

## Qualitative Evaluation of School Menus of 1<sup>st</sup> Cycle Students in Private and Public Schools in the Greater Lisbon Region

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### Abstract

**Introduction:** School is a privileged and decisive place for health promotion. School cafeterias are responsible for offering adequate food for the energy and nutritional needs of children, providing complete, balanced, and varied meals to encourage healthy eating habits.

**Objective:** To evaluate the quality of 1<sup>st</sup> cycle school menus in public and private schools in the greater Lisbon region.

**Methods:** Cross-sectional analytical observational study carried out in 1<sup>st</sup> cycle schools in Greater Lisbon. Thirty-six menus (lunch meal) were evaluated, covering a total of 204 schools (32 private and 172 public). The menus were obtained over 4 consecutive weeks and evaluated with the SPARE System of Planning and Evaluation of School Menu software.

**Results:** The public schools' menus presented a better overall assessment compared to private schools. Regarding the item "soup", 25% of the public menus and 46.8% of the private ones were not acceptable. The item "meat, fish and eggs" was considered unacceptable in 75% of the menus of public schools and 87.5% of private ones. The side items "cereals, derivatives and tubers" and "vegetables and legumes" presented discrepant results. In private schools, 65.6% and 84.3% of the menus were not acceptable for cereals and vegetables, respectively. On the contrary, in public schools, 75% of the menus were good or very good in cereals and very good in vegetables. In relation to "dessert", 50% of public schools and 34.3% of private schools had very good menus. However, the remaining 50% of the public menus and 31.2% of the private ones were not acceptable.

**Conclusion:** In general, there seems to be a trend towards better results in the evaluation of public-school menus. However, all the schools evaluated reveal a need for improvement in the preparation of the menu plan, which must comply with the guidelines on school menus and cafeterias of the General Directorate of Education.

**Keywords:** School; Quality; Menus; Meals; Children

### Introduction

In recent years, scientific and epidemiological evidence has significantly increased the relationship between food and health [1]. Acquiring healthy eating habits and regular physical activity is a priority for maintaining health status and reducing the risk of some diseases [1,2]. Obesity is the biggest health problem in the 21<sup>st</sup> century, related to the prevalence and increase in the incidence of several chronic diseases, from cardiovascular diseases, hypertension, metabolic syndrome, diabetes mellitus and heart attack, which will decrease the average life expectancy [3]. The increasing obesity is related to a higher consumption of energy-dense foods, poor in nutrients, rich in saturated fats, with high levels of sugar, salt and reduced physical activity [4]. A narrative review of the literature [5] made in 2020 by Frade., *et al.* described that Portugal is one of the five countries in the European Region with the highest prevalence of childhood obesity and that obesity is more prevalent in children aged between 6 and 12 years (26.2%). Children in the 1<sup>st</sup> cycle are between 6 and 10 years old, crucial ages for acquiring healthy eating habits and maintaining them in adulthood [6,7]. Food education in children is essential to improve knowledge, enhance habits and attitudes that can later lead to lifestyles [8]. This education must be done through the curriculum content and the food supply in the school environment [9]. It is in schools that young people spend many hours and consume a substantial part of their daily food. Therefore, school meals should be a privileged space for health, promoting healthy lifestyles and social equality, as it should provide nutritionally balanced, healthy, and safe meals to all students [10]. In Portugal and according to Decree-Law n. 399-A/84, of 28 December [11], municipalities are responsible for school meals in kindergartens and primary education, but they don't always have a nutritionist in the education department of the municipal council. The nutritionist is a health professional who directs his action to safeguard human health through health promotion, prevention, and treatment of disease through assessment, diagnosis, prescription and food and nutritional intervention to people, groups, organizations, and communities, as well as the planning, implementation and management of communication, food safety and sustainability, through a scientifically proven professional practice that is constantly improving [12]. In Portugal, the school canteen is responsible for providing children, health, complete, balanced, and varied meals that meet their energy and nutritional needs. The Portuguese General Directorate of Education (DGE) provides guidance on school menus [6] which although not mandatory, are recommended for use in public and private schools. Moreover, DGE and the General Directorate of Health recommend the use of the software "System of Planning and Evaluation of School Menus" (SPARE) which allows a qualitative assessment of different parameters of the school meals, namely the variety of foods supplied and the cooking methods [1,13]. At the national level, there are some studies that assess the quality of school menus in different regions of the country [14-16]. However, according to current knowledge, qualitative evaluation studies of menus served in public and private schools in the greater Lisbon region are not available.

### Objective of the Study

The objective of the present study is to evaluate the quality of 1<sup>st</sup> cycle school menus in public and private schools in the greater Lisbon region.

### Materials and Methods

#### Study design

Cross-sectional analytical observational study carried out in 204 public and private schools in the greater Lisbon region. A total of 36 menus from the 1<sup>st</sup> cycle of public and private schools were evaluated.

#### Study population

**Sample characterization:** The sample consists of 32 school menus from the 1<sup>st</sup> cycle of private schools and 4 school menus from public schools in the municipalities of Lisbon, Sintra, Cascais and Oeiras. In municipalities, the menu plan is the same for all 1<sup>st</sup> cycle educational establishments. Thus, 60 schools in Lisbon are covered by the same menu, 68 in Sintra, 22 in Oeiras and 23 in Cascais, representing a total

of 173 public schools. In relation to private schools, the menus of 12 schools in Lisbon, 3 in Oeiras, 12 in Cascais and 5 in Sintra were evaluated. It should be noted that in Cascais private schools, 12 menus were evaluated for 11 schools, since one of the schools has two menus, one menu for 1<sup>st</sup> and 2<sup>nd</sup> year and another menu for 3<sup>rd</sup> and 4<sup>th</sup> year.

**Data collection:** An internet search of private schools’ menus in the greater Lisbon region was initially carried out, resulting in 60 schools. Of these, only 40 had weekly or monthly school menus available on the institution’s website. The menus were obtained over a period of 4 consecutive weeks. Nine schools were excluded from the study due to lack of information. In relation to public schools, the same procedure was adopted, with school menus being obtained from the websites of the municipalities.

**Qualitative analysis of menus:** The quality assessment of the menus was performed using the 1<sup>st</sup> edition of the SPARE computer tool [17]. The qualitative evaluation of menus from private and public 1<sup>st</sup> cycle schools in the Lisbon region was made according to the following Parameters: A, Acceptable; G, Good; VG, Very Good; NA, Not Acceptable. These parameters are an integral part of a computer tool, SPARE, created based on DGE guidance on school menus [6]. SPARE allows planning meals in an effective and organized way, in accordance with the main current national and international food and nutritional recommendations. It was considered that all menus had food technical sheets and that all schools provided water with the meal. In cases where the menus did not describe an item, as happened with the “use of local/regional/national food” and “offer of at least 3 varieties of fruit served at the meal”, it was considered that they were not used or were not available.

**Data analysis:** Statistical analysis was performed using computer software for Windows, SPSS®, version 22.0 (SPSS INC, Chicago). Results were expressed as a number and percentage.

## Results and Discussion

The qualitative evaluation of menus in private and public 1<sup>st</sup> cycle schools in the greater Lisbon area is presented in table 1. The results obtained showed a better overall evaluation of the menus of public schools in relation to private ones. 50% of public 1<sup>st</sup> cycle schools in the greater Lisbon region have menus classified as good, whereas the global assessment of the menus of the private schools have a lower classification. This difference can be explained by the fact that at the time of drawing up the specifications for the public concession tender, the obligation to comply with Circular n<sup>o</sup>3/DSEEAS/DGE/2013 [6], a document recommended by the DGS with guidelines for the preparation of menus in school canteens.

Evaluation of Schools (n = 204)	Public (n= 4*)				Private (n = 32**)			
	NA	A	G	VG	NA	A	G	VG
General Items	0 (0.00)	2 (50.0)	2 (50.0)	0 (0.00)	7 (21.9)	22 (68.8)	3 (9.4)	0 (0.00)
Soup	1 (25.0)	2(50.0)	0 (0.00)	1 (25.0)	15 (46.9)	17 (53.1)	0 (0.00)	0 (0.00)
Meat, fish and egg	3 (75.0)	1 (25.0)	0 (0.00)	0 (0.00)	29 (87.5)	4 (12.5)	0 (0.00)	0 (0.00)
Monitoring of cereals, derivatives, and tubers	1 (25.0)	0 (0.00)	2 (50.0)	1 (25.0)	21(65.6)	0 (0.00)	11 (34.4)	0 (0.00)
Monitoring vegetables and legumes	1 (25.0)	0 (0.00)	0 (0.00)	3 (75.0)	27 (84.4)	3 (9.37)	0 (0.00)	2 (6.25)
Dessert	2 (50.0)	0 (0.00)	0 (0.00)	2 (50.0)	10 (31.3)	3 (9.37)	8 (25.0)	11 (34.4)
Global Assessment	1 (25.0)	1 (25.0)	2 (50.0)	0 (0.00)	13 (40.6)	19 (59.4)	0 (0.00)	0 (0.00)

**Table 1:** Qualitative evaluation of menus in private and public 1<sup>st</sup> cycle schools in the greater Lisbon area.

Results are presented in number (percentage). A: Acceptable; G: Good; VG: Very Good; NA: Not Acceptable. These parameters were established according to computer tool SPARE based on DGE guidance on school menus [5].

\*Total number of schools (1 menu per municipality) from 4 municipalities (Cascais, Lisbon, Oeiras, Sintra) in the Lisbon region.

\*\*There are 32 menus but only 31 schools since one of the private schools has a menu for 1<sup>st</sup> and 2<sup>nd</sup> year, and another for 3<sup>rd</sup> and 4<sup>th</sup> year.

### General items

The general assessment of the menu plans indicates that all the evaluated schools' meals consist of soup, main dish, and dessert daily. Regarding the daily accompaniments of raw or cooked vegetables on the plate, 84.3% of private schools presented an unacceptable result, as well as 25% for public schools. In the evaluation made to all General Items, it was observed that 21.88% of the menus of private schools had an unacceptable classification. In public schools, all the menus presented at least acceptable results. The predominant cooking methods on the menus were boiled and stewed (48.4%), followed by roasted (32%), then fried (15.6%) and finally stewed and grilled (4%). It is positively highlighted that most menus only include a maximum of two dishes with fried foods per month. The description of the generality of the menus is not very rigorous, namely about the specification of the culinary methods of the meals and the identification of the available fruit.

### Soup

Regarding the item soup, 46.8% and 25% of the menus were classified, respectively, as not acceptable in private and public schools. For this item, the menus of private schools did not present good or very good ratings. While the supply of soup is positively rated in 75% of the public schools, only 53.1% of private school menus are acceptable, but with an excessive offer of non-vegetable soup [6]. Soups that are not traditionally confectioned with vegetables (e.g. chicken or fish soup) do not have the same nutritional beneficial profile as vegetable soups [18], therefore should be served no more than once a month. In addition, cream/velvety soups should be served no more than twice a week [6]. Most private schools and the public schools of Cascais municipality offered cream or mashed soup more times a week, contrary to the DGE guidelines. Moreover, SPARE assessment tool positively values the addition of legumes to soup 2 to 3 times a week. The offer of soups with fresh or dried legumes in the school menu evaluated was very insufficient. Only the municipality of Lisbon presented a school menu with the appropriate frequency of soup with legumes. In a study of 15 sets of menus from kindergartens and 1<sup>st</sup> cycle schools in the public network of the municipality of Pombal, it was also found that chicken soup was offered in school menus more frequently than recommended [14].

### Meat, fish and egg

Regarding the meat, fish and eggs item, the menus of 87.5% of the private and 75% of public schools had a not acceptable classification. Most menus are prepared by alternating the supply of meat and fish on the plate within the same week. However, meat dishes are usually predominant on the weekly menu. The SPARE qualitative evaluation criteria regarding the item "meat, fish and eggs" it's different from DGE guidelines, namely in relation to the amount of egg offered per week. According to the Circular of the DGE (2013) [6], the egg must be included in the menu with a mandatory periodicity of twice a month. In this study, the offer of meals in which the egg is the only animal source of protein is rare. Sintra municipality offers a weekly dish with a vegetable or egg-based origin protein source and without meat or fish [6]. This measure favors the consumption of products of plant origin. Excessive consumption of animal products has been associated with a higher risk of several types of chronic diseases [19,20]. In contrast, protein of plant origin has been associated with a lower risk of chronic diseases and greater longevity [21,22]. It was also verified that the offer of red meat is more frequent than that of poultry. In some of the evaluated menus, no white meat dishes (e.g. poultry) were offered during consecutive weeks. The offer of animal protein with a higher amount of saturated fat [23] is not recommended [6]. As for the supply of fish, the analysis of the menu shows that the frequency of offering fish dishes is lower than recommended [6,24] in both public and private schools. On several menus, no oily fish dish is offered weekly, when it should be at least once a week, as stated in the SPARE criteria.

### Cereals, derivatives and tubers

Regarding this item, 65.6% of the menus in private schools were classified as not acceptable, while 75% of the public ones were considered good or very good in relation to this parameter. All menus had a side dish providing complex carbohydrates. Rice was the most

common accompaniment, followed by potatoes and pasta. In the study by Lopes, *et al.* (2009), the most mentioned side dish on the menu was potato, and when rice was served, it was also served with fries. This difference in the supply of potatoes versus rice may be related to regional differences. There was no equitable distribution between rice, pasta, and potato, which would be desirable. Bread is a good source of fiber and provides B vitamins and minerals (phosphorus, magnesium, and potassium) essential to the body [6,25]. Only on the menus of the municipalities of Lisboa and Sintra, provided mixed flour (wheat and rye) bread with the meal.

### Vegetables and legumes

Regarding this item, 84.3% of the menus in private schools were classified as not acceptable and 75% of the menus in public schools were classified as very good. In some of the menus of public and private schools, the Side dish of vegetables and legumes was not described in all meals. Vegetables, due to their nutritional characteristics [26], are foods with recognized health benefits, as they contain a lot of fiber, vitamins, minerals and are very rich in phytochemicals [27]. Thus, its inclusion in the dish at all meals should be privileged [28]. The frequency of presence of legumes in the dish was much lower than recommended and when provided, the same legume (peas) was usually offered.

### Dessert

For the item Dessert, it was found that 31.2% of the menus in private schools and 50% of the menus in public schools were classified as not acceptable. It should also be noted that 50% of public schools scored very good on this item compared to 34.3% of private schools. Although the menus offer fresh fruit, in most private schools' sweet desserts are offered more than once a week. Moreover, citrus fruit is not available at least once a week.

Fruits are rich in vitamins, minerals, and fiber. Consumption of unpeeled fruit is encouraged to obtain a higher fiber intake [29] although there is a risk associated with the presence of agrotoxics [30]. Thus, proper washing is essential before making them available in school cafeterias [31].

### Drink

None of the menus contained information on which drink was made available to children. Even if it is assumed to be water, this information should be included in the menus.

### Overall rating

Overall, 40.6% of the menus from private schools and 25% of the menus from public schools were considered unacceptable. However, in public schools, 50% of the menus were classified as good.

### Comparison of menus in private schools by location

Table 2 shows the results of the qualitative evaluation of menus from private schools in the Lisbon region by location. Regarding the Global assessment, 33.3% and 58.3% of the menus of private schools in Lisbon and Cascais respectively, were classified as not acceptable. In the general item, 91.7% of the menus in Lisbon were classified as acceptable or good and in Cascais 58.3% of the menus were classified as acceptable. For Meat, fish, and egg, both Lisbon and Cascais menus were classified as not acceptable with 91.7%. In the side dishes of cereals, derivatives, and tubers, both schools were evaluated as not acceptable with 66.7% for Lisbon and Cascais. The evaluation in SPARE, in the side dishes of vegetables and legumes, was not acceptable for both, in which Lisbon was 83.3% and Cascais was 100%. In desserts for both schools, it was acceptable to point out that Lisbon was very good with 50% and Cascais was very good with 25%. In

relation to Oeiras the results are not acceptable for the meat, fish, and egg item and for the cereal, derivatives, and tubers side dishes with 66.7% for both. In relation to Sintra the unacceptable items are the same with 80% and 60% respectively, plus the side dishes with vegetables and vegetables, not acceptable with 80%.

Schools (n = 32)	GA		GI			Soup		Meat fish and egg		CDT	
	NA	A	NA	A	B	NA	A	NA	A	NA	B
<b>Location</b>											
Lisbon (n = 12)	4 (33.3)	8 (66.7)	1 (8.33)	8 (66.7)	3 (25.0)	4 (33.3)	8 (66.7)	11 (91.7)	1 (8.33)	8 (66.7)	4 (33.3)
Oeiras (n = 3)	0 (0.00)	3 (100)	0 (0.00)	3 (100)	0 (0.00)	1 (33.3)	2 (66.7)	2 (66.7)	1 (33.3)	2 (66.7)	1 (33.3)
Cascais (n = 12)	7 (58.3)	5 (41.7)	5 (41.7)	7 (58.3)	0 (0.00)	7 (58.3)	5 (41.7)	11 (91.7)	1 (8.33)	8 (66.7)	4 (33.3)
Sintra (n = 5)	2 (40.0)	3 (60.0)	1 (20.0)	4 (80.0)	0 (0.00)	3 (60.0)	2 (40.0)	4 (80.0)	1 (20.0)	3 (60.0)	2 (40.0)

VL			Dessert			
NA	A	VG	NA	A	B	VG
10 (83.3)	1 (8.30)	1 (8.30)	4 (33.3)	0 (0.00)	2 (16.7)	6 (50.0)
1 (33.3)	1 (33.3)	1 (33.3)	0 (0.00)	0 (0.00)	2 (66.7)	1 (33.3)
12 (100)	0 (0.00)	0 (0.00)	5 (41.7)	1 (8.33)	3 (25.0)	3 (25.0)
4 (80.0)	1 (0.00)	0 (0.00)	1 (20.0)	2 (40.0)	1 (20.0)	1 (20.0)

**Table 2:** Qualitative evaluation of menus from private and public 1<sup>st</sup> cycle schools in the Lisbon region by location.

Results are presented in number (percentage).

A: Acceptable; GA: Global Assessment; B: Good; CDT: Cereals, Derivatives and Tubers; VL: Vegetables and Legumes; GI: General Items; VG: Very Good; NA: Not Acceptable. These parameters were established according to computer tool SPARE based on DGE guidance on school menus [5].

### Study Limitations

Limitations of the study are the fact that the evaluation of the menus only considers the written menu plan and did not consider compliance with it or the associated technical sheets. As the detail of most of the menus is not very rigorous, namely about the specification of the cooking methods, as well as the fruit that is not identified, the evaluation may have presented bias. Although the public menus are applied in many teaching establishments, only 4 menus were evaluated versus 32 menus from private schools.

### Conclusion

The qualitative evaluation of the menus using the SPARE computer tool identified the need for improvements in the elaboration of the menu plan of public and private schools of the 1<sup>st</sup> cycle of the greater Lisbon region, to contribute to a more complete, varied, and balanced diet at lunch school. In the menus evaluated, it was concluded that the items: a) meat, fish and egg; b) the Side dish of cereals, derivatives, and tubers and c) the side dish of vegetables and legumes must be improved to comply with the existing recommendations. The results obtained in the present study demonstrate a trend towards better classifications in public schools, in all items evaluated. Given the relevance of infant feeding, it is considered extremely important that 1<sup>st</sup> cycle private schools follow the recommendations of the DGE when preparing the menu plan for school cafeterias.

## Conflict of Interest

Financial interest or any conflict of interest did not exist.

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