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The Role of Food and Nutrition education in improving Dietary Habits

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Abstract

To find out whether teens' involvement in a non-profit organization's Food and Nutrition education program resulted in a change in the quantity of food they ate. Fifty-five low-income teenagers participating in an NGO received a six-month nutritional intervention that included six visits with dietitians and strategic communication and relationship initiatives. At baseline and after the intervention, body weight, height, BMI, nutrition and eating behaviors questionnaire, one day recall and diet quality evaluation of the Digital Food Guide's Diet Quality Index were collected. Dietary pattern improvement required a 5-point rise in the Digital Food Guide's Diet Quality Index. Food labels were better understood and daily and weekend eating habits. Fruits, vegetables, dairy goods, legumes, and milk consumption increased (adequate components). However the intake of whole grains and nuts was low while that of items that should be eaten in moderation was high. The effort altered the eating habits of teenagers, making it a practical and affordable way to promote health, avoid illness. The diet quality index in the digital meal guide has also proven useful for analyzing dietary changes and directing future counseling and nutritional intervention efforts.

Keywords: Teenagers, Food and Nutrition Education, Food consumption, Dietary Habits

1. Introduction

In the tropics, Food and nutrition are essentials for promoting and protecting health, allowing complete human development with a high standard of living and citizenship. The whole human life cycle is affected by nutritional hazards of varying degrees and types, which

take on diverse epidemiological configurations and contribute to the health and disease processes of individual groups (Rodrigues *et al.*, 2022). The present dietary pattern of teenagers is often poor in micronutrients and heavy in sweets and fats, making them susceptible persons from a nutritional standpoint. In many parts of the world, teenage obesity has reached epidemic proportions and become a serious public health issue. To combat these food and nutrition problems, one of the most important public health measures is encouraging people to eat healthily. This includes developing a strategy to reduce the incidence of dietary deficiencies and chronic diseases (Dominguez *et al.*, 2022). Nutritionist information must be imparted to teenagers in a rhythm that correlates to how their knowledge and life experiences are being problematized since altering eating patterns calls for more than simply providing food suggestions. This will lead to desired attitudes and behaviors. Teenagers are motivated and have greater awareness of healthy eating when these skills are taught to them in school (Amantea *et al.*, 2020).

Higher education institutions, particularly those with a focus on charity and assistance, are one of the most prevalent sites for the implementation of public Food and Nutrition rules encourage maintaining the healthy diet. Such settings must provide children with enough opportunities to learn about and practice healthy lifestyle habits, including but not limited to food and nutrition instruction (Baktir 2021). It is necessary to carry out such projects into the curriculum in order to build knowledge in a cross-sectional way and to ensure the sustainability of the activities taken both within and outside the classroom (Correa et al 2019). They should use active, enjoyable, and participatory methods to encourage changes in people's attitudes about food (Ahmed *et al.*, 2022). It is essential to develop nutrition education programs for young people attending nonprofit institutions in order to increase their understanding of proper food practices, inspire them to actively participate in social change and improve the chances of a brighter future for humanity (Rajasooriar and Soma 2022).

Even though it is recommended that students learn about food and nutrition, the literature has relatively few instances of effective measures taken in the majority of Brazilian towns. This is the case despite the fact that the majority of Brazilian municipalities (Montagna et al 2021). The lack of comparable research including teenagers also necessitates a reevaluation of the typical nutritional therapies used on this population (Johnston and Correa 2019) The understanding of a person's and his or her social group's eating habits, as well as the collective development of the methods used, should be the main topics of discussion. It is more probable for interventions to successfully promote healthy eating habits if they are based on the conceptions, needs, and beliefs of the target group. Partida *et al.*, (2018) planned to serve as an evaluation for a survey that was intended to evaluate the nutrition knowledge, attitudes, and beliefs of active teenagers towards nutrition, exercise, and eating habits. Students ranging from middle school to high school made up the total participant pool of 117 and 40 respectively. Three different online questionnaires were used to obtain information about eating habits, levels of general and sport-specific nutrition knowledge, and attitudes toward nutrition education (Lepelere and Deforche 2019).

Raskind *et al.*, (2019) suggested a healthy diet helps youngsters Improved feelings overall as well as having a greater learning capacity, both of that are beneficial to succeeding in school. Young people that acquire dietary procedures, should regularly exercise, abstain against tobacco use, and have coping skills may have a lower risk of developing chronic illnesses as adults. The author Jung *et al.*, (2019) evaluated the Healthy Highway Program's impact on primary school children' healthy eating knowledge and food choices. The program used social cognitive theory to teach students the value of good health and nutrition, the

benefits of healthy eating, how to read food labels, and how to make healthy food choices through observation and hands-on experiences. The author Lattanzi *et al.*, (2023) worked with (115) 4–5–year–old children (53% girls and 47% boys) to improve their eating habits by teaching them about nutrition. During the study, the children used "Nutripiatto," which is a picture of a plate and a simple guide. They used a Food Frequency Questionnaire to find out what the kids ate at the start and end of the study, after they had been using "Nutripiatto" for one month. The author Chagolla, (2020) explored the impact of two techniques on the snack–selection behavior of 25 third–grade students; the research employed a multiple baseline approach. Nutrition education alone had minimal to no effect on children's choice of snack in children who chose non–nutritious over nutritious snacks for more than 40% of the baseline observations. The author Chung and Fong (2018) examined the effect that behavioral feedback in nutrition education has in influencing students' nutrition knowledge and behavior. Students are given the ability to take responsibility of tracking their dietary intake and adjust their diets by making their own judgments about food choices and portion sizes via the use of reflective feedback that is made available through e–learning.

The author Huys *et al.*, (2019) addressed the nonequivalent controls design to examine the impact of garden–based nutrition education on teenagers' intake of fruits and vegetables. A control group and two treatment groups consisted of 99 sixth graders from three separate primary schools. One treatment group additionally engaged in activities related to gardening while the other students in the treatment groups took part in a 12–week nutrition education program. The author Krishna and Dhas (2022) examined the college women workers' eating habits. Women's nutrition knowledge was most influenced by education and career. Nutrition education improved eating habits in women. The author Marcotrigiano *et al.*, (2021) analyzed the nutritional and food safety knowledge of teenage Italians as well as their eating habits and behaviors. Students at one school gave themselves nutrition surveys they had helped design and pilot test. There was a separate tally for each component. The investigation was part of an ongoing nutritional monitoring initiative in the Aosta Valley Area of Northern Italy. The author Schuetz *et al.*, (2019) used a nutritional risk assessment to identify cancer patients in need of dietary assistance. Patients and their families may benefit from Team Nutrition's professional assistance with meal preparation, nutrition education, and encouragement of healthy eating and regular physical activity. After receiving nutrition education, patients increased their protein intake and total energy levels.

With regard to the aforementioned factors, dietitians undoubtedly confront a problem while looking for effective intervention models. The ability to evaluate how well food and nutrition education programs work with this population lets professionals figure out where they work well and where they need more work. This lets them improve the programs in a way that makes people think about changing their eating habits and realize how important it is. This study's objective was to ascertain whether or not youths who participated in food and nutrition education programs changed their eating patterns.

The remaining portion of this study is given as follows: Section 2 provides methods, Section 3 lays out the suggested results and Section 4 concludes the study.

2. Methods

The five–month of dietary program which is a subject among non–controlled intervention trial comprises assessments conducted both before and after. The research was created at a city–based non–governmental organization. The NGO uses multimedia tools to support the professional, sociocultural, and personal growth of young people who are socially and

economically underprivileged. Every year, full-time students from poor socioeconomic backgrounds between the ages of 15 and 20 (17.0 ± 0.45) attend the institution. The morning meal, lunch, and afternoon refreshments are available at the institution three times a day. Students enrolled at the university between June 2021 and September 2022 made up the study population. The primary inquiry decided to focus on this population over the many other projects she had created the difficulty non-profit organizations face the dearth of studies with adolescents and the NGO works with underprivileged adolescents, which has an immediate impact on teenagers' eating habits. This is a convenience sample as a result.

The sample for the research consisted of both male and female students aged from 15 to 20 enrolled at a non-profit institution. No participants had any particular requirements. They were permitted to take part in the research by their parents or legal guardians. The research eliminated students who took part in less than 75% of the program's activities for teaching them about food and nutrition.

The institution offered the instructional activities for a total of five months. Over the course of seven meetings with the nutrition team, the initiative for educating people about nutrition and diets featured lectures, cooking classes, including interpersonal relationships and nutritional counseling. In order to support the program and deepen the interaction with the kids, it also featured communication, relationships, activities, and tactics utilizing an announcement board for five months. Each participant had their height and weight assessed in accordance with guidelines provided by the System of Vigilance Alimental Nutritional. The teenagers' nutritional status was determined by their BMI and World Health Organization guidelines. A special survey measured the teenagers' understanding of diet and eating habits in relation to the major topics addressed by the educational activities. The information was collated and statistically analyzed to look for any potential correlations between the variables. The amount of food eaten was measured by a daily memory (One day). They also gathered each adolescent's food records from two days that were not consecutive, namely one day during the week and one day over the weekend.

The Diet Quality Index associated with the Digital Food Guide (IQD-GAD), was used to convert the data collected in one day. The energy content was given by the Table 1.

The IQD-GAD was used to convert the data collected in one day into food groups and servings. The energy content was given by the Table 1.

The IQD-GAD evaluates the food choices or groups divided into two categories: adequacy components and moderation components. The latter category includes food groups that contain compounds that are hazardous when consumed in excess, while the first category consists of food types that are nutrient-rich and bioactive substances that provide necessary nutrients. The digital food guide's diet quality index may get up to 100 points. The following categories apply to the scores: Low quality diet receives 0–50 points, middle quality receives 40–80 points, and good quality receives 71–90 points.

The IQD-GAD provides intervention increased by at least five points, which was required by the intervention model to demonstrate improvement in the teenagers' dietary patterns. Despite being created for adults, they chose to utilize the IQD-GAD since it is up to date, verified, adapted to dietary patterns, and based on the nutritional requirements set. The dietary pattern has reliability equivalent to international indicators and attempts to avoid chronic illnesses. The macro- and micronutrient levels in the recommended diet for this index include calcium, magnesium, iron, salt, zinc, and vitamin A.

Based on a descriptive analysis of the data, metrics of central tendency, dispersion and frequency were all taken into consideration. The Kolmogorov-Smirnov test evaluated the

variables' distribution to see whether it was normal. Teens' body mass indices were compared before and after the intervention using Pearson's Chi-square test. By categorizing teenagers' eating behaviors as per the IQD-GAD's recommendations and binomial test investigated adolescent diets after the intervention. The Student's test and the Wilcoxon test were used to compare the serving sizes in every food item equally prior to and following the surgery. The Social Sciences and Mathematics Statistical Program on Microsoft version 29 both was used to do the statistical analyses. At 5% ($p < 0.05$), the significance threshold was established.

3. Result

More than 250 pupils at this institution, and 66.7% of them were teens. 55 people took part in the study as a consequence; most of them were females between the ages of 16 and 18 who had finished high school. The anthropometric measurements of the research subjects are shown within Table 1.

Table 1: Students' before and after intervention anthropometrics
(Source: Author)

BMI classification	Intervention in post (%)	Pre-intervention (%)
Underweight	1 (1.9)	0 (0.0)
Normal weight	41 (74.1)	41 (75.9)
Overweight	6 (11.1)	4 (5.6)
Obese	7 (13.0)	10 (18.5)

Note: Pearson's Chi-squared test found a significance level of $p = 0.00$.

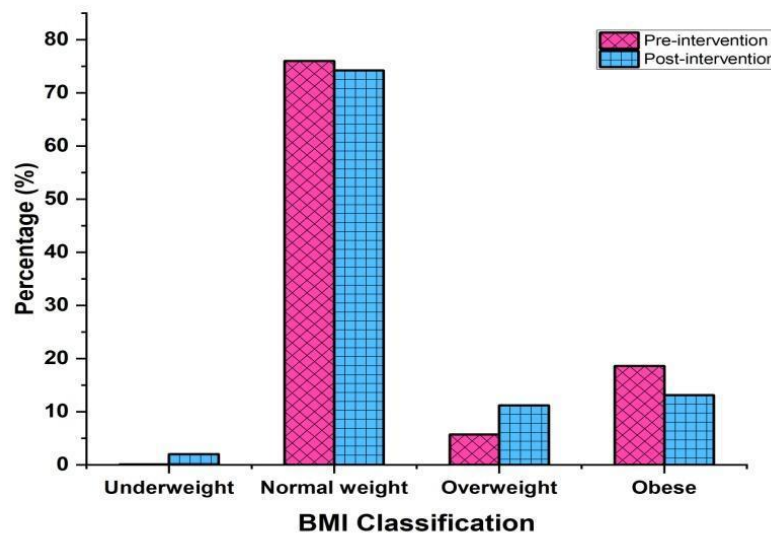


Figure 1: Classification based on Body Mass Index (BMI) in Percentage
(Source: Author)

Figure 1 depicts the students' body mass index categorization. Before and after the intervention, an anthropometric evaluation revealed the prevalence of overweight and obesity of 25.4%. But 5.6% of the individuals saw a drop in their Body Mass Index (BMI), moving from obese to overweight. Before and after the intervention, an anthropometric evaluation revealed the prevalence of overweight and obesity of 25.3%. But 5.6% of the individuals saw a drop in their Body Mass Index (BMI), moving from obese to overweight. As a result of intervention, the proportion of students who drank milk rose from 80.3% to 95.6%, and 7.3% of them switched from whole milk to semi-skimmed (5.4%) or skimmed (3.2%) milk. Following the intervention, there was a notable improvement in students' awareness of nutrition and how to read food labels: 65% of students began to grasp the content on food labels after starting to read them in 55% of the class according to the IQD-GAD, 37% throughout the course of the day, the tested meals had gotten better and 40% had improved over the weekend after the intervention.

According to the categorization, Table 2 and figure 2 display the eating habits. Even though it was not statistically significant, the number of students who had poor diets dropped by 11.1% on the weekend and 16.6% during the week. The majority of students now had an intermediate-quality diet both during the week and on the weekends after all of these instances improved from having a bad diet. There was no discernible shift in the proportion of students who had a diet of sufficient nutritional value during the weekdays or on the weekends, either before or after the intervention. On the weekends, not a single student maintained a diet of sufficient nutritional value.

Table 2: Before and after intervention diet quality classification
(Source: Author)

Variables	Digital Food Guide Diet Quality Index		ρ^*
	Before intervention	Before intervention	
	n (%)	n (%)	
Week day			
Bad quality	51 (94.4)	43 (77.8)	0.11
Intermediate quality	2 (3.7)	11 (20.4)	
Good quality	1 (1.9)	1 (1.9)	
Weekend day			
Bad quality	37 (68.5)	32 (57.4)	0.30
Intermediate quality	18 (31.5)	23 (42.6)	
Good quality	0 (0.0)	0 (0.0)	

Note: *Binominal test.

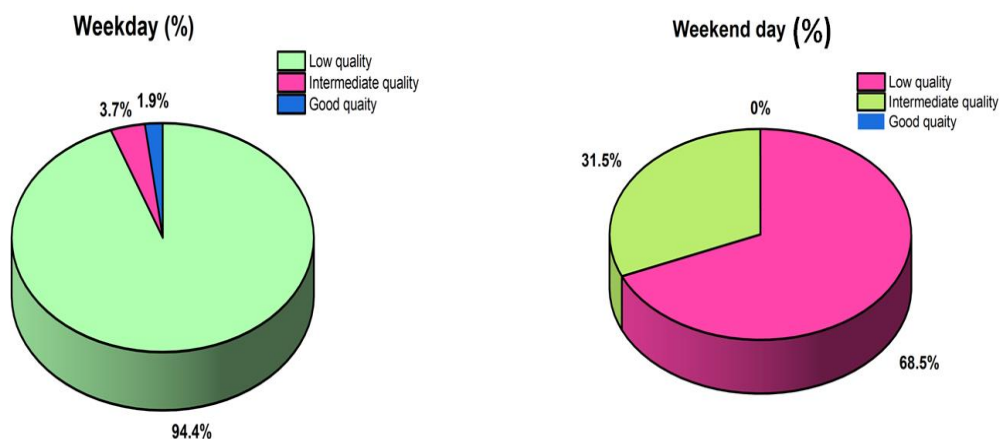


Figure 2: A pie graphic illustrating the characteristics of a week day and a weekend day (Source: Author)

Tables 3 and 4 indicate pre- and post-intervention serving sizes of each dietary component. Dairy, fruit, and vegetable consumption exceeded daily requirements over the week and weekend. On weekends, consumption of chicken, shellfish, and eggs rose considerably whereas consumption of vegetable oils declined although not significantly. The intervention had no effect on the insufficient consumption of whole grains and nuts that persisted after the intervention. The majority of food categories designated as components of moderation, including sugars and sweets, refined grains, meat, and pig, saw no change as a result of the intervention. Weekend and weekday consumption of these foods surpassed the reference levels.

Table 3: Before and after intervention weekday meal component servings (Source: Author)

Factors	Referral range	After intervention		Before intervention		p**
		Median	Minimum – Maximum	Median	Minimum – Maximum	
Moderating factors						
Refined grains and breads	0.1 to 1.1	7.27	0.01–22.66	3.55	0.01–22.04	1.12
Animal fat	0.1 to 1.1	0.01	0.01–8.58	0.01	0.01–9.45	0.85
Sugars and sweets	0.1 to 1.1	7.91	0.01–28.89	7.68	0.01–29.60	0.48
Beef and pork	0.1 to 1.1	1.01	0.01–7.58	0.01	0.01–10.45	0.85
Adequacy factors						
Whole grains and breads	4.1 to 6.1	0.01	0.01–5.89	0.001	0.01–2.77	0.41

Vegetables	4.1 to 5.1	3.24	0.01-22.79	1.09	0.01-6.76	0.01
Milk and dairy products	1.5 to 2.6	1.92	0.01-19.91	0.56	0.01-7.46	0.01
Vegetable oils	2.1 to 3.1	2.21	0.01-13.50	2.03	0.01-11.62	0.08
Seafood, eggs and Poultry	0.1 to 2.1	0.48	0.01-8.62	0.82	0.01-8.62	0.85
Fruits	3.1 to 5.1	2.01	0.01-4.29	0.01	0.01-3.96	0.06
Legumes	2.1 to 3.1	2.56	0.01-5.11	0.94	0.01-7.67	0.01
Nuts	0.6 to 1.6	0.01	0.01-7.79	0.01	0.01-4.05	0.66

Note: Roots, tubers, and bread made with whole grains; A comparison of before and after intervention servings using Wilcoxon and students tests.

Table 4: Before and after intervention patterns of weekend food consumption
(Source: Author)

Factors	Referral range	After intervention		Before intervention		p**
		Median	Minimum – Maximum	Median	Minimum – Maximum	
Moderating factors						
Refined grains, breads	0.1 to 1.1	6.19	1.18–15.28	4.46	1.50–15.05	0.16
Animal fat	0.0 to 1.1	0.01	0.01–7.51	0.01	0.01–4.37	0.97
Sugars and sweets	0.1 to 1.1	3.30	0.01–28.89	3.53	0.01–29.13	0.98
Beef and pork	0.1 to 1.1	1.61	0.01–14.76	1.85	0.01–9.76	0.27
Adequacy Factors						
Whole grains and breads	4.1 to 6.1	0.01	0.01–11.07	0.01	0.01–2.18	0.14
Vegetables	4.1 to 5.1	2.06	0.01–16.63	0.60	0.05–6.93	0.06
Milk and dairy products	1.5 to 2.6	1.51	0.01–8.47	0.17	0.01–3.95	0.01
Vegetable oils	2.1 to 3.1	1.73	0.21–24.68	2.26	0.47–10.78	0.91
Seafood, eggs and Poultry	0.1 to 2.1	0.63	0.01–12.85	0.01	0.01–9.43	0.03
Fruits	3.1 to 5.1	1.51	0.01–5.45	0.55	0.01–3.81	0.04
Legumes	2.1 to 3.1	2.57	0.01–7.77	1.29	0.01–6.39	0.01
Nuts	0.5 to 1.6	0.01	0.01–6.81	0.01	0.01–0.01	0.32

Note: Roots, tubers, and bread made with whole grains; Pre- and post-intervention serving analysis tests: A nonparametric Wilcoxon test and a parametric Student's test.

4. Conclusion

The study's method of food and nutrition education significantly increased the participants' nutritional status and eating habits, making it a valuable and affordable tool for preventing illness, improving health, and raising the standard of living. There seems to have been an improvement in both the classification and quality of the young people's diets as a consequence dietary sequences. A majority of food categories regarded to contain appropriate components, which are helpful to one's health when ingested in the right levels, had the highest increase in consumption as a result of the program. A companion instrument to the Digital Food Guide, the Diet Quality Index will be a crucial instrument towards guiding upcoming nutrition-related initiatives among the group. This indicator made it possible to study whether or not teenage participants in a nutrition education program improved their eating patterns.

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