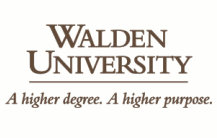

2017

Nurse Practitioners' Guide on Consumption of Hundred Percent Fruit Juice by Children

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This is to certify that the doctoral study by

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has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

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Walden University
2017

Abstract

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By

Monisola Adeyemo

MSN, Howard University, 1995

BSN, University of D.C., 1987

Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Nursing Practice

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August 2017

Abstract

Childhood obesity has reached an epidemic level in the United States, growing exponentially and posing a great risk to the current and future health of the American people. This trend of increasing incidence of overweight and obesity in children has been occurring for decades, there is a need for multimodal preventative solutions to control the rate. The purpose of this Doctor of Nursing Practice (DNP) project was to develop an evidence-based guideline, educational materials, and a long-term evaluation process that would provide information on the proper consumption of 100% fruit juice as 1 solution that will impact the health of very young children. The program leveraged information gathered from literature review and synthesis followed by a formative and summative evaluation. Sufficient evidence has been found to support a correlation between the feeding of 100% fruit juice to infants as dietary supplements and childhood obesity. The DNP project facilitates preventive care that is based on scientific evidence in the fight against childhood obesity. Nine nurse practitioners at the study site clinic evaluated the guideline using Appraisal of Guideline, Research and Evaluation II framework. Based on the feedback evaluation, all nurse practitioners that participated agreed that the guideline was well prepared, easy to understand, and achievable. They also agreed that the guideline could make a difference in the fight against childhood obesity. The interaction between the nurse practitioners and the parents will hasten information flow process that aids obesity cases reduction. As a result, vital social change can be achieved in young obese children through positive influence and the empowerment of nurse practitioners.

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Dedication

This paper is dedicated in honor of all the nurse practitioners in a primary healthcare setting who provide primary care services to communities across the United States. Your dedication to serve local communities and bring about positive change in health and wellness is a reflection of your commitment to the nursing profession.

Acknowledgments

I give special thanks to the faculty of Walden University, especially my project committee members in the persons of Dr. Marisa Wilson, Dr. Joanne Minnick, and Dr. Janice Long, for their contributions to assure that I achieved this goal in my academic career. I would also thank the members of my family for their moral support and patience during the course of this endeavor.

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Section 1: Introduction

Introduction

Childhood obesity has reached an epidemic level in the United States and is growing exponentially. Obesity was recognized as a public health problem decades ago (World Health Organization, 2003). Childhood obesity presents a great risk to the current and future health of the American people. A National Health and Nutrition Examination Survey (2011) revealed that the prevalence of obesity in children aged 12 to 19 has grown from 5% in 1980 to 21% in 2012, showing that this trend has been increasing for decades. The Institute of Medicine (2015) reported that childhood obesity in the nation in 2004 was three times the rate as it was in 1970.

Childhood obesity is defined as a body mass index (BMI) above the 95th percentile (Ogden & Carroll, 2010). The overweight and obese children, consisting of male and female across all races, ethnic, and age groups, fit in the over 85th percentile of the overall population of over 23 million children and teenagers in the United States (Robert Wood Johnson Foundation, 2011). If this trend continues, some predictions stated that by 2015, 1 in 4 adolescents and children will score above the 95th percentile in BMI (Ogden & Carroll, 2010). The predictive value of this statement in 2017 is neither clear nor deniable.

Obesity in children is an acknowledged major problem in the United States; however, no unified strategy has been identified for its treatment or prevention. It is generally understood that many factors are linked to the increasing childhood obesity epidemic among which is the reliance on processed foods (Heyman & Abraham, 2017).

One type of processed food types is 100% fruit juice, and it has been reported that feeding excessive fruit juice to infants is related to elevated risk of obesity at early childhood (Wang et al., 2008). Scientific evidence also exists that sucrose intake without matching fiber, as commonly seen in fruit juice, is correlated with the occurrence of obesity and other health-related issues (Dennison et al., 1997; Heyman & Abraham, 2017). The daily per capita caloric consumption of processed beverages has markedly increased, specifically with sugary beverages including 100% fruit juice, paralleling the significant up-surge in childhood obesity in the United States (Wang et al., 2008).

Based on the aforementioned facts, the link between excessive intake of fruit juice and elevated risk of obesity in children is clear. Primary healthcare clinics usually have the initial encounter with at-risk children for childhood obesity, and the percentage of overweight and obese children served by such primary clinics has increased. As the first point of contact in the patient care process, primary family clinics are best positioned for childhood obesity prevention. Therefore, there is a considered clear and urgent need to develop evidence-based guidelines that will augment the existing recommendations and educational efforts for nurse practitioners in primary clinics who can in turn educate parents/guardians on the childhood obesity issue.

Background Information and the Statement of Problem

As I have already stated, many factors are linked to the increasing childhood obesity; foremost among them is the reliance on processed foods. The feeding of too much fruit juice to infants is related to elevated risk of obesity at early childhood (Heyman & Abraham, 2017). The major problem in childhood obesity that I focused on

in this study was the lack of wide-spread understanding by nurse practitioners that the nutritional supplementation with 100% fruit juice fed to infants in early childhood has a direct impact on obesity in young children and adolescents.

It is obvious that children will prefer fruit drinks as compared to other drinks, such as water, since it tastes sweet and good. Furthermore, 100% fruit juice or drinks are convenient methods for mothers to feed a child and can be an inexpensive way of replacing vital items in a child's diet. It is also true that most poor or low-income mothers and guardians are prone to using 100% fruit juice or drinks as a main portion of the day-to-day nutritional content of their child or children (Heyman & Abraham, 2017). In addition, as a result of low intake of milk and high consumption of 100% fruit juice or drinks, the recommended calcium daily intake in this class of children has also been compromised, creating a health concern (Wang et al., 2008).

It has also been found that unpasteurized juices may lead to serious bacterial infections, tooth decay, and promotion of picky feeding among children (American Academy of Pediatrics [AAP], 2007). Other observed changes associated with the high consumption of 100% fruit juices and sugary drinks in children are flatulence, abdominal distension, and frequent diarrhea (Heyman & Abraham, 2017). All of these aforementioned adverse effects led me to come up with a plan through this project study to ensure that children are fed with a recommended diet that is free of excessive 100% fruit juices. I considered that addressing the issues of excess consumption of 100% fruit juice during infancy as the best preventive measure for childhood obesity. Identifying and treating childhood obesity in children can be more challenging than preventing it at early

ages. It is important that nurse practitioners are able to provide correct guidance and well-documented facts that feeding 100% fruit juice in excess to infants can result in unfavorable effects such as childhood obesity later in life.

The clinical study site for this project, located in the northeastern part of the United States, serves families that struggle with childhood obesity as many other families around the country. Nurse practitioners at the study site clinic measure the heights and weights of patients to assess development, growth, and BMI. The average percentage of children who are overweight and obese among patients at this study site is 35%. Nurse practitioners at the clinic provide counseling, nutritional and physical exercise guidance, and other treatment options such as the referral of patients with high BMI to a specialist. They also treat the health conditions related to childhood obesity. In addition to the aforementioned data collection, nurse practitioners at the clinic also provide preventive guidance to the patients as a critical role in the prevention of childhood obesity.

In this study, I used the health belief model (HBM; National Cancer Institute [NCI], 2003) instrument. Programs designed to address childhood obesity require theoretical background, and I found that the most suitable theory for managing the obesity problem in children is the HBM. The theory underlying the original HBM is that "health behavior is shaped by personal perceptions or beliefs regarding a disease and the available remedies to lower its occurrence" (Hochbaum et al, 1958, (p. 2). The HBM has shown that "personal health is shaped by a range of intrapersonal factors that ends up affecting health behavior" (NCI, 2003, p. 4). HBM is a framework for motivating people to take healthy actions that are positive based on the desire to avoid negative health

consequences as the prime motivation. For instance, the apparent threats of childhood obesity observed in children can be used to motivate parents/guardians to follow nutritional guidelines and recommendations and avoid feeding 100% fruit juice to infants as a nutritional supplement.

Project Question

I developed the following question to guide this project: Does clinical evidence support the development of a guideline and educational process for nurse practitioners on the consumption of excessive fruit juice, 100% or otherwise, by children that can ultimately impact childhood obesity?

Goals and Objectives of the DNP Project

My goals with this DNP project were to develop evidence-based guidelines, educational materials, and a long-term evaluation process that will inform and educate nurse practitioners at the study site on how best to prevent the detrimental consumption of 100% fruit juice during infancy to assure the best practice of childhood obesity prevention and provide parents and children with the necessary information on the healthy consumption of 100% fruit juice as one solution that families can apply in their home environment. My objectives with this DNP project were to:

- Increase the knowledge of nurse practitioners at study site clinic on the guideline for 100% fruit juice consumption for infants.
- Increase the knowledge of nurse practitioners about the appropriate fruit juice consumption in infants that can be practiced at the infants' home environments to spur healthy changes.

Significance or Relevance to Clinical Practice

Primary healthcare providers including nurse practitioners consider it critical to address the issue of childhood obesity at an early age because of the potential health risks such as heart and lung diseases, diabetes, and related abnormal metabolic disorders that could result from the lack of efforts (Heyman & Abraham, 2017). Feeding infants with sugary foods such as 100% fruit juice is a major contributor to childhood obesity (AAP, 2007). Identifying and treating childhood obesity in children is more challenging than preventing it at early age. A major significance of this study to clinical practice is that the resulting guideline will become handy for use by a majority of primary healthcare providers that includes nurse practitioners, pediatricians, dieticians, nurses, and school health services who are, for the most part, the first line of caregivers to overweight or obese children in society. In the primary care setting, there is very limited time for adequate history-taking for obesity, especially when the patients come in with an unrelated acute illness. More often than not, these patients and their families are unaware of the problem, which makes raising the issue of body weight problematic for the practitioner. Given these constraints, it becomes very challenging to identify and treat children who are at-risk and suffering from excess body weight.

Therefore, this DNP project will provide additional resources to nurse practitioners at the study site to coordinate efforts at the clinic towards the prevention of childhood obesity at an early age. In addition, the engagement and active participation of the nurse practitioners against childhood obesity will make the obesity prevention more effective. An effective process of this nature will produce a favorable outcome.

Evidence-Based Significance of the Project

The risk of childhood obesity increases with the excess consumption of fruit juice by infants (Heyman & Abraham, 2017; Wang et al., 2008). The sugar in 100% fruit juice consumed by infants without the corresponding fiber leads to childhood obesity and other health problems as they grow up (AAP, 2007). The consumption of fruit juice among children, especially from infancy, has various problems because of the sugar content that is high in the fruit juice. On the contrast, the fruit juices have low levels of fibers making it not advisable to be consumed in excessive quantities among children. For example, when a child consumes four ounces of 100% grape juice, they consume 20 grams of sugar (Heyman & Abraham, 2017). Correspondingly, the amount of calories in a half-cup of sliced apples, otherwise known as whole fruits, has more calories from sugar and has a greater amount of fiber (Butte, 2010). Therefore, the constituents of the half a cup of sliced apples serve the right proportions of nutrients that should be consumed as compared to that consumed in four ounces of 100% grape juice. Butte (2010) also documented that the fiber consumption of most children in the state of Minnesota and in the United States at large is much lower than the recommended fiber nutrient intake to reduce obesity among children.

As previously stated, in the United States children have increased their daily consumption of sugary beverages and 100% fruit juice (Wang et al., 2008). Of all age groups in the United States, toddlers and young children have the highest consumption of fruit juice (Commission on Nutrition American Academy of Pediatrics [CNAAP], 2001). Fruit juice and sugar-flavored drinks are the second and third largest sources of

energy consumption among toddlers (Heyman & Abraham, 2017). Total intake of fruit juice is also high among children in preschool (CNAAP, 2001).

According to Wang et al. (2008), preschool children consume 10 or more ounces of 100% fruit juice drink daily on average. In the meantime, children in preschool barely meet the recommended daily intake for milk or fiber (Butte, 2010). In this DNP project, I used existing scientific evidence on the association of the 100% fruit juice consumption and childhood obesity to develop an evidence-based obesity prevention program that will significantly enhance nursing care and health outcomes for children. The results of this project study can also be used to forward existing guidelines, which will empower nurse practitioners. Parents are also vital in the implementation of the guidelines since they spend the most time with their children who are of a great concern in this discussion.

Implications for Social Change in Practice

With this DNP project, I facilitated evidence-based preventative care in the fight against childhood obesity. In this project, I utilized existing evidence that describes the effects of 100% fruit juice consumption on childhood obesity. The results of this project will strengthen the role of the nurse practitioners in obesity prevention through the implementation of a guideline, which will facilitate suitable information for children and parents that can be used to make healthy dietary choices. The Institute of Medicine (2004) noted that obesity-related "health concerns are immediate and warrant urgent preventative actions" (p. 4). Nurse practitioners are in a position to have constant communication with at-risk children for obesity and have the potential to influence dietary choices. With an applicable evidence base, nurse practitioners can intervene

whenever a child is at-risk for obesity, preventing the occurrence of obesity and related health problems. Also, nurse practitioners are in a position to advocate for families and their children and can influence local and national policies that influence dietary selections for children. Educating and equipping nurse practitioners with scientific evidence and guidelines to support their work in relation to childhood obesity is another step in addressing the obesity epidemic and, if coupled with local community outreach, may slow the progression of the obesity problem that has exploded over the past three decades.

Definitions of Terms

Childhood obesity: BMI is used to determine whether a person is overweight or obese. BMI is defined based on a unit of measurement where height in meters and weight measured in kilograms are computed using a formula (kg/m^2). The BMI value is then used to assign the person in categories such as underweight - BMI < 18.5, normal range - BMI between 18.5–25, overweight - BMI between 25–30, and obese - BMI > 30. According to the Center of Disease Control and Prevention Growth Charts (Kuczmarski et al., 2000), in children ages 2 to 19, BMI is assessed by age and sex specific percentiles such as BMI greater than 95th percentile is obese, BMI between 85th and 95th percentile is overweight, BMI between 5th and 85th percentile is normal range, and BMI less than 5th percentile is underweight. The International Obesity Task Force also provides BMI cut points by age and sex for overweight and obesity for children age 2 to 18, and the cut points correspond to an adult BMI of 25 (overweight) or 30 (obesity; Cole et al., 2000).

Fruit juice: A beverage made of 100% fruit juice from the naturally occurring liquid in the fruit tissue; it contains no artificial-sweetener when the fruit drink is defined as beverage that contains less than 100% natural fruit juice. It includes sweetened fruit juice reconstructed from fruit-flavored drinks and concentrate. Sugar sweetened beverages are fruit drinks, fruit ades, and carbonated beverages including cola beverages and sodas with sweeteners added (National Kids Count, 2011).

Summary

Childhood obesity has been increasing at an alarming rate despite the national attention and a range of enacted policy interventions both at the national and local level. There are several factors that have been identified to explain this epidemic; among them are the easy accessibility and excessive consumption of energy and flavored drinks (Wang et al., 2008). Feeding infants with sugary foods such as 100% fruit juice as nutritional supplement is a major contributor to childhood obesity (Heyman & Abraham, 2017).

There is ample evidence documenting the poor health implications of childhood obesity. There are also guidelines and evidence-based best practices available to be used in the effort to prevent childhood obesity. The purpose of this DNP project was to design evidence-based program that addressed the issues of excessive consumption of 100% fruit juice and the resulting obesity in infants and children. Identifying and treating childhood obesity in children is more challenging than preventing it at early age.

This DNP project was an effort to educate and equip nurse practitioners with evidence and best practices on the effect of 100% fruit juice fed as dietary supplement at

infancy on childhood obesity. In the project, I will provide additional resources and evidence from the existing body of literature that practitioners at the primary care level rely on for their regular evidence-based practice in order to bring about favorable outcomes in local communities against childhood obesity. In the public domain, there is ample information, which suggest that excessive consumption of fruit juices among children is a concern because of its high sugar and low fiber content. In the next sections of this project, I will provide more details on these issues and concerns.

Section 2: Review of Scholarly Evidence

Specific Literature

As I stated in the problem statement, higher fruit juice consumption by infants leads to an elevated risk for childhood obesity at later ages. There is also scientific evidence showing that sucrose consumption without matching fiber, as is common in fruit juice, is linked to liver injury, metabolic syndrome, and obesity (Heyman & Abraham, 2017). It is therefore imperative that the problem of childhood obesity is confronted right from the onset or early stages before it results in a more complicated adverse clinical outcome.

Fruit juice consumption among children is problematic because of the high sugar and low fiber combination in the content. For instance, four ounces of 100% apple juice has 0 grams of fiber, but 13 grams of sugar in 60 calories (American Academy of Pediatrics [AAP], 2007; Gerber, 2011). Likewise, 100% grape juice has 20 grams of sugar per four fluid ounces (AAP, 2007). Similarly, a half-cup of sliced apples has half as many calories (30) and fewer calories from 5.5 grams of sugar and 1.5 grams of fiber addition (AAP, 2007). Children's overall consumption of fiber in the United States is low (Butte, 2010). Higher consumption of fiber is related to a lower risk of obesity in children as well as adults (O'Neil et al., 2010).

Recent studies have also suggested that the disproportionate consumption of fructose, either from the sucrose-almost 50% fructose-in 100% fruit juice or from high fructose corn syrup in sweetened drinks, may be correlated with injury on liver and metabolic syndrome (Lim et al., 2010). Hepatic metabolism of fructose encourages fat

development and accumulation of intrahepatic lipids, hindrance of mitochondrial β-oxidation of long chain fatty acids, triglyceride formation and steatosis, liver and skeletal muscle resistance of insulin, and hyperglycemia (Lim et al., 2010). Longitudinal studies on interventions have revealed that hypercaloric foods of both fat and fructose can cause an upsurge in intrahepatocellular lipids, and that excessive systemic fructose can lead to increased low density lipoprotein triacylglycerols (Sobrecases et al., 2010).

Evidence has also suggested that high calorie liquids as in fruit juices were not physiologically adequate to activate the brain's satiety mechanisms as observed for solid diets with optimal non-sugary fluid consumption. Chen et al. (2009) found that removal of liquid calories from the diet resulted in loss of body weight, whereas removal of solid calories did had an opposite effect. These results appeared to suggest that fruit juice may also modify the nervous system signals for energy consumption, a physiological phenomenon that had been associated with dependence and addiction related to excessive energy consumption and metabolic syndrome (Lustig, 2010).

General Literature

Wojcicki and Heyman (2012) noted that 100% fruit juice consumption leads to childhood obesity and that 100% fruit juice should be eliminated from the Food Programs of the U.S. Department of Agriculture. Conversely, there are some critics who dispute this recommendation by citing some studies that have not shown conclusive association between overweight/childhood obesity and moderate consumption of 100% fruit juice in children (O'Neil & Nicklas, 2008). These critics also argue that 100% fruit juice significantly contributes to nutrient intake.

The U.S. Department of Agriculture (2010) recognized that 100% fruit juice supplies nutrients along with the calories they contain; therefore, it recommends limited use as a complement to whole fruit. With a four ounce serving of 100% fruit juice providing a half cup toward the recommendation providing a convenient way to help reach daily fruit recommendations (U.S. Department of Agriculture, 2010). However, the issue is that excessive consumption of 100% fruit juice without matching fiber leads to childhood obesity, as I have discussed previously and there is sufficient evidence to support this fact.

Evidence-Based Recommendations

The AAP published recommendations in 2001 for 100% fruit juice consumption in children and revealed that 100% fruit juice has no nutritional benefit over whole fruits and may contribute to the child's over nutrition (AAP, 2005). Specifically, the AAP recommended that 100% fruit juice consumption should be limited to eight to 12 ml/d for children aged seven to 18 years. Children should at least be six months old to drink 100% fruit juice and parents should provide it in a cup only, not a bottle; in addition, consumption should be limited to four to six ounces per day through the age of 12 months (Garner et al., 2005; Heyman & Abraham, 2017). Children seven to 18 years of age should limit consumption to 12 oz. of 100% fruit juice per day (Garner et al., 2005). Infants, children, and adolescents should not drink unpasteurized juice (AAP, 2001). The American Heart Association recommends that children who are one to three years of age consume the equivalent of one cup of whole fruit per day. Children from four to 13 years should consume one and half cups per day (AAP 2017; Garner et al., 2005). Sugar-

sweetened fruit drinks have been associated with excess weight gain and obesity and provide little nutritional benefit to children and should be restricted at all expenses (Butte, 2010).

It is important to emphasize to parents that breastfeeding is the preferable source of infant nutrition for the first six to 12 months. The American Academy of Family Physicians, American Academy of Pediatrics, American Heart Association, and World Health Organization all recommended breast milk as the preferred source of infant nutrition for the first six to 12 months (Butte, 2010). The U.S. Preventive Services Task Force (2008) recently stressed the need for primary care nurses to further promote breastfeeding efforts. Alternatives apart from breastfeeding to the children should be sought out but 100% fruit juice should not be the primary choice (Gidding et al., 2005).

Best Practices

Best practices are tested practices that have roots in scientific evidence and proven to bring favorable change that addresses the problem (Green & Murphy, 2014). Guidelines and recommendations are provided based on best evidence-based practices. In this subsection, I will discuss some of the evidence, recommendations and best practices available in the literature of the field.

As I have previously discussed, excessive consumption of 100% fruit juice can contribute to childhood overweight and obesity (AAP, 2007). A study found that 2 to 5 year old children who consumed 12 or more ounces of fruit juice per day were more likely to be obese than those who consumed less juice (Dennison et al., 1997). Excessive fruit juice consumption may be correlated with malnutrition, flatulence, diarrhea, and

abdominal problem (AAP, 2007, 2017). Fruit juice that is not pasteurized may contain pathogens that may cause serious illnesses (AAP, 2007, 2017). The U.S. Food and Drug Administration (2015) requires warning labels on the dangers of harmful bacteria on all unpasteurized juice or products.

Whole fruit is more nutritious than fruit juice and provides dietary fiber; 100% fruit juice provides no nutritional advantage over whole fruits. As I have previously stated, the recommended total daily intake of fruit juice for children aged one to six years is not more than 4 to 6 ounces. For infants who are breastfed, AAP recommends that gradual introduction of foods that are iron fortified may follow no sooner than around 4 months, preferably 6 months as a complementary to breast milk. Infants should not be offered juice before they reach age 12 months (Heyman & Abraham, 2017).

Fruit juice drinks, fruit nectars, or fruit punches contain less than 100% fruit juice and have a lower nutritional value than 100% fruit juice (AAP, 2017). Beverages with high sugar content should not have place in a healthy diet and should be avoided (AAP, 2017). Consumption of juice during the day continuously has been linked with a decreased appetite for other nutritious foods, which can result in problems of feeding and obesity (AAP, 2017). Infants should not be offered juice from easily transportable covered cups or bottles that facilitate consumption of juice throughout the day (AAP, 2017).

Conceptual Models/Theoretical Frameworks

The HBM model is the most commonly used theory in health promotion work. The HBM model was developed in the 1950s as a method of explaining why screening

medical programs provided by the U.S. Public Health Service, mainly for tuberculosis, and hypertension were not highly successful (Hochbaum, 1958). The model helps in gaining a deep insight into obesity and medication adherence on the bases of a well-developed behavior theory (Hochbaum, 1958). A team of social psychologists developed the HBM at the U.S. Public Health Service in an effort to understand the pervasive failure of people to accept preventive measures or tests screening for the early detection of diseases that are asymptomatic; it was later applied to responses of patients to symptoms and to compliance of prescribed medical treatments (Hochbaum, 1958).

HBM uses four perceptions as the main constructs of the model: perceived seriousness, perceived susceptibility, perceived benefits, and perceived barriers (Green & Murphy, 2014). These perceptions, individually or in combination, can be applied to explain health behavior (Green & Murphy, 2014). Recently, other constructs have been added to the HBM; consequently, the model has been extended to include motivating factors, cues to action, and self-efficacy (Green & Murphy, 2014). The model as applied to childhood obesity is presented in Figure 1.

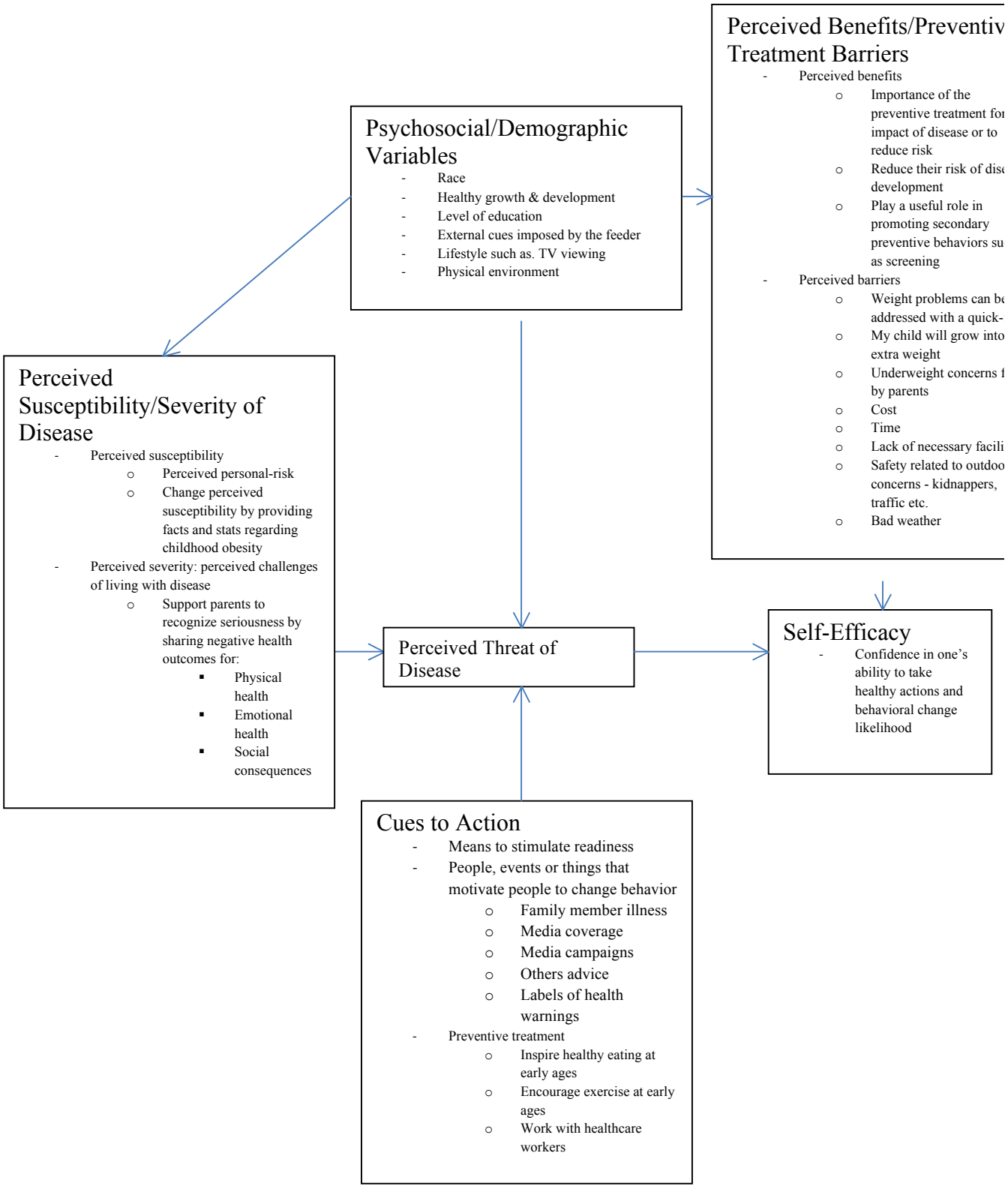
Summary

Childhood obesity has been increasing Higher fruit juice consumption by infants is known to result in higher risk for childhood obesity at later years. There is ample of scientific evidence to show that sucrose consumption without the matching fiber, as commonly seen in fruit juice, has been linked to liver injury, metabolic syndrome, and obesity. Excessive fruit juice consumption by children is of major concern because of the high sugar and low fiber combination in the content.

As gathered in literature, four ounces of 100% apple juice has 0 grams of fiber, but 13 grams of sugar in 60 calories (American Academy of Pediatrics [AAP], 2007; Gerber, 2011). Similarly, 100% grape juice has 20 grams of sugar per four fluid ounces (AAP, 2017) while an half cup of sliced apples has half as many calories (30) and fewer calories from 5.5 grams of sugar and 1.5 grams of fiber addition (AAP, 2017). As reported by Butte (2010), children's overall consumption of fiber in the United States is low. Higher consumption of fiber has been associated with lower risk of obesity in children as well as adults.

As recognition of the potential hazards of 100% fruit juices consumption for infants, the U.S. Department of Agriculture (2010) recommended four ounce serving of 100% fruit juice daily intake as a complement to whole fruit. Similarly, the AAP recommended that 100% fruit juice consumption should be limited to eight to 12 ml/d for children aged seven to 18 years; infants, children, and adolescents should not drink unpasteurized juice (AAP, 2001). The HBM model used for this study consisted of four main perception constructs namely perceived seriousness, perceived susceptibility, perceived benefits, and perceived barriers (Green & Murphy, 2014). These perceptions, individually or in combination, can be applied to explain health behavior (Green & Murphy, 2014). In the next section, I will engage in the discussion of study design, goals, objectives, activities, and evaluation.

Figure 1. The health belief model (HBM)



Section 3: Collection and Analysis of Evidence

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Introduction

The primary methodology that I employed in developing the DNP project was to engage nurse practitioners who are the stakeholders and to utilize existing evidence, recommendations, and best practices to establish a program that enables nurse practitioners to effectively support the effort to prevent childhood obesity. At the study site clinic, it is a priority to train and equip nurse practitioners with evidence-based guidelines and information so that they can discuss and motivate parents/guardians to follow a scientific approach in the effort to prevent childhood obesity. In this chapter, I will present the details of the guideline development and stakeholders' analysis.

Stakeholders' Involvement

As Crawford (2013) stated, environments surrounding children strongly influence their behaviors, and sustainable and meaningful behavior change is not likely to occur without sustained support from parents. Nurse practitioners who interact with parents need to support them and provide useful information that will be provided in the guideline. In effect, the guideline will fill a critical gap for nurse practitioners and the management of the study site clinic who are the major stakeholders in this exercise.

The major stakeholders I identified for this DNP project were nurse practitioners and the management of the study site clinic. Strong collaboration between parents and nurse practitioners is crucial to the success of guideline implementation for childhood obesity prevention. Successful implementation of the guideline provides flexibility for

nurse practitioners with busy schedules and adds value, not just responsibility. This includes offering training to nurse practitioners on easy and practical approaches to improve communication between nurse practitioners and parents.

Nurse practitioners and caregivers who are aware of the health benefits of the recommendations on the consumption of 100% fruit juice can instill healthy behaviors in children. Most parents are not aware of the dangers they expose their children to since they allow them to drink the fruit juices due to convenience and availability (Heyman & Abraham, 2017). On the other hand, the children also like consuming the fruit juices since they are sweet, which encourages the parents to provide them more often not bearing in mind the adverse effects on health children.

Nurse practitioners should work closely in unison to achieve the needed outcome in improving the obesity rate reduction among children. The nurse practitioners need each other because they are the facilitators of the proper dissemination of the relevant information since they have the right qualifications. The parents and the children should also be encouraged to adhere to the set standards in order to attain the levels of healthy eating habits and practices among children. Nurse practitioners are the most effective stakeholders in these scenarios because they are the ones who can communicate effectively with parents.

Program Design

Using the HBM as theoretical foundation, I designed this program for the study site clinic, with the following mission, goals, and objectives. The theoretical foundation most suitable to address and manage the childhood obesity problem in children was the

HBM. It is most suitable because the HBM model heavily relies on critical perception constructs consisting of perceived seriousness, perceived susceptibility, perceived benefits, and perceived barriers to the subject being addressed (Green & Murphy, 2014). The foundation of the theory is that "health behavior is shaped by personal perceptions or beliefs regarding a disease and the available remedies to lower its occurrence" (Hochbaum, 1958, p. 3). Personal perceptions are shaped by a range of intrapersonal factors that affect health behavior (Green &Murphy, 2014). HBM is a framework for motivating people to take healthy actions that are positive based on the desire to avoid negative health consequences as the prime motivation (Green &Murphy, 2014). Therefore, by using this theoretical framework in this project, nurse practitioners at the study site clinic will receive evidence-based guidelines and the necessary training to communicate with parents/guardians to motivate and influence behavioral change in favor of obesity prevention.

Mission

The mission of this program is to fight childhood obesity at the study site clinic and to make a favorable impact on the health and wellness of children and families. The program provides training to nurse practitioners at the study site clinic on the guideline for 100% fruit juice consumption, nutritional education, and advocacy to parents and children being served by the clinic. The program will engage the nurse practitioners, parents, and children on the adoption of the guideline.

Program Goals, Objectives, and Activities

Goal 1

Develop an evidence-based program that will educate nurse practitioners at the study site clinic on the issue and provide a guideline on the consumption of 100% fruit juice during infancy as a best practice for childhood obesity prevention.

Objective 1

Increase the knowledge of nurse practitioners at the study site clinic on the guideline for 100% fruit juice consumption for infants.

Activities 1

1. Prepare the guideline for 100% fruit juice consumption.
2. Prepare training materials and specific action plans. The training materials should include various guidelines that impact the fruit intake to a child. The training must be conducted by the nurse practitioners so that the ideal information can be transmitted to the targeted mothers and guardians. The training materials must contain the following information:
    - Information about encouraging children to eat whole fruits (AAP, 2001, 2017).
    - If juices are consumed they should not be more than 50% of the recommended intake per day (AAP, 2001, 2017).
    - Children who are below 6 months old should not be fed completely with fruit juices (CNAAP, 2001; Heyman & Abraham, 2017).

- At no single period should the milk be replaced with fruit juices in the child's diet (Garner et al., 2005; Heyman & Abraham, 2017).
- The stakeholders should be aware that 100% fruit juices are a good source of minerals and vitamins but that they must be administered with a lot of care. They may lead to adverse effects if consumed in excess. (Garner et al., 2005; Heyman & Abraham, 2017).

3. Provide training for nurse practitioners.

Goal 2

Nurse practitioners receiving the necessary information on the healthy consumption of 100% fruit juice as a dietary supplement for infants so parents can apply it in their families for a home environment that is healthier.

Objective 2

Increase the knowledge of nurse practitioners about the appropriate fruit juice consumption in infants so they can educate parents to apply healthy changes in their home environments.

Activities 2

1. Nurse practitioners discuss childhood obesity with parents and children and the role of excessive consumption of 100% fruit juice in the epidemics of childhood obesity.
2. Publish fact sheets for distribution at the clinic.
3. Nurse practitioners encouraging parents and children to learn and apply the recommendations in the 100% fruit juice consumption guideline.

Goal 3

Provide nurse practitioners with recommended nutritional information.

Objective 3

Design a template for nurse practitioners as a handout comprising of nutritional facts that are relevant for children.

Activities 3

1. Design a nutritional factsheet.
2. Publish the nutritional education factsheet.
3. Make the nutritional education factsheet available to nurse practitioners.

Program Timeline

See Table 1 for detailed program activities and Gantt Chart timeline for implementation.

Program Evaluation

Conceptual Model of the Evaluation

The health promotion theory provides a framework for multidimensional interventions to impact the environmental, sociocultural, and individual factors affecting childhood obesity (Green & Murphy, 2014) .As the health promotion theory compliments the HBM model, the evaluation of this program will focus on the utility of the HBM instrument throughout the implementation process and beyond. Most of the changes needed to address childhood obesity take time, so continuous monitoring and evaluation

of this program is necessary in order to coordinate the various interventions required under this framework. In this project, the timeline for conducting program evaluation is annual for at least 5 years in order to gather the necessary information on environmental changes and social, cultural, and individual behavioral changes. The evaluation process reveals if the changes are actually occurring and how fast they are happening. This creates a feedback loop for on-going program implementation and new intervention programs as well.

The health promotion framework guides the systematic process of collecting, analyzing, and interpreting data to assess the results achieved by a program or initiative (Green & Murphy, 2014). Outcomes are measured against the targets and objectives that were stated before the implementation of the program (Green &Murphy, 2014). The underlying premise of the health promotion framework is that long-term health improvements will only succeed if programs are integrated into a wider, multifaceted health promotion framework that helps sustainable change, and runs "beyond the individual to encompass the overall environment, structural issues and organizational practice" (Inchley, Muldoon, & Currie, 2006, p. 66). The objectives of the health promotion framework include enhancing lifestyles and children's healthy behaviors via improved nutritional practices and increased physical activity (Green &Murphy, 2014).

Evaluation Plan

The evaluation of this program, which I developed to reduce childhood obesity through a guideline for the consumption of 100% fruit juice engaging nurse practitioners at the study site clinic, is the most critical part for the success of the program. Through

the evaluation process, the program receives annual feedback to refine the implementation, while at the same time ensuring that the program is tracking towards the achievement of its goals and objectives. This evaluation plan has the following goals, objectives, and related activities.

Goals. The goals of this evaluation plan are to make the program successful by providing timely feedbacks, identifying issues that need to be addressed so the program can move forward, and providing important lessons for future programs that will be designed to address childhood obesity problems.

Objectives. The objectives of the evaluation plan are:

1. To conduct annual evaluations based on health promotion framework,
2. To identify responsible bodies and assign responsibilities,
3. To establish a formal communication between evaluation and program implementation teams, and
4. To identify resources and put in place a mechanism that sustains the evaluation for 5 more years after the program implementation is complete

Activities. The following are some of the activities I identified in the evaluation plan:

1. Form an evaluation team of nurse practitioners.
2. Develop the evaluation instruments such as forms, questionnaires, reports, etc.
3. Identify responsible bodies and action items for each responsible body.
4. Identify communication hierarchies and inform all parties involved, especially the evaluation and program implementation teams.

5. Identify resource requirements for the evaluation process and come up with strategies to acquire the required resources.

This evaluation process demands many types of data to be collected. The formative data that needs to be collected are:

- The number of nurse practitioners participating in the program.
- The number of children being served by the program, and
- The number of parents being served by the program.

The summative data that need to be collected are:

- The number of obese and overweight children,
- The prevalence of obesity related health problems, and
- The cost per child.

Timeline. See Table 1 and 2 for detailed Gantt charts for timeline and Evaluation plan.

Table 1

Gantt Chart

Activities	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Goal 1: Empower Nurse Practitioners at Lakewood Family Clinic for childhood obesity prevention.												

Activities	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Objective 1: Train Nurse Practitioners at Lakewood Family Clinic on the guideline for 100% fruit juice consumption.												
Activities												
1 Prepare the guideline for 100% fruit juice consumption												
2 Prepare training materials and specific action plans												
3 Provide training for nurse practitioners												
Goal 2: Provide parents and children with the necessary information on the healthy consumption of 100%												

Activities	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
fruit juice as dietary supplement for infants so they can apply in their families for a home environment that is healthier.												
Objective 2: Provide children and parents with the necessary skills to apply for healthy changes in their home environments.												
Activities												
1 Discuss childhood obesity with parents and children and the role of excessive consumption of 100% fruit juice in the epidemics of												

Activities	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
childhood obesity.												
2 Publish fact sheets for distribution at the clinic												
3 Encouraging parents and children to learn and apply the recommendations in the 100% fruit juice consumption guideline.												
Goal 3: Provide children and parents with recommended nutritional information.												
Objective 3: Design a template for nurse practitioners, parents, and children as a												

Activities	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
guidance comprising of nutritional facts that are relevant for children.												
Activities												
1 Design a nutritional factsheet												
2 Publish the nutritional education factsheet												
3 Make available for nurse practitioners, parents and children the nutritional education factsheet												

Table 2

Evaluation Plan Gantt Chart

Activities	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Goal 1: Make the program successful by providing timely feedbacks and identifying issues that need to be addressed so the program can move forward.						
Objectives 1- 3: To conduct annual evaluations based on HPS framework, to identify responsible bodies and assign responsibilities and to establish a formal communication between evaluation and program implementation teams.						
Activities						
1 Form an evaluation team						
2 Develop the evaluation instruments such as forms, questionnaire, reports etc.						
3 Identify responsible bodies and action items for each responsible body						
4 Identify communication hierarchies						

Activities	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
and inform all parties involved, especially, the evaluation and program implementation teams						
5 Conduct annual evaluations						
Goal 2: Provide important lessons for future programs that will be designed to address childhood obesity problems.						
Objective 4: To identify resources and put in place a mechanism that sustains the evaluation for five more years after the program implementation is complete.						
Activity						
Identify resource requirements for the evaluation process and come up with strategies to acquire the required resources						

Summary

The major stakeholders I identified for this DNP project were nurse practitioners and the management of the study site clinic. Both stakeholders need a strong collaboration between each other to create a successful implementation of the guideline for childhood obesity prevention. One critical step is offering training to nurse practitioners on easy and practical approaches to improve communication between nurse practitioners and parents. It is important to know that most parents are not aware of the dangers that excessive fruit juice consumption pose to their children. The nurse practitioners would play an important role in encouraging the parents and educating them on the adverse effects on the health of their children.

My goal in this project is to develop an evidence-based program that will educate nurse practitioners at the study site clinic on the issue and provide a guideline on the consumption of 100% fruit juice during infancy as a best practice for childhood obesity prevention. As discussed in this section, my objective is to increase the knowledge of nurse practitioners at the study site clinic on the guideline for 100% fruit juice consumption for infants. The associated activities including but not limited to preparations of the guideline for 100% fruit juice consumption, training materials, and data gathering, analysis, and timeline are also discussed.

Section 4: Findings and Recommendations

Introduction

Nurse practitioners, especially in the primary healthcare setting, are best positioned to positively affect childhood obesity rates. Preventive measures can go a long way in alleviating childhood obesity if properly implemented. During primary healthcare visits, parents of young children can learn a great deal from NPs about childhood obesity and ways to prevent it. To enable nurse practitioners to engage in their role effectively, they need an evidence-based guideline that helps them educate parents or guardians. In this DNP project, I focused on providing such a guideline on the appropriate consumption of 100% fruit juice during infancy in order to prevent childhood obesity. The guideline was evaluated by 9 nurse practitioners at the study site clinic using the Appraisal of Guidelines for Research & Evaluation II (AGREE II) framework as well as the data I collected using general questionnaire. I will present my findings and discuss the evaluation in the following subsections.

Findings and Implications

I distributed the evaluation questionnaires and invitation to participate to all nurse practitioners at the study site clinic and nine responses were returned. The general evaluation included 14 questions total with five of the questions based on Likert scales and the remaining nine being open-ended questions. I have summarized the participant responses in Tables 3 and 4. For questions pertaining to the guideline content, understandability, and achievability, all nurse practitioners who participated agreed that the guideline effectively outlined the proper level of consumption of 100% fruit juice and

also agreed that it was also easy to understand and achievable. All participants responded that the guideline can make a difference in addressing childhood obesity and addresses the concerns of nurse practitioners who are stakeholders in obesity evaluation and recommendations for intervention. One concern raised by one participant was that the guideline explicitly presents the proper amount of 100% fruit juice consumption acceptable for young children along with alternatives. However, the guideline does not address other food-related concerns that parents might have (for example, fussy eaters, the cost of buying fresh fruit, etc.), which is a valid concern, but since this issue is beyond the scope of the guideline, no amendment was necessary.

All participants except one agreed that the process put in place to properly evaluate the guideline was adequate. The participant who disagreed did not mention the reason why and since the evaluation was done anonymously, follow-up questioning was not applicable. One participant also voiced her concern that existing evidence is mostly influenced by the fruit juice/food industry. Except for one no response, all participants confirmed that during the evaluation, they have not encountered disputable or controversial evidence used as a basis for the development of the guideline. However, most participants complained that pertinent peer-reviewed evidence was not used in the guideline development. The reason was that participants were not provided with the entire study document along with citations from peer-reviewed sources before the evaluation. However, I provided the information to the participants after the fact to address their concerns.

Finally, the participants identified some barriers that might arise in implementing the guideline, such as lack of proper education strategy for parents/guardians and NPs, low awareness on the negative consequences of excessive fruit juice consumption, poor participation or lack of commitment from parents or guardians in on-going education, and follow-up appointments. All participants agreed that education is the key in overcoming the barriers and implementing the guideline. In essence, it would be the responsibilities of the NPs to educate parents/guardians.

Table 3

General Questionnaire: Likert Scale

S. No.	Questions	Frequency	Percent
1	Do you agree that the guideline outlines proper level of consumption of 100% fruit juice by infants?		
	Agree	9	100
	Disagree		
	No Response		
2	Is the guideline easy to understand?		
	Agree	9	100
	Disagree		
	No Response		
3	Is the guideline achievable?		
	Agree	9	100
	Disagree		
	No Response		
4	Do you agree that the process put in place to properly evaluate the guideline adequate?		
	Agree	7	78
	Disagree	1	11
	No Response	1	11
5	Do you agree that the content of the guideline is applicable to infants?		
	Agree	8	89
	Disagree		
	No Response	1	11

Note. Strongly agree and agree categories and strongly disagree and disagree were combined together for this analysis.

Table 4

General Questionnaire: Open-Ended Questions

Question #1	Do you think the guideline can make a difference in addressing childhood obesity? Please explain.
Responses	The guideline will make a huge difference in terms of addressing childhood obesity. In my daily private practice, childhood obesity has become a major source of concern for health professionals across the world. Many environmental factors are the triggers such as food choices and physical activity.
	Most certainly the guideline can play a role in addressing a good portion of processed sugar being consumed by children and therefore reduce calories from sugary drinks and potential for excessive weight gain.
	Yes, this guideline helps children adopt and maintain healthy eating habits at an early stage of life.
	To some extent.
	Yes, I think the guideline can make a difference in addressing childhood obesity. The rate at which children are becoming obese is at a constant high and more education needs to be given to parent on how to prevent it.
	Yes, the guideline can make a positive difference in addressing childhood obesity. The guideline illustrate that breastfeeding is the preferable source of nutrition in infancy. The guideline in general discusses that consumption of fruit juice must be limited to prevent obesity in children.
	Yes – childhood obesity is an important health issue. Following this guideline is an important step to combating this problem.
	It promotes health and prevents damage such as obesity in infant and children.
	Yes, because consistent education is the best way to get any message across to any population. The guideline is good in its own fashion as it shows timeline and sample of appropriate diet at any given time to an infant, toddler, or school age children.
Question #2	Do you think the guideline addresses the concerns of stakeholders such as parents/guardians and nurse practitioners?
Responses	Absolutely!
	Not necessarily, the guideline is explicit as to what food alternatives to fruit drinks will be more beneficial but not concerns parents might have e.g. fussy eaters, cost of buying fresh fruit as compared to fruit juice etc.

(table continues)

	Responses
	Yes, the guideline identifies approaches that Nurse Practitioners (NPs) at Lakewood Family Clinic can utilize to encourage parents/caregivers about obesity prevention from infancy including education strategies and practice-based, system-level interventions.
	Yes
	Yes, it does as everyone has a part to play, the parents, guardians and participants.
	Yes, the guideline does address the stakeholders such as parents/guardians regarding how fruit juices consumption at an early age can lead to childhood obesity.
	Yes
	Yes, a guideline identifies factors that influence decision making that result in good patient outcome.
	One nurse practitioner did not respond
Question #3	Do you believe that the guideline is prepared based on existing peer reviewed evidences? Please explain.
Responses	Yes, the education strategy can incorporate emphasis on the biology/origin of weight gain or weight control.
	Yes, the guideline translates best evidence into the practices of NPs at the Lakewood Family Clinic. This is a well-designed guideline that illustrates how to prevent childhood obesity beginning from infancy.
	Yes, it is. There are several articles on childhood obesity but I have not seen many on the damage of consuming 100% fruit juice to infants.
	Yes, the guideline is prepared based on existing peer-review evidence as the writer referenced surveys which highlighted the prevalence of childhood obesity.
	Yes. The background provided some evidence-based report on obesity.
	No, by reviewing the guideline, the existing evidences are commercial base with bias from the fruit companies.
	Three nurse practitioners did not respond
Question #4	Have you encountered disputable or controversial evidences used as a basis for the development of the guideline? Please explain.
Responses	Yes, educating the general public, both children and their parents, particularly those who have a familial history of obesity identified through screening by primary care physicians (PCPs).
	None

(table continues)

	Responses
	No, most literature I reviewed in my response to this questionnaire all support the same evidence used in the development of this guideline. Studies support a positive association between sugar sweetened fruit juices and childhood obesity.
	No
	None that I identified.
	No
	No
	No
	One nurse practitioner did not respond
Question #5	Do you think that some pertinent peer reviewed evidences were not utilized in the guideline development? Please explain.
Responses	No
	Though the intent of the investigator was clear usage of an organization with authority such as the American Academy of Pediatrics that addresses such guidelines/recommendations would have bolstered this project more.
	No
	Peer review is utilized in the guideline development.
	None that I noticed.
	Yes, inquiring from more evidence-based research/finding could have been utilized more in developing the guidelines.
	All important evidence relevant to the development of the guideline was used.
	Peer review evidence was not utilized; it is more initial research.
	One nurse practitioner did not respond
Question #6	Is the guideline clearly presented?
Responses	Yes
	Yes
	Yes, this guideline emphasized a logical step-by-step action statements supported by evidence profiles recommendation points that connect action to evidence.
	The guideline is clearly presented.
	Yes
	Yes, the guideline is clearly presented, easy to read and understand.
	Yes
	The guideline is clearly presented.
	One nurse practitioner did not respond
Question #7	Do you consider the guideline is fairly and independently presented based on facts and peer reviewed evidences and recommendations? Please explain.
Responses	(table continues)

	Responses
	Yes, I do. I read up the literature, seems up-to-date.
	It appears to be consistent with recommendations given by the American Academy of Pediatrics but could be expanded to address concerns that parents might have and ways NPs can teach the parents. Unfortunately no citation or reference to evidences based peer review was noted.
	Yes, this guideline systematically addresses actions to assist NPs and/or parents or guardians decisions about appropriate fruit beverages/choices in the prevention of childhood obesity. It addressed: identifying and refining the topic area of the guideline; identifying and assessing the evidence; translating evidence into practice guidelines at Lakewood Family Clinic; and reviewing R.T.O. and updating the guidelines.
	Yes
	The guideline was fairly presented.
	Yes, I believe the guideline is based on facts and recommendations. The guideline addressing that fruit juices in infants should be avoided and limited consumption in children ages 1 to 6 years. Overall, the guideline is clear and concise.
	Yes. The background provided national survey and other reports on childhood obesity. The guideline was then presented to address the issue.
	Two Nurse practitioners did not respond
Question #8	What barriers might arise in implementing the guideline? What do you think should be done to overcome the barriers? Please explain.
Responses	Education strategy
	Parents need to better understand the negative consequences of excessive fruit juice consumption and this should be addressed during teaching. For example the American Academy of Pediatrics cited some myths and perceptions parents have about juice as follows: - In general, parents thought 100% fruit juice was a healthy choice. - Parents thought that the oral health angle was impactful when discussing risks of sugared beverages. - Some parents mentioned elimination issues as a reason to or not use juice drink. - Other family members and eating out were two factors parents identified as contributing to the introduction of juice or other sugar sweetened beverages.
	(table continues)

	Responses
	Stakeholders, such as the parents or guardians of children at Lakewood Family Clinic may lack in their full participation/commitment or involvement in ongoing education, follow-up appointments. Many studies have shown that dedication are sometimes difficult to achieve the recommendations is to praise parents/guardians for their efforts in improving their children obesity prevention. Also, changing individual behavior may be hard to overcome. A comprehensive approach may be required, ongoing education at each office visit.
	Household income – help from state, local government Education level of parents – continue educating parents
	Parental influence – the parents control/determine what the children eat and drink. Financial implications Social implications
	Barriers that may arise include list of 100% fruit juices versus artificially flavored juices. Another barrier is the willingness of the parties to totally avoid fruit choice in infancy. Nurse practitioners play a significant role in healthcare and can educate parents on the advantages of 100% fruit juice consumption in children.
	Possible barrier to guideline implementation includes attitude/acceptance by parents. Overcoming this barrier will need proper education and reminder with each clinic visit.
	1. The cost of 100% fruit juice will be the barrier to implement this guideline. The parents will be educated on important and benefit of quality compare to quantity. 2. Mislabeling juice packages by the juice companies. The parents should be educated on benefit of homemade 100% juice.
	One nurse practitioner did not respond
Question #9	Please provide any information that you deem pertinent to the guideline, the implementation process and the evaluation in the space provided.
Responses	None
	Information can be found at the link below to the American Academy of Pediatrics website that addresses Infant Food and Feeding including guidelines and recommendations on Healthy Drinks which can guide this project to be more robust in addressing myths, barriers, and conversation starters when discussing this issue with a parent. http://www.aap.org/en-us/advocacy-and-policy/aap-health-initiatives/HALF-Implementation-Guide/Age-Specific-Content/Pages/Infant-Food-and-Feeding.aspx

(table continues)

Responses
Implementation - Participation by parents/guardians and NPs are consistent. Education – Strategic level for evaluating outcomes of this guideline is simple and concise. The tools to measure the outcome of this guideline are clearly identified and practicable.
Education is the key. As NP, we are obligated to educate our client. Most importantly explaining to them and not only providing pamphlet.
Questionnaire was well thought out, clear, concise and adequate for the topic at hand.
Emphasis on educating parents and guardians about artificial fruit juices and its negative impact should be added. Then how do the NP/providers evaluate the understanding of the parents/guardians regarding avoiding fruit juices in infancy with each wellness visit. Children should be weighed to monitor any significant weight gain and address it.
Parent's education on 100% fruit juice for infant takes priority and it is paramount.
Two nurse practitioners did not respond

The participants who responded on the general questionnaire also participated in the AGREE II evaluation. Domain 1 of the AGREE II framework deals with scope and purpose, and there are three questions in this domain. The guideline scored 96.3% in this domain.. Domain 2 deals with stakeholder involvement, which has four questions, and the guideline scored 97.7% for in this domain. Domain 3 deals with rigor of development and has the most questions, which were seven in number. The guideline scored 91.8% in this domain. Domain 4 deals with clarity and presentation and has four questions; the guideline scored 95.8%. Domain 5 deals with application, has three questions, and the guideline scored 82.1%. Domain 6 deals with editorial independence, which has two questions. The guideline scored 94.4% for this domain.

On the overall quality assessment, the guideline scored 92.6%. Two participants commented that "the guideline is a great project, the subject was well explained and no modification is necessary" and "the guideline explicitly covers every aspect of the end user and promote outcome." All participants responded that they recommend the guideline for use with 100% approval with no modification.

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Data Analysis

My analysis of the data in regard to the developed guideline for the proper level of 100% fruit juice consumption by infants included a two-step process. Step 1 was comprised of the ability for the NPs to evaluate the guideline using the AGREE II Tool (Agree Trust, 2009). The second step was having the participants complete the general questionnaire with open-ended questions whose results I used to obtain in-depth feedback. The AGREE II Tool was designed to provide a framework to aid in the determination of the quality of a developed guideline (Agree Trust, 2009). The AGREE II Tool is generic and I utilized it for the purpose of allowing the participants to "undertake their own assessment of the guideline before adopting its recommendations into nursing practice" (Agree Trust, 2009, p. 8). The AGREE II Tool consists of the following six domains: "(a) scope and purpose, (b) stakeholder involvement, (c) rigor of development, (d) clarity of presentation, (e) applicability, and (f) editorial independence" (Agree Trust, 2009, p. 5). The AGREE II Tool also contains an overall guideline assessment that allowed the participants to rate their overall recommendation of the guideline. The six domains consist of 23 questions, and the overall guideline assessment

consists of two questions (Green & Murphy, 2014). The data I obtained from the eight AGREE II Tools was analyzed and computed according to the guidelines for scoring of the tool. The overall guideline assessment provided the final analysis and acceptance of the guideline. Please see Table 1 for the tabulated AGREE II domain percent scores.

Discussion of Findings

The review conducted by nurse practitioners at the study site clinic on the guideline for proper level of 100% fruit juice has provided valuable information with regard to the content, understandability, achievability and overall quality of the guideline. The guideline scored 93% on total overall quality using the AGREE II evaluation framework. The highest score for the guideline was on stakeholders' involvement, which was 98%. The guideline has scored great on all domains of the evaluation framework with average score of 95%. This result indicates that the guideline was well developed in terms of scope and purpose, stakeholders' involvement, rigor of development, clarity and presentation, application and editorial independence. All nurse practitioners agreed that the guideline can make a real difference in the prevention of childhood obesity. They also mentioned that the work of nurse practitioners at the clinic regarding engaging parents in education, preventing and treatment of causes and effects of childhood obesity at early age will be strengthened as a result of this guideline.

Recommended Guideline for the Consumption of 100% Fruit Juice by Infants

- It is important to emphasize to parents that breastfeeding is the preferable source of infant nutrition for the first 6 to 12 months (Heyman & Abraham 2017; AAP, 2017).

- Gradual introduction of foods that are iron fortified may follow no sooner than around 4 months, preferably 6 months as a complementary to breast milk (Heyman & Abraham 2017; AAP, 2017).
- Beverages with high sugar content should not have place in a healthy diet and should be avoided (Heyman & Abraham 2017; AAP, 2017)
- Infants, children, and adolescents should not drink unpasteurized juice (Heyman & Abraham 2017; AAP, 2017).
- Whole fruit is more nutritious and provides dietary fiber. All children should be encouraged to eat whole fruit to meet their recommended daily fruit intake of two to three servings per day (Heyman & Abraham 2017; AAP, 2017).
- 100% fruit juice is artificially flavored juice and has no nutritional benefits over whole fruit (Heyman & Abraham 2017; AAP, 2017).
- One hundred percent fruit juice should not replace breast milk or infant formula to insure adequate intake of essential nutrients for growth (Heyman & Abraham 2017; AAP, 2017)
- Children should be at least 6 months old to drink 100% fruit juice when the infant can drink from a cup (Heyman & Abraham 2017; AAP, 2017).
- One hundred percent fruit juice can be part of a healthy diet when consumed as a component of a well-balanced diet (Heyman & Abraham 2017; AAP, 2017).
- Consumption of 100% fruit juice should be limited to four to six ounces per day for infants from 6 to 12 months (Heyman & Abraham 2017; AAP, 2017)

- Children 1 to 6 years of age should also drink no more than four to six ounces of 100% fruit juice per day (Heyman & Abraham 2017; AAP, 2017).
- One hundred percent fruit juice consumption should be limited to eight to 12 ml/d for children aged seven to 18 years old (Heyman & Abraham 2017; AAP, 2017).

Optional Guideline to Discourage Excessive Consumption of 100% Fruit Juice

- Infants should not be offered juice from easily transportable covered cups or bottles that facilitate consumption of juice throughout the day (Heyman & Abraham 2017; AAP, 2017).
- One hundred percent fruit juice should be given in a cup as part of a meal or a snack while seated at a table (Heyman & Abraham 2017; AAP, 2017).
- Offer water on a regular basis instead of juice when children are thirsty (Heyman & Abraham 2017; AAP, 2017).
- Read beverage bottle labels for sugar content and hidden sugars. (Heyman & Abraham 2017; AAP, 2017).

Implications for Practice/Social Change

The guideline, as evaluated by nurse practitioners, is a tool to be used in clinical practice to empower nurse practitioners who need evidence based recommendations and approaches to educate parents/guardians of infants on the proper level of 100% fruit juice consumption. The interaction between NPs and parents using well-developed information will have a positive impact on nursing practice as well as the wellbeing of society. As awareness of the negative consequences of childhood obesity grows, there will be a need

to address behavioral and knowledge changes early in order to create long term favorable health outcome.

Project Strengths and Limitations

The strength of this project comes from the fact that the guideline is evidence based, peer reviewed, and provides a real life solution for a commonly seen problem for nurse practitioners who are at the forefront of the fight against childhood obesity. The formative and summative evaluation provides credence for the guideline that will improve the buy-in of all nurse practitioners and guardians, which is a critical aspect of successful implementation. This guideline will be of good use to all healthcare providers dealing with children but susceptible to childhood obesity but the current focus of the project is primarily on nurse practitioners.

The limitation for this project is scope. The scope of this project is focused on the study site clinic. Childhood obesity is a national epidemic that requires urgent national response. However, every small step helps the overall effort being exerted on the elimination of childhood obesity. In addition, there are also some gaps that are still lacked in the field in regards to the knowledge based information on the effects that 100% fruit juice has on dental caries, on body weight, and other factors. Research on such topics should however be conducted in a manner that the data available should be evidence based so that it avoids any premature conclusions that will contradict the main aim of the research.

A very limited role of the importance of fresh juice among children has been put forward through the available literature. It however recommends that lesser amount of

juice should be consumed by children to complement their diet when necessary. The surveys that have been carried out recently for instance have indicated that most of the large percentage of the fluids that children consume comes from the beverages such as juices (Garner et al., 2005). Very little amount is consumed directly as water. This is the major reason for many cases of obesity among children in the United States. One hundred percent fruit juices should not be consumed as the only drink by infants but should be used just as a supplementary fluid source to the consumption of the breast milk of the mother. Juice should not be consumed or given when it is in the unpasteurized form. It is also advisable that it should not be served in amounts and cups that are available for consumption throughout the day since the caregiver or parent will be tempted to offer it to the infants. There should be further research and evidence that are consistent with the recommendations in this research. Availability of the right clinical knowledge will go a long way to ensure that nurse practitioners use the right nutritional guidelines for infants and other children.

Summary

As aforementioned in this section, preventive measures against childhood obesity will go a long way in combating this social and health challenges when proper procedures are followed such as that laid out in formulated guideline. During primary healthcare visits, parents of young children should be educated by nurse practitioners on how to best care for their children regarding excessive fruit juice consumption and how it would prevent childhood obesity. In this DNP project, I have focused on providing a guideline on the appropriate consumption of 100% fruit juice during infancy in order to prevent

childhood obesity. I have used the AGREE II framework and data I collected using general questionnaire in an evaluation completed by nine nurse practitioners to develop the proposed guideline.

All participants generally agreed that the guideline was well developed in scope and purpose, stakeholders' involvement, rigor of development, clarity and presentation, application and editorial independence. A lone dissent opinion indicated that the guideline was too specific and fairly rigid on recommendations and did not address other parental factors that could confound the desired goal such as issues relating to fussy eaters, the cost of buying fresh fruit, etc. A major implication of this DNP project for clinical practice is that improved interaction between NPs and parents using well-developed evidence based information will have a positive impact on nursing practice as well as the wellbeing of society. In addition, as awareness of the adverse effects of childhood obesity grows, there will be a better means to address behavioral changes early in life that would lead to a more favorable health outcome. A recognized limitation of this project is limited scope because childhood obesity is a national epidemic that requires urgent national response but it is also a fact that every small step helps the overall effort being exerted on the elimination of childhood obesity.

Section 5: Dissemination Plan

Introduction

Dissemination is a vital component after evidence-based guideline has been developed. Dissemination of this project study will allow NPs to use the up-to-date and evidence-based guideline for providing clear and concise information on the proper level of 100% fruit juice consumption to parents or guardians. This will also allow NPs or other healthcare providers to practice based on credible evidence while providing childhood obesity preventive services. My plan is to submit the manuscript of the outcome of this project to the *Journal of the American Association of Nurse Practitioners*.

The project is a clear guideline on the importance of not allowing infants to consume juice more so those who are less than 1 year. The project, if used properly, will offer NPs a suitable platform from which to advise parents on the necessary information on nutrients and how to manage obesity. Obesity is becoming prevalent as lifestyle changes are being witnessed in various economies, and children are being affected the most (Ogden, 2012). With this kind of project, more children will be saved from nutritional disorders that lead to obesity among other diseases that they experience. Parents are also vital to this plan and their efforts should be highly emphasized since they spend most of the time with their children. NPs should provide clear guidelines as stipulated in the project, since they also come into contact with the children most often. Any nonadherence to this project would lead to increased cases of obesity and an unhealthy public health outcome.

Analysis of Self

I honestly believe this DNP project has transformed me in a meaningful way from an ordinary NP into a subject-matter expert. As a result of this project, I am now equipped with knowledge that I can implement in the course of my private practice that can bring about substantial change and positive outcomes. I learned a great deal by actually developing and implementing this DNP project about how to utilize multidisciplinary, systematic, and scientific approaches to address issues in nursing practice. The healthcare informatics, evidence translation, and program development are also some of the great lessons I have learned that have the potential to positively impact my career. Acquisition of tacit and explicit knowledge is vital in achieving a change in the society and this project has enabled me to gain necessary knowledge for me to attain my desired goals at whatever level I serve in the future.

Summary

I prepared this guideline on the proper level of 100% fruit juice consumption by infants based on peer-reviewed scientific evidence and recommendations from authoritative institutions. The guideline was also reviewed by NPs at the study site clinic using the AGREE II framework. Based on the evaluation, the guideline scored on average 95%, which indicates the quality of the guideline in terms of relevant contents, presentation, clarity, and independence. These qualities of the guideline will make it easier to implement and bring about positive change in the prevention of childhood obesity. Based on the information gathered on the survey, campaigns can be initiated and

the NPs participating in the fight against this problem have enough information that can convince parents on the advert effects of drinking juices and other sugary drinks.

Childhood obesity is on the increase due to the various changes in diet and NPs and other the health care providers should be aware of the right methods that should be applied so that healthy feeding of the children can be achieved in the society. Societal change as a whole should be recommended and lifestyles changes will ensure that the right intake of nutrients is available to the children who need adequate nutrients as they grow up in order to avoid the development of obesity. I reiterated the fact that as awareness of the adverse effects of childhood obesity grows, there will be better means to address behavioral changes early in life that would lead to a more favorable health outcome in children.

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Appendix A: AGREE II Tool*

Please answer the following questions on a 7 – point scale

1= Strongly Disagree 7 = Strongly Agree

SCOPE AND PURPOSE

1. The overall objective of the guideline is specifically described.

   1 2 3 4 5 6 7

2. The health problem addressed (appropriate level of 100% fruit juice consumption by infants) in the guideline is specifically described.

   1 2 3 4 5 6 7

3. The population to whom the guideline is meant to apply is specifically described.

   1 2 3 4 5 6 7

STAKEHOLDER INVOLVEMENT

4. The guideline evaluation group includes all relevant professionals.

   1 2 3 4 5 6 7

5. The views and preferences of the target group (nurse practitioners) have been sought.

   1 2 3 4 5 6 7

6. The target users of the guideline are clearly defined.

   1 2 3 4 5 6 7

7. The guideline has been piloted among target users.

   1 2 3 4 5 6 7

RIGOR OF DEVELOPMENT

8. Systematic methods were used to search for evidence.

   1 2 3 4 5 6 7

9. The criteria for selecting evidence are clearly described.

   1 2 3 4 5 6 7

10. The methods used for formulating the recommendations are clearly described.

    1 2 3 4 5 6 7

11. Health benefits, side effects, and risks have been considered in formulating the recommendations.

1 2 3 4 5 6 7

12. There is an explicit link between the recommendations and the supporting evidence.

1 2 3 4 5 6 7

13. The guideline has been externally reviewed by experts prior to finalization. (nurse practitioners are currently reviewing)

1 2 3 4 5 6 7

14. A procedure for updating the guideline is provided.

1 2 3 4 5 6 7

CLARITY AND PRESENTATION

15. The recommendations are specific and unambiguous.

1 2 3 4 5 6 7

16. The different options for management of the condition (100% fruit juice consumption by infants) are clearly presented.

1 2 3 4 5 6 7

17. Key recommendations are easily identifiable.

1 2 3 4 5 6 7

18. The guideline provides tools (advice) on how the recommendations can be put into practice.

1 2 3 4 5 6 7

APPLICATION

19. The potential organization barriers in applying the recommendation have been discussed.

1 2 3 4 5 6 7

20. The possible cost implications of applying the recommendations have been considered.

1 2 3 4 5 6 7

21. The guideline presents key review criteria for monitoring and/or audit purposes.

    1 2 3 4 5 6 7

EDITORIAL INDEPENDENCE

22. The guideline is editorially independent from the funding body.

    1 2 3 4 5 6 7

23. Conflicts of interest of guideline development members have been recorded.

    1 2 3 4 5 6 7

GENERAL COMMENTS:

OVERALL GUIDELINE ASSESSMENT

1. Rate the overall quality of this guideline.

   1 2 3 4 5 6 7

   1. I would recommend this guideline for use.

   Yes_____

   Yes, with the following modifications

   _____

   _____

   _____

   _____

   _____

   No_____

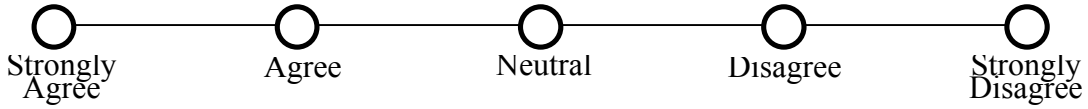
***Adapted from www.agreetrust.org – with permission**

Hochbaum, G., Rosenstock, I., & Kegels, S. (1952). Health Belief Model. *Unites States Public Health Service. Retrieved April, 15, 2017 from* http://www.agreetrust.org.

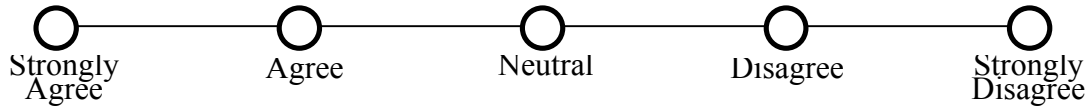
Appendix B: General Questions

QUESTIONNAIRE TO GATHER DATA ON THE REVIEW OF THE NURSE PRACTITIONERS' GUIDELINE ON THE CONSUMPTION OF 100% FRUIT JUICE BY INFANTS

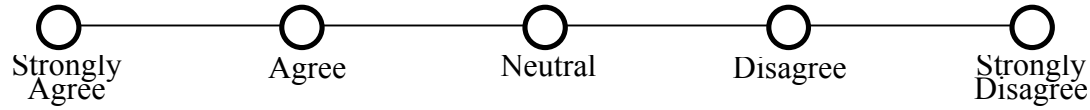
1. Do you agree that the guideline outlines proper level of consumption of 100% fruit juice by infants?



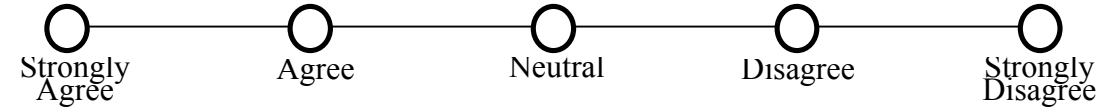
2. Is the guideline easy to understand?



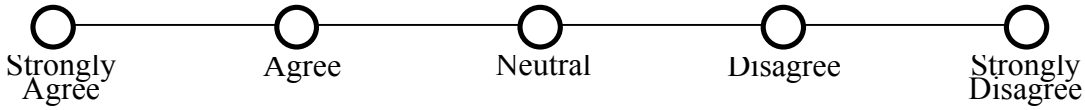
3. Is the guideline achievable?



4. Do you think the guideline can make a difference in addressing childhood obesity? Please explain.
5. Do you think the guideline addresses the concerns of stakeholders such as parents/guardians and nurse practitioners?
6. Do you agree that the process put in place to properly evaluate the guideline adequate?



7. Do you believe that the guideline is prepared based on existing peer reviewed evidences? Please explain.
8. Have you encountered disputable or controversial evidences used as a basis for the development of the guideline? Please explain.
9. Do you think that some pertinent peer reviewed evidences were not utilized in the guideline development? Please explain.
10. Is the guideline clearly presented?
11. Do you agree that the content of the guideline is applicable to infants?



12. Do you consider the guideline is fairly and independently presented based on facts and peer reviewed evidences and recommendations? Please explain.

*Adapted from:

Likert, Rensus (1932). "A Technique for the Measurement of Attitudes". *Archives of Psychology*. 140: 1-55.

Appendix C: Agree II Data

Domain I: Scope and Purpose

	Item 1	Item 2	Item 3	Total
NP 1	6	7	6	19
NP 2	7	7	7	21
NP 3	6	6	7	19
NP 4	7	7	7	21
NP 5	6	7	7	20
NP 6	7	7	7	21
NP 7	7	7	7	21
NP 8	7	7	7	21
NP 9	7	6	7	20
Total	60	61	62	183

Maximum possible score = 7 (strongly agree) x 3 (items) x 9 (appraisers) = 189

Minimum possible score = 1 (strongly disagree) x 3 (items) x 9 (appraisers) = 27

The scaled domain score: (Obtained score – Minimum possible score)

(Maximum possible score – Minimum possible score)

$$\frac{183 - 27}{189 - 27} = \frac{156}{162} = 0.963$$

Scaled Domain Score: 96.3%

Domain 2: Stakeholder Involvement

	Item 4	Item 5	Item 6	Item 7	Total
NP 1	6	6	7	7	26
NP 2	7	7	7	7	28
NP 3	6	7	7	6	26
NP 4	7	7	7	7	28
NP 5	7	6	7	7	27
NP 6	7	7	7	7	28
NP 7	7	7	7	7	28
NP 8	7	7	7	7	28
NP 9	7	7	7	7	28
Total	61	61	63	62	247

Maximum possible score = 7 (strongly agree) x 4 (items) x 9 (appraisers) = 252

Minimum possible score = 1 (strongly disagree) x 4 (items) x 9 (appraisers) = 36

The scaled domain score: (Obtained score – Minimum possible score)

(Maximum possible score – Minimum possible score)

$$\frac{247-36}{252-36}=\frac{211}{216}=0.977$$

Scaled Domain Score: 97.7%

Domain 3: Rigor of Development

	Item 8	Item 9	Item 10	Item 11	Item 12	Item 13	Item 14	Total
NP 1	7	7	7	7	7	7	7	49
NP 2	6	5	4	7	6	7	1	36
NP 3	7	6	7	6	7	6	7	46
NP 4	7	7	7	7	7	7	7	49
NP 5	5	7	6	6	4	7	7	42
NP 6	6	7	7	7	7	7	7	48
NP 7	7	6	6	6	6	7	6	44
NP 8	7	7	7	7	7	7	7	49
NP 9	6	7	7	7	7	7	6	47
Total	58	59	58	60	58	62	55	410

Maximum possible score = 7 (strongly agree) x 7 (items) x 9 (appraisers) = 441

Minimum possible score = 1 (strongly disagree) x 7 (items) x 9 (appraisers) = 63

The scaled domain score: (Obtained score – Minimum possible score)

(Maximum possible score – Minimum possible score)

$$\frac{410-63}{441-63}=\frac{347}{378}=0.918$$

Scaled Domain Score: 91.8%

Domain 4: Clarity and Presentation

	Item 15	Item 16	Item 17	Item 18	Total
NP 1	7	6	7	7	27
NP 2	7	6	7	7	27
NP 3	7	6	6	6	25
NP 4	7	7	7	7	28
NP 5	5	7	7	5	24
NP 6	7	7	7	7	28
NP 7	7	7	7	7	28
NP 8	7	7	7	7	28
NP 9	7	7	7	7	28
Total	61	60	62	60	243

Maximum possible score = 7 (strongly agree) x 4 (items) x 9 (appraisers) = 252

Minimum possible score = 1 (strongly disagree) x 4 (items) x 9 (appraisers) = 36

The scaled domain score: (Obtained score – Minimum possible score)

(Maximum possible score – Minimum possible score)

$$\frac{243 - 36}{252 - 36} = \frac{207}{216} = 0.958$$

Scaled Domain Score: 95.8%

Domain 5: Application

	Item 19	Item 20	Item21	Total
NP 1	7	7	6	20
NP 2	1	1	1	3
NP 3	7	7	6	20
NP 4	7	7	7	21
NP 5	5	6	6	17
NP 6	7	6	6	19
NP 7	7	6	6	19
NP 8	7	7	7	21
NP 9	6	7	7	20
Total	54	54	52	160

Maximum possible score = 7 (strongly agree) x 3 (items) x 9 (appraisers) = 189

Minimum possible score = 1 (strongly disagree) x 3 (items) x 9 (appraisers) = 27

The scaled domain score: (Obtained score – Minimum possible score)

(Maximum possible score – Minimum possible score)

$$\frac{160 - 27}{189 - 27} = \frac{133}{162} = 0.821$$

Scaled Domain Score: 82.1%

Domain 6: Editorial Independence

	Item 23	Item 23	Total
NP 1	6	6	12
NP 2	7	7	14
NP 3	7	6	13
NP 4	7	7	14
NP 5	6	6	12
NP 6	7	7	14
NP 7	7	7	14
NP 8	7	7	14

NP 9	7	6	13
Total	61	59	120

Maximum possible score = 7 (strongly agree) x 2 (items) x 9 (appraisers) = 126

Minimum possible score = 1 (strongly disagree) x 2 (items) x 9 (appraisers) = 18

The scaled domain score: (Obtained score – Minimum possible score)

(Maximum possible score – Minimum possible score)

$$\frac{120 - 18}{126 - 18} = \frac{102}{108} = 0.944$$

Scaled Domain Score: 94.4%

General Comments:

Great project! The subject was well explained. NP 5

No modification is necessary, the guideline explicitly covers every aspect of the end user and promote outcome. NP 7

Overall Guideline Assessment

	Overall Quality	Total
NP 1	7	7
NP 2	6	6
NP 3	6	6
NP 4	6	6
NP 5	6	6
NP 6	7	7
NP 7	7	7
NP 8	7	7
NP 9	7	7
Total	59	59

Maximum possible score = 7 (strongly agree) x 1 (items) x 9 (appraisers) = 63

Minimum possible score = 1 (strongly disagree) x 1 (items) x 9 (appraisers) = 9

The scaled domain score: (Obtained score – Minimum possible score)

(Maximum possible score – Minimum possible score)

$$\frac{59 - 9}{63 - 9} = \frac{50}{54} = 0.926$$

Total Overall Quality: 92.6%

Recommend this guideline for use:

	Yes	Yes with Modifications	No
NP 1	Yes		
NP 2	Yes		
NP 3	Yes		
NP 4	Yes		
NP 5	Yes		
NP 6	Yes		
NP 7	Yes		
NP 8	Yes		
NP 9	Yes		
Total	100% Approval		

Adapted from:

Brouwers, M. C., Kho, M. E., Browman, G. P., Burgers, J. S., Cluzeau, F., Feder, G., … Zitzelsberger, L. (2010). AGREE II: advancing guideline development, reporting and evaluation in health care. CMAJ : Canadian Medical Association Journal, 182(18), E839–E842. http://doi.org/10.1503/cmaj.090449

Appendix D*: Guidelines For 100% Fruit Juice Consumption in Controlling Obesity in Children Ages 0- 6 Years

Areas for Guidance/ Advice	Recommended Ages	Required I6nformation	Comments/ Recommendations
Nutrition	-All children under the age of 6 months.	- No juice for infants less than 6 months. - Encourage breast milk or formula - Parents to avoid treating dehydration with fruit juices - Mouth care should begin as soon as possible - Introduce iron-fortified foods such as cereals, meats, and vegetables at around 4 months.	- Before six months of age, fruit juice provides no nutritional benefit - Parents and caregivers should always avoid feeding infants with fruit juice -Mouth care reduces dental diseases later in life`
	Children 6months to 6 years	-Whole fruits are preferred over 100% fruit juice -Consumption of fruit juice should not exceed 4 to 6 ounces per day - Added sugars be limited to ≤25 g (approximately 100 kilocalories or 6 teaspoons) in children ≥2 years of age - Fruit juice should be offered only from a cup - Fruit juice should be used as part of a meal or a snack and not be sipped throughout the	-100 percent fruit juice (as opposed to "fruit drinks") can be part of a well-balanced diet for infants and children older than six months of age when consumed in limited quantities - Excessive fruit juice consumption may be associated with malnutrition (over-nutrition and under nutrition), diarrhea, flatulence, abdominal distention, and dental caries - Juices containing vitamin C may improve the absorption of iron

		day; it should not be consumed at bedtime or in bed - Mouth care should be performed each evening - Recommend whole fruits over fruit juices	- Calcium-fortified juices provide a bioavailable source of calcium but lack other nutrients present in human milk, infant formula, and cow's milk - Drinking juices at nighttime promotes bacterial growth and dental infection. - Giving juices in bottles can increase the volume consumed and lead to overconsumption

	Children 6months to 6 years	- Whole fruits is preferred over 100% fruit juice - 4 to 6 ounces of juices per day - Avoid giving juices in bottles - Avoid giving juices at bedtime - Mouth care every night is highly recommended - Fruit juices limited to 8oz per day -Avoid unpasteurized juice products - Children 1 to 6 years of age should also drink no more	- Gradual introduction of foods that are iron-fortified may follow not sooner than around 4 months as a complementary to breast milk. - 100% fruit juice is not recommended- it is inferior. - Drinking juices at nighttime promotes bacterial growth and dental infection. - Giving juices in bottles allow them to consume more. - Mouth care

		than 4 to 6 ounces of 100% fruit juice per day.	decreases dental diseases. - Recommend whole fruits over fruit juices
	Children 7 to 18 years	- Children 7 to 18 years of age should drink no more than 7 ounces of 100% fruit juice per day.	- Recommend whole fruits over fruit juices - Drinking juices at nighttime promotes bacterial growth and dental infection

Adapted from:

American Academy of Pediatrics, Committee on Nutrition. (2007). Policy statement: The use and misuse of fruit juice in pediatrics. *Pediatrics, 119*, 405.

Heyman, M. B., & Abraham, S. A. (2017). Fruit juice in infants, children, and adolescents: Current recommendations. *Gastroenterology, Hepatology, and Nutrition, Committee on Nutrition,* 139.