

Nutritional status and dietary habits in preschool-age children

Estado nutricional e hábitos alimentares em crianças de idade pré-escolar

El estado nutricional y los hábitos alimentarios de niños de edad preescolar

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Abstract

Context: The prevalence of childhood obesity continues to increase worldwide. Its consequences are dramatic, and are associated with a higher probability of premature death and disability in adult life. This situation is so alarming that it is considered one of the greatest health challenges in the 21st century. Goals: To classify the nutritional status of preschool-age children attending selected kindergartens; To characterize the dietary habits of preschool-age children attending selected kindergartens. Methods: A non-experimental, descriptive and cross-sectional study developed in a health care centre of the Municipality of Sintra, within the scope of the School Health Programme. The sample consisted of 300 children. Results: 154 children were male, 146 were female; 140 children were 3 years old and 160 were 4 years old; 92 Children (30.6%) were overweight. Of these, 41 children were pre-obese (13.6%) and 51 were obese (17%). The most consumed foods belonged to the “meat, fish and eggs” food group. Conclusions: The prevalence of overweight children in the study sample was high. An imbalance was observed in the representation of the consumed products, due to an excessive consumption of products from the “meat, fish and eggs” food group.

Keywords: preschool child; nutritional status; food habits; obesity.

Resumo

Contexto: A prevalência da obesidade infantil continua a aumentar em todo o Mundo. As suas consequências são dramáticas, estando-lhe associada uma maior probabilidade de morte prematura e incapacidade na vida adulta. Este é um dos maiores desafios de saúde para o século XXI. Objetivo: Classificar o estado nutricional das crianças de idade pré-escolar a frequentar os jardins-de-infância selecionados; Caracterizar os hábitos alimentares das crianças de idade pré-escolar a frequentar os jardins-de-infância selecionados. Metodologia: Estudo não-experimental do tipo descritivo e transversal desenvolvido num centro de saúde da zona do concelho de Sintra, no âmbito do Programa de Saúde Escolar. A amostra é constituída por 300 crianças. Resultados: 154 crianças pertencem ao género masculino, 146 ao feminino; 140 crianças têm 3 anos de idade e 160 têm 4 anos; 92 crianças (30.6%) têm excesso de peso. Destas, 41 apresentam pré-obesidade (13.6%) e 51 obesidade (17.0%). Os alimentos mais consumidos pertencem ao grupo alimentar da carne, peixe e ovos. Conclusão: A prevalência de crianças com excesso de peso na amostra estudada é elevada. Verifica-se uma distorção na representatividade dos produtos consumidos, existindo um consumo exagerado de produtos do grupo da carne, peixe e ovos.

Palavras-chave: criança pré-escolar; estado nutricional; hábitos alimentares; obesidade.

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Resumen

Introducción: La prevalencia de la obesidad infantil sigue aumentando en todo el mundo. Sus consecuencias son dramáticas, ya que se asocia a una mayor probabilidad de muerte prematura y discapacidad en la edad adulta. Esto se considera como uno de los mayores retos de la salud para el siglo XXI. Objetivos: Clasificar el estado nutricional de los niños de edad preescolar que acuden a los jardines de infancia seleccionados; Caracterizar los hábitos alimentarios de los niños de edad preescolar que acuden a los jardines de infancia seleccionados. Métodos: Estudio no experimental, descriptivo y transversal, desarrollado en un centro de salud de Sintra, en el programa de salud escolar. La muestra estuvo formada por 300 niños. Resultados: Se trata de 154 niños y 146 niñas; 140 niños tienen 3 años y 160 tienen 4 años; 92 niños (30,6%) tienen sobrepeso. De estos, 41 tienen preobesidad (13,6%) y 51 obesidad (17,0%). Los alimentos más consumidos pertenecen al grupo de las carnes, pescados y huevos. Conclusiones: La prevalencia de niños con sobrepeso en nuestra muestra es alta. Asimismo, se ha comprobado que existe una representación distorsionada en la rueda de los alimentos, pues hay un consumo excesivo de productos que pertenecen al grupo de las carnes, pescados y huevos.

Palabras clave: niños preescolares; estado nutricional; hábitos alimenticios; obesidad.

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Introduction

The prevalence of childhood pre-obesity and obesity is significantly increasing in the World, Europe and Portugal, and is becoming a serious public health issue. In Europe, 1 in every 5 children is overweight, and an additional 400,000 children are becoming overweight every year. This adds to the 14 million who are already overweight, at least 3 million of whom are obese (Lobstein, Rigby, & Leach, 2005). This serious problem is associated with a higher probability of premature death and disability in adulthood. If no preventive measures are taken, a number of these children will become obese adults and will develop serious health problems, which will result in a significantly reduced life expectancy and quality of life. Hence, special attention should be given to children and young people so as to foster their engagement in healthy behaviours (WHO, 2006). In line with this idea, the Commission of the European Communities (2005, p. 9) states that “important lifestyle choices pre-determining health risks at adult age are made during childhood and adolescence”. This means that from a very early age it is necessary to empower the individual for life-long learning, so that he/she acquires the tools to make healthy choices. To fight this epidemic, strategies will have to be developed to encourage healthy eating, reducing the consumption of fat and sugar and increasing the consumption of fruit and vegetables (WHO, 2006). According to the available evidence, the major investment should be made on prevention. However, it is known that this prevention ought to be implemented as early as possible, since the prevalence of childhood obesity is growing in increasingly younger age groups. Literature describes preschool as the best life cycle stage to start preventing childhood obesity. The OMS (2005) states that childhood health determines health over the total lifespan, and that the first years of life lay the foundations for people’s achievement of their health potential. Prevention, especially in younger people, is universally viewed as the best approach for reversing the rising global prevalence of obesity (Han, Lawlor, & Kimm, 2010). It is, therefore, urgent to invest in health promotion strategies which may contribute to reversing this situation.

For the above reasons, we believe that it would be important to understand the nutritional status and

dietary habits of preschool-age children, starting with the following research question: What are the nutritional status and dietary habits of preschool-age children in the parish of Rio de Mouro?

In an attempt to answer this question, the following goals were defined: to classify the nutritional status of preschool-age children attending the selected kindergartens by assessing their Body Mass Index (BMI); to characterize the dietary habits of preschool-age children attending the selected kindergartens.

Methodology

Study type

This is a non-experimental, descriptive and cross-sectional study carried out in a Health Centre of the Municipality of Sintra within the scope of the School Health Programme.

Sample

We used a non-probabilistic intentional sample composed of preschool-age children attending kindergartens covered by the selected Health Centre who were born in 2003/2004, thus children who were 3 and 4 years old, respectively. The inclusion criteria for selecting the sample in this study were as follows: children born in 2004 and 2003; children living with their families, and here we have adopted Casey’s (1988) definition of family, i.e. parents or people who are responsible for and have a significant influence in the continuity of care of the child; children with no associated pathologies that interfere with growth.

The inclusion criteria for the selection of the kindergartens were: private kindergartens with an operating license meeting all the legal requirements and belonging to the intervention area of the Health Care Centre where the study would be carried out; Private Social Solidarity Institutions (IPSS) working together with the Health Care Centre and belonging to its intervention area.

After the application of these criteria, a sample of 300 preschool-age children distributed by seven kindergartens was obtained. Public kindergartens were not included in the study as they are only attended by children who are over 5 years of age.

Variables

The variables defined for this study were: gender, age, nutritional status and dietary habits. The variable nutritional status was classified according to the BMI. The formula for BMI is weight in kilograms divided by height in squared meters. In paediatric age BMI is calculated as follows: Underweight - $\leq 5^{\text{th}}$ percentile; Normal weight - $> 5^{\text{th}}$ and $< 85^{\text{th}}$ percentiles; Overweight - $\geq 85^{\text{th}}$ percentile; (Pre-obesity - $\geq 85^{\text{th}}$ and $< 95^{\text{th}}$ percentiles -; Obesity - $\geq 95^{\text{th}}$ percentile).

Anthropometry

Children's weight and height were measured, and their BMI was calculated based on both anthropometric variables. After calculating the BMI, the children's nutritional status was classified. The measurements of both weight and height were always performed under the same conditions, with the same equipment and by the same raters. BMI values were recorded and calculated in a specific sheet, through the application of the international curves developed by the National Centre for Health and Statistics, used in the Portuguese Programme-Type of Action (Ministério da Saúde, Direção Geral da Saúde, 2005).

Food frequency questionnaire

To achieve our second goal, a Food Frequency Questionnaire (FFQ) was applied to the parents of the children who had been diagnosed with pre-

obesity and obesity. The parents were asked to characterize the frequency with which their children consumed specific food items. This questionnaire was designed by Willett and used in the Nurses' Health Study. Its importance is recognized internationally, as well as the studies conducted to test its validity. It has been widely used and validated for the Portuguese population through studies conducted by Moreira, Sampaio, and Almeida (2003), and Barros, Moreira, and Oliveira (2005), among others. The aim of the FFQ is to assess the frequency with which certain food items are consumed by a specific population group in time units (Slater, Philippi, Marchioni, & Fisberg, 2003). The FFQ has two main components: a list of food items and an area for the person to refer how frequently he/she consumes each food item. The questionnaire is composed of 71 items distributed by eight food groups: (I) dairy products; (II) meat, fish and eggs; (III) oils and fats; (IV) bread, cereals and derivatives; (V) cakes, biscuits, desserts and sweets; (VI) vegetables, greens and fruits; (VII) beverages; (VIII) fast food and sauces.

Each participant was asked to indicate the consumption frequency of each of the food items. There were 9 possible response options for each item, ranging from less than once a month to six or more times a day. To calculate the mean consumption frequencies for each food group, each response was assigned a score as follows (Table 1).

TABLE 1 – Response options and respective scores

RESPONSE	ASSIGNED SCORE
once per month or never	1
1-3 times per month	2
once per month	3
2-4 times per week	4
5-6 times per week	5
once per day	6
2-3 times per day	7
4-5 times per day	8
6 times per day or more	9

Data were analysed using Microsoft Excel and the software Statistical Package for Social Sciences (SPSS, Microsoft Windows), version 16.0.

Ethical Principles

This study took into account the principles on which ethical standards for research are based; the principles of Beneficence (integrity and protection against exploitation); Respect for Human Dignity (transmission of all information on the study, obtaining a written, free and informed consent); and Justice (guarantee of anonymity, privacy and confidentiality).

Results

Following the schedule which had been previously drawn up, 300 children from the seven kindergartens were assessed. The following results were obtained: Regarding gender and age, 154 children were male and 146 were female; 140 children were 3 years old and 160 were 4 years old.

The classification of the children's nutritional status according to the BMI percentile is as follows: underweight - 19 children (6.3%); normal weight - 189 children (63.0%); overweight - 92 children (30.7%).

Overweight children were distributed as follows: pre-obesity - 41 (13.6%); obesity - 51 (17.0%).

It should be highlighted that there are more overweight children in IPSS. Private institutions registered the lowest percentages of pre-obesity and obesity.

When parents were asked about their children's food frequency, it was possible to sort the eight food groups according to consumption by using the median values (Table 2). According to Figure 1, the intake of meat, fish and eggs represents 35.0%, and, despite being less frequently consumed, fast food and sauces still account for 8% of the children. Food groups were sorted in descending order of consumption: meat, fish and eggs (the most consumed food items); vegetables, greens and fruits; bread, cereals and derivatives; dairy products; cakes, biscuits, desserts and sweets; dairy products; cakes, biscuits, desserts and sweets; oils and fats; beverages; fast food and sauces (the less consumed food items).

TABLE 2 – Food frequency by food groups in children

	Dairy Products	Meat, fish and eggs	Oils and fats	Bread, cereals and derivatives	Cakes, biscuits, desserts and sweets	Vegetables, greens and fruit	Beverages	Fast food and sauces
Mean	22.78	34.92	16.90	23.67	22.15	35.07	15.11	9.26
Median	23.00	35.00	17.00	23.00	21.00	34.50	15.00	8.00
Standard deviation	4.46	5.13	4.02	5.07	6.35	7.26	3.21	3.37
Minimum	13.00	25.00	6.00	14.00	8.00	20.00	10.00	5.00
Maximum	34.00	49.00	27.00	42.00	38.00	57.00	25.00	19.00

Since it was not possible to show all FFQ results, Table 3 displays the food items which were more and less consumed by children per food group. We have grouped them into two categories: most frequently

and less frequently consumed food items. The first are consumed less than once per month or never, while the latter are consumed 2 to 4 times per week or more.

TABLE 3 – Distribution of the most frequently and less frequently consumed food items per food group

Food items	Less frequently consumed (< once per month or never)	Most frequently consumed (2-4 times per week or more)
Group I (Dairy Products)	Skimmed milk (93.1%); Niza, Evora, Serra da Estrela cheese types (81.9%); Whole Milk (80.6%)	Yoghurts other than plain yoghurt (93.0%); Semi-skimmed milk (83.5%); Flamengo-type cheese (65.3%)
Group II (Meat, fish and eggs)	Seafood: bivalve molluscs, shrimp, edible crab (87.5%); Beef liver, pork, chicken, trotter, cow feet (79.2%); fatback, bacon, streaky bacon (75.0%)	Chicken, turkey and rabbit meat (73.6%); Ham, smoked ham, smoked pork sausage (56.9%); pork and beef (45.9%)
Group III (Oils and fats)	Lard (88.9%); Cream (61.1%)	Olive oil (91.6%); Butter (72.2%)
Group IV (Bread, cereals and derivatives)	Muesli (84.7%); cornbread (81.9%)	Rice (91.7%); Pasta (spaghetti, macaroni, etc.) (83.3%); White Bread, bread loaf, toast (80.6%)
Group V (Cakes, biscuits, desserts and sweets)	Marmalade, jam, jelly, honey (54.2%); Sugar (spoon, package, etc.) (47.2%)	Biscuits: Marie, whole-wheat, saltine crackers (68.1%); Other types of biscuits or cookies (61.1%);
Group VI (Vegetables, greens and fruits)	Dried Fruit (peanuts, almonds, hazelnuts, etc.) (76.4%); Olives (70.8%); Canned Fruit (peach, pineapple, etc.) (65.3%)	Fresh fruit (apple, pear, orange, banana, peach, melon, grapes, etc.) (97.2%); Vegetable soups (no meat or fish) (86.2%); Boiled, roasted or braised potatoes (65.4%)
Group VII (Beverages)	Alcoholic beverages; Coffee (100%)	Fruit juices (54.1%); Soft drinks (Coca-Cola, flavoured, iced tea, etc.) (31.9%)
Group VIII (Fast food and sauces)	Mayonnaise (68.1%); Ketchup (52.8%)	Salted snacks (croquettes, rissoles, codfish cakes, pies, etc.) (13.9%)

Also in terms of dietary habits, parents were asked about their behaviours regarding the use of visible fat on meat, poultry and fish skin, how fish and meat were usually cooked, and which fats were used to cook and season their children's meals. It was observed that 84.7% of parents remove all or almost all visible fat from meat. However, this percentage is not so significant regarding the removal of poultry or

fish skin: 80.5% of parents remove poultry skin, while 69.4% remove fish skin.

According to Table 4, parents usually grill (41.7%) or boil (40.3%) fish; only 18.1% fries, roasts or braises fish. Meat is usually grilled (47.2%) or stewed (27.8%). Parents usually season or cook their children's food using olive oil, while oil is the most commonly used fat for frying.

TABLE 4 – Parents' opinion regarding their children's dietary habits.

C H I L D	What do you usually do with ...				How do you usually eat ...				Which fat do you use to...									
	Visible fat from meat		Poultry skin		Fish skin		fish		meat		Stew /Braise		Fry		Season			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
Remove all	47	65.3	42	58.3	42	58.3	Boiled	29	40.3	7	9.7	Oil	7	9.7	52	72.2	3	4.2
Remove almost all	14	19.4	16	22.2	8	11.1	Grilled	30	41.7	34	47.2	Margarine	5	6.9	9	12.5	0	0.0
Remove a little	4	5.6	5	6.9	8	11.1	Fried	4	5.6	7	9.7	Lard	3	4.2	0	0.0	1	1.4
Do not remove	7	9.7	9	12.5	14	19.4	Roasted	6	8.3	4	5.6	Olive Oil	56	77.8	11	15.3	66	91.7
							Stewed	3	4.2	20	27.8	Butter	1	1.4	0	0.0	2	2.8

Discussion

Results regarding the nutritional status of the children who were part of our sample are similar to those found by Rito (2004) in a study carried out in Coimbra with children aged 3 to 6 years, where 31.9% of the children were overweight. Also Padez, Fernandes, Mourão, Moreira, and Rosado (2004), in a study conducted with children aged 7 to 9 years, concluded that the prevalence of overweight and obesity was 31.6%: 20.3% of the children were pre-obese and 11.3% were obese. Data also called our attention to the fact that the institutions where the number of pre-obese and obese children was higher were all Private Social Solidarity Institutions, which means that there is a greater prevalence of overweight in lower socioeconomic contexts. This fact thus reinforces the WHO (2006) statement that obesity is common among individuals who are economically disadvantaged, with low incomes, lower levels of education and limited access to health care. Children from disadvantaged backgrounds are more likely to experience poorer school performances and are consequently more prone to lower incomes as adults. This may promote a greater inability to provide adequate health care, nutrition and stimuli to the children, thus contributing to the intergenerational transmission of poverty (OMS, 2010). The World Disasters Report (International Federation of Red Cross and Red Crescent Societies, 2011, p. 15) also mentions that there is a tendency for families on low incomes to buy and consume energy-dense and nutrient-poor “junk” food. The report adds that “it is up to ten times cheaper to provide calories in the form of foods high in fat, salt and sugar than it is to provide them with protective foods such as fruit and vegetables”. People who live in more disadvantaged situations due to social, organizational and financial constraints are the ones who ultimately make less healthy choices in terms of nutrition and physical activity. From an evolutionary perspective of obesity, it could be said that *“in developed countries the poor are the most obese”* (Carmo, Santos, Camolas, & Vieira, 2008, p. 10).

As for dietary habits, the results obtained are in line with data from Instituto Nacional de Estatística (2010) for the period 2003-2008 regarding the significant increase in meat consumption. As a result, a reduction in meat consumption is therefore recommended. The

same was observed in this study: the food items which are most frequently consumed are precisely those from the “meat, fish and eggs” food group. Saturated fats are abundant in animal fats, and its excessive intake can lead to the onset of some pathologies, particularly cardiovascular diseases and high blood cholesterol levels (Nunes & Breda, 2001).

The answers about the frequency of consumption of other food items can be classified as a good eating habit for the food groups which follow are “greens, vegetables and fruit”, and then “dairy products” and “bread, cereals and derivatives” with the same percentage.

According to data from Instituto Nacional de Estatística (2010), the consumption of dairy products increased by 6%, as well as the consumption of cereals, particularly rice. Rice has gradually been replacing roots and tubers (which are in a downward trajectory since the 1990s). Portugal is the biggest consumer of rice in Europe, with a 17.3 kg/*per capita*/per year consumption of milled rice, followed by Spain and Italy with the much lower values of 7.2 and 6 kg/*per capita*/per year, respectively.

A balanced diet to meet the needs of preschool-age children should be distributed, regarding energy/caloric intake, according to the rules of healthy nutrition, i.e. the diet should be varied and include foods which provide the necessary nutrients in terms of proportion and quantity.

The systematic and regular introduction of fruits and vegetables in the child’s diet can play an important role in the creation of healthy dietary habits, which will contribute to the fight against obesity. Each child should “consume at least 3 pieces of fruit per day, in so far as fruit provides a good part of the daily vitamin needs, particularly vitamin C (...) and other substances with antioxidant properties (which help prevent chronic diseases, such as cardiovascular diseases and neoplasms)” (Ministério da Agricultura do Desenvolvimento Rural e das Pescas, Ministério da Saúde, & Ministério da Educação, 2010). The OMS (2002) reinforces this idea and adds that the low intake of these products is responsible for almost three million deaths every year from those diseases. The OMS and FAO (2003) recommend a daily intake of 400 grams of fruit and vegetables per person, which in reality is often far from what is recommended.

Conclusion

According to our results, the prevalence of overweight preschool-age children in the municipality of Sintra is quite high (30.7%). It follows that prevention should start at an early stage of child development. It is in preschool age that the basic patterns are acquired, namely eating patterns. It is therefore important to create opportunities for children of this age group to practice healthy behaviours related to diet and physical exercise in positive social and emotional contexts. At this age, building strong foundations is known to encourage future learning, which serves as basis and support for all subsequent learning. Hence, we believe that this is the right moment to start “empowering” the individual, i.e. outlining a path to autonomy and partnership. For this reason, education for healthy lifestyles should be an integral part of learning in this stage of life.

We also verified that kindergartens from private social solidarity institutions have the highest prevalence of overweight children, whereas the lowest percentages were found in private institutions. We should therefore focus our attention on, or at least pay further attention to lower socioeconomic family contexts.

Despite the availability of a large amount of information on healthy nutrition and the high investment made by nurses in health education with regard to eating habits, our study still identified a distortion in the food wheel due to an excessive consumption of “meat, fish and eggs”, which is a practice that we should try to change in this population. The most frequently consumed foods by this age group are chicken, turkey, and rabbit meat.

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