

Culturally Tailored Interventions for Childhood Obesity in Mexico

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ABSTRACT

The purpose of this Doctor of Nursing Practice (DNP) project is to develop and implement a culturally tailored educational program into a community clinic in a northern border community in Mexico to prevent and combat childhood obesity. In Mexico, 33.2% of children are overweight or obese and numbers are continuing to rise, which has a significant impact on physical and psychological health and can lead to diabetes, fatty liver disease, thyroid disease, cardiovascular disease, cancer, depression, and other chronic diseases. Guided by Bandura's theory of self-efficacy, weekly education sessions were delivered to members of the community clinic for two weeks. Content included both a nutrition component and an exercise component. An emphasis was made on increasing physical activity, increasing water consumption, decreasing sugar sweetened beverages, and increasing fruit and vegetable consumption. Videos were developed for each education session. Worksheets and handouts were developed to enhance learning and give participants a tangible reference for individual learning. Content was taken from the CDC and adapted to fit the needs of the community. All content was culturally tailored for low literacy levels and translated to Spanish. Knowledge, behavior change, and self-efficacy were measured by pre and post surveys. Self-efficacy showed statistically significant change from pre and post intervention. These findings suggest that healthy eating and exercise education can potentially increase knowledge, promote behavior change, and enhance self-efficacy, which can, in turn, prevent and combat childhood obesity and related disease states.

Keywords: pediatric, childhood, obesity, prevention, education

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Childhood obesity has become a global epidemic resulting in short- and long-term impacts on children's physical, psychological, social, and economic well-being (Ash et al., 2017). Latino children are affected exponentially by rising obesity rates. There are still no clear treatment strategies and many healthcare providers are not adequately trained nor do they have the clinical support they need to provide care for the obese child (Cuda & Censani, 2019). Prevention is the key to this health issue, and early identification of modifiable risk and protective factors is essential.

Problem Statement

According to the Center for Disease Control (2020), childhood obesity affects one out of every five children putting children at risk for poor health. The prevalence of obesity is 18.5% for children aged two to 19 years and affects approximately 13.7 million children and adolescents in the United States. Obesity prevalence is 13.9% among children aged two to five years, 18.4% among children aged six to 11 years, and 20.6% among children aged 12 to 19 years (CDC, 2020). Childhood obesity is also more common among certain populations including Hispanics at 25.8% and non-Hispanic blacks at 22% (CDC, 2020). Hispanic whites and non-Hispanic Asians had lower obesity prevalence than non-Hispanic blacks and Hispanics at 14.1% and 11% (CDC, 2020). In Arizona, 25.5% of children ages 10 to 17 years are overweight or obese for their age based upon reported height and weight (United Health Foundation, 2020). In Mexico, 33.2% of children are overweight or obese (Pérez-Herrera & Cruz-López, 2018). This is a problem because childhood overweight and obesity can lead to cardiovascular disease, cancer, diabetes, and other chronic disease (Heerman et al., 2019) in adolescence and adulthood.

Purpose and Rationale

The prevalence of childhood obesity is higher in Latino children than any other ethnicity. Childhood obesity results from a complex multitude of factors that include cultural influences, education, finances, improper nutrition, and lack of physical activity (Heerman et al., 2019). Community based interventions, including both the child and the parents, have demonstrated efficacy for slowing the rate of increasing Body Mass Index (BMI) in children (Soltero et al., 2018). The purpose of this Doctor of Nursing Practice project is to conduct an in-depth review of the literature and to develop an intervention for Latino children and their families based on the best overweight and obesity prevention and management evidence for this population.

Background and Significance

Latino Children at Risk for Obesity

Adult obesity and other related diseases such as diabetes mellitus (DM), cardiovascular disease, psychological problems, and overall poor quality of life can result from being obese or overweight as a child. Therefore, prevention is the key to controlling this epidemic and combatting childhood obesity (Bogart et al., 2016). Chronic conditions that are highly prevalent in Mexico include DM, ischemic cardiopathy, cerebrovascular disease, hypertension, chronic obstructive pulmonary disease, and mental health disorders (Pan American Health Organization, 2017). In Mexico, DM is the leading cause of loss of health, and accounts for 7.1% of years of healthy life lost and is the third most frequent cause of premature death and of years lived with disability (Pan American Health Organization, 2017). Families from low-income, minority communities, such as Naco, Mexico, face structural barriers to engaging in healthy behaviors that are necessary to support healthy childhood growth patterns. These barriers include unsafe neighborhoods and inadequate access to healthy foods. It is theorized that obesity interventions

may fail because the content does not account for the wide variability of cultural, social, and psychological factors that contribute to both obesity and health behaviors (Heerman et al., 2019).

Community and Family-Based Interventions

Community based lifestyle interventions that include diet combined with physical activity can reduce the risk of obesity and improve cardiometabolic and psychosocial health in Hispanic children (Brown et al., 2019; Soltero et al., 2018). Since parents and culture have significant influences in children's lives, obesity prevention interventions strategies should include the family (Ash et al., 2017). In a community-based diabetes prevention program for Latino youth with obesity, a weekly nutrition and health class was delivered along with exercise sessions to groups of families (Soltero et al., 2018). After three months, the children in the intervention group had significant increases in insulin sensitivity and quality of life, along with reductions in BMI, waist circumference, and percent body fat percentage (Soltero et al., 2018). Likewise, a 12-week gardening, cooking, and nutrition intervention showed significant reduction in BMI z-scores and waist circumference in the low-income, Hispanic youth participants living in Los Angeles (Gatto et al., 2017).

Motivational interviewing (MI) may be an effective intervention when used with adolescents to treat obesity. In a meta-analysis of 11 studies, a community-based intervention using MI was used to analyze effects on reducing body mass index (BMI) and BMI percentile. While there were no statistically significant findings, MI needs to be further explored as it has shown to be effective in other weight loss studies (Vallabhan et al., 2018).

A family-based randomized controlled trial (RCT) that included 117 obese mother and child dyads offered group education sessions for the intervention. The intervention group had significant results in reducing portion sizes, decreasing the number of times parents forced the

children to finish meals, and decreasing the amount of food substitutions (López-Contreras et al., 2020). The intervention also demonstrated efficacy in increasing the consumption of roasted foods, fruits, and vegetables. Furthermore, the children in the intervention group showed significantly decreased insulin resistance (López-Contreras et al., 2020).

A two-armed RCT did not show significant effects on BMI when enhanced primary care plus contextually tailored, individual health coaching was used as an intervention versus enhanced primary care alone (Taveras et al., 2017). Both groups were given social and emotional wellness education which included stress reduction techniques, positive thinking, and content about bullying. Both groups showed improved parent perception of empowerment related to their child's weight management and improved quality of life scores (Taveras et al., 2017).

Minding the Baby, another community-based program, focuses on the development of primary relationships, culture, and community to support the health, mental health, and development of mothers and children living in marginalized families (Ordway et al., 2018). Participants in this program were primarily Hispanic and the focus was to develop and enhance parent-child attachment, maternal reflective functioning, and to promote positive parenting behaviors. Data from a prospective longitudinal cohort study on this program showed significantly lower rates of obesity among 2-year-old children living in low-socioeconomic-status communities (Ordway et al., 2018). Similarly, a multi-faceted three-year intervention including parent workshops on nutrition and physical activity, school-based nutrition lessons, enhanced physical education program for children, and a monthly voucher for fruits and vegetables was effective at slowing the rate of BMI growth among Mexican-heritage children (Sadeghi et al., 2019).

School Based Interventions

School based interventions have been explored but only a few have demonstrated efficacy in combating childhood obesity as a whole. An after-school, 12-week, randomized controlled cooking and gardening intervention was conducted in elementary schools in Los Angeles. This intervention included primarily Hispanic participants. It demonstrated how attitudes, self-efficacy, and motivation psychosocial behaviors relate to changes in dietary intake and health outcomes even though there was not significant reduction in BMI. (Landry et al., 2019). Likewise, a breakfast in the classroom initiative, which included nutrition education for children in low-income communities, showed no significant effect on overweight or obesity prevalence (Polonsky et al., 2019). However, in one school based RCT that offered a greater variety of bite-sized food and water at lunch as well as posters promoting physical activity, and nutrition education did show long-term effects on BMI percentile (Bogart et al., 2016).

Primary Care Interventions

Current primary care interventions for childhood obesity include physician education and implementation of a family based multidisciplinary program focused on behavior modification (Gupta & White, 2017). Families are taught, in the primary care setting, to focus on five servings of fruits and vegetables, four or more glasses of water, three cups of low-fat milk, two important meals (breakfast and family dinner), one hour of physical activity for one hour of screen time, and zero sugar sweetened beverages (Gupta & White, 2017). Prevention strategies and programs can be classified as behavior-oriented, which are individual-based interventions, or community-based, which are context-related interventions (Weihrauch-Blüher et al., 2018). Current prevention strategies have focused mainly on the individual and there are gaps in the

community area as these strategies have not been heavily studied or utilized (Weihrauch-Blüher et al., 2018).

Research Gaps

Evidence based strategies for preventing and treating childhood obesity are evolving. There are limited studies targeting diverse populations, such as the Hispanic community, that go beyond diet and physical activity. This inhibits the development of comprehensive, tailored, community and family-based interventions (Ash et al., 2017). Research gaps include studies in low-income countries, interventions for children on the lower and higher ends of the age spectrum, interventions targeting media use and sleep, and studies with racial minorities and children from non-traditional families (Ash et al., 2017).

Common themes presented in the literature review are that community and family-based interventions that include both diet education and an exercise component have demonstrated most efficacy in childhood obesity treatment and prevention within the Latino community. Current practices that are utilized in the primary care setting should move to a community and family-based approach and include both nutrition education and an exercise component. A culturally tailored, community-based intervention program is a promising intervention to implement for the children and families in Naco, Mexico.

Internal Evidence

The children of Naco, Mexico are experiencing high rates of childhood obesity (T. Carlson, personal communication, March, 4, 2021). The Naco Wellness Initiative has two primary goals to improve overall child and adult health and wellness. The first is to reduce the incidence of diabetes and other preventable chronic diseases through educational, physical activities, by participative organic gardening, and fundamental nutrition education. The second is

to improve glycemic control, health literacy, diabetes distress, diabetes self-efficacy, and medication adherence among children and adults (Naco Wellness Initiative, 2020).

Preliminary interest in this problem led to an inquiry of current evidence to determine the best interventions for childhood obesity and a literature review was conducted to answer the clinically relevant PICOT question, “In overweight and obese Latino children, how does a community and family-based education program, compared to no prevention program, affect body mass index, over 16 weeks?”

Search Strategy

In an effort to answer this clinical question, an exhaustive search was conducted in the Cumulative Index to Nursing and Allied Health Literature (CINAHL), PubMed, and Cochrane Library databases as they are broadly known as reputable sources of scientific journals and health science literature. The databases were searched using combinations of the key terms that addressed all aspects of the PICO question and included: *children, kids, youth, child, pediatric, paediatric, Mexican, Latino, Hispanic, Chicanos, Latinas, Chicanas, overweight, obese, obesity, fat, unhealthy weight, high BMI, obesity prevention, community-based intervention, community-based program, family-based program, family-based intervention, school based program, nutrition education, exercise, education, BMI, and body mass index*. All searches were limited to peer reviewed articles published between the years 2015 and 2021. Titles and abstracts were screened for key terms applicable to the PICO. Rapid critical appraisal was done to further extract 10 final studies that were included in the evaluation table (Appendix A). Grey literature of government publications from the Centers for Disease Control and Prevention and Arizona State government policies were also searched.

CINAHL

In the initial search of PICO terms and with “the equivalent subjects expander” enabled, 718 articles were yielded. The number of available articles was decreased to 304 when limiters for peer reviewed articles published between 2015 and 2021 were applied. Titles and abstracts were screened for high quality evidence. The final yield of 16 studies were chosen for further review and critical appraisal.

PubMed

The initial search of PICO terms produced 526 articles. In addition to the prior mentioned limiters, results were further restricted to randomized controlled trials, systematic reviews, and meta analyses. Of the 68 articles that remained, 25 were selected for further review.

Cochrane Library

The initial search of the PICO key terms produced three systematic reviews and 182 clinical trials. The systematic reviews were disqualified as they did not adequately address the PICO. After further extraction based on titles and abstracts, and excluding repetitive studies already chosen, an additional 10 studies were chosen for rapid critical appraisal.

Critical Appraisal and Synthesis of the Evidence

The rapid critical appraisal process developed by Melnyk and Fineout-Overholt (2019) was used to determine the quality and strength of the selected articles. The quality of evidence was high as most studies were RCTs conducted without bias (see Appendix A, Table A1). One study was a quasi-experimental study which was included in the table as it showed significant results with a large population over long period of time (Sadeghi et al., 2019). All of the studies included showed statistically significant results on at least one outcome variable. Heterogeneity was observed in the sample size as well as the time period (see Appendix A, Table A2). Samples sizes ranged from 37 participants to 2,439 participants. Interventions were carried out over a

period of five weeks to three years. The sample characteristics were relatively homogenous, as the majority of participants were Latino children ages four to 15 years and included their parents. One study included only females (Daly et al., 2016) and another study included only young mothers (Ordway et al., 2018). All of the studies were conducted in the United States. Six studies were conducted in urban areas (Bogart et al., 2016; Boutelle et al., 2017; Daly et al., 2016; Gatto et al., 2016; Heerman et al., 2019; Soltero et al., 2018) and four studies were conducted in rural areas (Crespo et al., 2018; Falbe et al., 2015; Ordway et al., 2018; Sadeghi et al., 2019). All of the studies included BMI (either BMI% or BMIz) or body composition as an outcome variable.

Seven of the studies included both nutrition education and an exercise component in the intervention (Bogart et al., 2016; Boutelle et al., 2017; Crespo et al., 2018; Falbe et al., 2015; Heerman et al., 2019; Sadeghi et al., 2019; Soltero et al., 2018). Parenting skills was a focus in the intervention of five of the studies (Boutelle et al., 2017; Crespo et al., 2018; Falbe et al., 2015; Heerman et al., 2019; Ordway et al., 2018). Behavior modification was apparent in the intervention of four studies (Boutelle et al., 2017; Crespo et al., 2018; Daly et al., 2016; Soltero et al., 2018). Only one study included mindful eating as a component of the intervention (Daly et al., 2016). Three of the studies mention that the interventions were culturally tailored to the Latino community (Falbe et al., 2015; Heerman et al., 2019; Sadeghi et al., 2019). Only one study included a food voucher as a component of the intervention (Sadeghi et al., 2019). The intervention included a cooking component in two of the studies (Gatto et al., 2016; Sadeghi et al., 2019). Likewise, two studies included emotional well-being as a part of the intervention focus (Ordway et al., 2018; Soltero et al., 2018).

There is growing compelling evidence to suggest that childhood obesity prevention and intervention measures that incorporate both nutrition education and physical activity is effective in decreasing BMI trajectory in the Latino community. Culturally tailored interventions can further enhance outcomes when family and community influences are included. Family and community-based interventions have the potential to decrease BMI trajectory as well as increase quality of life, strengthen the sense of wellbeing, and enhance self-efficacy.

Theory Application

Family, environment, and cultural influences are important to consider within the Latino community. The Social Cognitive Theory (SCT) was chosen to guide the development and delivery of a childhood obesity prevention program in Naco, Mexico (see Appendix B, Figure 1). SCT addresses psychosocial factors and motivations influencing health behaviors and methods to promote sustainable behavior change (Bandura, 1986). Bandura's SCT suggests that an individual's behavior is shaped by the ability to regulate behavior and shape the environment (Knol et al., 2016). Interaction between the individual's personal factors, environment, and behaviors is termed 'reciprocal determinism', meaning that these factors has the potential to influence the others. Social Cognitive Theory suggests that the environment can influence behavior and can be altered to reinforce healthy eating and physical activity (Knol et al., 2016). Concepts of SCT include the environment, behavioral capacity, self-control, observational learning, reinforcements, and self-efficacy (Knol et al., 2016). These past experiences are highly variable and dependent on cultural experiences. In relation to the design and development of a childhood obesity prevention program in Naco, Mexico, SCT guides the inclusion of family and community influences as well as past experiences that influence current behaviors that put children at risk of obesity. Altering the home or community environment and parental behavior

can lead to changes in the child's behavior and will positively impact the child's health (Knol et al., 2016).

Implementation Framework

The implementation of this DNP project is guided by the Rosswurm and Larrabee Model (1999) (see Appendix B, Figure 2). This model is useful because it adapts to specific needs and problems in an organization. The model is comprised of concrete steps to efficiently facilitate overcoming problems, issues, or gaps identified when planning to make improvement or practice change. The steps agree with a doctoral project timeline as they align with specific curriculum trajectory goals recommended each semester. The model begins with assessment of the problem and moves through linking the problem to an intervention and intended outcomes, then synthesizing the evidence in order to design a practice change, then implementing the practice change, and ends with sustaining and maintaining the practice change. This model guides the change agent and provides the user with the ability to progress through each step linearly or to go back and forth between steps, or even start over based on unforeseeable problems. It also allows for long term sustainability as it promotes communication and education with stakeholders in order to integrate the practice change into standards of practice (Rosswurm & Larrabee, 1999). This model is efficient as it guided the development and execution of a culturally tailored, community-based obesity prevention program).

Each step of this DNP project was guided by this model. An initial needs assessment took place with stakeholders and providers in the clinic. Specific content needs were assessed as it relates to childhood obesity issues in Mexico. An exhaustive literature search was conducted to synthesize the best evidence about childhood obesity prevention and treatment measures. A community-based education program was then designed and implemented to address the specific

needs of the Latino community. The process and outcomes from the program have been evaluated. Measured outcomes of the childhood obesity education program included knowledge, self-efficacy, and changes in dietary and exercise habits. Every part of the process has been constantly monitored and evaluated and any necessary changes were made. The original plan was to implement the program into the clinic as a practice change. Processes and outcomes were updated for the most efficient and effective childhood obesity education program.

Implications for Practice Change

Evidence shows that a community-based intervention is effective in decreasing BMI trajectory, promoting behavior change, and enhancing self-efficacy. By applying this evidence to the community in Naco, Mexico, a northern border community, it is intended to lead to behavioral changes at the individual level and, potentially, influence health within the broader community by altering social norms. The development of a culturally tailored childhood obesity program delivered in a format that permits sustainability without the expense of limited resources is crucial in order to make a significant impact against childhood obesity in the Latino community.

As interventions for youth with obesity move beyond a singular focus of weight loss to improving cardiometabolic and psychosocial health outcomes, the focus of the intervention should benefit from a broader definition of clinical significance that includes positive outcomes on physical and mental health as well as quality of life (Soltero et al., 2018). Community based interventions are particularly important to implement within the Latino community because peers who share the same community and cultural experiences are well positioned to give and receive support for healthy behavior change (Soltero et al., 2019). Parents also play a central role in supporting lifestyle behaviors by shaping their child's food and physical activity environments,

through parenting practices, and by serving as role models and are critical agents in implementing the components of the interventions (Soltero et al., 2019). The educational intervention should provide parents with the skills and resources needed to support behavior change at the family level (Soltero et al., 2019).

Planning for a community-based intervention included physical activity and nutrition education for the entire family and community. Family education is effective in promoting positive health behaviors and mitigating some barriers and limitations many Latino families may encounter (Tamayo, Dobbs & Pincu, 2020). Input from stakeholders and community members were obtained during meetings throughout all phases of DNP project design to ensure that the education was appropriately translated and tailored toward the unique needs of the community. The use of culturally familiar objects such as promotoras, traditional foods, culturally accepted forms of physical activity, group sessions, and family involvement is imperative as this may be effective among Latino children and parents (Tamayo, Dobbs & Pincu, 2020). Current knowledge, self-efficacy, and attitudes as well as current behaviors related to dietary and physical activity habits were obtained through the use of pre- and post- surveys and questionnaires.

Method

Ethics

Four ethical principles were used to guide this DNP project: autonomy, justice, beneficence, and nonmaleficence. Autonomy, or respect for persons, is defined as the duty to respect the self-determined decisions of others (ANA, 2015). Autonomy was maintained and participants will remain free of coercion and coaxing. The risks and benefits were thoroughly explained and written consent was obtained. Justice is defined as the equitable distribution of

social burdens benefits in society (ANA, 2015). Fair distribution of scarce resources, competing needs, rights and obligations, and potential conflicts with established legislation was considered in order to maintain justice among all participants. Scarce resources related to the DNP project include lack of access to the internet and mobile devices. The promotoras, or community health workers, were trained and educated in order to deliver educational resources in real time, in person for sustainability. All materials were translated to Spanish for participants to understand and comprehend. Beneficence is defined as the intent of doing good (ANA, 2015). This intervention, called “Familia Sana, Vida Sana” was designed with intent to do good maintaining beneficence. A narrative video education program was designed to educate and empower participants to make health eating and living choices, thus impacting their health in the future. Nonmaleficence is defined as the intent to do no harm (ANA, 2015). The intervention was designed with the intent to do no harm to the participants. Participants had the option to drop out of the intervention at any time, for any reason. The Arizona State University Internal Review Board (IRB) granted approval prior to recruitment of participants and initiating the DNP project (See Appendix D for approval letter).

Setting and Stakeholders

The Naco Wellness Initiative (NWI) provides medical and wellness services to benefit the minds and bodies of people with limited resources in Naco, Mexico. Naco Wellness Initiative collaborates with bi-national health care providers, through a well-organized and professional infrastructure while, at the same time, strives to maintain the values and culture of the local people and their communities. Mr. Tom Carlson is the president of the NWI and is responsible for all the services it provides and its successes and challenges. Mrs. Lupita Sanchez, the director of NWI, directly oversees the community health workers, known as the promotoras, and the

services provided by the NWI. Mrs. Sanchez holds the responsibility of organizing events, hiring new staff, and preparing department budgets. There are nine promotoras. Promotoras are community health workers that contribute their time and efforts to the NWI in exchange for compensation, benefits, training and professional development. Their time and effort are investments made to the organization, and they depend on the organization's success to ensure their continued employment.

Intervention Planning

An initial needs assessment was conducted to assess the needs of the Naco community. The Naco Wellness Initiative leadership team and staff were asked about the range of content they would like included in the program, as well as the duration and time for the entire educational program.

There were a few barriers identified in the initial needs assessment. There is scarce availability of healthy foods, fruits, and vegetables within the community. There is one small grocery store where locals can shop. This grocery store offers a very limited variety of fruits and vegetables, but has a wide range of highly processed foods, sugar sweetened beverages, and candy available. There is no internet connection or WiFi available. Literacy level is low and some adults are illiterate. Schools remained closed for many months due to the COVID-19 pandemic. Educational materials are designed with barriers in mind and tailored to the community's needs.

The NWI does not have health records, electronic or paper, for their community members and there is no electronic means for data collection. For this DNP project, pre- and post- data collection included paper surveys in order to obtain the participants' current nutrition and physical activity knowledge, current diet practices, and self-efficacy.

Intervention Implementation

The intervention was given the name “Familia Sana, Vida Sana” which translates from Spanish to “Healthy Family, Healthy Life” in English. *Familia San, Vida Sana* included weekly face-to-face education sessions of 30-60 minutes each. Participants completed two modules per day. The total duration of the DNP project was two weeks. Content included both a nutrition component and a physical activity component. An emphasis was made on increasing time spent doing physical activity, increasing water consumption, decreasing sugar sweetened beverages, and increasing fruit and vegetable consumption. Whiteboard videos, via videoscribe™ software, were developed for each module. Each video was then converted to an MP4 format to be played on a large television screen for participants in the NWI clinic. Spanish worksheets and handouts were developed to enhance learning and give participants a tangible reference for individual learning. *Familia Sana, Vida Sana* is based on information from the CDC and adapted to fit the needs of the community. All content was developed for low literacy levels and translated to Spanish and back to English by certified translators to verify proper translation. The specific content follows the Table C1 outline (see Appendix C).

Participants were consented on day one of *Familia Sana, Vida Sana* as they gathered at NWI community center to attend the intervention. Mrs. Bahena, project facilitator, consented the participants.

Prior to the start of the *Familia Sana, Vida Sana*, the participants completed the pre-survey (See Appendix E). The participants created their own identification number for the surveys (month of their birthday and year their first child was born). After consent procedures were completed, the pre-surveys were distributed to participants. The pre-survey took 15 to 20

minutes to complete. For those who were unable to read, the questions were read to them by Mrs. Bahena, project facilitator.

Each education session (i.e., total of 4 sessions) was delivered via video and projected on a large television screen. Each video was saved to a hard drive and emailed to Mrs. Lupita Sanchez. The wellness center does not have internet but they have the ability to play an MP4 on a large television screen. Each video was 25 to 35 minutes in length. A question break was built into the video presentation. Questions were answered by the promotoras and Mrs. Bahena, who were present at all sessions.

The promotoras' role during the educational session was answer any questions about the content. They did not consent consenting participants or collect the surveys. Their primary role was to provide support to the participants and answer any questions. Promotora training session took place one week prior to the start of *Familia Sana, Vida Sana*. Promotoras were given an overview of the content and given a chance to ask questions.

The post-survey was distributed to participants at the NWI community center after the last education session (See Appendix E). The post-survey took approximately 15 to 20 minutes to complete. For those who are unable to read, the questions were read to them by Mrs. Bahena.

Participants and Recruitment

The promotoras of the NWI screened and recruited participants. Families with children between the ages of two and 18 years were recruited. Inclusion criteria included a child's BMI in range of overweight or obese or at least one factor that puts the participant at risk for obesity. Risk factors for obesity are listed in the inclusion and exclusion criteria table (see Appendix C, Table C2). Children and their families were excluded if they were not interested in participating

in the DNP project, were planning to move out of the town, did not have an eligible child living in their home, or were not able to complete pre- and post-surveys.

Data and Outcome Measures

Demographics were collected on participants which included age and education. The primary outcomes of interest were self-efficacy, knowledge, and behavior change for nutrition and physical activity. Guided by SCT, self-efficacy and knowledge were measured. Pre- and post-surveys were developed by the DNP student and mentor and were used as tools for data collection (see Appendix D). The pre-survey contains three questions about demographics including a question about age, a question about how many children live in the household, and a question about the highest level of education obtained by the participant. There are two questions about food security. The pre- and post-survey both contain questions about the number of hours of screen time, the number of hours spent doing physical activity, the number of servings of fruits and vegetables each child consumes each day, and the number of sugar sweetened beverages each child consumes in a day. The pre- and post-survey contain five questions about parent self-efficacy to make lifestyle changes for health. The surveys were developed in English and then translated to Spanish and back to English, by certified translators, to assure accurate translation.

Data was collected and maintained by the Mrs. Bahena, project facilitator, for the duration of the DNP project. All data was kept private and did not contain individual identifying factors such as participants names. Each participant chose a random number identifier (month of their birthday and year their first child was born). De-identified data was shared only with professionals working on the project. All data will be destroyed via shredding after the dissemination of results and findings.

Results

Data was analyzed using the Intellectus Statistics software™. There were 11 participants that were consented and completed the pre-surveys. There were 8 participants (73%) that completed all four education sessions and filled out both the pre-survey and the post-survey. Just over one third of participants had completed some high school. The majority of participants had 2 children (Mean=1.91, SD=0.94). Frequencies and percentages of the other demographic data are presented in Table 1.

Table 1

Descriptive Statistics

Variable	<i>n</i>	%
Age		
35-44	3	27.27
55-64	1	9.09
45-54	5	45.45
65+	1	9.09
25-34	1	9.09
Missing	0	0.00
Education		
Some high school	4	36.36
Elementary school graduate	2	18.18
Bachelor's degree	1	9.09
High school graduate	3	27.27
Some elementary school	1	9.09
Missing	0	0.00

Outcome measures

TV viewing

The result of the two-tailed paired samples *t*-test for changes in child TV viewing from before the educational intervention and after the intervention was not significant based on an alpha value of .05, $t(9) = 0.00$, $p = 1.000$. Cohen's *d* value is 0.36 which shows a small effect. The results are presented in Table 2.

Physical activity

The result of the two-tailed paired samples *t*-test for child physical activity was not significant based on an alpha value of .05, $t(9) = -0.80$, $p = .443$. Cohen's *d* value is 0.25 which shows a small effect. The results are presented in Table 2.

Healthy Lifestyle Knowledge

The result of the two-tailed paired samples *t*-test was not significant for parent healthy lifestyle knowledge based on an alpha value of .05, $t(7) = -1.93$, $p = .095$. Cohen's *d* value is 0.68 which shows a medium effect. The results are presented in Table 2

Fruit and Vegetable Intake

The result of the two-tailed paired samples *t*-test was not significant for child fruit and vegetable intake based on an alpha value of .05, $t(9) = 1.50$, $p = .168$. Cohen's *d* value is 0.47 which shows a small effect. The results are presented in Table 2.

Sugar Sweetened Beverage (SSB) Intake

The result of the two-tailed paired samples *t*-test was not significant for child sugar sweetened beverage intake based on an alpha value of .05, $t(9) = 1.00$, $p = .343$. Cohen's *d* value is 0.32 which shows a small effect. The results are presented in Table 2.

Self-Efficacy

The result of the two-tailed paired samples *t*-test was significant for parent self-efficacy based on an alpha value of .05, $t(7) = -2.66$, $p = .032$, Cohen's *d* value is 0.94 which shows a

large effect. The results are presented in Table 2.

Table 2

Two-Tailed Paired Samples t-Test

Pre-TV		Post-TV		<i>t</i>	<i>p</i>	<i>d</i>
<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
2.69	0.92	3.21	0.95	2.24	.031	0.36
<i>Note.</i> N = 10. Degrees of Freedom for the <i>t</i> -statistic = 9. <i>d</i> represents Cohen's <i>d</i> .						
Pre-Activity		Post-Activity		<i>t</i>	<i>p</i>	<i>d</i>
<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
1.80	0.92	2.00	0.82	0.80	.443	0.25
<i>Note.</i> N = 10. Degrees of Freedom for the <i>t</i> -statistic = 9. <i>d</i> represents Cohen's <i>d</i> .						
Pre-Knowledge		Post-Knowledge		<i>t</i>	<i>p</i>	<i>d</i>
<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
1.88	0.83	2.50	0.53	-1.93	.095	0.68
<i>Note.</i> N = 8. Degrees of Freedom for the <i>t</i> -statistic = 7. <i>d</i> represents Cohen's <i>d</i> .						
Pre-Fruit&Veg		Post-Fruit&Veg		<i>t</i>	<i>p</i>	<i>d</i>
<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
2.20	0.42	2.00	0.00	1.50	.168	0.47
<i>Note.</i> N = 10. Degrees of Freedom for the <i>t</i> -statistic = 9. <i>d</i> represents Cohen's <i>d</i> .						
Pre-SSB		Post-SSB		<i>t</i>	<i>p</i>	<i>d</i>
<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
2.10	0.32	2.00	0.00	1.00	.343	0.32
<i>Note.</i> N = 10. Degrees of Freedom for the <i>t</i> -statistic = 9. <i>d</i> represents Cohen's <i>d</i> .						
Pre-Self-Efficacy		Post-Self-Efficacy		<i>t</i>	<i>p</i>	<i>d</i>
<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
12.25	2.76	15.62	4.72	-2.66	0.032	0.94
<i>Note.</i> N = 8. Degrees of Freedom for the <i>t</i> -statistic = 7. <i>d</i> represents Cohen's <i>d</i> .						

Evaluation of Program

There were qualitative evaluation questions included at the end of the post-survey.

Familia Sana, Vida Sana received all positive comments from all participants. All participants would recommend this program to a friend or family member. Examples of comments about

Familia Sana, Vida Sana included, “This program was perfect”, “I liked everything and I want to learn more”, and “It was interesting & well explained with everything you need”.

Discussion

Childhood obesity can contribute to child and adolescent diabetes, cardiovascular disease, cancer, depression, thyroid disease, fatty liver, and/or other chronic diseases. The purpose of this DNP project was to implement nutrition and exercise education into an underserved border community clinic in Mexico. There were no statistical differences for Latino parent/legal guardian knowledge or behavior change after the delivery of an educational intervention targeting the promotion of healthy lifestyle behaviors. There was a statistically significant change in parent/legal guardian self-efficacy in their ability to give their children a healthy diet and lifestyle by including an hour or more of physical activity into their routines, give them five servings of fruits and vegetables daily, and limiting sugar sweetened beverages to one serving per week. These findings were not unanticipated as the educational intervention was not long enough to demonstrate behavior change. The mean scores for healthy lifestyle knowledge, the number of sugar-sweetened beverages consumed, the amount of servings of fruits and vegetables consumed, and the amount of daily physical activity demonstrated improvement after the intervention even though the results were not statistically significant. The content of *Familia Sana, Vida Sana* is congruent with the literature as it includes information on nutrition and exercise. In the literature review conducted, all of the studies included showed statistically significant results on at least one outcome variable and all interventions were carried out over a period of five weeks to three years (see Appendix A, Table A1). Therefore, the duration of *Familia Sana, Vida Sana* was too short to accurately assess knowledge and behavior change.

Limitations

There were many circumstances prior to and during the implementation of the educational intervention. The intervention took place south of the border in an underserved community in Mexico. Therefore, multiple border crossings were necessary in all phases of the

DNP project. Due to the COVID 19 pandemic, multiple border closures significantly impacted that timing and duration of the project. *Familia Sana, Vida Sana* was originally planned as a 6-week intervention. The duration was shortened to two weeks because of additional border closures and COVID-19 outbreaks. Also, the time line for implementation was pushed forward from October 2021 to January 2022. The clinic was completely closed during the month of December. The new timeline was feasible to initiate the *Familia Sana, Vida Sana* because the NWI has a well-established garden program that began at the end of January 2022 and the educational program was congruent with the garden program goals. The clinic could not accommodate the originally planned intervention length (i.e., six sessions) during the month of January 2022. Therefore, the intervention was necessarily shortened to once a week for two weeks with two modules delivered each week.

Strengths

The participants and promotoras were open and motivated to learn which served as a facilitator to the DNP project. Parents of at-risk children who attended all sessions, participated interactively. The intervention content was designed for sustainability by the inclusion of promotoras in the delivery of the education in their home base clinic. The portability of the MP4 method of delivery is efficient for sustainability. Other strengths of the education were that it is culturally tailored, delivered in Spanish, and developed for low literacy levels.

Conclusion

Physical activity and nutrition education, that is culturally tailored, is a promising intervention to help decrease the risk factors associated with childhood and adolescent obesity. Nutrition and physical activity knowledge are imperative for promoting health and wellness in rural and underserved communities. Furthermore, healthy lifestyle education needs to be tailored

to fit within the specific community needs to enhance learning, behavior change, and promote self-efficacy. If this program continues to be delivered in the future, conducting weekly sessions for a duration of at least six weeks is warranted.

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Appendix A

Evaluation and Synthesis Table

Table A1

Quantitative Evaluation Table

Citation	Theory/ Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables & Definitions	Measurement/ Instrumentation	Data Analysis	Findings/ Results	Level of Evidence; Decision and application to practice
Bogart et al. (2016). Two-year BMI outcomes from a school-based intervention for nutrition and exercise Funding: Supported by the National Institute on Minority Health and Health Disparities Country: USA	Integrated model of school-based prevention: inferred	Design: RCT Purpose: To examine the long-term effects on BMI of an RCT for a 5-week, middle school-based obesity prevention intervention	N: 2439 n: 1178 INT n: 1261 COM Setting: School Demographics: overweight or obese Latino children in the 7 th grade Retention: 56%	IV: SNaX, a 5-week school-based intervention to promote healthy eating and encourage physical activity DV1: BMI%	Height: stadiometer Weight: electronic scale BMI: calculated as (weight in pounds/[height in inches × height in inches]) × 70; CDC classification	Multivariable regression	DV1: Students overall: unadjusted b, – 1.15 (SE, 1.02; P = 0.26); adjusted b, –0.98 (SE, 1.01; P =0.33) Healthy weight students: unadjusted b, – 1.99 (SE, 2.40; P = 0.41); adjusted b, –1.43 (SE, 2.35; P = 0.54)	LOE: II Strengths: large n, appropriate statistical method, demonstrates long term effects Weaknesses: the use of district records for height and weight outcomes 2 years’ post-intervention, rather than follow-up assessments

Key: **AHF**- Active and Healthy Families intervention; **ASU**-Arizona State University; **BASH**-Brief Acculturation Scale for Hispanics; **BC**-Body Composition; **BMI**-Body Mass Index; **BMIZ**-Body Mass Index z-Score; **BRFSS**- Behavioral Risk Factor Surveillance System; **CI**-Confidence Interval; **CDC**-Center for Disease Control and Prevention; **COACH**-Competency-Based Approaches to Community Health; **COB**-Country of Birth; **COM**-Comparison Group; **DV**-Dependent Variable; **DXA**-dual-energy X-ray absorptiometry; **F**-Female; **FBT**-Family Based Treatment; **FCI**-Family Centered Intervention; **FRESH**- The Family, Responsibility, Education, Support and Health; **LOE**-Level of Evidence; **INT**-Intervention Group; **IRR**-Incidence Rate Ratio; **IS**-Insulin Sensitivity; **IV**-Independent Variable; **M**-Mean; **Ma**-Male **MAAS**-Mindful Attention Awareness Scale; **MEI**-Mindful Eating Intervention; **MTB**-Minding The Baby; **MVPA**-Moderate to Vigorous Physical Activity; **MX**-Mexico; **OTT**-Oral Glucose Tolerance Test; **NHANES**-National Health and Nutrition Examination Survey; **NSFS**- Niños Sanos, Familia Sana; **PBT**-Parent Based Treatment; **PE**-physical activity/exercise; **PPAP**: Preschooler Physical Activity Parenting Practices; **QOL**-Quality of Life; **RCT**-Randomized Control Trial; **TG**-Triglycerides; **WC**-Waist Circumference; **WCTHR**: Waist Circumference to Height Ratio

Citation	Theory/ Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables & Definitions	Measurement/ Instrumentation	Data Analysis	Findings/ Results	Level of Evidence; Decision and application to practice
<p>Bias: None recognized</p>							<p>Overweight students: unadjusted b, 0.90 (SE, 1.50; P = 0.55); adjusted b, 1.05 (SE, 1.51; P = 0.49)</p> <p>Obese students: unadjusted b, -2.59 (SE, 0.81; P = 0.002); adjusted b, -2.33 (SE, 0.83; P = 0.005)</p>	<p>conducted by trained members of the study team, low retention rate</p> <p>Conclusion: SNaX showed substantial effects on BMI among obese students 2 years postintervention</p> <p>Feasibility: low retention rate, education program delivered in the schools; generalizable to children of Naco, Mexico</p>

Key: **AHF**- Active and Healthy Families intervention; **ASU**-Arizona State University; **BASH**-Brief Acculturation Scale for Hispanics; **BC**-Body Composition; **BMI**-Body Mass Index; **BMIZ**-Body Mass Index z-Score; **BRFSS**- Behavioral Risk Factor Surveillance System; **CI**-Confidence Interval; **CDC**-Center for Disease Control and Prevention; **COACH**-Competency-Based Approaches to Community Health; **COB**-Country of Birth; **COM**-Comparison Group; **DV**-Dependent Variable; **DXA**-dual-energy X-ray absorptiometry; **F**-Female; **FBT**-Family Based Treatment; **FCI**-Family Centered Intervention; **FRESH**- The Family, Responsibility, Education, Support and Health; **LOE**-Level of Evidence; **INT**-Intervention Group; **IRR**-Incidence Rate Ratio; **IS**-Insulin Sensitivity; **IV**-Independent Variable; **M**-Mean; **Ma**-Male **MAAS**-Mindful Attention Awareness Scale; **MEI**-Mindful Eating Intervention; **MTB**-Minding The Baby; **MVPA**-Moderate to Vigorous Physical Activity; **MX**-Mexico; **OTT**-Oral Glucose Tolerance Test; **NHANES**-National Health and Nutrition Examination Survey; **NSFS**- Niños Sanos, Familia Sana; **PBT**-Parent Based Treatment; **PE**-physical activity/exercise; **PPAP**- Preschooler Physical Activity Parenting Practices; **QOL**-Quality of Life; **RCT**-Randomized Control Trial; **TG**-Triglycerides; **WC**-Waist Circumference; **WCTHR**: Waist Circumference to Height Ratio

Citation	Theory/ Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables & Definitions	Measurement/ Instrumentation	Data Analysis	Findings/ Results	Level of Evidence; Decision and application to practice
<p>Boutelle et al. (2017)</p> <p>Effect of attendance of the child on body weight, energy intake, and physical activity in childhood obesity treatment</p> <p>Country: USA</p> <p>Funding: None</p> <p>Bias: None recognized</p>	<p>Family Based Treatment model: inferred</p>	<p>Design: RCT</p> <p>Purpose: To determine whether PBT is similarly effective as FBT on child weight loss over 24 months</p>	<p>N: 150 n: 75 INT n: 75 COM</p> <p>Settings: an academic medical center</p> <p>Demographic: Children: mean BMI 26.4; mean BMI z score 2.0; mean age 10.4 years; 66.4% girls Parents: mean BMI 31.9; mean age 42.9 years; 87.3% women; and 31% Hispanic, 49% non-Hispanic white, and 20% other race/ethnicity</p> <p>Retention: 87%</p>	<p>INT: FRESH, nutrition and physical activity education, parenting skills, and behavior modification strategies</p> <p>DV1: Child weight loss</p>	<p>height and weight: measured in duplicate; the mean of the 2 values was used to calculate BMI (calculated as weight in kilograms divided by height in meters squared); age-adjusted BMI% and BMIz were calculated.</p>	<p>Linear Mixed Effects Regression Model (LME)</p> <p>Noninferiority Analysis</p>	<p>DV1: Decreases in BMI z in both groups: $\chi^2 = 37.07$; $p < 0.001$</p> <p>LME: 0.001 (95% CI, -0.06 to 0.06), $p = 0.96$</p> <p>Pooled: $m = 50$.007 (90% CI, -0.04 to 0.06)</p> <p>Noninferiority: 0.195 (-0.13 to -0.065)</p>	<p>LOE: II</p> <p>Strengths: randomized design; use of noninferiority testing; racial/ethnic diversity of the families; validated treatment protocol; 24-month observation period</p> <p>Weaknesses: participants were treatment-seeking volunteers with 8- to 12-year-old children whose BMI percentile was less than 99.9% limiting generalizability; no placebo control</p>

Key: **AHF**- Active and Healthy Families intervention; **ASU**-Arizona State University; **BASH**-Brief Acculturation Scale for Hispanics; **BC**-Body Composition; **BMI**-Body Mass Index; **BMIZ**-Body Mass Index z-Score; **BRFSS**- Behavioral Risk Factor Surveillance System; **CI**-Confidence Interval; **CDC**-Center for Disease Control and Prevention; **COACH**-Competency-Based Approaches to Community Health; **COB**-Country of Birth; **COM**-Comparison Group; **DV**-Dependent Variable; **DXA**-dual-energy X-ray absorptiometry; **F**-Female; **FBT**-Family Based Treatment; **FCI**-Family Centered Intervention; **FRESH**- The Family, Responsibility, Education, Support and Health; **LOE**-Level of Evidence; **INT**-Intervention Group; **IRR**-Incidence Rate Ratio; **IS**-Insulin Sensitivity; **IV**-Independent Variable; **M**-Mean; **Ma**-Male **MAAS**-Mindful Attention Awareness Scale; **MEI**-Mindful Eating Intervention; **MTB**-Minding The Baby; **MVPA**-Moderate to Vigorous Physical Activity; **MX**-Mexico; **OTT**-Oral Glucose Tolerance Test; **NHANES**-National Health and Nutrition Examination Survey; **NSFS**- Niños Sanos, Familia Sana; **PBT**-Parent Based Treatment; **PE**-physical activity/exercise; **PPAP**: Preschooler Physical Activity Parenting Practices; **QOL**-Quality of Life; **RCT**-Randomized Control Trial; **TG**-Triglycerides; **WC**-Waist Circumference; **WCTHR**: Waist Circumference to Height Ratio

Citation	Theory/ Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables & Definitions	Measurement/ Instrumentation	Data Analysis	Findings/ Results	Level of Evidence; Decision and application to practice
								<p>Conclusion: PBT was noninferior to FBT on all outcomes</p> <p>Feasibility: Parents in PBT attended significantly fewer treatment sessions; PBT had 24% attrition at 3 months and 27% attrition at 6 months, compared with 12% and 8% attrition for FBT at the same times</p>
Crespo et al. (2018). A randomized controlled trial to prevent obesity among Latino pediatric patients	Obesity Care Model: Stated Socioecological Model for Latino Health Promotion: Stated	Design: RCT Purpose: To test the efficacy of a clinic-based intervention to lower BMI and improve BC	N: 297 n: 136 COM n: 149 INT Secondary Outcomes: n: 48 COM n: 31 INT	IV: <i>Luces de Cambio</i> 2-month family-based culturally tailored behavioral intervention; 7 group	NHANES III Anthropometric Procedures weight status classified using the 2000 CDC Growth Charts	independent-samples t-tests and chi-square tests Analysis of covariance	DV1: +0.1; p=0.19 DV2: +1.5 p=0.10 DV3: +.04; p=0.33 DV4: -1.0; p=0.02	LOE: II Strengths: specifically, targeted Latino and lower income patients at risk for obesity; measured BMI and fat%;

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Citation	Theory/ Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables & Definitions	Measurement/ Instrumentation	Data Analysis	Findings/ Results	Level of Evidence; Decision and application to practice
<p>Funding: None</p> <p>Country: USA (US-Mexico Border region)</p> <p>Bias: None recognized</p>		<p>among overweight Latino children.</p>	<p>Setting: two clinic locations in San Diego county</p> <p>Demographics: M age (months): 91.2 ± 18.0 #F: 49.8% Parent COB- USA: 89 Mexico: 203 Other: 5</p> <p>Retention: 77%</p>	<p>classes, 2 clinic visits, and 6 scripted phone calls over a 12- month period.</p> <p>DV1: Child BMI DV2: Child BMI% DV3: Child BMIz Secondary Outcomes: DV4: DXA child total % fat DV5: DXA child trunk % fat</p>	<p>DXA for BC</p>	<p>Mixed Effects Models</p>	<p>DV5: -1.8; p=0.04</p>	<p>Limitations: inclusion criteria were expanded to include the 75th to 98.9th percentiles. This may have limited ability to detect BMI changes; did not meet goal sample size; paper-based health records were used; statistically significant secondary outcomes on small N</p> <p>Conclusion: <i>Luces de Cambio</i> did not reduce BMI among overweight Latino children but did lower</p>

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								total and trunk % fat Feasibility: Low retention rate and use of DXA not feasible due to high cost
Daly et al. (2016). A mindful eating intervention: A theory-guided randomized anti-obesity feasibility study with adolescent Latino females. Funding: None Country: USA Bias: None recognized	Information-Motivation-Behavioral-Skills Theory: Stated	Design: RCT Purpose: to test the feasibility and efficacy of MEI on BMI and mindful awareness	N: 37 n: 14 INT n: 23 COM Setting: urban public high school in southern Arizona Demographic: Latino, F, age 14-17, BMI>90 th % Retention: 62%	IV: MEI DV1: BMI DV2: Motivation	Mindful awareness: MAAS scale BMI: pounds and inches Motivation: Adolescent motivation questionnaire	Independent sample t-test ANOVA	DV1: MEI group: declined by 1.1 kg/m2 (t = 3.03, p = 0.019) 4-week f/u: decline from baseline and from 6 weeks by 1.4 kg/m2 (F 1,7 = 9.24, p = 0.019; η = 0.57) COM: increased by 0.72 kg/m2 (t = 2.98, p = 0.021) delta BMI (t = 23.62, p < 0.001)	LOE: II Strengths: COM and repeated measures design; specifically targets Latinas Limitation: small pilot study; only included F; COM did not receive the information across six sessions, raising questions about whether the group meetings and instructor contact time

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							<p>DV2: no significant change</p>	<p>influenced the results</p> <p>Conclusion: Initial and sustained decline of BMI in the MEI group supports further study. The value of practicing satiety-focused mindful eating behavioral skills to facilitate health behavior change.</p> <p>Feasibility: high attrition rate but feasible due to on-site physical weight recording, culturally congruent cuisine, and recruitment strategies via promotoras</p>

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<p>Falbe et al. (2015). Active and healthy families: A RCT of a culturally tailored obesity intervention for Latino children</p> <p>Funding: grant from the Safeway Foundation and American Heart Association Postdoctoral Fellowship</p> <p>Country:USA</p> <p>Bias: None recognized</p>	<p>Trans-theoretical Model and personalized goal setting: Stated</p>	<p>Design: RCT</p> <p>Purpose: To test the impact of a family-centered, culturally tailored obesity intervention delivered through group medical appointments on BMI and other measures of cardiovascular risk among Latino children.</p>	<p>N:55 n: 28 INT n: 27 COM</p> <p>Setting: 2 Federally Qualified Health Center in California</p> <p>Demographic: Latino children aged 5-12</p> <p>Retention: 76%</p>	<p>IV: AHF program of five 2-hour medical appointments every other week for 10 weeks in the families' medical home.</p> <p>DV1: BMI DV2: BMIz DV3: TG</p>	<p>BMI: height and weight measured without shoes or clothing</p> <p>TG: Eight-hour fasting blood was collected by venipuncture</p>	<p>Two-sample t-tests and linear regression</p>	<p>DV1: decreased -0.50 in the INT and increased +0.32 in the COM, change of -0.78 (95% CI, -1.28, -0.27; P = .004)</p> <p>DV2: INT maintained weight (+0.08 kg); COM gained weight (+1.4 kg); difference in change of -1.34 kg (95% CI -2.41, -0.27; P = .02)</p> <p>DV3: improvement in INT -26.8 mg/dL (95% CI -50.1, -3.6; P = .03)</p>	<p>LOE: II</p> <p>Strengths: multicomponent, culturally tailored approached with specific focus on family stress due to immigration; promotoras were included in provider triad</p> <p>Weaknesses: long-term impact has yet to be determined; follow-up height and weight measures could not be obtained from 15 participants</p> <p>Conclusion: AHF resulted in reductions in child BMI, BMI z</p>

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								score, and triglycerides. Feasibility: relevant to PICO; generalizable to the children and families in Naco, MX
Gatto et al. (2016). LA sprouts randomized controlled nutrition, cooking and gardening programme reduces obesity and metabolic risk in Hispanic/Latino youth Funding: A Community Benefit grant from the Keck	Bandura’s self-efficacy: stated	Design: RCT Purpose: to explore the effects of a novel 12-week gardening, nutrition and cooking intervention (LA sprouts) on dietary intake, obesity parameters and metabolic disease risk among low-income, primarily	N: 375 n: 204 INT n: 171 COM Setting: school gardens Demographic: 89% Hispanic, 90% eligible for free lunch at school, majority were overweight/obese Retention: 86%	IV: LA Sprouts gardening, nutrition, and cooking for 12 weeks DV1: BMI% DV2: BMI z DV3: WC DV4: Body fat %	Height: stadiometer Weight and body fat%: bioelectrical impedance BMI: CDC classification WC: NHANES protocol	Repeated measures mixed effects linear model Chi square and independent t-tests	DV1: -2.0(2.7%) vs. -1.0(1.4%), p=0.13 DV2: -0.1(9.9%) vs. -0.04(3.8%), p = 0.01 DV3: -1.2 (1.7%) vs. 0.1(0.1%), p<0.001 DV4: -0.5(2%) vs -0.6(2.4%), 9=0.82	LOE: II Strengths: culturally tailored, took place during the afterschool hours, an ideal time for implementing programs Weaknesses: prevalence of overweight/obese is higher than national average, small study for 4 schools, data not available for long

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School of Medicine at USC provided funding to build the school gardens. Country: USA Bias: None recognized		Hispanic youth in Los Angeles						term sustainability Conclusion: LA Sprouts resulted in a decreased risk of obesity and metabolic disease and improvements in dietary intake in high-risk Hispanic youth Feasibility: high retention rate and generalizable to low income Hispanic youth
Heerman et al. (2019). Competency- based approaches to community health: A RCT to reduce childhood obesity among	Paradigm of personalized medicine: Stated	Design: RCT Purpose: To test the effectiveness of a novel intervention, COACH, on changes in child BMI over	N: 117 n: 59 INT n: 58 COM Setting: local park and recreation community center	IV: 90 min personalized counseling sessions for 15 weeks to build parent and child agency for health behaviors;	Height: stadiometers Weight: research grade and calibrated scales	BMI Z: Linear and quadratic term Child diet: Ordinary least squares regression	$\alpha = 0.05$ DV1: -0.41 kg/m ² per year; 95% CI -0.82 to 0.0; $p = 0.05$ DV2: vegetables:	LOE: II Strengths: Analysis over 12 months; several variables analyzed; personalized intervention; good retention

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<p>Latino preschool-aged children</p> <p>Funding: Department of Pediatrics at Vanderbilt University Medical Center, Turner-Hazinski Award. Dr. Heerman's time was supported by a K23 award from NHLBI</p> <p>Country: USA</p> <p>Bias: Secondary outcomes were measured by parent report and subject to recall bias.</p>		<p>1 year of follow-up</p>	<p>Demographics: Children 3–5 years old, Spanish speaking, and a BMI ≥50th percentile; parents had to self-identify as Hispanic/Latino</p> <p>Exclusion Criteria: medical condition precluded PE or if parents lived outside of specified zip code</p> <p>Retention: 91%</p>	<p>follow up maintenance phone-calls</p> <p>DV1: BMI z across 12 months DV2: child diet DV3: child PE DV4: parent BMI DV5: parent diet practices DV6: parent PE DV7: parent self-efficacy for child health behaviors DV8: PPAP scale to encourage child PE</p>	<p>Survey data: collected in Spanish</p> <p>Acculturation: Child diet: 9 single survey items used in the Feeding Infants and Toddlers Study (soda, juice, sugary drinks, fruits, vegetables, sweets, snacks, other dairy, and water)</p> <p>Child PE: parent report</p> <p>Diet practices: summed score of a 4-item questionnaire</p> <p>Parent PE: BRFSS module for PE</p>	<p>Intervention effectiveness: likelihood ratio test</p> <p>Child/Parent PE: Negative binomial regression</p>	<p>IRR = 1.91; (95% CI 1.22–2.99); p = 0.005 snacks: IRR = 0.62; (95% CI 0.42–0.94); p = 0.02</p> <p>DV6: Combined MVPA and walking: IRR= 1.99; 95% CI 1.16–3.42; p = 0.01</p> <p>DV7: sugar: B = 2.24; (95% CI 0.70–3.77); p = 0.005, juice: B = 1.59; (95% CI 0.05–3.13); p = 0.04 physical activity: B = 2.00; (95% CI 0.74–3.25); p = 0.002 fruits/vegetables: B = 1.71; (95%</p>	<p>Weaknesses: not adequately powered to detect small changes in secondary outcomes; biases may have contributed to issues with reliability of the measures; large number of statistical tests on secondary outcomes results in increased chance of Type 1 error; fairly small n</p> <p>Conclusion: Over 1-year follow-up, the intervention resulted in slower linear BMI growth for Latino preschool-aged</p>

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					<p>Parenting self-efficacy for child health behaviors: 16-item scale, with four sub-scales: avoiding sugary beverages, avoiding fruit juice, supporting fruits and vegetables intake, and supporting PE</p> <p>Parenting practices around child PE: PPAPP scale</p>		<p>CI 0.47–2.95); p = 0.01</p> <p>DV8: Engagement: B = 6.14; (95% CI 1.61–10.68); p = 0.009 psychological control: B = -1.24; (95% CI -2.35 to -0.13); p = 0.03</p> <p>*DV2-DV8: significant at 4 months only, not sustained at 12 months</p>	<p>children from poverty</p> <p>Feasibility: High retention rate indicates this is a feasible curriculum</p>
Ordway et al. (2018). A home visiting parenting program and child obesity	Socioecological approach: stated	<p>Design: RCT</p> <p>Purpose: To test the prevention-focused, socioecological approach of the</p>	<p>N: 158 n: 92 INT n: 66 COM</p> <p>Setting: participants homes</p>	<p>IV: MTB, a 27-month home visiting parenting program</p> <p>DV1: BMI z</p>	BMI z: CDC classification adjusted for age and sex	Logistic Regression Model	<p>DV1: Full Sample: CI: 95% 0.12 (0.03–0.47), p=0.03</p> <p>Hispanic Only: CI:95%</p>	<p>LOE: II</p> <p>Strengths: long term prospective design over 2 years; focuses on whole family approach</p>

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Citation	Theory/ Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables & Definitions	Measurement/ Instrumentation	Data Analysis	Findings/ Results	Level of Evidence; Decision and application to practice
Irving B. Harris Foundation, the Pritzker Early Childhood Foundation, the Seedlings Foundation, the Child Welfare Fund, the Stavros Niarchos Foundation, The Patrick and Catherine Weldon Donaghue Foundation, The Edlow Family Fund, the Schneider Family, The New York Community Trust, the National Institute of Nursing Research		MTB program on changes in rates of childhood overweight and obesity early in life.	Demographic: Majority Hispanic mothers, average age 19 Retention: 79%				0.14 (0.03–0.53), p<0.05	Weaknesses: incomplete growth data in the children’s medical records; did not collect data on other obesity risk factors Conclusion: MTB program significantly lowered the rate of obesity among 2-year-old children living in low-socioeconomic-status communities Feasibility: Generalizable to Hispanic families; intense intervention

Key: **AHF**- Active and Healthy Families intervention; **ASU**-Arizona State University; **BASH**-Brief Acculturation Scale for Hispanics; **BC**-Body Composition; **BMI**-Body Mass Index; **BMIZ**-Body Mass Index z-Score; **BRFSS**- Behavioral Risk Factor Surveillance System; **CI**-Confidence Interval; **CDC**-Center for Disease Control and Prevention; **COACH**-Competency-Based Approaches to Community Health; **COB**-Country of Birth; **COM**-Comparison Group; **DV**-Dependent Variable; **DXA**-dual-energy X-ray absorptiometry; **F**-Female; **FBT**-Family Based Treatment; **FCI**-Family Centered Intervention; **FRESH**- The Family, Responsibility, Education, Support and Health; **LOE**-Level of Evidence; **INT**-Intervention Group; **IRR**-Incidence Rate Ratio; **IS**-Insulin Sensitivity; **IV**-Independent Variable; **M**-Mean; **Ma**-Male **MAAS**-Mindful Attention Awareness Scale; **MEI**-Mindful Eating Intervention; **MTB**-Minding The Baby; **MVPA**-Moderate to Vigorous Physical Activity; **MX**-Mexico; **OTT**-Oral Glucose Tolerance Test; **NHANES**-National Health and Nutrition Examination Survey; **NSFS**- Niños Sanos, Familia Sana; **PBT**-Parent Based Treatment; **PE**-physical activity/exercise; **PPAP**: Preschooler Physical Activity Parenting Practices; **QOL**-Quality of Life; **RCT**-Randomized Control Trial; **TG**-Triglycerides; **WC**-Waist Circumference; **WCTHR**: Waist Circumference to Height Ratio

Citation	Theory/ Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables & Definitions	Measurement/ Instrumentation	Data Analysis	Findings/ Results	Level of Evidence; Decision and application to practice
Country: USA								
Bias: None recognized								
Sadeghi et al. (2019). A three-year multifaceted intervention to prevent obesity in children of Mexican-heritage Funding: National Institute of Food and Agriculture, U.S. Department of Agriculture, under award	Social Learning Theory: Stated	Design: Quasi Experimental Purpose: To determine the effectiveness of NSFS on slowing BMI growth among Mexican-heritage children.	N: 782 n: 430 INT n: 352 COM Setting: California’s rural Central Valley Demographics: M Age: 5.98 Sex: F 50.7%; Ma 49.3% Mother’s COB:USA 18.6%; MX 77.4%; other 4% Retention: 90%	IV: NSFS (Healthy Children, Healthy Family) three-year intervention included parent workshops on nutrition and PE; school-based nutrition lessons and enhanced PE program for children; and a monthly voucher for	Child BMI, age- and sex-specific percentiles, and BMI z were calculated using the CDC reference logarithmic transformation of raw BMI (log BMI) and zBMI and included both the zBMI and log BMI results	Chi-square, t-tests, and linear mixed effect model	DV1: Boys: $\beta = 0.04$ (0.02), P = 0.03 Girls: $\beta = 0.01$ (0.02), P = 0.69 DV2: Boys: $\beta = 0.25$ (0.12), P = 0.04 Girls: $\beta = -0.02$ (0.10), P = 0.81 DV3: Boys: $\beta = 0.02$ (0.10), P = 0.02 Girls: $\beta = 0.00$ (0.10), P = 0.56	LOE: III Strengths: Large N; high retention rate; large duration; broad participation of a transdisciplinary research team of doctors, nutritionists, economists, and behavioral scientists Weaknesses: Greater statistical significance on males

Key: **AHF**- Active and Healthy Families intervention; **ASU**-Arizona State University; **BASH**-Brief Acculturation Scale for Hispanics; **BC**-Body Composition; **BMI**-Body Mass Index; **BMIZ**-Body Mass Index z-Score; **BRFSS**- Behavioral Risk Factor Surveillance System; **CI**-Confidence Interval; **CDC**-Center for Disease Control and Prevention; **COACH**-Competency-Based Approaches to Community Health; **COB**-Country of Birth; **COM**-Comparison Group; **DV**-Dependent Variable; **DXA**-dual-energy X-ray absorptiometry; **F**-Female; **FBT**-Family Based Treatment; **FCI**-Family Centered Intervention; **FRESH**- The Family, Responsibility, Education, Support and Health; **LOE**-Level of Evidence; **INT**-Intervention Group; **IRR**-Incidence Rate Ratio; **IS**-Insulin Sensitivity; **IV**-Independent Variable; **M**-Mean; **Ma**-Male **MAAS**-Mindful Attention Awareness Scale; **MEI**-Mindful Eating Intervention; **MTB**-Minding The Baby; **MVPA**-Moderate to Vigorous Physical Activity; **MX**-Mexico; **OTT**-Oral Glucose Tolerance Test; **NHANES**-National Health and Nutrition Examination Survey; **NSFS**- Niños Sanos, Familia Sana; **PBT**-Parent Based Treatment; **PE**-physical activity/exercise; **PPAP**- Preschooler Physical Activity Parenting Practices; **QOL**-Quality of Life; **RCT**-Randomized Control Trial; **TG**-Triglycerides; **WC**-Waist Circumference; **WCTHR**: Waist Circumference to Height Ratio

Citation	Theory/ Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables & Definitions	Measurement/ Instrumentation	Data Analysis	Findings/ Results	Level of Evidence; Decision and application to practice
number 2011– 68001-30167 Country: USA Bias: None recognized				fruits and vegetables DV1: log BMI DV2: BMI z DV3: WCHTR				Conclusion: A community- based, multifaceted intervention was effective at slowing the rate of BMI growth among Mexican- heritage children. Feasibility: relevant to PICO, generalizable to children in Naco, MX; practical intervention; high retention rate
Soltero et al. (2018). Effects of a community- based diabetes prevention program for Latino youth with obesity Funding:	Expanded eco- developmental model: Stated Social Cognitive Theory: Stated	Design: RCT Purpose: To examine the short- and long-term effects of a community- based lifestyle intervention among Latino	N= 160 n= 91 INT n= 69 COM Setting: Outcomes assessed at ASU research lab; The exercise curriculum and lifestyle classes	IV- lifestyle intervention of nutrition and health education, exercise, and behavior change strategies DV1- IS	IS: estimated using insulin and glucose concentrations during the OGTT QOL: 15-item Youth QoL Instrument Short Form was used to assess generic	Cohen’s d effect size	IS: 3 months: p<0.01 6 months: p<0.05 12 months: p>0.05 QOL: 3 months: p<0.001	LOE: II Strengths: Appropriate statistical analysis; Analyzes both short term and long-term effects of intervention;

Key: **AHF-** Active and Healthy Families intervention; **ASU-**Arizona State University; **BASH-**Brief Acculturation Scale for Hispanics; **BC-**Body Composition; **BMI-**Body Mass Index; **BMIZ-**Body Mass Index z-Score; **BRFSS-** Behavioral Risk Factor Surveillance System; **CI-**Confidence Interval; **CDC-**Center for Disease Control and Prevention; **COACH-**Competency-Based Approaches to Community Health; **COB-**Country of Birth; **COM-**Comparison Group; **DV-**Dependent Variable; **DXA-**dual-energy X-ray absorptiometry; **F-**Female; **FBT-**Family Based Treatment; **FCI-**Family Centered Intervention; **FRESH-** The Family, Responsibility, Education, Support and Health; **LOE-**Level of Evidence; **INT-**Intervention Group; **IRR-**Incidence Rate Ratio; **IS-**Insulin Sensitivity; **IV-**Independent Variable; **M-**Mean; **Ma-**Male **MAAS-**Mindful Attention Awareness Scale; **MEI-**Mindful Eating Intervention; **MTB-**Minding The Baby; **MVPA-**Moderate to Vigorous Physical Activity; **MX-**Mexico; **OTT-**Oral Glucose Tolerance Test; **NHANES-**National Health and Nutrition Examination Survey; **NSFS-** Niños Sanos, Familia Sana; **PBT-**Parent Based Treatment; **PE-**physical activity/exercise; **PPAP:** Preschooler Physical Activity Parenting Practices; **QOL-**Quality of Life; **RCT-**Randomized Control Trial; **TG-**Triglycerides; **WC-**Waist Circumference; **WCHTR:** Waist Circumference to Height Ratio

Citation	Theory/ Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables & Definitions	Measurement/ Instrumentation	Data Analysis	Findings/ Results	Level of Evidence; Decision and application to practice
National Institutes of Health/National Institute on Minority Health and Health Disparities Country: USA Bias: None Recognized		youth with obesity.	were held at the YMCA Demographics: Latino, age 14 to 16 years, with obesity, defined as BMI ≥ 95th percentile for age and sex or BMI ≥ 30 kg/m2 Retention: 86%	DV2-QOL DV3-BC	QoL; Weight specific QoL was assessed using the 26-item weight-specific module BC: bioelectrical impedance analysis		6 months: p<0.001 12 months: p<0.001 Weight-specific QoL: 3 months: p≤0.002 6 months: p≤0.002 12 months: p≤0.002 BC: 3 months: BMI%, BMI, WC, and percent body fat p<0.05 6 months: BMI%, BMI, WC, and percent body fat p<0.05 12 months: BMI% and percent body fat p<0.01; WC p=0.078	high level evidence Weaknesses: Blinding was not used; relatively small N Conclusions: community-based lifestyle intervention can increase insulin sensitivity and QOL, and slow the trajectory of adiposity among Latino adolescents with obesity.

Key: **AHF**- Active and Healthy Families intervention; **ASU**-Arizona State University; **BASH**-Brief Acculturation Scale for Hispanics; **BC**-Body Composition; **BMI**-Body Mass Index; **BMIZ**-Body Mass Index z-Score; **BRFSS**- Behavioral Risk Factor Surveillance System; **CI**-Confidence Interval; **CDC**-Center for Disease Control and Prevention; **COACH**-Competency-Based Approaches to Community Health; **COB**-Country of Birth; **COM**-Comparison Group; **DV**-Dependent Variable; **DXA**-dual-energy X-ray absorptiometry; **F**-Female; **FBT**-Family Based Treatment; **FCI**-Family Centered Intervention; **FRESH**- The Family, Responsibility, Education, Support and Health; **LOE**-Level of Evidence; **INT**-Intervention Group; **IRR**-Incidence Rate Ratio; **IS**-Insulin Sensitivity; **IV**-Independent Variable; **M**-Mean; **Ma**-Male **MAAS**-Mindful Attention Awareness Scale; **MEI**-Mindful Eating Intervention; **MTB**-Minding The Baby; **MVPA**-Moderate to Vigorous Physical Activity; **MX**-Mexico; **OTT**-Oral Glucose Tolerance Test; **NHANES**-National Health and Nutrition Examination Survey; **NSFS**- Niños Sanos, Familia Sana; **PBT**-Parent Based Treatment; **PE**-physical activity/exercise; **PPAP**: Preschooler Physical Activity Parenting Practices; **QOL**-Quality of Life; **RCT**-Randomized Control Trial; **TG**-Triglycerides; **WC**-Waist Circumference; **WCTHR**: Waist Circumference to Height Ratio

Table A2

Synthesis Table

Study Characteristics	Bogart et al.	Boutelle et al.	Crespo et al.	Daly et al.	Falbe et al.	Gatto et al.	Heerman et al.	Ordway et al.	Sadeghi et al.	Soltero et al.
Year	2016	2017	2018	2016	2015	2016	2019	2018	2019	2018
RCT	•	•	•	•	•	•	•	•		•
Quasi Experimental									•	
# Subjects	2,439	150	297	37	55	375	117	158	782	160
Theory/CF	IMSBP	FBTM	Obesity care model; SMLH	IMBST	Transtheoretical Model; personal goal setting	Bandura’s self-efficacy	Paradigm of personalized medicine	Socio-ecological approach	SCT	SCT; Expanded eco-developmental model;
Intervention Length	5 weeks	24 months	2 months	6 weeks	10 weeks	12 weeks	15 weeks	27 months	3 years	12 months
Measurement Tools	BMI	BMI, 24-hour dietary recalls, NDS, Actigraph accelerometers, CRPBI, BCFQ	NHANES, BMI, DXA	MAAS scale, BMI, AMQ	BMI, TG	BI, BMI, NHANES protocol	ACDS, BMI, parent reports, DPQ, BRFSS, Parenting self-efficacy for child health behaviors, PPAPP	BMI	BMI, log BMI	QOL, OGTT, BI
Setting	School	Medical Center	Medical Clinic	School	Medical Clinic	School Garden	Community Center	Home	School	Community Center
Rural			•		•			•	•	
Urban	•	•		•		•	•			•
Country	USA	USA	USA	USA	USA	USA	USA	USA	USA	USA
Demographics										

Key: **ACDS**-Acculturation on Child Diet Survey; **AMQ**- Adolescent Motivation Questionnaire; **BC**-Body Composition; **BCFQ**-Birch Child Feeding Questionnaire; **BI**- Bioelectrical Impedance; **BMI**- Body Mass Index; **BRFSS**- Behavioral Risk Factor Surveillance System; **CF**-Conceptual Framework; **CRPBI**-Children’s Report of Parental Behavior; **DPQ**- Diet Practice Questionnaire; **DXA**-dual-energy X-ray absorptiometry; **FBI**-Family Based Intervention; **FBTM**- Family Based Treatment Model; **IMBST**- Information Motivation Behavioral Skills Theory; **IMSBP**-Integrated model of school-based prevention; **INT**-Intervention; **NDS**-Nutrition Data Systems for Research Software, **NHANES**-National Health and Nutrition Examination Survey; **NR**-Not Reported; **OGTT**-Oral Glucose Tolerance Test; **PPAP**: Preschooler Physical Activity Parenting Practices Scale; **QOL**-Quality of Life; **SBI**-School Based Intervention; **SCT**-Social Cognitive Theory; **SMLH**- Socioecological Model for Latino Health; **TG**-Triglycerides; **WC**-Waist Circumference; **WCHTR**-Waist Circumference to Hip Ratio; **Δ**-statistically significant change; **&**-and

Mean age (y)	12	10	8	15	9	9	4	19	6	15
% f	50.9	66.7	49.8	100	52	52	63	100	50.7	54
% Hispanic	75.4	33	NR	100	100	89	100	69	100	100
% born in Mexico			30						77.4	
% born in USA			68.4						18.6	
% born in another county			5						4	
% Spanish speaking			92.6							
Independent Variable										
SBI	•			•		•				
FBI		•	•		•		•			
CBI									•	•
Parenting Program								•		
Dependent Variables										
BMI%	↓		No Δ			No Δ				↓
BMIz		↓	No Δ		↓	↓	↓	↓	↓	↓
BMI		↓	No Δ		↓					↓
Log BMI									↓	
WCHTR									↓	
Total fat %			↓	↓		No Δ				
Trunk fat %			↓							
WC						↓				↓
Triglycerides					↓					
Insulin Sensitivity										↑
Parent BMI		•					•			
Child & parent energy intake		•					•			

Key: **ACDS**-Acculturation on Child Diet Survey; **AMQ**- Adolescent Motivation Questionnaire; **BC**-Body Composition; **BCFQ**-Birch Child Feeding Questionnaire; **BI**- Bioelectrical Impedance; **BMI**- Body Mass Index; **BRFSS**- Behavioral Risk Factor Surveillance System; **CF**-Conceptual Framework; **CRPBI**-Children’s Report of Parental Behavior; **DPQ**- Diet Practice Questionnaire; **DXA**-dual-energy X-ray absorptiometry; **FBI**-Family Based Intervention; **FBTM**- Family Based Treatment Model; **IMBST**- Information Motivation Behavioral Skills Theory; **IMSBP**-Integrated model of school-based prevention; **INT**-Intervention; **NDS**-Nutrition Data Systems for Research Software, **NHANES**-National Health and Nutrition Examination Survey; **NR**-Not Reported; **OGTT**-Oral Glucose Tolerance Test; **PPAP**: Preschooler Physical Activity Parenting Practices Scale; **QOL**-Quality of Life; **SBI**-School Based Intervention; **SCT**-Social Cognitive Theory; **SMLH**- Socioecological Model for Latino Health; **TG**-Triglycerides; **WC**-Waist Circumference; **WCHTR**-Waist Circumference to Hip Ratio; **Δ**-statistically significant change; **&**-and

Child & parent physical activity		•					•			
Parenting style		•								
Parent feeding behavior		•								
Parent self-efficacy for child health behaviors							•			
QOL										↑
Themes										
Exercise and nutrition education	•	•	•		•		•		•	•
Parenting Skills		•	•		•		•	•		
Behavior Modification		•	•	•						•
Mindful eating				•						
Culturally Tailored					•		•		•	
Cooking component						•			•	
Food voucher									•	
Emotional Wellbeing								•		•

Key: **ACDS**-Acculturation on Child Diet Survey; **AMQ**- Adolescent Motivation Questionnaire; **BC**-Body Composition; **BCFQ**-Birch Child Feeding Questionnaire; **BI**- Bioelectrical Impedance; **BMI**- Body Mass Index; **BRFSS**- Behavioral Risk Factor Surveillance System; **CF**-Conceptual Framework; **CRPBI**-Children’s Report of Parental Behavior; **DPQ**- Diet Practice Questionnaire; **DXA**-dual-energy X-ray absorptiometry; **FBI**-Family Based Intervention; **FBTM**- Family Based Treatment Model; **IMBST**- Information Motivation Behavioral Skills Theory; **IMSBP**-Integrated model of school-based prevention; **INT**-Intervention; **NDS**-Nutrition Data Systems for Research Software, **NHANES**-National Health and Nutrition Examination Survey; **NR**-Not Reported; **OGTT**-Oral Glucose Tolerance Test; **PPAP**: Preschooler Physical Activity Parenting Practices Scale; **QOL**-Quality of Life; **SBI**-School Based Intervention; **SCT**-Social Cognitive Theory; **SMLH**- Socioecological Model for Latino Health; **TG**-Triglycerides; **WC**-Waist Circumference; **WCHTR**-Waist Circumference to Hip Ratio; Δ -statistically significant change; &-and

Appendix B
Models and Frameworks

Figure B1

Figure B2

Appendix C

Table C1

Content Outline

Module	Whiteboard Video Content
1	Healthy nutrition overview: What are fats, carbs, and protein? Fiber All About Sugar: Simple versus complex carbohydrates Ways to decrease sugar consumption
2	Exercise: How much physical activity do I need? Three types of physical activity and examples of each How do I get my child active? Sample exercises and stretching
3	Portion Sizes: “Plate it” method Meal planning Water, water, water! How does water help my body? How much water does my body need? Ways to drink more water? Choose water over sugar sweetened beverages (SSB) Fruit infused water recipes
4	Fruits and vegetables: How much do I need? Ways to incorporate more fruits and veggies into the daily diet. Smoothie recipes

Appendix C

Table C2

Inclusion and Exclusion Criteria

Inclusion Criteria	Exclusion Criteria
BMI range of overweight or obese	Not interested in participating in the study
Consume food and drinks that are high in sugar and saturated fat on a regular basis	Move out of town
consume refined grain products on a regular basis	Do not have an eligible child living in the home
Have limited intake of vegetables	Do not comply with completion of surveys and anthropometric measurements
Are not physically active each day	
Do activities that don't burn calories (sedentary time screen time)	
Live in an environment where healthy eating and physical activity are not encouraged	
Eat to help deal with stress or social problems	
Come from a family of overweight people where genetics may be a factor,	
Come from a low-income family who do not have the resources or time to make healthy eating and active living a priority	
Are exposed to the aggressive marketing of energy-dense foods and beverages to children and families	
Have a lack of information about sound approaches to nutrition,	
Have a lack of access, availability and affordability to healthy foods,	
Have a genetic disease or hormone disorder such as Prader-Willi syndrome or Cushing's syndrome	

Appendix D

IRB Approval Letter



APPROVAL: EXPEDITED REVIEW

[Diana Jacobson](#)
 EDSO: DNP
 602/496-0863
 DIANA.JACOBSON@asu.edu

Dear [Diana Jacobson](#):

On 10/7/2021 the ASU IRB reviewed the following protocol:

Type of Review:	Initial Study
Title:	Familia Sana, Vida Sana!
Investigator:	Diana Jacobson
IRB ID:	STUDY00014432
Category of review:	
Funding:	None
Grant Title:	None
Grant ID:	None
Documents Reviewed:	<ul style="list-style-type: none"> • Bahena Consent DJ edits 10 04 21.pdf, Category: Consent Form; • Bahena consent Spanish, Category: Consent Form; • Bahena_PostSurveySpanish.pdf, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions); • Bahena_PreSurveySpanish.pdf, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions); • Bahena_Recruitment ScriptSpanishTranslations.pdf, Category: Recruitment Materials; • Bahena_RecruitmentFlyer_SpanishTranslation.pdf, Category: Recruitment Materials; • Bahena_ScriptswithSpanishTranslations.pdf, Category: Translations; • BahenaTranslationCertificate .pdf, Category: Translations;

The IRB approved the protocol from 10/7/2021 to 10/6/2022 inclusive. Three weeks before 10/6/2022 you are to submit a completed Continuing Review application and required attachments to request continuing approval or closure.

If continuing review approval is not granted before the expiration date of 10/6/2022 approval of this protocol expires on that date. When consent is appropriate, you must use final, watermarked versions available under the "Documents" tab in ERA-IRB.

In conducting this protocol you are required to follow the requirements listed in the INVESTIGATOR MANUAL (HRP-103).

REMINDER - All in-person interactions with human subjects require the completion of the ASU Daily Health Check by the ASU members prior to the interaction and the use of face coverings by researchers, research teams and research participants during the interaction. These requirements will minimize risk, protect health and support a safe research environment. These requirements apply both on- and off-campus.

The above change is effective as of July 29th 2021 until further notice and replaces all previously published guidance. Thank you for your continued commitment to ensuring a healthy and productive ASU community.

Sincerely,

IRB Administrator

cc: Sara Bahena

Appendix E

Pre-Survey

Familia Sana, Vida Sana
Pre Encuesta

Por favor, no escriba su nombre en este cuestionario. Por favor, cree su propio número de identificación personal de 6 dígitos. Utilice los dos primeros dígitos que son el mes en que nació y los cuatro dígitos del año en que nació su primer hijo(a).

Ejemplo: La Sra. Bahena nació en junio y mi primer hijo nació en 2015. Mi número de identificación es **062015**

Escriba el número de identificación personal AQUÍ: _____

Por favor, marque un círculo alrededor de la categoría que incluye su edad. ¿Cuál es tu edad?

18-24

25-34

35-44

45-54

65 o más

¿Tiene actualmente niños menores de 18 años viviendo en su hogar? Por favor, rodee con un círculo su mejor respuesta.

Sí

No

Si respondió que sí, ¿cuántos niños menores de 18 años viven en su hogar? ¿Cuáles son sus edades?

Por favor, escriba aquí ¿quién vive en su casa?

¿Qué es lo que mejor describe su nivel de educación? ¿Cuánta escuela obtuvo? Rodee con un círculo su mejor respuesta.

Alguna escuela primaria

Graduado de escuela primaria

Alguna escuela secundaria

Graduado de escuela secundaria o equivalente

Alguna escuela preparatoria

Graduado de escuela preparatoria

Certificado de escuela vocacional o comercial

Alguna Universidad o Colegio

Título profesional

Licenciatura

Carta De Pasante

Prefiero no contestar

Por favor, circule verdadero o falso para las siguientes declaraciones:

En los últimos 12 meses, nos preocupaba si nuestra comida se agotaría antes de tener dinero para comprar más.

Verdadero Falso

En los últimos 12 meses, la comida que compramos simplemente no duró y no teníamos dinero para obtener más.

Verdadero Falso

Pre Encuesta

¿Cuántas horas al día pasa su hijo(a) viendo televisión, jugando videojuegos, jugando en un teléfono celular o trabajando en la computadora? Por favor, marque su respuesta para cada niño(a).

Niño(a) 1	Niño(a) 2	Niño(a) 3	Niño(a) 4	Niño(a) 5
A. menos de 1 hora	A. menos de 1 hora	A. menos de 1 hora	A. menos de 1 hora	A. menos de 1 hora
B. 1-3 horas	B. 1-3 horas	B. 1-3 horas	B. 1-3 horas	B. 1-3 horas
C. 3-5 horas	C. 3-5 horas	C. 3-5 horas	C. 3-5 horas	C. 3-5 horas
D. más de 5 horas	D. más de 5 horas	D. más de 5 horas	D. más de 5 horas	D. más de 5 horas

¿Cuántas horas al día pasa su hijo(a) afuera jugando y estando active(a)? Por ejemplo: ¿correr, saltar o practicar deportes? Por favor, circule de su respuesta para cada niño(a).

Niño(a) 1	Niño(a) 2	Niño(a) 3	Niño(a) 4	Niño(a) 5
A. menos de 1 hora	A. menos de 1 hora	A. menos de 1 hora	A. menos de 1 hora	A. menos de 1 hora
B. 1-3 horas	B. 1-3 horas	B. 1-3 horas	B. 1-3 horas	B. 1-3 horas
C. 3-5 horas	C. 3-5 horas	C. 3-5 horas	C. 3-5 horas	C. 3-5 horas
D. más de 5 horas	D. más de 5 horas	D. más de 5 horas	D. más de 5 horas	D. más de 5 horas

¿Cuánta actividad física necesitan hacer los niños todos los días? Por favor, circule su mejor respuesta.

- A. menos de 30 minutos cada día
- B. 30 min/día
- C. 60 min/día
- D. 90 min/día

¿Cuántas porciones de frutas y verduras come su hijo(a) cada día? Por favor, circule su mejor respuesta.

*Una porción es ½ taza de bayas; 1 taza de lechuga; ½ manzana; 1 taza de calabacín; ½ taza de maíz; 1 tomate mediano; ½ de papa mediana u otro vegetal con almidón; ½ taza de brócoli, ½ taza de zanahorias.

Niño(a) 1	Niño(a) 2	Niño(a) 3	Niño(a) 4	Niño(a) 5
A. 0 porciones	A. 0 porciones	A. 0 porciones	A. 0 porciones	A. 0 porciones
B. 1-3 porciones	B. 1-3 porciones	B. 1-3 porciones	B. 1-3 porciones	B. 1-3 porciones
C. 4-6 porciones	C. 4-6 porciones	C. 4-6 porciones	C. 4-6 porciones	C. 4-6 porciones
D. más de 6 porciones	D. más de 6 porciones	D. más de 6 porciones	D. más de 6 porciones	D. más de 6 porciones

¿Cuántas porciones al día bebe su hijo(a) de bebidas endulzadas con azúcar como refrescos, bebidas de frutas, bebidas deportivas, bebidas energéticas, aguas endulzadas, etc.? Por favor, circule su mejor respuesta.

*Un tamaño de una porción es de 6-8 onzas.

Niño(a) 1	Niño(a) 2	Niño(a) 3	Niño(a) 4	Niño(a) 5
A. 0 porciones	A. 0 porciones	A. 0 porciones	A. 0 porciones	A. 0 porciones
B. 1-3 porciones	B. 1-3 porciones	B. 1-3 porciones	B. 1-3 porciones	B. 1-3 porciones
C. 4-6 porciones	C. 4-6 porciones	C. 4-6 porciones	C. 4-6 porciones	C. 4-6 porciones
D. más de 6 porciones	D. más de 6 porciones	D. más de 6 porciones	D. más de 6 porciones	D. más de 6 porciones

Círcule un número en la siguiente escala (1 = no seguro; 2 = un poco seguro; 3 = seguro; 4 = muy seguro; 5 = extremadamente seguro) para responder a las siguientes preguntas:

1. ¿Qué tan seguro está de que puede darle una dieta y un estilo de vida saludable a su hijo(a)?

1	2	3	4	5
No seguro	Un poco seguro	Seguro	Muy seguro	Extremadamente seguro

2. ¿Qué tan seguro está de que podría ayudar a su hijo(a) hacer 1 hora de actividad física de intensidad moderada cada día?

*La actividad física de intensidad moderada significa respirar fuerte pero aún así poder hablar.

1	2	3	4	5
No seguro	Un poco seguro	Seguro	Muy seguro	Extremadamente seguro

3. ¿Qué tan seguro está de que puede darle a su hijo(a) 5 porciones de frutas y verduras todos los días?

* Una porción de fruta es $\frac{1}{2}$ taza; una porción de verdura es $\frac{1}{2}$ taza.

1	2	3	4	5
No seguro	Un poco seguro	Seguro	Muy seguro	Extremadamente seguro

4. ¿Qué tan seguro está de que solo puede darle a su hijo UNA bebida endulzada con azúcar cada semana?

1	2	3	4	5
No seguro	Un poco seguro	Seguro	Muy seguro	Extremadamente seguro

5. ¿Qué tan seguro está de que sólo puede darle a su hijo(a) una taza pequeña de 6 onzas de 100% jugo cada día?

1	2	3	4	5
No seguro	Un poco seguro	Seguro	Muy seguro	Extremadamente seguro

Appendix E

Post-Survey

Familia Sana, Vida Sana

Posencuesta

Por favor, no escriba su nombre en este cuestionario. Por favor, cree su propio número de identificación personal de 6 dígitos. Utilice los dos primeros dígitos que son el mes en que nació y los cuatro dígitos del año en que nació su primer hijo(a).

Ejemplo: La Sra. Bahena nació en junio y mi primer hijo nació en 2015. Mi número de identificación es 062015

Escriba el número de identificación personal AQUÍ _____

¿Cuántas horas al día pasa su hijo(a) viendo televisión, jugando videojuegos, jugando en un teléfono celular o trabajando en la computadora? Por favor, marque su respuesta para cada niño(a).

Niño(a) 1	Niño(a) 2	Niño(a) 3	Niño(a) 4	Niño(a) 5
A. menos de 1 hora	A. menos de 1 hora	A. menos de 1 hora	A. menos de 1 hora	A. menos de 1 hora
B. 1-3 horas	B. 1-3 horas	B. 1-3 horas	B. 1-3 horas	B. 1-3 horas
C. 3-5 horas	C. 3-5 horas	C. 3-5 horas	C. 3-5 horas	C. 3-5 horas
D. más de 5 horas	D. más de 5 horas	D. más de 5 horas	D. más de 5 horas	D. más de 5 horas

¿Cuántas horas al día pasa su hijo(a) afuera jugando y estando activo(a)? Por ejemplo: ¿correr, saltar o practicar deportes? Por favor, circule de su respuesta para cada niño(a).

Niño(a) 1	Niño(a) 2	Niño(a) 3	Niño(a) 4	Niño(a) 5
A. menos de 1 hora	A. menos de 1 hora	A. menos de 1 hora	A. menos de 1 hora	A. menos de 1 hora
B. 1-3 horas	B. 1-3 horas	B. 1-3 horas	B. 1-3 horas	B. 1-3 horas
C. 3-5 horas	C. 3-5 horas	C. 3-5 horas	C. 3-5 horas	C. 3-5 horas
D. más de 5 horas	D. más de 5 horas	D. más de 5 horas	D. más de 5 horas	D. más de 5 horas

¿Cuánta actividad física necesitan hacer los niños todos los días? Por favor, circule su mejor respuesta.

- A. menos de 30 minutos cada día
- B. 30 min/día
- C. 60 min/día
- D. 90 min/día

¿Cuántas porciones de frutas y verduras come su hijo(a) cada día? Por favor, circule su mejor respuesta.

*Una porción es ½ taza de bayas; 1 taza de lechuga; ½ manzana; 1 taza de calabacín; ½ taza de maíz; 1 tomate mediano; ½ de papa mediana u otro vegetal con almidón; ½ taza de brócoli, ½ taza de zanahorias.

Niño(a) 1	Niño(a) 2	Niño(a) 3	Niño(a) 4	Niño(a) 5
A. 0 porciones	A. 0 porciones	A. 0 porciones	A. 0 porciones	A. 0 porciones
B. 1-3 porciones	B. 1-3 porciones	B. 1-3 porciones	B. 1-3 porciones	B. 1-3 porciones
C. 4-6 porciones	C. 4-6 porciones	C. 4-6 porciones	C. 4-6 porciones	C. 4-6 porciones
D. más de 6 porciones	D. más de 6 porciones	D. más de 6 porciones	D. más de 6 porciones	D. más de 6 porciones

¿Cuántas porciones al día bebe su hijo(a) de bebidas endulzadas con azúcar como refrescos, bebidas de frutas, bebidas deportivas, bebidas energéticas, aguas endulzadas, etc.? Por favor, circule su mejor respuesta.

*Un tamaño de una porción es de 6-8 onzas.

Niño(a) 1	Niño(a) 2	Niño(a) 3	Niño(a) 4	Niño(a) 5
A. 0 porciones	A. 0 porciones	A. 0 porciones	A. 0 porciones	A. 0 porciones
B. 1-3 porciones	B. 1-3 porciones	B. 1-3 porciones	B. 1-3 porciones	B. 1-3 porciones
C. 4-6 porciones	C. 4-6 porciones	C. 4-6 porciones	C. 4-6 porciones	C. 4-6 porciones
D. más de 6 porciones	D. más de 6 porciones	D. más de 6 porciones	D. más de 6 porciones	D. más de 6 porciones

Círcule un número en la siguiente escala (1 = no seguro; 2 = un poco seguro; 3 = seguro; 4 = muy seguro; 5 = extremadamente seguro) para responder a las siguientes preguntas:

1. ¿Qué tan seguro está de que puede darle una dieta y un estilo de vida saludable a su hijo(a)?

1	2	3	4	5
No seguro	Un poco seguro	Seguro	Muy seguro	Extremadamente seguro

2. ¿Qué tan seguro está de que podría ayudar a su hijo(a) hacer 1 hora de actividad física de intensidad moderada cada día?

*La actividad física de intensidad moderada significa respirar fuerte pero aún así poder hablar.

1	2	3	4	5
No seguro	Un poco seguro	Seguro	Muy seguro	Extremadamente seguro

3. ¿Qué tan seguro está de que puede darle a su hijo(a) 5 porciones de frutas y verduras todos los días?

* Una porción de fruta es ½ taza; una porción de verdura es ½ taza.

1	2	3	4	5
No seguro	Un poco seguro	Seguro	Muy seguro	Extremadamente seguro

4. ¿Qué tan seguro está de que solo puede darle a su hijo UNA bebida endulzada con azúcar cada semana?

1	2	3	4	5
No seguro	Un poco seguro	Seguro	Muy seguro	Extremadamente seguro

5. ¿Qué tan seguro está de que sólo puede darle a su hijo(a) una taza pequeña de 6 onzas de 100% jugo cada día?

1	2	3	4	5
No seguro	Un poco seguro	Seguro	Muy seguro	Extremadamente seguro

Por favor, responda las siguientes preguntas lo mejor que pueda:

¿Cuántas sesiones de Familia Sana, Vida Sana asistió (por favorcírcule un número)?

1 2

¿Nombra tres cosas que más le gustaron del programa Familia Sana Vida Sana?

- 1.
- 2.
- 3.

¿Qué más le hubiera gustado aprender acerca de una vida saludable que NO estaba incluida en el programa?

¿Recomendaría esta educación a otros familiares y/o amigos?

1. Sí
2. No
3. Si no, ¿por qué no