THE EVALUATION OF AN EDUCATIONAL INTERVENTION ON FOOD LABEL LITERACY AMONG PARENTS OF CHILDREN IN AN OUTPATIENT PEDIATRIC CLINIC

by

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ABSTRACT

IFUNANYA OKOCHA. The evaluation of an educational intervention on food label literacy among parents of children in an outpatient pediatric clinic (Under the direction of DR.FLORENCE OKORO)

Childhood obesity has been on the rise for decades and its effects have a negative impact on the health, psychology of the people with significant economic cost to the society at large. Many risk factors have been attributed to obesity such as quality and quantity of food, high calorie intake, sugary drinks, and sedentary lifestyle, but not much is emphasized on nutrition label literacy. This project is to evaluate the effect of an educational intervention to improve parents' nutrition label literacy intended to help parents make healthy food choices for their children.

This quantitative descriptive study was conducted at an outpatient pediatric clinic among parents and guardians using a paper and pencil survey. The participants completed a demographic survey for an overview of the participants' background such as gender, age, and socioeconomic status. One of the aims of the project was to identify the participants' nutrition label literacy by administering a Food Label Literacy for Applied Nutrition Knowledge (FLLANK) pretest. The goal of the project was to evaluate the impact of an educational intervention by assessing the participants' performances in the FLLANK post-test.

A total of 30 participants completed the pre and post intervention questionnaire. 53.3% (n=16) of the participants were above the age of 35 and 83.3% (n=25) were females. 73.3% (n=22) of the participants had a minimum of a 2-year college degree and 60% (n=18) earned more than $45,000/ year. 46.7% (n=14) of the participants identified as Hispanics or African

Americans, respectively. 70% (n=21) of the participants indicated they understood food labels, while 60% (n=18) reported that they would buy food items based on how the packaging looked. Overall, the majority (86.7%, n=26) of the participants indicated that they would like to learn and understand nutrition labels despite the fact that the majority of the participants had at least a 2-year college education. The results showed that irrespective of socioeconomic status, the participants improved in their nutrition label literacy after the educational intervention. The long-term goal of this project will be to observe a consistent reduction in childhood obesity as the parents make healthy food choices.

Keywords or phrases: *nutrition labeling, parents' food perceptions, childhood obesity, obesity prevention, adolescents and obesity, nutrition facts, food label utilization, nutrition label comprehension, health literacy, and parent food literacy.*

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DEDICATION

I am blessed and privileged to have praying parents Mr. Chukwunenye & Mrs. Roseline Anachebe. They taught me that with God all things are possible and that I could do all things through Christ who strengthens me.

To my wonderful husband, my heart, my love, Dr. Chiedu Okocha for his unflinching support and love. Many times, he would ask *"how are you doing baby?"* and whatever my answers were he would cheer me on with these words *"well done my dear, you are almost done."* I love you sweetie.

To my beloved daughters, I fondly call my princesses – Dumebi, Ijeoma & Ifeoma Okocha, I love you and appreciate your support and patience. You are the stars in my crown and the wind beneath my wings.

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Above all, I want to say **THANK YOU** to my heavenly father, my God, the King eternal, immortal, invisible, and the only wise God; to Him be all honor and glory forever and ever.

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LIST OF ABBREVIATIONS

AAP - American Academy of Pediatrics

BMI - Body Mass Index

CATCH - Coordinated Approach to Child Health

CDC - Center for Disease Control and Prevention

COVID-19 - Coronavirus Disease 2019

CPPW - Communities Putting Prevention to Work

DNP - Doctor of Nursing Practice

EBP – Evidence-based Project

FLLANK - Food Label Literacy for Applied Nutrition Knowledge

HL - Health Literacy

HS – High School

ICD-10 Z71.3 - Dietary Counseling and Surveillance

UNCC-IRB – University of North Carolina, Charlotte Institutional Review Board

NAFLD - Nonalcoholic fatty liver disease

ND - Nutrition Detectives

PC – Project Coordinator

SWOT - Strength Weakness Opportunity Threat

WHO - World Health Organization

Chapter 1: Introduction

1.1 Introduction and Background Information

As early as 2003, the World Health Organization (WHO) reported that childhood obesity was considered an epidemic of global proportions; a severe public health problem of the 21st century. According to the Centers for Disease Control and Prevention (CDC), the obesity rate among children and adolescents in the United States has tripled since the 1970s (2018). The prevalence of obesity in children and adolescents ages 2–19 years is 18.5% affecting about 13.7 million (CDC, 2019). Among individual age groups there is an increase in obesity: in the 2-5 years age group the prevalence of obesity was 13.9%, 6-11 years age group18.4%, and 20.6% among ages 12–19 (CDC, 2019).

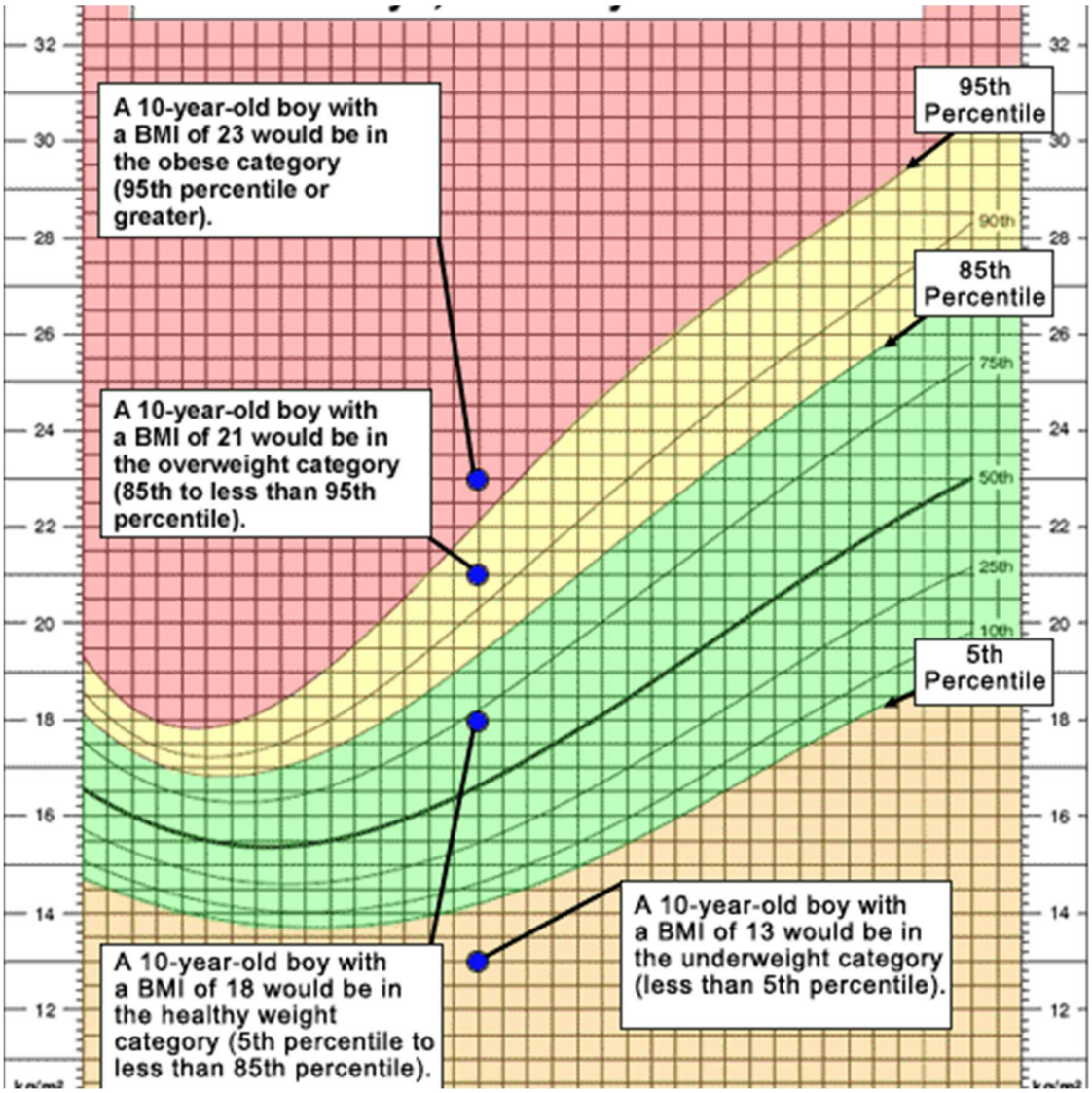
The study conducted by Guerrero, Mao, Fuller, Bridges, Franke & Kuo (2016), shows that one out of three children of ethnic descent especially among African Americans and Hispanics at age 4 had a body mass index (BMI) growth trajectory to become overweight or obese, attributable to the consumption of non-nutritious foods with high calories and fat contents. Although childhood obesity cuts across various races, ethnicity, and socioeconomic groups, it is disproportionally significant among children of minority or ethnic groups. This is indicated by the following prevalence data: 25.8% among Hispanics, 22.0% in Blacks, as compared to 14.1% in whites and 11.0% in Asians (CDC, 2019). Skinner, Ravanbakht, Skelton, Perrin & Armstrong (2018) report that approximately 1 in 5 school-aged children in the United States is obese. Unfortunately, parents' underestimate their children's weight status and have a misconception that children shed fat as they grow older. According to Ruiter, Saat, Molleman, Fransen, Velden,

Jaarsveld, Engels & Assendelft (2020), obese children are more likely to remain obese as adults. The current rate of obesity is approximately 42% in the U.S. (State of obesity, 2020).

The American Academy of Pediatrics (AAP) considers obesity as excess adiposity rather than excess weight. The AAP uses the BMI which is the ratio of weight in kilograms to the square of height in meters to determine if a child's weight is within normal limits, overweight, or obese for the age and gender (AAP, 2015). Using the standardized chart below (fig. 1), according to CDC the Normal BMI in the green zone is 18.50–24.99 (5^{th} to $<85^{th}$ percentile); overweight is BMI of >= 25.00–29.99 (which is 85^{th} to $< 95^{th}$ percentile); Obese is BMI of >= 30.00 (which is > or = to 95^{th} percentile).

Causes of childhood obesity can be classified into modifiable and non-modifiable factors. For example, the modifiable factors are the quality and quantity of foods and drinks consumed, sedentary lifestyle, screen time, and sleep hygiene. The non-modifiable factors are age, gender, genetics, race, ethnicity, diseases, medications etc. (American Academy of Pediatrics, 2003). Being overweight or obese is a risk factor for many health issues such as cardiovascular disease, diabetes, cancers, and arthritis. The health consequences of childhood obesity are worse when it starts at an early age because there is a higher chance of premature death and long-term disability (World Health Organization, 2020). As a result, the federal government initiated the *Healthy People* program in collaboration with the Centers for Disease Control and Prevention (CDC) and Communities Putting Prevention to Work (CPPW) that sets health maintenance strategies and prevention goals that are reassessed every decade. One of the goals of *Healthy People* in collaboration with CPPW is to reduce childhood obesity through improving nutrition and increasing physical activities (2020).

Figure 1: CDC's BMI Graph



1.2 Problem Statement

Many studies including that conducted by Guerrero et al., & Wippold & Tucker (2016) show that an increase in BMI is highly affected by the quality and quantity of food consumed. In 2016, 180.5 million (60.7%) people 2 years and older were either overweight or obese (Waters & Graf, 2018). Childhood obesity places a huge burden on the children's health, psychological and

emotional well-being, and drains financial resources away from healthcare facilities. According to the State of Childhood Obesity, an estimate of $14 billion is budgeted annually for direct health expenses related to complications of childhood obesity. Many studies have been conducted to determine the causes and consequences of childhood obesity. Likewise, awareness has increased through evidence-based practices and interventions that have stemmed from such studies, but it has not made the indelible mark as expected. Rather, the linear forecast suggests that by 2030, 51% of the population will be obese (Finkelstein, Khavjou, Thompson, Pan, Sherry, & Dietz, 2012). The increasing trend of childhood obesity could be a result of consumers' nutrition label illiteracy as supported by Persoskie, Hennessy & Nelson (2017) which shows that many consumers cannot interpret nutrition labels, consequently, their dietary habits have been negatively affected.

The CDC's data in 2019 report that adults in the US have low literacy and numeracy skills as seen in the pie chart below (fig. 2). 12% of American adults could read at levels 4 & 5, while 9% of American adults could solve levels 4 & 5 mathematical problems. The average literacy in the US is at level 3 and numeracy at level 2. This why U.S. and many other western countries are making efforts to ensure that consumers become literate in nutrition labels facts and that the labels are easy to read in an effort to decrease the rate of obesity. A systematic review by Moore, Donnelly, Jones & Cade (2018), showed that the potential for nutrition label literacy to impact the population's health was dependent on the consumers' ability to understand and use information on food labels to make healthy choices. Moore et al. stated that in order to understand food labels, it is important to read and understand the ingredients and numeracy used in the labels.

The above problem statement led to this quality improvement project which seeks to find evidence-based answers to the following clinical question:- *"Among parents whose children attend an outpatient clinic, does an in-person educational intervention improve the parents' food label literacy?"*

Figure 2: CDC's Literacy & Numeracy Pie Chart

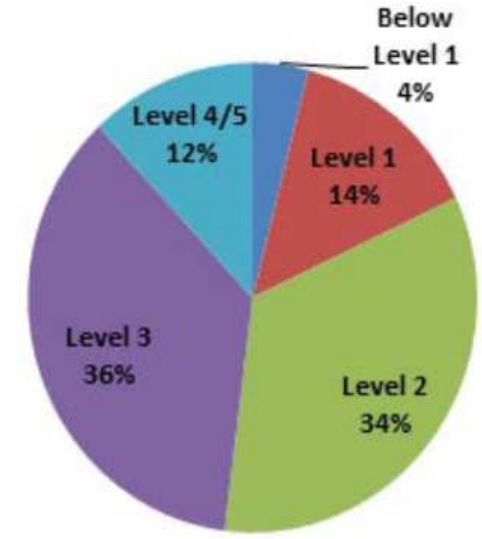


Figure 1: Percentage of U.S. adults age 16 to 65 at each level of proficiency on the PIAAC* literacy scale

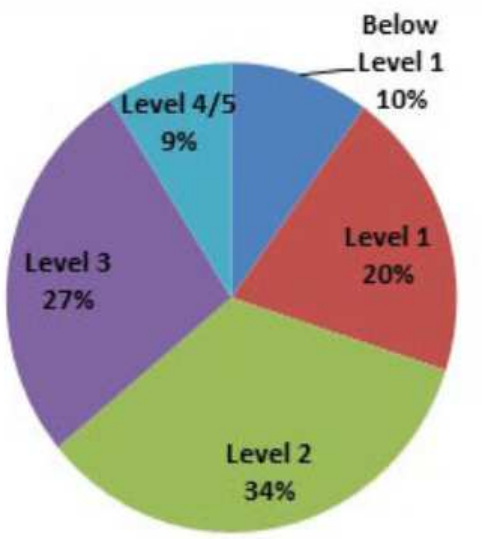


Figure 2: Percentage of U.S. adults age 16 to 65 at each level of proficiency on the PIAAC* numeracy scale

1.3 Purpose of the Program

This project seeks to identify parents' nutrition label literacy as the *missing link* in the management of childhood obesity. The purpose of this project is to create awareness for both parents and healthcare providers of the lurking dangers of obesity especially with onset in early childhood and to promote early intervention. The goal is to demystify the unknown contents in the food we feed our children through parent nutrition label literacy and give the parents a better insight of the food they feed their children. The purpose of this project is to educate the parents on nutrition label literacy and equip them with information that they may use in the future when making food choices. This project does not neglect or negate other evidence-based interventions which encourage increased physical activities, reduction or complete elimination of high calorie and fatty foods, encouraging increased consumption of fruits and vegetables, portion control and avoidance of sugary drinks. Rather, it buttresses the need for healthcare providers to perform *food reconciliation (phrase coined by project coordinator, Ifunanya Okocha, 2021)* with the parents and their children during annual well-child visits and to teach the parents about nutrition label facts. This empowers the parents and children in decision making as it pertains to their health.

1.4 The Goals & Objectives of the Project are:

(i) to create awareness of the causes and consequences of childhood obesity and need for early intervention through nutrition food label literacy.

(ii) to educate the parents to become literate on how to identify and define key nutrition components such as carbohydrates, proteins, vitamins, sugars, fats (saturated and unsaturated), and sodium (salts). The parents would model their food choices after the

food pyramid and recommended serving size for each food group, and caloric intake per body requirements.

(iii) through interventional education, parents are able to make better food choices towards prevention of childhood obesity.

Moran (2017) state that objectives relay the intention of the project (pg. 131). The project objectives are to identify parents' knowledge deficits in nutrition label facts, and to educate parents on how to use the *food pyramid* (Appendix F) and recommended serving size using *MyPlate* (Appendix D). The *food pyramid* is a pictorial representation of the various food groups and provides dietary guides according to daily required nutrients. *MyPlate* was created by experts at Harvard Public Health and School of Medicine to encourage healthy eating. It is an actual size model plate partitioned according to daily body requirement per meal (Harvard, 2021).

The short term goal for this project was to ensure that the parents have increased knowledge in nutrition label literacy after the educational intervention session. The long term goal is for the parents to continue to implement knowledge acquired during the project implementation in making healthy food choices and consequently reducing the rate of childhood obesity.

Chapter 2 - Literature Review

Burson & Conrad (2017) state that literature review supports the need to study a phenomenon. The purpose of undertaking this literature review was to analyze parents' nutrition label use, label literacy and nutrition knowledge. The literature selection addressed the causes, and consequences of obesity in children and also discussed the need for early intervention and impact of educating parents on nutrition label facts.

CINAHL Plus with Full Text, PubMed, MEDLINE, and PsycINFO were searched with keywords or phrases pertaining to the project topic such as nutrition labeling, parents' food perceptions, childhood obesity, obesity prevention, adolescents and obesity, nutrition facts, food label utilization, nutrition label comprehension, health literacy, and parent food literacy. Inclusion criteria were peer reviewed journals written in English. Due to limited publications on this topic, there was no limit on the region or country of research or publication date. Publications from 2010 to date were carefully reviewed and considered, but preference was given to peer review articles within 5 years of initiating this project.

2.1 Causes of Childhood Obesity

The American Academy of Pediatrics reports that obesity has increased among all age groups in children 2–19 years with 41.5% of teenagers becoming obese by age 16–19 years (2018). Obesity is considered a disorder with multiple causes associated with environmental factors, lifestyle, and cultural preferences (Cuschieri & Grech, 2020). The main cause of childhood obesity results from excessive caloric intake from foods and sugary drinks, consuming more than required by the body and high fat content diets. The World Health Organization (WHO) reports that the majority of food served to children have little or no vitamins, minerals or other healthy micronutrients (2020). In addition to a poor diet, a sedentary lifestyle is also a risk

factor for obesity (Sahoo, Sahoo, Choudhury, Sofi, Kumar & Bhadoria, 2015). With increase in the amount of time spent watching television programs, and playing video games, children lack the interest in outdoor activities or other physical activities in general (American Academy of Child & Adolescent Psychiatry, 2021). Children, especially in this technology age substitute physical games such as basketball, soccer, football etc., for simulation games they play on electronic devices, therefore promoting sedentary lifestyle. Other contributing factors to sedentary lifestyle are unsafe neighborhoods, lack of appropriate playgrounds and parents' inability or indifference to supervise the children's outdoor play activities (An, Yang, Hoschke, Xue, & Wang, 2017).

The media and advertising companies have inundated our screens and billboards with advertisements of fast foods, sugar packed drinks and quick fix meals marketed to the children and parents. Many of these unhealthy foods taste good and are disguised as healthy by portraying happy and satisfied parents and children enjoying their products during mealtimes. These unhealthy foods and drinks are devoid of vitamins, minerals, antioxidants, proteins, fiber, healthy fats, iron, zinc, and micronutrients (American Heart Association, 2021). They are packed with artificial food colors and flavors, enriched with corn syrup, high sugar content, unhealthy sugar substitute, high carbohydrates, unhealthy fats and artificial food preservatives. Unfortunately, with respect to childhood obesity, parents are often illiterate about the nutritional content of the foods they feed their children at home. Begley, Paynter, Butcher & Dhaliwal (2019), state that food illiteracy is a contributing factor to unhealthy food choices, thus obesity ensues.

2.2 Consequences of Childhood Obesity

Obesity severely affects the wellbeing of the children as it relates to their physical, social, emotional health and self-esteem. Many children have body image distortion due to being obese and are at risk of being bullied at school and in society and. These children are at risk of school absenteeism, poor academic performances or suicidal behaviors due to stigmatization rather than cognitive reasoning (Johnson, 2018). The resultant effect of childhood obesity is the manifestation of diseases usually seen in the older population which are exaggerated in the children, for example, type 2 diabetes, cardiovascular disease, hyperlipidemia, hypertension, metabolic syndrome, stroke, asthma, sleep disorders, nonalcoholic fatty liver disease (NAFLD), arthritis, GERD, bone fracture, sleep apnea, among others (Mayo, 2018). Likewise, The National Cancer Institute (2017) states that adiposity is associated with increased prevalence of cancers such as endometrial, liver, colorectal, breast, thyroid, ovarian etc. The World Health Organization estimates that 2.8 million people die annually from the debilitating health problems associated with obesity (2020). Due to this alarming consequences, the World Obesity Day is celebrated annually on March 4 to create awareness (National Today, 2021).

Among overweight or obese children in the United Sates, 80% of children 10 to 14 years are at risk of being obese in adulthood with the consequence of reduced life expectancy (Sanyaolu, Okorie, Qi, Locke & Rehman, 2019). Finkelstein, Graham & Malhotra, report that in comparison to a normal weight child, the estimated incremental lifetime medical cost per obese child is $19,000 (2014). The direct and indirect cost of treating or managing obesity-related illness is estimated at $190.2 billion which is about 20% of annual medical expenses in the United States (Harvard school of public health, 2020).

2.3 Effect of Educational Intervention

Much evidence-based interventional programs have been developed from research in the past such as the Coordinated Approach to Child Health (CATCH), and 5-2-1-0 program, among others. The CATCH program is for children who carry excess weight and is designed to promote fun physical activities for the children and their families. The 5-2-1-0 program is a community based childhood obesity prevention program that originated in Maine (Rogers, Hart, Motyka, Rines, Vines & Deatrick, 2013). The 5-2-1-0 was coined to be a simple, consistent, and easy message to remind families on how to make healthy choices as it relates to the quality and quantity of food consumed as well as the choice of physical activities. The program promotes "eating at least five servings of fruits and vegetables", "two hours or less of recreational screen time", "encourages one hour or more physical activity," and "little or no sugary drinks (promotes water and low fat milk)".

Unfortunately, with the impact of the COVID-19 pandemic in early 2020, many children are now on screen in a remote learning format. This poses a lot of challenge for parents and providers to regulate the children's screen time and sedentary lifestyle especially with limited outdoor activities and social distancing implemented to curtail the spread of the virus. Although, controlling the spread of COVID-19 virus is of utmost importance, it is advisable for providers to emphasize and encourage parents and children to engage in safe physical activities. It is also important to encourage healthy food choices as the tendency would be to eat more comfort foods that are high in calorie (sugar) and fat contents.

The CDC has been in the forefront of combating childhood obesity through their campaign *"Eating Better, Moving More"* (2018) alongside other evidence-based programs such

as the *"Let's Move"* campaign initiated by former first lady Michelle Obama in 2010 (Eschimeyer, 2017). Unfortunately, the probing question is "why is childhood obesity still on the rise despite the proven efficacy of all the instituted programs?" According to the American Academy of Pediatrics (2018) research shows that there was an average of 5% spike in childhood obesity from 2014–2016 in all age groups and populations in spite of increased awareness and implementation of numerous evidence-based programs (Skinner, Ravanbakht, Skelton, Perrin & Armstrong). It is important to differentiate that the spike in childhood obesity does not mean that the evidence-based programs are not effective, rather it means that there is a missing link in maintenance of the achieved results. Kelishadi & Azizi-Soleiman (2014) stated that parents play a vital role in their children's health choices especially in the quality and quantity of food the children eat. This missing link could perhaps be attributed to parent nutrition label illiteracy.

Early intervention and management of childhood obesity is paramount to the health of the society as it has been proven that children who are obese are more likely to remain obese as adults. As healthcare providers, it is recommended to educate the parents on nutrition label literacy as quantity and quality of food consumed are major contributors of childhood obesity. In an effort to reduce obesity, the Labeling Legislation Acts seek to educate consumers on nutrition labels and assist consumers in making good nutrition choices, yet many parents are illiterate in nutrition information on food labels (Moore, Donnelly, Jones & Cade, 2018). In a study conducted by Vemula, Gavaravarapu, Mendu, Mathur & Avula (2013), research findings showed that 99% of the participants had formal education but were illiterate with respect to nutrition label knowledge and utilization. Also, 81% of their study participants reported that food

purchasing was based on the expiration date, convenience, packaging and taste rather than nutrition label facts.

This project focuses on the need for parents' nutrition label literacy which has been identified as a barrier in the implementation of many evidence-based studies that were intended to reduce the rate of childhood obesity. It is crucial to address the parents' nutrition label literacy, especially on how they access, understand, and utilize health information from nutrition labels. According to Emmett & Jones (2015) the Avon longitudinal study shows that parents who had a better understanding of nutrition label facts were more likely to feed their children healthy meals from birth, therefore initiating early intervention in the prevention of childhood obesity.

2.4 Impact of Parent Health Literacy in Preventing Childhood Obesity

Parents or guardians play a vital role in the nutrition of the children and consequently their health outcomes as it relates to their weight. Zoellner, Hill, You, Brock, Frisad, Alexander, Silva, Price Marshall & Estabrooks (2017), studied the impact of Health Literacy (HL) on parents and their children. The cross-sectional study showed that 1 in 3 parents or guardians had low HL with higher prevalence among those with low income and racial and ethnic minority groups as compared to those with higher income and non-ethnic groups. High income earners do not fully understand nutrition label facts, but by virtue of their earning power could afford foods from high-end stores that carry healthier foods than the general grocery stores.

The cross-sectional study conducted by Zoellner, Hill, You et al., revealed that parents with low HL benefited from focused educational intervention on the health consequences of childhood obesity and how to read nutrition labels. These parents were noted to have increased knowledge on nutrition label facts and were able to make healthy foods and drinks choices for

their children. The study showed that the parents HL with lower formal education improved to the same level or better when compared to those with higher education or income who received the same educational intervention. The conclusion of their cross-sectional study was that implementing a universal approach to parents or guardians' HL would be instrumental in the prevention of childhood obesity. The study showed significant reduction in BMI among the children of the participants enrolled in the study irrespective of their social economic status.

2.5 Conceptual Framework

The Transtheoretical (Stages of Change) Model suits this DNP project. The Transtheoretical Model has been successfully used in exercise and diet intervention programs (Polit & Beck, 2017). This framework consists of five defined stages which include:

(i) Precontemplation (not ready) - The parent demonstrates illiteracy in nutrition label facts and holds on tightly to their learned behavior. The parent does not see any reason for a change.

(ii) Contemplation (getting ready) – The parent is educated about the causes and consequences of childhood obesity, and how nutrition label illiteracy contributes to childhood obesity. At this stage, the parent begins to show a willingness to become literate in reading nutrition labels.

(iii) Preparation (ready) – The participants complete the demographic survey (Appendix A) and take the Food Label Literacy for Applied Nutrition Knowledge (FLLANK) pretest (Appendix B). The participants realize that it was challenging choosing the right food label. At this point, the participant is open to review the pretest with the project coordinator (PC) as well as listen to the nutrition education session. The PC

uses the visual display board (Appendix G) and the nutrition label cheat sheet (Appendix E) to educate the participants on nutrition label facts. The PC also uses the food pyramid (Appendix F) to teach the participants how to make healthy food choices, while using *MyPlate* (Appendix D) to adhere to recommended serving size. The participant shows willingness to make the necessary changes and actively seeks information to improve their knowledge.

(iv) Action - This is also known as the implementation stage. After the nutrition education session, the participant has basic literacy in nutrition label facts, understands the basic components of the food label, and is able to differentiate between unhealthy and healthy food choices based on the information on the food labels. The participant verbalizes possible healthy food choices that they can make for their children by using the food pyramid and *MyPlate* as guides for recommended portion sizes. The participant's increase in nutrition label literacy is reflected in an increased FLLANK post-test score.

(v) Maintenance – The participants remain self-motivated to continue learning about nutrition label facts, and successfully transfer acquired knowledge to the child(ren). The participant is consistent with planning healthy meals for the child(ren) after the project duration. The knowledge and lifestyle transcends this scholarly project.

These stages are implemented to move the project participants through a continuum of change that will enable them and their children to maintain healthy habits as it pertains to nutrition label literacy. The flexibility of this theoretical framework allows for the participants to spend as much time needed on each stage or to step back to previous stages as needed in order to reach and remain in the "maintenance stage".

Chapter 3 - Project Implementation Plan

3.1 Project Introduction at Implementation Site

The importance of developing an implementation plan according to Polit & Beck (2017) is to provide descriptive step-by-step analysis of the project to generate a successful outcome. Implementation plan gives pertinent information about the project setting, population, and interventions. It sets clear expectations of how the project is expected to evolve and describes the role of those involved in the project.

Upon the University of North Carolina Institutional Review Board (UNCC-IRB) approval of the project proposal, the project was advertised at the implementation site for a period of 2–4 weeks in the Fall of 2020 using the UNCC-IRB approved fliers (Appendix H). The PC visited the clinic site at least once a week to introduce and recruit participants for the project.

3.2 SWOT ANALYSIS

For a successful implementation, a SWOT analysis is imperative. According to Zaccagnini & White (2017), SWOT analysis helps the PC to assess the strength, weakness, opportunity, and threats of the project. The PC capitalized on the potential *"strength and opportunities"* the project might bring; on the contrary, anticipated *"weakness and threats"* to a successful project implementation and sought interventions to counter any limitations.

Figure 3: SWOT Analysis

SWOT	**ANALYSIS**
S - Strength	• Willingness of the practice to host the project.

	• Parents willingly participate in the project and complete all steps in one session. • Support of the clinic staff • Private space in the practice to conduct the project and safely store data. • Participants will have only one session of the project to complete. • Use of a validated and reliable measurement tool
W - Weakness	• Parents might have limited time to participate in the 30-45 minutes one-time session. • Non-English speaking parents are not part of the project. • Bilingual parents may have gaps in communication. • This problem was resolved by indicating in the inclusion criteria that participants must comprehend the English language. The

	availability of bilingual staff will also bridge communication gaps.
O - Opportunity	• Have access to diverse population of parents at the clinic. • The project is reproducible as the practice staff can use the project's teaching tools to educate parents and patients in the future. • To create awareness of the causes, consequences and prevention of childhood obesity. • To educate parents on nutrition label literacy and consequently a reduction in childhood obesity
T - Threat	• The participants might feel that they are being blamed for their child's obesity, therefore seen as bad parents. • Parents might not want to enroll in the project for unknown personal reasons. • Parents may feel defensive if they fail the pretest.

	• This problem was resolved by assuring the participants that this project is an interventional education for all parents. • Limitations caused by COVID-19 to maintain social distancing. Project implementation was done one family at a time to curb the spread of the virus.

3.3 Project Clinical Setting and Population

The project was conducted at MidCarolina Pediatrics, a privately owned urgent care and outpatient pediatric clinic located in a metropolitan area of Charlotte, North Carolina. They serve a diverse population of individuals from various races, ethnicity, and socioeconomic status. The clinic is run by medical staff including a board certified pediatrician (medical director), pediatric nurse practitioners, medical assistants, and laboratory technicians. The non-medical staff in the clinic include the practice manager, clerical staff, and billers. The standard ages of patients range from newborns to 18 years, but patients up to 21 years of age are seen for urgent visits. The providers work collaboratively with other interdisciplinary or specialist groups for patient referrals.

3.4 Professionals & Stakeholders Involved in the Project

Moran, Burson & Conrad state that the selection and roles of stakeholders in any project is critical as they affect the outcome of the project (2017). The internal stakeholders include the medical staff such as clinical expert (pediatrician), nurse practitioner, dietician, nurses, medical assistants, while non-medical stakeholders include the practice manager, and clerical staff. The meeting was held with the stakeholders and a power point of the project proposal, with supporting statistical data and evidence-based literature reviews that analyzes the debilitating and detrimental consequences of childhood obesity was presented. The stakeholders were introduced to the need for early educational intervention through parent nutrition label literacy. According to Kakinami, Houle-Johnson & McGrath's (2016) report that parents' deficiency in nutrition label use, label literacy, and nutrition knowledge is directly proportional to adiposity in children with consequential effects on their cardiovascular system and general health status. The research shows that obese children are at higher risk of remaining obese in adulthood. Therefore, the need for early intervention through parent nutrition label literacy.

The external stakeholders are parents whose children are patients at the clinic. The parents were introduced to the project through strategically displayed advertisements in the clinic. The parents were approached on a one-on-one basis by the PC for voluntary enrollment into the project.

3.5 Data Collection Tools

According to Moran, Burson and Conrad (2017) data collection plan gives a step-by-step process, the purpose, and method of analysis of data collected (pp. 263). This project involved an intervention that required data collection from the participants to assess knowledge improvement

among parents through an in-person nutrition label education. Prior to data collection, safety and confidentiality parameters were in place as stipulated by the UNCC-IRB. The duty of UNCC-IRB is to ensure that the method of data collection met federal requirements for ethical research especially with the involvement of human subjects (Polit & Beck, 2017).

The privately owned outpatient pediatric facility does not have its own IRB, but the practice has strict policies in place that conforms to UNCC-IRB regulations on patient confidentiality and protection. The PC reviewed the policies of the practice regarding patient safety and confidentiality. The PC submitted the project proposal to UNCC-IRB for approval. Once the UNCC-IRB project approval was obtained, the implementation of the project which involves the participants' enrollment, in-person interventional education for the participants, as well as data collection and analysis began. The PC enrolled the participants based on the following criteria which are to (a) be a parent or guardian of a child in the clinic, (b) be a parent or a guardian who is directly involved in feeding a child(ren) at least one major meal daily, and (c) a parent or guardian who comprehends the English-language. The PC also explained the informed consents signed by the participants. According to Zaccagnini & White, informed consent give the participants pertinent details about the project, participants' protection and privacy, project timeline, and utilization of data collected by the PC (2017).

3.6 Measurement Tools

The data collection method involved administering a paper and pencil survey to the participants. The two assessment tools utilized were (i) the parents' demographics (gives an overview of the participants' status such as race, gender, age bracket, level of education etc.), and (ii) the Food Label Literacy for Applied Nutrition Knowledge (FLLANK). The FLLANK

test was developed by Dr. David & Dr. Catherine Katz, and no permission was needed to use their test; they only requested to be recognized. The reliability and validity of the FLLANK survey had been tested in research conducted for nutrition label literacy among school children (Reynolds, Treu, Njike, Walker, Katz & Katz, 2012).

The FLLANK test consists of a pair of 10 common food labels in 2 groups named "Nutrition fact A" and "Nutrition fact B." The pair of labels for each food item have slight variations in the food labels (view Appendix B for sample of the FLLANK test). Examples of common food labels featured in the FLLANK test are crackers, cookies, bread, cereal bars etc. For each food type, the parents had to compare and contrast the information listed on the food labels to determine which food label had the healthier option. The participants had the option to choose one of the 3 answer choices listed as "A", "B" or "Can't Tell" on the FLLANK survey. The FLLANK test uses guiding clues to examine food labels based on the nutrition facts panel found on the food labels such as the serving size, calories, total fat, sodium, total carbohydrate, dietary fiber, sugars, and proteins. Other clues include hydrogenated oils, high fructose corn syrup, and having long ingredient lists.

The FLLANK tests aligns with the project objectives as it focuses on assessing the nutrition label literacy of the parents. The goal of the project was attained as it identified the parents' deficiencies in food label literacy by conducting an in-person educational intervention on how to read food labels using the FLLANK survey. The aim of the project was to increase parent's food label literacy, and their ability to make healthier food choices in the real world. Review of each label listed in the FLLANK test helped the parents understand the rationale why certain foods based on the nutrition facts were either healthy or unhealthy. With multiple sample

label reading practices, the parents were able to identify key nutrition facts to look out for when reading a food label.

3.7 Data Collection Method

During the quantitative and qualitative data collection, the parents were assigned numeric codes ranging from 1 to 30 written on their survey papers for privacy. The PC instructed the parents on how to complete the survey. After the participants completed the demographic and FLLANK pretest survey, they attended an in-person educational session conducted by the PC. The final phase of the project implementation was administering the FLLANK post-test. All participant's documentation collected during the project was stored at the clinic site in a secure cabinet located in the office space provided for the PC throughout the duration of the project. The PC had sole access to the cabinet and at the conclusion of the project. All the project documents with participant's personal identifiers will be discarded in an approved and secured *shred-it* cabinet to be professionally shredded.

A presumptive power analysis showed that a minimum of thirty participants were needed for this project to yield accurate statistical analysis. According to Polit & Beck, power analysis helps to reduce statistical errors, and strengthens statistical conclusion and validity (2017).

3.8 Educational Intervention Method

The educational intervention method included a visual display board (Appendix G, created by the PC), hands on practice on sample food labels, and using the nutrition label cheat sheet card (Appendix E, created by the PC) to practice making healthy food choices. To simplify reading food labels, the visual board was used to show favorite snacks and drinks with the measured quantity of sugar in grams. This was the center of discussion which prompted the

parents and the children to ask questions. For example, in a 12 ounce can coke, there are 78 grams of sugar, and 252 grams of sugar in the Nerds candy. Visualizing the actual quantity of sugar made more sense to the participants rather than just the numeric values on the food labels. Other teaching tools such as food pyramid (Appendix F), and "MyPlate" (Appendix D) were used to show the parents how to make healthy choices and the recommended serving size. The parents had opportunity to ask questions.

Also, the laminated wallet size nutrition label cheat sheets were given as gifts to the participants to help them remember the information shared during the education session. The PC taught the parents about key ingredients to avoid in food labels such as the bad fat (that is the saturated fat) seen in cheese, hard butter, and bacon; or the trans-fat seen in fried foods, many baked snacks and prepackaged food. We also identified what makes the food healthy such as good fat (known as monounsaturated, and polyunsaturated) as seen in salmon, olive oils and nuts; fibers are from whole grains, fruits and vegetables; while proteins are from lean meat, fish, and beans. The PC also taught the parents what serving size meant.

3.9 Data Analysis

The pre and post-test were scored using the FLLANK test standardized answer sheet (Appendix C) and the result used for data analysis. The PC manually entered the entire data into an Excel spreadsheet using the numeric codes assigned to each participant. The Excel spreadsheet with data was sent to the statistician electronically for data analysis. The statistician used the Stata software v.16 (2019) for data analysis. The pre and post-test scores were analyzed using appropriate variable type and normality for the data. Categorical data were compared using

Chi-square and McNemar's test and descriptive statistics performed as appropriate. All tests were considered statistically significant at a p-value = < 0.05.

Chapter 4: Project Analysis

4.1 Statistical Analysis

The Data collected were entered into an excel sheet without participant's information and sent to the statistician. The Stata software version 16 was used for statistical analysis. All data were assessed for normality. Descriptive and comparative statistics was performed as appropriate for the distribution of the data. The Demographic data was summarized using frequencies and proportions, and continuous variables was summarized with means and standard deviations. The FLLANK pre & post-test was scored by summing the counts & percentages of the products correctly identified as the healthier choice, and these continuous values were compared between the pre- and post-intervention groups. Chi-square test was used for unpaired subgroup analysis, and McNemar's test for paired group analysis. All tests performed were considered statistically significant at the $p < \text{or} = 0.05$.

4.2 Variable Consolidation

The Education variable as seen on the demographic survey was consolidated from five categories (did not complete high school (HS), completed high school, 2-year college, 4-year college, and graduate school or higher) to three categories (HS or below, College, and Graduate school) where "did not complete High School" and "completed High school" were grouped into HS or below; and 2-year and 4-year college were grouped into College. The Income variable was consolidated from four categories (less than $15,000/ year, less than $30,000/ year, less than $45,000/ year, and $45,000 or more/ year) to dichotomous variables (Low and High) where less than $15,000/ year, less than $30,000/ year, and less than $45,000/ year were grouped into low income and $45,000 or more/ year as high income. A new grouping variable was created to

analyze participants who purchase food by reading labels compared to those who only purchase due to packaging. The variable identified participants who indicated either one option or the other, not both.

Findings

4.3 Sample size and Demographic Information

The characteristics of the thirty participants are shown in table 1 below. Figures and frequencies were used to analyze the demographic data. The sample consisted 83.3% of females (n=25) and males 16.7% (n=5). 53.3% (n=16) of the participants were 35 years and above. The socioeconomic status showed that 33.3% (n=10) of the participants had at least a 2-year college degree, 13.3% (n=4) had a 4-year college and 26.7% (n=8) had a graduate school or higher. Altogether, 73.3% (n=22) of the participants had at least a form of college education. This was reflected in the participant's income as 60% (n=18) of the participants earned $45,000.00 and above. Also, 79.3% (n=23) of the participants indicated that they were *"responsible for making food choices"* in the home, 70% (n=21) chose true for *"I understand food labels"* and 50% (n=15) reported that *"I read food labels before buying food"* while 60% (n=18) responded *"I buy food items based on how the food package looks."* Overall, 86.7% (n=26) indicated *"I would like to learn and understand nutrition labels."* It is important to note that equal numbers of participants were identified as African Americans or Blacks and Hispanics at 46.7%, (n=14) and the Whites and Asians were 3.3% (n=1) respectively.

Table 1: Participant Characteristics

Baseline Characteristics N = 30	Count (n)	%
Age		
18-25	5	16.7
25-30	4	13.3
30-35	5	16.7
35+	16	53.3
Female	25	83.3
Male	5	16.7
Education level		
Did not complete High School	2	6.7
Completed High school	6	20
2-year college	10	33.3
4-year college	4	13.3
Graduate school or higher	8	26.7
Ethnicity		
Hispanic	14	46.7
African American/Black	14	46.7
White	1	3.3
Asian	1	3.3
Income		
Less than $15,000/ year	4	13.3
Less than $30,000/ year	6	20
Less than $45,000/ year	2	6.7
$45,000 or more/ year	18	60
Pre-test questions		
I understand food labels		
True	21	70
False	9	30
I read food labels before buying food		
True	15	50
False	15	50
I buy food items based on how the food package looks		
True	18	60
False	12	40
I would like to learn and understand nutrition food labels		
True	26	86.7
False	4	13.3
Responsible for feeding the children		
True	23	79.3
False	6	20.7

***Descriptive Statistics, counts and percentages.*

4.4 Results

This study was used to understand the role of participants in making healthy food choices for their children. The focus of this study was to identify the participant's nutrition label literacy and consequently how it affects the choice of food the participants would feed their children. As reported by Guerrero et al., & Wippold & Tucker (2016) that the quality and quantity of food the children eat is directly proportional to adiposity which results in obesity. The subgroup analysis were viewed to answer questions such as how income, and level of education influenced the participant's knowledge of the type of food they feed their children. Ideally, it is expected that those who were more educated with higher earning power would make better food choices for their children. The goal of the educational intervention was to improve the literacy of the participants as measured in the post-test scores. The following were the results from the pre and post data analysis from the FLLANK survey as illustrated below.

4.5 Pretest Subgroup Analysis:

Table 2. Did readers of food labels perform better in pre-test? **(See Appendix B for survey questions)**

Food Label Questions	Do read labels Percent correct **(%)**	Do not read labels Percent correct **(%)**	**p-value**
Q1	13/15 (86.7)	12/13 (92.3)	.630
Q2	13/14 (92.9)	12/15 (80.0)	.316
Q3	11/14 (78.6)	13/15 (86.7)	.564
Q4	14/15 (93.3)	7/13 (53.8)	.016*
Q5	9/14 (64.3)	10/15 (66.7)	.893
Q6	14/15 (93.3)	12/14 (85.7)	.501
Q7	13/15 (86.7)	11/14 (78.6)	.564
Q8	9/15 (60.0)	5/13 (38.5)	.256
Q9	13/14 (92.9)	9/13 (69.2)	.114
Q10	2/14 (14.3)	1/13 (7.7)	.586
Total (summed % of correctly identified products)	111/145 (76.6)	92/138 (66.7)	.065

*** Chi-square test used.** ***Statistical significance at a p<0.05 level***

In Table 2, Chi-square test for categorical variables was performed to test the relationship between food label readers' and non-label readers' performance in the pretest.

Table 2 analyzed the responses of participants who answered yes to "reading food labels" versus those who "do not read food labels." Only question 4 was statistically significant (p=.016) indicating 93.3% of *label readers* compared to 53.8% of *non-label readers* answered the question correctly. Although there were numerical increases in questions 2, 6, 7, 8, 9 & 10, overall, there was no statistically significant difference between *label readers* and *non-label readers* in frequency of correct answers to the pretest questionnaire (Table 2). This analysis suggests that those who read labels are more likely to make healthier food choices as compared to those who did not read food labels. This supports the basic need to read food labels. Overall, the result was not statistically significant.

4.6 Education Intervention Analysis:

Table 3. Pre and Post Survey Scores **(See Appendix B for survey questions)**

Food Label Questions	Pre-Intervention % Correct	Post-Intervention n = 30 % Correct	p-value
Q1	25/28 (89.3)	28 (93.3)	.654
Q2	25/29 (86.2)	29 (96.7)	.180
Q3	24/29 (82.8)	28 (93.3)	.250
Q4	21/28 (75.0)	27 (90.0)	.206
Q5	19/29 (65.2)	28 (93.3)	.005*
Q6	26/29 (89.7)	29 (96.7)	.250
Q7	24/29 (82.8)	27 (90.0)	.180
Q8	14/28 (50.0)	29 (96.7)	.000*
Q9	22/27 (81.5)	24 (80.0)	.655
Q10	3/27 (11.1)	20 (66.7)	.000*
Total [b] (summed % of correctly identified products)	203/283 (71.7)	269/300 (89.7)	.000*

Table 3 - McNemar's test for paired binary data was performed.

Table 3 performed analysis of the 30 participants' responses in the pretest and the impact of the educational intervention as reflected in the post-test. The results showed numerical increases in the percentage of correct answers from the pretest to the post-test for each of the 10 survey questions, with the exception of question 9 where 81.5 % of participants answered the question correctly, but in the post-test 80.0% answered the question correctly. Specifically, the results for question 5 (pre: 65.2; post: 93.3), 8 (pre: 50.0; post: 96.7) & 10 (pre: 11.1; post: 66.7) were statistically significant with p-values of 0.005, 0.000 & 0.000, respectively. Overall, an average of 71.7% of the participants answered the survey questions correctly in the pretest. After the educational intervention, 89.7% of the participants answered the post-test questions correctly. The total summed percentage of correctly identified questions was statistically significant with p-value = 0.000. This shows that the educational intervention helped to improve the nutrition label of the participants irrespective of their educational or economic status.

Tables 4 and 5 compared the performance of the participants by gender. The results are as shown below.

Table 4. Comparing performance by gender: Female **(See Appendix B for survey questions)**

Food Label Questions	Pre-Intervention % Correct	Post-Intervention n = 25 % Correct	p-value
Q1	23/23 (100)	24 (96.0)	1.0
Q2	20/24 (83.3)	25 (100)	.125
Q3	21/24 (87.5)	24 (96.0)	.500
Q4	17/23 (73.9)	24 (96.0)	.059
Q5	15/24 (62.5)	23 (92.0)	.008*
Q6	21/24 (87.5)	24 (96.0)	.250
Q7	21/24 (87.5)	22 (88.0)	1.0
Q8	12/23 (52.2)	24 (96.0)	.002*
Q9	19/22 (86.4)	21 (84.0)	1.0
Q10	3/22 (13.6)	16 (65.0)	.004*
Total (summed % of correctly identified products)	172/233 (73.8)	227/250 (90.8)	.000*

Table 5. Comparing performance by gender: Male **(See Appendix B for survey questions)**

Food Label Questions	Pre-Intervention n = 5 % Correct	Post-Intervention n = 5 % Correct	p-value
Q1	2 (40)	4 (80)	.625
Q2	5 (100)	4 (80)	1.0
Q3	3 (60)	4 (80)	1.0
Q4	4 (80)	3 (60)	1.0
Q5	4 (80)	5 (100)	1.0
Q6	5 (100)	5 (100)	1.0
Q7	3 (60)	5 (100)	.500
Q8	2 (40)	5 (100)	.250
Q9	3 (60)	3 (60)	1.0
Q10	5 (100)	4 (80)	.125
Total (summed % of correctly identified products)	36/50 (72.0)	42/50 (84.0)	.148

Table 4 & 5 - McNemar's test for paired binary data was performed.

Tables 4 & 5 analyzes the overall responses of the females and males in the pretest and post-test, respectively. The females (n=25) showed a statistically significant increase in post-intervention score for Questions 5 (pre: 62.5; post: 92.0; p=.008), Question 8 (pre: 52.2; post: 96.0; p=.002), and Question 10 (pre: 13.6; post: 65.0; p=.004). Also, there were numeric increases in the pre and post-intervention for the females in questions 2, 3, 4, 6 & 7 although they were not statistically significant. Overall, the impact of the educational intervention was statistically significant with the females. Likewise, the Males (n=5) showed numerical increases in questions 1, 3, 5, 7 & 8, but none showed statistically significant results. Also, there were 20% decrease in the post test scores after the educational intervention in questions 2, 4 & 10. Although the men did not achieve a statistically significant result, the overall analysis demonstrated that both the women and the men benefited from the educational intervention somewhat. It is important to note that males (n=5) had a low representation in this project as compared to the females (n=25).

Tables 6 & 7 showed the comparison between the low and high income earners. McNemar's test was performed.

Table 6. Comparing performance by Income: Low **(See Appendix B for survey questions)**

Food Label Questions	Pre-Intervention % Correct	Post-Intervention n = 12 % Correct	p-value
Q1	9/10 (90)	10 (83.3)	1.0
Q2	8/11 (72.7)	11 (91.7)	.625
Q3	10/12 (83.3)	11 (91.7)	1.0
Q4	7/11 (63.4)	11 (91.7)	.180
Q5	7/11 (63.4)	11 (91.7)	.250
Q6	9/11 (81.8)	11 (91.7)	.500
Q7	8/12 (66.7)	10 (83.3)	.625
Q8	6/11 (54.6)	12 (100)	.025*
Q9	7/9 (77.8)	8 (66.7)	1.0
Q10	2/11 (18.2)	9 (75)	.014*
Total (summed % of correctly identified products)	73/109 (67.0)	104/120 (86.7)	.000*

Table 7. Comparing performance by Income: High **(See Appendix B for survey questions)**

Food Label Questions	Pre-Intervention % Correct	Post-Intervention N=18 % Correct	p-value
Q1	16/18 (88.9)	18 (100)	.500
Q2	17/18 (94.4)	18 (100)	1.0
Q3	14/17 (82.4)	17 (94.4)	.500
Q4	14/17 (82.4)	16 (88.9)	1.0
Q5	12/18 (66.7)	17 (94.4)	.025*
Q6	17/18 (94.4)	18 (100)	1.0
Q7	16/17 (94.1)	17 (94.4)	1.0
Q8	8/17 (47.1)	17 (94.4)	.005*
Q9	15/18 (83.3)	16 (88.9)	1.0
Q10	1/16 (6.3)	11 (61.1)	.011*
Total (summed % of correctly identified products)	130/174 (74.7)	165/180 (91.7)	.000*

Those identified as *Low Income* (Table 6) showed numerical increases in all post-test scores after the educational intervention except for Question 1 (pre = 90%, post = 83.3%) and Question 9 (pre = 77.8%, post = 66.7%). The *Low income* participants had statistically

significant increases in post-intervention scores for Question 8 (pre: 54.6; post: 100; p=.025) and Question 10 (pre: 18.2; post: 75.0; p=.014). Similarly, the *High Income* group (Table 7) had statistically significantly increased their post-test scores for Questions 5, 8 and 10. All the other survey questions showed numeric increases from the pretest to the post-test. The low income group had an average score of 67.0% in the pretest and in the post-test had 86.7% resulting in a 19.7% increase. In the high income group, the average score in the pretest was 74.7% and 91.7% in the post-test, with a 17% increase in scores. Overall analyses showed that both participants in the low and high income groups had a statistically significant result after the educational intervention. It is important to point out that the participants in the low income group performed at the same level or better than those in the high income group. This shows that irrespective of the income level, the educational intervention was statistically significant in both groups.

Table 8. Performed an analysis if the level of education predicted correct answers.
(See Appendix B for survey questions)

Dependent Variable	β Coefficient (SE)	Odds Ratio	p-value
Pre-Intervention Q4			
Education Level = 1 (2-4 year college)	4.17 (1.5)	65	.006*
Education Level = 2 (Graduate School)	3.56 (1.5)	35	.020*
Pre-Intervention Q7			
Education Level = 1 (2-4 year college)	2.85 (1.3)	17.3	.027*

****Logistic regression was performed to assess the impact of educational level on the likelihood of a correct answer to any given question, where the dependent variable was the question (either pre or post) and the independent variable was the education level comprising three categorical options.**

The analysis shown in Table 8 above is a logistic regression that analyzes if the level of education of the participants predicted the correctness of their answers in the pretest. The focus is on the results of two models (Question 4 & 7 in the pretest) that achieved significance. Based on the analysis, a participant had 65 times the odds (β: 4.2; p=.006) of answering pre-intervention Question 4 correctly if they had a College education level, and 35 times the odds (β: 3.6; p=.020)

if they had a Graduate education level, as compared to those with a high school education level. Likewise, a participant had 17.3 times the odds of answering pre-intervention Question 7 correctly if they had a College education level (β: 2.9; p=.027) as compared to someone with a high school education.

Table 9. Who performs better, label readers or those who purchase based on packaging?
(See Appendix B for survey questions)

Food Label Questions	Packaging only Percent correct (%)	Label readers Percent correct (%)	p-value
Q1	9/9 (100)	6/6 (100)	1.0
Q2	8/9 (88.9)	6/6 (100)	1.0
Q3	8/9 (88.9)	4/5 (80)	1.0
Q4	4/8 (50)	6/6 (100)	.085
Q5	7/9 (77.8)	3/6 (50)	.329
Q6	9/9 (100)	5/6 (83.3)	.400
Q7	7/8 (87.5)	6/6 (100)	1.0
Q8	4/8 (50)	5/6 (83.3)	.301
Q9	6/9 (66.7)	6/6 (100)	.229
Q10	1/8 (12.5)	0/6	1.0
Total (summed % of correctly identified products)	63/86 (73.3)	47/59 (79.7)	.376

**** indicates statistical significance at a p<0.05 level***

Chi-square test for categorical variables was performed, to test the relationship between person type (packaging or label_ and question number.

Table 9 analyzed the performance of the participants in the pretest who responded that they read food labels versus those who purchased their food based on the packaging only. Although the comparison between the two groups did not yield statistical significance, it showed that label readers were more likely to make better nutrition choices as compared to the participants who looked at the food packaging alone. The label readers scored 100% in 5 out of 10 survey questions, while those who looked at the packaging scored 100% in only 2 questions. Also, the label readers were more likely to choose the healthier food label as seen in questions 2, 4, 7, 8 & 9. Overall, Table 9 shows that those who read food labels had a 79.7% chances of

making healthier nutrition choices. Those who made purchases based on packaging alone had a 73.3% chance of making healthier nutrition choices.

Table 10 & 11- McNemar's test performed.

Table 10. Comparing performance by Education: Low **(See Appendix B for survey questions)**

Food Label Questions	Pre-Intervention % Correct	Post-Intervention % Correct	p-value
Q1	6/6 (100)	7/8 (87.5)	1.0
Q2	5/7 (71.4)	7/8 (87.5)	1.0
Q3	6/8 (75.0)	7/8 (87.5)	1.0
Q4	1/6 (16.7)	8/8 (100)	.063*
Q5	5/7 (71.4)	7/8 (87.5)	1.0
Q6	6/7 (85.7)	7/8 (87.5)	1.0
Q7	3/7 (42.9)	6/8 (75.0)	.250
Q8	2/7 (28.6)	8/8 (100)	.025*
Q9	2/5 (40.0)	5/8 (62.5)	.500
Q10	1/7 (14.3)	6/8 (75.0)	.046*
Total (summed % of correctly identified products)	37/67 (55.2)	68/80 (85.0)	.000*

Table 11. Comparing performance by Education: High **(See Appendix B for survey questions)**

Food Label Questions	Pre-Intervention % Correct	Post-Intervention N= % Correct	p-value
Q1	19/22 (86.4)	21/22 (95.5)	.625
Q2	20/22 (90.9)	22/22 (100)	.500
Q3	18/21 (85.7)	21/22 (95.5)	.500
Q4	20/22 (90.9)	19/22 (86.4)	.655
Q5	14/22 (63.6)	21/22 (95.5)	.008*
Q6	20/22 (90.9)	22/22 (100)	.500
Q7	21/22 (95.5)	21/22 (95.5)	1.0
Q8	12/21 (57.1)	21/22 (95.5)	.005*
Q9	20/22 (91.9)	19/22 (86.4)	1.0
Q10	2/20 (10.0)	14/22 (63.6)	.004*
Total (summed % of correctly identified products)	166/216 (76.9)	201/220 (91.4)	.000*

Education is a major factor in this project, and it is important to analyze the influence of formal education on participants' nutrition label literacy as depicted in Tables 10 & 11 above. For this analysis, the participant's level of education was categorized as dichotomous variables. The participants who did not complete high school or completed high school were grouped as having low levels of education, while those with 2-year college, 4-year college and Graduate school or higher were grouped as having a high level of education. There were 8 participants grouped as having low education and 22 participants grouped as having high education.

Table 10 shows the performances of participants with low education in the pretest as compared to their post-test performances. Among low education group participants, the analysis showed that 5 out of 10 questions (questions 4, 7, 8, 9 & 10) did not attain at least 50% correctness in the pretest. In the post-test, numerical increases were noted in questions 2, 3, 4, 5, 7, 8, 9 & 10. Specifically, the questions (4, 7, 8, 9 & 10) in the pretest that were less than 50% increased to 87.5%, 75.0%, 100%, 62.5% & 75.0% respectively. Also, questions 4, 7 & 9 attained statistical significance. The overall result in Table 10 was statistically significant with p-value = 0.000. The pretest showed that the participants answered the survey questions correctly 55.2% of the time. After the educational intervention, the participants answered the post-test survey correctly 85.0% on the average. That is approximately 30% increase in scores.

Similarly, Table 11 analyzes the performance of participants grouped as high education in the pre and post-test. In the pretest, the participants answered all the questions with scores greater than 50% except for question 10 where the pretest score was 10%. After the educational intervention, the participants' responses to the survey questions showed numeric increase in questions 1, 2, 3, 5, 6, 8 & 10. Specifically, questions 5, 8 & 10 were statistically significant. Overall, the analysis showed statistical significance with p-value = 0.000 where 76.9% of the

participants answered the pretest correctly as compared to the 91.4% of the participants answering the survey questions correctly. That is approximately 15% increase in the scores. We can all agree that having a higher education gave the high education group of participants an edge in the pretest, but after the educational session the level of education was no longer consequential. This shows that the educational intervention increased the participants nutrition label literacy.

4.7 Strength of Project

Thirty participants were successfully recruited as calculated by the power analysis. The overall pre & post-test result was statistically significant @ p=0.00. In the subgroup analysis, the result showed that after the educational intervention, the participants level of education was inconsequential as participants from both low and high education groups had statistically significant improvement in the post-tests. The nutrition label gap was bridged. Likewise, the participants in the low and high income groups had statistically significant results as well. Also, the women had a statistically significant result.

4.8 Limitations

Overall, I had a successful project implementation, but I encountered some setbacks due to COVID-19. A lot of time was spent cleaning after each participant. Another limitation was due to the low number of male participants as compared to the number of females enrolled. One obvious limitation was due to the inclusion criteria that only surveyed English speaking participants, and this eliminated many ethnic participants. This skewed my demographic data, but surprisingly did not affect my results when compared to other research. Finally, for future

considerations, the plan will be to collect data from multiple sites as compared to collecting from one site and make provisions for Spanish speaking participants.

4.9 Significance of data

Various subgroup analyses were performed to compare the performances of the participants based on the answers on the demographic survey as seen in the different tables illustrated in chapter 4. Tables 2 compared the responses between the participants who read labels versus those who did not read food labels. The result showed that in the pretest, there was only one question that was statistically significant, but overall, the participants who read food labels performed better in 7 questions (2, 4, 6, 7, 8, 9 & 10) as compared with those who did not read food labels. This analysis supports the need to teach parents on the importance of reading food labels as this practice leads to making healthy food choices.

Table 3 showed the general performances of the participants in the pre and post-tests. Questions 5 (pre 65.2, post 93.3; p=0.005), 8 (pre 50.0, post 96.7; p=0.000 & 10 (pre 11.1, post 66.7; p=0.000) were statistically significant. The other questions showed substantial numeric increase from the pretest to the post-test. Overall, the data analysis showed statistical significance with pretest 71.7%, post-test 89.7% and p-value =0.000 (using $p< 0.05$ level to indicate statistical significance). This table shows that post educational intervention, the participants' nutrition label literacy improved significantly.

Further subgroup analysis as seen in Tables 4 through 11 shows numerical increases and statistical significance in the overall results. This shows that the participants benefited from the educational intervention. Results show that participants who read food labels were more likely to make healthier food choices.

4.10 Summary

Although childhood obesity has been noted as an epidemic of global proportions, it is still possible to change the upward trajectory of the rate of obesity through emphasis on educational interventions on nutrition label literacy among parents and school age children. 70% of the participants reported that they understood food labels but 86.7% indicated interest to learn and understand food labels. Overall, there is a need for early intervention through parent nutrition label literacy.

Chapter 5

Obesity in general is a huge burden on our health and healthcare system that requires more resources, healthcare providers, specialized care, specialized equipment, and remodeling of medical, residential and commercial facilities to accommodate for disability caused by obesity. There are indirect costs associated with the consequences of obesity to our economy such as lost wages, higher insurance rates and increased healthcare expenses (Harvard, 2021). All these are capital intensive, but obesity is preventable if early intervention is initiated from childhood. The Harvard School of Public Health states that America pays the price for the extra pounds and associated debilitating diseases (2021). The Harvard School of Public Health reveals the escalating cost of obesity management stating that in 1998 about $42 billion was spent; in 2005 the cost rose to about $190 billion. Based on the trend, Lightwood, Bibbins-Domingo, Coxson, Wang, Williams & Goldman (2009) forecasted an estimated attributable cost of $254 billion between 2020 and 2050 due to the effects of obesity.

As identified in the EBP projects highlighted in the literature review, there have been many interventions and programs to combat the epidemics of obesity especially with childhood onset. These programs have been proven effective but have not significantly affected the decline in childhood obesity. Research has shown that obesity can start before the age of 2 years and that most children who are overweight in their early years of life tend to remain obese in adulthood despite the interventions. This emphasizes the role of parents who are the children's primary caregivers and decision makers on the quality and quantity of food the children consume. The negative impact of childhood obesity on life-long health also places a huge responsibility on healthcare providers to identify these children and to initiate early intervention. Healthcare providers should identify the parent's nutrition label illiteracy through thorough dietary

surveillance and counseling. Healthcare providers should include nutritional assessments of their patients during well-patient visits. According to Cooksey-Stowers, Schwartz & Brownell (2017), residents in regions of food deserts have a higher rate of obesity. Routine patients' dietary surveillance and counseling by healthcare providers will cut down on the rate of obesity and drastically cut healthcare expenses by over $200 billion as estimated by Lightwood et. al (2009).

In summary, this EBP project shows that socioeconomic status is not directly proportional to the nutrition label literacy as discussed in the literature review and data analysis. Therefore, the recommendation is for healthcare providers to initiate an early intervention by educating all parents in nutrition label literacy.

5.1 Implication for Clinical Practice

One of the implication to clinical practice is for providers to consciously include nutrition literacy as an important part of their patient's health assessment. The parents should be asked to bring the food labels that they consume at home especially during well child visits . The providers may bill for dietary counseling and surveillance using ICD-10 code of Z71.3. This assessment will initiate early intervention and prompt referrals to dieticians or nutritionist for focused nutrition health literacy.

5.2 Implication for Future Study

Implication for future studies addresses the long term goal as addressed earlier. The focus group will be parents with overweight or obese children whose BMI would be monitored over a period of 3-6 months after nutritional educational intervention on food label literacy with the parents. This would measure the impact of parents' nutrition label literacy as evidence by decrease in the children's BMI. Also, during the course of this project, it was obvious that many

healthcare providers were not literate in nutrition labels. This would be an area for future projects to ascertain how providers' nutrition label literacy improves the health of their patients.

Although the statistical power analysis for the project required at least 30 participants, it was still a relatively small sample size. Therefore, for future studies, it is important to use a larger sample size. The numeric disparity of the male (n=5) compared to the females (n=25) that participated in the survey could have affected the overall results. The plan for future study would need to recruit a relatively equal number of both genders as participants.

In the future, it would be important to study the method of nutrition labeling in the United States. The project would entail redesigning some popular food labels to assess the participants' ease of making healthier food choices as compared to when the participant read the original food label. The hypothesis of the project is that participants are most likely to make healthier food choices when reading food labels that are better designed, simplified and consumer friendly.

5.3 Discussion

America pays dearly for every pound both with our health and financial resources. Obesity is preventable and healthcare providers are encouraged to initiate early intervention through dietary counseling and parent's nutrition label literacy. Healthcare providers might have some biases and subconsciously categorized their patients. Providers might feel that the parents who have higher socioeconomic status do not need the education. On the other hand, the providers might have the perception that those with low socioeconomic status might not understand the teaching. This is absolutely incorrect because according to the results from this project, as well as other research cited in the literature review, those with low education performed as good or even better than those classified as having high education. The results

show that the participants' irrespective of their socioeconomic status were more likely to make healthier choices after the educational intervention. The recommendation is to make the teaching simple and relatable. During this project, one of the reasons primary care providers did not include dietary counseling and surveillance was due to short time allotted for patient encounters.

It is a common practice for providers to perform medication reconciliation with their patients. Hence, I coined the phrase *food reconciliation*. I believe that the food we consume is as important, if not more important than the medication we take. Therefore, the need to perform *food reconciliation* with our patients to ensure that they are making healthy choices. As a result, the rate of diseases will reduce as the rate of obesity declines.

5.4 Recommendations

This evidence-based project can be replicated in any pediatric clinic using the same or similar tools to assess parents or guardian's nutrition label literacy. The healthcare providers could use real food labels to assess the parent's nutrition label literacy. To provide real-time nutrition surveillance, the healthcare provider can ask the parents to bring in sample food and drink labels their children consume. The educational intervention used in this project can be customized and taught to school age children and customized according to the age and developmental level of the child. The healthcare providers are encouraged to perform a food diary assessment with their patients and work out a plan on how the parent-child dyad could work collaboratively to ensure healthy food choices. The goal is to maintain healthy weight and steadily decrease the rate of childhood obesity. The recommendation is to start the nutrition label literacy early with every parent to encourage healthy food choices. This will become a learned behavior and a life-long habit for the children who would get accustomed to making healthy food

choices and eating healthy from the onset. Nutrition label literacy in collaboration with other factors such as portion control, little or no sugary drinks and daily exercise will bring the rate of childhood obesity to a steady decline.

Healthcare professionals should get involved in politics and development of policies that affect the health of the nation as a whole. Providers can be advocates in making healthcare policies to regulate non-nutritional food additives and the quantity of sugar in foods and drinks. The healthcare provider, especially the Advanced Practice Provider (APP), has the education, qualification, and leadership role to influence healthcare policies at the helm of affairs in America (Chilton, 2015). The APP has the platform to reach out to their local, state, and federal legislators with issues that affect the health of their constituents and to support healthcare policies that best benefit the community especially to regulate the quality of food.

References

American Academy of Child & Adolescent Psychiatry (2021). Screen time and children. *https://www.aacap.org/AACAP/Families_and_Youth/Facts_for_Families/FFF-Guide/Children-And-Watching-TV-054.aspx*

American Academy of Pediatrics (2003). Prevention of pediatric overweight and obesity. *Pediatrics, 112*(2), 424-427.

American Academy of Pediatrics (2015). Algorithm for the assessment and management of childhood obesity in patients 2 years and older. *AAP Institute for Healthy Childhood Weight*. https://www.paaap.org/uploads/1/2/4/3/124369935/551b74_5a52cf9033cb48b09aba3c0280a15402.pdf

American Academy of Pediatrics (2018). New study finds childhood obesity epidemic continues overall, increases significantly among some groups. Retrieved from https://www.aap.org/en-us/about-the-aap/aap-press-room/Pages/New-Study-Finds-Childhood-Obesity-Epidemic-Continues-Overall.aspx

American Heart Association (2021). Unhealthy foods. https://www.heart.org/en/healthy-living/go-red-get-fit/unhealthy-foods

An, R., Yang, Y., Hoschke, A., Xue, H., & Wang, Y. (2017). Influence of neighborhood safety on childhood obesity: A systematic review and meta-analysis of longitudinal studies. *Obesity reviews: an official journal of the International Association for the Study of Obesity*, *18*(11), 1289–1309. https://doi.org/10.1111/obr.12585

Begley, A., Paynter, E., Butcher, L. M., & Dhaliwal, S. S. (2019, February 20). Examining the association between food literacy and food insecurity. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6412525/

CATCH (2019). CATCH programming for children who carry excess weight. Retrieved from https://catchinfo.org/modules/hwyc/?gclid=EAIaIQobChMI-vXBxOXa6AIVy4CfCh3d4g7qEAAYASAAEgKnzfD_BwE

Centers for Disease Control and Prevention (2018). *CDC healthy schools: Obesity*. https://www.cdc.gov/healthyschools/obesity/index.htm#:~:text=In%20the%20United%20States%2C%20the,than%20tripled%20since%20the%201970s.&text=Data%20from%202015%E2%80%932016%20show,the%20United%20States%20has%20obesity.

Centers for Disease Control and Prevention (2019). *Prevalence of childhood obesity in the United States.* https://www.cdc.gov/obesity/data/childhood.html

Centers for Disease Control and Prevention (2019). Health literacy: Understanding literacy & numeracy. https://www.cdc.gov/healthliteracy/learn/UnderstandingLiteracy.html

Chilton, L. (2015). Nurse practitioners have an essential role in health policy. The Journal for `Nurse Practitioners, 11(2), pg. 19. https://doi.org/10/1016/j.nurpra.2014.10.009

Cooksey-Stowers, K., Schwartz, M. B., & Brownell, K. D. (2017). Food Swamps Predict Obesity Rates Better Than Food Deserts in the United States. *International Journal of Environmental Research and Public Health*, *14*(11), 1366. https://doi.org/10.3390/ijerph14111366

Cuschieri, S., & Grech, S. (2020). COVID-19: A one-way ticket to global childhood obesity crisis? *Journal of Diabetes & Metabolic Disorders,* 19(2), 2027-2030. https://doi.org/10.1007/s40200-020-00682-2

Eldridge, C. R. (2017). Nursing science and theory: Science underpinnings for practice. In Zaccagnini & White (3rd ed.), *The doctor of nursing practice essentials: A new model for Advanced practice nursing* (pp.3). Jones and Bartlett Learning.

Emmett, P. M., & Jones, L. R. (2015). Diet, growth, and obesity development throughout childhood in the Avon Longitudinal Study of Parents and Children. *Nutrition reviews*, *73 Suppl 3*(Suppl 3), 175–206. https://doi.org/10.1093/nutrit/nuv054

Eschimeyer, D. (2017). America's move to raise a healthier generation of kids. https://letsmove.obamawhitehouse.archives.gov/

Finkelstein, E. A., Graham, W. C. K., & Malhotra, R. (2014). Lifetime direct medical costs of childhood obesity. *Pediatrics, 133(5),* 854-862. https//doi.org/10.1542/peds.2014- 0063

Guerrero, A. D., Mao, C., Fuller, B., Bridges, M., Franke, T., & Kuo, A. A. (2016). Racial and ethnic disparities in early childhood obesity: Growth trajectories in body mass index. *Journal of Racial and Ethnic Health Disparities, 3*(1), 129-137. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4761404/

Harvard (2021). Healthy eating plate vs USDA's myplate. https://www.hsph.harvard.edu/nutritionsource/healthy-eating-plate-vs-usda-myplate/

Harvard (2021). Obesity prevention source. Economic costs. Harvard School of Public Health. https://www.hsph.harvard.edu/obesity-prevention-source/obesity-consequences/economic/

Healthypeople.gov (2020). *Tackling childhood obesity through the communities putting prevention to work (CPPW) initiative*. https://www.healthypeople.gov/2020/healthy-people-in-action/story/tackling-childhood-obesity-through-the-communities-putting

Holland, K. (2020). Obesity facts. https://www.healthline.com/health/obesity-facts

Johnson, K. (2018). Childhood obesity and absenteeism: Implications for School Leaders. Winona State University. https://openriver.winona.edu/leadershipeducationcapstones/1

Kakinami, L., Houle-Johnson, S., & McGrath, J. J. (2016). Parental nutrition knowledge rather than nutrition label use is associated with adiposity in children. *Journal of nutrition education and behavior*, *48*(7), 461–467.e1. https://doi.org/10.1016/j.jneb.2016.04.005

Kelishadi, R., & Azizi-Soleiman, F. (2014). Controlling childhood obesity: A systematic review on strategies and challenges. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4274579/#ref9

Lightwood, J., Bibbins-Domingo, K., Coxson, P., Wang, Y. C., Williams, L., & Goldman, L. (2009). Forecasting the future economic burden of current adolescent overweight: an estimate of the coronary heart disease policy model. *American journal of public health*, *99*(12), 2230–2237. https://doi.org/10.2105/AJPH.2008.152595

Moore, S. G., Donnelly, J. K., Jones, S., & Cade, J. E. (2018). Effect of educational interventions on understanding and use of nutrition labels: A systematic review. *Nutrients, 10*(10)*,* 1432. https://doi:10.3390/nu10101432

Moran, K. (2017). Developing the scholarly project. In Moran, Burson & Conrad (2nd ed), *The doctor of nursing practice scholarly project: A framework for success* (pp.131). Jones and Bartlett Learning.

National Today (2021). World obesity day – March 4, 2021. https://nationaltoday.com/world-obesity-day/#why-we-love

Perososkie, A., Hennessy, E., Nelson, L. W. (2017). US consumers; understanding of nutrition labels in 2013: The importance of health literacy. *Preventing chronic disease, 14*(170066). http://dx.doi.org/10/5888/pcd14.170066

Polit, D. F. & Beck, C. T. (2017). Theoretical frameworks. In Potil & Beck (10th ed.), *Nursing research: Generating and assessing evidence for nursing practice* (pp.124). Lippincott Company.

Reynolds, J. S., Treu, J. A., Njike, V., Walker, J., Smith, E., Katz, C. S., & Katz, D. L. (2012). The validation of a food label literacy questionnaire for elementary school children. *Journal of nutrition education and behavior*, *44*(3), 262–266. https://doi.org/10.1016/j.jneb.2011.09.006

Rogers, V. W., Hart, P. H., Motyka, E., Rines, E. N., Vines, J., & Deatrick, D. A. (2013). Impact of let's go! 5-2-1-0: A community-based, multi-setting childhood obesity prevention program. Retrieved from https://academic.oup.com/jpepsy/article/38/9/1010/958053

Ruiter, E. L. M., Saat, J. J. E. H., Molleman, G. R. M., Fransen, G. A. J., Velden, K., Jaarsveld, C. H. M., Engels, R. C. M. E. & Assendelft, W. J. J. (2020). Parents' underestimation of their child's weight status. Moderating factors and change over time: A cross-sectional study. *PLoS ONE, 15*(1). https://doi.org/10.1371/journal.pone.0227761

Sahoo, K., Sahoo, B., Choudhury, A. K., Sofi, N. Y., Kumar, R., and Bhadoria, A. S. (2015). Childhood obesity: Causes and consequences. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4408699/

Sanyaolu, A., Okorie, C., Qi, X., Locke, J., & Rehman, S. (2019). Childhood and Adolescent Obesity in the United States: A Public Health Concern. *Global pediatric health*, *6*, 2333794X19891305. https://doi.org/10.1177/2333794X19891305

Skinner, A.C., Ravanbakht, S. N., Skelton, J. A., Perrin, E. M., & Armstrong, S.C. (2018). Prevalence of obesity and severe obesity in US children, 1999-2016. *Pediatrics, 141*(3). https://doi.org/10.1542/peds.2018-1916

State of Childhood Obesity (2020). Obesity rates & trend data. https://stateofchildhoodobesity.org/data/

Vemula, S. R., Gavaravarapu, S. M., Mendu, V. R., Mathur, P., & Avula, L. (2013). Use of food label information by urban consumers in India – a study among supermarket shoppers. *Public health nutrition, 17(9),* 2104-2114. doi:10.1017/S1368980013002231

Waters, H. & Graf, M. (2018). America's obesity crisis: The health and economic costs of excess weight. *Milken Institute.* https://milkeninstitute.org/sites/default/files/reports-pdf/Mi-Americas-Obesity-Crisis-WEB.pdf

White, K. W. & Zaccagnini, M. E. (2017). A template for the DNP project. In Zaccagnini & White (3rd ed.), *The doctor of nursing practice essentials: A new model for Advanced practice nursing* (pp.457-458). Jones and Bartlett Learning.

Wippold, G. M., & Tucker, C. M. (2016). Childhood obesity disparities: Influential factors and intervention strategies. *American Psychological Association.* https://www.apa.org/pi/families/resources/newsletter/2016/06/childhood-obesity

World Health Organization (2003). *Obesity and overweight*. https://www.who.int/dietphysicalactivity/media/en/gsfs_obesity.pdf

World Health Organization (2020). Global strategy on diet, physical activity, and health: Reasons for children and adolescents to become obese. Retrieved from https://www.who.int/dietphysicalactivity/childhood_why/en/

World Health Organization (2020). Why does childhood overweight and obesity matter? https://www.who.int/dietphysicalactivity/childhood_consequences/en/#:~:text=Childhood%20obesity%20is%20associated%20with,diseases%20at%20a%20younger%20age.

Zoellner, J.M., Hill, J., You, W., Brock, D., Frisard, M., Alexander, R., Silva, F., Brice, B., & Marshall, R., Estabrooks, P. A. (2017). The Influence of Parental Health Literacy Status on Reach, Attendance, Retention, and Outcomes in a Family-Based Childhood Obesity Treatment Program, Virginia, 2013–2015. *Preventing Chronic Disease*,*14*(160421). doi: http://dx.doi.org/10.5888/pcd14.160421

Appendix A: Demographic Survey

Part 1 – Demographic Survey

Please enter your assigned numeric code

1. **Select your age bracket**
   a. **18-25**
   b. **25-30**
   c. **30-35**
   d. **35 or older**
2. **Please specify your ethnicity**
   a. **Hispanic**
   b. **African American/ Black**
   c. **White**
   d. **Asian**
   e. **Other:_____**
3. **Gender**
   a. **Male**
   b. **Female**
4. **Highest level of education**
   a. **Did not complete High School**
   b. **Completed High school**
   c. **2-year college**
   d. **4-year college**
   e. **Graduate school or higher**
5. **I am responsible for at least one main meal the child eats at home**
   a. **True**
   b. **False**
6. **My current household income is _____**
   a. **Less than $15,000/ year**
   b. **Less than $30,000/ year**
   c. **Less than $45,000/ year**
   d. **$45,000 or more/ year**
7. **I understand the food labels**
   a. **True**
   b. **False**
8. **I read food labels before buying food**
   a. **True**
   b. **False**
9. **I buy food items based on how the food package looks**
   a. **True**
   b. **False**
10. **I will like to learn and understand nutrition food labels**
    a. **True**
    b. **False**

Appendix B: Sample FLLANK Pre & Post Tests

FLLANK (pre/ post) Test Sample

13204

ID #: | | | | | | | |

Month / Year: | | | - | | | | |

School: | |

Time Point: ● *Pre* ○ *Post*

STUDENT FOOD LABEL QUIZ

For each of the following pairs of foods in the same food category, such as bread or cereal or crackers or cookies, choose the one you think is more nutritious ("better for you") by filling in th bubble next to your choice. Please use a #2 pencil. To change your answer, erase completely.

1. FOOD CATEGORY: CRACKERS

Nutrition Facts A

Serving size 55 Pieces (30g/1.1oz)
Servings Per Container About 6

Amount Per Serving
Calories 140 Calories from Fat 45

	% Daily Value*
Total Fat 5g	**8%**
Saturated Fat 1g	**5%**
Trans Fat 0g	
Polyunsaturated Fat 1.5g	
Monounsaturated Fat 2.5g	
Cholesterol less than 5 mg	**1%**
Sodium 250mg	**10%**
Total Carbohydrate 20g	**7%**
Dietary Fiber Less than 1g	**3%**
Sugars less than 1g	
Protein 4g	

INGREDIENTS: UNBLEACHED ENRICHED WHEAT FLOUR [FLOUR, NIACIN, REDUCED IRON, THIAMIN MONONITRATE (VITAMIN B1), RIBOFLAVIN (VITAMIN B2), FOLIC ACID], CHEDDAR CHEESE [(PASTEURIZED MILK, CHEESE CULTURE,SALT, ENZYMES), WATER, SALT], VEGETABLE OILS (CANOLA, SUNFLOWER,AND/OR SOYBEAN), CONTAINS 2 PERCENT OR LESS OF: SALT, YEAST, SUGAR, YEAST EXTRAACT, LEAVENING (BAKING SODA, MONOCALCIUM PHOSPHATE, AMMONIUM BICARBONATE), SPICES ANNATTO (COLOR) AND ONION POWDER.

Nutrition Facts B

Serving size 55 Pieces (30g/1.1oz)
Servings Per Container About 6

Amount Per Serving
Calories 140 Calories from Fat 45

	% Daily Value*
Total Fat 5g	**8%**
Saturated Fat 1g	**5%**
Trans Fat 0g	
Polyunsaturated Fat 1.5g	
Monounsaturated Fat 2.5g	
Cholesterol less than 5 mg	**1%**
Sodium 250mg	**10%**
Total Carbohydrate 19g	**6%**
Dietary Fiber 2g	**7%**
Sugars less than 1g	
Protein 4g	

INGREDIENTS: WHOLE WHEAT FLOUR, UNBLEACHED ENRICHED WHEAT FLOUR [FLOUR NIACIN, REDUCED IRON, THIAMIN MONONITRATE (VITAMIN B1), RIBOFLAVIN (VITAMIN B2), FOLIC ACID], CHEDDAR CHEESE [(PASTEURIZED MILK, CHEESE CULTIRE,SALT, ENZYMES), WATER, SALT], VEGETABLE OILS (CANOLA, SUNFLOWER,AND/OR SOYBEAN), CONTAINS 2 PERCENT OR LESS OF: SALT, YEAST, SUGAR, YEAST EXTRAACT, LEAVENING (BAKING SODA, MONOCALCIUM PHOSPHATE, AMMONIUM BICARBONATE), SPICES ANNATTO (COLOR), ONION POWDER, BUTTER, ENZYMES, SODIUM PHOSPHATE.

The "Better for you" choice is:

○ **A** ○ **B** ○ **CAN'T TELL**

39661

2. FOOD CATEGORY: COOKIES

Nutrition Facts A

Serving size 1 Cookie (31g/1.1 oz)
Servings Per Container 8

Amount Per Serving
Calories 150 Calories from Fat 70

	% Daily Value*
Total Fat 8g	**12%**
Saturated Fat 3.5g	**18%**
Trans Fat 0g	
Polyunsaturated Fat	
Monounsaturated Fat	
Cholesterol 10mg	**3%**
Sodium 95 mg	**4%**
Total Carbohydrate 20g	**7%**
Dietary Fiber 0g	**0%**
Sugars 11g	
Protein 2g	

INGREDIENTS: UNBLEACHED ENRICHED WHEAT FLOUR [FLOUR, NIACIN, REDUCED IRON, THIAMIN MONONITRATE (VITAMIN B1), RIBOFLAVIN (VITAMIN B2), FOLIC ACID], SEMI-SWEET CHOCOLATE (SUGAR, CHOCOLATE LIQUOR, COCOA BUTTER, DEXTROSE, SOY LECITHIN ADDED AS AN EMULSIFIER, VANILLA EXTRACT), FRUCTOSE, BUTTER (MILK),VEGETABLE OILS (PALM AND/OR INTERESTERIFIED AND HYDROGENATED SOYBEAN AND/OR HYDROGENATED COTTONSEED). BROWN SUGAR, SUGAR, INVERT SUGAR, WHOLE EGGS, CONTAINS 2 PERCENT OR LESS OF CORN SYRUP, LEAVENING BAKING SODA, AMMONIUM BICARBONATE, CREAM OF TARTAR), RICE STARCH, SALT, PECTIN, CANOLA OIL, WHEAT FLOUR, CARAMEL COLOR, ARTIFICIAL FLAVORS, WHEAT GLUTEN, SODIUM STEAROYL, LACTYLATE, NATURAL FLAVORS, CALCIUM STEAROYL, TYLATE AND DATEM (DOUGH CONDITIONER)

Nutrition Facts B

Serving size 2 cookies (24g)
Servings Per Container about 8

Amount Per Serving
Calories 130 Calories from Fat 70

	% Daily Value*
Total Fat 8g	**12%**
Saturated Fat 3.5g	**17%**
Trans Fat 0g	
Polyunsaturated Fat	
Monounsaturated Fat	
Cholesterol 15mg	**5%**
Sodium 60mg	**3%**
Total Carbohydrate 14g	**5%**
Dietary Fiber less than 1g	**3%**
Sugars 8g	
Protein 1g	

INGREDIENTS: SEMI-SWEET CHOCOLATE (SUGAR, CHOCOLATE LIQUOR, COCOA BUTTER, BUTTERFAT, SOY LETHICIN, VANILLA), UNBLEACHED WHEAT FLOUR, BUTTER, EVAPORATED CANE JUICE, PECANS, LIQUID WHOLE EGGS, VANILLA EXTRACT, AND OTHER NATURAL FLAVORS, BAKING SODA, SALT.

The "Better for you" choice is:

○ **A** ○ **B** ○ **CAN'T TELL**

39661

3. FOOD CATEGORY: CEREAL BARS

Nutrition Facts A

Serving size 1 BAR (37g)
Servings Per Container 6

Amount Per Serving
Calories 150 Calories from Fat 20

	% Daily Value*
Total Fat 2g	3%
Saturated Fat 0g	0%
Trans Fat 0g	
Polyunsaturated Fat	
Monounsaturated Fat	
Cholesterol 0 mg	0%
Sodium 85mg	4%
Total Carbohydrate 29g	10%
Dietary Fiber 2g	8%
Sugars 15g	
Protein 2g	

INGREDIENTS: TRIPLE BERRY FILLING (FRUIT JUICE CONCENTRATE [PINEAPPLE, PEACH AND PEAR], FRUIT PUREE [RASPBERRY, BLUEBERRY AND STRAWBERRY], TAPIOCA STARCH, APPLE POWDER, NATURAL BERRY FLAVORS, VEGETABLE GLYCERIN, LOCUST MEAN GUM, RED CABBAGE [AS A COLOR ENHANCER], PINEAPPLE JUICE SYRUP, OAT FLOUR, BARLEY FLOUR, OAT FLAKES, RICE FLOUR, DATE PASTE, APPLE POWDER, EXPELLER-PRESSED CANOLA OIL, RAISIN JUICE CONCENTRATE, TAPIOCA STARCH, MALTED BARLEY EXTRACT, PEAR POWDER, NATURAL FLAVOR, SALT, ALUMINUM FREE BAKING POWDER, BAKING SODA.

Nutrition Facts B

Serving size 1 BAR (37g)
Servings Per Container 8

Amount Per Serving
Calories 140 Calories from Fat 25

	% Daily Value*
Total Fat 3g	5%
Saturated Fat 0.5g	3%
Trans Fat 0g	
Polyunsaturated Fat	
Monounsaturated Fat	
Cholesterol 0 mg	0%
Sodium 105mg	4%
Total Carbohydrate 26g	9%
Dietary Fiber less than 1g	3%
Sugars 13g	
Protein 1g	

INGREDIENTS: (HIGH FRUCTOSE CORN SYRUP, CORN SYRUP, MIXED BERRY [STRAWBERRY, BLUEBERRY, RASPBERRY] PUREE CONCENTRATES, GLYCERIN, SUGAR, NATURAL FLAVOR, MODIFIED CORN STARCH, SODIUM ALGINATE, SODIUM CITRATE, CITRIC ACID, MALIC ACID, MODIFIED CELLULOSE, DICALCIUM PHOSPHATE, RED #4, BLUE#1), ENRICHED FLOUR [WHEAT FLOUR, NIACINAMIDE, REDUCED IRON, THIAMIN MONONITRATE (VITAMIN B1), RIBOFLAVIN (VITAMIN B2), FOLIC ACID], WHOLE GRAIN OATS, SUGAR, SUNFLOWER OIL, HIGH FRUCTOSE CORN SYRUP, CONTAINS TWO PERCENT OR LESS OF HONEY, CALCIUM CARCONATE, DEXTROSE, NONFAT DRY MILK, WHEAT BRAN, SALT, CELLULOSE, POTASSIUM BICARBONATE (LEAVENING), NATURAL AND ARTIFICIAL FLAVOR, MONO- AND DIGLYCERIDES, PROPYLENE GLYCOL ESTERS OF FATTY ACIDS SOY LECITHIN, WHEAT GLUTEN, CORNSTARCH, VITAMIN A PALMITATE, CARRAGEENAN, NIACINAMIDE, SODIUM STEAROYL LACTYLATE, GUAR GUM, ZINC OXIDE, REDUCED IRON, PYRIDOXINE HYDROCHLORIDE (VITAMIN B6), THIAMIN HYDROCHLORIDE (VITAMIN B1), RIBOFLAVIN (VITAMIN B2), FOLIC ACID.

The "Better for you" choice is:

○ **A** ○ **B** ○ **CAN'T TELL**

39661

4. FOOD CATEGORY: CEREAL

Nutrition Facts A	
Serving size ¾ cup (26g)	
Servings Per Container about 12	
Amount Per Serving	
Calories 100	Calories from Fat 15
	% Daily Value*
Total Fat 1.5g	2%
Saturated Fat 0g	0%
Trans Fat 0g	
Polyunsaturated Fat 0g	
Monounsaturated Fat 1g	
Cholesterol 0 mg	1%
Sodium 140mg	6%
Total Carbohydrate 22g	7%
Dietary Fiber 1g	4%
Sugars 8g	
Protein 1g	

INGREDIENTS: WHOLE GRAIN CORN, SUGAR, CORN MEAL, WHOLE GRAIN OATS, CORN STARCH, MODIFIED CORN STARCH, CANOLA OIL, CORN SYRUP, HIGH FRUCTOSE CORN SYRUP, SALT, TRICALCIUM PHOSPHATE, CALCIUM CARBONATE, TRISODIUM PHOSPHATE, RED 40, BLUE1 AND OTHER COLOR ADDED, ZINC AND IRON (MINERAL NUTRIENTS), VITAMIN C (SODIUM ASCORBATE), NATURAL FLAVOR. A B VITAMIN (NIACINAMIDE), VITAMIN B6 (PYRIDOXINE HYDROCHLORIDE), VITAMIN B2 (RIBOFLAVIN), VITAMIN A (PALMITATE), A B VITAMIN (FOLIC ACID). VITAMIN B12, VITAMIN D, VITAMIN E (MIXED TOCOPHEROLS) ADDED TO PRESERVE FRESHNESS.

Nutrition Facts B	
Serving size 1 cup (28g)	
Servings Per Container about 9	
Amount Per Serving	
Calories 100	Calories from Fat 15
	% Daily Value*
Total Fat 2g	3%
Saturated Fat 0g	0%
Trans Fat 0g	
Polyunsaturated Fat 0.5g	
Monounsaturated Fat 0.5g	
Cholesterol 0 mg	0%
Sodium 190mg	8%
Total Carbohydrate 20g	7%
Dietary Fiber 3g	11%
Sugars 1g	
Protein 3g	

INGREDIENTS: WHOLE GRAIN OATS, MODIFIED CORN STARCH, SUGAR, OAT BRAN, SALT, CALCIUM CARBONATE, OAT FIBER, TRIPOTASSIUM PHOSPHATE, CORN STARCH, WHEAT STARCH, VITAMIN E (MIXED TOCOPHEROLS) ADDED TO PRESERVE FRESHNESS. IRON AND ZINC (MINERAL NUTRIENTS) VITAMIN C (SODIUM ASCORBATE), A B VITAMIN (NIACINAMIDE), VITAMIN B6 (PYRIDOXINE HYDROCHLORIDE), VITAMIN B2 (RIBOFLAVIN), VITAMIN B1 (THIAMIN MONONITRATE) VITAMIN A (PALMITATE), AB VITAMIN (FOLIC ACID), VITAMIN B12, VITAMIN D.

The "Better for you" choice is:

○ **A** ○ **B** ○ **CAN'T TELL**

39661

5. FOOD CATEGORY: BREAD

Nutrition Facts A	
Serving size 1 Slice (43g/1.05oz)	
Servings Per Container 16	
Amount Per Serving	
Calories 100	Calories from Fat 15
	% Daily Value*
Total Fat 2 g	**3%**
Saturated Fat 0 g	**0%**
Trans Fat 0g	
Polyunsaturated Fat 1g	
Monounsaturated Fat 0.5g	
Cholesterol 0 mg	**0%**
Sodium 180mg	**8%**
Total Carbohydrate 20g	**7%**
Dietary Fiber 3g	**12%**
Sugars 3g	
Protein 4g	

INGREDIENTS: WHOLE WHEAT FLOUR, WATER, CRUSHED WHEAT, WHEAT GLUTEN, SUGAR, RAISIN JUICE CONCENTRATE, SOYBEAN OIL, YEAST, CONTAINS 2 PERCENT OR LESS OF: WHEAT BRAN, WHOLE WHEAT FLAKES, UNSULPHURED MOLASSES, SALT, HONEY, VINEGAR, ENZYME MODIFIED SOY LECITHIN, CULTURED WHEY (MILK) AND ENZYMES.

Nutrition Facts B	
Serving size 2 Slices (45g/1.6oz)	
Servings Per Container 10	
Amount Per Serving	
Calories 130	Calories from Fat 20
	% Daily Value*
Total Fat 2.5g	**4%**
Saturated Fat 0.5g	**3%**
Trans Fat 0g	
Polyunsaturated Fat 0.5 g	
Monounsaturated Fat 1g	
Cholesterol 0 mg	**0%**
Sodium 250mg	**10%**
Total Carbohydrate 23g	**8%**
Dietary Fiber Less than 1g	**2%**
Sugars 3g	
Protein 4g	

INGREDIENTS: UNBROMATED UNBLEACHED ENRICHED WHEAT FLOUR [FLOUR, MALTED BARLEY FLOUR, NIACIN, REDUCED IRON, THIAMIN MONONITRATE (VITAMIN B1), RIBOFLAVIN (VITAMIN B2), FOLIC ACID]. WATER, HIGH FRUCTOSE CORN SYRUP, YEAST, SOYBEAN OIL, CONTAINS 2 PRECENT OR LESS OF: SALT, MONOGLYCERIDE, NONFAT MILK*, WHEAT GLUTEN, SUGAR, CALCIUM CARBONATE, CALCIUM PROPIONATE (TO RETARD SPOILAGE), BUTTER *, HONEY AND ENZYMES.
*ADDS A TRIVIAL AMOUNT OF CHOLESTEROL

The "Better for you" choice is:

○ **A** ○ **B** ○ **CAN'T TELL**

39661

6. FOOD CATEGORY: CRACKERS

Nutrition Facts A

Serving size 6 crackers (28g)
Servings Per Container about 10

Amount Per Serving	
Calories 120	Calories from Fat 35
	% Daily Value*
Total Fat 4 g	**6%**
Saturated Fat 0.5g	**3%**
Trans Fat 0g	
Polyunsaturated Fat 2 g	
Monounsaturated Fat 1g	
Cholesterol 0 mg	**0%**
Sodium 135mg	**6%**
Total Carbohydrate 20g	**7%**
Dietary Fiber 3g	**13%**
Sugars 0g	
Protein 3g	

INGREDIENTS: WHOLE WHEAT, SOYBEAN OIL, MALTODEXTRRIN, SALT, MONOGLYCERIDES, ROSEMARY, MONOSODIUM GLUTAMATE (FLAVOR ENHANCER), ONION POWDER, SPICES, OLIVE OIL, SPICE EXTRACTS, NATURAL FLAVOR.

Nutrition Facts B

Serving size 17 Crackers (30g)
Servings Per Container about 8

Amount Per Serving	
Calories 140	Calories from Fat 50
	% Daily Value*
Total Fat 6 g	**9%**
Saturated Fat 1.5g	**8%**
Trans Fat 0g	
Polyunsaturated Fat 2.5g	
Monounsaturated Fat 2g	
Cholesterol 0 mg	**0%**
Sodium 300mg	**13%**
Total Carbohydrate 20g	**7%**
Dietary Fiber 1g	**5%**
Sugars 3g	
Protein 4g	

INGREDIENTS: ENRICHED FLOUR (WHEAT FLOUR, NIACIN, REDUCED IRON, THIAMIN MONONITRATE [VITAMIN B1]. RIBOFLAVIN [VITAMIN B2], FOLIC ACID), PARTIALLY HYDROGENATED SOYBEAN AND/OR COTTONSEED OIL WITH TBHQ FOR FRESHNESS, SUGAR, TOASTED WHOLE GRAIN WHEAT, DEGERMINATED YELLOW CORN FLOUR, RYE, HONEY, HIGH FRUCTOSE CORN SYRUP, SALT, CONTAINS 2 PERCENT OR LESS OF: WHOLE GRAIN OATS, WHEAT BRAN, STONE GROUND WHOLE WHEAT FLOUR, BARLEY, MALT EXTRACT, NATURAL FLAVOR, LEAVENING (BAKING SODA, SODIUM ACID PYROPHOSPHATE, MONOCALCIUM PHOSPHATE), MILLET, RICE, ONION, SPICES, SODIUM SULFITE, SOY LECITHIN.

The "Better for you" choice is:

○ **A** ○ **B** ○ **CAN'T TELL**

39661

7. FOOD CATEGORY: CEREAL

Nutrition Facts A	
Serving size 1 cup (56g)	
Servings Per Container about 8	
Amount Per Serving	
Calories 210	Calories from Fat 25
	% Daily Value*
Total Fat 2.5 g	4%
Saturated Fat 0.5g	2%
Trans Fat 0g	
Polyunsaturated Fat 1 g	
Monounsaturated Fat 1g	
Cholesterol 0 mg	0%
Sodium 250mg	10%
Total Carbohydrate 44g	15%
Dietary Fiber 5g	18%
Sugars 10g	
Protein 6g	

INGREDIENTS: WHOLE OAT FLOUR, WHOLE WHEAT FLOUR, BROWN SUGAR, SUGAR, MALTODEXTRIN, MALTED BARLEY, EXTRACT MOLASSES, SODIUM BICARBONATE, SALT, CALCIUM CARBONATE, REDUCED IRON, SODIUM ASCORBATE, YELLOW 5, NIACINAMIDE*,ZINC OXIDE, VITAMIN E ACETATE, VITAMIN A PALMITATE, YELLOW 6, THIAMIN MONONITRATE*, PYRIDOXINE HYDROCHLORIDE*, RIBOFLAVIN*, FOLIC ACID*.
* ONE OF THE B VITAMINS.

Nutrition Facts B	
Serving size 1 cup (55g)	
Servings Per Container about 8	
Amount Per Serving	
Calories 200	Calories from Fat 25
	% Daily Value*
Total Fat 3 g	5%
Saturated Fat 0.5g	2%
Trans Fat 0g	
Polyunsaturated Fat 0.5g	
Monounsaturated Fat 1g	
Cholesterol 0 mg	0%
Sodium 320mg	13%
Total Carbohydrate 43g	14%
Dietary Fiber 3g	11%
Sugars 13g	
Protein 4g	

INGREDIENTS: CORN MEAL, WHOLE GRAIN WHEAT, WHOLE GRAIN BARLEY, WHOLE GRAIN OATS, SUGAR, RICE, BROWN SUGAR, RAISINS, CRISP RICE (RICE FLOUR, MALT EXTRACT,SUGAR, SALT), ALMOND PIECES, DRIED DATES, WALNUT PIECES, CALCIUM CARBONATE, DRIED CRANBERRIES, SALT, CORN SYRUP, GLYCERIN, DRIED PRUNES, CORN STARCH, DRIED APPLES, PARTIALLY HYDROGENATED SOYBEAN AND COTTONSEED OIL, MALT SYRUP, TRISODIUM PHOSPHATE, NONFAT MILK, CULTURD NONFAT MILK, ZINC AND IRON (MINERAL NUTRIENTS), VITAMIN C (SODIUM ASCORBATE), AB VITAMIN (NIACINAMIDE), COLOR ADDED, VITAMIN B6 (PYRIDOXINE HYDROCHLORIDE), VITAMIN B2 (RIBOFLAVIN), VITAMIN B1 (THIAMIN MONONITRATE), VITAMIN A (PALMITATE), AB VITAMIN (FOLIC ACID), ARTIFICIAL FLAVOR, VITAMIN B12, VITAMIN D, BHT AND SODIUM BISULFITE ADDED TO PRESERVE FRESHNESS AND COLOR.

The "Better for you" choice is:

○ **A** ○ **B** ○ **CAN'T TELL**

39661

8. FOOD CATEGORY: CEREAL BAR

Nutrition Facts A

Serving size 1 Bar (22g)
Servings Per Container 6

Amount Per Serving
Calories 90 Calories from Fat 15

	% Daily Value*
Total Fat 1g	**2%**
Saturated Fat 1g	**5%**
Trans Fat 0g	
Polyunsaturated Fat	
Monounsaturated Fat	
Cholesterol 0 mg	**0%**
Sodium 100mg	**4%**
Total Carbohydrate 17g	**6%**
Dietary Fiber Less than 1g	**1%**
Sugars 7g	
Protein 2g	

INGREDIENTS: CEREAL (RICE, SUGAR, WHOLE GRAIN WHEAT, WHEAT GLUTEN, DEFFATED WHEAT GERM, SALT, WHEAT FLOUR, MALT FLAVORING, MALTODEXTRIN, RIBOFLAVIN [VITAMIN B2]. THIAMIN HYDROCHLORIDE [VITAMIN B1], CORN SYRUP, SUGAR, VEGETABLE OIL (CONTAINS ONE ORE MORE OF THE FOLLOWING: CANOLA AND/OR SUNFLOWER OIL, PARTIALLY HYDROGENATED SOYBEN AND/OR COTTON SEED AND/OR PALM KERNEL OIL, HYDROGENATED COTTONSEED OIL , TBHQ AND MIXED TOCOPHEROLS FOR FRESHNESS), FRUCTOSE, DEXTROSE, CONTAINS 2 PERCENT OR LESS OF: WHOLE GRAIN OATS, WHEAT FLOUR, SORBITOL, NONFAT DRY MILK, GLYCERIN, BROWN SUGAR, APPLESAUCE (APPLES, WATER), NATURAL AND ARTIFICIAL VANILLA FLAVOR, SOY LECITHIN, CALCIUM CARBONATE, MALTODEXTRIN, SALT, NATURAL AND ARTIFICIAL FLAVOR, SODIUM PROPIONATE, NIACINAMIDE, BHT, PYRIDOXINE HYDROCHLORIDE (VITAMIN B6).

Nutrition Facts B

Serving size 1 bar (31g)
Servings Per Container 6

Amount Per Serving
Calories 120 Calories from Fat 35

	% Daily Value*
Total Fat 3.5 g	**5%**
Saturated Fat 1g	**4%**
Trans Fat 0g	
Polyunsaturated Fat	
Monounsaturated Fat	
Cholesterol 0 mg	**0%**
Sodium 90mg	**4%**
Total Carbohydrate 19g	**6%**
Dietary Fiber 2g	**8%**
Sugars 7g	
Protein 4g	

INGREDIENTS: ROLLED OATS, BROWN RICE SYRUP, GRAPE JUICE CONCENTRATE, PEANUT BUTTER (PEANUTS, SALT), DRY-ROASTED PEANUTS, CHOCOLATE CHIPS (ORGANIC EVAPORATED CANE JUICE, CHOCOLATE LIQUOR, COCOA BUTTER, SOY LECITHIN,GROUND VANILLA BEANS), DATE PUREE, PLUM PUREE, PEANUT FLOUR, VEGETABLE GLYCERIN, CRISP RICE (RICE FLOUR,RICE BRAN, ROSEMARY EXTRACT), ORGANIC OAT FLOUR, SOY NUTS, LESS THAN 2% OF ORGANIC SUNFLOWER OIL, CALCIUM CARBONATE, NATURAL FLAVORS (PEANUT), VITAMIN C (ASCORBIC ACID), SALT, BAKING SODA,SOY LECITHIN, VITAMIN E (D-ALPHA TROCOPHEROLACETATE), FOLIC ACID.

The "Better for you" choice is:

○ **A** ○ **B** ○ **CAN'T TELL**

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9. FOOD CATEGORY: CEREAL

Nutrition Facts A	
Serving size 1 Cup (30g)	
Servings Per Container about 11	
Amount Per Serving	
Calories 100	Calories from Fat 10
	% Daily Value*
Total Fat 1g	2%
Saturated Fat 0g	0%
Trans Fat 0g	
Polyunsaturated Fat	
Monounsaturated Fat	
Cholesterol 0 mg	0%
Sodium 160mg	6%
Total Carbohydrate 25g	8%
Dietary Fiber 5g	20%
Sugars 6g	
Protein 2g	

INGREDIENTS: WHOLE GRAIN OAT FLOUR, WHOLE GRAIN BARLEY FLOUR, NATURALLY MILLED SUGAR, OAT FIBER, WHEAT STARCH, TAPIOCA SYRUP, SEA SALT, CALCIUM CARBONATE, MOLASSES, ZINC AND IRON (MINERAL NUTRIENTS), VITAMIN C (SODIUM ASCORBATE), A B VITAMIN (NIACINAMIDE), VITAMIN E (TOCOPHERYL ACETATE), VANILLA FLAVOR, VITAMIN B6 (PYRIDOXINE HYDROCHLORIDE), VITAMIN B1 (THIAMIN MONONITRATE), VITAMIN A (ACETATE), A B VITAMIN (FOLIC ACID), VITAMIN D (CHOLECALCIFEROL), VITAMIN E (MIXED TOCOPHEROLS) ADDED TO PRESERVE FRESHNESS.

Nutrition Facts B	
Serving size 1 cup (31g/1.1oz)	
Servings Per Container about 16	
Amount Per Serving	
Calories 120	Calories from Fat 0
	% Daily Value*
Total Fat 0g	0%
Saturated Fat 0g	0%
Trans Fat 0g	
Polyunsaturated Fat	
Monounsaturated Fat	
Cholesterol 0 mg	0%
Sodium 180mg	7%
Total Carbohydrate 28g	9%
Dietary Fiber Less than 1g	1%
Sugars 8g	
Protein 1g	

INGREDIENTS: MILLED CORN, SUGAR, MALT FLAVORING, HIGH FRUCTOSE CORN SYRUP, SALT, SODIUM ASCORBATE AND ASCORBIC ACID (VITAMIN C), NIACINAMIDE, IRON, PYRIDOXINE HYDROCHLORIDE (VITAMIN B6), THIAMIN HYDROCHLORIDE (VITAMIN B1), VITAMIN A PALMITATE, FOLIC ACID, BHT (PRESERVATIVE), VITAMIN B12 AND VITAMIN D.

The "Better for you" choice is:

○ **A** ○ **B** ○ **CAN'T TELL**

39661

10. FOOD CATEGORY: COOKIE

Nutrition Facts A

Serving size 1 Cookie (30g)
Servings Per Container 12

Amount Per Serving
Calories 130 Calories from Fat 45

	% Daily Value*
Total Fat 5g	8%
Saturated Fat 1.5g	8%
Trans Fat 0g	
Polyunsaturated Fat	
Monounsaturated Fat	
Cholesterol 0 mg	0%
Sodium 70mg	3%
Total Carbohydrate 21g	7%
Dietary Fiber 3g	12%
Sugars 8g	
Protein 2g	

INGREDIENTS: HARD RED WINTER WHEAT, OATS, RYE, TRITICALE, BARLEY, LONG GRAIN BROWN RICE, BUCKWHEAT, SESAME SEEDS), DARK CHOCOLATE CHIPS (EVAPORATED CANE JUICE, CHOCOLATE LIQUOR, COCOA BUTTER, SOYA LECITHIN, GROUND VANILLA BEAN), WHOLE ROLLED OATS, EXPELLER PRESSED CANOLA OIL, HONEY, EVAPORATED CANE JUICE CRYSTALS, BROWN RICE SYRUP, CHICORY ROOT FIBER, OAT FIBER, VEGETABLE GLYCERIN, NATURAL FLAVORS, SODIUM BICARBONATE, SOY LECITHIN, SALT, MIXED TOCOPHEROLS (NATURAL VITAMIN E) FOR FRESHNESS, MONOCALCIUM PHOSPHATE, WALNUTS, PEANUT FLOUR, NONFAT DRY MILK, EGGS.

Nutrition Facts B

Serving size 1 pouch (31g)
Servings Per Container 5

Amount Per Serving
Calories 100 Calories from Fat 30

	% Daily Value*
Total Fat 3.5g	5%
Saturated Fat 1.5g	8%
Trans Fat 0g	
Polyunsaturated Fat	
Monounsaturated Fat	
Cholesterol 0 mg	0%
Sodium 75mg	3%
Total Carbohydrate 15g	5%
Dietary Fiber 2g	8%
Sugars 6g	
Protein 1g	

INGREDIENTS: WHOLE GRAIN WHEAT FLOUR, UNBLEACHED ENRICHED WHEAT FLOUR [FLOUR, NIACIN, REDUCED IRON, THIAMIN MONONITRATE (VITAMIN B1), RIBOFLAVIN (VITAMIN B2) FOLIC ACID], SUGAR, VEGETABLE OILS (INTERESTERIFIED AND HYDROGENATED SOYBEAN AND/OR HYDROGENATED COTTONSEED), NONFAT MILK, COCOA PROCESSED ALKALI (DUTCHED), SEMI-SWEET CHOCOLATE POWDER (SUGAR, CHOCOLATE LIQUOR, DEXTROSE), INVERT SUGAR, CONTAINS 2 PERCENT OR LESS OF : SALT, MAKING SODA, NATURAL FLAVORS AND SOY LECITHIN.

The "Better for you" choice is:

○ **A** ○ **B** ○ **CAN'T TELL**

Appendix C: FLLANK Test Answer and Rationale Sheet

Food Label Quiz (Pre and Post)

Code Sheet with Correct Answers

1. **B** on the basis of:
   CLUE 5 (A has less than 2 grams of fiber per 100 calories)

2. **B** on the basis of:
   CLUE 3 (A has partially hydrogenated oil)
   CLUE 4 (A has a long ingredient list)

3. **A** on the basis of:
   CLUE 2 (first ingredient of B is high fructose corn syrup)
   CLUE 3 (B has high fructose corn syrup)
   CLUE 4 (B has a long ingredient list)
   CLUE 5 (B has less than 2 grams of fiber per 100 calories)

4. **B** on the basis of:
   CLUE 3 (A has high fructose corn syrup)
   CLUE 5 (A has less than 2 grams of fiber per 100 calories)

5. **A** on the basis of:
   CLUE 3 (B has high fructose corn syrup)
   CLUE 5 (B has less than 2 grams of fiber per 100 calories)

6. **A** on the basis of:
   CLUE 3 (B has partially hydrogenated oil & high fructose corn syrup)
   CLUE 4 (B has a long ingredient list)
   CLUE 5 (B has less than 2 grams of fiber per 100 calories)

7. **A** on the basis of:
   CLUE 3 (B has partially hydrogenated oil)
   CLUE 4 (B has a long ingredient list)

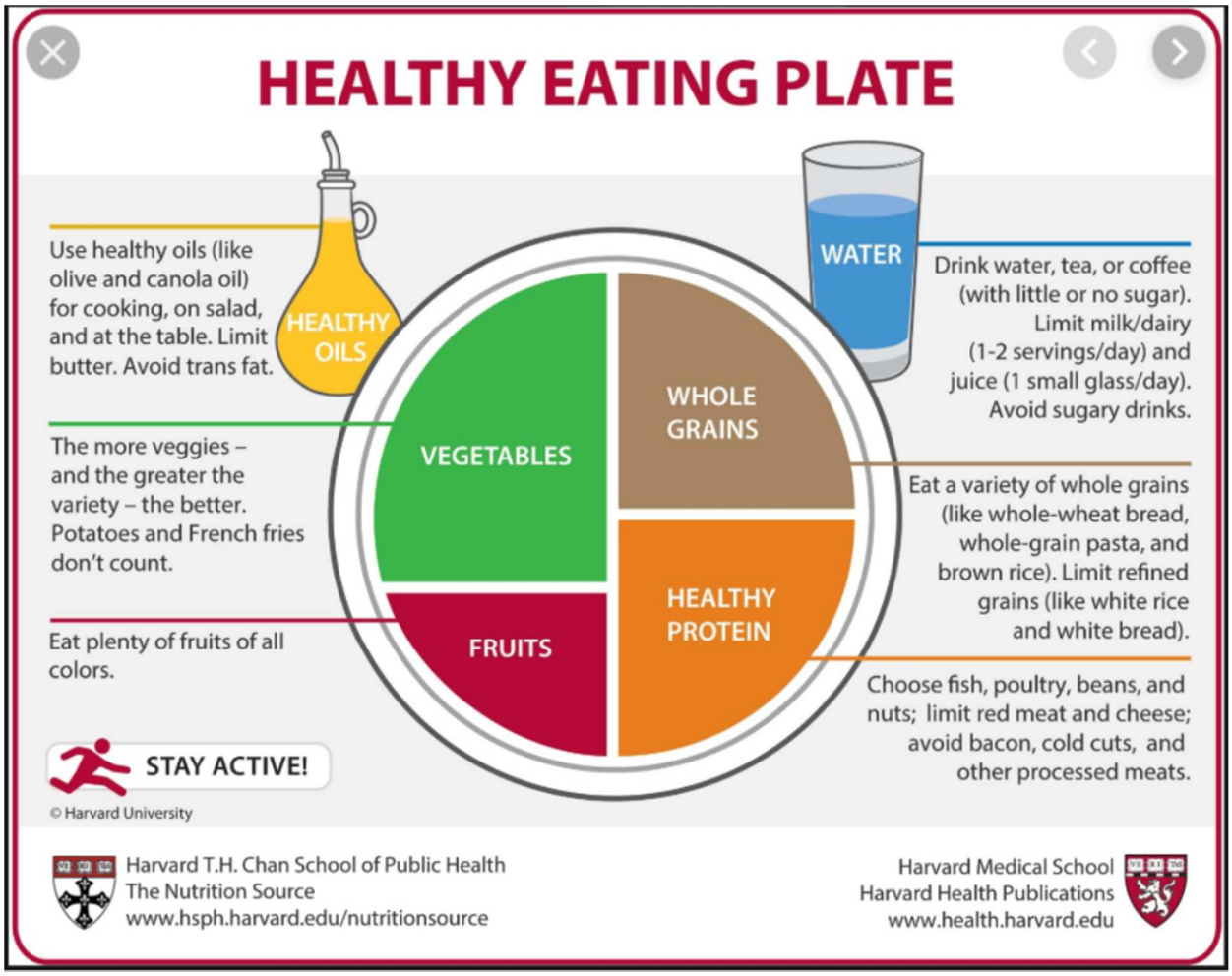
8. **B** on the basis of:
   CLUE 3 (A has partially hydrogenated oil)
   CLUE 4 (A has a long ingredient list)
   CLUE 5 (A has less than 2 grams of fiber per 100 calories)

9. **A** on the basis of:
   CLUE 3 (B has high fructose corn syrup)
   CLUE 5 (B has less than 2 grams of fiber per 100 calories)

10. **A** on the basis of:
    CLUE 3 (B has partially hydrogenated oil)

Revised 3/31/09

Appendix D: Sample of My Plate



Appendix E: Sample of Laminated Nutrition Label Cheat Sheet

(Page 1)

Nutrition Label Cheat Sheet

Daily Food Recommendation 2000 calories

Total Fat	**44 -77 grams**
Saturated Fat	**16 – 22 grams**
Trans Fat	**0 grams (less than 2 grams)**
Cholesterol	**300 milligrams or less**
Sodium	**2300 milligrams = 1 teaspoon of salt**
Total Carbohydrate	**225 – 325 grams**
Dietary Fiber	**25 – 30 grams**
Sugars	**25 grams (female); 37.5 grams (male)**
Proteins	**Ave 56 grams (1 gram/kg)**
Micronutrient	**Vitamins A,C, Calcium, Iron etc.**

Avoid foods with the following:

Saturated fat, Trans Fat, Hydrogenated oil, Partially Hydrogenated oil
High fructose, Added sugar, High salt content, Long ingredient list.
Look out the first ingredient on the list.

(Page 2)

Good Fat (monounsaturated, polyunsaturated)
Salmon (omega-3 fat), nuts, seeds, canola oil,
Olive oil, Peanut oil, soft margarine, avocado

Bad Fat (Saturated Fat - Heart disease, stroke)
Hard oil at room temperature
Coconut oil, cheese, fatty meat, hard butter
Hard margarine, bacon, meat, Hot dog, Salami,
Ice cream, Lard, croissants etc.

Trans Fat (Heart disease, stroke)
Deep fried foods, prepacked foods, cookies, crackers,
Waffles, Fast foods, Shortening, Coffee creamer etc.

Fiber: Whole grain, beans, fruits, vegetables etc.

Proteins: Lean meat, fish, tofu, beans, eggs etc.

Sodium: Table salt, canned foods etc.

Appendix F


The Food Pyramid
The food pyramid below shows the foods that we can eat more of at the bottom, and the foods that we should eat less of at the top.
For adults, teenagers and children aged five and over
Not needed for good health
Foods and drinks high in fat, sugar and salt
Not every day*
*Maximum once or twice a week
Needed for good health. Enjoy a variety every day
Fats, spreads and oils
In very small amounts
Meat, poultry, fish, eggs, beans and nuts
2 servings a day
Milk, yogurt and cheese
3 servings a day*
*5 for 9–18 year olds
Wholemeal cereals and breads, potatoes, pasta and rice
3–5 servings a day*
*Up to 7 for males aged 19–50
Vegetables, salad and fruit
5–7 servings a day
Drink 6–8 glasses of fluid a day — water is best.
daydream

Appendix G: Visual Board to Enhance Nutrition Literacy

Appendix H

IRB Approved Project Flyer