActWorksheet.aspx