

COMPLIANCE OF MENUS WITH NUTRITIONAL STANDARDS IN PUBLIC AND PRIVATE KINDERGARTENS IN CROATIA

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ABSTRACT

Background. It is necessary to ensure a variety of nutrients in weekly menus in kindergartens according to the recommendations and standards currently in effect. It is also important to follow the energy value of macronutrients, which is usually carried out by the relevant institutions quarterly in every kindergarten. However, the quality of menus in relation to the representation of different types of food is not monitored.

Objective. The aim of this study was to estimate the quality of meals in relation to the representation of different types of food in state and privately owned kindergartens in one of Zagreb district in Croatia.

Material and Methods. Weekly menu's daily meals served in kindergarten groups for children (4 - 6 years old) were analysed and compared with the Croatian Health Care, Hygiene and Balanced Diet Programme for Children in Kindergartens and with Food Plan Standards for Children in Kindergartens - Menus and Standards. The studies were performed in state and privately owned kindergartens in Zagreb, district Maksimir.

Results. Except in the serving of dairy products, which were in comparison to the proscribed standard overrepresented, other foods such as grains, fruits, vegetables, meat, eggs, pulse were underrepresented. Grains, except in a smaller number of servings, were statistically underrepresented in state owned kindergartens in comparison to the privately owned ones. The largest discrepancy was shown in the low number of fish servings, equally so in the state and privately owned kindergartens.

Conclusions. In recent years strides have been made to harmonise menus provided by kindergartens with standards based on scientific research on the prevention of obesity. However, further harmonisation of "old" and "new" foods intended to achieve a more substantial balance of the consumption of certain foods and the adequate amounts of their nutritional values is necessary.

Key words: *child, preschool, food, kindergarten*

INTRODUCTION

A balanced diet is of utmost importance through all stages of human life cycle. Numerous studies prove the relationship between obesity and various physical diseases [1] and mental diseases [19]. It is therefore important to establish appropriate dietary habits and attitudes from an early age [4, 20, 21]. In view of this fact, increasingly more effort is dedicated to the implementation of nutritional standards when planning meals in kindergartens. The Republic of Croatia adopted amendments to the Health Care, Hygiene and Balanced Diet Programme for Children in Kindergartens [9], (referred later as Health Kindergarten Programme), and issued guidelines Food Plan Standards for Children in Kindergartens - Menus and Standards [23]. Food pro-

ducts, based on new studies concerning the prevention of health risks and obesity related to unhealthy diet, were consequently added to kindergarten menus. In regard to previous guidelines, which were developed over two decades ago, this indicated progress [18, 19].

However, in the time of fast foods, general lack of time and shortage of trained specialists, who would provide education on proper nutrition and ensure its adoption from an early age, we can surmise the presence of oversights in the implementation of health standards. In the comparison of required standards before and after the introduction of "new menus" in 2008 [5], numerous studies conducted in Croatia revealed significant deviations in a number of factors associated with daily meals. These studies mostly focused on the energy value of meals in relation to the amount of carbohydrates, proteins

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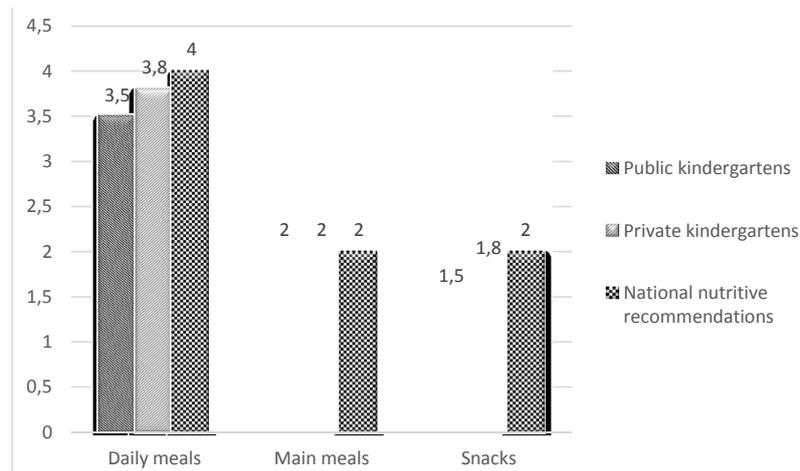


Figure 1. Average number of daily meals served in public and private kindergartens

and fats. Some of them also examined the differences between state-owned (public) and privately owned kindergartens. These studies paid little attention to the composition of menu items and food variety [3, 12].

The aim of this study was to determine the compliance of specific menus with nutritional standards in state-owned and privately owned kindergartens in one district of Zagreb. It was specially aimed to assess: (1) the number of servings in the “Morning Program 4” which is required to meet 80% of the recommended daily intake; (2) the amount of food items per serving - type and quantity, with special attention focused on the fish.

MATERIALS AND METHODS

In Croatia the city of Zagreb is divided into 17 city districts. Using a random number generating software, the Maksimir district was selected. The sample included all kindergartens in the district, namely four state-owned and four privately owned kindergartens. Weekly menu's daily meals were analysed using a check-list comprising the basic items on the menu in line with Health Kindergarten Programme [9] and Food Plan Standards for Children in Kindergartens - Menus and Standards [23]. In addition, authorised kindergarten employees

were interviewed. The weekly menu “Morning Program 4” daily meals were analysed in kindergarten groups for children between 4 and 6 years of age. The results were processed by conventional methods of descriptive statistics and presented as measures of location, dispersions, percentages and absolute numbers in tables and graphs. The differences between state-owned and privately owned kindergartens were examined using the *Student's t-test*.

RESULTS

The results of the analysed number of daily meals on the weekly menu demonstrate that the number of meals was in compliance with the Health Kindergarten Programme [9] in both state-owned and privately owned kindergartens (Figure 1). The number of snacks was lower and ranged from 1-2 snacks per day with an average value of 1.5 in state-owned and 1.8 in privately owned kindergartens. According to Health Kindergarten Programme [9] the total number of daily meals was, therefore, less than 4.

The results of analysed menus, in view of the daily serving of certain food types presented in Table 1 and Figure 2 indicate that, on average, grains were present in 3.2 servings per day in state-owned and in 3.8 se-

Table 1. Representation of foods and their relation to the nutritional recommendations [9] and nutritional standards [23] in public and private kindergartens

Daily serving of foods	Public kindergartens				Private kindergartens				p
	Mean value	Range	Relation to nutritional recommendations	Percentage in comparison to nutritional standards	Mean value	Range	Relation to nutritional recommendations	Percentage in comparison to nutritional standards	
Grains	3.2	2 - 5	100%	-27	3.8	3 - 5	100%	-17	0.01
Fruits	1.1	1 - 2	100%	-25	1.1	1 - 2	100%	-25	0.52
Vegetables	1.3	1 - 3	100%	-37	1.4	1 - 2	100%	-34	0.71
Meat, fish, eggs, pulses	1.2	1 - 2	100%	-40	1.3	1 - 2	100%	-37	0.49
Milk	2.1	1 - 4	100%	+20	1.9	1 - 3	100%	+15	0.56

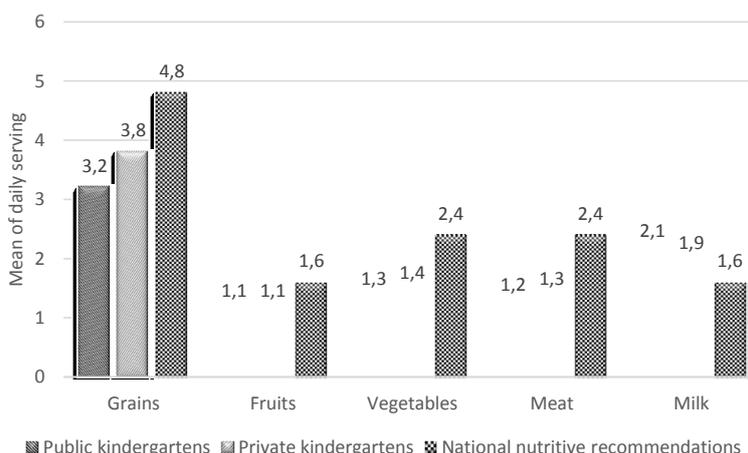


Figure 2. Representation of foods in public and private kindergartens

rvings per day in privately owned kindergartens. Thus although in compliance with the Health Kindergarten Programme [9], which prescribes the number of meals for each day, and in relation to the Food Plan Standards for Children in Kindergartens - Menus and Standards [23], which recommends that 80% of 6 daily meals be served during a 9-10 hour stay, the results revealed a deficiency of 27%.

On average, fruit was served 1.1 times a day in both state-owned and privately owned kindergartens, which, although in compliance with the Health Care, Hygiene and Balanced Diet Programme for Children in Kindergartens [9], demonstrated 25% less servings when compared to the Food Plan Standards for Children in Kindergartens - Menus and Standards [23], which recommends that fruit makes 80% of 2 daily meals served. Vegetables were, on average, served 1.3 times a day in state-owned and 1.4 times a day in privately owned kindergartens. Although the results were in compliance with the Health Care, Hygiene and Balanced Diet Programme for Children in Kindergartens [9], in relation to the Food Plan Standards for Children in Kindergartens - Menus and Standards [23] they showed a deficiency of 37% in state-owned and 34% in state-owned kindergartens. According to the Health Kindergarten Programme [9], meat, fish, eggs and pulses should be present in children’s daily diet and can be interchangeably combined on the weekly menu and constitute three servings per day. However, only 1.2 servings a day were recorded in state-owned and 1.3 servings a day in privately owned kindergartens, which in relation to the Food Plan Standards for Children in Kindergartens - Menus and Standards [23] revealed a deficiency of 40% in state-owned and 37% in privately owned kindergartens.

Milk was served in 2.1 serving units in state-owned and 1.9 serving units in privately owned kindergartens, thus exceeding the Food Plan Standards for Children in Kindergartens - Menus and Standards [23] recommendations of 80%, namely 2 serving units.

The weekly menus analysed in view of the recommended servings of fish, whose results are demonstrated in Table 2, indicated that only one kindergarten within the privately owned group served fish on a weekly basis, while all other kindergartens, from both groups, did not serve fish at all. Seafood, specifically squid, was included in the weekly menu in one kindergarten within the state-owned group and in 2 kindergartens within the privately owned group.

Table 2. Weekly frequency of serving fish and squids in kindergartens

Kindergarten	Fish	Squids
Public 1	0	1
Public 2	0	0
Public 3	0	0
Public 4	0	0
Private 1	1	0
Private 2	0	1
Private 3	0	1
Private 4	0	0

No weekly menus of kindergartens from examined groups included foods high in fat, with added sugar or salt. Water was readily available for drinking at all times.

DISCUSSION

The modern society we live in imposes new lifestyles under whose conditions it is necessary to provide adequate measures of health care and nutrition for children, in accordance with the Health Kindergarten Programme [9]. A balanced diet in kindergartens is of utmost importance because it improves children’s health, growth and development, as well as prevents disease and promotes the adoption of healthy habits at an early age, which in turn have an impact on reducing the incidence of obesity and other chronic non-communicable diseases in later stages of life [10, 11, 13].

Numerous research studies investigated the nutritive value of kindergarten meals through the years and their compliance with the recommended standards. The issue was particularly salient after the introduction of “healthy menus” in all kindergartens in 2008, which aimed to update and augment such menus in order to prevent the development of diet-related diseases. Such researches were only concerned with determining the energy value and macronutrient content (carbohydrates, proteins and fats) of meals, as well as the deviation of macronutrient content from the recommended values and prescribed standards [6, 12]. This study demonstrated the prevalence of major food groups on kindergarten menus which could explain certain phenomena observed in the aforementioned research dealing with the energy value of macronutrients.

Analysis of the results pertaining to the number of servings showed that the number of snacks was not in accordance with the Health Kindergarten Programme [9], which prescribes two snacks a day, neither in state-owned nor in privately owned kindergartens. Although there was no statistically significant difference in average number of snacks between state-owned and privately owned kindergartens, a slightly better conditions were noted in privately owned kindergartens where the average number of snacks served per day amounted to 1.8, compared to 1.5 snacks served per day in state-owned kindergartens.

The analysis of the results of daily servings of grains showed a statistically significant difference between the state-owned kindergartens, where grains were served 3.2 times on average and privately owned kindergartens, where they were served 3.8 times on average. Furthermore, a difference of 27% from the Food Plan Standards for Children in Kindergartens - Menus and Standards [23], which recommends 6 servings of grains on a daily menu, was recorded in both groups. Grains are primarily a source of carbohydrates, mostly complex carbohydrates. They are located at the base of the healthy diet pyramid and should be the most prevalent group of foods consumed [16]. Reducing the frequency of serving foods pertaining to this group can result in reduced energy and the loss of the nutritional value of the menu. Other Croatian research conducted in Zagreb kindergartens, as well as kindergartens in other parts of Croatia, yielded similar results [3, 22].

Fruit and vegetables are also rich in carbohydrates but poor in fats and complete proteins. However, according to the Food Plan Standards for Children in Kindergartens - Menus and Standards [23], the number of servings of fruit and vegetables was not sufficient neither in state-owned nor in privately owned kindergartens. It is similar to results of other studies which reported shortage of fruits and vitamins in meals served in kindergartens [8, 15]. It should nonetheless be noted

that the number of servings of fruit and vegetables was in compliance with the Health Care, Hygiene and Balanced Diet Programme for Children in Kindergartens [9], which prescribes a daily intake of foods pertaining to these groups. All kindergartens served at least one serving of fruit and vegetables per day, ranging from 1 to 3 servings.

According to the Food Plan Standards for Children in Kindergartens - Menus and Standards, meat, fish, eggs and pulses should make 2-3 serving units a day, and can be interchangeably combined on the weekly menu. It is recommended to serve fish 1-2 and egg up to 3 times a week on average whereas meat should be served every day [23]. The analysis results indicated that meats and pulses were the most prevalent foods with 1.2 servings, on average, in state-owned and 1.3 servings, on average, in privately owned kindergartens. Egg, as a main dish, was not served in any kindergarten. Fish was served in only one kindergarten, once a week. Therefore, in terms of fish consumption, in seven of the eight investigated kindergartens neither Health Kindergarten Programme nor Food Plan Standards for Children in Kindergartens - Menus and Standards requirements were met [9, 23].

The results of these studies demonstrated that milk and dairy products were often served in both state-owned and privately owned kindergartens and that the Food Plan Standards for Children in Kindergartens - Menus and Standards [23] recommendations were exceeded by 15-20%. Milk and dairy products are an important source of biologically valuable proteins, so if such foods make up a significant part of the meal on the menu, along with the latest trend to supplement “new menus” with various pulses, the amounts of protein in daily meals could be exceeded by up to 30%, as referenced in national research [12]. Such prevalence of proteins directly burdens the liver and kidneys, and disrupts metabolic functions. The studies dealing with the analysis of energy value of macronutrients, including meals provided in kindergartens and at home, also reported an increased presence of proteins in the diet of children eating outside the kindergarten [2, 7].

CONCLUSIONS

In recent years efforts have been made in Croatia to harmonise menus in kindergartens with nutritional standards based on scientific research on the obesity prevention. Many foods high in fat, as well as foods with added sugar or salt were therefore replaced in the menus by new pulses, whole grains and fresh fruits. However, further harmonisation of “old” and “new” foods intended to achieve a more substantial balance of the consumption of certain foods with adequate nutritional values is necessary.

Conflict of interest

The authors declare no conflict of interest.

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