

Feasibility of a remotely delivered program to prevent Latino adolescent obesity in the Midwestern USA

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Summary

Adolescent obesity prevention programs focusing on Latino fathers may be useful to address Latino adolescent obesity. Adolescent obesity has become an urgent issue because of the coronavirus disease 2019 pandemic, with limited ability to deliver prevention programs in-person. This study aimed to assess the feasibility of a community-based, adolescent obesity prevention program for Latino father–adolescent dyads delivered remotely, adapted from the in-person *Padres Preparados, Jóvenes Saludables* program. A quasi-experimental design was used to assess the feasibility of the remotely delivered program based on criteria adapted from other feasibility studies of community-based health promotion programs for Latino families. Father–adolescent dyads were recruited at two sites in a Midwestern state during 2020; mothers were also encouraged to participate. Recruitment met the feasibility criteria (65 families expressed interest between August and October) with 26 families participating in this study. The retention ratio (percentage of participants who completed a post-session survey to those who completed the baseline survey) among fathers was acceptable (77%), while a lower percentage of adolescents were retained (68%). The session attendance ratio (number of sessions attended of the eight total sessions offered) was higher among adolescents (88%) and lower among fathers (68%) compared to the criteria. Satisfaction ratings ($\geq 88\%$) and completeness of data collection at both baseline and post-session survey ($\geq 76\%$) were acceptable. Favorable results were obtained for parent outcomes, while adolescent outcomes were not favorably changed. This remotely delivered adolescent obesity prevention program was feasible for Latino fathers; however, additional engagement with adolescents may be needed.

Lay summary

Adolescent obesity became a more urgent issue because of the coronavirus disease 2019 pandemic with less physical activity under lockdown, more food insecure families and limited in-person access to programs. Our study concluded that a remotely delivered version of a community-based, adolescent obesity prevention program for Latino father–adolescent dyads (the *Padres Preparados, Jóvenes Saludables* program) was feasible based on participation, satisfaction and parent outcomes. Additional engagement in activities to improve adolescent health behaviors may be needed to improve the overall effectiveness of the program.

Keywords: adolescent obesity prevention, community-based program, feasibility, Latino parents and adolescents, remote education

INTRODUCTION

Latino family resilience is based on strengths and assets that contribute to the well-being of the family. One of these strengths is familism, which is a core cultural belief in the centrality of family, allowing for solid relationships between parents and children and parental support for children's healthy lifestyles (Bermudez and Mancini, 2013). A systematic review identified other cultural family strengths that also serve as protective factors for youth including family involvement, supervision of children and communication (Cardoso and Thompson, 2010). Protective factors can address risk factors for poor health among Latino immigrant families, such as lower socioeconomic status, unsafe neighborhoods and family separation.

National Health and Nutrition Examination Survey data from 2015 to 2018 showed that the prevalence of overweight and obesity was 37% for Hispanic, 31% for non-Hispanic Black, and 20% for non-Hispanic White 6- to 11-year-old youth (Ogden et al., 2020), indicating that prevalence is high among all children, but that Hispanic children and adolescents are disproportionately affected. In addition, the prevalence of overweight and obesity increased from 28% in 1999–2002 to 37% in 2015–2018 among 6- to 11-year-old Hispanic children (Ogden et al., 2020). Improving dietary patterns, parental eating patterns and child physical activity are strategies to prevent childhood obesity (Liberati et al., 2020). To address childhood obesity among Latino youth, community-based, family-centered prevention programs focused on diet and physical activity have been implemented (Gallo et al., 2020; O'Connor et al., 2020). Both fathers and mothers contribute to the development of adolescents' healthy behaviors related to food and physical activity (Lindsay et al., 2006; Yee et al., 2017). The importance of Latino father's involvement in family-centered, obesity prevention programs is based on their role within the family regarding role-modeling healthy behaviors and influencing the availability of healthy foods and physical activity (Garfield and Isacco, 2012; O'Connor et al., 2018; Zhang et al., 2018).

The need to address childhood obesity prevention has become more urgent because of the coronavirus disease 2019 (COVID-19) pandemic (Jenssen et al., 2021). A review indicated that school closures and lockdowns reduced the time spent on physical activity among children (Nogueira-de-Almeida et al., 2020). Low-income families reported a decrease in fruit and vegetable intake and increased food insecurity because of the pandemic via a survey, with a greater proportion of Hispanic participants reporting food insecurity than participants in other racial/ethnic groups (Sharma et al., 2020). In-person delivery of obesity prevention programs has been less feasible because of the COVID-19

pandemic; therefore, effective programs that are delivered remotely are needed, especially among low-income populations who may have structural barriers to participation. The aim of this study was to assess the feasibility of a community-based, childhood obesity prevention program for low-income, Latino father–adolescent dyads delivered via online and mobile phone technologies regarding recruitment, attendance, satisfaction, retention, completeness of data collection and preliminary effectiveness. Feasibility criteria were based on other studies assessing the feasibility of community-based health promotion programs for Latino families (Allen et al., 2013; Gallo et al., 2020; O'Connor et al., 2020).

METHODS

Study design

The *Padres Preparados, Jóvenes Saludables* program was a community-based intervention program within a randomized controlled trial (RCT) that focused on parenting skills and food and physical activity parenting practices to address Latino childhood obesity prevention (University of Maryland, n.d.; Zhang et al., 2019). The program was originally delivered in-person for Latino fathers and adolescents. Latino fathers with their adolescents (10–14 years) were recruited through flyers and announcements at community centers or churches, mothers were also encouraged to attend. Parents and youth were invited to attend educational sessions and complete baseline, post, and 3-month follow-up session surveys. The program facilitators provided 8-weekly 2.5-hour sessions on weekday evenings or Saturday mornings at four community centers or church sites in a staggered fashion. A waitlisted control group participated in educational sessions about 3 months after the intervention group participated in the sessions.

Session content included food preparation and exercise for adolescents and parents together, separate interactive activities and discussion for adolescents and parents related to parenting skills and food and physical activity parenting practices, and joint education on healthy eating and physical activity. Each session focused on a particular set of parenting skills applied to a diet or physical activity topic, including (i) parenting style and healthy habits; (ii) multiple cultures and living an active lifestyle; (iii) adolescent development and healthy foods; (iv) communication and limiting screen time; (v) rules, expectations and healthy beverages; (vi) managing conflicts and healthy snacks; (vii) monitoring, supervision and fast food; and (viii) connecting with your child and family meals (Zhang et al., 2019). A standardized teaching manual was provided to facilitators, which included background information,

teaching materials and handouts, PowerPoint slides, and scripts for presentation of content in Spanish and English for each session. Sessions for parents were delivered in Spanish by two trained bilingual facilitators. Sessions for youth were delivered in English by two trained graduate students or community partner staff members. The program was conducted from 2017 to 2020 in-person. At two of the four sites, a mobile app was developed and used to replace three of the eight control group sessions.

Because of the COVID-19 pandemic, in-person sessions were not held after March 2020 according to the CDC guidelines ([Centers for Disease Control and Prevention, 2020](#)). At that time, the study design was modified from an in-person RCT to a single-group, pre-post-test design with remotely delivered sessions. The content for all eight remotely delivered sessions was the same as that delivered in the in-person sessions. The research team developed mobile app content for the remaining five educational sessions, and adapted the in-person delivery to remote delivery via Zoom videoconferencing. The mobile app content was presented in video format and made available for viewing by families prior to the Zoom sessions. Separate Zoom sessions were conducted for parents and children because many families did not have multiple devices. During the Zoom sessions, the lesson content as viewed in the mobile app videos was reviewed, followed by reflection and discussion led by facilitators, allowing the in-person session content to be consistent with the content and activities delivered via Zoom sessions. Food preparation and physical activity content was limited to sharing healthy food recipes via WhatsApp messaging and promoting physical activities among parents that could be completed with their child in limited spaces, while youth participated in 5–10 minutes of physical activity during the Zoom sessions. As a result, session duration was decreased to about 1.5 hours including the separate parent and youth segments. WhatsApp messaging and phone coaching calls were also implemented between Zoom sessions to review content and goals and remind participants of upcoming sessions. A standardized teaching manual was also developed for facilitators of the remotely delivered sessions, which was adapted from the manual used for in-person delivery including similar components based on the same content.

During the recruitment period for the remotely delivered program, community partners sent flyers and email messages to middle-school parents, previous program participants and community education listservs within their organizational networks. Interested participants were asked to call or email the community partner (at both sites) or the study coordinator (at one site). Community partners provided names and

contact information for interested participants to the study coordinator for eligibility screening. Facilitators for parent sessions were bicultural, bilingual extension educators who delivered the sessions in Spanish (one educator facilitated sessions at both sites). Facilitators for youth sessions were trained graduate students or community partner staff members who delivered the sessions in English (one graduate student facilitated sessions at both sites). Training for all facilitators was conducted by study staff in Spanish for parent facilitators and in English for youth facilitators based on the standardized teaching manuals.

To evaluate the feasibility of the remotely delivered program, this study used a quasi-experimental design without a control group. Expectations for meeting recruitment goals, maintaining high attendance, retaining participants from pre- to post-assessment, satisfaction, completeness of data collection and preliminary effectiveness regarding outcomes were established to guide the assessment of feasibility ([Table 1](#)).

Participants

Latino fathers and early adolescents (10–14 years) were recruited by two organizations, an urban charter school and an extension office in a rural area between August and October 2020. These community partners had agreed to conduct the program at their sites in-person prior to discontinuation of in-person programming in March 2020 because of the COVID-19 pandemic. Both were willing to participate in a feasibility study regarding remote delivery of the program. Fathers who self-identified as Latino, spoke Spanish and had ≥ 3 meals/week with the adolescents were eligible for the program. Previous research has shown that ≥ 3 family meals/week promoted healthy food intake among adolescents ([Neumark-Sztainer et al., 2003a](#)). Mothers who self-identified as Latina, spoke Spanish and were spouses/partners of fathers who participated in this program were also welcome to participate in the same program sessions. Participants were asked to complete baseline and post-session data collection surveys.

In the baseline data collection survey, questions for parents assessed sociodemographic characteristics, food-related activities, home food environment and physical activity. Questions for adolescents assessed demographic characteristics, height and weight, and physical activity. Parent survey questions were in Spanish and adolescent questions were in English. All questionnaires were completed via a Qualtrics platform. Adolescents also completed 24-hour dietary recall interviews by phone. In the post-session data collection survey, participants were asked questions about session satisfaction in addition to the same questions used in the baseline data collection. Fathers received

Table 1: Feasibility criteria

Feasibility criteria	Measures	Actual data	Evaluation
1) Recruit 15–20 Latino families in ≤2 months	Contact record created by facilitators	65 families in 3 months	Met criteria
2) Retain 75% of participants for baseline and post-session data collection surveys	Retention ratio	Fathers: 77%, mothers: 56% Adolescents 68%	Met criteria among fathers
3) Maintain ≥70% attendance to 8 educational sessions	Session attendance ratio	Fathers: 68%, mothers: 63% Adolescents: 88%	Met criteria among adolescents
4) Obtain 80% ‘excellent’ or ‘good’ satisfaction ratings from participants	Satisfaction surveys	Parents: 96% Adolescents: 88%	Met criteria
5) Observe improvement in adolescent-reported dietary intake and physical activity and father-reported food and physical activity parenting practices from baseline to post-session	Parent outcomes: frequency of food and physical activity parenting practices, food intake frequency, home food availability and accessibility, and physical activity Adolescent outcomes: 24-hour dietary recall and frequency of physical activities	Parents: favorable results were obtained for parenting practices, dietary intake, and home food environment Adolescents: dietary intake and physical activity were not favorably changed	Met criteria among fathers
6) Collect survey data from ≥75% at baseline and post-session	Completeness of data collection	Parents: ≥ 83% Adolescents: ≥76%	Met criteria

\$35 gift cards and adolescents received \$25 gift cards for completing data collection procedures. Fathers provided consent and adolescents provided assent before participation.

Measures

Program attendance and retention ratios

Attendance at Zoom sessions was recorded by the program facilitator or study coordinator at the beginning of each session. An attendance ratio was calculated as the percentage of sessions attended per participant of the eight total sessions offered. A retention ratio was calculated as the percentage of participants who completed a post-session survey to those who completed the baseline survey.

Satisfaction ratings

Satisfaction questions for parents after the last session included questions about the usefulness of information provided in the sessions and interactions with program facilitators. After the last session, adolescents were asked to rate their satisfaction regarding feeling comfortable sharing opinions via Zoom and usability of skills learned. Satisfaction questions included four response options: strongly disagree, tend to disagree, tend to agree and strongly agree.

Parent outcomes

Survey questions for parents assessed frequency of food and physical activity parenting practices, food

intake frequency, home food availability and accessibility, and physical activity. Questions to assess parenting practice outcomes were tested for construct validity among Latino parents with favorable results reported by [Zhang et al. \(2020\)](#). Survey items included setting expectations/limits and modeling regarding intakes of fruit, vegetables and sugar-sweetened beverages (SSBs) with five-point frequency response options. To assess physical activity and screen time parenting practices, questions regarding setting expectations/limits and modeling were included with five-point frequency response options in the survey.

Food frequency questionnaires for parents were adapted from a tested Food Behavior Checklist with acceptable reliability and validity among a diverse sample ([Townsend et al., 2003](#)), where participants wrote in daily intake frequencies of fruits and vegetables. Parents also reported intake of sugary drinks and regular soda based on four response options (no/ yes, sometimes/ yes, often/ yes, always).

Questions about home food availability and accessibility were adapted from a previous cross-sectional study of adolescents (Project EAT— Eating Among Teens), which established acceptable psychometric properties among a sample including 3.5% Hispanic participants ([Neumark-Sztainer et al., 2003b](#); [Robinson-O’Brien et al., 2009](#)). Healthy home food availability and accessibility were assessed by summing coded responses to five questions regarding availability of fruits, vegetables, and three questions regarding

accessibility of FV (coded as 1 = never, 2 = sometimes, 3 = usually, 4 = always). The score for unhealthy home food availability was the sum of the coded responses to the questions about availability of junk food, soda pop, sweets and potato chips (coded as 1 = never, 2 = sometimes, 3 = usually, 4 = always).

The level of physical activity was assessed based on frequencies of vigorous, moderate and mild physical activities per week, adapted from the Leisure Time Physical Activity Questionnaire, which has shown acceptable reliability and concurrent validity in a group of healthy adults of both sexes (Godin and Shephard, 1985).

Adolescent outcomes

Adolescent physical activity was assessed in the same manner as parent physical activity. Adolescent dietary intake based on dietary recall interviews was assessed using Nutrition Data System for Research (NDSR) software version 2016, with validity assessed in numerous studies (Wilson *et al.*, 2009; Nutrition Coordinating Center, University of Minnesota, 2016). Three 24-hour dietary recall interviews were conducted by trained researchers within a week after the pre-session survey was completed. Adolescents were asked to describe all foods and beverages eaten during the 24 hours before the interview, referring to a food amounts booklet to estimate amounts eaten. Intakes of fruit, vegetable, SSB, sweets and salty snacks, solid fats, fast food, and added sugars were assessed based on NDSR food group categories. Healthy Eating Index-2015 (HEI-2015) scores were calculated using SAS code from the National Institutes of Health, National Cancer Institute.

Completeness of data collection

Completeness of data collection was assessed based on the participants who completed both pre- and post-session surveys. Ratios of analytical responses were calculated for parenting practice and physical activity questions among parents. Among adolescents, responses for anthropometric questions, physical activity questions and dietary recall interviews were used to assess the completeness of data collection.

Statistical analysis

Demographic characteristics and attendance ratios were described using means with standard deviations (SD) and medians with interquartile ranges (IQR). Outcome variables were described using means with SD. Normal distribution of outcome variables was assessed by the Shapiro–Wilk test and visual observation of histograms. The differences in outcome variables between baseline and post-sessions were evaluated

using Wilcoxon signed-rank tests. The level of significance was set at $p < 0.05$. Statistical analysis was performed using IBM SPSS Statistics for Windows (version 26.0, IBM Corp. Armonk, NY, USA).

RESULTS

Sixty-five families expressed interest in the program to community partners or the study coordinator during the 3-month recruitment period and 32 families remaining after screening for eligibility and accounting for those who could not be reached by the study coordinator (Figure 1). Among the eligible families, 26 families including 26 fathers, 16 mothers and 25 adolescents completed the baseline data collection survey. Six fathers, seven mothers and eight adolescents dropped out before the post-session survey. Data based on 20 fathers, 9 mothers and 17 adolescents who completed both the baseline and post-session surveys were included for analysis.

Mean ages of fathers and mothers were 39 ± 8.7 and 40 ± 5.6 years, respectively, with an average of 18 ± 8.1 years of residence in the USA (Table 2). Ninety percent of parents attained high school or more education. All parent participants were married or lived with a partner. Seventy-six percent of parents were employed and 86% of the participants reported household income of more than \$25 000/year. Average age of adolescents was 13 ± 1.6 years and 77% were boys. About half of the adolescent participants had overweight or obesity.

Of the participants who completed the baseline data collection survey, 77% of fathers, 56% of mothers and 68% of adolescents also completed the post-session data collection survey. Median session attendance ratios were 69% (IQR: 50, 87.6) for fathers, 63% (IQR: 50, 100) for mothers and 88% (IQR: 62.5, 100) for adolescents.

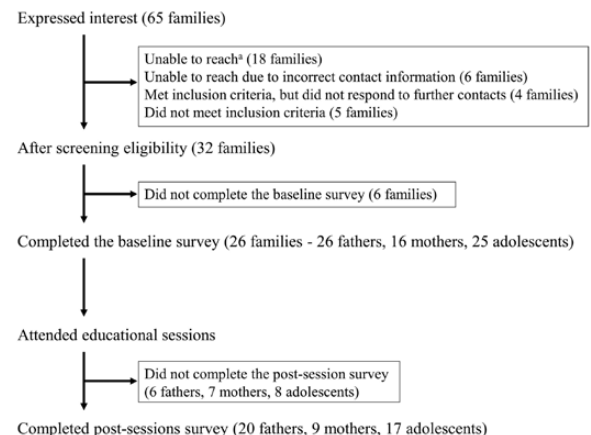


Figure 1: Flowchart. *Families did not respond to several phone calls from coordinators.

Table 2: Demographic characteristics of participants

	Fathers	Mothers	Overall
Parents			
<i>n</i>	20	9	29
Age, mean ± SD	39 ± 8.7	40 ± 5.6	39 ± 7.8
Years in the USA, mean ± SD	18 ± 7.2	17 ± 10.3	18 ± 8.1
Education attainment, <i>n</i> (%)			
No school/primary/middle school	2 (10%)	1 (11%)	3 (10%)
High school, GED	11 (55%)	4 (44%)	15 (52%)
College, technical school, bachelors, advanced degree	7 (35%)	4 (44%)	11 (38%)
Marital status, <i>n</i> (%)			
Married, living with a partner	20 (100%)	9 (100%)	29 (100%)
Employment status, <i>n</i> (%)			
Unemployed	4 (20%)	3 (33%)	7 (24%)
Employed	16 (80%)	6 (67%)	22 (76%)
Household income, <i>n</i> (%)			
<\$25 000/year	3 (15%)	1 (13%)	4 (14%)
≥\$25 000/year	17 (85%)	7 (88%)	24 (86%)
Adolescents			
<i>n</i>			17
Age, mean ± SD			13 ± 1.6
Boy, <i>n</i> (%)			13(77%)
Weight status, <i>n</i> (%)			
Underweight			1 (7%)
Healthy weight			6 (40%)
Overweight			2 (13%)
Obesity			6 (40%)

Satisfaction survey results showed that most parents (>97%) tended to or strongly agreed that parenting information and nutrition and physical activity content delivered using app videos and Zoom was relevant or helpful for learning (Table 3). WhatsApp messages and phone calls were also rated as relevant and helpful for parents for learning (>93%). More than 88% of adolescents tended to or strongly agreed that they felt comfortable sharing ideas in Zoom sessions and that the sessions helped them learn about nutrition.

Based on the data reported by 29 parents, limits for SSB consumption for adolescents were significantly greater after the sessions ($p = 0.001$) (Table 4). Frequencies of role-modeling fruit and SSB consumption indicated significant favorable changes ($p = 0.04$ for fruit, $p = 0.008$ for SSB). Unhealthy home food availability was decreased significantly ($p = 0.024$). Significant favorable decreases in frequency of screen time parenting practices were observed after the sessions with greater limits on screen time for adolescents and less frequent role modeling of screen time ($p = 0.02$ for limits, $p = 0.04$ for modeling, Table 4).

Physical activity parenting practices and physical activity frequencies were not changed between baseline and post-session. Adolescent intake of fruit decreased from pre- to post-session ($p = 0.005$), while all other adolescent dietary intake variables, HEI-2015 scores and physical activity frequencies were not changed from pre- to post-session (Table 4).

Completeness of data collection was indicated by having pre- and post-session survey responses from 100% of parent participants ($n = 29$) for parenting practice questions and 83% ($n = 24$) for physical activity questions (Table 1). Among adolescents, pre- and post-session survey responses were collected from 88% ($n = 15$) for anthropometric questions, and 100% ($n = 17$) for physical activity questions. At least one 24-hour dietary recall interview was completed pre- and post-sessions by 76% ($n = 13$) of adolescents.

DISCUSSION

This study evaluated the feasibility of a small scale, remotely delivered version of the *Padres Preparados*,

Table 3: Satisfaction survey results (fathers and mothers, $n = 29$; adolescents, $n = 17$)

	Strongly disagree, %	Tend to disagree, %	Tend to agree, %	Strongly agree, %
Fathers and mothers ($n = 29$)				
App videos				
The videos with parenting information were relevant	3.4	0.0	37.9	58.6
The nutrition and physical activity information was relevant	3.4	0.0	31.0	65.5
Zoom				
The parenting information was relevant to my learning	0.0	0.0	27.6	72.4
The nutrition and physical activity content was relevant	0.0	0.0	34.5	65.5
What's App				
The messages from facilitators were helpful in my learning	0.0	0.0	31.0	69.0
Phone calls				
The information discussed during the calls was relevant	6.9	0.0	65.5	27.6
It is important for me to connect personally	0.0	0.0	44.8	55.2
Adolescents ($n = 17$)				
I was comfortable sharing my ideas in the Zoom meetings.	11.8	0.0	29.4	58.8
The activities in the Zoom meetings helped me learn about nutrition.	0.0	0.0	35.3	64.7

Jóvenes Saludables program (Table 1). Acceptable recruitment, retention ratios among fathers, session attendance ratios among adolescents, satisfaction ratings and completeness of data collection were observed, while retention ratios among adolescents and session attendance ratios among fathers were slightly lower than expected. Favorable results were obtained for parenting practices and parent SSB intake, and unhealthy home food availability; however, adolescent dietary intakes, HEI-2015 scores and frequency of physical activity were not favorably changed from pre- to post-sessions.

Three previous studies reported findings from in-person family-centered childhood obesity prevention programs: the *Papás Saludables Niños Saludables* program (O'Connor *et al.*, 2020), the *Vidas Activas y Familias Saludables* program (Gallo *et al.*, 2020), and the *Healthy Dads, Healthy Kids* program (Morgan *et al.*, 2014). In these studies, 65–81% of fathers/parents and their children completed data collection surveys after the program sessions, and mean ratios of session attendance were 72% and 71% reported in two of the three studies. In the current study, fathers' retention and session attendance ratios met the established criteria, similar to previous programs delivered in-person.

Adolescents' session attendance ratio met the feasibility criteria, although the adolescent retention ratio was lower than the criteria. The current adolescents' retention ratio was in the range reported in the previous feasibility studies (Morgan *et al.*, 2014; Gallo *et al.*, 2020; O'Connor *et al.*, 2020). The attendance ratios and the high program satisfaction indicated that the program described in the current study was considered useful by father and adolescent participants.

In the current study, favorable results were observed for parent-reported SSB intake, greater parental limits on adolescent SSB intake and less frequent modeling of SSB intake. These changes were consistent with an observed decrease in the availability of unhealthy foods at home and a nonsignificant decrease in adolescent intake of added sugars. Information on the sugar and calorie content of beverages and relationship to health was provided in Zoom sessions and app videos to address the societal norm for consumption of SSBs, which was reported to be ingrained in culture among Latinx participants in previous focus group interviews (Cuy *et al.*, 2020). Parent SSB intake also decreased significantly among participants in the in-person pilot *Padres Preparados, Jóvenes Saludables* study (Zhang *et al.*, 2019). Participants in the in-person and remote

Table 4: Differences of outcomes between pre- and post-survey (20 fathers, 9 mothers, and 17 adolescents)

	Mean \pm SD			<i>p</i> ^b
	Baseline	Post-session	Change ^a	
Outcomes for parents (20 fathers, 9 mothers)				
Parenting practice: expectation/limits (<i>n</i> = 29)				
Fruit	2.3 \pm 0.77	2.3 \pm 0.75	0 \pm 0.7	0.59
Vegetable	2.4 \pm 0.78	2.2 \pm 0.79	-0.2 \pm 0.6	0.17
SSBs	1.5 \pm 0.69	0.9 \pm 0.75	-0.7 \pm 0.6	0.001**
Parenting practice: role modeling (<i>n</i> = 29)				
Fruit	3.6 \pm 1.1	4.0 \pm 0.78	0.4 \pm 1.2	0.04*
Vegetable	3.7 \pm 0.86	3.7 \pm 0.77	0 \pm 1.0	0.96
SSB	2.3 \pm 1.1	1.7 \pm 0.8	-0.6 \pm 1.2	0.008**
Dietary intake				
Fruit (<i>n</i> = 26)	2.0 \pm 1.3	2.9 \pm 1.9	1.2 \pm 2.6	0.06
Vegetable (<i>n</i> = 29)	2.0 \pm 1.6	2.4 \pm 1.3	0.7 \pm 1.8	0.18
SSB (<i>n</i> = 29)	3.9 \pm 0.95	3.2 \pm 0.85	-0.9 \pm 1.1	0.003**
Food availability/accessibility (<i>n</i> = 29)				
Healthy foods ^c	16.2 \pm 2.6	17.2 \pm 2.2	1.8 \pm 2.8	0.079
Unhealthy foods ^d	8.1 \pm 1.5	7.5 \pm 1.0	-0.5 \pm 1.6	0.024*
Parenting practice: expectation/limits(<i>n</i> = 29)				
Physical activity	2.8 \pm 0.89	2.7 \pm 0.71	-0.1 \pm 1.1	0.53
Screen time	3.1 \pm 0.94	2.6 \pm 0.69	-0.6 \pm 1.0	0.02*
Parenting practice: role modeling (<i>n</i> = 29)				
Physical activity	3.1 \pm 1.1	3.1 \pm 0.75	0 \pm 1.0	0.96
Screen time	3.7 \pm 0.94	3.2 \pm 0.85	-0.3 \pm 0.9	0.04*
Physical activity (time/week)				
Vigorous exercise (<i>n</i> = 24)	1.8 \pm 1.9	1.8 \pm 1.1	-0.2 \pm 1.3	0.51
Moderate exercise (<i>n</i> = 25)	2.4 \pm 2.1	2.2 \pm 1.7	-0.3 \pm 2.6	0.63
Outcomes for adolescents (17 adolescents)				
Adolescent dietary intake (<i>n</i> = 13)				
Fruit intake (servings)	1.8 \pm 1.1	0.3 \pm 0.6	-1.4 \pm 1.3	0.005**
Vegetable intake (servings)	1.5 \pm 0.8	1.8 \pm 1.3	0.3 \pm 1.4	0.42
SSB intake (servings)	0.3 \pm 0.5	0.2 \pm 0.4	-0.1 \pm 0.3	0.17
Sweets and salty snacks intake (servings)	1.7 \pm 1.1	1.3 \pm 1.8	-0.4 \pm 2.1	0.35
Solid fats intake (g)	60 \pm 27	43 \pm 24	-17 \pm 33	0.10
Fast food intake (servings)	0.4 \pm 0.7	0.3 \pm 0.6	-0.1 \pm 0.7	0.35
Added sugars (g)	32 \pm 15	23 \pm 14	-10 \pm 19	0.09
HEI-2015 index (<i>n</i> = 13)				
Total HEI-2015 score (Max 100)	56 \pm 17	57 \pm 10	0.9 \pm 17	0.92
Added sugars (Max 10)	8.4 \pm 1.7	9.2 \pm 1.2	0.7 \pm 2.4	0.21
Physical activity (time/week) (<i>n</i> = 17)				
Vigorous exercise	2.3 \pm 1.4	2 \pm 1.2	-0.3 \pm 0.9	0.85
Moderate exercise	2.2 \pm 1.3	1.9 \pm 0.9	-0.4 \pm 1.2	0.71
Mild exercise	1.9 \pm 0.9	2.2 \pm 1.2	0.4 \pm 1.4	0.12
Mild exercise (<i>n</i> = 25)	1.8 \pm 1.9	2.2 \pm 1.4	0.9 \pm 2.3	0.11

^a Value changed in pose-session compared to baseline.^b Wilcoxon signed-rank test.^c Fruits and vegetables.^d SSB, junk foods, sweets and salty snack foods.* *p* < 0.05, ** *p* < 0.01.

sessions had the opportunity to either use sugar cubes in a hands-on activity (in-person) or view a demonstration via Zoom (remote) to measure the sugar in various SSBs. The decrease in parental SSB intake might indicate that parents recognized a need to limit SSB intake based on the session content, regardless of the manner in which the information was delivered.

Screen time parenting practices were favorably changed in the current study from pre- to post-remote sessions, with greater limits on adolescent screen time and less frequent modeling of screen time, possibly motivated by an activity that allowed parents and youth to develop a family media plan to limit screen time. However, physical activity parenting practices did not change in the remotely delivered program, while parental expectations of greater frequency of adolescent physical activity were observed in the in-person pilot study (Zhang *et al.*, 2019). The in-person pilot study included time for parents and youth to engage in physical activity together, including activities that could be done indoors at home, such as dance, yoga and calisthenics. The remotely delivered program only provided suggestions for parents for physical activities that parents and youth could do together, while time was included during Zoom sessions for these activities with youth. Future programs delivered remotely could include time and direction for joint physical activity during Zoom sessions to improve youth physical activity based on a report from the *Healthy Dads, Healthy Kids* study indicating that co-physical activity mediated child's physical activity (Lloyd *et al.*, 2015).

Preferences for remote versus in-person sessions may be dependent on personal characteristics and situations. In-person sessions may be able to provide more engaging experiences for some, where participants feel a vibrancy of being around other people and an accountability to others. Those learning remotely may miss the vibrancy of the in-person experience; however, the virtual convenience of remote sessions may offset perceived disadvantages if other potential issues such as Wi-Fi connectivity, a need to share one device and managing family distractions can be addressed. Satisfaction responses indicated that parents in the current study who were learning remotely generally agreed that the remote components (videos on the app, Zoom sessions, WhatsApp text messages and phone calls) provided relevant content and were helpful for learning. Zoom sessions and phone calls allowed for a personal connection with session facilitators and other participants which may have somewhat addressed preferences for in-person sessions. Additional information about preferences for remote learning experiences was collected in interviews with participants and will be reported elsewhere.

The acceptable retention and session attendance ratios for a community-based program and favorable changes in parent outcomes compared to similar in-person programs supported the feasibility of remotely delivering the *Padres Preparados, Jóvenes Saludables* program. Improvements could be made to add time during Zoom sessions for joint physical activity and cooking either via demonstrations or using ingredients delivered to homes with facilitators leading recipe preparation. Time could also be spent watching the mobile app videos together to address challenges to asynchronous participation in remotely delivered sessions reported by parents. Additional consideration of interactive activities to further engage youth is needed to improve youth outcomes. The virtual convenience of remotely delivered programs with similar content to in-person programs based on the current convenience sample of low-income Latino families may remove some of the previously reported barriers to in-person participation in programs to address Latino child health disparities (Garcia-Huidobro *et al.*, 2016; Johnson *et al.*, 2021).

This study contains several limitations. The study design did not include a control group, compromising the ability to explain causality between program exposure and outcomes. Studies have shown that girls were more likely than boys to adopt healthy lifestyle changes after intervention programs (Brown and Summerbell, 2009; Herscovici *et al.* 2013); therefore, the high percentage of boys versus girls in the current study may have influenced the results. The small sample size based on feasibility testing was, therefore, not powered to detect significant changes in outcomes from pre- to post-sessions. The outcome measurements were self-reported, which might be affected by participants' desirability bias.

CONCLUSION

The *Padres Preparados, Jóvenes Saludables* program adapted from in-person to remote delivery was feasible based on the assessment of retention and session attendance ratios and parent outcomes among Latino families. Additional engagement in activities to improve adolescent health behaviors may be needed to improve the overall effectiveness of the program. However, the feasibility was achieved even with considerable constraints based on the extremely limited timeframe to adapt an in-person intervention to an entirely remotely delivered program.

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Ethics approval

The *Padres Preparados, Jóvenes Saludables* study was performed according to the Declaration of Helsinki and all procedures were approved by the University of Minnesota Institutional Review Board Human Subjects Protection Committee (ID Number: 511S80707). This clinical study is retrospectively registered in the ClinicalTrials.gov Identifier: NCT03469752 (08/03/2018).

Consent to participate

All participants provided written informed consent prior to participation.

Consent for publication

Not applicable.

Data Availability

The data used in the current study are available from the corresponding author on reasonable request.

Author contributions

MR and GAHC were responsible for study design and implementation. MR, GAHC, SAD, JM, DS, AB and MR developed and provided the program. MR and AORP collected the data. SNS analyzed the data and wrote the first draft with contributions from MR. All authors reviewed and commented on subsequent drafts of the manuscript.

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