

Article

The Feasibility of an Online Lifestyle Intervention During the COVID-19 Pandemic on the BMI Z-Score of Mexican Schoolchildren: A Pilot Randomized Controlled Trial

Diana L. Ramírez-Rivera ¹, Teresita Martínez-Contreras ², Alma L. Ruelas ¹, Trinidad Quizán-Plata ² , Julián Esparza-Romero ³ , Michelle M. Haby ²  and Rolando G. Díaz-Zavala ^{2,*} 

¹ Posgrado en Ciencias de la Salud, Departamento de Ciencias Químico Biológicas, Universidad de Sonora, Luis Encinas y Rosales S/N, Hermosillo 83000, Sonora, Mexico

² Departamento de Ciencias Químico Biológicas, Universidad de Sonora, Luis Encinas y Rosales S/N, Hermosillo 83000, Sonora, Mexico

³ Departamento de Nutrición Pública y Salud, Centro de Investigación en Alimentación y Desarrollo (CIAD, AC), Carretera Gustavo Enrique Astiazarán, Hermosillo 83304, Sonora, Mexico

* Correspondence: giovanni.diaz@unison.mx; Tel.: +52-(662)-289-3793 (ext. 4630)

Abstract: The COVID-19 pandemic was a risky period for childhood obesity, due to the increase in unhealthy behaviors. Online interventions could prevent this problem. The aim of this study was to evaluate the feasibility and explore the effect of an online program on the BMI z-score of Mexican schoolchildren at 4 months during the pandemic. A pilot randomized controlled trial was conducted with 54 children. The intervention included three online sessions per week of nutrition and physical activity, as well as nutrition information for parents during 4 months. The control group received one nutrition digital brochure. Of the schoolchildren enrolled, 87% completed the study, and the intervention group attended 46% of the classes. At the end of the intervention, no significant difference between groups in the BMI z-score was observed (-0.02 , 95% CI -0.19 to 0.15). However, the intervention group improved their quality of life and daily fruit consumption. This online intervention implemented during the COVID-19 pandemic was feasible, and the exploratory analysis showed positive trends in quality of life and daily fruit consumption but not in the BMI z-score and other secondary variables of Mexican schoolchildren. Additional strategies may be needed to improve attendance in online interventions and their impact on BMI in this age group.



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Keywords: childhood obesity; prevention; online intervention; COVID-19 pandemic; nutrition; behavior change

1. Introduction

Childhood obesity is a global public health problem that continues to affect developing countries more severely [1]. In Mexico, from 2000 to 2020, the prevalence of obesity in children doubled, from 9% to 18.6% [2]. This is concerning, as excess weight in the early stages can have multiple physical, metabolic, and emotional consequences [3]. In this sense, the Mexican government has implemented public health strategies to promote healthy lifestyles in children, such as improvements in the food environment, nutrition and health education, taxes on sweet beverages, and front-of-package labeling for foods and beverages, among others [4].

Additionally, researchers in Mexico have been conducting programs to prevent obesity in schools. A systematic review included studies of childhood obesity prevention programs

in Mexico, some of them (9/16) showed a significant statistical ($p < 0.05$) change in either weight or BMI across the evaluation period and between groups. However, the results were heterogeneous and inconclusive [5]. In addition, a recent and atypical event, the COVID-19 pandemic, led us to look for new ways to implement strategies.

The COVID-19 pandemic was a risk factor for childhood obesity, due to an increase in some unhealthy behaviors [6]. In a systematic review that included results on dietary changes during quarantine in different countries, it was found that there was an increase in the consumption of snacks, sweets, and ultra-processed foods instead of fruits, vegetables, and fresh foods [7]. Also, reports indicated a significant decline in physical activity and an increase in sedentary behaviors among the population during this period due to the isolation and the closure of schools and sports centers, among other reasons [8]. These behavior changes could explain body weight modifications, because a systematic review of longitudinal studies showed an increase in weight and body mass index (BMI) among both children and adults from before to during the pandemic (up to November 2021). Children experienced an average weight gain of 1.65 kg (95%CI: 0.40, 2.90) and 0.13 (95%CI: 0.10, 0.17) for BMI z-scores, and the prevalence of obesity increased by 2% (95%CI: 1%, 3%) [9]. These findings highlight the importance of implementing strategies to address unhealthy behaviors and prevent obesity during pandemic periods.

One of the strategies proposed to mitigate excess weight during the COVID-19 pandemic was the implementation of online childhood obesity prevention programs [10]. This was proposed due to the limitation of school closures and the fact that the internet is one of the most used technologies by children and adolescents in the world [11]. Some systematic reviews have been conducted to assess the effect of online or technological programs among children and adolescents before the pandemic [12,13]. However, few of the included studies are focused on preventing obesity in school-aged children (6 to 12 years). Only two studies with these characteristics were implemented through mobile phones, with recommendations and nutritional counseling; one was parent-focused and the other only for girls. Neither study showed a significant effect on the BMI z-score, only on lifestyle outcomes [14–16]. Therefore, the results of these types of interventions have been limited.

The present research group evaluated a school-based obesity prevention program in an in-person format with Mexican schoolchildren. A 9-week pilot randomized controlled trial (RCT) was conducted with 41 schoolchildren. The program consisted of nutrition education sessions, physical activity classes, and family participation. At 9 weeks, a favorable trend in the BMI z-score and significant effects on body fat and waist circumference, nutrition knowledge, and physical activity were observed [17]. Considering the generally positive results of this study, the program was adapted to an online format for implementation in the pandemic context.

The current evidence consistently shows that pandemic periods worsen children's nutrition and physical activity habits, as well as their BMI. This highlights the need for preventive interventions to better address these issues in future pandemics. To the best of our knowledge, there are no intervention studies focused on preventing childhood obesity during the COVID-19 pandemic. The aim of this study was to evaluate the feasibility and explore the effect of a 4-month online childhood obesity prevention program on the BMI z-score and lifestyle parameters of Mexican schoolchildren during the COVID-19 pandemic through a pilot RCT.

2. Materials and Methods

2.1. Study Design

An outcome assessor-blinded pilot randomized controlled trial of two parallel groups with an allocation ratio of 1:1 was conducted. A sample size calculation was not performed because it is a pilot study aimed at evaluating the feasibility of the intervention in a new context [18]. It was proposed to have a minimum of 50 participants for practical reasons, i.e., mainly to be able to carry out the measurements in the participant's homes in a 2-week period.

A 4-month online lifestyle intervention was implemented in Mexican schoolchildren. The primary outcome was the feasibility of the intervention and the change in the BMI z-score in the intervention group compared to a control group after 4 months. The secondary outcomes were the changes in waist circumference, relative fat mass, and lifestyle variables between groups.

2.2. Recruitment and Participants

Schoolchildren in the 4th, 5th, and 6th grade and their parents, were invited to participate in the study through online school classes in February 2021. Those interested in participating had to sign the informed consent and assent online (parents and children, respectively).

Youths of any weight were included if they had access to the internet and electronic devices (e.g., smartphones, computers, tablets, or smart TVs). Children with another sibling participating in the study; with any disease or drug use; participating in another lifestyle intervention with effects on body weight; or with a condition that does not allow physical activity were excluded. The protocol was approved by the Research Ethics Committee of the Nursing Department from Universidad de Sonora (CEIENFERMERIA-EPM-003-2020) and registered on the Clinical.trials.gov platform (NCT04772859). All interested participants provided written informed consent and assent, and the methods were performed according to the protocol of this study [19].

2.3. Intervention

Online lifestyle intervention: The intervention was based on the “Planet Nutrition” program, which was previously developed by this study team [12]. The intervention lasted 4 months (1 March to 1 July 2021). The online sessions were delivered to the children in a group format (meeting), everyone from their homes, through the Zoom app, 3 days per week for 60 min each (30 min for nutrition and 30 min for physical activity), during the afternoon in after school hours. The session characteristics were as follows:

- Nutrition education: didactic material, such as presentations, videos, and infographics was created based on the topics of the “Planet Nutrition” program (Table 1). In each online session, different tools were used to reinforce learning and interest, such as cooking workshops, videos, and games. In addition, we worked with the children weekly on the self-monitoring of different behaviors. These were focused on increasing the consumption of fruits and vegetables, water, physical activity, and reducing screen time, and the consumption of sweet beverages. A nutritionist from the study team was in charge of providing the classes with the support of trained nutrition interns. A total of 31 different topics were provided in 48 sessions.
- Physical activity: The classes were designed for children and allowed for a reduced space in which to exercise. Different skills were developed, including strength, elasticity, flexibility, and resistance. Material available at home was used (e.g., bottles with water, chairs, mats, and broomsticks, among others) to perform the exercises. Two physical activity teachers from the study team taught a total of 48 sessions over the 4 months.

Table 1. Sessions and topics of the online lifestyle intervention.

Sessions	Topics
1	Creating healthy habits
2	What is excess weight?
3	Is it really bad to eat ultra-processed food?
4	The bitter truth of sweetened beverages
5	The importance of physical activity
6	Sedentary behaviors
7	Food Guidelines: My plate
8	Analyzing my healthy lunch
9	Jar for healthy drinking
10	Sweetened beverages vs. healthy lunch
11	Reading food labels
12	Importance of healthy nutrition
13	Ultra-processed food
14	Sustainable lifestyle
15	Traditional Mexican diet
16	Healthy lunch
17	Identifying good and bad fats
18	What is important to know about sodium?
19	Smoking
20	Learning about Cancer
21	Importance of consuming fruits and vegetables
22	Vitamins and minerals
23	Why is fiber consumption important?
24	Gut microbiota
25	Jeopardy: Let's put into practice the learning
26	How to prepare a salad
27	Preparing healthy desserts
28	How to be active during summer holidays
29	Healthy nutrition in summer holidays
30	Sleep and growth
31	Planet Nutrition challenge

- Parent's participation: A private Facebook group was created, and health and nutrition information was uploaded 2 times per week. The topics were related to what the children saw in class to reinforce learning at home, and others focused on healthy habits at home. Didactic material was used: infographics, images, and informative posts. In addition, WhatsApp (social media for texting) was used to remind parents to consult the materials.
- Control group: a digital brochure was provided at the beginning of the study with recommendations for a healthy lifestyle, and at the end of the study, they had access to the intervention materials through a web page.

2.4. Measurements

Study measurements were taken at baseline (February 2021) and at 4 months (July 2021). The weight, height, and waist circumference were measured by an assessor blinded to the allocation group. These measurements were conducted at the participants' homes in an outdoor area following hygienic practices to reduce the risk of COVID-19 spread. Lifestyle questionnaires were answered by parents and nutrition knowledge by children, through Google Forms online questionnaires.

- Weight: A TANITA SC-240 scale (Tokyo, Japan) was used to measure the body weight. The measurement was taken without shoes and accessories with light clothes. Children stood in the center of the scale with their feet separated and arms at their sides [20].

- Height: this was measured with a SECA 213 stadiometer (Hamburg, Germany), without shoes, with the body resting on the stadiometer, heels together, slightly spread toes, and extended legs, following the Frankfurt plane [20].
- BMI z-score: this was calculated using weight, height, sex, and date of birth of the children, using the “Anthro Plus” software version 1.0.4 [21].
- Waist circumference: a metallic anthropometric tape (Lufkin Executive Thinline W606PMM, Missouri City, TX, USA) was used, taking the umbilical scar as a measurement reference and in a standing position [20].
- Relative fat mass: This is an estimator of total body fat. The percentage of fat was estimated using a formula validated with American children aged 8 to 14 years. Data on waist circumference (cm), height (cm), and sex were used [22].
- Food consumption: Some questions from the semi-quantitative food frequency questionnaire (FFQ) from the National Health and Nutrition Survey were used. We asked about the frequency of consumption of ultra-processed foods (sweet beverages, fried foods, cakes, and cookies) and healthy foods (fruits, vegetables, and water) in the previous 7 days [23].
- Physical activity and sedentary activities: The physical activity and sedentary lifestyle part of the questionnaire “The Health Behavior in School-aged Children” (HBSC) was used, which is a validated lifestyle questionnaire for school-aged children. It consists of 9 questions, with 5 questions related to the time and frequency of physical activity and 4 to sedentary activities [24].
- Nutrition knowledge: A questionnaire designed by the research team was used to assess the children’s nutrition and health knowledge. It consists of 32 questions with multiple-choice answers. The results were evaluated on a scale from 0 to 10. More correct answers indicated a greater score.
- Quality of life: The PedsQL™ (Pediatric Quality of Life Inventory) questionnaire was used, which was designed to assess the quality of life aspects in both healthy pediatric patients (2 to 18 years old) and those with chronic disease. This generic health status instrument evaluates the frequency of problems experienced over the past month in physical, emotional, social, and school functioning [25].

2.5. Allocation

Baseline measurements were obtained over two weeks (15 to 27 February 2021). Once these measurements were completed for all participants, they were randomly assigned to the intervention or control group by a person independent from the recruitment (blinded). The random number sequence was generated using the software “Research Randomizer” version 4.0 [26]. The random allocation was performed using a random block sequence, stratified by BMI z-score and sex, with an allocation ratio of 1:1. Because the allocation was carried out at a single point in time and without the knowledge of the participants, allocation sequence concealment was guaranteed.

2.6. Data Analysis

Considering that this was a pilot study, the results derived from the statistical analysis should be interpreted as exploratory due to the lack of statistical power, as the sample size was not calculated. However, the following analyses were conducted to analyze trends in the variables of interest. The normality of the data was evaluated with the Shapiro–Wilk test. Data are presented as mean and standard deviation (SD). An independent *t*-test for two samples or Mann–Whitney U, if the data was not normally distributed, was used to analyze the difference between groups in the change in the BMI z-score (final value–baseline value) and continuous secondary outcomes. A chi-square test was used to compare changes

in categorical variables. All variables were evaluated by intention-to-treat. The missing data at the end of the study were replaced with the baseline values (baseline observation carried forward). The analyses were performed using the software NCSS version 20.0.8 and a statistical significance criterion of $p \leq 0.05$.

3. Results

3.1. Enrolment and Baseline Characteristics

A total of 157 schoolchildren were invited to participate in this study, of whom 72 were interested (recruitment rate: 45.6%) and 54 (75%) met the inclusion criteria; 27 were allocated to the intervention group and 27 to the control group (Figure 1). No differences between groups were found in the baseline characteristics. Two-thirds of the children were females, with a mean age of 10 years (Table 2).

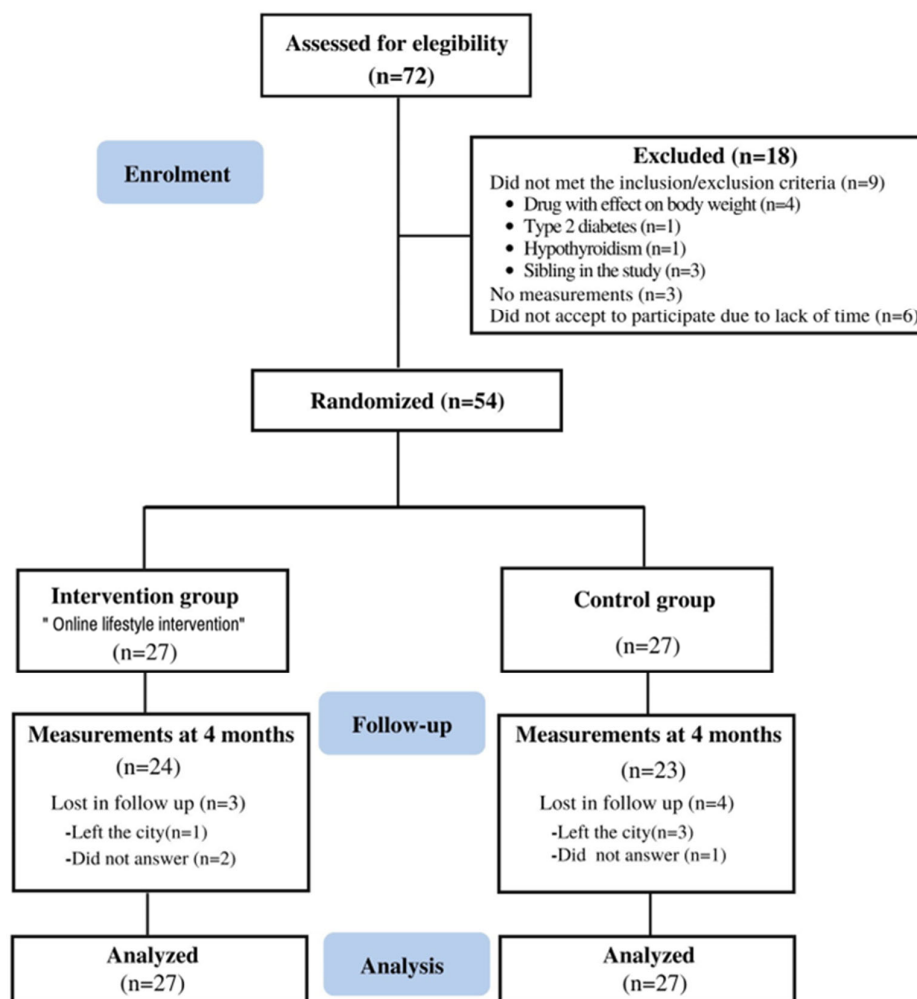


Figure 1. Flow diagram of participants recruited for the 4-month pilot randomized controlled trial during the COVID-19 pandemic.

Table 2. Baseline demographics, anthropometrics, and lifestyle characteristics of the participants in the intervention group (n = 27) and control group (n = 27).

Characteristics	Intervention Group (n = 27)	Control Group (n = 27)	Total (n = 54)	p Value ^a
Demographics				
Age, mean (SD), y	10.1 (0.7)	10.1 (0.8)	10.1 (0.8)	0.99
Sex				0.81
Male, n (%)	9 (33)	10 (37)	19 (35)	
Female, n (%)	18 (67)	17 (63)	35 (65)	
Parents education				0.10
Basic level, n (%) ^b	5 (19)	8 (30)	13 (24)	
High school, n (%)	4 (15)	3 (11)	7 (13)	
University (college), n (%)	17 (63)	15 (56)	32 (59)	
Postgraduate, n (%) ^c	1 (4)	1 (4)	2 (4)	
Anthropometric				
Weight, mean (SD), kg	47.3 (13.1)	44.4 (13.4)	45.9 (13.3)	0.38
Height, mean (SD), m	1.5 (0.1)	1.4 (0.1)	1.5 (0.1)	0.43
BMI, mean (SD), z-score	1.5 (1.4)	1.1 (1.7)	1.3 (1.6)	0.53
Waist circumference, mean (SD), cm	77.3 (12.3)	74.6 (12.6)	76.0 (12.5)	0.43
Relative fat mass, mean (SD), %	35.0 (6.4)	33.7 (6.7)	34.5 (6.6)	0.48
Nutritional Status				0.90
Normal weight, n (%)	9 (33)	11 (41)	21 (39)	
Overweight, n (%)	7 (26)	6 (22)	13 (24)	
Obesity, n (%)	11 (41)	10 (37)	20 (37)	
Quality of Life ^d				
General score, mean (SD), score	73.8 (13.6)	75.6 (9.9)	74.7 (11.8)	0.56
Physical functioning, mean (SD), score	70.0 (21.1)	72.7 (19.5)	71.3 (20.3)	0.63
Emotional functioning, mean (SD), score	69.3 (21.7)	71 (14.2)	70.0 (18.0)	0.74
Social functioning, mean (SD), score	85.7 (13.8)	85.6 (10.2)	85.6 (12.0)	0.95
School functioning, mean (SD), score	72.2 (16.8)	75.2 (14.2)	73.7 (15.5)	0.48
Habits				
Physical activity, mean (SD), h/day	0.3 (0.3)	0.3 (0.2)	0.3 (0.3)	0.79
Sedentary time, mean (SD), h/day	2.5 (1.3)	2.1 (1.2)	2.31 (1.3)	0.28
Daily fruit consumption ^e , n (%)	7 (26)	3 (11)	11 (20)	0.40
Nutrition knowledge ^f , mean (SD), score	6.2 (1.6)	6.2 (1.6)	6.2 (1.6)	0.96

Abbreviations: SD: standard deviation. BMI z-score: body mass index, calculated as weight in kilograms divided by height in meters, expressed in units of standard deviation. ^a Quantitative variables were analyzed using a *t*-test for independent samples. The BMI z-score and physical activity were analyzed by the Mann–Whitney U test and categorical variables with the chi-square test. ^b Completion of a basic level is equivalent to 9 years of schooling in Mexico. ^c Postgraduate refers to a master's degree or PhD. ^d pts: points, scale 0–100 on the Quality of Life Score (PedsQL). ^e A semi-quantitative food frequency questionnaire adapted from the National Health and Nutrition Survey of Mexico was used. ^f pts: points, scale 0–10.

3.2. Exploratory Effects of the Intervention at 4 Months

As part of the feasibility of the intervention, at 4 months, there was a dropout of 13% of children (Figure 1), mainly due to the inability to complete the final measurements. Children attended a mean of 22 of the 48 (46%) sessions. The main reasons for absences were internet problems and school issues. Children and parents reported obtaining benefits from the intervention, mainly in improving their nutrition knowledge, and the majority rated the intervention as excellent (Table 3).

Table 3. Change in anthropometrics and lifestyle outcomes of the intervention group (n = 27) and control group (n = 27) at 4 months.

Outcomes	Intervention Group (n = 27)	Control Group (n = 27)	Intervention Effect at 4 Months (95% CI)	p Value ^a
Anthropometric				
Weight, mean (SD) ^a , kg	2.03 (2.27)	1.94 (2.00)	0.09 (−1.08 to 1.25)	0.82
Height, mean (SD), m	0.03 (0.01)	0.02 (0.02)	0.01 (−0.0001 to 0.016)	0.32
BMI, mean (SD), z-score	−0.008 (0.36)	0.01 (0.25)	−0.02 (−0.19 to 0.15)	0.40
Waist circumference, mean (SD), m	0.89 (3.70)	1.10 (3.27)	−0.21 (−2.12 to 1.68)	0.51
Relative fat mass, mean (SD), %	−0.26 (2.3)	−0.01 (1.89)	−0.25 (−1.39 to 0.89)	0.39
Quality of life				
General score, mean (SD) ^b	12.2 (12.3)	5.2 (12.0)	7.0 (0.40 to 13.6)	0.03
Physical functioning, mean (SD), score	13.1 (17.2)	9.5 (19.5)	3.63 (−6.41 to 13.7)	0.47
Emotional functioning, mean (SD), score	8.9 (19.9)	3.51 (20.0)	5.37 (−5.55 to 16.3)	0.32
Social functioning, mean (SD), score	8.52 (15.4)	1.11 (15.2)	7.40 (−0.96 to 15.8)	0.08
School functioning, mean (SD), score	15.0 (20.1)	4.44 (15.8)	10.6 (0.40 to 20.7)	0.04
Habits				
Physical activity, mean (SD), h/day	0.38 (0.40)	0.24 (0.47)	0.13 (−0.10 to 0.37)	0.11
Sedentary time, mean (SD), h/day	−0.63 (1.18)	−0.24 (1.14)	−0.38 (−1.02 to 0.25)	0.15
Daily fruit consumption, n (%) ^c	9 (33.3)	2 (7.41)		0.01
Nutrition knowledge, mean (SD), score ^d	0.93 (1.59)	0.45 (1.47)	0.48 (−0.36 to 1.31)	0.26
Feasibility ^e				
Child-attended sessions, n (%)	22 (46)			
Parent-attended information, n (%)				
None	2 (8.3)			
1–5 topics	6 (25.0)			
5–10 topics	10 (41.7)			
10 topics or more	6 (25.0)			
Children’s benefits, n (%)				
Better nutrition	8 (33.3)			
More physical activity	4 (16.7)			
More nutrition knowledge	12 (50.0)			
Parent’s benefits, n (%)				
Better nutrition	5 (20.8)			
More physical activity	1 (4.2)			
More nutrition knowledge	10 (41.7)			
Family lifestyle changes	8 (33.3)			
Children’s rating of the intervention				
Excellent	23 (95.8)			
Good	1 (4.2)			
Parent’s rating of the intervention				
Excellent	20 (83.3)			
Good	4 (16.7)			

Abbreviations: CI: confidence interval; SD: standard deviation, BMI z-score: body mass index, calculated as weight in kilograms divided by height in meters, expressed in units of standard deviation. ^a The data were analyzed with a *t*-test for independent samples. The weight, height, BMI z-score, waist circumference, relative fat mass, and physical activity were analyzed with Mann–Whitney U and the daily fruit consumption with a chi-square test. ^b pts: points, scale 0–100 on the Quality of Life Score (PedsQL). ^c A semi-quantitative food frequency questionnaire adapted from the National Health and Nutrition Survey of Mexico was used. ^d pts: points scale 0–10. ^e Some feasibility outcomes. They were only evaluated in children and parents of the intervention.

The 4-month online intervention does not appear to have had an effect on the BMI z-score (−0.02, 95% CI −0.19 to 0.15) (Figure 2) or most of the secondary outcomes (Table 3). However, positive trends were found in the quality of life general score, the school functioning score, and daily fruit consumption (Table 3).

A harm assessment was not formally performed due to the low risk involved in this intervention, and no consequences or unintended effects were spontaneously reported by the participants of either group.

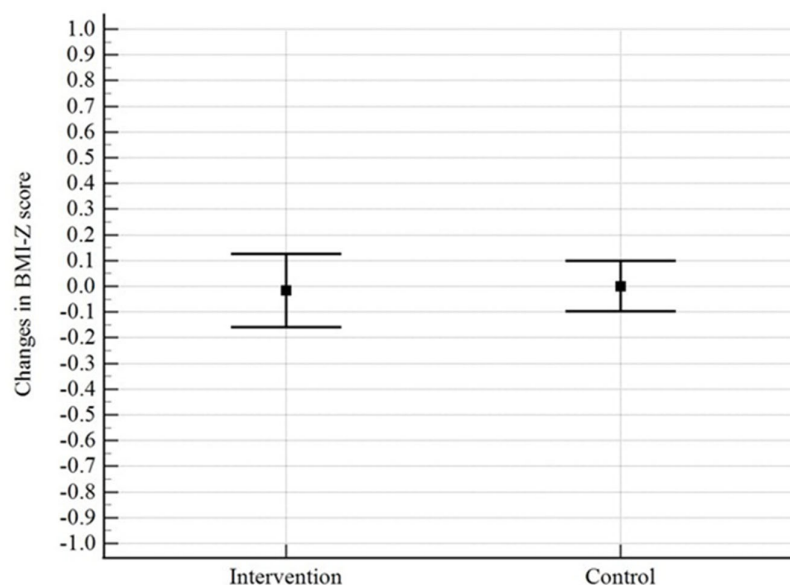


Figure 2. Changes in BMI z-score at four months of intervention. Note: means and CI 95% were used to build this figure.

4. Discussion

This online lifestyle intervention implemented during the pandemic was feasible, based on recruitment, retention, and acceptance; however, the exploratory results did not show a positive effect on the BMI z-score of Mexican schoolchildren during the pandemic. We were unable to find any similar studies that measured the impact of online interventions during the COVID-19 pandemic. However, the results from our study are consistent with two pre-pandemic online obesity prevention programs [15,16]. For example, the parent-focused intervention conducted by Paineau et al. did not find a significant difference in the BMI z-score between intervention groups, when compared to the control group [15]. In contrast, a systematic review of in-person interventions in schoolchildren did show a significant difference in the BMI z-score between intervention and control groups [27]. Considering the evidence from online interventions, including the present work, these types of interventions do not appear to be effective, while face-to-face interventions are. However, we should continue trying to find effective interventions in online format, because it is the only possible format to use during pandemic periods.

The findings observed in this research may be linked to the regional context. A study conducted with schoolchildren of Hermosillo indicated that eating habits and the prevalence of overweight and obesity worsened during the pandemic [28]. In contrast, in Italy, a high-income country, reports indicate that dietary habits improved during and after the pandemic, with stronger adherence to the Mediterranean diet, increased consumption of local foods, and greater preparation of traditional dishes [29]. Therefore, interventions for the prevention of obesity could have different results according to the contextual factors of a country. In addition, some studies suggest that individual and interpersonal factors are also crucial in eating and physical activity behavior in major life events such as the pandemic [30].

The social context during the intervention was difficult in Mexico, with families reporting difficulties in their economic well-being. Moreover, at the time of this study (March 2021), Mexico was experiencing a high peak of confirmed cases of COVID-19, high mortality, and no access to vaccination in most of the population [31], and Mexico was one of the most affected countries by the pandemic worldwide [32]. Thus, achieving behavioral change during the pandemic was more challenging.

In addition, the online format and relatively low attendance (46%) to the program sessions could also have affected the results. Although parents were reminded about the children's attendance at classes, and children were motivated in each one, they reported that the main reasons for absences were school activities and internet problems. Therefore, for future studies, strategies to increase attendance could be considered, such as including the activities of the program within school hours and as part of a subject (not after school), or using an attendance challenge as part of the program. Another suggestion is to record classes so that children who have internet connectivity problems can watch them later and not miss out on the teaching of the classes. This same intervention delivered in an in-person format with an attendance of 90% demonstrated favorable trends in the BMI z-score and significant effects on body fat, waist circumference, and physical activity [17].

This online intervention showed positive trends in the children's general Quality of Life Score and school functioning score. Studies suggest that during the long quarantine period of the pandemic, children experienced depression, anxiety, and poor quality of life [33]. Thus, the benefit of the intervention on quality of life could be related to the interactivity of the online sessions, namely workshops, conversations with other children, online physical activity, and parental participation, given that this intervention was implemented during a time when children had little contact with their peers and teachers. Additionally, children increased their daily fruit consumption, which has many health benefits as they are rich in vitamins, minerals, fiber, and other phytochemicals [34].

This study enhances our understanding of the feasibility of online interventions during the pandemic. However, a definitive study was not conducted because the quarantine conditions had already changed, the pandemic was better controlled, and the lack of effect of the intervention on zBMI suggested that an in-person intervention would be better. Currently, the program is being implemented in an in-person format, and we are working in more schools across the city [35].

This study has some limitations. As mentioned previously, the results should be considered exploratory because it is a pilot study, aimed to evaluate the feasibility of an approach in a new context. Second, there was a relatively low participation in the intervention sessions, which likely limited the effect of the intervention.

The strengths of the study include its randomized controlled trial design, that randomization and measurements were blinded, that rigorous inclusion/exclusion criteria were applied, and that the intervention was delivered by health professionals with experience in the program.

5. Conclusions

The present lifestyle intervention was feasible, and the exploratory analysis showed positive trends in quality of life and daily fruit consumption but not in the BMI z-score of Mexican schoolchildren. This study improves our understanding of online interventions during the COVID-19 pandemic. Additional strategies may be needed to improve attendance in online interventions and their impact on BMI in this age group.

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Institutional Review Board Statement: This study was conducted in accordance with the Declaration of Helsinki and approved by the Ethics Committee of the University of Sonora Department of Nursing: EPM-003-2020 on 30 November 2020, and it was registered in Clinical Trials (NCT04772859).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: Data may be obtained from a corresponding author upon request.

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