

RECOMMENDATIONS REGARDING THE NUTRITION OF PRESCHOOLERS

D.T. Anton-Păduraru¹, A. Marin², Ș. Dupa³, A.S. Drochioi¹

Abstract

Nutrition plays a role in child's growth and development, and it is also a source of social interaction through verbal and non-verbal communication that contributes to psychosocial and emotional development. Unhealthy food habits can affect child growth and may increase the risk of chronic illnesses, while proper nutrition can prevent various conditions. Preschool period is characterized by moderate food consumption in line with slower growth rates, periods of lack of interest in food or resistance to new foods. Preschoolers require a customized diet according to the needs of this period and their characteristics, based on the same principles as adult nutrition but with a different nutrient requirement. Energy and nutritional needs are higher than those of the adult because they have to cover the needs for growth and development. In this paper, the authors want to show the current nutritional recommendations specific to the preschool period, because promoting healthy eating habits as early as possible in life is very important.

Keywords: preschooler, nutrition, recommendations.

Introduction

According to the World Health Organization (WHO), proper nutrition combined with regular physical activity is the basis of good health. Nutrition plays a role in child's growth and development, and it is also a source of social interaction through verbal and non-verbal communication that contributes to psychosocial and emotional development.

Proper nutrition is important in preventing various conditions such as small height, delayed puberty, nutritional deficits, dehydration, eating disorders, etc. Preschoolers require a diet tailored to the needs of this period and their characteristics, being more independent in choosing the type and quantity of food. Preschool nutrition - also called the "golden age of childhood" - is based on the same principles as adult nutrition, but nutrient needs are different. Preschool period is characterized by moderate food consumption in line with slower growth rates, periods of lack of interest in food or resistance to new foods [1]. It's the period when:

-children do not always eat all groups of foods.
Selective nutrition or refusal to eat occurs for various

reasons: neophobia, when they associate a food with an unpleasant object (for example, pasta can be seen as similar to worms), "contamination" of a food with another that the child does not accept, lack of availability for the child of food to touch or play to develop self-sufficiency, negative eating experiences (the child is forced to eat, he is punished, he feels pain because of the gastro-oesophageal reflux, he has mouth sensitivity);

- the child consumes high quantities of liquids and semi-liquid food;

- the selection of food is restricted due to food insecurity, food allergies / intolerances of cultural reasons.

Other more common nutritional problems encountered in preschool children are:

- growth disorders (malnutrition, malabsorption);

- iron anaemia due to excessive consumption of cow's milk or unbalanced diet;

- caries especially in children from low-level social-economic families who use the bottle for a long time or who frequently consume sugars and carbonated beverages;

- gastro-oesophageal reflux;

- constipation due to insufficient fibre intake, allergy to cow's milk protein, emotional problems;

- diarrhoea due to increased consumption of fruit juice containing large amounts of non-absorbable monosaccharides and oligosaccharides or due to milk cow's protein allergy [2].

Dietary food habits that are established since early stage persist during adulthood. Unhealthy eating habits can affect child growth and increase the risk of chronic illness (cardiovascular pathology, obesity, diabetes) [3].

Nutritional recommendations

Preschool children should eat various food daily, 3 main meals and 2 snacks that take an adequate time (if the meal lasts less than 10 minutes, the preschool child does not have enough time to eat, and if it lasts more than 30 minutes, the meal can turn into something boring). We think that a meal should last 15-20 minutes and the child will be able to eat again at the next meal or snack [4,5].

¹“Grigore T.Popa” University of Medicine and Pharmacy Iasi, Romania – Department of Mother and Child Medicine, Discipline Pediatrics

²“Grigore T.Popa” University of Medicine and Pharmacy Iasi, Romania – Resident doctor

³“Grigore T.Popa” University of Medicine and Pharmacy Iasi, Romania – PhD Student

E-mail: antondana66@yahoo.com, angelica_marin31@yahoo.com, stefana.alexoaie@gmail.com, simonadrochioi@yahoo.com

The advantages of serving 3 meals and 2 snacks are:
 -prevents eating less nutritious foods throughout the day

-prevents the feeling of hunger or thirst that may occur in a longer period between meals.

Breakfast - considered a nutritional marker of healthy lifestyle, it must be the most important meal of the day to provide the energy and nutrients needed by the body after the night's rest (calcium, iron, B-group vitamins). Breakfast provides the feeling of satiety in the first part of the day and helps to limit the consumption of food in the second part of the day. It also helps to keep the blood sugar within normal limits. Having breakfast has positive effects: better weight, better nutritional intake, better memory and better attention. Instead, giving up breakfast has negative effects on cognitive, psychosocial, attention, school performance, and attendance at the kindergarten.

Lunch contributes to adequate caloric and nutrients intake. Dessert is part of the meal and it should not be more desired or expected than the meal itself. It is preferable to have healthy, home-made desserts.

Snacks are important as they provide energy intake, but sugar-rich snacks that reduce appetite and increase the risk of caries should be avoided. The ideal snack has to provide proteins, carbohydrates, calories, vitamins, minerals, fibre (e.g. yogurt, fruit, nuts and seeds). Snacks must be planned 2-3 hours before the main meals [4]. Consuming 2 snacks in addition to the 3 main meals provides children with calories and nutrients in adequate portions, daily.

Preschoolers requires the same nutrients as the adult, but they need higher calories intake compared to their body weight. Energy and nutritional needs are higher compared to the adult ones because they need to cover the process of growth and development [6,7]. Children are not miniature adults: they grow and develop at a faster pace and require more energy compared to adults.

The calorie requirement (CR) in preschool is calculated using the formula:

$$CR \text{ (kcal/day)} = 1000 + 100 \times \text{age (years)}$$

It varies between 1300-1600 kcal/day or 90 kcal/kg bodyweight or 16 kcal/cm height (8, 9). Compared to the adult requiring 30-35 kcal/kg bodyweight, preschoolers require a higher amount compared to their size due to the rapid growth and the fact that they are very active.

The main nutrition principles in a balanced diet should be:

-proteins: 15-18% of the calorie requirement, of which 2/3 animal protein [6].

-carbohydrates: 55-60% or 10 g/kg bodyweight/day.

-fats: 25-30% or 2-3 g/kg bodyweight/day (essential fatty acids 1-3 % of the CR); saturated fatty acids 10%, mono non saturated fatty acids 10%, polynonsaturated fatty acids 10%, linoleic acid 5-8 g/day or 4-10% of the calories, alpha-linoleic acid 0.5-0.8 g/day or 0.4-1% of the calorie intake, omega-3 fatty acids 40-55 mg/day).

A fatter diet is recommended for this age group because fat is needed for the growth and development of the nervous system.

It is considered that a diet in which 25-30% of calories come from fats and where saturated fats are below 10% is safe and appropriate for healthy children. It is advisable not to consume fish that may contain mercury (shark, swordfish) or fish oils that may contain dioxin and polychlorinated biphenyl.

Proteins - components of all cells, play a role in the development of metabolic processes, in adjusting the osmotic pressure and the acid-base balance, in the good functioning of organs, in growth and development, as well as in energy. Proper protein consumption is associated with a lower risk of disease and a shorter duration of the same. Protein deficiency accompanied by inadequate energy intake leads to protein-calorie malnutrition [10].

Child Nutrition Guidelines recommends a balanced diet based on 4 food groups:

-group 1: providing good sources of energy, carbohydrates, fibre and vitamins from group B;

-group 2: offering a variety of fruits and vegetables that supply vitamin A, iron, zinc, and fiber. According to WHO, the daily fruit and vegetable intake for EU Member States should be 400g/day [11]. Exposing the infant and toddler to fruits and vegetables is associated with their acceptance in the following periods of life. Fruit consumption is preferable to the consumption of fruit juices that are high in sugar and low in fibre. Cooke and Wardle quoted by Cupples Cooper have shown that exposing children to a variety of fruit and vegetables during their pre-school life leads to an increase in their consumption over the course of their lives [12].

-group 3: containing sources of protein, calcium, vitamin A and calories;

-group 4: containing sources of protein, iron, zinc [13] - table 1.

A balanced diet containing foods from all major groups also ensures the need for vitamins and minerals - table 2.

Under 5 years of age, vitamin supplementation is recommended in children who do not eat properly for a long time, consuming a limited number of foods that are restricted or vegetarian, who have food allergies or intolerances.

WHO said that 190 million preschools worldwide have vitamin A deficiency, which is necessary for growth and infection control. In places where vitamin A deficiency is a public health problem, it is recommended that children under 5 years of age receive vitamin A supplements to reduce morbidity and mortality. A vitamin A 200,000 IU dose in children between 1-5 years provides adequate protection for 4-6 months, the exact range depending on the vitamin A diet and the rate of use. The daily menu must also contain: vitamin D 400 IU, folic acid 200 µg, vitamin C 35 mg, group B vitamins, also calcium 500 mg and zinc 4-6.5 mg [14].

Table 1. Recommended food groups in the preschoolers' diet.
(according to <https://www.mayoclinic.org/healthy-lifestyle/childrens-health/in-depth/nutrition-for-kids/art-20049335>)

Group 1	Group 2	Group 3	Group 4
- bread - rice - potatoes - pasta - grains -starch- containing food	- fruit - vegetables -green vegetables	- milk - dairy	- meat - fish - egg -other dairy foods non- protein

Table 2. Necessary intake of vitamins and oligo-elements in preschoolers
(according to Graur Mariana).

Oligo-element / vitamin	Required intake
Iron (mg)	7
Zinc (mg)	7
Iodine (µg)	90
Copper (mg)	1.1
Fluorine (mg)	1
Selenium (µg)	30
Vitamin C (mg)	75
Vitamin B1 (mg)	0.6
Vitamin B2 (mg)	1
Vitamin B3 (mg)	8
Vitamin B6 (mg)	3
Vitamin B8 (µg)	20
Vitamin B12 (µg)	1.1
Vitamin A (µg)	450
Vitamin E (mg)	7.7
Vitamin D (µg)	5
Vitamin K (µg)	20

The intermittent iron supplementation (30 mg of elemental iron, 3 consecutive months) is recommended as a public health intervention in preschool children to improve the status of iron and reduce the risk of anaemia in areas with an increased incidence of the same [15,16].

Potassium is required to maintain the total volume of fluids, the hydro-electrolyte balance, and the normal cell function. It is contained in unrefined foods, especially fruits and vegetables (600mg/100g nuts, green vegetables - spinach, cabbage 550 mg/100g, bananas, dates, tomatoes, cucumbers 300mg/100g). Food processing decreases potassium levels, and the diet rich in processed food and low in fruits and vegetables also contains small amounts of potassium [17].

With regard to fibre consumption, while more fibre and fewer fats are recommended for an adult, in preschoolers, due to their smaller stomach volume, the consumption of a large amount of fibre would quickly lead to a feeling of fullness, decreased absorption of nutrients, diarrhoea and other gastrointestinal symptoms. Therefore, the recommended fibre intake for preschoolers is 14-18 g/day [9].

The need for liquids is 80 ml/kg bodyweight/day or at least 6-8 glasses x 100-120 ml [6,13]. The fluid intake must be increased during the warm season and during physical activities. Excessive fluid intake can reduce fibre and iron intake. Fluids include water, mineral water with a sodium content below 20 mg/l, unsweetened milk and fruit juices. Avoid carbonated beverages, excess tea (it contains tannin interfering with iron absorption), coffee and Coca Cola (containing caffeine) [18]. Water and milk are the safest beverages that can be offered between meals as they do not cause erosion and dental caries. However, more than 3 servings of milk per day may reduce the appetite for other foods [19]. Energy drinks are not recommended to preschoolers because of the increased sugar content (15 teaspoons/600 ml) and caffeine. It is necessary to limit the consumption of foods containing caffeine because the exposure to 2.5 mg caffeine/kg bodyweight has toxic effects. Chocolate contains 10 mg caffeine/50g, tea 55 mg/250 ml, energy drinks 72 mg/250g [18]. A maximum of 125 ml of 100% natural fruit juice is recommended as part of a meal or snack, but it is best to have whole fruit and vegetables (1). Water is recommended to reduce the acidity

and sugar content of fruit juices, diluting them by 1:1, and given only during a meal.

Daily recommended salt intake is 1-1.5 g (400-600 mg sodium), not exceeding 3 g (1.2 g sodium). Therefore, recommendations are as follows:

- do not add salt to food;
- reduce the consumption of processed foods, sauces, ready-made soups;
- limit the consumption of snacks that are rich in fat, but poor in nutrients;
- use natural flavouring spices [2, 9, 13].

Foods with high sodium content are: soy sauce (700 mg/100g), bacon (1500 mg/100g), cheese (800mg/100g), butter and margarine (700 mg/100g), fish (100mg/100g), processed meat, corn flakes [20].

It is recommended to limit the daily sugar intake to 8 teaspoons (one teaspoon = 5g) [9].

The serving size depends on age: for example, for 3-year-old children, 1 serving = ½ of the one recommended for 5-year-old children. Serving size increases as the children grow up, as well as the calorie and nutrient intake. It is not necessary for a preschooler to eat the recommended nutrient intake every day: one day he can eat more, other day he can eat less, depending on the foods offered, but the necessary intake for a period of 2 weeks must be covered by a balanced diet [2].

Conclusions

1. Promoting healthy eating habits from early ages is very important.
2. Early food experiences may have long-term consequences on eating habits and food preferences.
3. Preschoolers must learn to eat healthy foods and make the right choices with the help of parents and educators.
4. Parents should be educated on the size of the servings for preschoolers, compared to the ones for adults.
5. It is necessary to publish specific national nutrition guides for different ages, easy to understand and be applied by the parents.

Conflict of interests

The authors report no conflicts of interest.

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Correspondence to:

A. Marin
Grigore T. Popa” University of Medicine and Pharmacy.
16, str. Universității,
Iași, Romania
Tel. +40742415430.
E-mail: angelica_marin31@yahoo.com