



## Article

# A Prospective Study Measuring the Effect of an Interactive Educational Program on Overweight and Obesity among School-Aged Children

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**Abstract:** Being overweight or obese is a public health problem. This work evaluated a food and nutrition education (FNE) intervention to reduce overweight status among schoolchildren in four schools in the West Panama Province. This was a quasi-experimental before-and-after study that implemented a 34-week FNE intervention through workshops with didactic material to 403 children between 8 and 13 years old. A knowledge and attitude survey was used as an evaluation tool before and after the FNE intervention. The prevalence of excess weight (40%) did not reduce after the intervention. The zBMI at the beginning was 0.57 (1.29) for girls and 0.70 (1.36) for boys, and at the final evaluation was 0.57 (1.28) for girls and 0.67 (1.33) for boys. No significant differences were observed between the point of evaluation and sex. No differences were reported in the median level of attitude, although higher levels of knowledge were reported in students of both sexes. The FNE in schoolchildren can be effective in acquiring knowledge and maintaining a positive attitude towards food, but more research is needed to address nutritional status. Although the intervention had no impact on nutritional status, the FNE facilitated the adoption of skills and competencies in schoolchildren. The success of the implementation of the study highlighted the feasibility of replicating the FNE interventions on a larger scale to contribute positively to the multi-level and sectoral public policy Study Without Hunger in Panama.

**Keywords:** overweight; obesity; malnutrition; food policy; nutrition education



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## 1. Introduction

The overweight and obesity epidemic is a public health problem that affects millions of school-age children worldwide, especially in low and middle-income countries [1–3]. These conditions have been associated with the appearance of non-communicable chronic diseases (NCDs) [4–6]. Childhood obesity has also been associated with a reduction in life expectancy of between 2 and 5 years [7], and the growing trend of obesity has enormous economic costs [8]. The risk factors for overweight and obesity include a lack of knowledge about healthy eating, changes in eating patterns, limited access to healthy diets, and high consumption of sugar-sweetened beverages and highly processed foods, among others [9,10]. However, obesogenic environments in homes, schools, and the community have increased this problem [11–13]. These factors represent a great challenge for families when it comes to providing a healthy diet to school-age children [14].

School age is a life stage where the habits and behaviors of the child can be significantly influenced, allowing for modifications of inappropriate habits that they may have previously acquired [15,16]. For example, a systematic review showed that school programs could have long-term effects on a large target group, indicating that this is because children spend a significant portion of their time in school and engage in some behaviors such as lifetime activities [17]. For this reason, it is a priority to design primary prevention programs targeting overweight and obesity in childhood in schools [6,18].

Effective programs for the primary prevention of childhood obesity should consider interventions at the family, community, school, and extracurricular levels. In addition, experts recommend programs that influence specific eating and physical activity (PA) behaviors [19]. An example of a primary prevention program targeting childhood obesity is food and nutrition education (FNE) interventions. Educational interventions on healthy eating in schools aim to promote greater awareness of the multiple interactions that food has on health and learning, as well as promote knowledge about the importance of the production, distribution, and consumption of food [18]. The FNE must include interventions at different levels, prioritizing the educational level and the family [20–23], and it should focus on influencing cognitive and behavioral aspects [24].

Malnutrition in Panama, particularly overweight, obesity, and NCDs, are increasing in all age groups. At school age, the overweight prevalence is critical. Meanwhile, in 2003, the overweight prevalence affected 20% of the school population, for 2008, the overweight prevalence reached 26.9% [25]. Currently, the latest national survey reveals that the overweight prevalence among schoolchildren reaches more than 35% [6]. The same national survey reveals that 72% of the adult population is overweight, and 36% is obese [6]. NCDs lead the death statistics in the country [26]. Therefore, not acting on time can represent a sentence of disability or premature death for the following generations [27]. Among the main reasons for this is the high accessibility and consumption of ultra-processed products and sugary drinks from very early ages [28], as well as sedentary lifestyles. However, alluding to individual responsibility is not reasonable; the obesogenic food system and environment with a high supply and marketing of unhealthy food have changed consumption patterns in the population [10].

This study evaluates a school based FNE intervention to improve knowledge, attitude, and behaviors around healthy eating in four schools in the Province of West Panama in Panama. It also evaluated the effects on overweight status. This country provides an interesting case study because 37% of school children are overweight or obese [6], and the prevalence of obesity in the general population has increased steadily over the last 30 years [29,30]. The study results may provide promising information for improving the nutritional status of children; guiding families and communities; contributing to normative actions to change food environments; contribute to the prevention and control of overweight and obesity in schools.

## **2. Materials and Methods**

### **2.1. Study Design**

This is a prospective study without a control group, with pre-test and post-test measurements. The research was carried out from March to December 2019 in schools in the province of West Panama in Panama. This province is located west of the country's capital and has an estimated population of 460 thousand inhabitants. These areas are characterized by being of a medium and low socioeconomic level and being considered residential areas. The coordination and execution of the project included the participation of nutrition technicians from the Ministry of Education, the Ministry of Health, and the nutrition team of the United Nations Food and Agriculture Organization (FAO) in Panama.

### **2.2. Participants**

The study universe consisted of students from four schools belonging to three districts of the West Panama Province. The La Herradura School, located in an urban area in the

district of La Chorrera; the Hernando Bárcenas School, located in an urban area in the district of Capira; the El Espavé School in a rural area and the Berta Elida Fernández School in an urban area, both belonging to the Chame district. These schools were chosen because they are located close to the capital city and contain both urban and rural areas. In addition, these schools were selected because they have local nutrition teams from the district representative of the Ministry of Health and Education.

The universe of participants was 1205 schoolchildren made up of the total enrollment in the intervened grades of the four schools from fourth, fifth, and sixth-grade levels. Children of these upper-grade levels were considered for participation, given the nature of the theoretical contents taught using the FNE intervention curriculum.

### *2.3. Inclusion and Exclusion Criteria*

Students who attended the 2019 school year in the selected grade levels (4th, 5th, and 6th), as well as who were between 8 and 13 years old at both the time of the anthropometric evaluation and the FNE intervention, were included. Those students with physical disabilities or special needs were excluded.

### *2.4. Sample Size*

The study sample size of school-age children was calculated using the Stata<sup>®</sup> v16.1 software (Stata Corporation LP, College Station, TX, USA). The sample size estimate was calculated to determine a change, before and after the intervention, of 5% in the prevalence of overweight under the following criteria: 95% confidentiality, an estimation error of 5%, and using a prevalence of overweight reported by the Ministry of Health of 39% [31], which represents the most recent data at the time of the study.

Based on the consensus of the nutrition technicians of the Ministry of Education, the Ministry of Health, and the nutrition team of FAO Panama, the percentage of change of 5% was determined feasible to achieve given the period of implementation of the FNE intervention of 34 weeks. The total sample consisted of 403 students (49% girls) from 8 to 13 years of age. The type of sampling used was convenient, including those students available during the evaluation period in coordination with the directors and grade teachers. Educational activities were implemented among all participating students. However, the measurements were made on a selected sub-sample.

### *2.5. Procedures*

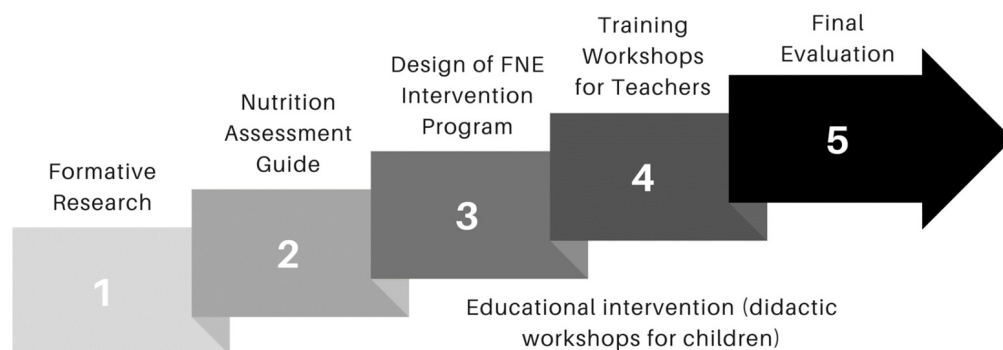
The baseline survey (BL) was carried out in April 2019. The implementation of the FNE program consisted of 34 weeks, and the final evaluation (FE) was carried out in November 2019. The anthropometric evaluation and dietary record were carried out in the BL and the FE by registered nutritionists. The knowledge evaluation was structured on Panama's Food-Based Dietary Guidelines (FBDG) [32]. In addition, the attitude about eating and healthy lifestyles was evaluated using a previously validated questionnaire [33]. A detailed study protocol was previously published elsewhere [34].

The FNE program was developed in conjunction with the Nutrition Department of the Ministry of Education in Panama. The objective of the program was to promote the prevention of overweight and obesity in public and private schools in the country through the design and implementation of actions focused on promoting healthy eating environments and patterns in schools. The program considered the development of a manual and methodological guide for anthropometric measurements in schoolchildren in support of the nutritional surveillance system of the food and nutrition area of the Ministry of Health in Panama. In addition, the program aimed to strengthen the FNE component of the public school health curriculum throughout West Panama. In addition, a tailored communication component was developed for the dissemination, implementation, and monitoring of healthy eating regulations in kiosks and cafeterias of educational centers.

In order to implement these modalities, a methodological strategy was developed that included two components: the nutritional surveillance system and the development

of FNE actions. A didactic guide for teachers was designed and validated that included 17 recreational workshops to promote healthy eating habits and lifestyles [35]. Each workshop contained detailed information on the methodology explained in a simple and concise way for ease of facilitation. It also included the objectives, expected skills, and suggested materials for conducting the workshop. The validation of the didactic guide for teachers and its toolkits was previously published by the authors [35].

The FNE Program consists of the execution of a nutritional surveillance system, with evaluation before and after the teacher-training component and the educational component. The program takes place at the school throughout the school year, from March to December (Figure 1). At the beginning of the school year, the advisory committee was formed. Subsequently, nutritional evaluation and teacher training on taking anthropometric measurements were carried out. A nutritional evaluation manual for school-age children was designed and validated. The 17 didactic activities were designed and validated together with the manual for teachers. Both documents were subjected to content validation with teachers in virtual workshops. Subsequently, the activities with the children were implemented. Finally, the final evaluation of the cognitive, behavioral, and anthropometric dimensions was carried out. A full description of the FNE program and its components are published elsewhere [36].



**Figure 1.** FNE Program Flowchart.

## 2.6. Anthropometric

For the BL and FE surveys, anthropometric measurements were collected, recording weight, height, waist and arm circumference, as well as the bicipital and triceps skinfolds in all schoolchildren. Two previously trained research team members collected anthropometric data to reduce inter-observer errors. In addition, the data collection was supervised by a research nutritionist at all times to help ensure the validity of the measurements. Each anthropometric measurement was taken in triplicate to reduce measurement errors. Weight and height measurements were made on the school uniform. Each participant was placed in a standing position and, at the time of measurement, with their shoes, straps, or another article of clothing (e.g., watches, purses, wallets, coins, etc.) removed for reliability across measurements.

The equipment used for the anthropometric measurements was a SECA 874 digital scale (SECA, model 874, Hamburg, Germany); a SECA 437 portable height rod (SECA, model 217, Hamburg, Germany); a SECA 437 height rod adapter (SECA, model 437, Hamburg, Germany); and, a carbon fiber tape measure, non-compliant material brand SECA 201 (SECA, model 201, Hamburg, Germany). For the bicipital and tricipital skinfolds, the reading was performed on the dominant arm using a fat caliper with a capacity of up to 70 mm (LANGE brand). Waist circumference was measured with a tape measure at the level of the navel on the uniform. With the anthropometric data, the z-score of the body mass index (BMI) for sex and age (BAZ) was estimated, as well as the height-for-age z-score (HAZ) using the Anthro Plus program [37,38]. Nutritional status was classified as follows: underweight when it was  $<-2$  standard deviations (SD); normal  $-1$  to  $<1$  SD; overweight from  $\geq 1$  to  $<2$  SD; and obesity of  $\geq 2$  SD.

### 2.7. Body Image Self-Perception

Self-perception of body image was determined using the seven anatomical models proposed by Collins [39]. Low weight was considered when the participants selected silhouettes one and two; normal weight when silhouettes three and four were selected; overweight when silhouettes five to six were selected; and obesity when silhouette seven was selected.

### 2.8. Knowledge and Attitudes about Food, Nutrition, and Healthy Lifestyle

A knowledge and attitude questionnaire was conducted. The questionnaire consisted of 14 knowledge questions about the Panamanian FBDG [32] and 17 other attitude questions about eating habits and healthy lifestyles using a Likert-type scale with five response options. In order to determine attitudes, students were asked if they agreed or disagreed with the following statements: 1 = fully disagree; 2 = disagree; 3 = undecided; 4 = agree; and 5 = fully agree. The knowledge and attitude questionnaire was previously validated and published [33].

### 2.9. Statistical Analysis

All statistical analyzes were performed with Stata<sup>®</sup> v16.1 software (Stata Corporation LP, College Station, TX, USA). Simple frequencies and relative frequencies were used to describe the study population. The following primary outcomes were defined in the study: anthropometric characteristics, including weight in kg, height in cm, BAZ, HAZ, waist circumference, arm circumference, biceps skinfold, and triceps skinfold; knowledge and attitudes regarding eating habits and healthy lifestyles; the prevalence of excess weight and the prevalence of obesity; and the self-perception of body image. To compare the outcomes during the BL and the FE, Pearson's Chi2 was used in case the outcome was measured in a categorical variable. To compare quantitative outcomes, a comparison of means t-test or a nonparametric test of equality of medians was used when whether or not the outcome followed a normal distribution. All comparisons were made stratifying by sex to evaluate any sex-specific differences. A *p*-value of less than 0.05 was defined to determine statistical differences in the outcomes.

## 3. Results

Table 1 describes the sociodemographic characteristics of the study population. Approximately half of the population was boys (51%), with an average age of 10 years (+/−1 year).

**Table 1.** Sociodemographic characteristics of the study population.

Characteristics	<i>n</i> (%)
Sex	
Boys	205 (51)
Girls	198 (49)
Age	
Mean (SD) <sup>1</sup>	10.1 (0.99)
School	
La Herradura	121 (30)
Berta Elida Fernández	129 (32)
El Espavé	43 (10.7)
Hernando Bárcenas	110 (27.3)

<sup>1</sup> Abbreviations. SD, standard deviation.

Table 2 describes the anthropometric characteristics of the population before and after the intervention, according to sex. Differences in weight, height, waist circumference, arm circumference, and bicipital skinfold were reported in students of both sexes before and after the intervention. Tricipital skinfold, body mass index z-score, and height z-score did not report significant differences before and after the intervention.

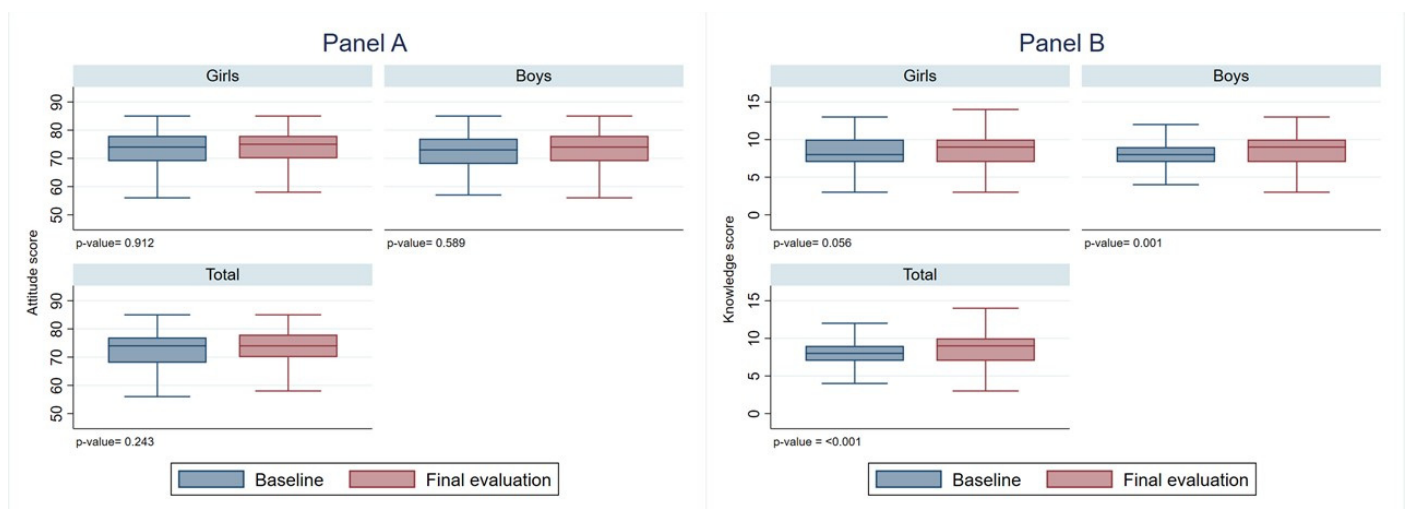


**Table 2.** Anthropometric characteristics of the study population before and after the intervention.

Anthropometric Characteristic	Median (Percentile 25 & 75) <sup>1</sup>		<i>p</i> *
	BL	FE	
Weight, kg			
Girls	38.4 (30–44.7)	40.7 (33.3–48.4)	0.044
Boys	34.4 (29.8–42.8)	36.8 (31.9–46.5)	0.023
Total	36.1 (29.9–43.6)	38.7 (32.5–47.6)	0.078
Height, cm			
Girls	141.4 (134.6–148.3)	145.0 (138.6–152)	0.012
Boys	138.6 (133.9–143.6)	141.6 (136.6–147.5)	0.014
Total	139.5 (134.2–146.1)	143.5 (138.0–149.7)	<0.001
Z Score BMI, SD			
Girls	0.57 (1.29) <sup>a</sup>	0.57 (1.28) <sup>a</sup>	0.961 <sup>b</sup>
Boys	0.70 (1.36) <sup>a</sup>	0.67 (1.33) <sup>a</sup>	0.8155 <sup>b</sup>
Total	0.64 (1.33) <sup>a</sup>	0.62 (1.31) <sup>a</sup>	0.8386 <sup>b</sup>
Z Score height for age, SD			
Girls	−0.14 (1.07) <sup>a</sup>	−0.13 (1.04) <sup>a</sup>	0.9534 <sup>b</sup>
Boys	−0.30 (1.09) <sup>a</sup>	−0.25 (1.13) <sup>a</sup>	0.6567 <sup>b</sup>
Total	−0.22 (1.08) <sup>a</sup>	−0.19 (1.09) <sup>a</sup>	0.7153 <sup>b</sup>
Waist circumference, cm			
Girls	63.1 (57.4–70)	66.5 (61.5–73.5)	0.001
Boys	64.2 (60.2–72.1)	67 (62.7–75)	0.006
Total	63.7 (59.0–71.1)	67.0 (62.0–74.5)	<0.001
Arm circumference, cm			
Girls	21.8 (19.6–24.1)	24 (22–26.7)	<0.001
Boys	21.1 (19.2–24.2)	23.6 (21.4–26.4)	<0.001
Total	21.6 (19.4–24.2)	23.9 (21.5–26.5)	<0.001
Biceps skinfold, mm			
Girls	8.3 (6.3–11.7)	7 (5–11.3)	0.066
Boys	7.7 (5–11.7)	6 (4–11.7)	0.147
Total	8.0 (5.7–11.7)	7.0 (4.3–11.7)	0.007
Triceps skinfold, mm			
Girls	14.3 (11–19)	14.7 (10.7–19.7)	0.805
Boys	13 (9.3–17.7)	12.8 (8–19)	0.863
Total	13.7 (10.3–18.3)	13.7 (9.33–19.33)	0.896

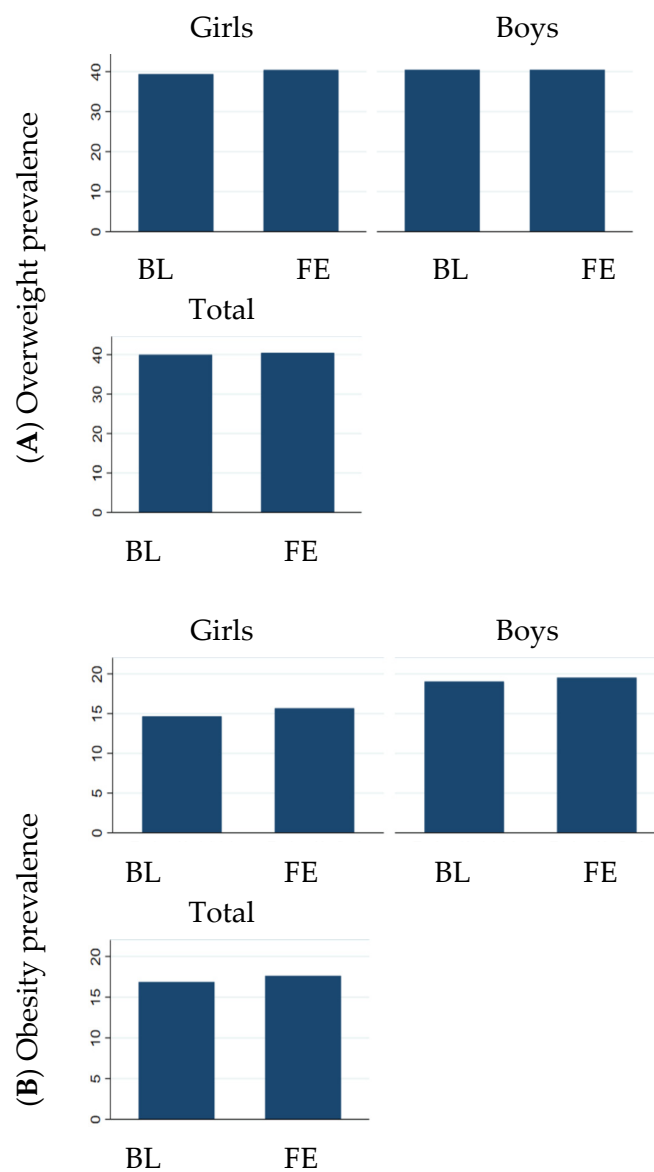
<sup>1</sup> Abbreviations. BL, baseline; FE, final evaluation. \* Nonparametric test of equality of medians. <sup>a</sup> Mean and standard deviation. <sup>b</sup> Parametric test of means.

Figure 2 reports the students' knowledge and practices before and after the intervention. No differences were reported in the median level of attitudes in students of both sexes (Panel A). However, higher levels of knowledge were reported in students of both sexes (Panel B).



**Figure 2.** Attitude (panel A) and knowledge (panel B) scores of the students according to gender before and after the intervention. Abbreviations. BL, baseline; FE, final evaluation. The *p*-value for the Wilcoxon signed-ranks test.

The prevalence of excess weight in girls and boys during the initial evaluation was 39.4% and 40.5%, respectively (Figure 3A). During the final evaluation, the prevalence of excess weight in girls and boys was 40.4% and 40.5%, respectively (Figure 2A). Regardless of sex, no differences were reported in the prevalence of excess weight after the intervention. On the other hand, the prevalence of obesity in girls and boys during the initial evaluation was 14.6% and 19%, respectively. During the final evaluation, no change in the prevalence of obesity was found: girls (15.7%) and boys (19.5%).



**Figure 3.** Prevalence of excess weight (panel A) and obesity (panel B) in the study population by sex and evaluation time point. Abbreviations. BL, baseline; FE, final evaluation.

The percentage distribution of self-perception of body image in the study population is reported in Figure 4. Normal weight is self-perceived among 57.1% of girls during the initial intervention, while during the final intervention, the percentage was 65.2%. The 8.1 percentage point increase was not significant ( $p$ -value = 0.0991).



**Figure 4.** Percentage distribution of self-perception of body image in the study population by sex and evaluation time point. Abbreviations. BL, baseline; FE, final evaluation.

In the case of boys, normal weight was self-perceived among 78.5% of the sample during the initial intervention and 75.6% during the final intervention. No significant change in self-perception of normal weight was reported ( $p$ -value = 0.4809). On the other hand, excess weight was self-perceived among 4.5% of girls during the initial intervention, while the proportion was 7.5% during the final evaluation, although not significant ( $p$ -value = 0.2064).

Self-perception of being overweight was reported among 9.2% of boys during the initial evaluation, while it was 13.2% during the final evaluation and was not significant ( $p$ -value = 0.2106). No participant self-reported being obese.

#### 4. Discussion

Being overweight and obese constitutes a serious public health problem in Panama, affecting a large number of children [6]. In the present study, a high prevalence of excess weight was observed among the evaluated participants. The FNE intervention did not modify the nutritional status of boys or girls. The BAZ score before and after the FNE intervention remained unchanged. Similar results have been previously reported by the research team in a controlled study on the effect of FNE on the nutritional status of school-age children in six educational centers located in rural and indigenous areas of Panama [40].

Despite this finding, significant changes were observed in the knowledge and maintenance of a positive attitude toward eating habits and healthy lifestyles. The impact of educational interventions on knowledge, attitudes, and practices has been widely reported [41–43]. For example, a review on FNE found consistent support for improving knowledge about nutrition and food choices in school-age children [44]. Other studies confirm the importance of FNE in addressing overweight and obesity in school-age children [45,46]. In the long term, FNE in schools may have an impact on the nutritional status of children, so it will be necessary to establish a food and nutritional surveillance system in education, both in terms of process and impact, to monitor these indicators. However, there is an obvious knowledge-behavior gap that requires further investigations for improvements to nutritional status.

The excess weight reported in this study is even higher than that reported by the different previous measurements. In 2003 and 2008, the Living Standards Surveys reported 20% and 26.9% excess weight in this age group, respectively [25,47,48]. Subsequently, two non-representative exercises of the Ministry of Health in Panama carried out in 2014 and 2017 reported 29% and 29.9%, respectively [31,49]. More recently, the National Health Survey of Panama (ENSPA, for its Spanish acronyms) 2019–2020 reported that excess weight in schoolchildren reached more than 36% [6]. These data are consistent with previous reports on excess weight in schoolchildren in Latin America and the Caribbean [3].



More evidence-based and innovative approaches are needed to address overweight and obesity in educational spaces, in particular.

On the other hand, we did find a discrepancy between participant self-perception of body image and excess weight—a phenomenon previously reported also by other authors [50,51]. The low perception of being overweight based on body image also reflects the lack of visibility of the phenomenon of malnutrition in schools. In other words, being overweight or obese has become so normalized that students see such excess body size as the norm, not the exception. A more in-depth detailed analysis examining the ethnomedical perspectives on malnutrition could be useful to better understand this phenomenon.

Our findings suggest that the FNE activities, training, and use of didactic tools through games may have helped to reinforce the learning process about nutritional well-being and healthy eating. As pointed out by Ryan and Deci, promoting and maintaining healthy behaviors will allow them to be valued by the community [52]. A significant increase in knowledge was observed, particularly around the healthy eating plate and the number of food groups therein. In addition, improvements were observed in the key messages of the FBDG as well as student attitudes towards food statements and healthy lifestyles. Similar results have been documented in different countries [41,53]. Educational interventions must be appropriate to the reality and cultural belonging of each context; they must consider the theoretical and methodological bases, as well as environmental influences, behaviors, and individual characteristics that allow for promoting healthy lifestyle habits in students and that generate a positive impact in schools [54,55]. Additional educational modalities influencing multiple behavioral levels may hold greater promise for future interventions.

Finally, the study results suggest that the playful activities that involved games and graphic images (e.g., healthy eating icons) were easier to understand and retain for students. On the contrary, activities that involved memory to recall the composition of food groups without graphic education materials resulted in fewer correct answers. These findings reinforce the need to include age-appropriate educational activities, in this case through games, helping to make nutrition a fun and easy subject to learn. The development of such curricula, accompanied by teaching guides, may be helpful resources for using FNE activities in the classroom. In addition, while we did not find any impact on student attitudes, it is likely due to the already high attitudinal scores at baseline. An interesting finding is that boys had more significant results than girls. Perhaps it is related to the fact that they are more interested in and influenced by gaming. However, we do not have a plausible explanation for this. Therefore, this finding needs to be evaluated through further investigation.

The results of this study highlight the importance of strengthening nutrition in the curriculum in a transversal way so that children can acquire a critical and information-based capacity to choose healthy diets. This aspect can undoubtedly be reinforced by providing schools with an optimal food supply that is fresh, safe, diverse, and sufficient in quantity and quality. In addition, the enactment of complementary policies that also promote a healthy food environment outside of the school may also be beneficial, for example, implementing nutritional warning labeling systems on the packaging and prohibiting the sale and consumption of sugary drinks and junk foods inside and outside of the school environment, among others.

The present findings must be analyzed in light of their limitations and strengths. Some limitations of the present study were the sample size, the type of the non-representative sample, the selection of schools for convenience, and the absence of randomization and control. Moreover, while Tanner's developmental stages are considered important in the development of children, especially of girls, it was not possible to address them in the FNE intervention due to cultural limitations and to ensure fuller student participation throughout the study [56]. In addition, another limitation was that the professors and teachers had little to very little knowledge about healthy eating at the beginning of the project, so it was necessary to carry out support inductions so that they could reinforce the contents of the FNE to the students.

Despite these limitations, this study has some strengths to highlight. On the one hand, the number of measures used allowed for a broad understanding of the potential impact of FNE on food, nutrition, cognitive and behavioral aspects, as well as on the self-perception of body image. Another strength was the duration of the educational activities: 34 weeks of intervention in which students were exposed to the content to improve eating practices. Moreover, the interventions were participatory, involving the entire school having to collaborate for the development of the workshops. In addition, this study was conducted in a real-world context, the school, showing the feasibility of replicating it in similar schools nationwide. Finally, the FNE resources that were created, including the tailored box of educational tools, which had board games, floor games, and a didactic guide for teachers, among others, may be useful resources for the Ministry of Education of Panama to utilize in the future.

## 5. Conclusions

In conclusion, the results found in this study show that the implementation of an FNE program in schoolchildren can be effective in improving short-term knowledge and maintaining a positive attitude towards eating and healthy lifestyles, reinforcing what has already been reported by several reviews on the impact of the FNE on better nutrition in schools [57,58]. While this intervention had no impact on the child's nutritional status, the FNE facilitated the development of some skills and competencies in schoolchildren at a stage of life where eating habits and lifestyles are being established. The study's implementation success highlighted the feasibility of replicating FNE interventions on a wider scale to positively contribute to the multi-level and sectoral public policy Study Without Hunger that allows preventing and controlling the growing prevalence of overweight and obesity in school-age children in Panama.

**Author Contributions:** Conceptualization, I.R.-C.; methodology, I.R.-C. and L.E.; formal analysis, I.R.-C. and C.R.-R.; investigation, L.U. and M.M.; writing—original draft preparation, I.R.-C., L.U., S.R.K. and M.M.; writing—review and editing, I.R.-C., S.R.K. and C.R.-R. All authors have read and agreed to the published version of the manuscript.

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**Institutional Review Board Statement:** The study was conducted in accordance with the Declaration of Helsinki and approved by the Bioethics Committee of the University of Panama (No. CBUP/075/2019). The research protocol was registered in the international clinical trials platform with the number ISRCTN28920505.

**Informed Consent Statement:** Informed consent was obtained from all subjects involved in the study. The intervention was educational and did not represent any physical risk or harm to the participants. Participating parents, teachers, and students were informed of the purpose of the project and the data collection process. Parents provided their signed informed consent before the start of the intervention. In addition, signed informed assent was obtained from the students.

**Data Availability Statement:** The data supporting this study's findings are available from the corresponding author upon reasonable request.

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**Conflicts of Interest:** The authors declare no conflict of interest.

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