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Changes on Determinants of Feeding Behavior after a Summer Workshop "*Jugando a Ganar Salud*" in Mexican Children from Low Socioeconomic Status

Vergara A, Chaires C, Moreno LI and Pérez-Lizaur AB*

Health Department, Universidad Iberoamericana, Mexico

Abstract

Background: Feeding habits; selection of foods, culinary preparations and amounts of food eaten and this mode of feeding is influenced significantly by family, friends, school and media in children. Despite several studies have shown benefits of alimentary orientation there is little evidence that dietary habits persist after an nutrition education intervention.

Objective: To evaluate the impact of a two-years follow up summer workshop on the nutrition knowledge, availability, preference and self-efficacy in a group of Mexican school aged children from lower socioeconomic status.

Design: In this cohort study, anthropometrics and determinants of feeding behavior evaluations were performed onschool-aged children after a two years follow up summer workshop.

Subject: 14 school-aged children (7 boys and 7 girls) registered in a summer workshop implemented in a low socioeconomic status area in México City during a two-years follow-up. Children were asked to complete a questionnaire to measure dimensions of eating behavior focused on four components: knowledge, preferences, food availability and self-efficacy, asking about fruit and vegetables consumption as well as feeding schedule. Also, anthropometrics were obtained and Body Mass Index (BMI) and Waist-to-Height Ratio (WTHR) were calculated.

Statistical analysis: Descriptive statistics, X^2 tests, Friedman and Wilcoxon analysis were performed. Continuous variables are presented as mean ± standard deviation, categorical variables as percentages. A p value <0.05 was considered statistically significant.

Results: It was observed a 14.31% in the prevalence of children with cardiovascular risk, defined using waist-to-height ratio (p=0.308). In relation of the determinants an improvement in the knowledge (p<0.001) and self-efficacy, which were sustained over time (p<0.001) Preferences and availability remained without changes. It was observed a trend of improvement for all feeding behavior determinants higher in girls compared with boys.

Conclusions. In a sample of Mexican children of low socioeconomic status who attended a summer workshop, the changes of knowledge and self-efficacy, considered as determinants of feeding behavior are maintained over time, after a two years follow-up.

Keywords: Socioeconomic status; Children; Childhood obesity; Food habits; Healthy life styles; Nutrition knowledge; Obesity; School-aged children

Introduction

Eating behavior is defined as normal behavior related to feeding habits; selection of foods, culinary preparations and amounts of food eaten [1] and this mode of feeding is predisposed significantly according to the socioeconomic status that the child belongs [2]. Even though it has been identified that the mother has a fundamental role in education and transmission [3], family, friends, school and media influence children's eating behavior [4] suggesting that the most important role is on parental behaviors as they shape many aspects of children's development, eating concerns and weight outcomes [5,6] as such, intervening early may be necessary to engender healthy behaviors before malnutrition patterns are established [7].

Despite several studies have shown the benefits of school`s intervention programs to modify the student's patterns of diet [8-11] are ideal for receiving education about healthy lifestyles as children spend most of their time within school [12] and also since it has been recognized that healthier choices at one stage in life are associated with healthier choices at a later stage [13,14] because of that childhood is critical to acquire healthy habits [13] regardless there is comparatively little evidence that dietary habits persist into adult life principally because there are so few longitudinal studies.

To clarify the impact of a summer workshop on the determinants of feeding behavior we examined schoolchildren, which attended a summer workshop for two continuous years. This is a sub analysis derived from a larger study focused on evaluating the effectiveness of the summer workshop for promoting healthy lifestyle "***Jugando a Ganar Salud***" (Playing to win heath), which included a physical activity and nutritional components in school children from low socioeconomic status.

Methods

Study population

The "*Jugando a Ganar Salud*" workshop included 187 children of

***Corresponding author:** Pérez-Lizaur Ana Bertha MC, Health Department, Universidad, Iberoamericana, Mexico City, Mexico, Tel: +52 (55) 5950-4266, Fax: +52 (55) 5950-4254; E-mail: anabertha.perez@ibero.mx

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Anthropometrics	Total N= 14	Boys n= 7	Girls n= 7	p [a,b]
Sex, %	-	50	50	1.000
Age, years	9.09 ± 1.38	8.92 ± 1.49	9.25 ± 1.37	0.710
Weight, kg	31.23 ± 9.83	34.96 ± 12.63	28.56 ± 7.13	0.432
Height, cm	130 ± 9.56	135 ± 10.43	127.07 ± 7.97	0.268
BMI, kg/m^2	17.94 ± 2.97	18.63 ± 3.84	17.44 ± 2.38	1.00
Waist circumference, cm	61.08 ± 10.17	65.57 ± 12.06	57.87 ± 7.99	0.343
WTHR	0.47 ± 0.046	0.48 ± 0.06	0.45 ± 0.04	0.530
WTHR>0.5, n(%)	3(21.42)	2(28.6)	1(14.3)	0.310

Body Mass Index: BMI; Waist to Height ratio: WTHR
[a,b] x^2 or U Mann-Whitney testaccording variable type.

Table 1: Description by sex before summer workshop of 2010.

both sexes from a convenience sample of kids from a summer workshop implemented in a low socioeconomic status area in México City, according to the National Council of Population's criteria (CONAPO) [15]. This intervention began in the summer of 2010 and continued in summer 2011. Children were invited to participate in the study and were included if they and their parents signed an informed consent form that they brought home the day before measurements were made. Children with a contraindication for physical activity, secondary hypertension or with any congenital abnormality were excluded. Of the 187 children, 14 (7 boys and 7 girls) finished the follow-up period of two years, and these are the children included in the present report.

Measurements

Anthropometric and determinants of feeding behavior evaluations were performed on all children at the beginning of each workshop and at the end. Data were collected in the morning, immediately after the children arrived at the summer workshop by a group of nutritionist trained at Universidad Iberoamericana Campus Santa Fe.

Anthropometry

Weight (SECA professional scale model 750, Seca North America, Hanover, MD), height (SECA model 280 portable stadiometer, Seca North America) were measured in accordance to the reference manual of anthropometric standardization. Waist circumference was measured at the level of the iliac crest rim with a non-extensible tape measure with the subject in expiratory phase. All measurements were taken with shoes and heavy outer clothing removed [16]. Body mass index (BMI) was defined as the total body weight (kg) divided by the height in square meters (m^2), and waist to height ratio (WHTR) was obtained dividing waist circumference (cm) by height (cm). A cut point ≥ 0.50 was considered to determine cardiovascular risk [17].

Feeding behavior

Information related to feeding behavior was assessed with a multiple-choice questionnaire with 25 items focused on four areas: knowledge, preferences, availability and self-efficacy.We obtained the sum of the correct responses obtained for each determinant, considering a maximum score for each component; for nutritional knowledge: 0-6; for food preferences: 0-5; for healthy food availability: 0-3; and finally for Self-efficacy: 0-10, the higher this score in each component is less attached to a healthy diet.

Nutritional knowledge was evaluated by asking items such as: What colors are the three food groups of "*El plato del Bien comer*" (Dish of good eating)?, meanwhile food preferences were obtained by questions like the following: My friends and I have fruit and vegetables "always".

On the other hand, availability was assessed asking about if there were fruit and vegetables at home, the questions included, "I can eat in my house when I please 'fruits and vegetables' " and "In my home I can take 'natural water'".

Lastly, self-efficacy was considered by questioning issues such as: "I think when I get hungry at home or school I can eat my favorite fruit or vegetable".

Procedure

The summer workshop "Jugando a Ganar Salud", children were involved during four hours a day in traditional games and sports in order to achieve with the recommendations of the World Health Organization (WHO) which suggests to accomplish the goals with appropriate activities according age and preferences of children. Additionally reinforced knowledge, skills and positive attitudes for a healthy lifestyle. Both courses were in charge of college students from the University Iberoamericana with prior training.

Statistical Analysis

Continuous variables are presented as mean ± standard deviation and categorical variables as relative frequencies. For a baseline comparison of the continuous variables for boys and girls, the Student's t-test for independent groups was used. Spearman's correlations for feeding behavior determinants were obtained. The X^2 tests or Fisher's exact test was used for categorical variables; Friedman and Wilcoxon analysis were made to evaluate the changes in the determinants of feeding behavior over time. All analysis were performed with commercially available software (SPSS 12.0 for Windows: SPSS, Inc., Chicago, IL, USA). Results were considered statistically significant when $p<0.05$.

Results

14 school children (7 boys and 7 girls) with a mean age of 9.09 ± 1.38 were included. The characteristics of subjects, including anthropometric are shown in Table 1. There were no differences by sex (Table 1).

Assessment of nutrition knowledge at baseline showed that a high proportion -78.6% of children knew and identified the colors in "*El Plato del bien comer"*, nevertheless only 23.1% recognized the recommendations in the planning and food preparation of a complete breakfast and only 14.3% of children pointed out a complete meal (with the 3 Food Groups).

Regarding food preferences, 42.9% of children reported to consume fruit or vegetable as lunch while 57.1% also always eat them at home. In this sense the 57.1% of children mentioned that their parents always bought fruits and vegetables and in the 50% of the cases the family always is used to eat them.

On the other hand, when evaluated food availability, most of the children (71.4%) informed always to have ready to eat fruit and vegetables, and be able to have this kind of food and natural water when they please.

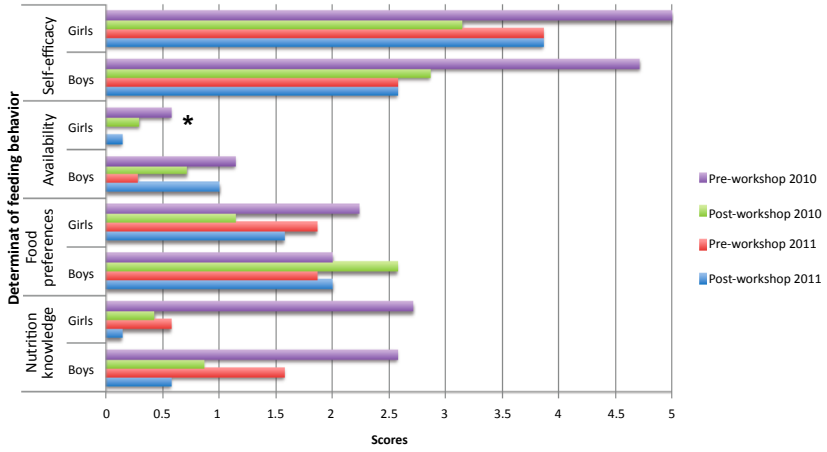
Relative to self-efficacy, 21.4% of children affirmed not being able to prepare a dish with the three food groups, and only 35.7% suggested that always could eat a fruit or vegetable in any meal.

A moderate-high correlation was observed between nutrition knowledge and food preferences (r=0.740; p=0.002), with self-efficacy (r=0.687; p=0.007), and also with availability (r=0.636; p=0.015). Likewise, food preferences were related to availability (r=0.659; p=0.010) and with self-efficacy (r=0.714; p=0.004).

Determinants	Scores				p[a]
	Pre- workshop 2010	Post- workshop 2010	Pre- workshop 2011	Post- workshop 2011	
Knowledge	2.64 ± 1.5	0.64 ± 1.00	1.07± 1.14	0.35 ± 0.63	**0.000**[***]
Preferences	2.14 ± 1.65	1.85 ± 1.7	1.85 ± 1.35	1.79 ± 1.52	0.958
Availability	0.86 ± 1.29	0.50 ± 0.75	0.14 ± 0.36	0.57 ± 0.51	0.098
Self-efficacy	4.86 ± 2.82	3.00 ± 2.00	3.21 ± 1.8	3.21 ± 1.80	**0.002**[***]

[a]Friedman test
*** p<0.001
Data is presented as mean ± standard deviation

Table 2: Changes in scores of the determinants of feeding behavior in school-aged children.



* Friedman test for boys and girls independently, p=0.002

Figure 1: Changes in the scores for the determinants of feeding behavior in children who attended summer workshops 2010-201.

Findings after 2-year follow-up

At the end of the 2-years follow-up children were aged 9.57 ± 1.9, the mean in the waist circumference augmented 3.566 cm (p<0.000) and also it was observed a 14.31% in the prevalence of children with cardiovascular risk, defined using waist-to-height ratio (p=0.308).

When analyzing the total scores obtained for each feeding behavior determinant it was observed an improvement in the knowledge (p<0.001) and self-efficacy, which were sustained over time (p<0.001). Preferences and availability remained without changes (Table 2).

Changes in the proportions of correct responses before and after the summer workshops were compared; questions with answers that were enhanced were those with applied knowledge from "*Plato del Bien Comer*" as choosing one of the breakfast and dishes which includes the three groups of food, with a increment of 1.8% (p=0.564) and 31.2% (p<0.001), respectively. Besides, 91.5% of the children changed in response and noted that the best choice of drink after playing is water (p=0.018).

Other changes observed at the end of follow-up were in the self-efficacy field when asking about the when asked about the availability to eat a salad (5.2%; p=0.855), prepare a dish with the three food groups (11.8%; p=0.117), eat 5 servings of fruits and/or vegetables a day (18.7%; p<0.05) or asking someone who prepare meals including vegetables (13.6%; p<0.05).

In this same area in question focused on promoting new healthy food consumption unfavorable responses were obtained in a larger number of children, nevertheless no statistical significance were found.

Additionally, a stratified analysis for sex was performed to compare the scores in the determinants through time; there was a trend for improvement in higher proportion in girls compared with boys, in which only the variable availability reached statistical significance (p= 0.002) (Figure 1). There were no statistically significant differences according to presence of cardiovascular risk.

Discussion

Even though the multiple benefits of a good feeding and nutrition, its practice remains rare among young people, as was observed in the present study, where the baseline results showed that although most of the children are provided with information that is not enough to apply to elections for breakfast or healthy dishes.

Notwithstanding the improvements observed in knowledge and self-efficacy on eating behavior, changes in the availability remained, perhaps because the latter factor depends more on the economic and family context, reaffirming that the family keep on being the main center responsible for training and education of children [18] as they control many aspects that contribute to a child's health related behavior [19,20].

Relating to self-efficacy, children seemed to improve it but in some aspects of this area –tasting new food or meals- did not change, perhaps because this depends on the child's early experiences with food, especially food practices of parents, which are fundamental in the development of eating habits [21,22] or because the price, convenience and social relations are other values considered when choosing a food [23] instead of knowledge.

Another significant finding was the increase in the awareness of eating 5 fruits and vegetables a day, even the consumption was not measured, these results is similar to the reported by Bere et al., in Norway [24]. One possible explanation is the low family income designated to this item, in Mexico only 16.4% is designated for fresh vegetables purchases [25].

Our findings highlight the importance of targeting the family environment for the promotion of healthy eating behaviors among children. Future interventions should encourage parents to be positive role models by targeting parental intake and to create a supportive home environment through increased encouragement and availability of fruits and vegetables and employing rules to govern eating behaviors. Thus, the need to use strategies to increase and mantain good eating practices, including the determinants assessed in here is indisputable and healthy lifestyles should be strengthened.

This study is limited by the small sample size. Subjects were recruited in a summer workshop with a general invitation and advertisements. It was challenging to follow children during two years because most of them did not join to the second workshop. Moreover, our measure of anthropometrics and feeding behavior variables are restricted to assess some components of nutritional status and behavior. Despite these limitations, there were several strengths; the found information is valuable as it documents the response to two interventions among children who attended the summer workshop "*Jugando a Ganar Salud*". Besides, our results corroborated that healthy food availability is highly influence by parents or food suppliers independently of nutritional knowledge of children. Otherwise we augment previous studies by examining children during a large following.

Conclusion

With the findings reported in the present study, it is possible to conclude that the summer workshop "Jugando a Ganar Salud", wich includes components of physical activity and food guidance, is an effective tool to improve some of the feeding determinants in school Mexican children from lower socioeconomic status. At the same time, the program activities with similar objectives should be reinforced periodically so that part of the children's daily activities are dedicated to make appropriate decisions on a long-term basis.

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