

CHILDHOOD OBESITY: DEVELOPING EARLY NUTRITION & FEEDING EDUCATION
FOR PARENTS AT WELL CHILD VISITS

A Dissertation
Submitted to the Graduate Faculty
of the
North Dakota State University
of Agriculture and Applied Science

By

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In Partial Fulfillment of the Requirements
for the Degree of
DOCTOR OF NURSING PRACTICE

Major Program:
Nursing

March 2020

Fargo, North Dakota

North Dakota State University
Graduate School

Title

Childhood Obesity: Developing Early Nutrition & Feeding Education for
Parents at Well Child Visits

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ABSTRACT

Childhood obesity is an extensive problem in the United States and North Dakota (CDC, 2014). Significant health consequences are linked to obesity, including type two diabetes, hypertension, hyperlipidemia, cardiovascular disease, cancers, and psychological disorders (Pandita et al., 2016; Xu & Mishra, 2018). Obesity comorbidities, previously presented in later adulthood, now emerge in younger populations (Pandita et al., 2016). Unfortunately, treatment of obesity is not effective, and therefore, prevention must be the primary focus (Daniels et al., 2015; Pandita et al., 2016). Diet and eating behaviors have a significant impact on weight, and children develop taste preferences and lifelong eating behaviors within the first few years of life (Birch & Anzman, 2010; Daniels et al., 2015; IOM, 2011). Therefore, targeting interventions on feeding and nutrition in infancy may foster healthy habits for life and play a role in the prevention of obesity. Responsive feeding interventions hold promise in supporting healthy growth. Ellyn Satter's Division of Responsibility promotes the responsive feeding relationship between parent and child. The purpose of the practice improvement project was to address childhood obesity prevention through the development of an educational curriculum on feeding and nutrition. The parent-focused education correlated with each well child visit (WCV) between the ages of two weeks and three years.

A multidisciplinary team of representatives from pediatrics, behavioral health, and patient education was consulted to develop the education. Ten providers at Midwestern primary care clinics reviewed the educational curriculum and provided feedback on the content and methods to deliver the education to parents. Most providers found the content to be accurate (n = 7; 70%) and comprehensive (n = 8; 80%). Three providers suggested expanding on topics such as breastfeeding and mixing formula. Providers unanimously agreed that the curriculum is relevant

and understandable. A formal literacy evaluation resulted in grade-level readability scores between the 6th and 8th-grade levels. Almost all providers (n = 9) believed the curriculum would be valuable for use in practice. The preferred delivery method chosen was one on one provider to parent education. The project clinic plans to pilot the curriculum with parents attending infant and toddler WCVs.

ACKNOWLEDGEMENTS

I would first like to acknowledge the faculty and staff from the North Dakota State University Doctor of Nursing Practice program. Their support, encouragement, and guidance were vital for this project and for my success as a student. In particular, I would like to express sincere gratitude to Tina Lundeen for her endless patience and commitment to this dissertation. Your time, expertise and feedback were incredibly valuable, and I would not have made it through this process without your help. To Dr. Kelly Buettner-Schmidt, Dr. Dan Friesner, and Dr. Heidi Saarinen: thank you all for participating on my committee. Your time, ideas, and feedback were greatly appreciated.

A special thank you also goes to members outside of my committee, whose time and expertise were instrumental to this project. To Dr. Carrie Brower-Breitweiser for your guidance, suggestions, and patience with me when I bit off more than I could chew. To Abigail Vetter for your mentorship from when I was first learning to be a registered nurse, to your continued support throughout this journey to becoming a nurse practitioner.

To my fellow 2020 Doctor of Nursing Practice classmates: I would not have made it through this process without you. Thank you all for being shoulders to lean on, ears to complain to, and for cheering each other on along the way. I am grateful to have gotten to know you all over the last three years.

Finally, I would like to sincerely thank my cheerleaders from day one: my family. To my parents, Mark and Debbie, thank you for pushing me to be my best, providing everlasting love and support, and reminding me that I am capable of more than I think. To my brother, Lee, thank you for your endless encouragement and for always being someone I can look up to. Last, but far from least, thank you to my husband, Eric, for supporting me through this wild journey, listening

to my breakdowns, and for pulling me back up time and time again. I am so blessed to have you all in my life.

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LIST OF ABBREVIATIONS

AAP.....	American Academy of Pediatrics.
APRN.....	Advanced Practice Registered Nurse.
BMI.....	Body Mass Index.
CDC.....	Centers for Disease Control and Prevention.
EdS.....	Education Specialist.
FNP.....	Family Nurse Practitioner.
IOM.....	Institute of Medicine.
IRB.....	Institutional Review Board.
PIP.....	Practice Improvement Project.
PNP.....	Pediatric Nurse Practitioner.
RCT.....	Randomized Controlled Trial.
RWG.....	Rapid Weight Gain.
sDOR.....	Satter’s Division of Responsibility.
USDA.....	United States Department of Agriculture.
USDHHS.....	United States Department of Health and Human Services.
WCV.....	Well Child Visit.
WHO.....	World Health Organization.
WIC.....	Women, Infants, and Children.

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CHAPTER 1. INTRODUCTION

Background

Obesity has long been a public health concern in the United States, and the nation has gradually seen the obesity epidemic develop into younger populations (Centers for Disease Control and Prevention [CDC], 2014). Many diseases are associated with obesity, including type two diabetes, hypertension, hyperlipidemia, and cardiovascular disease (Pandita et al., 2016). Obesity also has psychological consequences, such as depression, problems with body image, eating disorders, and decreased self-esteem (Chu et al., 2019). Primary prevention of obesity is key to addressing the obesity epidemic as treatment measures have been mainly ineffective (Daniels et al., 2015; Pandita et al., 2016). Consequently, obesity research has shifted from treatment interventions to the discovery of best practices in obesity prevention.

When compared to adults, body mass index (BMI) is expressed differently for children and adolescents. Throughout growth and development, a child's weight and height changes. Therefore, BMI in children and adolescents is calculated by comparing other children of the same age and sex. The comparison is reported as a percentile. Obesity in children two years and older is defined as a BMI above the 95th percentile for age, and overweight is defined as a BMI between the 85th and 95th percentiles (Institute of Medicine [IOM], 2011). According to the National Health and Nutrition Examination Survey, between 2015 and 2016, the prevalence of obesity in the US in children aged 2-19 years was 18.5%. The rate of obesity in children aged two to five years was 13.9%, which was lower than the obesity rates in children six years and older (Hales, Carroll, Fryar, & Ogden, 2017). However, the percent of overweight and obese children two years to five years old is concerning because a child's weight at five years is a strong predictor of adult obesity and obesity-related morbidity (Redsell et al., 2016).

North Dakota (ND) is one of many states where childhood obesity is a significant problem. Over an eight-year period, between 2000 and 2008, ND saw a 33% increase in obesity in children between the ages of two and four years (The State of Obesity, 2016). The most recent ND childhood obesity statistics from the CDC (2014) reported that 17.5% of children aged two to four years are overweight, and 14.4% of children aged two to four years are obese. While the rates of obese two to four-year-olds in the state have remained stable at about 14% since 2008, obesity initiatives have failed to reduce the childhood obesity rates (CDC, 2014).

Obesity has ramifications from an individual perspective as well as a public health perspective. Not only is obesity a contributing factor to the comorbid conditions listed previously, but obesity is a risk factor for 13 cancers. Additionally, obesity now rivals smoking as a leading cause of preventable morbidity and mortality (Xu & Mishra, 2018). Obesity also contributes to increased medical costs. Annual health care expenditures average \$4600 more for an adult who has been obese for at least ten years than for an individual of healthy weight (Su et al., 2015). The health consequences associated with obesity have significant impacts on individuals and society in terms of morbidity, mortality, and cost.

The Healthy People 2020 committee developed several objectives to reduce the childhood obesity epidemic. One objective is a reduction in the proportion of obese children aged two to five years, from 13.9% to 9.4% (United States Department of Health and Human Services [USDHHS], 2018). Childhood obesity is a complex issue. Several factors contribute to the development of obesity. One such factor is nutrition, which has a significant influence on weight and, therefore, is an important target. Healthy People 2020 includes an objective to increase emphasis on nutritional counseling at healthcare visits (USDHHS, 2018). Nutritional counseling is crucial to consider at an early age because feeding practices in infancy create the

basis for eating behaviors throughout life (Daniels et al., 2015; Pandita et al., 2016). Research has shown that allowing child-regulation of intake and fostering preferences for nutritious food promotes healthy growth and weight (Daniels et al., 2015; Pandita et al., 2016). Therefore, providing anticipatory guidance to parents related to healthy feeding behaviors are in line with Healthy People 2020 objectives for reducing childhood obesity.

Treating obesity rarely works (Daniels et al., 2015; Pandita et al., 2016). The most significant impact for reducing obesity lies in preventative measures directed at families and communities. Healthcare providers are a consistent and reliable source of health information for parents of young children, as about 90% of children under two years of age see a provider regularly for wellness exams (Child Trends Databank, 2018). Therefore, healthcare providers play an important role in obesity prevention strategies targeted at families with young children. The goal of the practice improvement project (PIP) was to develop an educational curriculum for providers to use at well child visits (WCV) from two weeks to three years of age. The educational curriculum focused on teaching parents about nutrition and feeding relative to the child's current developmental stage.

Significance of Proposed Project

Obesity in childhood becomes obesity in adulthood, negatively impacting the nation's health. Obesity has health consequences, including, but not limited to, type two diabetes, hypertension, hyperlipidemia, cardiovascular disease, cancers, and psychosocial consequences (Pandita et al., 2016; Xu & Mishra, 2018). Comorbidities, such as those just listed, are developing at younger ages when previously only seen in adults (Pandita et al., 2016). Earlier onset of chronic disease increases cost, extends disease course, and contributes to health complications that shorten an individual's lifespan (Pandita et al., 2016). Additionally, obesity

rivals cigarette smoking as a leading cause of preventable cancers (Xu & Mishra, 2018).

Prevention is the key to reducing obesity prevalence because treatment of obesity is ineffective (Daniels, et al., 2015; Pandita et al., 2016).

The Trust for America's Health and the Robert Wood Johnson Foundation created The State of Obesity project. A compilation of data from national and state surveys that track obesity rates are available on the State of Obesity website. Nationally, the rate of childhood obesity is 18.5% (The State of Obesity, 2016). Childhood obesity prevalence varies per age group and increases with age. Of children aged two to five years, 13.9% qualify as obese. The obesity rate is as high as 20.6% for those aged 12-19 years. Racial and ethnic disparities also exist. The rate of obesity in Latino children is up to 25.8%, and 22% of African American children are obese.

The state of ND has not been immune to increasing obesity trends. Of children aged two to four years, 14.4% are obese, and 17.5% are overweight, which is higher than the national average in the same age group (The State of Obesity, 2016). The most recent data shows that 14.9% of high school students are obese in the state. As previously discussed, ND witnessed a significant rise in obesity rates in children ages two to four years at the start of the millennium. While the obesity rates in two- to four-year-olds in ND have leveled off since 2008, the rates have not significantly decreased. Therefore, the obesity rate for high school students will likely increase since those affected as toddlers are likely to remain obese through their high school years.

County data in ND is available for children in the Women, Infants, and Children (WIC) program, however, the data is not representative of all children. The adult obesity rates for Cass County is currently 29.6% (Fargo Cass Public Health, 2019). Due to the rise in childhood obesity, the obesity rates in adults may also continue to increase because a child that is obese will

likely struggle with weight for life (Redsell et al., 2016). The statistics presented at the national and state levels indicate a significant problem that requires addressing.

Purpose Statement

The purpose of the PIP was to take steps toward reducing the development of childhood obesity through a parent-focused educational curriculum on infant and toddler feeding and nutrition. Education was specific to the age of the child attending well visits in a pediatric clinic beginning at the 2-week visit and continuing to the 3-year WCV.

Project Objectives

1. Create a parent-focused feeding and nutrition educational curriculum specific to the age of the child at each scheduled well child visit beginning with the 2-week visit through the 3-year visit.
2. Evaluate the educational curriculum for understandability, relevancy, value, and accuracy via a variety of approaches which includes research, expert review, and a formal literacy assessment.
3. Design an education delivery plan, in coordination with a research-focused pediatric provider, for implementing the education at an urban Midwestern pediatric primary care clinic.

The significance of childhood obesity cannot be understated. Childhood obesity has become a momentous problem nationally, as well as in the state of ND. Significant health problems are associated with obesity, leading to increased medical costs and decreased quality and quantity of life. As treatment of obesity remains mostly ineffective, early prevention must be a primary focus. The purpose of the PIP was to create a parent-focused educational curriculum on infant and toddler feeding and nutrition with a goal of preventing childhood obesity.

CHAPTER 2. LITERATURE REVIEW & PROJECT FRAMEWORK

Literature Review and Synthesis

This section provides a review of the literature on early childhood obesity prevention. The literature has demonstrated the importance of anticipatory guidance related to nutrition and responsive feeding practices in early childhood. However, the limited time available during WCVs remains a challenge to deliver all necessary education appropriately. The literature review is divided as follows: a) childhood obesity prevention, b) patterns of weight gain in early life, c) responsive feeding, c) developmentally appropriate nutrition and guidance for healthy weights, d) educating parents, and e) barriers.

A literature search was completed for all English-language studies on early childhood obesity prevention. Databases used to perform the search included Cochrane Library, Cumulative Index to Nursing and Allied Health Literature (CINAHL), PubMed, and Web of Science. The following keywords were searched: childhood obesity and prevention combined with feeding and nutrition. Age groups for the search were limited to "infant," "newborn," "infant 1-23 months," and "birth-23 months" when the database allowed. The publication was limited to academic journals, and dates were limited to 2010-2019. A total of 361 articles were yielded from this search. Inclusion criteria included studies completed with feeding or nutrition as part of the focus on preventing childhood obesity. Exclusion criteria included treatment of obesity, studies with interventions beginning after 18 months, or studies with a narrow focus such as a single minority population where results could not be generalized for the urban setting proposed for this project.

Childhood Obesity Prevention

Most research on childhood obesity has concentrated on children of school age and above. Interventions have been mainly unsuccessful, in part, because the interventions targeted established behaviors (IOM, 2011). Additionally, reacting to obesity through treatment measures at the tertiary prevention level is mostly ineffective (Daniels et al., 2015; Pandita et al., 2016). The lack of success in treating obesity means that primary prevention of obesity is crucial and should start in early development. The IOM has stressed the addressing of obesity through prevention measures in the first five years of life (Birch, Parker, & Burns, 2011). Children establish nutritional preferences and learn eating behaviors in the first few years of development. The preferences and behaviors learned in infancy and toddlerhood can significantly impact health throughout life (Birch and Anzman, 2010; Daniels et al., 2015; IOM, 2011). Therefore, fostering the development of healthy eating behaviors and food preferences is an essential focus for prevention.

Few programs centered on childhood obesity prevention have targeted children in early infancy. Given the prevalence of overweight and obese children between two to four years of age, however, there is a clear need for a focus on prevention in infancy (CDC, 2014). Promoting healthy habits in early life is important because obesogenic dietary and physical activity behaviors develop in the first two years of life (Verbestel et al., 2013). Recent studies have focused on early prevention with promising results.

The literature on early childhood obesity prevention primarily involves studies focusing on dietary components. One of the first and largest high quality randomized controlled trials (RCT) is the NOURISH study (Daniels et al., 2012). NOURISH educated first-time mothers on responsive feeding techniques, as well as developmentally appropriate exposures to healthy

foods using educational modules delivered in a group setting. Responsive feeding is the consistent and appropriate parental response to a child's communication of hunger and satiety. Mothers participated in the modules on two occasions: when infants were 4-6 months of age and again at 13-15 months. The study followed the mothers and children until the child reached five years of age. The educational interventions in the study led to a decrease in obesogenic eating behaviors. Children in the intervention group were more likely to respond to satiety cues, had healthier food preferences, and a higher intake of fruits and vegetables (Daniels et al., 2012). The positive eating behaviors displayed in the intervention group may have some impact on reducing the risk of obesity long term (Daniels et al., 2012). While positive eating behaviors were observed in the study, anthropometric measures varied throughout data collection. At the 14-month evaluation point, infants in the intervention group were less likely to have rapid weight gain, and their overall measurements were consistently lower than the control group (Daniels et al., 2012). However, anthropometric measurements at the 5-year mark did not show a significant difference in BMI (Daniels et al., 2015).

Three other early prevention RCTs and one observational study with a focus on nutrition and feeding have demonstrated positive impacts on BMI (Machuca et al., 2016; Paul et al., 2011; Savage et al., 2018; Verbestel et al., 2013;). A systematic review completed by Laws et al. (2014) studied early nutrition education in disadvantaged populations with similar results as NOURISH. The Laws et al. (2014) systematic review showed that educational interventions involving feeding practices in infancy have a positive short-term impact on physical growth in disadvantaged populations. A common theme between the majority of early prevention trials is the inclusion of behavioral components, especially the use of responsive feeding or parenting. Responsive parenting encompasses the parental response to all emotional and physical needs,

including feeding. A cross-sectional study by Pyper, Harrington, & Manson (2016) emphasized the importance of parental support of behaviors that promote physical activity, healthy eating, and limited screen time. The Pyper et al. (2016) study found that parental support increased the probability that children met national health guidelines for nutrition as well as physical activity and screen time. Unlike NOURISH, which focused solely on nutrition, the Pyper et al. (2016) study incorporated physical activity and sleep in addition to nutrition. Highlights of the Pyper et al. (2016) study include the importance of fostering behavior that relates to the development of healthy practices and the need for continued parental support and education throughout child development.

Similar to the NOURISH trial, four other prevention trials with a focus on feeding failed to demonstrate a statistically significant difference in BMI once participants reached toddler to preschool age (Helle, 2019; Reifsnider et al., 2018; Schroeder et al., 2015; Schwartz, Vigo, Dias de Oliveira, & Guigliani, 2015). The varying methodologies between each study could lend possible explanations for the lack of impact on BMI. In the case of Helle et al. (2019), the children had a lower risk of obesity to begin with as mothers were of higher socioeconomic class and highly educated with a mean age in the 30's. In another study by Schroeder et al. (2015), the infants in the intervention group had higher weight for height measures at baseline compared to the control group. The intervention for the study included education on nutrition, feeding, and physical activity at WCVs up to two years of age. The difference in anthropometric measures disappeared at six months, and there remained no difference at the end of the study. The authors did not adjust for baseline measurements due to the small sample size, which may, therefore, partly explain the insignificant difference in BMI between the groups at the end of the

intervention. In other words, a slowing in the pattern of weight gain of the intervention infants may not have otherwise occurred.

Next, a study by Schwartz et al. (2015) had interventions that ended when children were four months of age. As a result, the lack of success could indicate the need for continued support as the child develops and grows past the infancy stage. The study also lacked a strong emphasis on responsive feeding techniques, preferring to focus more on the importance of breastfeeding and healthy choices for complementary feeding. Finally, Reifsnider et al. (2018) also did not emphasize responsive parenting techniques, which may have been less impactful on anthropometry because, as noted earlier, responsive parenting was one common component in studies with successful weight outcomes.

Patterns of Weight Gain in Early Life

Growth is measured differently for children under two years of age than for older children. The CDC recommends the use of the World Health Organization's (WHO) growth chart for children under two years, which measures and plots weight-for-length (CDC, 2015). According to the WHO growth chart, a normal range for weight-for-length falls between the 2nd and 98th percentiles (Appendix A). Healthy growth in children under two years of age is a growth pattern that follows a trend on the chart and falls between the 2nd and 98th percentiles. Once a child reaches two years of age, the CDC growth chart, which calculates BMI, is recommended for use (Appendix A). The CDC considers children below the 5th percentile for BMI to be underweight (CDC, 2015). Overweight on the CDC growth charts is a BMI between the 85th and 95th percentiles, and obesity is a BMI above the 95th percentile (CDC, 2015). Therefore, the definition of healthy growth for children two years of age and older is a growth

pattern that follows a trend on the CDC growth chart with a BMI between the 5th and 85th percentiles.

Growth patterns in the first year of life correlate with risk for obesity, further highlighting the need for early education on nutrition and feeding. More specifically, a pattern of rapid weight gain (RWG) in infancy is associated with the development of obesity in later childhood (Woo Baidal, 2016; Zheng et al., 2017). In fact, RWG in healthy, term infants as early as the first week of life may predict obesity. Feldman-Winter et al. (2016) found that infants who gained 100 grams in the first week were more than twice as likely to be overweight by the age of two years. In the same study, exclusively breastfed infants were less likely to experience RWG (Feldman-Winter et al., 2016). Breastfeeding also contributed to slower weight gain and lower anthropometric measures in the first year of life in a study completed by Rogers and Blissett (2017). Due to the correlation of RWG in infancy and increased risk for obesity, interventions need to begin at birth.

Responsive Feeding

As alluded to previously, the most promise in fostering healthy growth in early childhood lies in the promotion of responsive parenting and feeding techniques. Responsive parenting and feeding involve the communication of the child's needs, followed by a swift and appropriate response from the parent. The vast majority of studies with interventions successful in facilitating healthy growth emphasized responsiveness to some extent (Daniels et al., 2012; Hohman et al., 2017; Machuca et al., 2016; Paul et al., 2011; Paul et al., 2018). Even those trials that promoted responsive parenting but did not measure or see a statistically significant difference in anthropometric measures, still resulted in positive outcomes related to healthy

feeding and eating behaviors and preferences (Daniels et al., 2014; Daniels et al., 2015; Helle et al., 2019; Magarey et al., 2016; Savage et al., 2016; Savage et al., 2018; Schroeder et al., 2015).

Conversely, Shi et al. (2017) found that nonresponsive feeding practices correlated with eating behavior problems and unhealthy weights. Two systematic reviews further supported responsive feeding interventions when the authors concluded that the most promise in preventing obesity in young children lies in targeting both diet and responsive feeding (Matvienko-Sikar, 2018; Redsell et al., 2016). Diet has a substantial impact on weight (CDC, 2019a). Children who learn healthy eating behaviors and food preferences early in life have a greater potential to maintain healthy eating and, consequently, healthier weights.

Parents serve as role models for their children's health and have a strong influence on health behavior. Pyper et al. (2016) provided support for this notion when they demonstrated that parents who supported behaviors that promote physical activity and healthy eating had children who were more likely to meet national recommendations on activity and diet. For example, in the same study, children in families who participated in family mealtime away from television sets consumed more fruits and vegetables. Avoiding meals in front of the TV is not only associated with healthier eating but also allows for more mindful eating because it eliminates the distraction from recognizing satiety cues.

Developmentally Appropriate Nutrition & Guidance for Healthy Weights

Several organizations have developed evidence-based and expert recommendations for childhood nutrition and feeding. The American Academy of Pediatrics (AAP) has specifically identified recommendations to promote healthy growth in infancy to prevent overweight and obesity (AAP, 2019). Additionally, Bright Futures, a program developed by the AAP with a focus on health promotion and disease prevention, includes evidence-based nutrition

recommendations for each WCV (Bright Futures, 2019). The United States Department of Agriculture (USDA) has created specific guidelines for dietary components appropriate for differing developmental stages (USDA, n.d.). Nutritional topics from the USDA and AAP were incorporated into the project's educational curriculum and included breastfeeding, responsive feeding, complementary feeding, nutritional requirements, and reduction of sugary foods and drinks.

Research overwhelmingly supports the positive benefits of breastfeeding. Therefore, the Institute of Medicine recommends exclusive breastfeeding for the first six months of life and continuation of breastfeeding with the introduction of solid foods through at least one year of age (Gaffney, Kitsantas, Brito, & Kastello, 2014). One of the many potential benefits of breastfeeding is the impact it may have on healthy weight. A systematic review by Patro-Gołąb et al. (2016) revealed that breastfed infants had a reduced risk of obesity in childhood and into adulthood. Additionally, exclusively breastfed infants are less likely to exhibit picky eating behaviors (Specht, Rohde, Olsen, & Heitmann, 2018). Specht et al. (2018) hypothesized that pickiness might be lower in breastfed infants because breastmilk exposes a child to a variety of flavors from the mother's diet.

There are a multitude of reasons why mothers may choose not to breastfeed, including body image concerns, perceived restrictions on social life, social stigmas of breastfeeding in public, and challenges associated with returning to work (Roll & Cheater, 2016). Infant formula has been linked to RWG in early life, likely related to practices surrounding formula preparation and feeding (Appleton et al., 2017). To maintain inclusivity, avoid feelings of inadequacy, and attempt to counteract obesogenic formula feeding practices, feeding information in the project's educational curriculum included information for both breastfed and formula-fed infants.

Complementary feeding has important implications for weight and fostering healthy nutrition. Complementary feeding is the gradual introduction of solid foods into an infant's diet of breastmilk or formula. As previously discussed, lifelong eating behaviors and taste preferences are established in the first few years of life, lending great significance to the complementary feeding stage (Birch & Anzman, 2010; Daniels et al., 2015; IOM, 2011). The AAP (2019) recommends waiting until around six months of age to begin complementary feeding due to developmental readiness and risk of RWG if complementary foods are introduced early. The USDA's WIC program offers guidelines for appropriate foods, nutrients, and portion sizes for infants up to one year of age (USDA, 2019). The guide was used in conjunction with AAP recommendations as the primary sources to develop educational content for the complementary feeding stage.

Environmental factors within the home and the role of the parents in fostering healthy lifestyles cannot be overstated. Children rely on their parents for their nutritional needs. Creating an environment conducive to healthy eating, therefore, is paramount. As previously mentioned, one important environmental factor in preventing obesity is partaking in family mealtime. Participating in family mealtime without electronic or other distractions has been shown to decrease obesogenic behaviors (Daniels, Hassink, & Committee on Nutrition, 2015). One explanation as to how family mealtime promotes healthier eating habits is that avoiding distractions, such as electronics, during mealtime may allow for better recognition of feelings of fullness and, therefore, lessen the chance of overeating. The AAP Committee on Nutrition also recommends providing consistent, healthy meals and increasing the availability of healthy foods in the child's environment (Daniels, Hassink, & Committee on Nutrition, 2015). Much of the

project's educational curriculum focused on the parent's role, promoting healthy foods, family mealtimes, and appropriate portion sizes for the child's age.

Healthcare providers are well-positioned to guide nutritional and feeding practices in early life. About 90% of children under the age of two years attend regular WCVs (Child Trends Databank, 2018). Therefore, healthcare providers can impact a majority of families with infants and toddlers. Since food preferences and dietary habits are established in early infancy and become difficult to modify as the child grows, providing appropriate guidance on nutrition and feeding is essential to fostering lifelong healthy eating behaviors (Lioret et al., 2015; Smithers et al., 2012).

Educating Parents

There are several methods of delivering patient education in practice. Most of the childhood obesity prevention trials outlined previously involved traditional face-to-face methods of education. One additional method that may be valuable for parents of young children is the use of technology, such as audiovisual modalities. A systematic review and meta-analysis by Flujas-Contreras, García-Palacios, & Gómez (2019) concluded that technology-based interventions increased parent participation when compared to traditional methods. There are several important developmental topics to cover in a short thirty-minute clinic visit, resulting in time constraints for the provider and an overload of information for parents to absorb. Having tools for parents to view at their leisure can save time during appointments so that providers can reinforce important information and have time for parent questions. Providing education through video format also standardizes the education delivered to every parent, ensuring that everyone receives the same information.

Parents report seeking out online resources to guide their parenting, including feeding practices in early childhood (Buultjens, Robinson, & Milgrom, 2012). Buultjens et al. (2012), however, found that popular Google searches lack reputable and easily navigable online resources on parenting. The need for easily accessible online resources lends an important opportunity for healthcare facilities to fill. Moreover, parents expect to have access to online and video education through healthcare facilities (Ledoux, Robinson, Baranwski, & O'Connor, 2018). If parents are searching for advice and information on the internet, healthcare facilities could provide resources in similar online formats that are reputable and evidence-based.

Another method to consider as an educational delivery method is the use of group visits. In an RCT completed by Gross et al. (2016), group visits began in the perinatal period and continued until the child reached three years of age. Similar to NOURISH, group visits were in addition to regularly scheduled healthcare visits. Group visits fostered peer support and focused on nutrition, feeding, and parenting. The Gross et al. (2016) group visit format led to an increase in exclusive breastfeeding and reduced early introduction of complementary foods compared to the control group. Group visits covering feeding and nutrition topics could potentially allow more time for anticipatory guidance and parent questions during WCVs. Group settings lend an opportunity to reach more people in a shorter amount of time and allow for peer interaction and support.

Regardless of the educational method of delivery, the AAP Committee on Nutrition recommends customizing education to the developmental stage of the child (Daniels, Hassink, & Committee on Nutrition, 2015). Significant changes in development occur during the first year of life. Nutritional and feeding needs change with rapid developmental progression; therefore, providing education that is relevant to the current needs of the family will likely increase the

educational value. The project educational curriculum provides nutrition and feeding information for every developmental stage between ages two weeks to three years. Written materials were chosen initially for the educational curriculum with the intent that providers help choose the ultimate delivery method.

Health Literacy

A systematic review of 98 articles on health literacy performed by Berkman et al. (2011) concluded that individuals with low health literacy tend to have inferior health outcomes and poorer use of healthcare services. Therefore, health literacy is critical to consider when writing health education materials. The Patient Protection and Affordable Care Act defined health literacy as "the degree to which an individual has the capacity to obtain, communicate, process, and understand basic health information and services to make appropriate health decisions" (CDC, 2019b). In recognition of concerns surrounding low health literacy, the USDHHS published the National Action Plan to Improve Health Literacy in 2010. The vision was for all individuals to have access to accurate and actionable health information delivered in a person-centered manner and to support lifelong learning and skills for the promotion of health (USDHHS, Office of Disease Prevention and Health Promotion, 2010).

In alignment with the National Action Plan's vision, one Healthy People 2020 objective is to "increase the proportion of persons who report their health care provider always gave them easy-to-understand instructions about what to do to take care of their illness or health condition" (USDHHS, 2016). In the baseline year, 2011, 64.1% reported receiving easy-to-understand instructions. With a target of 70.5%, the last report in 2016 came near goal when 69.2% of persons overall reported receiving understandable information. However, the disparity in health literacy is evident in adults over age 65, ethnic minority groups, immigrants and refugees, non-

native English speakers, and those individuals with less than high school education. Due to disparity, recommended readability levels vary from a fifth- to eighth-grade level depending on the source (Olfiffe et al., 2019).

The past decade has seen an explosion in the use of tests and formulas to determine the health literacy of patient education materials. Commonly used tests are summarized in Table 1. The tests described in Table 1 are also the preferred tests used by the organization associated with this PIP. According to Jindal and MacDermid (2017), readability formulas are quick and easy to use; however, readability scores are limited or inadequate as objective measures. Further, reading ease depends on many more factors than sentence length and number of syllables. Page layout, color, font, and spacing are just a few factors that affect readability. The writer must attempt to make written material engaging by highlighting important information, and tailor the education to the targeted audience. Readability scores are criticized for lack of construct validity because the formulas are based on statistics without regard to theories of reading and comprehension (Crossley, Skalicky, Dascalu, McNamara, & Kyle, 2017).

Table 1

Health Literacy Tests

Test	Measurement	Standard Score	Limitations	Benefits
Flesch-Kincaid Grade level	Grade level determined by computation of readability based on a combination of words per sentence and syllable	Academic grade level. Suggest 8 th grade or below	Developed for textbooks and technical literature	Frequently used Available as editing feature of WORD. Organization Choice
FORCAST (named after the authors)	Originally designed for assessment of technical documents. Grade level of text based on monosyllabic words	Academic grade level # Monosyllable words/150 words	Not designed for running narrative. Sentence length not considered	Organization choice Better for lists and incomplete sentences
Fry-Based Grade level or Fry-Graph Readability Formula	Grade level is calculated by plotting average number of sentences and syllables per 100 words on a graph	Readability through HS		Organization choice
Simple Measure of Gobbledygook (SMOG)	Based on regression analysis of polysyllables word frequency. Attempts to predict 100% comprehension	Grade level 4 th grade to college level	May produce grade level 1-2 grades higher than other formulas	Organization choice

Note. Citations for the table include the following: Abou-Diab, Moser, & Atterson, 2018; Berkman et al., 2011; Jindal & MacDermid, 2017; & Oliffe et al., 2019.

Barriers

Parents with children who are overweight or obese do not always perceive their children's weight to be unhealthy. Moreover, some parents believe that overweight infants are a sign of a well-fed baby (Harrison, Brodribb, & Hepworth, 2015). According to the Feeding Infants and Toddlers Study (FITS), most parents perceived their child's weight to be normal. If parents were concerned about an unhealthy weight, they were more likely to believe their child was underweight than overweight (Briefel, Deming, & Reidy, 2015). Additionally, the same study found that parents believed their child's diet to be healthier than reality. For instance, only 30% of preschool-aged children met daily fruit and vegetable recommendations despite most parents reporting that their child consumes enough fruits and vegetables (Briefel et al., 2015).

Furthermore, only about half of toddlers met the recommendations to limit the consumption of juice or other sweetened beverages (Briefel et al., 2015). The results of the previous studies identify potential barriers related to preconceived notions of infant weight. Recognizing parents' perception of weight and healthy diet can create a focus on early education and support of parents in feeding their children so parents can support the development of healthy habits.

Children rely on their parents to provide for their basic needs, including food. However, some parents face barriers that may impede them from meeting nutritional and feeding recommendations for their children. Ling, Robbins, and Hines-Martin (2016) identified perceived barriers parents face in supporting healthy behaviors of their children, including eating. Parents in the study identified picky eaters, lack of time, finances, and lack of cooking skills as barriers to supporting healthy eating. Healthcare providers need to recognize these barriers and help parents to address them. An essential piece for parents of toddlers to understand is that the typical norm for toddlers is to be selective eaters (AAP Committee on Nutrition, 2018).

Supporting parents and teaching them how to handle selective eating, or pickiness, is vital to helping parents foster healthy eating. One meaningful way to support parents is by encouraging them to keep exposing their children to a variety of flavors because frequent exposures increase the likelihood of trying new foods (De Cosmi, Scaglioni, & Agostini, 2017). To address pickiness in the educational curriculum, resources from AAP, USDA, and expert recommendations from a pediatrician, pediatric nurse practitioner (PNP), and pediatric dietician were used. Helping parents with other strategies such as providing quick, easy, and healthy recipes and connecting parents with community resources may also help to address time and financial barriers.

A significant challenge during a WCV is creating time to give nutrition the attention it deserves. Parental education is a crucial part of the WCV. However, 30-minute appointments limit a provider's ability to cover all important topics adequately. Health promotion information, including nutrition, is often not adequately addressed in these visits, likely a consequence of time constraints. Baseline data used in developing Healthy People 2020 objectives found that only "7.9% of office visits by all child or adult patients included counseling about nutrition or diet in 2012" (USDHHS, 2018). As previously discussed, providing information on feeding and nutrition has the potential to positively impact the weight and, therefore, the health of children. Devoting enough time to nutritional education at the WCV, however, often proves challenging.

While healthcare providers are ideally placed to provide nutritional counseling, many are poorly prepared to do so through their education. According to a survey of US medical schools, only 29% of programs spent the recommended 25 hours on nutritional education (Adams, Butsch, & Kohlmeier, 2015). The average amount of time spent on nutritional education in medical school is only 14.3 hours (Adams et al., 2015). Nursing education is not much better. Most baccalaureate nursing programs incorporate some basic nutritional concepts in their programs, either throughout core nursing classes or through a nutrition course (Kris-Etherton et al., 2014). Core competencies for advanced practice registered nurses (APRNs), however, include advanced physiology, pharmacology, and health assessment with little to no emphasis on nutrition-specific content (Kris-Etherton et al., 2014). With little emphasis on nutrition in medical school and APRN programs, healthcare providers may not feel equipped to provide patients with accurate and relevant nutritional information. Considering the unique nutritional needs of infants and toddlers, providers caring for this population need resources to help them adequately counsel parents.

Project Framework

Implementing evidence-based interventions into clinical practice can be a complex and challenging task. Several theories and models have been developed to guide practitioners with this process. Throughout this section, the Model for Improvement, which includes the use of Plan-Do-Study-Act (PDSA) cycles, will be introduced as an evidence-based practice model. Ellyn Satter's division of responsibility (sDOR) will also be introduced as a theory used to guide the development of the project.

Model for Improvement

The Model for Improvement is a simple framework designed to guide improvement projects. The model is comprised of three questions, answered in no particular order:

- “What are we trying to accomplish?
- How will we know a change is an improvement?
- What change can we make that will result in an improvement?” (Langley et al., 2009).

There are five steps used to address the three main questions for a successful PIP. The first step in the process is the formation of a team and stakeholders to create a successful foundation for the project. The second step is to establish objectives to answer the question, "What are we trying to accomplish?" By creating outcome measures, the third step answers the question, "How will we know that a change is an improvement?" The fourth step identifies what changes will be made by addressing the question, "What change can we make to result in improvement?" The fifth step involves testing the change (Langley et al., 2009).

To test the change, the Model for Improvement uses PDSA cycles. The PDSA cycle was used within this framework as a guide to test out a change on a small scale and make

improvements to the original change as necessary (Figure 1). The cycle involves four simple steps: plan, do, study, and act. In other words, these steps are: plan the change, implement the change, evaluate the outcomes, and make adjustments based on what was learned. Every time an adjustment is made, the cycle starts over again to see whether improvements were made, or unexpected consequences experienced (Deming, 2000).

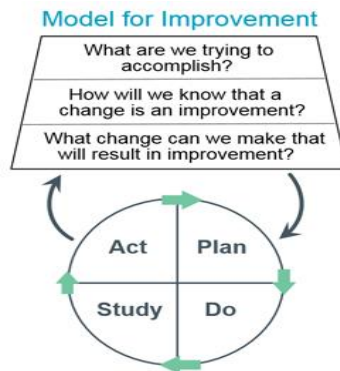


Figure 1. Model for Improvement with PDSA Cycle (Langley et al., 2009). Figure obtained with permission from copyright holders. See Appendix B for a copy of the permission statement.

The Model for Improvement serves as a universal tool for improvement projects. The PDSA cycle was well-served as a guide for creating new, developmentally specific education on feeding and nutrition. The model allowed for learning opportunities and adjustments throughout the development of the educational curriculum, resulting in a high-quality product (Langley et al., 2009).

Ellyn Satter’s Division of Responsibility

Ellyn Satter is a registered dietician and nutritionist with extensive experience with children. She emphasizes a biopsychosocial approach to eating and feeding, and she is the creator of the division of responsibility in feeding (sDOR), which has been endorsed by the AAP, USDA, and several other organizations (Ellyn Satter Institute [ESI], 2019). The sDOR is a responsive feeding technique in which the parent determines the what, when, and where their

child is fed, and the child determines how much and whether to eat what is given to them (ESI, 2019).

Satter emphasizes shifting the paradigm from a controlling approach to a trust-based approach in the prevention of childhood obesity (Satter, 1996). The philosophy behind the sDOR approach to feeding is the knowledge that infants and toddlers are capable of regulating their intake (ESI, 2019; Devaney et al., 2004; Fox et al., 2006). Satter believes that "a child who is controlled learns self-doubt, ambivalence, and dependency, either positive or negative. A child who is trusted learns self-esteem and responsibility" (Satter, 1996, p. 861). In other words, trusting a child's innate ability to manage their energy requirements, supports the child's emotional and physical development. Trusting the child may help to support healthy growth processes by constructing the eating environment so that the child learns to eat for their own energy needs rather than as a response to other factors, such as emotion.

Recent studies that have directly applied sDOR are lacking despite recognition from AAP and USDA. One study, Agras et al. (2012), sought to teach families with one or more overweight caregivers to apply sDOR. The study observed how the approach affected feeding interactions between the caregiver and child. In the study, sDOR was successful in decreasing harmful feeding practices, such as restriction and pressure, compared to the control group (Agras et al., 2012). Ruder & Lohse (2017) came to similar conclusions when implementing sDOR in the home setting led to a decrease in nutritional risk. Nutritional risk was evaluated through a validated tool measuring topics such as food and nutrient intake, feeding environment, and food security. The results of both studies suggest that sDOR is an effective method in promoting positive feeding practices.

CHAPTER 3. METHODS

As part of project planning, pediatric providers were asked to identify potential contacts with expertise or an interest in childhood obesity. One of the identified experts was a clinical psychologist who is a board-certified behavior analyst, an expert in feeding disorders and has an interest in early childhood development. As the director of the organization's feeding disorder program, the behavior analyst recognized that parents of infants and children need better and more consistent education on healthy nutrition and responsive feeding. The behavior analyst shared recent research indicating that nutrition education must begin as early in an infant's life as possible. Armed with the knowledge that prevention is key to decreasing childhood obesity, brainstorming began for methods to improve the quality and quantity of parental nutrition and feeding education. Along with other champions within the organization, the development of an educational curriculum for parents beginning at childbirth through age three became the project goal. The target audience was parents attending well child visits with children between the ages of two weeks and three years.

The parent-focused educational curriculum was based on a review of research, national nutrition and feeding guidelines, and expert consultation within and outside of the organization. The recurring theme among experts and research is the importance of responsive feeding. Responsive feeding has a positive impact on the prevention of childhood obesity. Therefore, sDOR fit well as a theory for the PIP.

The PDSA model was used in project development and evaluation. The PDSA model is intended to test a change on a small scale and make improvements as needed, and therefore appropriate for the PIP. The *Plan* step included organizational approval, pediatric provider recommendation and support, and alignment with an education specialist (EdS) for guidance and

feedback on the educational curriculum. Following several meetings, the project received permission to move forward by the organization and NDSU institutional review board (IRB). In the *Do* step, eleven parent education documents were written to correspond with the 2-week, 2-, 4-, 6-, 9-, 12-, 15-, 18-, 24-, 30-month, and 3-year WCV. Once developed, the EdS evaluated the educational materials for literacy level and compliance with organizational standards. The EdS approved the documents for dispersion and review by Pediatric and Family Medicine providers. During the PDSA *Study* step, providers reviewed the documents, provided feedback through a Qualtrics or paper survey, and chose a preferred delivery method for parental education. Data analysis followed the collection and review of the survey results. To complete the last step of the first PDSA cycle, *Act*, review of the recommendations and feedback from providers resulted in several minor edits to the documents. Plans for implementation began; however, due to timing and unforeseen circumstances, the next PDSA cycle was turned over to the organization.

PDSA

Plan

As part of the *Plan* step, numerous planning meetings with the behavior analyst and patient education department followed regarding organizational support of the project. Consultation with NDSU IRB and the organization IRB resulted in a determination that the project did not qualify as human subject research needing IRB approval. The organization gave verbal approval to move forward and waived the need for an official IRB application. See Appendix C for the IRB approval letter from NDSU.

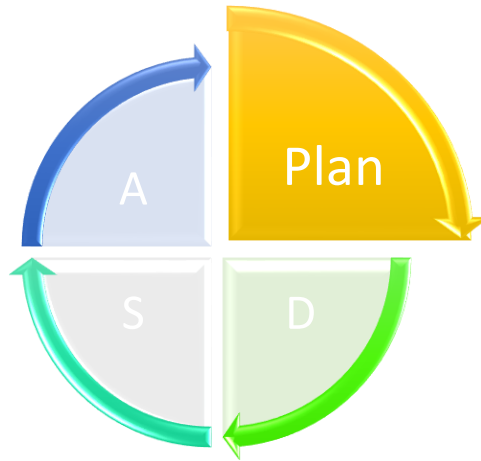


Figure 2. Representation of the “*Plan*” phase of the PDSA Cycle

Stakeholders

The first person to buy-in to the project was the behavior analyst, who had wanted to start a project on preventing childhood obesity considering recent research targeting infants and toddlers. A connection was made with the behavior analyst when reaching out to various contacts with an interest in childhood obesity. As an expert in early child development and feeding disorders, the behavior analyst was instrumental as a stakeholder within the organization for the project.

In order to develop the educational curriculum, project recruitment continued by adding several individuals considered experts from a variety of disciplines. The organization’s patient education department was the first to be reached out to for assistance. An EdS with a background in pediatrics as a registered nurse became the representative and liaison for the organization’s education department. The EdS contributed expertise in patient education and health literacy in developing the educational curriculum. Due to organizational policy, an EdS must review and edit all patient education before use in practice. Additionally, expert personnel provided input and consulted on the content for the educational curriculum. The experts included a lactation

consultant, a pediatric dietician, a pediatrician, and a PNP. All experts worked within the organization, except the PNP, who worked at a small private clinic within the same community.

Setting

The educational curriculum was developed for an urban Midwestern pediatric primary care clinic. The clinic was small, but part of a large healthcare organization spread throughout the Midwest with several clinics located within the community. The population of the metropolitan community was over 200,000. The clinic was a new, free-standing location that served the southern metropolitan area. Services provided at the clinic included primary care for pediatrics and adults, prenatal care, and walk-in clinic services. The clinic providers consisted of three pediatricians, two family medicine physicians, two family medicine nurse practitioners (FNPs), one certified nurse-midwife (CNM), and two FNPs who provided walk-in services only. The behavior analyst suggested the project setting because the small clinic size made the location appropriate for future implementation of the educational curriculum on a small scale as a pilot study.

Sample

A convenience sample included providers at the clinic who performed well child examinations from birth to at least three years of age. Three pediatricians, two family medicine physicians, and two FNPs were asked to participate. The CNM and walk-in providers were excluded because they did not routinely perform well child examinations for the specified age groups. The three pediatricians will be involved in implementing the educational curriculum in a pilot study in the future, making their input valuable.

Due to a low initial response rate from providers, feedback was sought from other professionals who routinely perform well child examinations for the specified age groups. The

behavior analyst suggested three additional pediatricians within the organization. The pediatricians practiced at a different clinic location but part of the same large healthcare organization within the same community as the primary setting. Additionally, an FNP who had previously served as a preceptor was asked to participate. The FNP worked for the same large organization, though in a rural setting. Finally, a PNP, who was a previous co-worker and personal mentor, agreed to participate. The PNP worked at a small independent clinic within the urban community of over 200,000 people. The PNP networked with 20 other PNPs she knew through her education and the National Association of Pediatric Nurse Practitioners. All providers asked to participate provided primary care services to the specified age groups. A larger sample allowed for more input on the educational curriculum prior to presenting the education to parents.

Do

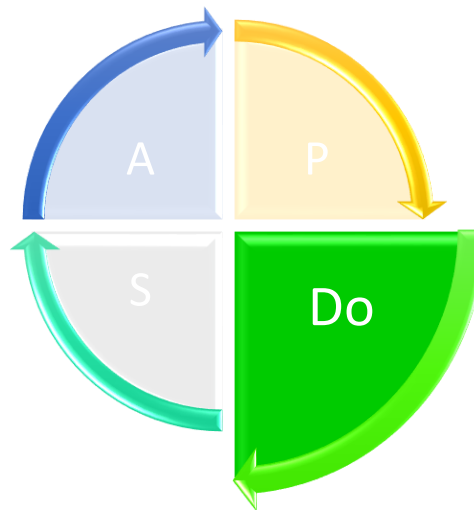


Figure 3. Representation of the “Do” phase of the PDSA Cycle

Objective One

The first objective involved the creation of a parent-focused educational curriculum on feeding and nutrition for parents presenting with their children for WCVs. Eleven documents

corresponded with the 2-week, 2-, 4-, 6-, 9-, 12-, 15-, 18-, 24-, 30-month, and 3-year WCVs. The feeding and nutrition education in each document was specific to each developmental stage and aligned with the sDOR approach to responsive feeding. Nutritional and feeding recommendations incorporated guidelines and recommendations from the AAP, USDA, ChooseMyPlate, and the WIC Program. At the time of the project development, the US Department of Health and Human Services (HHS) and USDA's *2015-2020 Dietary Guidelines for Americans* (2015) began with children two years of age and older. Therefore, the HHS and USDA guidelines directed the development of the curriculum for parents of children two years of age and older. The WIC program's feeding and nutritional recommendations were evidence-based and used in conjunction with AAP resources and recommendations to guide the curriculum for children under the age of two years (USDA, 2019).

Throughout the development of the initial drafts, the following experts provided approval and input: a pediatric dietician, a lactation consultant, a pediatrician, and the EdS within the organization, as well as a PNP from a small independent clinic. The EdS provided guidance on health literacy and methods of delivering patient education. Recommendations from the EdS guided changes made to the educational curriculum. The other members provided expert counsel on the educational content. Communication with experts occurred through a series of informal meetings, telephone calls, video conferencing, and email communication.

Data Analysis

The EdS reviewed the initial drafts of the educational curriculum and provided suggestions on formatting and word choice to maximize the readability of the curriculum. The EdS performed a health literacy assessment with four literacy assessment tools: Fry-Based Grade Level, Flesch-Kincaid Grade Level, Precise SMOG Index, and FORCAST Readability Formula.

Edward Fry developed a validated "readability graph" used to plot a grade-level score based on a combination of the number of sentences and syllables in a sample of the writing. The Fry-Based Grade Level uses the same formula to estimate a grade level readability score. The Flesch-Kincaid Grade Level uses a mathematical formula that involves the average number of words per sentence and the average number of syllables per word. The Precise SMOG Index uses a formula based on the average syllables in a sample of sentences throughout the text. Last, the FORCAST Readability Formula involves a calculation including the number of single-syllable words in a sample of text. Each readability formula resulted in a grade-level reading score for each education document correlating with the WCVs. The EdS used the scores from each of the four assessment formulas to compute an average grade level readability score for each education document corresponding with each WCV. In order to align with recommendations for written health information, the goal was to achieve a readability score at an 8th-grade level or below for every education document (Jindal & MacDermid, 2017).

Study

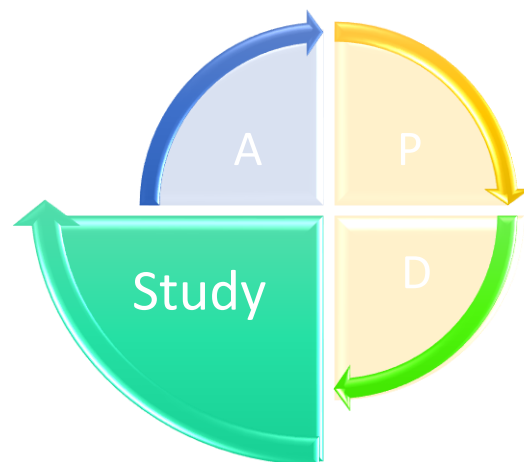


Figure 4. Representation of the “Study” phase of the PDSA Cycle

Objective Two

The second objective was to evaluate the educational curriculum for understandability, relevancy, value, and accuracy. Providers reviewed, evaluated, and provided feedback about the curriculum via a Qualtrics survey (Appendix D). As input was sought specific to the educational curriculum, previously designed and tested evaluation tools did not fit the project. Therefore, a survey was designed purely for feedback purposes. Reliability and validity were not tested, nor was the survey meant for reproduction or evaluation of similar projects.

The Qualtrics survey elicited quantitative and qualitative feedback. The survey included a series of yes or no questions, fill in the blank, Likert scales, and ranking questions. Simple yes or no questions were used to evaluate the provider's perception of the accuracy of the developed educational curriculum. Following the questions, providers could comment on accuracy. Likert scales are useful for evaluating the extent to which someone agrees or disagrees with a statement or topic. Therefore, questions about relevancy, value, and understandability were evaluated via an opinion-based 0-10 Likert scale. Finally, the survey included open-ended questions for provider feedback on perceived barriers, delivery methods, content, and comments or suggestions.

The sample of providers reviewed the educational curriculum and completed the survey. In order to allow flexibility for viewing the material on their own time, the survey was made available to providers both online and in paper forms delivered to the clinic. Providers put completed surveys in a manila envelope and sealed the envelope to maintain confidentiality. No identifiable data was elicited. The providers at the initial clinic location were given ten days to review the material and provide feedback. As discussed previously, due to a low initial response rate at the clinic, the survey was offered to other providers via email as outlined in the *Sample*

section. Due to time constraints, providers had just three days to review the material and complete the survey.

Data Analysis

Each completed survey was individually reviewed on the online Qualtrics program. One survey was completed on paper and was entered verbatim to the series of completed online surveys. Questions in yes/no format were tabulated. The questions formatted as 0-10 Likert scales were divided as follows: a response of 0 to 3 indicated “not at all agreeable,” 4 to 6 indicated “neutral,” and 7 to 10 indicated “extremely agreeable.” An average was calculated for each Likert scale question. Open-ended questions on general suggestions, inaccuracies, or missing material were organized by theme. Table 2 outlines how each component of objective two was addressed.

Table 2

Evaluation of Objective Two Components

Objective Two Component	Method of Evaluation
Understandability	Survey Question 5 (See Appendix)
Relevancy & Value	Survey Question 3 & Question 4 (See Appendix)
Accuracy	Review of Literature and Guidelines Consultation with Experts <ul style="list-style-type: none"> - Lactation Consultant - Pediatric Dietician - Pediatrician - Pediatric Nurse Practitioner Survey Questions 1 & 2 (See Appendix)

Act

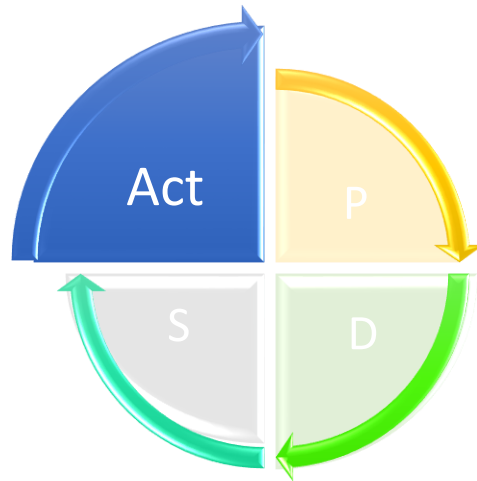


Figure 5. Representation of the “Act” phase of the PDSA Cycle

The *Act* step included adjusting the educational curriculum based on provider and EdS feedback. The EdS provided suggestions and results from the health literacy assessment to improve the readability of the educational curriculum. Readability improved through measures such as removing contractions and re-phrasing sentences to increase simplicity. After the changes, the EdS completed another formal health literacy evaluation. The methodology did not change for the second evaluation. Each document received an average grade level readability score.

Provider comments and suggestions obtained from the survey were carefully considered and the appropriate changes made. Before making suggested content changes, a literature review validated that the suggestions were indeed evidence-based. The second review did not involve major content-related changes, however, providers should review the edits in the documents before moving forward.

Objective Three

The *Act* step was further applied through the third objective, which involved the development of a plan to deliver the education to parents at an urban Midwestern primary care clinic. In order to determine the best educational delivery method, data from the survey was analyzed, as summarized in *Data Analysis*. A meeting was then held with the behavior analyst to review the results of the survey and brainstorm a plan to implement the educational curriculum into practice through a pilot study. The plan was verbally approved by the behavior analyst and is included in more detail in Chapter 5.

Data Analysis

Through the survey (Appendix D), information was gathered on what providers felt to be the best delivery method(s) for the educational curriculum in terms of feasibility and value. Providers ranked the following four options for delivery methods in order of preference: audiovisual modules, one on one discussion, written materials, and combination of audiovisual and written materials (1 = the most preferred, 4 = least preferred). The survey listed an optional fifth choice to fill in if providers suggested an additional delivery method. However, given no providers chose or ranked a fifth option, only the four options listed were analyzed. Mean rankings were calculated to determine the best option in terms of both feasibility and value. In order to determine the significance of the mean rankings, a non-parametric Friedman test of differences in repeated measures was performed. When the rankings were significantly different, post-hoc testing was completed using Conover's test to determine where the difference arose.

Providers also identified foreseen barriers to implementing the education through open-ended responses. Responses were organized by theme. The frequency of the most common reported themes was calculated.

PDSA Cycle 2: Parent Education Implementation

Once results were shared with the behavior analyst and plans were made for implementation, the PIP ended due to timing and unforeseen circumstances. While dispersing the parent-focused educational curriculum was unable to occur during the PIP, the organization had plans to conduct a pilot study using the materials. PDSA cycles were designed to be repeated as often as necessary for a PIP to be successful. After developing the educational delivery and implementation plan, the project was turned over to the organization for the project to continue with the next PDSA cycle.

CHAPTER 4. RESULTS

The primary goal of the PIP was to develop an educational curriculum for parents attending WCVs for children aged three years and younger. The education focused on feeding and nutrition for each developmental stage correlating with WCVs from the two-week visit to the three-year visit. Evaluation occurred over two weeks: from the end of February 2020 to early March 2020. Providers in urban and rural settings who perform WCVs in the specified age groups evaluated the curriculum. The EdS within the organization evaluated the educational curriculum for health literacy and the organization's standards of written patient education material. The results in this chapter are a continuation of the *Study* phase of the PDSA cycle, in which data is collected and prepared to be analyzed.

Providers

Thirty providers received the survey (Appendix D) to evaluate the educational curriculum. The providers consisted of six pediatricians, two family medicine physicians, three FNPs, and 20 PNs. Most providers practiced in urban settings as part of a large organization in both Minnesota (MN) and ND. Two providers practiced in rural settings: one was in a rural MN clinic part of a large organization, and the other practiced in a rural Indian Health Services clinic. One provider worked for a small private clinic in an urban setting. Thirty-three percent of providers responded to the survey (N = 10). Specific demographic data was not obtained from each participant through the survey as demographic data was irrelevant to the development of the educational curriculum. The data was not separated by provider for anonymity.

Objective One Results

Objective one involved the creation of the educational curriculum. The educational curriculum was created through reviews of literature and guidelines and with input from several

experts. The EdS reviewed the first drafts of the educational curriculum and made recommendations based on the organization’s standards for written patient materials. The EdS also provided recommendations beyond the organization's general standards on formatting and wording suggestions. The recommendations received from the EdS are summarized in Table 3. The EdS also calculated a grade-level readability score by taking the average of the following four assessment tools: Fry-Based Grade Level, Flesch-Kincaid Grade Level, Precise SMOG Index, and FORCAST Readability Formula (Table 4). The original grade-level readability scores for each WCV curriculum ranged from 6.3 to 8.0.

Table 3

Summary of EdS Recommendations

Category of Recommendations	Organization’s General Print Standards for Patient Education	Additional Recommendations from EdS
Layout & Design	<ul style="list-style-type: none"> • Balance of text & white space • Use of headings to guide reader • Font: minimum 12-point font for text (larger for headings) and serif style 	<ul style="list-style-type: none"> • Use only black font • Do not underline or use italics
Organization of Content & Clarity	<ul style="list-style-type: none"> • Use of plain language and pleasant tone • Shorter sentences and bullet points to organize information • Aim for 5th-6th grade readability • Use of bold style font to emphasize headings and keywords • Active voice with emphasis on desired behavior 	<ul style="list-style-type: none"> • Use pronouns in gender-neutral tones, such as “he/she” • Do not use contractions • Change use of “once” to “one time a day” • Replace “&” with the word “and” • Replace “i.e.” with “for example” or “such as”

Table 4

Average Grade Level Readability Scores from Initial Assessment with EdS

Well Child Visit	Average Readability Score
2 Week Visit	6.7
2 Month Visit	7.7
4 Month Visit	7.1
6 Month Visit	7.9
9 Month Visit	6.4
12 Month Visit	6.3
15 Month Visit	6.4
18 Month Visit	8.0
24 Month Visit	6.5
30 Month Visit	6.8
3 Year Visit	6.5

Objective Two Results

Under objective two, providers evaluated the educational curriculum through the survey (Appendix D). Evaluation of the content within the educational curriculum involved assessing for accuracy, relevancy, value, understandability, and any information providers felt was important to add to the educational curriculum.

Accuracy: Survey Questions 1-2

Seventy percent of providers (n = 7) felt the content within the educational curriculum was accurate (Table 5). Comments received on the accuracy of the content is summarized in Table 6. Twenty percent of providers (n = 2) commented that additional information should be added to the educational curriculum, which is summarized in Table 7.

Table 5

Evaluation of Educational Content Results (N = 10)

Survey Questions on Education Content	Yes	No
Question 1. Is the educational content for each age group accurate?	7	3
Question 2. Is there any nutritional or feeding information you feel is missing for any of the age groups?	2	8

Table 6

Comments on Question 1

Paraphrased Comments on Accuracy (n = 3)
<ul style="list-style-type: none"> • AAP recommends waiting six months to introduce solid foods • With breastfeeding, focus more on signs of satiety than length of feeding time. Do not add that infant should feed 20-45 minutes as some babies are very efficient and others take more time • Would like to see: “Breastfeeding should not hurt! Please see your healthcare provider or lactation counselor if you are experiencing pain during breastfeeding.” • Would prefer to see general statement of “infant cereal” in 4-month visit. Other than iron fortification, rice cereal has poor nutritional value compared to oatmeal. • Unless child is at increased risk for allergies, what evidence is behind waiting 3-5 days between new foods? • Disagree with toddler snack suggestions of Chex mix, rice cereal bars, and light ice cream • Clarify that walking around with sippy cups do not cause dental caries unless they contain drinks other than water

Note. In some instances, respondents used quotations to convey suggestions. The quotations listed above reflect the use of quotations by respondents.

Table 7

Comments from Question 2

Paraphrased Comments from Question 2 (n = 2)
<ul style="list-style-type: none">• Discuss making baby foods at 4- or 6-month visits• Beyond 2-week visit, continue to add instruction on mixing formula correctly. Hyponatremic seizures due to dilution of formula are more common around 3-4 months of age due to inability to afford appropriate quantities

Relevancy, Value, & Understandability: Survey Questions 3-5 & Literacy Evaluation

Providers evaluated the relevancy of the education for parents and the value of the education for their practice using a 0-10 Likert scale. Responses ranked 0-3 were labeled as "not at all relevant or valuable;" responses ranked 4 to 6 were considered "neutral," and responses ranked 7 to 10 were considered "extremely relevant or valuable." All providers (N = 10; 100%) found that the educational curriculum would be extremely relevant to parents with an average score of 9.11 on the 10-point scale. Most providers (n = 9; 90%) felt the educational curriculum would be extremely valuable to their practice with an average score of 9.00 on the 10-point scale. One provider felt neutral towards the value of the educational curriculum (n = 1; 10%). No providers (n = 0) felt the educational curriculum was "not at all relevant or valuable." Table 8 breaks down individual responses.

Table 8

Breakdown of Providers Responses to Questions on a 0-10 Scale (N = 10)

Abbreviated Survey Questions 3-5	5	6	7	8	9	10
3. How relevant to parents...?	0	0	1	1	3	5
4. How valuable to practice...?	1	0	0	1	2	6
5. How understandable...?	0	0	1	1	2	6

Note. Provider answers ranged from 5 to 10 on a 0-10 scale (10 = extremely relevant, valuable, or understandable). The full survey questions are in Appendix D.

Evaluating the understandability for objective two was completed through question five of the provider survey as well as through an additional formal literacy evaluation completed by the EdS on the final drafts of the educational curriculum. Question five asked providers to rate the understandability of the education for parents using a 0-10 Likert scale. A rating of 0 to 3 indicated "not at all understandable;" a rating of 4 to 6 indicated a "neutral" agreement on understandability, and "extremely understandable" was indicated by a rating of 7 to 10. All (N = 10) providers indicated that the educational curriculum was extremely understandable for the target audience, with an average score of 9.22 on the 10-point scale (Table 8).

After editing the educational curriculum per the EdS recommendations under objective one, the EdS completed another formal literacy evaluation. The EdS applied the following assessment tools to the educational curriculum: the Fry-Based Grade Level, Flesch-Kincaid Grade Level, Precise SMOG Index, and FORCAST Readability Formula. The results from each formula were again used to compute an average grade level (Table 9). The final scores ranged from 6.3 to 8.3.

Table 9

Average Grade Level Readability Scores from Initial & Final Assessment with EdS

Well Child Visit	Initial Readability Score Average	Final Readability Score Average
2 Week Visit	6.7	7.4
2 Month Visit	7.7	7.7
4 Month Visit	7.1	7.1
6 Month Visit	7.9	8.3
9 Month Visit	6.4	6.8
12 Month Visit	6.3	6.4
15 Month Visit	6.4	6.5
18 Month Visit	8.0	7.2
24 Month Visit	6.5	6.5
30 Month Visit	6.8	6.3
3 Year Visit	6.5	6.4

Additional Comments on Educational Curriculum: Survey Question 10

The survey concluded with a free-text response for providers to make any overall suggestions or comments (N = 6). The following table lists direct comments from each provider that responded.

Table 10

Direct Quotes Received for Question 10

Direct Quotes Received for Overall Suggestions or Comments (N = 6)
<ul style="list-style-type: none"> • “This is an excellent material and I have already been providing this to my patients as a supplement to their AVS.” • “Print in various languages (Spanish, Somali, Vietnamese).” • “These are great!!!” • “I think this information is fantastic and I would love to use this in my practice! It would be nice to have it as a pamphlet or some other easy to distribute form, but otherwise is great. This would have some significant value in my practice.” • “Include baby-led weaning.” • “Great job!”

Objective Three Results

Objective three involved designing a plan to deliver the educational curriculum to parents. In order to design the plan, providers were asked to give feedback and suggestions on educational delivery methods and the feasibility of implementing the education into practice. The survey listed the following options for delivery methods: audiovisual modules, one on one discussion, written materials, and a combination of audiovisual and written materials.

Delivery Methods: Survey Questions 6 & 7

Providers ranked each method from the most feasible to the least feasible delivery format as well as the most valuable to least valuable for parents (1 = most preferred, 4 = least preferred). One provider misunderstood the ranking system, and that response was subsequently removed. Each provider's response to ranking delivery methods in terms of feasibility is listed in Table 11. Based on the average frequency of most feasible options, providers ranked one on one discussions first with a mean ranking of 1.89, followed closely by written materials with a mean ranking of 2.00. (Table 12). The least feasible method cited by providers was audiovisual modules, with a mean ranking of 3.44.

Statistical testing was conducted using the Friedman test, which resulted in a Chi-square value of 8.3333 and a p -value of 0.0396. As the rankings were significantly different, post-hoc testing was completed using Conover's test to determine where the difference in ranking occurred. Table 13 shows that the difference in ranking of audiovisual modules was significantly different from one on one discussion and written materials, with p -values < 0.05 . A statistical difference between other delivery methods could not be determined.

Table 11

Individual Provider Responses for Question 6.

Provider	AV	1:1 Discussion	Written	AV & Written
P1	4	1	2	3
P2	1	2	4	3
P3	4	2	3	1
P4	4	2	1	3
P5	3	2	4	1
P6	4	2	1	3
P7	4	2	1	3
P8	3	2	1	4
P9	4	2	1	3
Total	31	17	18	24
Mean	3.44	1.89	2.00	2.67

Note. 1 = most preferred option, 4 = least preferred option. "AV" is abbreviated for Audiovisual. As zero providers listed or ranked a fifth option for delivery methods, a fifth ranking was removed from results. One respondent was removed from data due to a misunderstanding of the ranking system.

Table 12

Delivery Methods Ranked from Most to Least Feasible Based on Mean Rankings

Perceived Rank for Feasibility	Delivery Method	Mean Ranking
1 st Choice	1:1 Discussion	1.89
2 nd Choice	Written Materials	2.00
3 rd Choice	Audiovisual & Written Materials	2.67
4 th Choice	Audiovisual Modules	3.44

Table 13

Question 6 Post-Hoc Testing: Pairwise Comparisons Using Conover's Test for a Two-Way Balanced Complete Block Design

	1:1 Discussion	AV	AV & Written
AV	0.0019	-	-
AV & Written	0.2776	0.2776	-
Written	1.0000	0.0040	0.5053

Providers ranked the delivery methods based on what was felt to be the most valuable for parents. Table 14 lists each individual ranking from providers. Based on the mean rankings, one on one discussion was perceived to be the most valuable ($\bar{x} = 2.00$). The least valuable delivery method chosen by providers was audiovisual modules, with a mean ranking of 3.00. Table 15 ranks each delivery method from most valuable to least valuable based on the average ranking. Statistical difference testing was conducted using the Friedman test (Chi-square = 2.7333, p -value = 0.43359. No statistical difference between the methods was found.

Table 14

Individual Provider Responses for Question 7

Provider	AV	1:1 Discussion	Written	AV & Written
P1	4	1	2	3
P2	1	2	4	3
P3	1	4	3	2
P4	4	2	1	3
P5	3	2	4	1
P6	2	3	4	1
P7	4	1	2	3
P8	4	2	1	3
P9	4	1	2	3
Total	27	18	23	22
Mean	3.00	2.00	2.56	2.44

Note. 1 = most preferred option, 4 = least preferred option. “AV” is abbreviated for Audiovisual. As zero providers listed or ranked a fifth option for delivery methods, a fifth ranking was removed from results. One respondent was removed from data due to a misunderstanding of the ranking system.

Table 15

Delivery Methods Ranked from Most to Least Valuable Based on Mean Rankings

Perceived Ranking of Value	Delivery Method	Mean Ranking
1 st Choice	1:1 Discussion	2.00
2 nd Choice	Audiovisual & Written Materials	2.44
3 rd Choice	Written Materials	2.56
4 th Choice	Audiovisual Modules	3.00

Delivery Methods: Survey Questions 8 & 9

Finally, in an open-ended format, providers described how their chosen educational delivery method would be implemented (Table 16). Most providers preferred written materials to be involved with a discussion during the WCV (n = 5; 55.6%). Two providers (n = 2; 22.2%) discussed having the resources available to parents before the appointment through technology. Two providers (n = 2; 22.2%) felt educational materials could be provided during the rooming process before the provider entered the room.

Table 16

Quoted Responses from Question 8 Organized by Theme (N = 9)

Comments regarding Written Materials and One on One Discussions	Comments Regarding Resources Accessible Prior to or Outside of Appointments	Comment Regarding Material Provided During Rooming Process
<p>“I would like to use the handouts to allow parents to have a resource at home, I would review highlights of it.”</p> <p>“Handouts to give to parents during visits and discussion 1:1 after exam.”</p> <p>“Concise, colorful, easy to read written materials that can be handed to parents at well child office visits.”</p> <p>“Discussed and reviewed during WCCs.”</p> <p>“Discussion and providing materials during visit.”</p>	<p>“Viewing video education via our website”</p> <p>“Links to view at home for AV material. Or given during rooming.”</p>	<p>“After rooming and while they wait for the provider to come in.”</p> <p>“Written information could be printed prior to appointment and discussed with parents at visit.”</p>

Common themes cited in anticipated barriers to educational delivery included time, distractions, language, and interest (Table 17). The most common barrier providers listed was time (n = 5; 62.5%). Two providers cited languages other than English as a barrier (n = 2; 25.0%). Three providers (n = 3; 37.5%) thought distractions, such as fussy children, parent disinterest, or "veteran" parents who believe they already know the information, were barriers. One provider also reported lack of technology resources and need for staff training for educational materials requiring delivery through a technological format (n = 1; 12.5%).

Table 17

Quoted Responses from Question 9

Question 9. What barriers would you anticipate in the delivery of the education? (N = 8)

- “Parents are often in a rush.”
- “Time constraints to discussing all of this education can be offset by written materials.”
- “Time.”
- “I have patients who speak many different languages, would be nice to have it in various common languages in the area. Time to discuss in depth.”
- “Language, education level, kiddos wanting to leave or being noisy.”
- “Interest.”
- “Fussy children preventing parents from concentrating, one more piece of paper for them to have to take home, parental disinterest, veteran parents that think they already know all of this information.”
- “Time.”

CHAPTER 5. DISCUSSION & RECOMMENDATIONS

Childhood obesity is a growing concern within the US and is affecting children at younger and younger ages (CDC, 2014). In addition to psychological consequences, such as depression and body image concerns, obesity is associated with chronic diseases such as type two diabetes, hypertension, hyperlipidemia, and cardiovascular disease (Pandita et al., 2016; Xu & Mishra, 2018). Such comorbidities are developing younger ages, leading to an extended disease course and the opportunity for increased complications (Pandita et al., 2016). In the US, 13.9% of children aged two to five are obese (Hales et al., 2017). ND reports similar obesity rates at 14.4% for children aged two to four years (CDC, 2014). The rate of obesity in children in ND has remained around 14% since 2008 (The State of Obesity, 2016). Treating obesity once it develops has rarely been effective (Daniels et al., 2015; Pandita et al., 2016). Due to the rates of obesity in very young children, there has been a recent focus on obesity prevention starting as early as infancy.

Feeding practices in infancy create the foundation for eating behaviors throughout life (Daniels et al., 2015; Pandita et al., 2016). Therefore, anticipatory guidance for parents related to healthy nutrition and feeding practices in early life may have a positive impact on a child's eating behaviors and preferences as they grow into adulthood. If a child learns healthy eating behaviors and partakes in a healthy diet, the risk of developing obesity may decrease. The purpose of the PIP was to develop an educational curriculum on feeding and nutrition for parents attending WCVs between the ages of two weeks to three years. The educational curriculum incorporates the child's current developmental stage with the feeding and nutrition information.

Interpretation of Data

The *Study* phase of the PDSA cycle incorporated the review and analysis of survey data.

Objective One Interpretation

Objective one involved the creation of a parent-focused educational curriculum on feeding and nutrition for parents presenting with their children for WCVs. The recommendations from the EdS helped improve formatting and clarity with some phrases. The EdS recommended making pronouns gender-neutral, such as "he/she," to avoid offending parents if the pronoun did not correspond with the child's sex. After some consideration, editing of the documents involved eliminating pronouns whenever possible because the split pronouns were cumbersome and distracted from the text. When possible, subject or object pronouns were replaced with nouns, such as "baby," or a noun with a possessive object, such as "your baby." There were some instances where completely removing pronouns resulted in grammatically incorrect sentences. In those few cases, "he or she" replaced "he/she."

The literacy assessment resulted in grade-level readability scores that ranged from 6.3 to 8. Per the organization's recommendations, the goal was to achieve a readability score of about a 5th to 6th-grade level for each WCV curriculum. In order to improve readability scores, changes included the removal of complex or multi-syllable words and shortening of longer phrases. The completed educational curriculum handouts are found in Appendix E.

Objective Two Interpretation

Objective two evaluated the educational curriculum for understandability, relevancy, value, and accuracy.

Accuracy: Survey Questions 1-2

Seventy percent of providers reported the educational curriculum to be accurate (n = 7); eighty percent reported pertinent information was not lacking from the curriculum (n = 8).

Breastfeeding. Two providers made suggestions related to breastfeeding. One respondent recommended eliminating time limits for breastfeeding because some infants are very efficient and take less time, while others take longer to breastfeed. While Bright Futures provides some time guidelines of 20 to 45 minutes for feedings, WIC recommends that breastfeeding should not be limited to specific timeframes (Holt, 2011; USDA, 2019). WIC endorses that every infant establishes a different feeding pattern, though most do breastfeed for a total of 20 to 40 minutes at a time. Both sources use weight gain as a measure to assess the adequacy of feedings (Holt, 2011; USDA, 2019). Placing more emphasis on responsive feeding supports sDOR, which was the theory used to guide the development of the educational curriculum.

Another provider suggested a statement about notifying a healthcare provider if mothers experience pain with breastfeeding. Mild pain around the nipple is common when initiating breastfeeding. However, pain after the postpartum period or pain that is moderate to severe is unusual (USDA, 2019). Pain could result from incorrect latching, plugged milk ducts, or mastitis. Breast or nipple pain directly influences the breastfeeding experience. Therefore, it is reasonable to add a statement such as “Breastfeeding should not be painful. Please tell your provider or the lactation consultant if you are having pain.”

Formula Feeding. One provider recommended repeating a statement on the correct mixing of infant formula throughout the curriculum for formula-fed infants. The original statement was included in the curriculum for the two-week WCV only and discussed adding the correct amount of water when mixing powdered formula. The provider has noticed that some parents begin to dilute infant formula at three to four months of age, perhaps to save money. Educating parents about adding the correct amount of water when mixing formula is vital because over-diluted formula lacks calories and nutrients required for appropriate growth, thus

risking growth problems and water intoxication (USDA, 2019). Conversely, overly concentrated formula adds stress to an infant's immature kidneys and gastrointestinal system and can contribute to dehydration. The provider's suggestion to highlight the importance of correctly mixing formula, therefore, is reasonable to consider adding throughout the curriculum.

Introducing Solid Foods. One provider commented on AAP's recommendations of waiting six months to introduce solid foods. The AAP, as well as IOM and WHO, recommend delaying the introduction of solid foods until about six months of age (AAP, 2019; IOM, 2011; WHO 2003). The basis of the recommendations are stemmed from developmental readiness to handle solid foods, as well as concerns with obesity (AAP, 2019; Gaffney et al., 2014; IOM, 2011) The 4-month educational curriculum emphasized waiting for developmental readiness for starting solid foods, which usually occurs around six months of age. In consultations with the expert pediatrician, discussions occurred about the importance of providing anticipatory guidance to starting solid foods. Anticipatory guidance helps parents feel prepared to introduce appropriate, healthy foods when their child is developmentally ready. Bright Futures acknowledges that developmental readiness can occur between four- and six-months of age and recommends a discussion of solid foods at the 4-month visit (Holt, 2011). Children develop taste preferences in early childhood, so education should focus on the importance of introducing healthy from the beginning (Ventura & Worobey 2013).

Another provider inquired about the evidence behind waiting three to five days between introducing new foods. AAP, CDC, and USDA recommend gradual introduction of new foods (AAP, 2019; CDC, 2019a; USDA, 2019). For all children under 18 years of age, 5.1% have a food allergy (Jackson, Howie, & Akinbami, 2013). The ability to recognize the source of the reaction or intolerance would be impossible if more than one food was introduced at a time.

Another provider suggested replacing "infant rice cereal" with "infant cereal" in the complementary feeding stages. Infant rice cereal is fortified with iron, which is an important nutrient for infants, especially around six months of age, when iron stores begin to deplete (USDA, 2019). However, the Food and Drug Administration (FDA) now recommends offering a variety of iron-fortified cereals, such as oat and barley, due to the potential exposure to arsenic in rice (US FDA, 2016). The FDA maintains that infant rice cereal is still a safe option, but other sources of iron should be included in an infant's diet. Due to potential arsenic exposure, varying grains and iron sources is important information to clarify for parents and add to the curriculum.

Toddler Snacks. Toddlers are notorious for exhibiting neophobic tendencies (Ventura & Worobey, 2013). Neophobia can be defined as a refusal to eat new foods. As a result, the educational curriculum stressed the importance of continuing to offer and expose toddlers to healthy foods to increase familiarity and the chance a toddler will learn to eat those foods. The curriculum incorporated a document previously developed by the project organization that included snack options for picky toddlers. The toddler snacks embedded in the educational curriculum included Chex mix, rice cereal bars, and light ice cream. Feedback about the snack choices suggested there are healthier choices for snacks.

Relevancy, Value, and Understandability: Survey Questions 3-5 and Literacy Assessment

Providers agreed that the educational curriculum was relevant and valuable and that parents would find the curriculum to be extremely understandable for parents. Providers ranked understandability on the first drafts when the grade-level readability scores ranged from 6.3 to 8.0. After edits, the grade-levels decreased slightly for some documents but increased slightly for others. The results were discussed with the EdS, who stressed the importance of factors the formulas do not consider, such as engaging writing, formatting, word familiarity, and defining

complex words. While the organization's goal for grade-level readability is between a 5th and 6th-grade level, the literature indicates that an 8th-grade level is sufficient (Jindal & MacDermid, 2017). A criticism of readability formulas is the reliance on statistics only (Crossley et al., 2017). Crossley et al. (2017) suggests the development of more reliable readability formulas are possible. More sophisticated approaches that account for additional features of readability, such as vocabulary and cohesiveness, exist and could be incorporated into a readability formula.

The survey questions pertained to the whole curriculum rather than each individual document. Perhaps survey questions specific to each individual WCV document would add more value. One survey for review of eleven documents was a broad and generic approach to evaluation. Conversely, eleven surveys may be overwhelming and decrease the response rates. The questions on accuracy, relevancy, value, and understandability also lacked specificity. For example, asking if the information aligned with AAP guidelines and was evidence based, instead of merely inquiring about accuracy, may have elicited a different response. While one question asked for missing information, another question could have asked about information that could have been subtracted from the education. Asking about "relevance," could have been replaced by, "is the educational content relevant to the parents of [each age group]?" Finally, asking, "is the educational content written in a language most parents of infants and young children would understand" could be clearer than "understandability." Overall, less ambiguous questions would have allowed for universal interpretation and more informative responses.

Additional Comments on Educational Curriculum: Survey Question 10

Open-ended comments were overwhelmingly positive. Providers expressed appreciation for the curriculum and eagerness to begin use. A couple of providers commented about printing in other languages and including baby-led weaning information. Baby-led weaning is a solid-

food introduction approach that allows an infant to self-feed table food rather than the traditional spoon-fed method (Brown, Jones, & Rowan, 2017). As a newer approach, there is limited evidence to support baby-led weaning as a safe alternative to traditional methods due to concerns of choking and inadequate nutritional intake (Brown et al., 2017; D’Auria et al., 2018).

Translating the curriculum into languages of patient groups often seen in the clinic is a great suggestion. If the curriculum were to be translated into other languages, native speakers should review the documents for accuracy. Other readability formulas would also need to be explored. The readability formulas used in the PIP pertain only to the English language and cannot be considered reliable or valid for other languages. Applying readability formulas specific to each language would be ideal. An assessment of cultural appropriateness is also advisable.

Objective Three Interpretation

Objective three involved the development of a plan to deliver the education to parents at an urban Midwestern primary care clinic. Although the PIP ended prior to implementing the education, the co-investigator accepted a position within the project organization and plans to continue involvement with the project.

Delivery Methods: Survey Questions 6-9

Based on mean rankings, it seems providers preferred educational delivery methods in the following order, from most feasible to least feasible: one on one discussion, written materials, audiovisual and written materials, and audiovisual modules. Providers ranked the delivery methods in terms of value similarly. However, statistical testing could only conclude that one on one discussion and written materials were considered more feasible compared to audiovisual modules. Statistical testing could not identify a difference between the other delivery methods.

At the inception of the project, plans were discussed to deliver the education in an audiovisual format. However, the organization's patient education department opposed audiovisual modules due to lack of devices available for viewing. Providers also indicated that better options exist as statistical testing found audiovisual modules to be the least feasible compared to both one on one discussion and written materials. Further investigation as to why audiovisual modules were not considered feasible would lead to better understanding of the best delivery methods.

The providers' choice is important in considering delivery methods; however, the literature suggests that parents may prefer technology-related learning options. The current generation of parents with young children expect to find relevant parenting information, including nutrition and feeding, through healthcare organizations (Ledoux et al., 2018). Currently, the organization's online resources for infant and toddler feeding and nutrition is difficult to navigate, written without headings or index, and without visuals to grab readers' attention. Perhaps the method preferred by parents is more important than how providers think parents should be educated. Future projects could assess the parents' education delivery preferences.

Barriers to implementing education also need to be considered as patient education materials can only offer value if the education can reach the intended recipient. Providers commented most frequently on time and distractions, such as fussy children, as barriers to educating the intended population. Finding a balance between the best delivery method for both parents and providers presents a complex challenge, especially with multiple distractions and the time constraints of a 20-30-minute visit. Recognition, however, is the first step to overcoming barriers.

Recommendations

Finishing objective three would require a second PDSA cycle. Due to timing and other circumstances, the organization will assume the lead in planning a delivery method for the feeding and nutrition curriculum. The behavior analyst agreed to assume the project coordinator position for the next phase of the project. The project handoff is discussed in greater detail in the following section.

Education Delivery Plan

I reviewed the results of the survey with the new project coordinator and provided the following recommendations for moving forward. First, I would recommend further edits to the curriculum. The participating providers could review and give approval to the content changes suggested through the survey. Further refinement of the educational curriculum through use of an evaluation tool would ensure a high-quality material. Therefore, I would also recommend a tool to evaluate the curriculum, such as the Patient Education Materials Assessment Tool for Printable Materials (PEMAT-P). PEMAT-P provides a stringent review process to written patient education (Appendix F) (Agency for Healthcare Research and Quality [AHRQ], 2013). Additionally, reviewing for cultural appropriateness as applicable would increase value for a wide range of families across the community. I would also recommend considering other readability formulas if the curriculum is to be translated into other languages.

Another recommendation before delivering the education would be to receive feedback from parents of the targeted audience. Surveying parents on how they prefer to receive feeding and nutritional education could provide further guidance to the best delivery method. If written materials are chosen, a small sample of parents for each age group could be asked to help review the curriculum to gain information on ease of use, perception of visuals, and perception of what

the education is asking of parents. Centers for Medicare and Medicaid (CMS) has a toolkit on developing written material for patients. One section includes gathering feedback from intended readers and could be used to guide improvements of the curriculum from a parent perspective (McGee, 2020)

From the knowledge gained thus far from providers, the preferred delivery method seemed to be a combination of written materials and one on one discussion. Audiovisual modules were considered less feasible than other methods. As the literature suggests parents may prefer online resources, I would recommend further investigation into providers' perception of best delivery methods to determine what makes one method better than others. A focus group of providers would allow for open dialogue to identify advantages and barriers of different methods. In the meantime, the information technology department could create a version of written handouts to link electronically via the organization's website or MyChart, an electronic medical record-based communication tool. Therefore, if written handouts are used, parents could access the handouts before or after their WCV appointment. I would also recommend exploring ways to make the organization's website more engaging, appealing, and accessible for parents who wish to search for online parenting information.

Strengths

In developing the educational curriculum, a multidisciplinary approach was used. Development of the education was guided through consultation of a lactation consultant, pediatric dietician, pediatrician, pediatric nurse practitioner, and a behavior analyst with expertise in pediatric feeding. Consulting with several specialties allowed for the incorporation of multiple perspectives to create a well-rounded education. The enthusiastic support from the expert consultants was instrumental to the development of the curriculum. The clinic providers

also encouraged and supported the PIP. Without provider buy-in and willingness to participate, the project would not have progressed. A pediatric provider within the organization championed the project and agreed to be the point of contact, expert consultant, and liaison between the co-investigator, organization, and other providers. The behavior analyst suggested the use of sDOR, and the project team supported the incorporation of the theory throughout the curriculum. The culmination of support and expertise led to an evidence-based curriculum that emphasizes responsive feeding.

Limitations

Major limitations of the PIP included a short timeline, vacations, illness, coordination with team members, document review time by EdS, and survey difficulties. The education team within the organization opposed the original plan of developing the educational curriculum into audiovisual modules. A few months passed before a compromise could be made. The educational curriculum took approximately three months to develop because of the time needed to coordinate with every expert. The project could not move forward without expert input. Next, the EdS required an additional two weeks to review the curriculum than initially planned. Unfortunately, illness and vacations within the organization further delayed sending the curriculum and survey to providers. As a result, time was limited for providers to review the materials and complete the survey, which may have lowered responses. The education did not reach implementation due to time constraints. Testing the educational curriculum in practice would have provided useful information on the feasibility of delivering an educational curriculum on feeding and nutrition to parents.

The survey itself had some limitations as well. Providers were given only one survey to review eleven documents. More information may have been gathered with a survey specific to

each document. Additionally, due to unforeseen circumstances, the deadline for survey return was only a few days instead of a week or more. Perhaps if the survey had been available longer, a higher participation rate would have been observed. The terms “accurate, relevant, valuable, and understandable” were not defined, and therefore, may not have elicited intended responses. Additionally, asking providers about a preferred method of delivery instead of the most feasible may have been more effective. The original choice for Likert scale included a scale of five choices rather than ten. However, Qualtrics only allowed for a 0-10 Likert scale. The 0-10 scale made interpretation more difficult. A ten-choice Likert scale is more effective in highly educated persons, though more choices are also associated with more error. Providing the option of paper surveys resulted in challenges to data collection and analyzation. The average time to take the online survey was just over five minutes with provider comments.

Finally, the PIP did not take parental preference into account. As the recipients of the education, parental input is an important factor. Parents may have a differing view on the best delivery method for feeding and nutritional education. As previously discussed, the targeted audience of an educational tool can provide valuable feedback on ease of use, visuals, and the impact of education. Therefore, information from parents may add to the value of the curriculum.

Application to Nurse Practitioner Practice

Nurse practitioners play an essential role in patient education and health promotion. In fact, a key characteristic of a nurse practitioner's education is the focus placed on disease prevention and health promotion. Childhood obesity places a significant burden on the life of the individual as well as a society because of the relationship obesity has with several chronic disease processes, cancers, and high medical costs (Pandita et al., 2016; Su et al., 2015; Xu & Mishra, 2018). Prevention efforts for childhood obesity have shifted towards early life, with

recent evidence suggesting that an increased focus on responsive feeding and nutrition starting as early as infancy may hold the most promise (Daniels et al., 2015; IOM, 2011; Laws et al., 2014; Machuca et al., 2016; Paul et al., 2011; Savage et al., 2018; Verbestel et al., 2013). Nurse practitioners are, therefore, perfectly positioned to apply a similar focus on early feeding and nutritional education as measures to prevent childhood obesity.

Dissemination Plan

Dissemination is an essential step to any PIP to allow sharing of the knowledge gained and to lend support for future projects. The survey results and the final drafts of the educational curriculum were provided to the behavioral analyst through an informal meeting. Results were not disseminated to providers because the purpose of obtaining their feedback was to refine the development of the educational curriculum. The behavioral analyst plans to implement the educational curriculum into practice through a pilot study. The co-investigator plans to be involved in the pilot study through a partnership with the behavior analyst. Results from the pilot study will be submitted to a peer-reviewed journal. The PIP was planned to be presented at the NDSU College of Health Professions Poster Session in April of 2020. However, due to the Covid-19 pandemic, the poster session was cancelled.

Conclusion

In an effort to prevent childhood obesity, the purpose of the PIP was to develop an educational curriculum on feeding and nutrition for parents attending WCVs between the ages of two weeks to three years. The educational curriculum was developed with specific considerations for each developmental stage correlating with each WCV. Multidisciplinary experts were consulted throughout the development of the educational curriculum. Providers felt the curriculum was relevant, valuable, and easily understood. While the educational curriculum

was not able to be implemented into practice within the timeline of this project, recommendations were made regarding the future use of the educational curriculum. The data from this project suggested that the best educational delivery method would be a combination of written materials and one on one discussion. The organization has plans for a pilot study centering on the educational curriculum with the purpose of measuring the impact on weight over five years. As obesogenic dietary behaviors are developed in the first two years of life, increasing the emphasis on feeding and nutrition education for parents of infants and toddlers will contribute to Healthy People 2020 objectives and may reduce childhood obesity (USDHHS, 2018; Verbestel et al., 2013).

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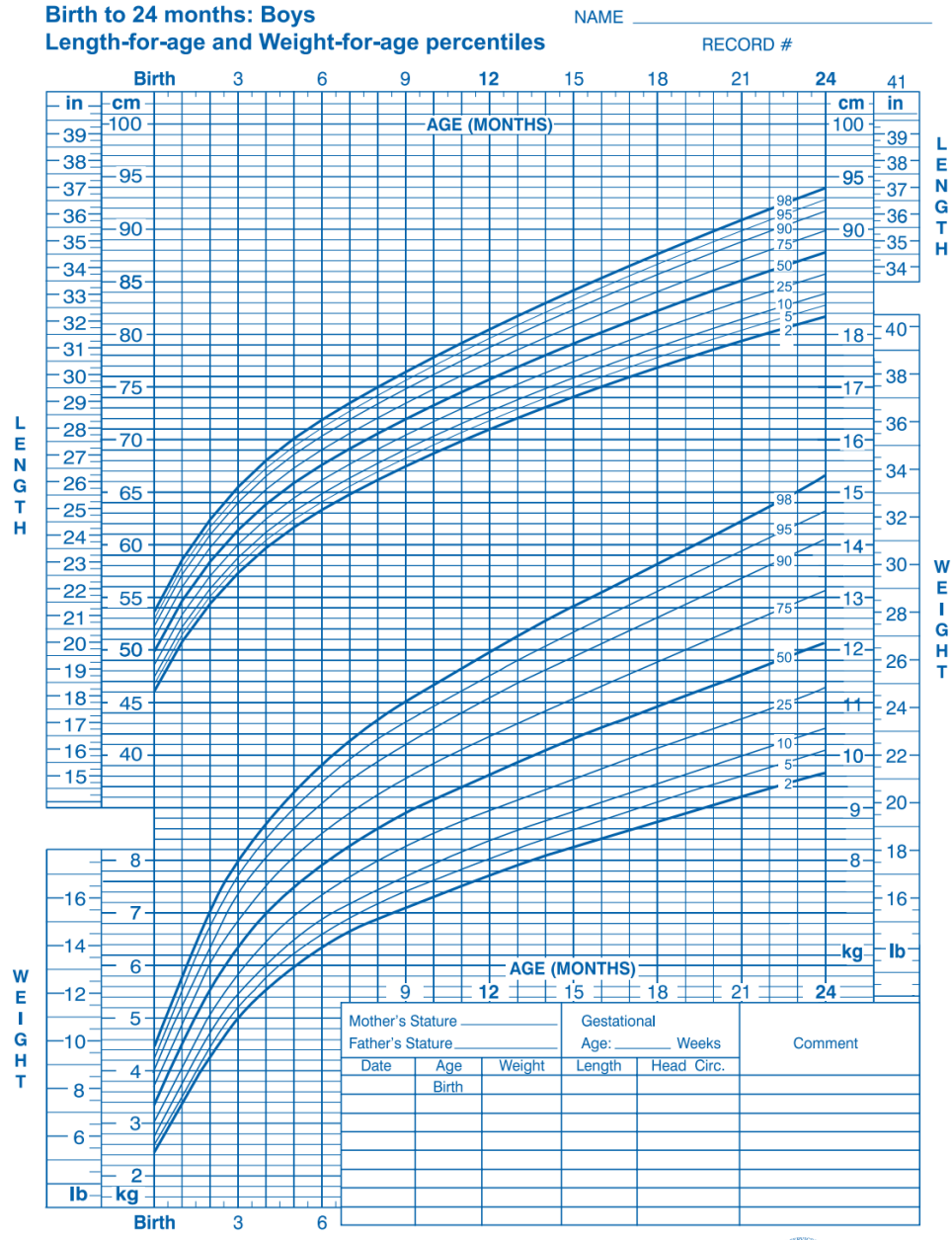
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APPENDIX A. GROWTH CHARTS



Published by the Centers for Disease Control and Prevention, November 1, 2009
 SOURCE: WHO Child Growth Standards (<http://www.who.int/childgrowth/en>)

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Figure A1. WHO weight-for-length percentiles for boys 0-24 months (CDC, 2010).

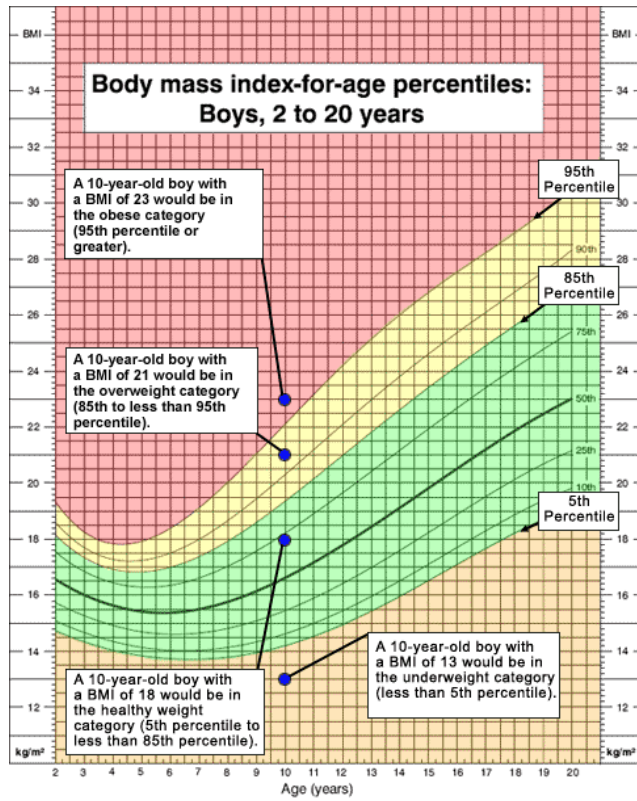


Figure A2. CDC BMI growth chart for boys aged 2 to 20 years.

Note. Figure obtained from CDC (CDC, 2018). The CDC Growth Chart is color-coded, with examples, for each weight status category as follows: red indicates obesity, yellow indicates overweight, green indicates healthy weight, and orange indicates underweight.

APPENDIX B. PERMISSION FOR USE OF MODEL FOR IMPROVEMENT FIGURE

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Number of figures/tables	1
Original Wiley figure/table number(s)	Figure 1.1
Will you be translating?	No
Title of your thesis / dissertation	Childhood Obesity: Implementation of a Pilot Prevention Program
Expected completion date	May 2020
Expected size (number of pages)	75

APPENDIX C. NDSU IRB APPROVAL LETTER



October 23, 2019

Dr. Tina Lundeen
Nursing

Re: Your submission to the IRB: "Childhood Obesity: Developing Early Nutrition & Feeding Education for Parents at Well Child Visits"

Co-Investigator(s) and Research Team: Ashley Benson

Thank you for your inquiry regarding your project. At this time, the IRB office has determined that the above-referenced protocol does not require Institutional Review Board approval or certification of exempt status because it does not fit the regulatory definition of 'research involving human subjects'.

Dept. of Health & Human Services regulations governing human subjects research (45CFR46, Protection of Human Subjects), defines 'research' as "...a systematic investigation, research development, testing and evaluation, designed to contribute to generalizable knowledge." These regulations also define a 'human subject' as "a living individual about whom an investigator (whether professional or student) conducting research:

- (i) Obtains information or biospecimens through intervention or interaction with the individual, and uses, studies, or analyzes the information or biospecimens; or
- (ii) Obtains, uses, studies, analyzes, or generates identifiable private information or identifiable biospecimens."

It was determined that your project does not require IRB approval (or a determination of exemption) from NDSU. The data collected is not about the individual respondents, but seeks their expertise about the curriculum.

We appreciate your intention to abide by NDSU IRB policies and procedures, and thank you for your patience as the IRB Office has reviewed your study. Best wishes for a successful project!

Sincerely,

A handwritten signature in purple ink that reads "Kristy Shirley".

Kristy Shirley, CIP, Research Compliance Administrator

For more information regarding IRB Office submissions and guidelines, please consult https://www.ndsu.edu/research/for_researchers/research_integrity_and_compliance/institutional_review_board_irb/. This Institution has an approved FederalWide Assurance with the Department of Health and Human Services: FWA00002439.

APPENDIX D. QUALTRICS SURVEY

Nutrition & Feeding Education for Well Child Visits

Question 1. Is the educational content for each age group accurate?

- Yes
- No

Question 1A. If you answered no to the previous question, ("Is the educational content for each age group accurate") please explain.

Question 2. Is there any nutritional or feeding information you feel is missing for any of the age groups?

- Yes
- No

Question 2A. If you answered yes to the previous question, ("Is there any nutritional or feeding information you feel is missing..") please explain.

Question 3. On a scale of 0-10, how relevant do you feel this information is for the parents of your patients in your practice?

0 1 2 3 4 5 6 7 8 9 10

Question 4. On a scale of 0-10, how valuable do you feel the educational curriculum would be for your practice?

0 1 2 3 4 5 6 7 8 9 10

Question 5. On a scale of 0-10, how understandable do you feel the educational curriculum would be for the parents of your patients?

0 1 2 3 4 5 6 7 8 9 10

Question 6. Please rank the following education delivery methods from 1 to 5 based on what you feel would be the most feasible to your practice. (1 indicates the most feasible and 5 indicates the least feasible)

- _____ Audiovisual modules
- _____ 1:1 Discussion
- _____ Written materials
- _____ Audiovisual & written materials
- _____ Other (Please specify)

Question 7. Please rank the following education delivery methods from 1 to 5 based on what you feel would provide the most value for the parents of your patients. (1 indicates the most valuable and 5 indicates the least valuable)

- _____ Audiovisual Modules
- _____ 1:1 Discussion
- _____ Written Materials
- _____ Audiovisual & Written Materials
- _____ Other (Please Specify)

Question 8. Please describe how the top delivery method(s) would best be implemented in your practice. (Ex: Viewing video education during the rooming process)

Question 9. What barriers would you anticipate in delivery of the education?

Question 10. Please include any additional suggestions or comments you may have.

APPENDIX E. EDUCATIONAL CURRICULUM

Feeding Your Baby

Two Week Well Child Visit

Your baby only needs breastmilk or infant formula and is not ready yet for other foods or drinks. Feed your baby when you see signs of hunger and stop when you see signs of fullness.

Crying is usually a late sign of hunger. But crying does not always mean your baby is hungry. Crying is how your baby talks to you. With some time, you will begin to tell that your baby has different cries for different reasons. Your baby might be crying because of a dirty diaper or a need to be burped. Crying can also mean your baby is tired, upset, or trying to get rid of energy.

Your baby will let you know when he or she is hungry or full. Here are some signs your baby might give you:

Hunger Cues

- Very awake
- Putting hands to the mouth
- Sucking or smacking lips
- Opening and closing mouth
- “Rooting” or turning head side to side
- Flexing arms and legs

Fullness Cues

- Spitting out the nipple
- Turning head away
- Slowing down or stopping sucking
- Extending arms and legs
- Relaxing fingers
- Closing lips
- Falling asleep

Babies have small tummies and need to eat often, including at night.		
How often should my baby eat?	How much should my baby be eating?	How do I know my baby is getting enough food?
<ul style="list-style-type: none">• About every 2-3 hours (or about 8-12 times in 24 hours)• Wake your baby up to eat if asleep for more than 4 hours.	<ul style="list-style-type: none">• Every baby is different.• On average, babies at this age eat about 1 to 1.5 ounces, but some eat 2 to 3 ounces.• Weight gain is a sign that your baby is getting enough food and eating well.	<ul style="list-style-type: none">• Count your baby’s diapers. Your baby should have 6 to 8 wet diapers in 24 hours.

At about this age (2-3 weeks), many babies go through a growth spurt and may need to eat more than usual. You may notice more hunger cues from your baby. Keep looking for and responding to your baby’s hunger and fullness cues. You may see another growth spurt around 6 weeks of age.

Breastfeeding is best for your baby because it gives your baby the best nutrition and support for healthy growth and development. If you are choosing to breastfeed, here is some more information:

Breastfeeding

- Rotate which breast you start with each feed. Let your baby finish feeding on one breast before offering the other one.
- Most babies eat for about 20-45 minutes. Watch for signs of fullness to know when your baby has had enough.
- Feeding increases the amount of breastmilk your body makes. Sucking on your breast tells your body to make more milk. Do not get discouraged during growth spurts! Your body will make more milk as your baby eats more.
- Breastfeeding should not hurt! Please see your healthcare provider or lactation consultant if it is painful to breastfeed.
- Breastmilk has very little vitamin D. Babies who are breastfeeding need a vitamin D supplement. Talk to your baby's provider about what is best for your baby.
- Mother's diet: eat a variety of healthy foods to help baby grow and keep you healthy. Stay hydrated – drink a glass of water at each feeding. Limit caffeine to 2 servings per day. Avoid alcohol 2 hours before breastfeeding (no more than 8 oz wine, 12 oz beer, 2 oz hard liquor per day).

Choosing to feed your baby formula is a healthy option. Formula gives babies the healthy nutrients they need to grow and thrive. Here is some more information for you:

Formula Feeding

- It is up to you what type of formula you choose. Just make sure it is iron-fortified. Do not use cow's, goat's, soy or other milk.
- Do not add cereal or other foods to the infant formula.
- Nipple sizes can vary slightly by manufacturer. At this stage, your baby needs the smallest size (usually labeled as either "stage 1", "newborn", or "slow flow").
- To prepare formula, follow the instructions on the formula container. Adding too much or not enough water can be very harmful to your baby.
- If warming formula, run under warm water or place in bowl of warm water for a couple of minutes. Never microwave formula because it heats unevenly and forms hot spots that can burn your baby's mouth. Test warmed fluids by placing a few drops on your wrist to make sure the formula is not too hot. Formula should be lukewarm.
- Feed your baby based on hunger cues (about every 3-4 hours). Pay attention to cues that your baby is full. Try not to push your baby to finish the bottle.
- To start feeding, place the nipple on the corner of baby's mouth or stroke baby's cheek. Your baby's mouth will open to accept the nipple. Do not force the nipple into baby's mouth.

- Babies need to feel loved and secure; holding your baby while feeding is an important part of emotional development. Never prop a bottle to feed your baby. Propping a bottle means feeding your baby by leaning a bottle against something, like a pillow, to hold it up instead of holding your baby and the bottle. Propping the bottle may be harmful to your baby for many reasons. Propping the bottle can lead to choking or formula getting into the lungs. Propping can cause more ear infections because formula can pool in the middle ear and not drain. Propping the bottle can lead to overfeeding your baby because babies will keep swallowing to prevent formula getting into the lungs.
- Burp at a natural break in feeding or at the end of a feeding to remove swallowed air from baby's tummy.
- Throw away any leftover formula that your baby does not eat within 1 hour. Do not reuse formula from an earlier feeding because spit from your baby's mouth can cause bacteria to grow in the formula.

Feeding Your Baby

Two Month Well Child Visit

How do I know if my baby is getting enough breastmilk or formula?

Every baby is different. Some may seem to eat a lot while others might seem to eat a little less than other babies their age. If the growth chart shows your baby is gaining weight well, your baby is eating well! Keep responding to your baby's hunger and fullness cues.

Is my baby getting enough food?



- Breastfed babies still eat about 8-12 times in 24-hours.
- Formula-fed babies eat about 6 to 8 times in a 24-hours.
- Do not be worried if your baby's eating pattern is a little different than others, as long as your baby is gaining weight.



Your baby might start to go longer stretches at night between feedings. Most babies still need a nighttime feeding when 2 months old.



Your baby should still have 6 to 8 wet diapers a day, but poops might slow down. As long as the poops are soft and easy to pass, this is normal.

Growth Spurts

Growth spurts may increase your baby's appetite. You may have noticed this around 6 weeks of age. Another growth spurt may happen at 3 months of age and 6 months of age. Do not get discouraged if you are breastfeeding. Your body will make more milk to meet your baby's demands.

What to feed my baby

Your baby should still only be eating breastmilk or formula. Your baby is not ready to eat solids yet because two-month-olds cannot hold their head or neck up yet, their muscles in the mouth are still developing, and their tummies are not ready to digest solid foods. Adding cereal will not help your baby sleep through the night.

Breastfeeding & Returning to Work

If you are breastfeeding and planning to return to work, you may want to begin pumping and freezing small amounts of milk to build up a supply for when you go back. Pumping twice a day, along with breastfeeding your baby, is one way to build up your supply.

Formula Feeding

Always prepare formula as directed on the container. Adding too much or not enough water can be very dangerous for your baby.

Fussiness

You might notice that your baby has fussy times throughout the day. Crying does not always mean that your baby is hungry. Soothing your baby by feeding when he or she is not hungry may lead to problems like tummy discomfort, more spit ups, increased gas, and unhealthy weight gain. If your baby is fussy and other needs are met, try these ways to soothe and comfort baby:

- Use calming motions such as rocking or wearing a baby carrier
- Sucking on a pacifier
- Play a calming sound, such as white noise, a fan, or a recording of a heartbeat
- Lay baby on his or her stomach while you are holding, and gently rub your baby's back. Remember to always put your baby to sleep on his or her back.



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You will soon find what works best to calm your baby. Many babies have a period of crying where they might resist soothing. You may have heard this called the period of PURPLE crying. For many babies, this period peaks around 2 months of age and slowly gets better. Though it may be frustrating at times, this normal stage of development will end. If you are getting frustrated, it is okay to set your baby down in a safe place and walk away. Do not ever shake your baby. Let your baby's provider know if you are worried about your baby's crying.

Here is what **PURPLE Crying** stands for:

P: Peak of crying – your baby's crying might slowly increase until it peaks around 2 months, then slowly decreases

U: Unexpected – crying comes and goes unexpectedly, without a reason

R: Resists soothing – no matter what you try, it is difficult to soothe

P: Pain-like face – your baby may make painful faces even when your baby is not in pain

L: Long lasting – episodes of crying can last several hours a day

E: Evening – episodes of crying may happen late in the afternoon or evenings

Feeding Your Baby

Four Month Well Child Visit

When To Start Solid Foods

Your baby has grown so much over the last 4 months! Soon, your baby will be ready to start trying solid foods. While this is a very exciting time, your baby needs to be developmentally ready before eating solid foods. **Most babies are not ready for solids until closer to 6 months.**

Here are some signs that show your baby is ready:

- Shows an interest in the food others are eating
- Holds head up without support
- Sits upright in a highchair
- Opens mouth when food is near
- Moves food from the front to the back of the mouth
- Swallows food instead of using tongue to push it back out of mouth

Do not be discouraged if your baby does not show interest the first time you try solid foods. One clue that your baby is **not** ready to eat solid foods is if your baby pushes food out of his or her mouth with the tongue. If your baby is not ready to eat, that's okay! Try again in a few days or weeks.

Keep in mind that your baby's main source of nutrition at this stage is still breastmilk or formula, and introducing solids is for practice.

How to get started with solid foods

Once your baby is ready, start with one food at a time. There is no evidence about a best food to try first. For example, you can start with a pureed vegetable, a fruit, or an iron-fortified cereal. The food you choose should be a single ingredient in a pureed consistency, with no added salt or sugar.

For babies who are breastfed, meat should be one of the first foods, in a pureed consistency, because the iron your baby was born with begins to run low at about 6 months old.

Here are some examples of first foods to try:



Pureed Sweet
Potatoes

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Pureed Pears

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Chicken Puree

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Infant Cereal

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Pureed Peas

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Start with a small amount (1-2 teaspoons) of the new food. Let your baby choose whether to eat the food and how much to eat by following hunger and fullness cues. Do not worry if your baby does not want or like the food you are introducing at first. Try the food again in a week or two. Babies will get used to new flavors and textures! Stay positive and do not pressure your baby to eat solid foods.

Hunger Cues	Fullness Cues
Smiles at you while feeding	Spits out nipple
Makes eye contact while feeding	Closes lips together
Moves head towards spoon	Pays more attention to other things than to food
Reaches for food	Turns head away from food

Adding Foods

Wait 3-5 days before introducing each new food so you can see if your baby has a reaction to the food. Signs of a reaction could be a rash, diarrhea, or breathing problems.

Variety is good!

Gradually offering a variety of food groups, flavors, and textures will help your baby get used to a healthy diet.

Honey

Honey, including that found in processed foods (such as Honey Nut Cheerios), should not be given to babies under 12 months of age. Honey sometimes has spores from an organism that makes a poison called botulism. Eating honey spores can cause botulism. Infant botulism can be a very severe illness and can lead to death.

Gagging

Babies often gag when first starting solid foods. You may notice some gagging while your baby is getting used to solid foods. Gagging is a normal reflex to prevent choking.

Choking

Babies can choke on any food. To keep your baby safe, do not feed your baby foods that are more likely to cause choking. For example, foods that are round, hard, or sticky the size may cause choking. Always stay with your baby during mealtimes.

Be prepared in case your baby does choke by taking an infant first aid or infant CPR class.

Feeding Your Baby

Six Month Well Child Visit

If your baby has not yet started solid foods yet, please review the education from the last visit for signs of developmental readiness and more information on how to get started.

What can I feed my baby?

Offer healthy foods. This is an important time to help foster your baby's tastes for healthy foods. Keep giving a wide variety of tastes and textures from all the food groups.

You want to make sure the consistency, size and shape are safe for your baby to prevent choking. Foods at this stage should be pureed or easily mashed between your fingers. Foods should not be sticky, firm, slick, or the size and shape of a marble.



Applesauce:
Example of Pureed
Consistency

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Ripe Avocado:
Easy to mash with fingers

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Ripe Banana:
Easy to mash with
fingers

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Do not get discouraged if your baby does not seem to want or like a new food. Sometimes it takes 10-15 tries over a period of months for babies to eat a new food.

How often & how much do I feed my baby?

Breastmilk or formula is still the most important meal in your baby's diet. Keep feeding your baby breastmilk or formula.	
How often should my breastfed baby nurse?	How often should my formula-fed baby drink formula?
<p>Many 6-month-old babies nurse 6 or more times in 24 hours.</p> <p>The number of feedings may vary from day to day.</p> <p>The number of times you feed will gradually decrease as your baby grows.</p>	<p>Many 6-month-old babies drink formula 5 to 6 times in 24 hours.</p> <p>The number of feedings may vary from day to day and slowly decrease as your baby grows.</p>

Solids: Start with offering solids one time a day and then slowly increase to two times a day with a breakfast and evening meal. Slowly start to offer as many flavors and textures as baby wants to eat.

Solid Foods: What and How Much to Feed Start with a couple of tablespoons and add more if your baby is interested. Gradually increase the serving sizes to:			
Grains: 1 to 2 ounces	Vegetables: 2 to 4 ounces	Fruit: 2 to 4 ounces	Protein Foods: 1 to 2 ounces
Some examples of grains include infant cereal or bread	Some examples of cooked, pureed or soft and easy to mash veggies include mashed carrots or peas	Some Examples of soft, easy to mash, or pureed fruits include pureed cantaloupe or soft, ripe mango	Protein foods include pureed meats or fish, mashed eggs, soft or shredded cheese, yogurt or mashed beans

For breastfeeding mothers – keep breastfeeding! Your baby is still benefiting so much from breastmilk. Your baby still needs vitamin D supplements. Make sure to offer iron-rich foods, like pureed meats and iron-fortified cereals. Talk to your provider about whether your baby needs an iron supplement.

Drinking from a cup

If your baby can sit without support, let your baby practice drinking from a cup.

Hold a plastic cup for your baby and slowly tip the cup so that you only give your baby a small amount of liquid. You can start practicing with just a few drops of water in a medicine cup (like one that would come with children’s liquid medicine).

Only use a small amount (1-3 ounces) of breastmilk or formula.

You might need to show your baby how you drink from a cup to help with learning.

If you are using a sippy cup, only fill it with breastmilk or formula at meals. Carrying the cup around and sipping drinks other than water throughout the day can cause early dental cavities.



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Preventing Allergies

New research has shown that early introduction of peanuts into your baby's diet can prevent a peanut allergy.

After you have started solid foods, you can introduce peanut-containing foods with these recommendations:		
If your baby does not have eczema or an egg allergy:	OR	If your baby has mild to moderate eczema:
Feed baby-friendly peanut foods as often as you would like! Your baby is at small risk.		Feed small amounts of baby-friendly peanut foods three times a week after you have started solids.
NOTE: If your baby has severe eczema, an egg allergy, or both, talk to your pediatric provider before introducing peanut foods.		

Examples of baby-friendly peanut foods to try. Remember, peanut butter alone is too sticky and thick for a baby at this age to be safe. Here are some safe ways to introduce peanuts:

- 2 tsp of creamy peanut powder mixed with a favorite pureed fruit or vegetable
- 2 tsp of creamy peanut butter mixed with equal parts breastmilk, formula, or water

Feeding Your Baby

Nine Month Well Child Visit

How often should your baby be offered foods?

Many 9-month-olds eat meals on the same schedule as the family with breakfast, lunch, and dinner. You can start to offer snacks between meals as well.

Your baby should still be drinking breastmilk or formula through 1 year of age. Avoid juice until 12 months. Offer some breast milk or formula in a cup at mealtimes to start weaning from the bottle.

Trust your baby's appetite by watching hunger and fullness cues. Hunger cues may include reaching for foods when hungry or turning away from food when full.

Let your baby be a part of family meals. Place your baby in a highchair at or near the family table. Be prepared for messes as your baby is learning how to eat. Your baby learns about eating by watching others eat.

What types of foods should my baby be eating?

Gradually introduce more solid textures to your baby. Some examples of different textures are mashed foods (like cooked potatoes), small pieces of soft foods (such as bananas), ground, soft foods (such as cooked broccoli), or strips of cooked or soft fruits and vegetables (like an avocado). Remember, it may take several tries before your baby eats a new texture or flavor.



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Iron is an important nutrient to help your baby grow and be healthy. Meat is a great source of iron that you can serve pureed to make the texture safe. Other foods with iron include eggs, many green vegetables, hummus, creamy peanut butter, and whole grains.



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Your baby is starting to learn how to grasp food between the thumb and forefinger. Offer foods that are easily grasped by small fingers. Most fruits and vegetables can be mashed or softened and cut into small pieces (about the size of a pea) or into strips that are easy to pick up. Some examples of finger foods are mango, cooked carrots, or tender cooked beef.

Try adding some mild spices to food to let your baby try different flavors. For example, you can try a small amount of cinnamon with applesauce.

Avoid soda, juices, teas, sugary drinks, cow’s milk, salt, butter or added fats, added sugar or other sweeteners, or fried or processed foods.

How much should my baby be eating?

These are some examples of average portion sizes for each food group for your 9-month-old. Offer your baby three meals and 1-2 snacks throughout the day. Your baby may eat more or less. Let your baby decide how much to eat at meals and snack time.

Breastmilk or Formula	Grains	Vegetables	Fruits	Protein
Total of about 24 ounces in 24 hours OR About 4-6 ounces with each meal and with snacks.	Infant cereal 2-4 Tbsps. two times a day Crackers 2 crackers one time a day Bread ½ slice of bread two times a day Pasta 3- 4 Tbsps. of pasta one time a day	3- 4 Tbsps. of cooked or mashed vegetables 2 to 3 times a day	3-4 Tbsps. of cut up fruit 2 or 3 times a day	Meat 3 to 4 Tbsps. of cooked meat two times a day Beans or Legumes ¼ cup two times a day Cheese ½ ounce (about the size of one dice cut into smaller pieces) one time a day Yogurt ½ cup one time a day

Feeding Your Toddler

12 Month Visit

What should my toddler be drinking?

Your toddler does not need formula anymore. Food is now the main source of nutrition. Your toddler can now drink whole cow's milk up until 2 years of age.

What to Drink	When to Offer	How Much to Offer
Whole Cow's Milk	Breakfast, Lunch, & Dinner	About 4 ounces in a cup with each meal No more than 20 ounces a day
Water	In between meals when thirsty	Try 4 ounces when thirsty Total of 8 to 32 ounces a day
Avoid these drinks: Juice, flavored milk, sodas, sports drinks, lemonade, flavored water, drinks with caffeine		

Juice is full of sugar and empty calories. If you serve juice, make it 100% juice and limit it to 4-6 ounces each day. Too much juice can make your toddler too full to eat nutritious foods, lead to dental cavities, cause an upset stomach, or add extra weight.

Serve your toddler's drinks in a cup at mealtimes to work on weaning from the bottle. Let your toddler practice drinking without a cover. The goal is to wean the bottle by 14 months.

What & how much should I offer my toddler to eat?

Your toddler's tummy is small and can only hold small amounts of food at a time. Serve three meals a day and 2 to 3 snacks a day in between meals. Snacks are important for getting the nutrients your toddler needs to grow. Use snack time for a fruit or vegetable instead of a pre-packaged snack.

Offer everyone in the family the same food. You may need to alter the size and texture of the food to make it safe. Offer your toddler soft table foods cut into small pieces that are easy to grab.

Be a good example by eating a variety of healthy foods with your toddler. Keep mealtime positive. Avoid distractions, like the TV, phones, or tablets.

Encourage self-feeding by letting your toddler use fingers and a baby spoon. Pay attention to cues that your toddler is full, such as pushing food away or losing interest.

Your toddler may refuse to eat new foods or textures. Do not pressure your toddler to eat the new food. Toddlers often need to see and try a new food many times before they like it. Keep offering new foods, but do not pressure your toddler to eat.

Do not use food as a reward or punishment.

Do not make special foods when your toddler refuses to eat what is offered.

Do not encourage your toddler to eat everything or clean the plate.

Serving sizes for your toddler

Tummy sizes vary so the right portion size might be a little more or less for your toddler. Use this chart as a guide for serving sizes.

Servings of Each Food Group				
Fruits	Vegetables	Grains	Protein	Dairy
Offer 2 to 3 or more servings each day	Offer 2 to 3 or more servings each day	Offer 5 to 6 servings each day	Offer 2 to 3 servings each day	Offer 3 servings each day
How much is one serving of each food group?				
¼ cup of soft fruit (canned, cooked or thawed from frozen) ½ piece of fresh fruit 2 to 4 ounces of 100% fruit juice	1 tbsp for each year of age of colorful, cooked vegetables (ex: at 12 months, offer about 1 tbsp per serving)	¼ cup dry cereal 4 tbsps. cooked rice, pasta, cereal 1-2 crackers ¼ to ½ slice of bread	2 tbsps. of chopped meat or fish ½ egg 2 tbsps. cooked, mashed beans, legumes, peas, lentils, & hummus	4 ounces of milk 1/3 cup yogurt 1 slice of cheese 2 tablespoons shredded cheese 1-inch cube of cheese

[Chart adapted from Healthy Children]

Feeding Your Toddler

15 Month Well Child Visit

Your toddler's tummy is little and needs smaller amounts of food more often. Offer healthy foods and snacks every 2 to 3 hours. Remember, your job is to provide healthy food choices to your toddler. Your toddler's job is to choose whether to eat the food and how much of the food to eat.

Your toddler can eat most of the same foods as everyone else at the family table. Spoons are getting easier for your toddler to use at meals. Start with small portions (about 1 tbsp of each food group) on a plate. Add food if your toddler wants more. Food should be chopped into bite-sized pieces.

The chart below is a general guide to food groups and the recommended servings per day.

Servings of Each Food Group				
Fruits	Vegetables	Grains	Protein	Dairy
Offer 2 to 3 or more servings each day	Offer 2 to 3 or more servings each day	Offer 5 to 6 servings each day	Offer 2 to 3 servings each day	Offer 3 servings each day
How much is one serving of each food group?				
¼ cup of soft fruit (canned, cooked or thawed from frozen) ½ piece of fresh fruit 2 to 4 ounces of 100% fruit juice	1 tbsp for each year of age of colorful, cooked vegetables (ex: at 15 months, offer about 1.5 tbsp per serving)	¼ cup dry cereal 4 tbsps. cooked rice, pasta, cereal 1-2 crackers ¼ to ½ slice of bread	2 tbsps. of chopped meat or fish ½ egg 2 tbsps. Of cooked and mashed beans, peas, or lentils	4 ounces of milk 1/3 cup yogurt 1 slice of cheese 2 tablespoons shredded cheese 1-inch cube of cheese

Iron

Iron is an important nutrient to help your toddler grow and be healthy. Meat is a great source of iron that you can serve pureed, ground or chopped into very small pieces to make the texture safe. Other foods with iron include eggs, many green vegetables, hummus, creamy peanut butter, and whole grains.

These foods can still be **choking hazards** for your toddler. Avoid giving your toddler:

- Round pieces of hot dogs
- Tough meats
- Nuts
- Grapes
- Chunks of peanut butter
- Raisins
- Popcorn
- Hard candies

Using Cups

By now, the bottle should be a thing of the past, and your toddler should be drinking out of cups. Do not let your toddler walk around with a sippy cup, unless it is filled with water. Little sips throughout the day of liquids other than water can cause tooth decay and decreased appetite for meals.

Appetite

It is normal for your toddler's appetite to go up and down. Do not worry about changes in appetite if your toddler looks healthy and is growing! Avoid comments about how much or what your child is eating. Do not make any negative comments about food. Do not ever pressure your toddler to eat more. Making meals positive and without distractions (such as the TV) will help your toddler learn to recognize signs of hunger and fullness. Your toddler will be open to trying new tastes and textures if mealtime is not stressful. Eating habits learned in childhood lead to healthy eating habits for life!

Feeding Your Toddler

18 Month Visit

Keep offering your toddler food every 2 to 3 hours. Let your toddler be a part of family mealtime by sitting at the family table. Your toddler is learning to be a healthy eater. Keep offering a variety of colorful foods. Your toddler still needs protein, fruit, vegetables, grains, and dairy.

Food might not be as exciting to your toddler as it used to be. Your toddler might be more excited about learning and exploring the world around us than eating. It is common for a toddler's appetite to slow down because growth has slowed since the first year of life.

How to Handle Picky Eating

Keep in mind that you are still in charge of offering your toddler healthy food. Your toddler still chooses whether to eat and how much to eat.

Your toddler may have figured out that refusing food can lead to getting what he or she wants. Here are some recommendations for what to do and what not to do to handle picky eating.

How to feed a picky eater	
DO NOT	DO:
Do not make special foods for your toddler.	Try adding 1 to 2 foods that your toddler likes with new foods. Try putting foods in fun shapes to increase your toddler's interest in what you serve.
Do not give up if your toddler refuses a new food, even after a few tries. (Remember, sometimes you have to offer a food 10 to 15 times before a toddler will eat a new food!)	Try adding disliked food to familiar foods. For example, you could try adding shredded cheese to broccoli.
Do not pressure or bribe your toddler to eat OR talk about disliked foods.	Set limits on unacceptable behaviors at mealtimes.
Do not worry if your toddler's appetite changes throughout the day.	Let your toddler decide how much to eat. It is normal for a toddler's appetite to change throughout the day. For example, your toddler might be less hungry for dinner if a large lunch was eaten.

Feeding Your Toddler

2 Year Well Child Visit

Picky Eating

It is normal for toddlers to be a little picky with their food.

- Put less on your toddler's plate than what you think will be eaten. A good rule of thumb for a serving size for a two-year-old is about 2 tablespoons per food group.
- You can always give more if your toddler wants more!
- It can be helpful to put one food that you know your toddler will eat with food your toddler has not eaten yet.

Your child is growing more slowly now. It is okay if your toddler is not hungry or refuses a meal. Offer a healthy snack in 1.5 to 2 hours. Remember, it is still your job to give healthy foods at about the same time each day. Your toddler's job is to choose whether to eat it and how much to eat.

The amount of food your toddler eats will go up and down from day to day. Try looking at what and how your child eats over the span of a week rather than each day.

If your toddler does not eat one or more food groups well, talk with your pediatric provider to see if a multivitamin is needed. If your child needs more iron, be aware that gummy vitamins do not have any iron in them.

Be a role model for healthy eating. Your toddler learns a lot from watching you!

Healthy foods & drinks are important for healthy growth

Keep exposing your toddler to a variety of fruits, vegetables, meats and beans, whole-grains, and milk products.

Choose healthy drinks so your toddler is hungry enough at mealtimes and stays healthy.

- Your toddler no longer needs whole milk. Offer low-fat (1% or 2%) or fat free milk. 16 ounces in one day is plenty – offering much more can decrease appetite.
- When offering juice, make it 100% juice and limit to 4 to 6 ounces per day.
- Avoid sugary drinks, such as soda, sports drinks, juice, and lemonade.
- Encourage water between meals and throughout the day.

You can help to make food interesting and fun by making food in shapes your toddler recognizes.



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Fresh fruits and vegetables are healthy snacks! Here are some other examples of healthy snacks for your toddler:

- Cheese & Crackers
- Tortilla & Cheese
- Fruits with Yogurt Dip
- Frozen Yogurt
- Graham Crackers with Peanut Butter
- Vegetables with Dip
- Apples & Peanut Butter
- English Muffin & Peanut Butter
- Fruit Kabobs
- Bread Sticks & Pizza Sauce
- Open faced sandwiches
- Rice Cereal Bars
- Fruit Smoothies

Involve your toddler throughout mealtimes- from preparation to cleanup!

Your toddler is starting to show some independence. Get your toddler involved in planning a meal by giving a choice between two vegetables to have for dinner.

You can increase interest in food at mealtimes by letting your toddler help with making meals. With lots of supervision, your toddler can help with small tasks, like stirring. Stay safe by being careful around stoves, turning pot handles inward, and not allowing finger-licking around raw foods.



Kids love to dress up. Getting your toddler a child-sized apron can add to the fun!

Your toddler can help set the table by placing forks and spoons next to the plates.

Let your toddler try to serve food from a bowl or platter onto a plate. If your toddler can shovel sand into a bucket or pour water from a bucket, your toddler is ready to try serving food.

You can get your toddler involved after a meal by helping with the dishes. With supervision, your toddler can use a sponge to help clean plastic or unbreakable items.

Feeding Your Toddler

30 Month Well Child Visit

Many toddlers show some signs of picky eating. Some pickiness is normal, even if it is a little frustrating at times! Focus on the positives, like praising for trying a new food. Avoid negative reactions.

Help your toddler develop good eating habits

WHAT TO DO:

- Feed your toddler 3 meals a day and 2 to 3 snacks per day.
- Seat your toddler at a table for meals and snacks.
- Model good eating habits. Make sure you eat with your toddler.
- Use small plates and spoons or forks that are easy for a toddler to use.
- Make foods easy to eat. Finger foods, such as sandwiches, strips of cheese, or chunks of fruit and vegetables are great!
- Encourage, but do not force, your child to follow the “one bite” rule for trying new foods.
- If your toddler refuses a food, try the food again in a few days or weeks.
- If your toddler refuses certain foods, try to figure out why. Was it too spicy, too hard, or too hot?
- Praise your toddler for trying new foods.
- Encourage your toddler to do quiet activities before mealtime. An excited child is hard to settle down to eat.
- Make consistent rules for mealtime. These could include hand washing before meals, no television at mealtime, and not leaving the table during the meal.

WHAT NOT TO DO:

- Do not use food as a reward or a bribe.
- Try to avoid activities before mealtime that will leave your toddler too excited to eat.
- Do not let your toddler eat while walking or standing.
- Do not have distractions, such as the TV, phones, or tablets, during mealtime.
- When your toddler begins to play with foods, that is usually a sign of fullness. Do not force your toddler to finish all the food on the plate.

Some food solutions for your toddler

Refuses Milk

- Do not serve too cold
- Prepare foods with milk
- Offer cheese or yogurt

Refuses Meat

- Chop into bite-size pieces that are moist
- Try eggs, cheese, or peanut butter
- Put meats into mixed dishes
- Try canned tuna and salmon in a mixed dish

Refuses fruits/vegetables

- If refusing vegetables, give more fruit
- Blend vegetables into spaghetti sauce, casseroles, meatloaf
- Add fruit to gelatins, cereal, ice cream

Eats too Many Sweets

- Decrease the amount in the home
- Decrease the amount of soda pop
- Avoid using sweets as a reward or bribe
- Encourage fruit or crackers for a snack



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Feeding Your Toddler

Three Year Visit

Your toddler depends on you to give healthy and nutritious foods. It is still your toddler's job to decide whether to eat and how much food to eat.

Your toddler's appetite might still seem to go up and down during the day. This is still normal. Your toddler's body knows how much food is needed based on the energy in the food and the energy used to play. Let your toddler listen to his or her body.

Keep being patient with picky eating and model good eating habits for your toddler. Make sure your toddler sees you and your family trying and enjoying a variety of healthy foods.

Teach your toddler about new foods to increase interest. Read a book about food, sing songs about food, or show your toddler how food is grown in the garden.

Let your toddler be involved in the kitchen. Your toddler can help with rinsing fruits or vegetables, adding ingredients, mashing potatoes, squeezing lemons, and kneading dough.

What you say about food matters. To stay positive about foods and how your toddler eats, try some of these phrases:

Instead of saying:	Try saying something like this:
<i>"Eat this for mom."</i> Saying things like this teaches your toddler they need to eat to get someone's approval.	<i>"This is a pear. It tastes sweet, like apples."</i> Pointing out how new foods taste, smell, or feel will increase your toddler's interest.
<i>"You cleared your plate! You're growing so big!"</i> <i>"Your brother ate all of his vegetables."</i> <i>"You can't leave the table until you finish your broccoli."</i> Saying things like this teaches your toddler to ignore feelings of fullness.	<i>"Is your tummy telling you that you're full?"</i> <i>"Do you still feel that hungry growling in your tummy?"</i> Saying things like this can help to prevent your toddler from overeating.
<i>"See, that wasn't so bad."</i> Saying something like this can make your toddler feel bad about not wanting to try a new food.	<i>"Do you like that?"</i> Letting your toddler decide how foods taste increases feelings of independence.
<i>"You can't eat any pie until you eat all of your vegetables."</i> <i>"If you stop crying, we'll go out for ice cream."</i> Using foods as a reward and a way to make your toddler feel better will teach unhealthy eating habits, like using food for comfort.	<i>"We can try this again another time."</i> <i>"I am sorry you are sad. Would you like a hug?"</i> Do not force your toddler to eat. Instead, keep trying new foods. Comfort your toddler during times of sadness by showing love and affection.

[Adapted from USDA (n.d.)]

APPENDIX F. RESOURCES FOR EDUCATIONAL CURRICULUM

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APPENDIX G. PEMAT-P

Title of Material: _____ _____
Name of Reviewer: _____ Review Date: _____

Read the [*PEMAT User's Guide*](#) before rating materials.

Understandability

Item #	Item	Response Options	Rating
Topic: Content			
1	The material makes its purpose completely evident.	Disagree=0, Agree=1	
2	The material does not include information or content that distracts from its purpose.	Disagree=0, Agree=1	
Topic: Word Choice & Style			
3	The material uses common, everyday language.	Disagree=0, Agree=1	
4	Medical terms are used only to familiarize audience with the terms. When used, medical terms are defined.	Disagree=0, Agree=1	
5	The material uses the active voice.	Disagree=0, Agree=1	

Topic: Use of Numbers			
6	Numbers appearing in the material are clear and easy to understand.	Disagree=0, Agree=1, No numbers=N/A	
7	The material does not expect the user to perform calculations.	Disagree=0, Agree=1	
Topic: Organization			
8	The material breaks or "chunks" information into short sections.	Disagree=0, Agree=1, Very short material ⁱ =N/A	
9	The material's sections have informative headers.	Disagree=0, Agree=1, Very short material ⁱ =N/A	
10	The material presents information in a logical sequence.	Disagree=0, Agree=1	
11	The material provides a summary.	Disagree=0, Agree=1, Very short material ⁱ =N/A	
Topic: Layout & Design			
12	The material uses visual cues (e.g., arrows, boxes, bullets, bold, larger font, highlighting) to draw attention to key points.	Disagree=0, Agree=1, Video=N/A	

Topic: Use of Visual Aids			
15	The material uses visual aids whenever they could make content more easily understood (e.g., illustration of healthy portion size).	Disagree=0, Agree=1	
16	The material's visual aids reinforce rather than distract from the content.	Disagree=0, Agree=1, No visual aids=N/A	
17	The material's visual aids have clear titles or captions.	Disagree=0, Agree=1, No visual aids=N/A	
18	The material uses illustrations and photographs that are clear and uncluttered.	Disagree=0, Agree=1, No visual aids=N/A	
19	The material uses simple tables with short and clear row and column headings.	Disagree=0, Agree=1, No tables=N/A	

Total Points: _____

Total Possible Points: _____

Understandability Score (%): _____

(Total Points / Total Possible Points x 100)

Actionability

Item #	Item	Response Options	Rating
20	The material clearly identifies at least one action the user can take.	Disagree=0, Agree=1	
21	The material addresses the user directly when describing actions.	Disagree=0, Agree=1	
22	The material breaks down any action into manageable, explicit steps.	Disagree=0, Agree=1	
23	The material provides a tangible tool (e.g., menu planners, checklists) whenever it could help the user take action.	Disagree=0, Agree=1	
24	The material provides simple instructions or examples of how to perform calculations.	Disagree=0, Agree=1, No calculations=NA	
25	The material explains how to use the charts, graphs, tables, or diagrams to take actions.	Disagree=0, Agree=1, No charts, graphs, tables, or diagrams=N/A	
26	The material uses visual aids whenever they could make it easier to act on the instructions.	Disagree=0, Agree=1	

Total Points: _____

Total Possible Points: _____

Actionability Score (%): _____
(Total Points / Total Possible Points x 100)

ⁱ A very short print material is defined as a material with two or fewer paragraphs and no more than 1 page in length.

EXECUTIVE SUMMARY

Childhood Obesity: Developing Early Nutrition & Feeding Education for Parents at Well Child Visits

Introduction

Childhood obesity has become a significant problem in the United States. Considerable health consequences are linked to obesity, including type 2 diabetes, hypertension, hyperlipidemia, cardiovascular disease, cancers, and psychological impacts. Such health problems are developing at younger ages when previously only seen in adults. Unfortunately, treatment of obesity is not effective, and therefore, prevention must be the primary focus. Diet and eating behaviors have a significant impact on weight, and children develop taste preferences and lifelong eating behaviors within the first few years of life. Therefore, targeting interventions on feeding and nutrition in infancy may foster healthy habits for life and play a role in preventing obesity. Furthermore, parents report seeking out feeding information online and expect their healthcare organization to have feeding resources readily available.

Purpose

The purpose of this project was to address childhood obesity prevention by developing an educational curriculum on feeding and nutrition. The parent-focused education correlated with each well child visit between the ages of two weeks and three years.

Project Design

The educational curriculum was developed through literature reviews and expert consultations from a multidisciplinary team. Providers in urban Midwestern primary care clinics provided feedback on the content and preferred methods of education delivery.

Results and Conclusion

- Providers agreed the curriculum was extremely relevant and understandable for parents.
- A formal literacy evaluation found the curriculum to be written at a 6th – 8th-grade level.
- Providers ranked one on one discussion and written materials as the preferred delivery methods for feeding and nutrition information at well child visits.

Recommendations

- Use a validated tool to complete one more stringent evaluation of the curriculum, such as PEMAT-P.
- Obtain parent input on how they would prefer to receive feeding and nutrition information.
- To increase parent satisfaction, consider making the educational curriculum readily available on the organization's website and through MyChart, as well as provided at well child visits.