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# Development of a Nutrition Education Tool to Reduce the Risk of Childhood Obesity in a Northwest Arkansas Hispanic Population

Isabel Maria Barrenechea Acre  
*University of Arkansas, Fayetteville*

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DEVELOPMENT OF A NUTRITION EDUCATION TOOL  
TO REDUCE THE RISK OF CHILDHOOD OBESITY  
IN A NORTHWEST ARKANSAS HISPANIC POPULATION

A Thesis/Creative Project

Submitted to the University of Arkansas

Dale Bumpers College of Agriculture, Food and Life Sciences

In Partial Fulfillment

Of the Requirements in

Bachelor of Science in Nutrition and Dietetics

With Honors Distinction

By:

Katherine Grace Ross

Mallori Channing Sando

Maria Isabel Barrenechea

Fayetteville, Arkansas

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## **Abstract**

*Purpose:* The goal of this qualitative research project is to create a bilingual education tool to equip the participants of the English as a Second Language (EASL) class at the Elmdale Elementary School location to reduce the risk of childhood obesity in their children. It is expected that participation in this project will contribute to the development of English language skills of those involved in the EASL class.

*Background:* Adults of Hispanic descent are at a high risk for developing obesity. In conjunction, so are their children. Children who are overweight and/or are obese have a high risk of developing heart disease, diabetes, high blood pressure, and other health complications. As a side effect of the language barrier some Hispanics experience, it may be difficult for them to fully understand nutrition resources in English. It is critical that these families feel empowered in reducing the risk of childhood obesity in their families.

*Methods:* A thorough review of the current literature was conducted so that the content of the tool conveyed the evidence-based practice in the prevention of childhood obesity. Input and feedback from two (one pre-tool development/one post-tool development) focus groups of approximately twelve to fourteen adult Hispanic males and females were analyzed to design and validate the content of the tool and an accompanying assessment instrument. All interactions were conducted in English and in Spanish.

*Conclusion:* This research project describes the development of a nutrition education tool sensitive to language and cultural factors of the Hispanic community. This service-learning project is designed to provide Hispanic families with evidence-based nutrition information in order to reduce the risk of childhood obesity.

## **Introduction**

### The Obesity Epidemic

Obesity is defined as a “Body Mass Index (BMI) at or above the 95<sup>th</sup> percentile for children of the same age and sex” (CDC, 2012). Childhood obesity rates remain high in the United States, and the overall prevalence of obesity in the nation’s young people, ages two to nineteen years of age, has not changed significantly within the past ten years, remaining at about 17% (CDC, 2014). Overall, the prevalence of obesity differs among age, sex, education level of head of household, and racial and ethnic groups (CDC, 2014). With significant disparities, the prevalence of obesity is higher among Hispanics and African Americans than any other racial and ethnic group. An estimated 22.4% of Hispanic children and adolescents are obese (Boudreau et al., 2013; CDC, 2014; Greaney et al., 2012). The complications that come alongside childhood and adolescent obesity include cardiovascular, pulmonary, psychosocial, neurological, endocrine, gastrointestinal, renal, and musculoskeletal areas, many of which can affect individuals later in life (Merikangas et al., 2012).

There is great importance in the prevention of obesity, but a very limited amount of research has been done to focus on preventing overweight and obesity among high-risk populations such as Hispanics (Boudreau et al., 2013; Greaney et al., 2012; Pottie et al., 2013).

Young individuals who are overweight or obese are vulnerable to many stereotypes because of their weight. Some parents feel blamed by their doctors for the excess weight of their children without being given helpful suggestions on making changes that they can apply to their everyday lives (Puhl et al., 2011).

### *Cultural Insight Sensitive to the Hispanic Population and Obesity*

Individuals of Latin American descent, most of whom were born in another country, have two to four times greater risk of developing Type II Diabetes than individuals natively born in the United States (Greaney et al., 2012; Pottie et al., 2013). Language may function as a barrier to delivering services for ethnic populations, especially when the primary language of the individual is not being used (Pottie et al., 2013). The language barrier may not always be evident, as there are reports of individuals who believe to be proficient in another language, but in fact are not. (Schyve, 2007). Understanding cultural differences can be very different than learning another language, and can interfere with the effectiveness of communication. Health literacy is also extremely important, in that an individual who knows and understands a language may not be able to comprehend medical jargon or complex instructions (Schyve, 2007).

### *Steps Towards Prevention*

Current literature highlights different prevention methods in order to reduce the risk of childhood obesity. However, the majority of evidence-based literature agrees upon the following methods: breastfeeding, discouraging the use of restrictive and coercive feeding practices, reducing the energy density of food, emphasizing parent role-model behavior, adequate sleep, limiting screen time, eating meals as a family, and physical activity.

## I. Breastfeeding

Latin American women are more likely to initiate lactation, but not likely to exclusively breastfeed for at least six months, which is the accepted prevention method that is seen to lower childhood obesity rates (Birch and Ventura, 2009; Fisher et al., 2000; Harder et al., 2005; Locke, 2002; Mennella et al., 2001; Metzger and McDade, 2010; Sullivan and Birch, 1994; Singhal and Lanigan, 2007; Spielgel et al., 2004; Taveras et al., 2010). The longer an infant is breastfed, the less likely the child is to be obese later in life (Thompson and Bentley, 2012). However, breastfeeding for less than four months is considered a risk factor for childhood obesity (Harder et al., 2005; Thompson and Bentley, 2012). One study followed the course of sibling pairs, one of whom was breastfed, and the other was not. The sibling that was breastfed was on average thirteen pounds lighter than the nonbreastfed sibling (Metzger and McDade, 2010). Another study suggests that any exposure to breast milk is correlated with lower rates of obesity seen between non-breastfed infants and those using formula (McCrory and Layte, 2012). For example, one study where the child was breastfed for five weeks was associated with lower rates of obesity at age nine. These individuals were 47% less likely to be obese as they aged. This percentage increased congruently up to 62% with the amount of time the child was breastfed (McCrory and Layte, 2012).

Several studies aim to answer the question “why does breast milk lower rates of childhood obesity.” Sources point to the composition of breast milk. An important component of breast milk is the naturally occurring hormone Leptin. It is considered to increase satiation, thus allowing the infant to recognize when he or she is full, preventing him or her from overeating. A critical point is that Leptin is found in breast milk and not in formula. (Fisher et al. 2000; Heinig et al., 1993; Lawrence, 2010; Locke, 2002; Spielgel et al., 2004). Formula is known for having

an unnecessary energy density, providing too many calories for the infant. It can be as great as 10 to 18% higher in comparison to breast milk (Heinig et al., 1993). Thus, infant formula is seen to initiate rapid growth in infants, leading to childhood obesity. One study specifically shows that breastfeeding resulted in a slower growth pattern, including more appropriate height and weight gain as compared to those that were formula fed (Singhal and Lanigan, 2007). A longer extent of breastfeeding also inhibits parents and caretakers from introducing solid foods too early, which is also linked with the probability of childhood obesity (Harder et al., 2005; Taveras et al., 2010; Thompson and Bentley, 2012).

It is also considered that breastfeeding is a natural way to expose an infant to new flavors through the breast milk of the mother. One study proposed that this might instill in babies a wide food preference range, leading to the acceptance of more variety and healthier foods (Sullivan and Birch, 1994).

## II. Discouraging the Use of Restrictive and Coercive Feeding Practices

While feeding a child, many parents are guilty of over-exerting their control. Sources argue against two common feeding styles on opposite ends of the spectrum: restrictive and coercive (Birch and Ventura, 2009; Birch et al., 2003; Birch et al., 1984; Klesges et al., 1983; Taveras et al., 2010). Evidence from a study showed that when left unsupervised, children tended to overeat the very foods that their parents restricted (Birch et al., 2003). Usually parents try to restrict specific foods or portion sizes. In one study, the children whose parents had strict rules about candy, sweets, salty snacks, etc. were reported as being overly excited and more preoccupied with said foods once they were made available, in comparison to other children who

had no restriction (Birch et al., 2003). Specifically, it is thought that maternal restriction of foods is associated with a higher probability of childhood obesity at age 3 (Birch et al., 2003).

Hispanic mothers are even more likely to adopt restrictive feeding practices. It has been shown that Hispanic mothers exert greater control over the eating habits of their children and are more likely to have restrictive feeding practices than their white/non-Hispanic counterparts (Taveras et al., 2010). On the other hand, but of the same effect, Hispanic mothers are more likely to pressure or coerce their children to eat more (Taveras et al., 2010).

Children whose parents frequently coerce or pressure them to eat have a higher chance of developing childhood obesity. It is thought that this feeding style results in the child depending upon the parent too much; therefore, the child suffers from a loss of internal responsiveness and begins to depend on external satiety cues, rather than auto-internal cues (Birch et al., 2003; Birch and Ventura, 2009). This has also been labeled “disinhibited eating,” which can lead to increased energy consumption, resulting in higher body weight (Carper et al., 2000; Klesges et al., 1983; Taveras et al., 2010).

Another theory comes from a study in which adults identified with not eating certain vegetables because they felt pressured to eat those foods as a child. In turn, this led to negative associations with those foods, which they continued to avoid throughout their life (Birch et al., 1984; Birch and Ventura, 2009).

### III. Reducing the Energy Density of Food

It has been shown that a greater consumption of fast food is linked with a poorer quality diet, higher BMI, and obesity among adolescents (French et al., 2001; Guthrie et al., 2002). The frequency of eating outside the home, most commonly fast food, has been the most significant



trend in food in the past fifty years. Eating outside the home accounts for over 50% of the food purchases of Americans (Binkley, 2006; Newman et al., 2014). Fast food is notoriously an “energy dense food,” being one that is unnecessarily high in calories. Greater exposure to these calorie dense foods is thought to be a risk factor for childhood obesity (McClure et al., 2013).

A common source of “empty calories,” or a substance that provides many calories but few essential nutrients, comes from sugar-sweetened beverages (SSBs). Consumption of SSBs among children and adolescents has increased significantly in the last thirty years, along with portion sizes from 13.2 fluid ounces to 18.9 fluid ounces (Dodd et al., 2013).

It has been shown that Black and Mexican-American children consume more SSB in comparison to their White counterparts, and rates of obesity are more prevalent among Mexican-American boys (Dodd et al., 2013). In one study, non-Hispanic whites had a greater tendency to drink unflavored low-fat milk at home than both non-Hispanic Black and Hispanic children. Hispanic children tended to drink more 100% fruit juice at school, and all instances of drinking SSBs increased with age (Dodd et al., 2013).

Because of the literature pointing towards the link between energy dense food consumption and rates of childhood obesity, reducing the frequency of eating fast food or its energy density, can lead to a lower risk of childhood obesity (French et al., 2001; Guthrie et al., 2002).

#### IV. Parent Role-Model Behavior

Approximately 38% of Hispanics in the United States are obese and 77% are obese or overweight (Greaney et al., 2012). This is of concern because the number one determinant of childhood obesity is whether one or both parents are obese. In numerous studies, the one

consistent risk factor among various demographics has been shown to be parental obesity (Salbe et al., 2002; Frisancho, 2000; Whitaker et al., 1997). Higher percentage of body fat and weight are highly correlated with parental BMI, and family eating habits are among the major predictors of obesity (Salbe et al., 2002; Whitaker et al., 1997).

Because children do not purchase or choose foods for themselves, this responsibility is placed solely on the parent/caretaker. Parental actions and behavior are a crucial factor in predicting the development of childhood obesity (Newman et al., 2014; Yu, 2011) For example; children whose parents consume more fruits and vegetables tend to do the same. While on the other hand, children whose parents are obese also tend to be obese (Boudreau et al., 2013; Goran and Gower, 2001; Newman et al., 2014; Nicklas et al., 2001)

## V. Adequate Sleep

The majority of literature supports the statement that adequate sleep is protective against childhood obesity (Taveras et al, 2008; Anderson and Whitaker, 2010; Taheri et al., 2004; Chen et al., 2008). However, one study found no significant link. The initial details of this study appear valid: it is a nationally representative study of a large sample size, adjusted for age, gender, race, household education, and income. There is one major limitation that may have skewed the results of whether adequate sleep is negatively correlated with childhood obesity (Hassan et al., 2011). The question, asked by randomized phone dialing, was “how many nights in the past week did your child get sufficient sleep?” This question is very subjective and open to interpretation. The wording of this question makes the interviewee decide what he or she considers to be “sufficient” sleep, instead of being given a number range or choices of different amounts (Hassan et al., 2011). In certain households, five to seven hours may be considered

“sufficient” sleep, while in all actuality, the National Sleep Foundation recommends children receive ten to eleven hours of nighttime sleep (National Sleep Foundation, 2015). Using such subjective wording may have hindered the researchers from gathering valid data. In turn, this may have altered the results of the study, thus, finding that sufficient sleep is not significant in protecting against childhood obesity.

The wide majority of other sources not only supports, but emphasizes adequate sleep as a crucial prevention method against childhood obesity. It is very important to establish a range that is considered “adequate” or “sufficient.” Many sources agree with the National Sleep Foundation, promoting number ranges that fall in between ten to eleven hours for children ages three to thirteen years old, and eleven to fourteen hours for toddlers ages one to two years old. Several studies defined such as 10.5 hours and found daily sleep to be inversely associated with obesity at three years old (Taveras et al., 2008; National Sleep Foundation, 2015).

Getting a good night of sleep is a habit that takes a consistent routine, especially for young children. One study found that along with a routine of limited TV, family meals, and adequate sleep, preschoolers had a 40% lower prevalence of obesity than those who had no specific routine. In turn, with each additional “routine” the rate of childhood obesity was lowered by 17% (Anderson and Whitaker, 2010).

Like the protective factor of breastfeeding, there are many theories as to why sleep is considered a protective factor against obesity, once again involving hormones, specifically Leptin and Ghrelin (Araujo et al., 2012; Chen et al., 2008; Spiegel et al., 2004; Spiegel et al., 1999; Taheri et al., 2004). It has been seen in adults that inadequate sleep reduces Leptin, which decreases the ability of the body to detect satiation. Not enough sleep may also increase Ghrelin, which results in an elevated appetite during the day (Taheri et al., 2004). Other hormones

affected by sleep deprivation include Insulin, Cortisol, and Growth Hormone, causing them to become out of balance, leading to a higher probability of overweight and obesity. (Araujo et al., 2012; Martinez et al., 2014).

In children, one theory suggests that not enough sleep at night leads to decreased performance during the daytime. This means that children who do not sleep enough at night may experience fatigue, daytime sleepiness, and cognitive problems, resulting in lower caloric expenditure, low activity level, and a tendency to be more sedentary (Chen et al., 2008). In a study, children who had short sleep duration at age three had a higher risk of being obese at age seven (Reilly et al., 2005). In another study, children who did not get adequate sleep were at a “58% risk for overweight or obesity” when compared with their peers that were getting adequate sleep. The children who received even less sleep were at a “92% risk for overweight and obesity.” With every additional hour of sleep, the “risk of overweight or obesity was reduced by 9%”(Chen et al., 2008).

It has been found that Latino children are less likely to get adequate sleep (National Sleep Foundation, 2015; Hassan et al., 2011). In comparison with other ethnic groups, on average Latino children have a bedtime of 9pm or later. Some tend to suffer from sleep-disordered breathing, which may affect quality and length of sleep (Hale et al., 2009; Loreda et al., 2010). In one study of a select sample size, only 18% of Mexican-American children met the National Sleep Foundation’s recommendation of adequate sleep (Martinez et al., 2014).

## VI. Limiting Screen Time

Various studies show improvement on children’s BMIs and a decrease in obesity with limited screen time (Epstein et al., 2008; Dennison et al., 2002). In the past, screen time was

associated with only the act of watching television; however, due to the rapid development of technology in the past thirty years, children are exposed to many more screens than just the TV. Parents are faced with trying to limit the amount of screen time in which their child engages and may feel overwhelmed. Studies agree that an appropriate amount of screen time per day is less than two hours; however, any attempt to limit screen time has been shown to have a beneficial effect on the BMI of children (Epstein et al., 2008; Dennison et al., 2002). Screen time often replaces a child's physical activity because they are otherwise preoccupied and entertained in a sedentary manner. A more sedentary lifestyle leads to obesity (McClure et al., 2013; U.S. Department of Health and Human Services, 2008). In fact, having a TV in the child's bedroom is a risk factor for obesity (Dennison, Erb, and Jenkins, 2002). It has been shown that more TV time at age three is positively associated with obesity at age seven (Dennison et al., 2002; Newman et al., 2014; McClure et al., 2013).

## VII. Family Meals

Evidence supporting the correlation between eating meals as a family and lower rates of childhood obesity operate on different definitions (Fulkerson et al., 2008; Jerica et al., 2014). Some sources argue that eating together as many as six to seven times a week may have beneficial effects on various aspects of a child's life (Anderson and Whitaker, 2010; Fulkerson et al., 2006; Videon and Manning, 2003). Other sources support family mealtime at least three times a week, which have been seen to lower odds of childhood obesity by 12% (Hammons and Fiese, 2011). Eating meals as a family, regardless of how often, is associated with a healthier BMI and diet (Gilman et al., 2000). Not only is it thought to be a protective factor against childhood obesity, but it helps to prevent unhealthy and disordered eating. In one qualitative

study utilizing the feedback of teen focus groups, participants associated the meals that they ate with their families to be healthier (Neumark-Sztainer et al., 2000).

### VIII. Physical Activity

As mentioned above, the more children engage in sedentary activities, the more likely they are to develop obesity. In order to counteract this tendency, it is recommended that children ages 6 and older get at least sixty minutes of physical activity a day. Because parents have such an influence on their children, adults should aim to get thirty minutes of moderate-intensity aerobic physical activity a day or at least 150 minutes a week (U.S. Department of Health and Human Services, 2008).

### **Methods**

A focus group is an in-depth and open-ended discussion conducted with a small group of individuals on a specific topic (Greaney et al., 2012; Robinson, 1999). Health care organizations have increased conductivity through the use of focus groups and personal communication with individuals who can give useful feedback (Robinson, 1999). The research team chose to conduct qualitative research through the use of focus groups. This method was preferred to efficiently gather information about participants' views on nutrition related topics. To facilitate conversation and probe responses, the ideal focus group size was between twelve to fourteen participants. Participants qualified to take part in the study if they were Hispanic and had at least one child under the age of 18 years old. Groups were formed from EASL classes at Elmdale Elementary School in Springdale, Arkansas. The adults chose to take part in this study on a voluntary, non-incentive basis.

### *Focus Groups*

Participants were given a pre-evaluative quiz consisting of eight questions. The quiz was designed to direct simply the goals of the nutrition education tool, not to measure knowledge or conduct quantitative research. The questions were in English and Spanish, side by side, translated by members of the research team (one, native of Bolivia, and another, a non-Hispanic member with a Spanish Minor and experience living in Ecuador). Questions were worded in first-person according to the viewpoint of the quiz taker and approved for use upon submission to an Institutional Review Board (IRB) committee.

Example questions included: “I feel confident in selecting healthy food/snacks for my family, I use the nutrition facts label to make choices about the food I buy, etc.” (Table 1).

After the pre-evaluative quiz, the focus group discussion was initiated. All questions, and some related to possible areas of digression, were formed beforehand and approved upon submission to the IRB committee. The research team facilitated conversation, but the majority of the open discussion was encouraged to be from the participants. Questions that probed for more details related to the pre-evaluative quiz were asked.

Examples included questions such as: “What comes to mind when you hear the words “physical activity? What do you think prevents people from eating healthily? Why?” Discussion lasted for approximately one to two hours. The methods of the focus group discussion were repeated with a second focus group of the same size on a later date. Both focus group meetings were recorded and later transcribed.

### *Formation of the Nutrition Education Tool*

The goal of the qualitative research was to develop a nutrition education tool in order to reduce the risk of childhood obesity in a Hispanic community in northwest Arkansas. An initial review of the literature was conducted in order to gather information to form the content of the nutrition education tool. Sources came from a range of electronic databases, including original contributors to foundational research and the most recent research. This information was collected and combined with the views and opinions of the focus groups to form the nutrition education tool. In order to obtain appropriate content and language for the nutrition education tool, Hispanic focus groups were consulted and a comprehensive review of the literature was conducted. The nutrition education tool was developed and designed sensitive to the perceived needs from the focus groups, but based on current evidence-based literature. The tool includes clear, simple information and realistic steps towards reducing the risk of childhood obesity in the readers' families. It is a bilingual tool, with copies in both Spanish and English.

## **Results**

### *First Focus Group*

There were twelve parents involved in the EASL class present to take the pre-evaluative quiz during the researchers' first visit. There were eleven females and one male. The quiz was designed in first person language from the perspective of the quiz-taker. Both English and Spanish versions of the questions were asked side by side. The first portion of the quiz consisted of thirteen options the participants could choose to mark if they agreed it "reduces the risk of obesity in my child."



The following results were the responses of the participants (Table 1): Twelve participants indicated, “How often I exercise,” eleven participants indicated, “physical activity level of my child,” “adequate sleep,” “limiting screen time,” and “family meals.” Ten participants indicated, “nutrition education.” Nine participants indicated, “the foods I eat,” “my weight,” “breastfeeding my child,” and “if I eat breakfast.” Nine participants indicated, “healthy weight gain during pregnancy.” Zero participants indicated, “smoking during pregnancy.”

The second portion of the quiz consisted of statements accompanied by a scale indicating the degree to which how much the participants agreed with the given statement. Four participants indicated that they were “more likely to be aware of their eating choices if they are overweight,” five participants indicated that they were “more likely to be aware of their eating choices if they are a healthy weight.” Two participants chose to not answer the question, and one participant wrote “I eat for health,” translated from Spanish to English.

The participants could choose from options on a scale that ranged from “never, rarely, sometimes, usually, and almost always.” Two participants responded “I never use the nutrition facts label to make choices about the food I buy,” one participant indicated he or she “rarely use the nutrition facts label to make choices about the food they buy,” five individuals indicated that they “sometimes use the nutrition facts label to make choices about the food I buy,” two individuals indicated that they “usually use the nutrition facts label to make choices about the food I buy,” and two individuals indicated they “almost always use the nutrition facts label to make choices about the food I buy.” None of the participants indicated that they would “rather read a nutrition facts label in English” or responded indifferently by marking the answer “doesn’t matter.” Five participants indicated that they would “rather read a nutrition facts label in Spanish,” and five participants indicated that they would “rather read a nutrition facts label in

both English and Spanish.” All twelve participants indicated that they “feel confident in selecting healthy food/snacks for their family.”

One participant indicated that he/she was “never concerned about my child’s weight.” Four participants indicated that they were “rarely concerned about my child’s health.” Three participants were “sometimes concerned about my child’s weight.” One participant is “usually concerned about my child’s weight.” Three participants were “concerned about their child’s weight.”

One participant indicated that he/she “never attempt to limit the amount my child eats.” Three participants “rarely attempt to limit the amount my child eats.” Five participants “attempt to limit the amount my child eats.” No participants “usually attempt to limit the amount my child eats.” Three participants “almost always attempt to limit the amount my child eats.”

Two participants indicated, “never encourage my child to eat more,” one participant “rarely encourages my child to eat more,” eight participants “sometimes encourage my child to eat more,” one participant indicated “I usually encourage my child to eat more,” and no participants responded, “I almost always encourage my child to eat more.”

Participants were asked about prior participation in “Eating Smart Being Active,” an eight lesson nutrition education program of the Expanded Food and Nutrition Education Program (EFNEP). The question asked was, “Out of eight nutrition education lessons in how many have you participated?” Six participants chose not to respond. One participant answered “no.” One participant indicated partaking in three lessons. One participant indicated four lessons. One participant indicated one lesson. One participant indicated five years of EFNEP sessions, and one participant indicated seven years. All twelve participants gave permission for their responses to be used for research.

### *Focus Group Discussion*

The researchers asked the focus group twelve discussion questions. They first read from the IRB approved script in English and then in Spanish. Overall the majority of the group was more responsive to the questions asked in Spanish. Conversation was then conducted in Spanish, but responses from the participants were repeated and interpreted to English by the Spanish-speaking members of the research team in order to maximize the use of the recording device.

The first question asked was, “What do you think prevents people from eating healthily? Why?” Participants responded with answers conveying the food preferences of their children. They typically want to eat sweet and baked foods. They specifically said pizza. The adults talked about “junk foods” they enjoy, too, even though they expressed that they know they should eat less. They specifically mentioned Takis®, a Cheetos®-like snack marketed to Latin Americans. Several participants mentioned time being a major barrier that prevents them from eating healthily. They emphasized not having enough time to cook because of strained work schedules conflicting with those of their family.

Participants were asked to describe what they normally eat for breakfast, lunch and dinner. Participants mentioned foods they typically eat for breakfast such: eggs, a sandwich, ham, crackers or bread, pancakes, eggs and bacon, coffee and crackers, and cereal with milk and a banana. The majority agreed that usually breakfast consists of something small. For lunch, the majority of participants said they are usually not at home to eat lunch because they are working during the day. They eat something quick on their break, or pack a lunch from home. When they do eat lunch the majority of participants described dishes that typically consisted of some type of meat, rice, and beans. While discussing a typical dinner, many cultural aspects were brought to light. Many explained that in Mexico, their country of origin, it is different. They said sometimes

they don't eat breakfast, or just lunch and dinner, other times, they don't eat dinner. All agreed that in their culture, most people usually eat two meals a day. "Dinner" may consist of a light snack or tea. However, their children eat three or more times a day, many more times than the parents do.

The second question asked was, "Who normally chooses what is for dinner in your family? Most females consistently said they choose because they hold the responsibility of cooking. One woman said, "I decide, but on the weekends I ask my family what they would like to eat because we eat together on the weekends." The male said that he is the one with the responsibilities of cooking; therefore, he decides what is for dinner.

The third question asked was, "How often do you eat dinner as a family?" About three-fourths responded saying that they do not have time to eat as a family because they work, or they only eat together on the weekends. One participant clarified that only the kids eat dinner together because he eats dinner at the restaurant in which he works. On the other side of the room, three ladies sitting together disagreed adamantly with the majority of responses. They insisted that they eat dinner with their families every day.

The fourth question probed responses in regard to whether the participants had lived outside of the United States. The question was worded "In which community do you feel like you have healthier food options? Why?" Participants responded by saying their country of origin (of those that have lived outside of the U.S.). When asked why, they replied with answers explaining that foods are more "natural" in other countries. They emphasized the fact that more foods are organic and there are no genetically modified organisms (GMOs). Here in the U.S. organic foods are very expensive, but in other countries organic foods are the cheapest and most affordable. Because of this, it is easier to have access to fresh fruits and vegetables.

The next question was designed to continue the previous conversation, “In which community do you feel you feel like you have a healthier life style? Why?” One participant voiced her opinion of life in Mexico, saying she walked more in Mexico, and thus viewed her life as healthier while living in Mexico. She explained that she walked to the market, store, and fields. Here, everything is further apart, and therefore she walks less, because she is forced to use some sort transportation. One participant said in her opinion there is more food available in the United States, but it has more chemicals. The majority of participants agreed that they thought the food from the U.S. contains more chemicals, GMOs, and is more processed. They specifically link these factors to an “unhealthy” food. Many people were undecided in which country they consider to have a healthier lifestyle, but rather the two are simply different.

The sixth question was “What area of nutrition would you like to learn more about?” There were not many responses, so the researchers had to probe for more discussion. One participant replied by saying she wanted to learn more about cooking healthily, including more nutritious recipes and meals.

The last question asked was, “What does physical activity mean to you?” Participants mentioned exercise, playing with their children, walking, going to the gym, dancing, sports, and Zumba®. When asked how often they engage in physical activity, the participants overwhelmingly said “never” or not often; however, one woman said “five times a week.” Some participants gave insight to barriers, explaining that when it is cold, they never exercise, but when it is warmer, they exercise more frequently.

### *Second Focus Group*

The same 12 individuals involved in the EASL class were present to take the post-evaluative quiz during the researchers' second visit. In addition, there were three other participants that were present that signed the consent form, took the post-evaluative quiz, and participated in the focus group. The researchers did not want to exclude these additional members of the class from participating in the activities; however, the post-evaluative quizzes for the individuals that were not present for the pre-evaluative quiz were not included in the results.

The second focus group consisted of fourteen females and one male. The post-evaluative quiz was the same as the pre-evaluative quiz, designed in first person language from the perspective of the quiz-taker. Both English and Spanish versions of the questions were asked side by side. This time, however, participants were given both English and Spanish versions of the draft nutrition education tool to use in answering the questions. The first portion of the quiz consisted of thirteen options the participants could choose to mark if they agreed it "reduces the risk of obesity in my child." The following results were the responses in which the participants indicated:

Twelve participants indicated, "How often I exercise," eleven participants, "physical activity level of my child," and twelve, "adequate sleep." Eleven participants reported, "limiting screen time," twelve, "family meals," eleven, "nutrition education," and nine, "foods I eat", and "my weight." Eleven participants indicated "breastfeeding my child" and "if I eat breakfast," and nine "healthy weight gain during pregnancy." Zero participants selected "smoking during pregnancy."

The second portion of the quiz consisted of statements accompanied by a scale indicating the degree to which the participants agreed with the given statement. The scale ranged from

“never, rarely, sometimes, usually, and almost always.” Five participants indicated that they were “more likely to be aware of their eating choices if they are overweight,” six participants reported that they were “more likely to be aware of their eating choices if they are a healthy weight,” and one participant chose to not answer the question.

Three participants responded “I never use the nutrition facts label to make choices about the food I buy,” zero “rarely use the nutrition facts label to make choices about the food they buy,” and six “sometimes use the nutrition facts label to make choices about the food I buy.” One individual indicated that he/she “usually use the nutrition facts label to make choices about the food I buy,” and two individuals responded they “almost always use the nutrition facts label to make choices about the food I buy.”

None of the participants indicated that they would “rather read a nutrition facts label in English” or responded indifferently by marking the answer “doesn’t matter.” Ten participants reported that they would “rather read a nutrition facts label in Spanish,” and two participants responded that they would “rather read a nutrition facts label in both English and Spanish.”

Eleven participants indicated that they “feel confident in selecting healthy food/snacks for their family.” One participant indicated that they “do *not* feel confident in selecting healthy foods/snacks for their family.”

One participant indicated that he/she was “never concerned about my child’s weight.” Two participants reported that they were “rarely concerned about my child’s weight,” six, “sometimes concerned about my child’s weight,” and one, “usually concerned about my child’s weight.” Two participants indicated, “almost always concerned about their child’s weight.”

One participant indicated that they “never attempt to limit the amount my child eats.” Three participants reported they “rarely attempt to limit the amount my child eats,” five,

“sometimes attempt to limit the amount my child eats,” and one reported that he/she, “usually attempt to limit the amount my child eats.” Two participants responded they “almost always attempt to limit the amount my child eats.”

Four participants indicated, “never encourage my child to eat more,” one, “rarely encourage my child to eat more,” and six, “sometimes encourage my child to eat more.” One participant reported “I usually encourage my child to eat more,” and zero participants responded, “I almost always encourage my child to eat more.”

In responses to the questions, “Out of the eight nutrition education lessons, ‘Eating Smart Being Active,’ in how many have you participated?” Four participants indicated they attended eight lessons. One participant indicated five lessons, one participant, seven lessons, and four participants chose not to respond. One participant wrote, “Every year Estela (the teacher) comes,” and one participant wrote, “I have participated when Estela comes, 2 years.” All twelve participants gave permission for their responses to be used for research.

### *Feedback*

After the participants used the nutrition education tool to take the post-evaluative quiz, the researchers solicited opinions in order to further edit the tool. The researchers asked the question “what is the first thing you see when you look at the nutrition education tool?” Participants responded with the answers: colors, “family meals” (section of the tool), the picture of the woman breastfeeding on the back page, and pictures in general. A second question was asked to probe opinions of the aesthetics of the tool, including design and color use. Participants indicated that the colors were pleasing, attention grabbing, bright, and pretty. They said the font was easy and big enough to read, and they also liked the use of both black and white font.



The researchers asked if there was anything that was confusing or strange. One participant specifically said the word “density” was confusing because she did not know the meaning of this word, a few other participants agreed with her. Another participant did not recognize the word “satiety.” There was some confusion about the correlation between parental weight and childhood obesity. After further questioning, the participant made it clear that rather than being confused by the text, she was just surprised to read the information.

The researchers asked if the participants thought any information was surprising or if they had learned anything new. Participants responded with saying the correlation between weight of parents and children, and also eating as a family. The researchers asked if they would prefer to have a nutrition facts label in Spanish (instead of just English, as is included on the nutrition education tool). The participants gave feedback saying an English nutrition facts label is acceptable, as long as the instructions of how to read it are in Spanish. They also indicated that it was easier to take the post-evaluative quiz while being able to use the nutrition education tool.

This concluded the feedback provided by the second focus group. Appropriate changes to the rough draft of the nutrition education tool were made. These changes included altering the Spanish translation of the word “satiety” to the Spanish translate of “satisfaction,” and rewording the explanation of “energy density.”

## **Discussion**

### *Interpretation of Pre vs. Post-Evaluative Quiz Results*

The researchers anticipated that the EASL students would be able to understand both English and Spanish while they were speaking; however, when the researchers began reading in English from the script, it was evident that the majority of the participants did not understand

English. The teacher of the EASL class told the researchers that Spanish would be necessary to guide the participants through the discussion. This was an unexpected barrier, as one of the three researchers was not bilingual. She was still able to contribute and participate, as she read the questions in English to give the EASL students the ability to hear and learn the English translations of the questions. The other two researchers, fluent in Spanish, were able to communicate with the participants without difficulty, reading from the Spanish version of the pre-approved script.

As the pre-evaluative quiz was administered, it appeared as though participants had difficulty understanding the wording of some of the questions. The questions written in first person caused confusion and many participants had to ask for clarification from the researchers.

In the responses for the question “I believe \_\_\_\_\_ can reduce the risk of obesity in my child,” there were some improvements in correct answers from the pre-evaluation to the post-evaluation. One notable change was the increase by two responses for “breastfeeding my child” and “If I eat breakfast.” There was also an increase in “adequate sleep,” “nutrition education,” and “healthy weight gain during pregnancy” by one response. There was no change in correct responses for “physical activity level of my child,” “if my child eats breakfast,” “the foods I eat,” “my weight,” “smoking during pregnancy,” “limiting screen time,” and “family meals. The participants had the nutrition education tool in both Spanish and English to take the post-evaluative quiz. It was assumed, therefore, that this was the reason for an increase in correct responses in some of the topic areas.

In the responses for the question “I am more likely to be aware of my eating choices if I am \_\_\_\_\_,” the responses for “at a healthy weight” increased from five responses in the pre-evaluative quiz to six responses in the post-evaluative quiz. The responses for “overweight”

increased from four responses in the pre-evaluative quiz to five responses in the post-evaluative quiz. Two individuals chose to not give a response in the pre-evaluative quiz and only one chose to not give a response in the post-evaluative quiz. In addition, in the pre-evaluative quiz, one individual did not understand the question and answered the question with, “I eat for health.” Therefore, it appeared there was an increased awareness of what they eat when they are at a healthy weight.

In the responses for the question “I use the nutrition facts label to make choices about the food I buy,” the responses for “never” increased from two responses in the pre-evaluative quiz to three responses in the post-evaluative quiz. The responses for “rarely” decreased from one response in the pre-evaluative quiz to no responses in the post-evaluative quiz. The responses for “sometimes” increased from five responses in the pre-evaluative quiz to six responses in the post-evaluative quiz. The responses for “usually” decreased from two responses in the pre-evaluative quiz to one response in the post-evaluative quiz. The responses for “almost always” remained the same at two responses.

In the responses to the question “I would rather read a nutrition label in,” the responses for “English” remained the same at zero responses from the pre-evaluative quiz to the post-evaluative quiz. The responses for “Spanish” increased from seven responses in the pre-evaluative quiz to ten responses in the post-evaluative quiz. The responses for “both Spanish and English” decreased from seven responses in the pre-evaluative quiz to two responses in the post-evaluative quiz. The responses for “doesn’t matter” remained the same at zero responses.

It is important to note that two individuals in the pre-evaluative quiz answered “Spanish” and “both Spanish and English” on the same question, therefore resulting in fourteen responses for the question, although there were only twelve participants. This may mean that fewer

individuals felt confident with both languages in the post-evaluative quiz than the pre-evaluative quiz. The nutrition fact tool was used to take the post-evaluative quiz and it had a nutrition facts label in English on it. There is potential for correlation in this change of responses from the participants using the tool, which had the English nutrition facts on it.

In the responses to the question “I feel confident in selecting healthy food/snacks for my family,” the responses for “yes” decreased from twelve in the pre-evaluative quiz to eleven in the post-evaluative quiz. The responses for “no” increased from zero in the pre-evaluative quiz to one in the post-evaluative quiz.

In the responses to the question “I am concerned about my child’s weight,” the responses for “never” remained at one from the pre-evaluative quiz to the post-evaluative quiz. The responses for “rarely” decreased from four responses in the pre-evaluative quiz to two in the post-evaluative quiz. The responses for “sometimes” doubled from three in the pre-evaluative quiz to six in the post-evaluative quiz. The responses for “usually” remained the same at one from the pre-evaluative quiz to the post-evaluative quiz. The responses for “almost always” decreased from three in the pre-evaluative quiz to two in the post-evaluative quiz.

In the results of the question “I attempt to limit the amount my child eats,” the responses for “never” remained at one from the pre-evaluative quiz to the post-evaluative quiz. The responses for “rarely” remained at three responses from the pre-evaluative quiz to the post-evaluative quiz. The responses for “sometimes” remained at five responses from the pre-evaluative quiz to the post-evaluative quiz. The responses for “usually” increased from zero responses in the pre-evaluative quiz to one responses in the post-evaluative quiz. The responses for “almost always” decreased from three responses in the pre-evaluative quiz to two responses in the post-evaluative quiz.

In the responses to the question “I encourage my child to eat more” the responses for “never” doubled from two responses in the pre-evaluative quiz to four responses in the post-evaluative quiz. The responses for “rarely” remained at one response from the pre-evaluative quiz to the post-evaluative quiz. The responses for “sometimes” decreased from eight responses in the pre-evaluative quiz to six responses in the post-evaluative quiz. The responses for “usually” remained the same at one from the pre-evaluative quiz to the post-evaluative quiz. The responses for “almost always” remained at zero from the pre-evaluative quiz to the post-evaluative quiz. Over all, the number of correct responses increased from pre-evaluative to post-evaluative quiz.

**Table 1. Responses from the Pre-Evaluative and Post-Evaluative Quiz**

Question	Option	Number of Responses (n=12)	
		Pre-Evaluation	Post-Evaluation
“I believe ____ can reduce the risk of obesity in my child”	Physical activity level of my child	11	11
	If my child eats breakfast	12	12
	The foods I eat	9	9
	Breastfeeding my child	9	11
	My weight	9	9
	Smoking during pregnancy	0	0
	Adequate sleep	11	12
	Healthy weight	8	9
	Limiting screen time	11	11
	Nutrition education	10	11
	How often I exercise	12	12
	Family meals	11	11
	If I eat breakfast	9	11
Healthy weight gain during pregnancy	8	9	
“I am more likely to be aware of my eating choices if I am”	At a healthy weight	5	6
	Overweight	4	5
	No response	2	1
	“I eat for health”	1	0

Question	Option	Number of Responses (n=12)		
		Pre-Evaluation	Post-Evaluation	
"I use the nutrition facts label to make choices about the food I buy"	Never	2	3	
	Rarely	1	0	
	Sometimes	5	6	
	Usually	2	1	
"I would rather read a nutrition label in"	English	0	0	
	Spanish	7*	10	
	Spanish and English (Both)	7*	2	
	Doesn't matter	0	0	
"I feel confident in selecting healthy food/snacks for my family"	Yes	12	11	
	No	0	1	
"I am concerned about my child's weight"	Never	1	1	
	Rarely	4	2	
	Sometimes	3	6	
	Usually	1	1	
	Almost always	3	2	
	Never	1	1	
	Rarely	3	3	
"I attempt to limit the amount my child eats"	Sometimes	5	5	
	Usually	0	1	
	Almost always	3	2	
	Never	2	4	
	Rarely	1	1	
"I encourage my child to eat more"	Sometimes	8	6	
	Usually	1	1	
	Almost always	0	0	
	*Two individuals marked two answers (marked "Spanish" and "Both," accounting for fourteen answers)			

### *Feedback from Participants concerning the Nutrition Education Tool*

In the post-evaluative quiz, the participants were encouraged to use the nutrition education tool to answer the questions. However, it was not until the group conversation of the nutrition education tool began that the participants fully comprehended the details of the content. The researchers took time to answer questions and explain in more detail the content of the tool. This discussion facilitated participants' comprehension and absorption of the information presented on paper.

During the focus group discussion, the participants were encouraged to respond with honest answers and to add more detail to their answers. The first question was, "What do you think prevents people from eating healthily? Why?" Although the participants did exhibit the ability to discern "healthy" foods, they admitted to frequent enjoyment of sweets and junk foods. In addition, they mentioned major barriers that prevented them from eating healthier. While cooking at home encouraged them to eat healthier foods with their families, time was a constraint that prevented the participants from being able to adhere to that routine. Work schedules were perceived by participants to be a hindrance to healthy foods choices. Additional research with the Hispanic population in northwest Arkansas is needed to identify if making healthier foods more available would encourage different eating habits within families.

In the second question, the participants were asked to describe what they normally eat for breakfast, lunch, and dinner. Most of the participants stated that were not accustomed to eating three meals per day. In the Hispanic culture adults were more likely to eat two larger meals per day. Many of the participants stated that their children ate three meals per day. This also demonstrated a difference in eating habits between parents and their children. In addition, there was probability that children were eating the same portion sizes as their parents, but more often

throughout the day. This could lead to overconsumption of calories and weight gain. This was beneficial for the researchers to understand in order to include information about parental eating behaviors and family meals in the nutrition education tool.

The next question asked was, “Who normally chooses what is for dinner in your family? By the responses given, the majority of the participants all chose what is for dinner. In addition, the majority of them worked full-time jobs, which also presented a time barrier that could discourage healthier cooking.

The following question was, “How often do you eat dinner as a family?” There was a wide range of responses. Many of the participants indicated they did not have time to eat dinner as a family, while others insisted they had family meals most nights. Once again, this supported the need to include family meals in the nutrition education tool.

The next question was, “In which community do you feel like you have healthier food options? Why?” The responses were consistent in that the participants believed it was easier to eat healthily in their home country because healthier foods were more available and affordable. In addition, there were more organic options and no GMOs. Organic foods in other countries were also less expensive because they were so accessible. In the United States, processed foods were typically more affordable than the fresh produce and organic foods. The researchers surmised that some Hispanic individuals of lower socioeconomic status are not able to afford fresh produce and, therefore, may rely on consuming more processed foods, leading to higher rates of obesity.

In the following question, the researchers wanted to know in which country the participants felt they had a healthier life style. One participant mentioned she felt as if she was able to walk more in her home country of Mexico because the places were much closer together.



It is assumed more exercise occurred in the Hispanic culture through daily activities rather than planned exercise. The environmental structure of the United States may prevent unplanned exercise, thus potentially decreasing the amount of physical activity that individuals get on a daily basis.

The researchers asked the participants about what information, in regard to nutrition, they would like to learn. There were very few responses, which potentially indicated they did not have an interest or perceived need to know more. Based on the results from the quiz, it was evident that there were discrepancies in the nutrition knowledge of the participants. Thus, it was important to create a tool with more detailed information in order to expand the knowledge of the participants.

The researchers asked what “physical activity” meant to the participants and how often they engaged in physical activity. It was noted that the participants were more likely to exercise when the weather was warm and sunny. The researchers concluded that they may perform more physical activity outdoors rather than in a gym. Weather conditions seemed to be a major hindrance to being physically active.

#### *Nutrition Education Tool Presentation*

A crucial role the focus groups played in this study was to provide insight about the content and design of the nutrition education tool. The feedback from the focus groups confirmed that the content of the nutrition education tool, based on the peer-reviewed literature, was appropriate for this audience. Likewise, based on the opinions of the participants, the researchers were able to further tailor the content of the tool for their intended audience.

Many changes involved colors, resizing of font, general design, and layout of the nutrition education tool; however, one significant change was made in regard to vocabulary and reading level. Specifically, the word “satiety” was changed to “satisfaction” because select individuals did not recognize this word. The term “density” was redefined with the assistance of post-evaluative participants. The researchers believed that the lack of understanding of these two terms may have been indicative of a lower education level and/or socioeconomic status of the participants, which is related to increased risk of childhood obesity (CDC, 2014).

Additional feedback provided insight related to childhood obesity and the Hispanic community. Participants voiced that they would prefer to read nutrition facts label in English with a Spanish explanation of the information provided. While Spanish speakers may be able to understand the content of a Spanish nutrition facts label, they do not feel confident absorbing the same information in English. This may lead to uninformed purchasing choices. Potential education could be done concerning English to Spanish translations of common food product. In addition, the food industry could implement the use of bilingual food labels on their packaging.

### *Limitations*

The researchers would like to conduct more focus groups with additional participants in order to solicit feedback and to improve the nutrition education tool. In future studies involving participants, it would be beneficial to separate the participants during the pre-evaluative quiz and the post-evaluative quiz. It was observed that the participants were talking and sharing answers while taking the quizzes, potentially skewing the results. Participants were enthusiastic during focus group discussion, but many times they were talking over each other, preventing their

comments from being accurately heard by the researchers. However, the impact of that limitation was minimized by taping and transcribing both focus group sessions.

There were a few more limitations to the study. The results were not generalizable to the entire Hispanic adult population of northwest Arkansas because participants were not randomly selected and only included one male. The literacy level of the nutrition education tool is approximately eighth grade reading level which may have impacted the use of the tool in completing the post-evaluative quiz. This reading level was higher than the researchers anticipated; however, because of the prior exposure of most of the participants to EFNEP, the nutrition information on the tool was designed to stretch their knowledge and understanding. The researchers plan to adjust the reading level to sixth grade.

#### *Additional Research Needed*

Through this study, the researchers recognized a need for further study of this population. While the development of the nutrition education tool is complete, additional pilot and field testing of the tool, as well as focus group discussions could validate and improve the content and effectiveness of the tool.

In conclusion, prospective study that follows those exposed to the tool would be ideal; therefore, researchers would be able to measure whether the tool has a direct impact, significantly lowering childhood obesity levels. There is little research done in regards to the Hispanic population in northwest Arkansas on the topic of obesity.

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## Literature Cited

- Anderson, S.E., and R.C Whitaker. 2010. Household and obesity in U.S. preschool-aged children. *Pediatr.* 125(3):420-428.
- Araujo, J., M. Severo, and E. Ramos. 2012. Sleep duration and adiposity during adolescence. *Pediatr.* 130(5):146-154.
- Binkley, J.K. 2006. The effect of demographic, economic, and nutrition factors on the frequency of food away from home. *J. Cons. Aff.* 40(2):372-391.
- Birch, L.L., and A.K. Ventura. 2009. Preventing childhood obesity: what works? *Int. J. Obesity.* 33(1):74-81.
- Birch, L.L., J.O Fisher, and K.K Davison, 2003. Learning to overeat: maternal use of restrictive feeding practices promotes girl's eating in the absence of hunger. *Am. J. Clin. Nutr.* 78(2):215-220.
- Birch, L.L., D.W. Marlin, and J. Rotter. 1984. Eating as the means activity in a contingency: effects on young children's food preferences. *Child. Dev.* 55:432-439.
- Boudreau, A.D.A., D.S. Kurowski, W.I. Gonzalez, M.A. Diamond, and N.M. Oreskovic. 2013. Latino families, primary care, and childhood obesity. *Am. J. of Prevent. Med.* 44(3S3):S247-S257.
- Carper, J.L., O. Fischer, L.L. Birch. 2000. Young girls' emerging dietary restaurant and disinhibition are related to parental control in child feeding. *Appetite.* 35(2):121-129.
- Centers for Disease Control. 2012. Basics about childhood obesity. [www.cdc.gov/obesity/childhood/basics.html](http://www.cdc.gov/obesity/childhood/basics.html) Accessed 10 April 2015.
- Centers for Disease Control. 2014. Prevalence of Childhood Obesity in the United States, 2011-2012. <http://www.cdc.gov/obesity/data/childhood.html> Accessed 8 December 2014.
- Chen, X., M.A. Beydoun, and Y. Wang. 2008. Is sleep duration associated with childhood obesity? a systematic review and meta-analysis. *Obes.* 16(2):265-274.
- Dennison, B.A., T.A. Erb, and P.L. Jenkins. 2002. Television viewing and television in bedroom associated with overweight risk among low-income preschool children. *Pediatr.* 109(6):1028-1035.
- Dodd, A.H., R. Briefel, C. Cabili, A. Wilson, and M.K. Crepinsek. 2013. Disparities in Consumption of sugar-sweetened and other beverages by race/ethnicity and obesity status among United States schoolchildren. *J. Nutr. Edu. Behav.* 45(3):240-249.

- Epstein, L.H., J.N. Roemmich, and J.L. Robinson. 2008. A randomized trial of the effects of reducing television viewing and computer use on body mass index in young children. *Arch. Pediatr. Adolesc. Med.* 162(3):239-245.
- Fisher, J.O., L.L. Birch, H. Smicklas-Wright, and M.F. Picciano. 2000. Breastfeeding through the first year of life predicts maternal control in feeding and subsequent toddler energy intakes. *J. Am. Diet. Assoc.* 100(6):641-646.
- French, S.A., M. Story, D. Neumark-Sztainer, J.A. Fulkerson, and P. Hannan. 2001. Fast food restaurant use among adolescents: associations with nutrient intake, food choices, and behavioral and psychosocial variables. *Int. J. Obes. Relat. Metab. Disord.* 25(12):1823-1833.
- Frisancho, A.R. 2000. Prenatal compared with parental origins of adolescent fatness. *Am. J. Clin. Nutr.* 72(5):1186-1190.
- Fulkerson J.A., D. Neumark-Sztainer, P.J. Hannan, and M. Story. 2008. Family meal frequency and weight status among adolescents: cross sectional and 5-year longitudinal associations. *Obes.* 16(11):2529-2534.
- Fulkerson, J.A., M. Story, A. Mellin, N. Leffert, D. Neumark-Sztainer, and S.A. French. 2006. Family dinner meal frequency and adolescent development: relationships with developmental assets and high-risk behaviors. *J. Adolesc. Health.* 39(3):377-345.
- Gillman, M.W., S.L. Rifas-Shimann, A.L. Frazier, H.R. Rocket, C.A. Jr. Camargo, A.E. Field, C.S. Berkey, and G.A. Colditz. 2000. Family dinner and diet quality among older children and adolescents. *Arch. Fam. Med.* 9(3):235-240.
- Goran M.I., and Gower B.A. 2001. Longitudinal study on pubertal insulin resistance. *Diabetes.* 50(11):2444-2450.
- Greaney, M.L., F.D. Lees, B. Lynch, L. Sebelia, and G.W. Greene. 2012. Using focus groups to identify factors affecting healthful weight maintenance in Latino immigrants. *J. of Nutr. Educ. and Behav.* 44:(5)448-452.
- Guthrie, J.F., B.H. Lin, and E. Frazao. 2002. Role of food prepared away from the home in the American diet, 1977-78 versus 1994-96: changes and consequences. *J. Nutr. Educ. Behav.* 34(3):140-150.
- Hale, L., L.M. Berger, M.K. LeBourgeois, and J. Brookes-Gunn. 2009. Social and demographic predictors of preschoolers' bedtime routines. *J. Dev. Behav. Pediatr.* 30(5):394-402.
- Hammons, A.J., and Fiese B.H. 2011. Is frequency of shared family meals related to the nutritional health of children and adolescents? *Pediatrics.* 127(6):e1565-1574.

- Harder, T., R. Bergman, G. Kallischnigg, and A. Plagemann. 2005. Duration of breastfeeding and risk of overweight: a meta-analysis. *Am. J. Epi.* 162(5):397-403.
- Hassan, F., M.M. Davis, and R.D. Chervin. 2011. No independent association between insufficient sleep and childhood obesity in the national survey of children's health. *J Clin. Sleep. Med.* 7(2):153-157.
- Heinig, M.J., L.A. Nommsen, J.M. Pearson, B. Lonnerdal, and K.G. Dewey. 1993. Energy and protein intakes of breastfed and formula-fed infants during the first year of life and their association with growth velocity: the DARLING study. *Am. J. Clin. Nutr.* 58(2):152-161.
- Jerica M.B., S. Rowley, A. Trofholz, C. Hanson, M. Rueter, R.F. MacLehose, and D. Neumark-Sztainer. 2014. Childhood obesity and interpersonal dynamics during family meals. *Pediatr.* 134:923-932.
- Klesges, R.C., T.J. Coates, and G. Brown. 1983. Parental influences on children's eating behavior and relative weight. *J. Appl. Behav. Anal.* 16(4):371-378.
- Lawrence, R.A. 2010. Does breastfeeding protect against overweight and obesity in children? A review. *Childhood Obesity.* 6(4):193-197.
- Locke, R. 2002. Preventing obesity: the breast milk-Leptin connection. *Acta. Pediatr.* 91(9):891-894.
- Loredo, J.S., X. Soler, W. Bardwell, S. Ancoli-Israel, J.E. Dimsdale, and L.A. Palinkas. 2010. *33(7):962-967.*
- Martinez, S.M., J.M. Tschann, L.C. Greenspan, J. Deardorff, C. Penilla, E. Flores, L.A. Pasch, S.E. Gregorich, and N.F. Butte. 2014. Is it time for bed? short sleep duration increases risk of obesity in Mexican American children. *Sleep. Med.* 15(12):1584-1489.
- McClure, A.C., S.E. Tanski, D. Gilbert-Diamond, A.M. Adachi-Mejia, L. Zhingang, L. Zhongze, and J.D. Sargent. 2013. Receptivity to television fast-food restaurant marketing and obesity among U.S. youth. *Am. J. Prev. Med.* 45(5):560-568.
- McCrory, C., and R. Layte. 2012. Breastfeeding and risk of overweight and obesity at nine-years of age. *Soc. Sci. Med. J.* 75(2):323-330.
- Menella, J.A., C.P. Jagnow, and G.K. Beauchamp. 2001. Parental and postnatal flavor learning by human infants. *Pediatr.* 93(6):271-277.
- Merikangas, A.K., P. Mendola, P.N. Pastor, C.A. Reuben, and S.D. Cleary. 2012. The association between major depressive disorder and obesity in US adolescents: results from the 2001-2004 National Health and Nutrition Examination Survey. *J. Behav. Med.* 35:149-154.

- Metzger, M.W., and T.W. McDade. 2010. Breastfeeding as obesity prevention in the United States: A sibling difference model. *Am. J. Hum. Biol.* 22(3):291-296.
- National Sleep Foundation. 2015. How much sleep do we really need? <http://sleepfoundation.org/how-sleep-works/how-much-sleep-do-we-really-need>. Accessed 5 February 2015.
- Neumark-Sztanier, D., M. Story, D. Ackard, J. Moe, and C. Perry. 2000. The family meal: views of adolescents. *J. Nutr. Educ.* 32(6):329-334.
- Newman, C.L., E. Howlett, and S. Burton. 2014. Implications of fast food restaurant concentration for preschool-aged childhood obesity. *J. Bus. Research.* 67(8):1573-1580.
- Nicklas, T. A., T. Baranowski, J.C Baranowski, K. Cullen, L. Rittenberry, and N. Olvera. 2001. Family and child-care provider influences on preschooler children's fruit, juice, and vegetable consumption. *Nutr. Reviews.* 59(7):224-235.
- Pottie K., A. Hadi, J. Chen, V. Welch, and K. Hawthorne. 2013. Realist review to understand the efficacy of culturally appropriate diabetes education programmes. *Diabetic. Med.* 30:1017-1025.
- Puhl, R.M., J.L. Peterson, and J. Luedicke. 2011. Parental perceptions of weight terminology that providers use with youth. *Pediatr.*128:e786-793.
- Reilly, J.J., J. Armstrong, A.R. Dorosty, P.E. Emmett, and A. Ness 2005. Early life risk factors for obesity in childhood: cohort study. *BMJ.* 330:1357.
- Robinson, N. 1999. The use of focus group methodology with selected examples from sexual health research. *J. Adv. Nurs.* 29(4):905-913.
- Salbe, A.D., C. Weyer, R.S. Lindsay, E. Ravussin, and P.A Tataranni. 2002. Assessing risk factors for obesity between childhood and adolescence: I. birth weight, childhood adiposity, parental obesity, insulin, and Leptin. *Pediatr.* 110(2):299-306.
- Schryve, P.M. 2007. Language differences as a barrier to quality and safety in health care: the joint commission perspective. *J. Gen. Intern. Med.* 22(2):360-361.
- Singhal, A., and J. Lanigan. 2007. Breastfeeding, early growth and later obesity. *Obes. Reviews.* 8(1):51-54.
- Spiegel, K., R. Leproult, M. L'Hermite-Baleriaux, G. Copinschi, P.D. Penev, and E.V. Cauter. 2004. Leptin levels are dependent on sleep duration: relationships with sympathovagal balance, carbohydrate regulation, cortisol, and thyrotropin. *J. Clin. Endocrinol. Metab.* 89:5762-5771.



- Spiegel, K., R. Leproult, E. Van Cauter. 1999. Impact of sleep debt on metabolic and endocrine function. *Lancet*. 354(9188):1435-1439.
- Sullivan, S.A., and L.L. Birch. 1994. Infant dietary experience and acceptance of solid foods. *Pediatr*. 93(2):271-277.
- Taheri, S., L. Lin, D. Austin, T. Young, and E. Mignot. 2004. Short sleep duration is associated with reduced Leptin, elevated Ghrelin, and increased body mass index. *PLoS. Med*. 1(3):e62.
- Taveras, E.M, M.W.Gillman, K. Kleinman, J.W. Rich-Edwards, and S.L. Rifas-Shiman. 2010. Racial/ethnic differences in early-life risk factors for childhood obesity. *Am. Ac. Pediatr*. 125(4):696-695.
- Taveras, E.M., S.L. Rifas-Shiman, E. Oken, E.P. Gunderson, and M.W. Gillman. 2008. Short sleep duration in infancy and risk of childhood overweight. *Arch. Pediatr. Adolesc. Med*. 162(4):305-311.
- Thompson, A.L., and M.E. Bentley. 2012. The critical period of infant feeding for the development of early disparities in obesity. *Soc. Sci. Med*. 97:288-296.
- U.S. Department of Health and Human Services. 2008. Physical activity guidelines for Americans. Washington (DC): U.S. Department of Health and Human Services. Office of Disease Prevention and Health Promotion Publication No. U0036. <http://www.health.gov/paguidelines>. Accessed April 7, 2015.
- Videon, T.M., and C.K. Manning. 2003. Influences on adolescent eating patterns: the importance of family meals. *J. Adolesc. Health*. 32(5):365-373.
- Whitaker, R.C., J.A. Wright, M.S. Pepe, K.D. Siedel and W.H. Dietz. 1997. Predicting obesity in young adulthood from childhood and parental obesity. *N. Engl. J. Med*. 337:869-873.
- Yu, H. 2011. Parental communication style's impact on children's attitudes toward obesity and food advertising. *J. Con. Aff*. 45(1):87-107.