

Study of Nutrition Habits in Primary School Students

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Abstract

The development of educational strategies to generate positive changes in eating habits of students at the primary school level has gained special interest in the last years. Education in terms of good nutrition is a key factor in student's healthy lifestyle. In order to know the eating habits of students, it becomes necessary to assess the nutritional status of students taking into account the different foods that themselves choose to eat. One place where they eat food that they themselves choose is at school during the recess, where they have access to buy different kind of food products. In this work, eating habits of students in their last year of primary school were evaluated by the use of a survey. To facilitate the survey understood, household measures were used. Nevertheless, the results were expressed by using the international system of units (SI). Data obtained shows that the most consumed product in the recess chosen by students is *alfajor* (45.7%), followed by sandwich and/or hot dog (35.1%). Meanwhile, the products that were less consumed were gelatin (3.5%) and cereal bars (3.5%). The total amount of intake macronutrients was also calculated from the survey completed by each of them and it was expressed as total caloric value, carbohydrates, proteins and fats. Although, the average total intake resulted in 1550 Cal/day, which is lower than the Recommended Daily Intake for children (2000 Cal/day), according with Recommended Dietary Allowance (RDA) the intake adequacies of the average macronutrient distribution were higher than 70% in all cases.

Keywords: Case report; Eating habits; Good nutrition; Primary schools students

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Introduction

The industrialization, urbanization, economic development and market globalization have led to lifestyle changes of the worldwide population. As a consequence, the nutritional habits have been changing during the last decades, characterized by an increase of fat intake, mostly in saturated fat, along with a decrease in cereals, fruits, legumes and vegetables consumption [1,2]. These changes in the world food economy are reflected in the change in eating habits, for example, increased energy consumption in diets that are currently high in fat, particularly saturated fat, and low in carbohydrates [3]. A high-fat diet, especially one rich in trans fats, which has negatively impact human health being a risk factor for chronic diseases [4]. In addition there are factors such as nutrition, genetic, environmental and prevalence that can affect the children growth. Although some studies have shown that knowledge does not always transfer into healthy behavior, it is widely known that education is another important

socioeconomic factor in determining risk of poor dietary intake and this has led to an emphasis on the need to increase nutrition education programs, particularly focused in specific groups in the community [5]. Nutritional habits are established in early life and can have a significantly effect on the health of individuals in the long-term [2].

Students' subjective food perceptions may reflect in different food choices during childhood that are developed by the body senses (taste, smell, tactile, vision and hearing) and they are being acquired as the child gets older [6]. Moreover, the environment where the food is provided influences the food-preference of the students. In this sense, the school is an advantageous environment in space and time for promoting healthy nutrition habits, because it is the second socializing place for children [7].

Primary school represents an important time point in student's life, and in particular the recess at school is a time when they have their own responsibility regarding food choices. Nowadays,

children are recognized as primary consumers, since they are able to make independent decisions and also purchases with their own money [8]. Therefore, children have increasing participation in food choices and it has been shown that accessibility, price and availability are determinants in the foods children consume [4]. Furthermore, it should be noted that food and nutrition is the responsibility of society, not just an individual or each family [9]. Consequently, eating habits are having a significant impact on the health and nutritional status of populations, particularly in developing countries and countries in transition. While living standards have improved, food availability has expanded and diversified over, and access to services has increased, there have also been significant negative consequences in terms of inappropriate eating habits, decreased physical activity and a corresponding increase in diet-related chronic diseases [3]. Thus, continuous social changes influence modifying eating habits. While it is known that the potential of cognitive development of children is genetic, it has been determined that an appropriate diet has positive effects on cognitive development [3]. As a result, good nutrition is very important for school-age children not only for your health but also because it can significantly improve their school performance. However, a child is not born with a healthy nutrition education, should learn it. Children are more likely to choose less-healthy foods when these are more readily accessible [4]. In recent times began increasingly to detect cases of so-called "hidden malnutrition" described as overweight or obesity in children and teenagers according to anthropometric parameters. Therefore, it is important to state to them good nutrition practices during growth and development.

The aim of this study was to know the nutrient adequacy of a group of students at the primary school level and their relationship with nutritional habits. With this propose a survey using household measures was developed and self-answered by each student. Additionally to take an insight about their eating habits, a questionnaire about their consumption preferences during the school recess was also done.

Materials and Methods

A cross-sectional study with primary school students enrolled at the last primary school year in General Paz Junior neighborhood in Córdoba (Argentina) was conducted. The consent of the authorities of the schools as well as the consent of each student for their participation in the study was previously requested. The data collection was obtained by the use of a survey to characterize the student population, while the body mass and height were measured. Data were collected in different schools as well as in different days in spring period.

Individuals

Children that took part in the study were primary school students from Córdoba (Argentina) of both gender, aged between 9 and 10 years old. This study includes those students regularly eating at the school buffet as well as those students who eat at home. Every student in the last primary school year was invited as a potential survey respondent and, then, was screened for participation based on age. That included a total of 4 schools and 114 students.

Survey design and data acquired

A survey was used to obtain data about the consumption frequency and kind of food consumed during the week (**Supplementary data 1**). The food frequency survey included a total of 16 kinds of food items.

In order to facilitate the student's compression of the survey, the weekly food consumption survey was designed using household measures such as units, teaspoons, cups, glasses, plates or a portion of the size of the palm of the hand. Then, taking into account the tables of food composition of the Center for Experimental and Applied Endocrinology [10], the caloric intake of each food was calculated converting in grams the household measures used in the survey. In order to obtain a dietary assessment, the Recommended Daily Intake (RDI) and total macronutrient intake of each student expressed as total caloric value (TCV) were used. Thus, from the data obtained in the weekly food consumption survey, grams of nutrients ingested per student were calculated and they were expressed as percentage of total caloric value and the percentage of each macronutrient (carbohydrates, proteins and fats). The obtained values were compared with the nutritional recommendations for school-age children as intake adequacy using the Equation 1.

$$IA(\%) = \frac{\text{macronutrient consumed (Cal)}}{\text{macronutrient recommended consumption (Cal)}} \times 100 \quad (1)$$

Another questionnaire was also used to obtain data about the kind of food selected for consumption during the school recess (**Supplementary data 2**), as an indication of general food habits, since it is during the recess when students have access to choose or buy different kind of foods. This questionnaire included a total of 12 foods.

Results and Discussion

In this study 114 primary school students completed the weekly food consumption survey and the questionnaire of food consumption during recess. However, fourteen food consumption surveys were eliminated because they were incomplete and/or present improbable results, resulting in 100 surveys used for the study. Meanwhile, 5 questionnaire of consumption during recess were eliminated for the same reason, resulting in 109 questionnaires of kind of food chosen during recess.

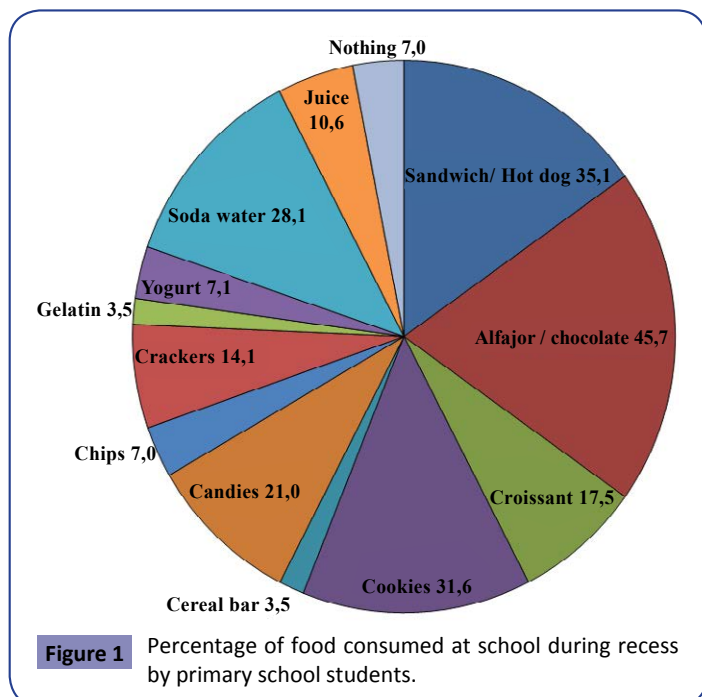
Table 1 summarizes the data obtained from the weekly food consumption survey, where is shown that the average total intake of nutrients of children resulted in 1550 Cal, when the Recommended Daily Intake for school-age children is 2000 Cal per day [3]. Total carbohydrates intakes, including carbohydrates from starchy foods (i.e., potatoes and pasta) and from simple carbohydrates (i.e., sugars), should range from 45 to 60% of the total energy intake [11]. It has been found that the population reference intake for proteins in children between 9 and 10 years old with a reference weight of about 30 and 34 kg is between 28 and 31 g/day, but there is not a tolerable upper intake level [12]. Intakes of fats should range between 20-35% of the total energy intake [13]. Therefore, taking into account the average macronutrient distribution (**Table 1**) it can be concluded that all of them are in the reference intake range.

Applying Equation 1 the IA of calories was 77.5%, the IA of carbohydrates was 73.5% and the IA of fat was 79.1%. For the above, it is concluded that according to the RDA, the global IA in terms of calories, carbohydrates, protein and fats was above 70% in all cases. A finding of interest is that in this sample of primary school students, there were no major differences in nutrition habits between students that regularly eat at the school buffet and those students who regularly eat at home. It should be highlighted that these school buffets belongs to the PAICOR program [14]. This program is regulated by the Cordoba province government and it is recognized as an excellent social program model that not only satisfy the children's nutrition necessity, but also recognize the rights to healthy feeding. The program includes breakfast, lunch, afternoon snack and also, if it is required, dinner. In some cases, it includes a mid-morning meal (i.e., fruits, cereal bars, yogurt, cheese, cookies, etc.).

Figure 1 shows the results obtained from questionnaire of food consumption and preferences during recess. It should be noted that more than 90% of students who consume food during recess marked two or more foods. Only 7% of the students answered that they do not consume any food during recess. The most chosen food product to consume during the school recess by the students was *alfajor*, followed by sandwich or hot dog, which contain higher amounts of trans fat. Cookies and sugary beverages, such as soda water, also showed a high percentage of consumption. These four foods were selected by more than 25% of cases. The food products that were less consumed were gelatin and cereal bars (with high dietary fiber and low fat),

Table 1 Average of macronutrients distribution of the primary school students (% , n=100).

TCV (Cal)	Macronutrients distribution (%)		
	Carbohydrates 55%	Proteins 12%	Fats 33%
1550 Cal	852 Cal (213 g)	186 Cal (47 g)	511 Cal (57 g)



which were those food studied with lower content of trans fats. Therefore, a small percentage of the primary school students surveyed had mainly healthy eating habits since they did not chose healthy foods, such as high-fiber and low-fat foods [4]. In fact, most of the food chosen presents a lot of carbohydrates and saturated fats. In this sense, the food products less chosen by students to eat during recess were the healthiest products introduced in the questionnaire, gelatin and cereal bars, which were selected by only 3.5% of students. Some recommendations focus on the education of students to eat healthier foodstuff should be potentiated as well as motivations for healthy eating habits should be found. Healthier food products should be selling at school kiosks, as well. The childhood period of life is marked by acquirement of food habits that tend to remain in adult life [7]. Therefore, improving the nutritional habits of primary school students not only will mark them in acquiring good nutritional habits but also it is an interesting strategy to getting children become trainers in their household.

Conclusion

In this study a survey and a questionnaire were used to known the weekly food consumption and the kind of food that students selects during the school recess. These two simple tools were useful to evaluate the students' average total intake, which is the survey and, in the case of questionnaire, allowed obtaining a preliminary indication of their general food habits. Although the average total intake of nutrients of the studied population resulted lower (1550 Cal/day) than the RDI for children (2000 Cal/day), the average macronutrient distribution were in the reference intake range being the intake adequacy higher than 70% for all macronutrients.

The most consumed product in the recess chosen by students was *alfajor*, followed by sandwich and/or hot dog and the products less consumed were those which with lower content of trans fats (gelatin and cereal bars) evidencing that when children have the availability to choose food products with higher trans fats content (hot dogs, *alfajor*, etc.) they found them more attractive than healthier ones (fruits, cereal bars, among others).

Although results from this earlier study and our survey did not directly present quantitative information of intake adequacies as well as food consumption preferences in primary school students, it indicates that the diet of these primary school students is relatively low in fruits and vegetables. Even though our results should be interpreted with caution, due to the small sample assayed since it is a cross-sectional study, and assuming that sociodemographic factors should be also examined as possible influencers of students nutrition habits, this study suggests that the possibility of assuming the responsibility for food purchasing and selection during the school recess can affect the dietary habits of primary school students since they still lack the experience of nutritional healthy. These preliminary results, suggest that more educational strategies focused on the importance to consume food low in trans fat are required. Therefore, this study may help parents, teachers and nutrition educators to understand that healthy recommendations are required to improve the nutritional

habits of primary school students which will influence their adult lifestyle in terms of dietary habits. In addition, healthier snacks should be more available than food products rich in trans fat, in order to promote beneficial choices for their long-term health. The combination of a larger sample and the development of more appropriate evaluating methods, would clarify the relationship between the students average total intake, the food

consumption at the school recess as well as the unhealthy snacks availability, with their general food habits.

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