

Assessment of ‘per capita’ lunchtime food intake among 6- to 35-month-old children: a study on compliance with national and international standards in the “Creche com Sabor e Saúde” (C2S) project

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Abstract

Introduction and objectives: To evaluate compliance with *per capita* food supply at lunch in daycare centers. **Methods:** Visits were made on five consecutive days at lunchtime to six daycare centers enrolled in the “Creche com Sabor e Saúde” project (C2S), meaning “Daycare Centers with Taste and Health”. To quantify food portions for different age groups (6-8 months, 9-11 months, 12-23 months, and 24-35 months), each meal component (carbohydrate sources, protein sources, and vegetables) and dessert (fruit) underwent random selection and was weighed three times. The averages obtained were compared to C2S project guidelines for *per capita* food supply, in line with national and international recommendations. **Results:** One hundred and forty-five dishes and 244 desserts were analyzed. No dishes were served to infants under nine months. *Per capita* amounts for protein-supplying foods were fulfilled (9-11 months: 14.2 g; 12-23 months: 20.3 g; 24-35 months: 23.9 g). Carbohydrate-rich foods were provided in quantities exceeding the recommendations, particularly for the 12-23 month age group (62.2 g vs. 40 g). For infants under 12 months, no vegetables were offered, and above this age, the average amount provided fell below the minimum guideline of 20 g (12-23 months: 9.4 g; 24-35 months: 10.8 g). The quantity of fruit offered exceeded the recommendations for the 6-8 month (84.6 g > 30-50 g) and 9-11 month (133.3 g > 40-70 g) age groups, aligning with guidelines for the 12-35 months. **Discussion:** Daycare centers inconsistently followed *per capita* food supply guidelines for lunch, with deficits in vegetable intake and excesses in carbohydrate-rich foods and fruit that surpassed the recommended quantities.

Keywords: Food supply. Per capita. Daycare center. Lunch.

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Análise da oferta alimentar per capita ao almoço para crianças dos 6 aos 35 meses de idade: um estudo sobre o cumprimento das orientações nacionais e internacionais do projeto “Creche com Sabor e Saúde” (C2S)

Resumo

Introdução e objetivos: Avaliar o cumprimento das orientações *per capita* de oferta alimentar para almoço em creches. **Métodos:** Realizaram-se visitas, em cinco dias consecutivos, durante o almoço, a seis instituições envolvidas no projeto “Creche com Sabor e Saúde” (C2S). Para quantificar as porções alimentares dos diferentes grupos etários (6-8 meses, 9-11 meses, 12-23 meses, 24-35 meses), cada componente do prato (hortícolas, alimentos fornecedores de hidratos de carbono e de proteína) e da sobremesa (fruta) foi aleatoriamente pesado três vezes. As quantidades médias obtidas foram comparadas com as orientações *per capita* obtidas no projeto C2S, alinhadas com as recomendações nacionais e internacionais. **Resultados:** Analisaram-se 145 pratos e 244 sobremesas. Não foi oferecido prato abaixo dos nove meses. As capitações para os alimentos fornecedores de proteína foram cumpridas (9-11 meses: 14,2 g; 12-23 meses: 20,3 g; 24-36 meses: 23,9 g). Os alimentos fornecedores de hidratos de carbono foram oferecidos em quantidades superiores às orientações, especialmente entre 12-23 meses (62,2 g vs. 30 g). Não foram oferecidos hortícolas abaixo dos 12 meses e, acima desta idade, a capitação foi inferior à orientação mínima de 20g (12-23 meses: 9,4 g; 24-36 meses: 10,8 g). A quantidade de fruta apresentada estava acima das recomendações dos 6-8 meses (84,6 g > 28-50 g) e dos 9-11 meses (133,3 g > 40-70 g), encontrando-se segundo as orientações na faixa etária dos 12-35 meses. **Discussão:** As capitações de alimentos oferecidas ao almoço não se apresentaram de acordo com as orientações em todas as faixas etárias, principalmente para os hortícolas (por defeito) e para os fornecedores de hidratos de carbono (por excesso).

Palavras-chave: Oferta alimentar. Capitações. Creche. Almoço.

Keypoints

What is known

- An appropriate dietary intake is crucial for proper child growth and development.
- Daycare centers are places where children spend a significant part of their day.
- Daycare centers are an important setting for promoting healthy eating habits.

What is added

- This study is the first analysis of lunch quantities provided in daycare settings, aligning with national and international guidelines.
- *Per capita* food supply guidelines at lunch were inconsistently followed in daycare centers.
- In general, vegetables are offered minimally by default, while carbohydrate-rich foods and fruit are provided in excess.

Introduction

As an essential element of health and well-being, food is a fundamental right enshrined in the Universal Declaration of Human Rights of 1948 and in the International Covenant on Economic, Social, and Cultural Rights of 1966^{1,2}. This right is also envisaged in the United Nations (UN) 2030 Agenda in five of the Sustainable Development Goals (SDGs 2, 3, 12, 14, and 15). More specifically, it is directly related to combating hunger (SDGs 2) and improving the quality of food and the sustainability of food systems (SDGs 12)³.

A healthy diet stands as a key determinant of population health and in childhood, it plays a pivotal role in growth and development, underscoring the importance of providing sufficient energy, macronutrients, and micronutrients^{4,5}.

Developing healthy eating habits⁵ and consuming appropriate portions from each food group are crucial for meeting individual needs across all age groups⁶, particularly in the early years of life. These factors are pivotal in preventing the early onset of chronic diseases, including type II diabetes, obesity, hypertension, and cardiovascular diseases, among others^{7,8}. In recent years, daycare centers have gained recognition as essential social institutions⁹ and can play a significant role in promoting healthy food environments^{10,11}.

Quantifying food consumption involves measuring the quantity of each food or ingredient *per capita* (originating from Latin, meaning per person) in collective feeding to create a specific meal. These measurements can be expressed in grams, kilograms, or liters per person and are essential components of the technical sheets used in meal preparation across various food units^{6,12}.

Children in daycare centers spend a significant portion of their day in this environment, which also serves as the primary setting for their daily meals. Consequently, establishing *per capita* food supply standards and ensuring meal compliance within these institutions are critical for optimizing child development¹³. Moreover, intervening in meal provision contributes to the effective management of the food service^{14,15}.

In order to assess children's eating habits in daycare centers, a characterization of the food offerings in these institutions was carried out¹⁶. Out of all the meals served, lunch inherently stands out as a primary daily meal. Out of all the meals served in daycare centers, lunch naturally represents one of the main meals of the day. However, in the Portuguese daycare context, most centers lack a defined *per capita* food offering. To address this, the “Creche com Sabor e Saúde” project (C2S), meaning “Daycare Centers with Taste and Health”, introduced *per capita* food supply guidelines based on reputable entities such as the European Food Safety Authority (EFSA) and the European Society for Paediatric Gastroenterology, Hepatology, and Nutrition (ESPGHAN)¹⁷. In alignment with the Institute of Medicine (2010), lunch is recommended to contribute approximately 30-35% of the total energy value (TEV) and include a variety of foods from different groups in appropriate quantities¹⁸.

By prioritizing the health and optimal development of the child, it is crucial to scrutinize the quantities of various foods provided at lunch at daycare centers.

Aim

To assess the adherence to *per capita* food supply guidelines at lunch in daycare centers.

Methods

This study was carried out in the “Creche com Sabor e Saúde” (C2S) project, that took place between February 2022 and February 2023, involving 18 Private Social Solidarity Institutions with daycare services for over 800 children aged six to 36 months, located in the northern and central regions of Portugal. C2S was co-financed by the Directorate-General of Health (DGS) and the “Associação Cultural e Recreativa de Cabreiros”. The project's team included nutritionists, interns, researchers, and professors from the Faculty of Nutrition and Food Sciences (University of Porto) and the main goal of this project was to improve the eating habits of children up to the age of three in a daycare center¹⁶.

Out of the 18 institutions participating in the C2S project, six daycare centers were selected for this study

by order of convenience (according to the availability of the research team and the geographic location of the institutions). The C2S Project was approved by the Faculty of Nutrition and Food Sciences of the University of Porto Ethics Commission (Parecer nº 77/2022/CEFCNAUP/2022).

The data collection of this cross-sectional study took place during lunchtime in the cafeteria over five days in each institution, spanning from October 2022 to January 2023, during the intervention period, in a total of 30 lunches. The lunch comprised soup, the main dish, and dessert. The analysis focused on the components of the main dishes (carbohydrate sources, protein sources, and vegetables) and desserts (fruit). Soup was excluded due to the impracticality of analyzing its various ingredients separately. In terms of vegetables on the plate, 25% of the recommended total vegetable portion for lunch was considered, with the remaining 75% allocated to soup. Exclusion criteria included weeks with holiday celebrations and composite main dishes. Data analysis was conducted separately for age groups (6-8 months, 9-11 months, 12-23 months, and 24-35 months).

1st phase – Data collection

Taking into account the potential bias stemming from fluctuations in the quantity of food served to individual children across different meal distribution phases, each component underwent three separate weighings on each day for every age group¹⁹. Considering the goal of obtaining three weight measurements for each food component over the course of five days in six different institutions, a total of 90 weight measurements were expected for each component for each age group. These measurements were taken using a Selecline® digital scale, boasting a maximum capacity of 3,000 g and a precision of 1.0 g.

To evaluate the quantity served for each component in the main dish (carbohydrate-supplying food, protein-supplying food, and vegetables), as well as the dessert offered, the following procedures were implemented:

- Record the weight of three empty dishes or bowls employed for serving meals and calculating the mean weight for each set of three;
- Weigh the dishes or bowls, during the standard plating procedure, with each food component of the main dish or dessert offered, and documenting the weights of each component individually;
- Deduct the average weight of an empty dish or bowl from each weighing subsequent to plating.

Table 1. Portions, in grams, defined in the “Creche com Sabor e Saúde” project (C2S) for children's lunch, presented by age group

Food groups	Age (months)			
	(6;8)	(9;11)	(12;23)	(24;35)
Meat, fish and eggs	15 g raw meat OR 12 g cooked meat OR 17 g raw fish OR 15 g cooked fish OR 25 g egg whites OR 20 g egg yolks OR 22 g whole eggs	15g raw meat OR 12 g cooked meat OR 17 g raw fish OR 15 g cooked fish OR 25 g egg whites OR 20 g egg yolks OR 22 g whole eggs	17 g raw meat OR 15 g cooked meat OR 20 g raw fish OR 17 g cooked fish OR 30 g egg whites OR 25 g egg yolks OR 25 g whole eggs	25 g raw meat OR 20 g cooked meat OR 25 g raw fish OR 25 g cooked fish OR 40 g egg whites OR 30 g egg yolks OR 35 g whole eggs
Pulses	7 g raw dried pulses OR 20 g cooked dried pulses OR 25 g raw/cooked fresh pulses OR 10 g lupin beans	7 g raw dried pulses OR 20 g cooked dried pulses OR 25 g raw/cooked fresh pulses OR 10 g lupin beans	10 g raw dried pulses OR 25 g cooked dried pulses OR 30 g raw/cooked fresh pulses OR 15 g lupin beans	10 g raw dried pulses OR 30 g cooked dried pulses OR 40 g raw/cooked fresh pulses OR 15 g lupin beans
Cereals and derivatives and tubers	20 g cooked rice and pasta OR 10 g rice, pasta and other raw grains OR 25 g potatoes and other tubers OR 10 g flours, flakes and semolina OR 15 g starchy fruits OR 30 g grains OR 10 g bread OR 10 g pseudocereals OR 10 g toasts OR 10 g non-dairy porridge OR 7 g dairy porridge	35 g cooked rice and pasta OR 10 g of rice, pasta and other raw grains OR 35 g potatoes and other tubers OR 10 g flours, flakes and semolina OR 25 g starchy fruits OR 45 g grains OR 20 g bread OR 15 g pseudocereals OR 15 g toast OR 10 g non-dairy porridge OR 10 g dairy porridge	35 g cooked rice and pasta OR 15 g rice, pasta and other raw grains OR 40 g potatoes and other tubers OR 15 g flours, flakes and semolina OR 25 g starchy fruits OR 50 g grains OR 20 g bread OR 15 g pseudocereals OR 15 g toasts OR 15 g non-dairy porridge OR 10 g milk porridge	55 g cooked rice and pasta OR 20 g rice, pasta and other raw grains OR 60 g potatoes and other tubers OR 20 g flours, flakes and semolina or 40 g starchy fruits OR 75 g grains OR 30 g bread OR 25 g pseudocereals OR 25 g toasts OR 20 g non-dairy porridge OR 20 g dairy porridge
Vegetables	60 g B vegetables OR 15 g A vegetables OR 40 g B vegetables OR 60 g C vegetables OR 90 g D vegetables	110 g B vegetables OR 30 g A vegetables OR 70 g B vegetables OR 105 g C vegetables OR 160 g D vegetables	125 g B vegetables OR 35 g A vegetables OR 80 g B vegetables OR 120 g C vegetables OR 180 g D vegetables	150 g B vegetables OR 45 g A vegetables OR 100 g B vegetables OR 145 g C vegetables OR 220 g D vegetables
Oil and fat	45 g avocado OR 5 g of olive oil OR 7 g vegetable cream, butters and spreads OR 8 g oleaginous fruits OR 10 g oilseeds	45 g avocado OR 5 g olive oil OR 7 g vegetable cream, butters and spreads OR 8 g oleaginous fruits OR 10 g oilseeds	45 g avocado OR 5 g olive oil OR 7 g vegetable cream, butters and spreads OR 8 g oleaginous fruits OR 10 g oilseeds	55 g avocado OR 6 g olive oil OR 10 g vegetable cream, butters and spreads OR 10 g oleaginous fruits OR 12 g oilseeds
Fruit	30 g A fruit OR 50 g B fruit OR 90 g C fruit OR 122 g D fruit OR 45 ml 100% juices	40 g A fruit OR 70 g B fruit OR 130 g C fruit OR 175 g D fruit OR 60 ml 100% juices	40 g A fruit OR 70 g B fruit OR 130 g C fruit OR 175 g D fruit OR 60 ml 100% juices	45 g A fruit OR 80 g B fruit OR 150 g C fruit OR 205 g D fruit OR 70 ml 100% juices

g: grams.

2nd phase – Data analysis and comparison

The amounts of food served during lunch meals were juxtaposed with the *per capita* food supply benchmarks established by the C2S Project for age groups ranging from six to 35 months (Table 1).

Statistical analysis

To construct the database and conduct statistical analyses, Microsoft Excel Software® version 2003 was

employed. A descriptive analysis was undertaken, commencing with the calculation of absolute and relative frequencies for the provision of each food component across different age groups. Subsequently, the mean and standard deviation of the quantity served for each analyzed food component during lunch were calculated in grams, stratified by age groups. To facilitate the comparison of average *per capita* food quantities served against previously established guidelines, line graphs were generated.

Table 2. Average weight, in grams, obtained for each component of the lunch, by age group - “Creche com Sabor e Saúde” project (C2S)

	6-8 months		9-11 months		12-23 months		24-35 months	
Target number of weighings for each component (n)	90		90		90		90	
Meal components (dish and dessert)	n (%)	Average quantity served (g)	n (%)	Average quantity served (g)	n (%)	Average quantity served (g)	n (%)	Average quantity served (g)
Carbohydrate-supplying foods (dish)	0 (0)	-	7 (7.78)	49,57	66 (73.3)	62.17	72 (80)	67.15
Protein-supplying foods (dish)	0 (0)	-	6 (6.67)	14,17	60 (66.67)	20.28	60 (66.67)	23.88
Vegetables (dish)	0 (0)	-	0 (0)	-	39 (43.33)	9.44	48 (53.33)	10.85
Fruit (dessert)	49 (54.44)	84,63	39 (43.33)	133,31	69 (76.67)	53.13	87 (96.67)	46.64

g: grams.

Results

The institutions included in this study had an average (standard deviation) of 10 (six) children aged six to 11 months, 12 (two) children aged 12 to 23 months and 17 (one) children aged 24 to 36 months.

In the 6-8 month age range, no main courses were provided, and 49 desserts were weighed. The recorded weights for the remaining age groups were as follows: for 9-11 months, seven main dishes and 39 desserts; for 12-23 months, 66 main dishes and 69 desserts; and for 24-35 months, 72 main dishes and 87 desserts. A comprehensive analysis was subsequently conducted on a total of 145 main dishes and 244 desserts.

Table 2 delineates the mean weights recorded for each component within the main dish and each dessert served during lunch, categorized by age group. Regarding dessert, fruit was the only food served across all age groups. Among the entire set of main dishes analyzed (n = 145), all included carbohydrate-supplying foods, 126 (86.9%) featured protein-supplying foods, while 87 (60.0%) incorporated vegetables. It is noteworthy that for the 9-11 month age group, none of the dishes within this category included vegetables. Figure 1 visually depicts the *per capita* averages, measured in grams, alongside the corresponding recommended guidelines for the supply of each food component (carbohydrate-supplying foods, protein-supplying foods, vegetables, and fruit) for each age group examined. It is also important to highlight that between six and eight months, no main dishes were served on any given day.

- Carbohydrate-supplying foods (main dish): the average *per capita* obtained (49.6 g from 9-11 m, 62.2 g from 12-23 m, and 67.2 g from 24-35 m) was always above the proposed guidelines considered (Fig. 1 A).
- Protein-supplying foods (main dish): From 9-36 m, the average *per capita* obtained (14.2 g from 9-11 m, 20.3 g from 12-23 m, and 23.9 g from 24-35 m) was in line with the proposed guidelines considered for all age groups (Fig. 1 B).
- Vegetables (main dish): when offered, the average *per capita* obtained (9.4 g from 12-23 m, and 10.9 g from 24-35 m) was below the suggested limits and did not even reach half of the lower limits of the proposed guidelines considered (Fig. 1 C).
- Fruit (dessert): from 6-11 m, the average *per capita* obtained (84.6 g from 6-8 m and 133.3 g from 9-11 m) was above the proposed guidelines considered. Between 12-35 m, the average *per capita* obtained (53.1 g from 12-23 m, and 46.6 g from 24-35 m) was in line with the proposed guidelines considered (Fig. 1 D).

Discussion

In this study, it was observed that there was an excess of carbohydrate-supplying foods and a deficiency in the availability of vegetables on the plate. Regarding dessert, an excess of fruit was served to infants between six and 11 months of age. Although this remains a relatively understudied area in this age

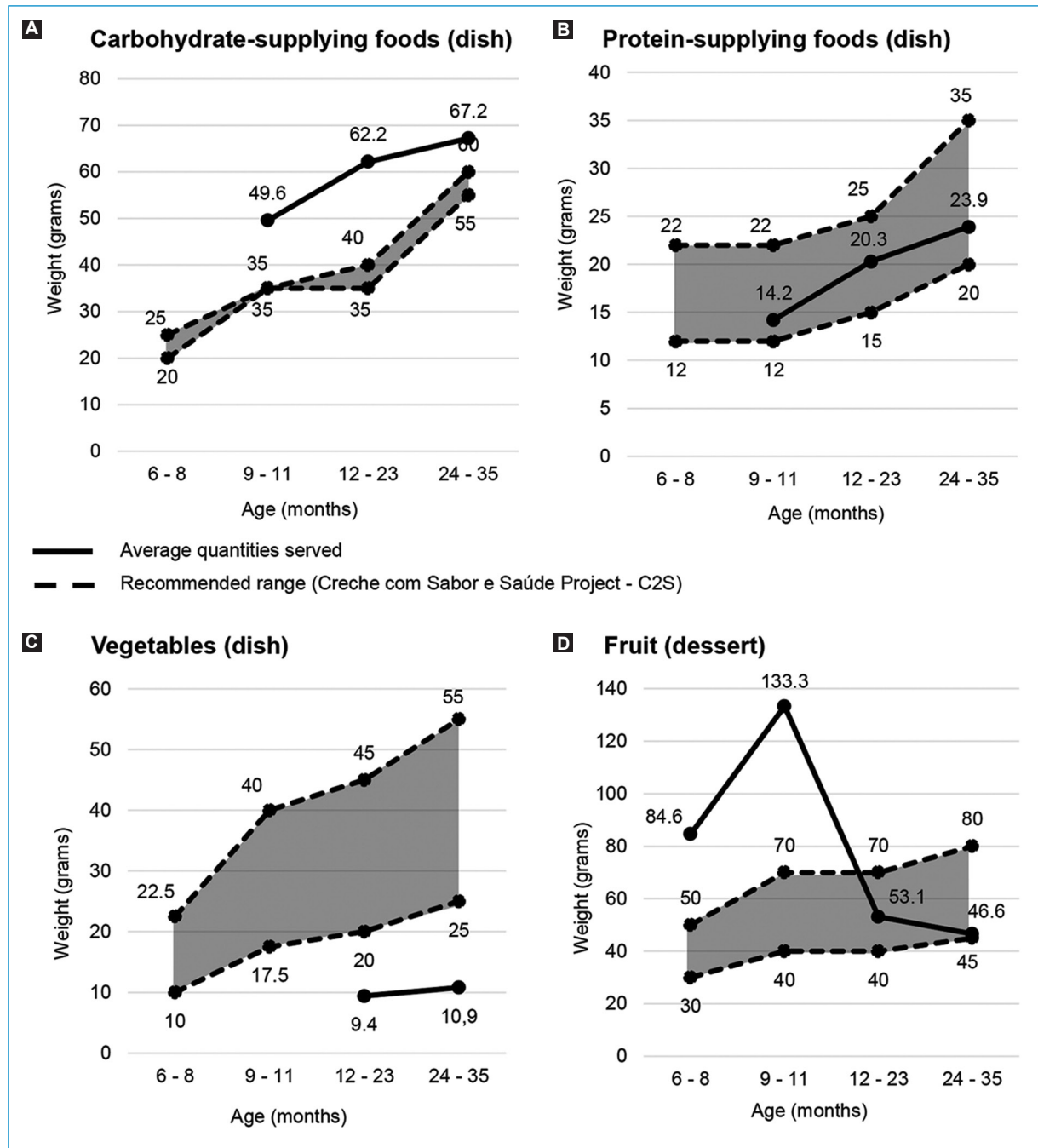


Figure 1. Comparison of the average quantities served at lunch (in grams) with the recommendations defined in the “Creche com Sabor e Saúde” project (C2S), by age group.

group, findings from two studies conducted in daycare centers in New York indicate that fewer than 50% of children adhered to national recommendations for intake across key food groups, which include fruit (excluding juices), vegetables, grains, dairy products, and meat, fish, and eggs, particularly noteworthy as regards vegetables and whole grains^{20,21}.

Furthermore, according to a systematic review published in 2022 by Elford et al.²², where the incorporated studies used menus as a tool to characterize and quantify food provision, a significant disparity emerges between the content presented on daycare menus and the actual offerings. This incongruence is particularly pronounced in studies with extended analysis

periods, exemplified by two investigations, one conducted in 2006 by Fleischhacker et al., in the United States and the other in 2015 by Alves et al., in Brazil^{23,24}. These findings align with the observations in this study, as vegetables were not consistently served on the plate, despite being listed on all menus under evaluation.

In terms of the supply of carbohydrate-supplying foods, only those visibly present on the plate were taken into account. It was noted that these foods were additionally incorporated into soups within institutions, suggesting that the actual consumption might surpass the average quantities obtained. The high intake of carbohydrates in this age group has the potential to lead to a daily energy intake surpassing the recommended needs, thereby contributing to the rise in the prevalence of childhood overweight, as highlighted in prior research²⁵. Furthermore, there is supporting evidence indicating that excessive consumption of this food group during adulthood is associated with an increased likelihood of developing cardiovascular diseases²⁶.

As regards protein-supplying foods, even though the quantity offered on the plate aligns with the considered guidelines, it is crucial to note that these foods are also incorporated into soups until the first year of age¹⁶. It is therefore anticipated that the values of protein-supplying foods presented in this study may be underestimated and, in reality, there could be an overconsumption of these foods. Findings from the most recent national food survey (IAN-AF 2015/16) indicate that approximately 80% of Portuguese children up to the age of 10 exceed the recommended intake levels for this food group²⁷. Excessive protein intake during childhood is linked to adverse health outcomes throughout life^{28,29}.

Concerning the observed non-compliance in the provision of vegetables (60% of the dishes included them), one potential justification was informally disclosed by professionals during visits to daycare centers. It was mentioned that, to reduce food waste, only an amount known to be consumed by the child was placed on the plate. This finding aligns with the outcomes of a study conducted in a daycare center in Brazil, involving children aged seven to 12 months²³. While effective food waste management is paramount in collective feeding contexts¹⁵, it is equally essential to consistently provide this category of food to cultivate taste and palate³⁰⁻³². An emphasis should be placed on raising awareness among daycare professionals to develop strategies that enhance the acceptance of vegetables, given the significance of this food group in promoting pediatric health^{7,8}. A systematic review incorporating 80 randomized trials demonstrated that multidisciplinary

interventions, incorporating schools and families, facilitated an increase in vegetable consumption among children under five years of age³³. Moreover, as indicated by a 2017 systematic review by Hendrie et al., strategies such as exposure to vegetables, bolstering professional training, and social planning (involving collaboration between families/guardians, professionals, and institutions to convey a consistent message promoting healthy eating and vegetable consumption) appear to be effective in child-targeted interventions³⁴.

In the current investigation, an excess of fruit was observed in infants between six and 11 months of age. In this age group, in contrast to the usual practice from 12 months onward, the dessert comprised a blend of various crushed or cooked fruits (such as banana, apple, and pear puree). Given the recognized significance of introducing foods individually during the complementary feeding period, the provision should consist of only a single fruit item per meal to train the child's palate⁵. Furthermore, when fruit was presented in puree form, the quantity served exceeded the recommended amount.

The primary limitation of this study lies in the relatively small number of daycare centers assessed, compounded by the fact that they were selected for convenience. Moreover, it was not always possible to measure each component three times due to logistical issues, such as the number of children in a specific age group present in each day and the pace of the meal distribution. Furthermore, the lunch assessment exclusively involved measuring the food within the main dish and dessert, as quantifying the ingredients used in the soup proved unfeasible. This limitation is even more significant when considering the nine to 11-month-old range since children are in the stage of food diversification, which may involve exploring new flavors/textures without necessarily aiming to fulfill nutritional needs. Thus, the exclusion of soup from these calculations is even more relevant to consider in this age group. However, logistically, it was not possible to weigh its ingredients. For future works, this assessment should be done by weighing each food item used in the preparation of the soups before the cooking process. Another weakness of this study is the exclusion of composite dishes. Finally, it should be noted that although the portions offered were quantified during the C2S project intervention period, this is not considered to have influenced the results, since the overall project was aimed at improving the quality of the menus and not so much at intervening in the quantity offered.

A noteworthy strength of this study is its pioneering nature, being the first conducted in Portugal to quantify

the amount of food provided during lunch in a day-care setting, focusing on the main dish and dessert. Consequently, the results obtained enable analysis and reflection, contributing to the formulation of food policies that foster healthy eating habits in daycare centers.

In conclusion, it is imperative for daycare centers to adopt guidelines that establish standardized processes and procedures regarding portions, technical specifications for products/recipes, menus, and plating. This priority is crucial for promoting health within these environments. Additionally, there is a fundamental need to invest in the training of daycare center staff, addressing the identified needs. Any strategies aimed at promoting well-being and health will remain incomplete without the active participation and awareness of families and the broader community.

Conclusion

The quantity of food provided at lunch did not consistently adhere to the established guidelines, particularly falling short for vegetables and surpassing recommendations for carbohydrate-supplying foods and fruit.

In order to foster healthy growth and development in children, it is imperative to implement standardized procedures and provide training for all professionals engaged in daycare centers. This cohesive approach ensures effective communication with families as well.

Previous presentation

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Authors' contribution

Lucia Nova: Acquisition of data either from patients, research studies, or literature; Analysis or interpretation of data from patients, research results, or literature search; Drafting the article; Final approval of the version to be published (mandatory for all authors); Agreement to be accountable for the accuracy or integrity of the work (mandatory for all authors). Beatriz Teixeira: Conception and design of the study, report, review, or another type of work; Acquisition of data either from patients, research studies, or literature; Analysis or interpretation of data from patients, research results, or literature search; Critical review of the manuscript for important intellectual content; Final approval of the

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Conflicts of interest

None.

Ethical disclosures

Protection of human and animal subjects. The authors declare that no experiments were performed on humans or animals for this study.

Confidentiality of data. The authors declare that no patient data appear in this article. Furthermore, they have acknowledged and followed the recommendations as per the SAGER guidelines depending on the type and nature of the study.

Right to privacy and informed consent. The authors declare that no patient data appear in this article.

Use of artificial intelligence for generating text. The authors declare that they have not used any type of

generative artificial intelligence for the writing of this manuscript, nor for the creation of images, graphics, tables, or their corresponding captions.

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