

Innovative teaching methodology of health friendly nutrition development and practice in pre-primary and primary education (HealthEDU) Project ref. No.:2016-1-LT01-KA201-023196

REPORT OF NATIONAL RESEARCH

RESEARCH AND ANALYSIS OF THE LEGAL AND FACTUAL STATUS AND PROBLEMS IN THE SPHERE OF NUTRITION OF CHILDREN AT THE AGE OF 4 TO 10 YEARS OLD IN GREECE

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1. Introduction

The role of nutrition in physical, mental, emotional and social growth and development of the individual is decisive. Ensuring healthy, adequate and safe nutrition during the first years of life can contribute to achieving the fullest physical and mental development. The relationship between diet and health has been firmly established, with diet playing a decisive role in disease prevention. In this context, the dietary habits of a population must be taken into account in health policy development.

It is on these grounds that **national priorities** are assessed, evaluated and documented and that **policy concerning nutrition** has been established. More specifically, in 1992, government bodies of seventeen states, including Greece, undertook to draw up National Action Nutrition Plans. Since 2002, the Greek Ministry of Health has set up a National Nutrition Policy Commission aiming to maintain health rather than simply treat disease.

The purpose of the commission, in cooperation with the relevant ministries, institutions and international organizations (both global and European), is to develop all-inclusive guidelines and to take such measures that every citizen can have easy access to adequate and safe food and be well-informed about healthy eating choices.

The commission's National Nutrition Policy sets out five main objectives:

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- Reduction of childhood obesity
- Increase consumption of vegetables and legumes
- Reduction of meat and increase in fish consumption
- Proper diet and nutrition in situations of mass catering
- Inform consumers about nutrient content of food and food safety

Two years ago, **National Nutrition Guidelines** were drafted by the Ministry of Health, covering the period from birth to 18 years of life for healthy infants, children and adolescents in Greece. For children and teens dietary guidelines were developed by evaluating and taking the following parameters into account:

- The eating habits of children and adolescents in Greece: To estimate the dietary habits of children and adolescents, food consumption data, food groups and dietary patterns data using existing sources of information (e.g. published studies in leading databases such as PubMed, but also Greek databases such as base IRIS) were gathered and analyzed. Following that, where possible, dietary habits were compared to international recommendations, and the existence of excessive or inadequate consumption of important food components (such as proteins, lipids, carbohydrates, iron, etc.) using the recommended dietary reference values (Dietary References values-DRVs) for these groups were identified.
- The main nutrition-related health problems of children and adolescents in Greece (e.g. obesity, iron deficiency anemia).
- The latest scientific evidence on the relationship of diet to health and disease, with emphasis on these age groups from studies conducted in the Greek population.
- The study of the influence of social-economic, psychological and cultural aspects of eating habits of infants, children and adolescents.
- The current dietary recommendations of recognized international health organizations, of scientific companies and internationally renowned institutions, as well as the dietary recommendations of European and other countries with well-established food policies (such as the USA, Canada, Australia).

It is important to note that there are also **national priorities and an established policy concerning nutrition and diet with a focus explicitly on children**. More specifically, over the last 10 years a new subject area has been included in the Greek school curriculum, namely the **Public Health Project**. Health education in schools is an interdisciplinary activity, which contributes to both the improvement of life at school and the relationship of schools with society. The aim of health education is to protect, improve and promote the mental and physical health and social well-being of students, both by developing their social skills and their critical thinking, in addition to the upgrading of the children's social and physical environment.

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As such, an important part of the Public Health Project is the Nutrition Project, which aims to promote the mental and physical health of students by adopting healthy eating habits. Over the course of doing the Nutrition Project the students have the opportunity to:

- explore, learn more about and understand the origins of food, their value and their effects on health, and the diet of previous generations.
- investigate the relationship between diet and place, time, economy, religion and culture.
- evaluate nutrition the information and adopt positive attitudes and behaviours.
- develop skills to classify, process and evaluate information and to become aware of the food-related risks that may threaten their health.
- investigate how the economic state of a country, families and individuals determine their standard of life and diet.
- recognize the power of advertising on food consumption, and to resist the temptation of advertising by developing critical thinking.

There is unfortunately a major problem that prevents children from benefitting from the aforementioned project; the fact that the Nutrition Project is not compulsory and that it is up to teachers to decide whether or not they will do the project with their children.

What scientific studies show: statistics matter

Several research studies over the last few years have investigated the state of diet and nutrition among Greek children. Among the more critical problems is the obesity rate which, as stated in WHO European Childhood Obesity Surveillance Initiative (COSI) [1], is significantly higher among children in Greece compared to their European counterparts. The GRECO Study [2] provides further evidence of the high obesity rates among children, but additionally suggests a possible correlation between the obesity and a low adherence to the Mediterranean diet. Another study [3] suggests a correlation between the BMI and adherence to the Mediterranean diet. In terms of nutrient intake, two studies [4,5] provide data on the low micronutrient intake and an imbalance in macronutrient intake in Greek children. Although one study [6] observed some positive trends in the eating habits of primary school children from 2009 to 2013, it also identified an increase in obesity in primary school children in the same time period. These studies and their outcomes are described in detail below:

The WHO European Childhood Obesity Surveillance Initiative (COSI)

The rate of child obesity in Greece is among the highest in Europe [1]. This has been established by the World Health Organization study 'WHO European Childhood Obesity Surveillance Initiative (COSI). According to the experts, childhood obesity remains a major threat to individual and public

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health, since it is associated with a variety of somatic and psychological disorders that appear in childhood and remain in adulthood.

Both the obesity rate and the percentage of body weight were found to be above normal for children 6-9 years in 16 European countries, including Greece. Research by the Greek Medical Association for Obesity, for children aged 7 and 9 years, was part of the COSI study, which included 5.682 primary school pupils, 2,758 in the second grade and 2924 in the fourth grade.

The results showed that the rate of obesity and weight gain is above average in children aged 6-9 years in 16 European countries with Greece having the highest rates. In Greece, 48.9% of boys and 44.8% of girls in the second grade of primary school weigh more than normal and these rates are the highest of all countries. The average weight of boys was the highest at 29.5 pounds, the average Body Mass Index (BMI) was the highest at 17.7 kg/m² and the obesity rate was also the highest at 23.9. In girls the average weight was the highest at 29.1 kg, the average BMI the highest at 17.7 kg/m² and the highest obesity rate was 18.6%, also the highest.

In the fourth grade, 57.2% of boys and 50.0% of girls had a weight above normal. The average weight of boys was the highest at 38.4 pounds, the highest average BMI at 19.5 kg/m² and the highest obesity rate at 30.5%. In girls the average weight was the highest at 37.6 pounds, the average the highest at BMI 19.2 kg/m² and the obesity rate was the highest at 20.8%.

As the research showed [1], the consequences of childhood obesity are many. In particular, there is an increase in blood pressure at the rate of 9-13% in overweight and 30% in obese children as well as an increased prevalence of dyslipidemia, insulin resistance and hyperinsulinemia. 25% of obese children have impaired glucose tolerance and 45% of newly diagnosed diabetic children and adolescents have Type 2 diabetes.

Also, 57% of obese girls and 35% of obese boys have psychological disorders, while 33% of severely obese children have obstructive sleep apnea and sleep disorders. 65% of obese children, aged 5 to 10 years, have at least one cardiovascular risk factor (Hypertension - Hyperlipidemia - Impaired glucose tolerance) while, 30% of obese children and adolescents have metabolic syndrome.

Additionally, the COSI study [1] showed that childhood obesity is related to family income. The six-year economic crisis experienced by Greece, possibly due to the increase on consumption of cheap high calorie food, seems to have resulted in weight gain above the norm, not only in children but also in adolescents and adults, which puts their health at increased risk.

Childhood obesity is more prevalent in low family incomes. In boys aged 7 from families with an annual family income under €12,000, the Body Mass Index (BMI) was 18.1 kg/m² while the BMI was significantly lower for boys in families with incomes €30,000 or higher at 17.27 kg/m². Similarly, for girls aged 7 years from families with annual family income under €12,000, the average BMI was 17.83 kg/m² compared to girls from families with incomes €30,000 at 16.75

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kg/m². Obesity rates in boys aged 7 years was 25.5% from families with an annual income of less than €30,000 and 6.7% for above €30,000. The corresponding rates among girls of the same age were 26.4% for incomes under €12,000 and 12.5% with family incomes greater than €30,000.

The GRECO study

In order to provide estimates of overweight and obesity among Greek schoolchildren, and the adherence rates to the Mediterranean diet (MD), a nationwide survey was performed among 4786 fifth and sixth grade students aged 10–12 years old [2]. Overweight and obesity prevalence among boys was 29.9% and 12.9%, while in girls 29.2% and 10.6%, respectively. Only 4.3% of the children followed a healthy MD. There was no difference between boys and girls and no differences were found between normal weight and Overweight or Obese children. However, a greater percentage of children from semi-urban or rural regions followed the MD. The prevalence of childhood obesity in Greece is the highest ever reported together with low adherence rates to the dietary patterns of the MD [2].

BMI and Lifestyle

Lifestyle patterns in relation to body mass index (BMI), in a nationally representative sample of the Greek pediatric population (1,305 children and adolescents aged 3 to 18 years, was assessed from May through July 2007 [3].

Principal component analysis identified seven lifestyle patterns explaining 85% of the total variance of lifestyle habits. A lifestyle pattern characterized by higher eating frequency, breakfast consumption and higher KIDMED score was negatively associated with BMI (standardized $\beta = -.125$, $P < 0.001$), after controlling for age, sex, and parental education. The association remained significant even when low-energy reporters were excluded from the analysis. Results from the study [3] suggest a potential intercorrelation and protective action of selected eating behaviors, namely eating frequency, breakfast consumption, and adherence to the Mediterranean diet, against overweight and obesity in children and adolescents.

The GENESIS Study

The GENESIS study [4] aimed to assess the nutrient adequacy of the diets of a representative sample of 2,374 toddlers and preschoolers. For both fat and carbohydrate, a substantial percentage of toddlers and preschoolers had usual intakes outside the acceptable macronutrient distribution range, whereas protein was less than this range. “At risk of overweight” and “overweight” children consumed more total energy, protein, and fat compared with their normal-weight counterparts, whereas no differences were found for micronutrient intakes. The estimated prevalence of inadequacy was found to be between 10% and 25% for niacin, vitamin E, and folate. Usual intakes exceeding the Tolerable Upper Intake Levels were recorded for zinc and copper [4].

Food and Nutrient Intake



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The aim of the present study [5] was to record the percentage of children, adults and elderly women in Greece meeting food and micronutrient intake recommendations. Additionally, the present study was aiming to identify the main food contributors of micronutrient intakes and assess the degree up to which meeting food intake recommendations also ensures micronutrient intake adequacy. Dietary intake data from three studies conducted in Greece (on 9–13-year-old children; 40–60-year-old adults; and 50–75-year-old women) were used to estimate mean intakes, the percentages of subjects meeting food and nutrient intake recommendations and the contribution of six core food groups to nutrient intake adequacy.

The present study [5] showed that more than 50% of children, adults and elderly women were failing to consume the recommended portions of vegetables, dairy and grains. Furthermore, children and adults consuming the recommended portions of individual core food groups had significantly lower percentages of inadequate micronutrient intakes compared to their counterparts not meeting food intake recommendations ($p < 0.05$). Nevertheless, even among those consuming the recommended portions from a specific core food group, the recommended intake of the corresponding micronutrient (for which this food group is the main contributor) was not always met. Indicatively, 18.2%–44.1% and 4.2%–7.0% of the populations under study were not meeting calcium and vitamin C intake recommendations, although they were consuming the recommended portions of dairy and fruits, respectively. In conclusion, these findings highlight the importance for public health policy makers to take all necessary initiatives to support the population in achieving the recommended intakes from all core food groups, but also emphasize on food variety to ensure adequate intake for all micronutrients.

Nestle Healthy Kids Initiative

The Nestlé Group has been running Healthy Kids Global Initiative since 2009, aimed at increasing knowledge of nutrition, health and wellness in school-aged children around the world. The programs have been implemented in 68 countries in partnership with over 280 organizations (NGOs, Institutes, Sports associations, etc.). As part of this global initiative, Nestlé Hellas has been supporting a series of programs related to nutrition education of children throughout Greece since 2009.

The Harokopeio University of Athens Program

In 2012 Nestlé Hellas commenced a three-year program in cooperation with the Harokopeio University of Athens to carry out research to study and evaluate the eating behavior and physical activity of 30,000 students (3rd and 5th grade of primary school) in relation to the socio-economic indicators [6].

Results of the Nestle/Harokopeio Study

The sample concerned 28 860 students enrolled in school in 2009 and then 30 425 in 2013 in the Attica region. The Attica region was chosen as it is heterogeneous in terms of the variety of



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ethnicities residing there and the diversity of urban areas. Moreover, it represents about 35% of Greek students.

Among the main conclusions of the study [6] is the increase in obesity rates from 8.2% in 2009 to 9.4% in 2013. It is worth noting that childhood obesity rates had been stable for many years with a slight downward trend. But the last two years a statistically significant upward trend has been observed. In relation to socio-economic factors, the results showed that there is a possible relationship between income and child obesity rates, since areas with low (declared) income coincide with those that have the highest rates of overweight and obese children. Furthermore, there appears to be a correlation between low educational level and indicators of childhood obesity, which further underlines the need for targeted nutrition education for children and information for all the family.

Significant differences were observed in the dietary habits of students [6]. Positive changes include the reduction of consumption of fast food meals and an increase the consumption of vegetables, while the negative developments include the reduction of fish consumption and pulses and the increasing incidence of skipping breakfast. Finally, in terms of physical activity, the proportions of pupils who participated in extracurricular activities were unchanged in 2014 compared to 2009, while the percentage of children who spend time in front of a screen has increased on both weekdays (29.7% versus 39.7%) and weekends (44.3% vs. 58.8%).

So far the report has introduced the national priorities and governmental policy in relation to nutrition in general and child nutrition specifically in Section 1. Detailed information were also provided about important studies that have been conducted in the field of nutrition offering an insight into the child obesity rates as well as lifestyle and nutrient intake in Greek children. Section 2 focuses on what is done in schools regarding nutrition and the choice of food products for consumption, while section 3 highlights some good practices and important initiatives that are being carried out in the area of school nutrition and nutrition education in Greece. Finally, Section 4 summarizes the report and outlines the most pressing issues faced in terms of school nutrition and nutrition education together with suggestions to tackle these problems.

2. How is child nutrition organized at national level in kindergartens and schools (with reference to children aged 4 to 10)

This section describes how the issue of child nutrition is organized in play schools, kindergartens and primary schools in Greece. Knowing the context within which the schools operate is important when reading this section. For this reason basic contextual information is outlined in order to add to clarification and understanding of the context and the regulations. This will also help the reader identify the challenges that emerge and understand the main ideas underpinning the recommendations for improvement (see Section 4).

2.1 General description of the situation



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This sections aims at providing the reader with a general description of the way child nutrition is organized in play schools, kindergartens and primary schools in Greece.

To begin with, at play schools (1-5 year olds) children are served breakfast, snacks and cooked lunches. However, in kindergartens (4-6 year olds), the parents have full responsibility for preparing their children's food. If the teacher pays a lot of attention to this very sensitive and important issue, they may provide the parents with healthy food guidelines. For instance, they may suggest that the kids should not bring any shop-bought biscuits or chocolates, fizzy drinks, chips and shop-bought pies to kindergarten. In addition, they might recommend that the parents should make sure that their children have a healthy homemade snack such as toasted bread with cheese, boiled eggs, homemade pies as well as homemade muesli bars, nuts and, of course, fresh and seasonal fruits or vegetables.

Finally, in primary schools (6-11 year olds), the only food that is made available to school students is through school canteens that sell snacks and drinks. Luckily, there is legislation that specifies the exact products that are allowed to be sold at the canteens as well as the foods and beverages that are not allowed to be sold.

2.2 What is the process to approve the food sold in schools?

The rules and regulations related to the process by which food is approved for schools are different for Play Schools, Kindergartens and Primary Schools. Play Schools operate under the authority of the local municipality, each of which sets their own food quality standard as well as the budget allocated for this purpose. The municipalities call for tenders from independent food and catering companies to supply the play schools in the region with food and food products. In their bid, tenderers must certify that:

- they meet certain rules and regulations: European regulations, Greek legislation, the Greek Food and Drink Code
- they have implemented HACCP or ISO 22000: 2005 (Certification of Food Safety Management System)
- the food comes from legally operating factories and companies.

As mentioned in Section 2.1, kindergartens do not provide children with food and children bring their own packed lunch. As such, no rules or regulations regarding the approval process for food consumed by children at kindergartens are required.

When it comes to primary school, the process to approve food for consumption at school, the responsibility falls under the authority of the national government. The canteen operator must be certified by EFET (Hellenic Food Authority) which develops and maintains a register of food-related businesses and oversees the audit program carried out by its services or other authorities and services nationwide.

The process through which food fit for consumption by children at school varies depending on the type of school and is regulated either by the local or central government. The following section provides a

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more detailed and explanation of how food consumption in Greek schools is organized and carried out in practice.

2.3 Regulatory requirements related to the food sold, consumed or served in the school

The students up to the age of 6 year old can attend public or private play schools or kindergartens. A number of criteria are used according to which enrollment in public nurseries/kindergartens can take place but detailing the process goes beyond the needs of this report.

According to the governmental law [7], the diet of children attending public play schools is determined by modern pediatric views on healthy eating for children. At play schools where food is served, it must be of adequate and proper qualitative composition, determined daily by the doctor and the Director / Director of the institution. Parents have to be informed of the weekly or monthly dietary plan, which must also be clearly displayed. Particular care should be taken with uncooked foods (fresh fruit and vegetables, fresh meat and fish, dairy products, etc.) for health and safety reasons. In addition, the food should be provided in sufficient quantities to meet the children’s nutritional needs and food containing additives (preservatives, colouring, artificial sweeteners, etc.) should be avoided or limited.

For private play schools, the exact same rules apply, only that here the management of the kindergarten can work with a dietician to come up with a more complete dietary plan and to choose better quality raw materials for any food that is made.

As far as the food portions are concerned for kindergartens, there are no specific requirements as no food is served in these institutions and the parents are solely responsible for providing their children with food to be consumed at school (see Section 2.1).

The nutrition of the students enrolled in public primary schools is almost exclusively provided through the concept of the “school canteen”. School canteens have very specific and very strict regulations to follow regarding the food products they are allowed to be sold at primary schools as well as the allowed food portions. The instructions and guidelines have been composed by the Greek Ministry of Education in collaboration with the Ministry of Health. Table 1 below shows the portions sizes for various food products that are allowed to be sold in Greek primary school canteens and Table 2 shows the foods and beverages that are forbidden to be sold at primary school canteens in Greece.

Table 1. Food portions allowed to be sold in Greek primary school canteens.

Food product	Food portion
Yogurt	200g
Cereal bars	40g
Raisin bread	60g
Must Cookie	60g
Cheese or vegetable pie	120g
Nuts	Package of 50g
Chocolate bar	30g

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Rice pudding	150g
Halvah (traditional sweet)	50g
Honey-sesame paste	50g
Fruit juice	250ml
Sesame bread, bread sticks, crackers and toasted bread	60g

Table 2. Foods and beverages that are forbidden to be sold at primary school canteens in Greece.

Forbidden foods	Forbidden beverages
Candy	Fizzy drinks
Chewing gums	Anything that contains alcohol
Nuts covered with salt or sugar	
Cold cuts (except for cold boiled turkey)	
Croissants	
Piroshkies	
Functional foods	
Dietary supplements	
Products that contains genetically modified organisms	

Any food products that are not on the list of recommended products are automatically forbidden. There are, however, some additional instructions and guidelines that school canteen operators should follow:

- Juices should not contain added sugar or sweeteners.
- To the fresh salads they are allowed to add olive oil, wine vinegar or lemon but they are not allowed to add salt.
- Yogurt should not contain added sugar.
- Smoothies that are freshly made at the school canteens should not contain added sugar.
- Drinks prepared from instant powders are not allowed.

In summary, very strict and specific regulations and guidelines exist in terms of both the types of food and portions sizes that are allowed and forbidden to be sold at primary schools, while at play schools these are more general, with the exact diet being decided by the school head with the help of health

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professionals. As children attending kindergartens bring their own food from home, no regulations have been developed.

2.4 Issues identified

There are a number of key issues that need to be addressed in order to improve the nutrition, diet and health of young children in Greece. These relate to the people and process involved in forming regulations and guidelines as well as the process related to the supply of food and food products to schools.

The **first problematic area** is related to the total absence of nutritionists in the decision making process concerning food and nutrition in nurseries, kindergartens, and primary schools. In general, the knowledge and experience of nutritionist in Greece are not recognized or valued, in neither the public health nor public educational systems. The role which nutritionist as experts in matter of healthy eating should play, is instead taken by other health professionals such as doctors, nurses, or in the worst case scenario even by administration staff who have no nutrition education and therefore lack the expertise to effectively advice on the development and implementation of nutrition policy, regulations and guidelines.

An additional problem is related to the fact that in kindergartens, nutrition is based simply on the provision of general guidelines, with not specific rules with general applicability. This leaves the guidelines open to interpretation by parents and also the parents do not feel obliged to follow the guidelines very strictly. As a result, the children's school lunch may not always be very healthy, with parents often choosing an easy option such as packaged and bought food products high in fat and sugar.

On top of that, the guidelines are decided by the individual teachers, who obviously have no nutrition education, and are not in a position to educate the parents, or provide a sense of consistency in the application of the guidelines. The guidelines are simply given to the parents at the beginning of the school year and never followed up.

Finally, the bidding process to supply food and food products to play schools is based on the criteria set by each municipality and, unfortunately, most often the only criterion is the lowest total price per food group and not the nutritional quality of the food.

3. Good practices

The need for action in the area of nutrition education has been identified by several governmental and non-profit organizations and practitioners in the field of nutrition education. Below are some good practices in this field that have been identified and listed and have been piloted or implemented in Greece in recent years. These initiatives focus on improving the school nutrition in Greece and raising awareness of the importance for adopting a healthy diet and generally a healthy life style.



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3.1 Ministry of Education and Agricultural University of Athens School Meal Programs

As a result of the economic crisis in Greece and incidences of students literally fainting in school because of a lack of food for some families, the Ministry of Social Security and Welfare in collaboration with the Ministry of Education, Research and Religious Affairs implemented a pilot nutrition and meal program in primary schools in the most populated region in Greece (Attica), providing a daily hot meal to school children in areas with low socioeconomic indicators (18 schools / 3,200 pupils). The School Meals program is directed to all children in the chosen schools. Through the daily supply of a free, healthy meal, the School Meals program addresses significant medium and long-term social and economic benefits, such as the reduction of social inequality and social exclusion, improving education and enhancing students' performance. The pilot program menu concerns all days of the school week and was developed by the Agricultural University of Athens to meet the nutritional needs of students in the context of a healthy Mediterranean diet. The meals are prepared by selected suppliers who have the required sanitary and hygiene processes in place and comply with the strict standards that have been set.

3.2 School Meals through the DIATROFI Nutrition Initiative

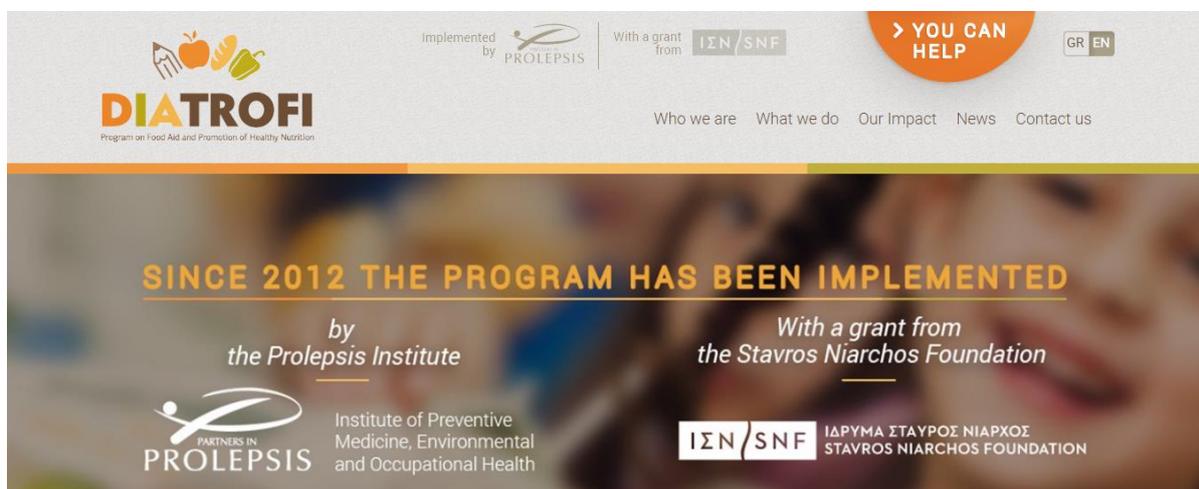


Figure 1 DIATROFI Nutrition Program (picture retrieved online from <http://diatrofi.prolepsis.gr/en/>)

The Institute PROLEPSIS has also been running the Nutrition Program [8] since 2010 and so provide free meals to students of low socio-economic background. In the 2015-2016 school year 247 participated in the program, with 20 528 children across the country benefiting. Without exception, the school children participating in the program receive a daily free healthy meal, especially developed for their dietary needs. Furthermore, through specially designed training material, which includes short messages and tips on healthy eating, and the organization of information events and activities for parents and children, the Nutrition Program promotes healthy eating by encouraging students and their families to adopt healthy eating habits that they will follow throughout life.

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At the beginning and end of each school year, questionnaires are administered to all parents about the process of the program, food security and the nutritional habits of children and their families. For the school year 2015-2016, the analysis of the responses we received showed:

- a decreased in the percentage of households facing food insecurity
- improved eating habits of children
- a decrease in the number of obese and overweight children
- a decrease in the number of underweight children

Also, through focus groups and interviews with teachers, parents and students, it was observed that:

- The participation of all children in each school helps avoid stigmatization of students, cultivating solidarity and a sense of equality among students.
- The project contributes to improving the parents' trust towards the school and thus their communication and cooperation.
- The school dropout rate has been reduced and a return to school and/or a systematic attendance of pupils at schools have been noted.
- Children have an increased awareness of good nutrition and healthy eating habits.
- The pedagogical efforts of the schools are enhanced.
- The children's awareness of environmental issues is growing.

3.2 An Alternative School Canteen

A Primary School in the town of Oropos, runs an alternative type of canteen. Students, parents and teachers contributed to the creation of the cafeteria where students can buy their snack, but not the kind of snack that is available at other schools. Cakes at the canteen are handmade; there are sandwiches with fresh ingredients and Arabic pita bread, homemade pies, hot custard, fruit salads and juices freshly squeezed in front of the children. The students, who normally learn about the benefits of good nutrition from books, learn through the canteen that how the most simple changes in their daily lives, their physical condition improves and that they are full of health and energy.

Every week, a different group of children takes responsibility for the running of the canteen. The particular group of children, together with their parents, prepares all the food and food products to be sold in the canteen that particular week. In the morning, before students enter the classroom, two people from the canteen group announce what will be offered during the breaks. At the cashier there are prices and pictures of each product.

Within a very short period of time the benefits of this unique canteen was evident. Besides adopting healthy eating habits, children:

- began to take initiative
- became more responsible in their behaviour
- started to be more cooperative and to help their classmates
- learned to make faster transactions and realized that mathematics is very useful asset in their daily lives

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All of this boosted their confidence, they gained an appetite and enthusiasm for school, they are now waiting in the canteen queue with patience and have become active members of the school community by taking a leading role.

3.3 “EYZHN” – National action towards Youth Health

The national action “EYZHN” was launched by the Harokopeion University of Athens (Greece) and the Ministry of Education targeting the school community in Greece [9].

In the context of this initiative a number of parameters related to students’ health are being monitored and assessed. School activities that aim at bringing closer teachers, families and students and strengthening the bonds among school and society are being designed. The main objective of this initiative is the promotion of a healthy lifestyle among children and adolescents through the adoption of healthy eating habits and physical activity.



Figure 2 EYZHN – retrieved from the official website online

Online educational resources are available for teachers to use and e-learning sessions run through the EYZHN e-learning platform. An online platform (<https://eyzinmetrics.minedu.gov.gr/metrics/>) has been also established for gathering data useful for the evaluation of the learning intervention. Lessons learnt can impact on current health and nutrition policies. You can find more information about this initiative online [9].

3.4 Nestle Hellas Healthy Kids Global Initiative

As part of the Healthy Kids Global Initiative, Nestlé Hellas has been supporting a pilot education initiative in collaboration with the Harokopeio University of Athens since 2009 and aims to educate primary school children how to make more healthy food choices [6]. In particular, children learn about:

- the food groups
- food choices for each food group and how they affect the body's functions
- the importance of meal frequency and food hygiene.

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The program has been implemented by providing information material on a representative sample of 1,000 children, with very good results.

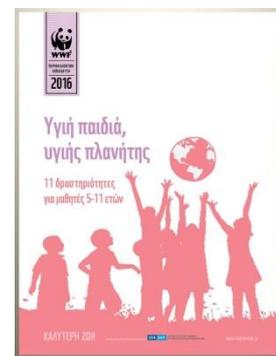
3.5 WWF Hellas Healthy Children, Healthy Planet

In 2016, WWF Hellas in collaboration with the Harokopeio University of Athens commenced the Healthy Children, Healthy Planet initiative which educates children in making healthy and 'green' food choices [10].

This initiative aims to highlight the link between a healthy diet that protects our planet and it sets out to help children and parents to understand that our food choices have an environmental footprint.

The program targets schools and is implemented through interactive activities such as:

- field trips to the fresh produce market and butchery to draw attention to the importance of seasonal and local products
- assessing the environmental footprint of school lunches
- song composition about healthy eating
- dancing and other fun fitness exercises
- creating healthy snacks with the help of a chef
- dramatization of stories related to a healthy and environmentally friendly diet
- learning how to read, interpret and assess food nutrition labels



An information booklet with all the activities was published in 2016 and has been made available free of charge for implementation in schools around Greece.

4. Identified problems at national levels / initiatives that should be implemented (i.e. non-formal education initiatives) and conclusions

In order to most effectively and efficiently improve the nutrition, diet and health of young children in Greece, the following issues require urgent attention:

- The lack of the presence and involvement of nutritionists in the decision making processes regarding food and nutrition in nurseries, kindergartens and primary schools.
- The lack of food and meals at kindergartens and primary schools.
- The lack of a comprehensive, well-organized and well-developed nutrition policy for the schools.
- The lack of compulsory nutrition education in the school curriculum.

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The above can be addressed by implementing the following:

- Nutrition projects that both the kids and their parents can take part in. This will help students learn more about the importance of healthy eating in their lives and to adopt healthy habits through experiential techniques, with the contribution of both nutritionists and teachers.
- All schools should be able to provide cooked lunch, with a very carefully designed dietary plan developed by nutritionists in order to meet the nutritional needs in terms of energy, macronutrients and micronutrients of young children.
- Free fruit and vegetables should be delivered to school kids, especially in the low-socio-economic regions.
- Cooking classes should be regularly organized at schools by both chefs and nutritionists where the kids can have the opportunity to get in touch with the art of cooking, but always based on healthy foods, ingredients and cooking methods.
- Projects that bring together students and parents with the aim of triggering mechanisms towards understanding the value of a healthy lifestyle and reflecting upon good healthy habits.

The problem of diet and nutrition related health issues in young children in Greece have been well-established. Though the government has produced policies and guideline regarding the diet, nutrition and health of children, there is little evidence of these being implemented in an organized and comprehensive manner so as to have lasting and long term benefits. Most importantly, however, the efforts that are being made to tackle the issues are few and lack the necessary amount of input of the most appropriate experts – nutritionists – resulting in ventures and actions that are not necessarily the most effective. Through small adjustments in the specific actions that are taken, together with the proper consultation and involvement of nutritionist, the diet, nutrition and health of young children Greece can surely be improved.

5. References

1. Wijnhoven, T.M.; van Raaij, J.M.; Sjöberg, A.; Eldin, N.; Yngve, A.; Kunešová, M.; Starc, G.; Rito, A.I.; Duleva, V.; Hassapidou, M.; Martos, É.; Pudule, I.; Petrauskiene, A.; Sant'Angelo, V.F.; Hovengen, R.; Breda, J. WHO European Childhood Obesity Surveillance Initiative: School Nutrition Environment and Body Mass Index in Primary Schools. *Int. J. Environ. Res. Public Health* 2014, **11**, 11261-11285.
2. Farajian, P., Risvas, G., Karasoulis, K., Pounis, G.D., Kastroni, C.M., Panagiotakos, D.B., Zampelas, A. Very high childhood obesity prevalence and low adherence rates to the Mediterranean diet in Greek children: The GRECO study. *Atherosclerosis* 2011, **217**(2), 525 – 530.

Innovative teaching methodology of health friendly nutrition development and practice in pre-primary and primary education (HealthEDU) Project ref. No.:2016-1-LT01-KA201-023196

3. Kontogianni, M.D., Farmaki, A., Vidra, N., Sofrona, S., Magkanari, F., Yannakoulia, M. Associations between Lifestyle Patterns and Body Mass Index in a Sample of Greek Children and Adolescents. *Journal of the American Dietetic Association* 2010, 110(2), 215 – 221.
4. Manios, Y., Grammatikaki, E., Papoutsou, S., Liarigkovinos, T., Kondaki, K. Moschonis, G. Nutrient Intakes of Toddlers and Preschoolers in Greece: The GENESIS Study. *Journal of the American Dietetic Association* 2008, 108(2), 357 – 361.
5. Manios, Y., Moschonis, G., Grammatikaki, E., Mavrogianni, C., Van den Heuvel, E., Bos, R., Singh-Povel, C. Food Group and Micronutrient Intake Adequacy among Children, Adults and Elderly Women in Greece. *Nutrients* 2015 7(3), 1841-1858.
6. <http://www.nestle.gr/csv/healthykids/healthykidsgreece>
7. http://www.gdimitrakopoulos.gr/files/kylikeio_8_2013.pdf
8. <http://diatrofi.prolepsis.gr/>
9. <http://eyzin.minedu.gov.gr/Pages/HomeAims.aspx>
10. http://kalyterizoi.gr/sxoleia/action?field_topic_tid=13