

STUDY ON THE USE OF MILK AND DAIRY PRODUCTS IN THE DIET OF CHILDREN IN SCHOOLS

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Abstract

School milk program are common in many countries around the world for a good reason. Nutritionists and social policy experts believe that encouraging healthy eating should be the main goal of this general and universal program. The benefits of school milk are many, so milk and dairy products are considered the main sources of nutrients needed for the harmonious development of children. The paper provides information on the benefits of consuming by dairy products on the student's body, the presentation of the categories of dairy products that are included in the program and how this program has influenced the consumption of milk among the population.

Key words: children, food choose, milk, school program.

INTRODUCTION

We live in a world that is developing at a dizzying tempo. Thus, there are countries with different stages of economic development and progress. The SARS CoV-2 pandemic more intensifies the vulnerabilities and deficiencies of the world's food systems. Most activities and processes affect food production, distribution and consumption, which are hampered by border restrictions, quarantines and other containment measures. And all this hinders the progress of the fight against hunger. Although we are still in the midst of a global pandemic wave, we can estimate a doubling of the population vulnerable to famine, as a result of the economic and health crisis triggered by SARS CoV-2, reconfigure the needs and necessities of the population, transportation restrictions and increased spending on food chain.

According to a study conducted by the ONU in 2019, hunger affects over 690 million people, and the COVID-19 crisis could increase the figure by another 130 million people worldwide, is more than 10% of the planet's population. The ONU report highlights worse figures from year to year, this situation worsening due to wars, global warming, economic and health crises. The nutritional status of children's diets around the world has

suffered as a result of trade actions that have increased dependence on food imports (Brownell et al., 2006).

Most of these people live in low- and middle-income countries, and especially in rural areas. They depend, to a large extent, on agriculture and animal husbandry. High food costs and low affordability mean that billions of people cannot eat healthy or nutrient-rich food. This hunger includes chronic food shortages and malnutrition, in the form of deficiencies in nutrients and micronutrients.

This problem is also encountered in developed countries. People who do not eat enough food, often become hungry, and in the long run this can lead to malnutrition. It is important to note that sometimes it is not hunger that leads to this condition, but a series of diseases and conditions that prevent digestion and absorption of nutrients (celiac disease, digestive problems, etc.). Most often, nutrient deficiencies are found in children, generally due to inadequate eating behaviour (Kusz & Kilar, 2020). The most common deficiency in the world is iron and calcium deficiency which leads to anaemia.

All of this has led many heads of state, government and organizations around the world to step in to end world hunger and improve food security in all parts of the world (FAO, 2014). School feeding has been

identified as a means of addressing the reduction of the proportion of people suffering from hunger worldwide and ensuring universal enrolment in primary education (Bundy et al., 2009; Buhl et al., 2010).

MATERIALS AND METHODS

This paper is based on a review of the narrative literature on the importance of feeding children in schools, studies on milk administration programs in schools implemented in different country. The study focuses on the strongest evidence available where possible, with the latest publications consulted. The effectiveness and effect of the presence of milk and dairy products in school milk programs was also investigated.

RESULTS AND DISCUSSIONS

The evolution of mankind has been marked by the succession over the centuries of several stages of socio-political order and civilizations, each characterized by its administrative, economic, religious and cultural peculiarities, with which they have evolved and changed over time - as it is known - food possibilities and habits (Graur et al., 2006).

The WHO Global School Health Initiative was launched in 1995, with a mandate to use schools as a means of strengthening health promotion and education activities at the local, national, regional and global levels - thus improving the health of students, families and families. to all members of the community (WHO, 2006). The term “health-promoting schools” has been developed to recognize educational institutions that “constantly strengthen their capacity as a healthy environment for life, learning and work” (WHO, 2006; Bulletin of the IDF N° 505/ 2020)

Schools and educational institutions have been identified as one of the fundamental settings for health promotion and establishing healthy eating and lifestyle patterns (Scriven & Stiddard, 2003). Schools can provide an important opportunity for prevention (Carter et al., 2002), as they provide the most effective way of reaching large numbers of people, including youth, school staff, families and community members (WHO, 1998).

Approaches to school food and nutrition policy

The World Health Organization (WHO), in 2020, declared the epidemic caused by the new coronavirus (COVID-19) as a global pandemic. This pandemic has caused an unprecedented global health crisis, with serious socioeconomic consequences and intense human suffering, which mainly affects people with chronic diseases. In addition, medical personnel, who were key during the COVID-19 crisis, were exposed to high health risks (Regulation (UE) 2021/522).

According to the new EU policies, schools may be important, protected settings for learning healthy dietary preferences and habits. Specific actions to promote healthy diets in school settings include free or subsidized fruits and vegetables, food- or nutrient-based standards for the foods and meals available in schools, changes to the presentation of food choices at points of offer and nutrition education and skills to increase nutrition literacy and capacity. Appropriate action should be taken to ensure the availability of healthier foods and to limit the availability of HFSS products. (HFSS products - High Fat, Sugar and salt foods)

Diet patterns have a significant influence on health and well-being. A healthy diet during childhood and adolescence reduces the risk of immediate health problems related to nutrition, which are a major concern for school children, namely obesity, tooth decay and lack of physical activity.

In addition, young people who have developed healthy eating habits at the beginning of life are more likely to maintain them and thus have a reduced risk of chronic diseases such as cardiovascular disease, cancer, type II diabetes and osteoporosis in adulthood.

Childhood and adolescence are critical periods for health and development, because the physiological need for nutrients increases and the consumption of a diet of high nutritional quality is particularly important. Eating habits, lifestyle and behaviour patterns are established during this period, which can persist throughout adulthood.

It is therefore the responsibility of each country, school or authority to decide which of the proposed suggestions presented in this guide are the most appropriate and applicable to the context-specific circumstances.

Milk's Role in School Meal Programs. School is the environment in which the child spends up to a third of the day, and the assimilation of the daily caloric needs should be achieved through a snack taken during school hours (Arpinte et al., 2009). During school, social factors greatly influence their dietary profile. The eating habits, food choices and meal quality of young people reflect the weak influence of the family and the increasing pressure of colleagues / social.

Changes in eating habits can be associated with the need to express their freedom from parental control and identity falsification.

Independence can be expressed through increased consumption of meals (fast meals) outside the home or school.

Psychological, social and environmental factors influence food preferences, which increase with age, and are subject to social and psychological changes. From a social point of view, young people experience peer pressure in many areas, including nutrition, and group behavior becomes the norm. Eating habits are strongly affected by cultural pressures. Thus, many teenagers and children feel pressured to have an "ideal" body shape. The desire to have a socially adequate body and the stigma of obesity can have a significant effect on body image and self-esteem among young people.

Other influences on food attitudes and choices include: religion, culture, metabolic problems, the family food model, access to information, food marketing and advertising, and life in social media.

Consumption of nutrient-rich foods, such as milk, which are readily available in school meals, is also associated with improved teacher and behaviour. Participation in school breakfast or lunch programs is associated with improved grades, standardized test scores, and school attendance. In addition, by adding nutrient-rich foods, especially fruits, vegetables and dairy products, which are missing from students' diets, their academic performance has improved.

The nutrition and health benefits of milk. Dairy products, fruits, nutrient-rich vegetables, and protein-rich foods (of plant or animal origin) are the most expensive food groups in the world.

Energy requirements result from basal metabolic rate, growth rate and physical activity. The intensity of physical activity varies with age, being lower in children between 2-5 years than in children between 6-10 years (Torun, 2011; Graur et al., 2005; Gibney et al., 2005). Calculation of energy requirements (ER) is calculated according to the formula:

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

Table 1. Energy requirements of children and adolescents

Age (Years)	Daily energy requirement kcal	
	kcal/d ^a	kcal/kg/d
1-3	1000-1200	102
4-6	1300-1400	90
7-10	1800-2000	70
11-13	2000-2200	60
14-18	2200-2400	50

^agender and activity level
Source (Torun, 2011; Graur et al., 2005; Lutter et al., 2003; Gibney et al., 2005)

Milk is a nutrient-rich food that provides significant value to school meals and feeds students. Very palatable, milk - along with other dairy foods - plays an important role in children's diets. By encouraging milk consumption in schools, the nutrient gaps that exist in students' diets can be eliminated.

Dairy and dairy products have been an important part of the human diet for about 8,000 years, and are part of the official nutritional recommendations of many countries around the world. They provide a package of key nutrients that are difficult to obtain in diets with limited or no dairy products, such as vegan or restrictive dairy diets. Indeed, dairy products are rich in calcium, protein, potassium and phosphorus. They contribute about 52-65% of the reference dietary intake (DRI) of calcium and 20-28% of the protein requirement, depending on the age of the consumer (Smit et al., 1999; Feskanich et al., 2003; Skinner et al., 2011, Dragomir et al., 2012). The contribution of dairy products to the provision of recommended calcium intakes has largely led to dietary recommendations for dairy consumption in most guidelines. Up to two-thirds of the calcium intake of the population in Western countries is supplied by dairy products (Gueguen et al., 2000; Gueguen L., 2011),

while dairy foods account for only 9-12% of total energy consumption (Bonjour JP., 2011). Milk offers health attributes that are different from herbal foods and other foods of animal origin, which can be very difficult to replace in a healthy diet for most people. The milk's unique nutrient package works together to provide multiple health benefits, including optimal growth and development in children and a reduced risk of chronic diseases such as type 2 diabetes and heart disease.

Milk and dairy products provide a suitable amount of nutrients for building bones, especially calcium, vitamin D, protein, phosphorus, magnesium, potassium, vitamin B12 and zinc. However, beyond bone health, milk, with its unique package of nutrients, is also the main food source for three of the four public health nutrients in children's diets.

Children and adolescents have a higher need for calcium, protein and minerals, so milk is one of the first food options. Milk is an almost complete food; it contains about 125 mg of calcium per 100 ml of milk, vitamin D, plus an optimal ratio of calcium - phosphorus, so it is one of the 5 food groups recommended by nutritionists to be consumed in every day. To meet the daily requirement of calcium, dairy products, green vegetables and mineral waters are important; they are easily accessible sources of calcium. Dietary Calcium Intake for children and young people, by age group are shown in Table 2 (Ciucu C., 2015; Bouziani et al., 2018; American Academy Of Pediatrics, 1999).

Table 2. Dietary Calcium Intake for children and young people, by age group

Age category	Calcium intake mg/day
1-3 years	500 mg
4-8 years	800 mg
9-18 years	1300 mg

Dairy products are good dietary sources of calcium due to their high calcium and nutrient content, high absorption rate, availability and relatively low cost, which makes regular consumption of dairy products possible. They provide more calcium, protein, magnesium, potassium, zinc and phosphorus per calorie than any other typical food found in the adult diet (Heaney, 2009; Caroli et al., 2011)

Many dietary recommendations include consuming 3 servings of dairy products per day (e.g., 1 glass of milk, 1 serving of cheese, 1 yogurt) - an amount that provides most of the calcium DRI to the general population. For example, 250 mg of calcium can be obtained from a 200 ml glass of milk, a portion of 125 g of yogurt or 35 g of hard cheese (Rozenberg et al., 2016; USD, 2013).

It stands out that milk is the only food needed in the school lunch program. The required serving size is 250 ml of milk. Some studies showed that there was a dose dependent effect, while we were unable to conduct the dose - response analysis, more work should be done to elucidate the dosage and effects of milk consumption on human health.

European Commission's Health Promotion and Disease Prevention Knowledge Gateway, offer a reference point for public health policy makers in creating a balanced meal (Food-Based Dietary Guidelines in Europe).

In each country, there is a personalized list of subsidized dairy products in the states, all respecting the tradition, culture and local availability. In addition to milk, we can also find yogurts and cheeses.

Due to the high incidence of people with intolerances and metabolic diseases, the list of products included in school meals has diversified so we also find vegetable milk (based on soy, rice, oats or almonds), and drinks based on calcium fortified plants have become part of nutritional recommendations as alternatives to milk in several countries, such as the United States, Sweden, Australia and Brazil. However, there is a resistance in their consumption, because their nutritional properties depend on the raw material used, processing, fortification with vitamins and minerals and the addition of other ingredients, such as sugar and oil (Mäkinen et al., 2016). The importance of raising consumer awareness of such products is underlined, as there are now cases of severe nutritional deficiencies in children reported as a result of inappropriate consumption of herbal beverages (Le Louer et al. 2014; Mäkinen et al., 2016; Ellis et al., 2015).

For pre-schoolers or students who suffer from intolerance to gluten and/or lactose and/or any other ingredient or compound and/or any

product distributed, they will benefit from products appropriate to their situation, within the daily value provided. Lactose-free or low-lactose milk (i.e., <0.01% and <0.1% lactose by weight), suitable for consumption by lactose-intolerant individuals, is obtained by adding beta-galactosidase to milk before heating, thus leading to the release of glucose and galactose.

National Approaches to Milk in Schools.

In many peoples' minds, school milk is synonymous with milk being subsidized, or even given free. However, there are three categories of milk distribution: free, subsidized and full-cost. Each country adopts one method or more, so that children benefit from a correct and adequate diet.

Looking back in time, at 110 years or older, school milk programs in countries such as United Kingdom, the United States and the Australia, where school milk interventions were created as a social safety net for children, providing Milk for school consumption takes place in many countries around the world.

Milk and dairy products play an important role in healthy eating patterns, and dairy milk continues to be an important component of school meals globally (Chen, 1989; Bulletin of the IDF, 2020).

In Regulation (EU) no. 1308/2013 states that "in order to encourage healthy eating habits among children [...]." The European Commission allocates annually the budget for the EU School Meal Programs both for the distribution of milk and dairy products, and for the distribution of fruits and vegetables to schoolchildren. National funds can also be used to supplement the EU budget (EU school scheme, 2020).

Since 1977, in European Union has been available School Milk Scheme, through which grants for the sale of reduced- rate milk products in schools. At the moment, two schemes are active in the European Union two similar nutritional schemes in schools specifically targeting children:

- the *School Milk Scheme*, through which grants have been available since 1977 for the sale of reduced- rate milk products in schools;
- the *School Fruit Scheme*, which has co-financed the distribution of fruit and

vegetables in schools since the 2009/10 school year.

The two schemes mentioned were designed to help stabilize the market and promote healthy eating, thus contributing in the short term to increasing and maintaining the consumption of dairy and dairy products by young people and in the long term to a proper education on eating habits (Regulation (EC) No 1234/2007, No 13/2009; No 657/2008).

School milk programme around the world contribute to good health and nutrition for children in schools.

The benefits of school milk programs for school children:

- normal growth and development of the body;
- improving the general health of children;
- increasing school performance;
- acquiring quality nutritional habits;
- prevent and reduce early school absenteeism;
- productive and healthy future adults.

The concern for children's nutrition has been a permanent concern of society and the authorities. In the following are presented the programs developed on the world map in different moments of humanity.

The first initiative was in United Kingdom, *School Milk in Britain* start on the passage of the Education (Provision of Meals) Act of 1906, and the Education (Administrative Provisions) Act of 1907, establishing medical inspection in State schools, marked the beginning of the construction of the welfare state (Atkins, 2007). The program continues, and the list of products in school meals is very diverse.

In Switzerland, start program *Break-time Milk Day* in 1940. During World War II, children and adolescents in cities received between 600 and 700 ml of milk per day and up to one liter in rural areas. This measure was recommended by the Swiss Federal Commission for War Nutrition (EKKE) to meet the calorie requirement and prevent rickets caused by vitamin D deficiency.

Since 1997, there has been an EU recommendation for member countries to implement such programs, and according to studies, the impact on public health is beneficial. In fact, European society promotes a healthy lifestyle both in schools and among adults (Yilmaz, 2017, Bailey et al., 2020).

In Romania since 2002 there is *Bread and milk Programme*, with application OUG No. 96/2002 on the provision of dairy and bakery products for students in grades I-VIII in state and private education, as well as for preschool children in state and private kindergartens with a normal schedule of 4 hours. The "*Laptele si cornul/Milk and croissant*" program allows: access to education and prevention of early school leaving; social aspects; healthy eating and education for healthy eating; the economic impact of the program on society.

In New Zealand, until 1940, milk was available to over 80% of school children. For several years during World War II, students also received an apple a day. The students received 284 ml of milk/day (Dunstall, 1992; Tennant et al., 1994; New Zealand history online, 2017). The program was discontinued in 1967 and resumed in 2013 (Cornall, 2020). Findings from the Milk for Schools evaluation provide a useful and timely contribution to the research regarding the ability of an in school initiative to increase the proportion of children meeting recommended dietary guidelines (Marsh et al., 2018).

Australian Milk for School Children Program (1950-1970). In Sydney, as early as 1924 were operating School milk scheme funded by private benefactors. The State Grants (Milk for School Children) Act was passed by federal parliament in 1950 and by the end of 1951 most states were inflicting this benefit on children up to the age of 13. In 1973, School milk scheme is abolish. Last year, in 2020, the dairy industry wants the national school milk program to be revived to improve the health of school-age children (Rymill L., 2020).

USA since 1940, the *Special Milk Program* began as an officially subsidized program at 15 elementary schools in low-income areas of Chicago. The children were charged 1 cent per 250 ml of milk. Those who could not pay received free milk, at the cost of private donations. Since 1955 the program has become free for all students. Since 1977 the Special Milk Program becomes permanent and subsidized by the state. The students received min. 250 ml of milk/day. A gap in research remains regarding children's preferences for extrinsic properties of fluid milk, especially as it relates to labelling and graphics. In American

children it understands how to create and market milk products that are appealing to children without compromising health outcomes through excessive calorie or fat intake is necessary to increase lifelong milk consumption (Bailey et al., 2020; Sipple et al., 2020).

South Africa and more country start de School Nutrition Program in 1994. National School Nutrition Program (NSNP) is the government program that provides one nutritious meal to all learners in Primary and Secondary Schools (Devereux et al., 2018; Laurie et al., 2017).

In Russia since 2005, are implemented the *School Milk Programs* in some regions. Most regions in Russia supply milk to grades 1-4, but some also supply upper-class children. School milk is always provided free of charge, financed from regional or municipal budgets. The school milk model with UHT treatment, guarantees food safety and allows efficient distribution without the need for refrigeration (tetrapak.com).

China School Milk Programme started since 2000 in some school. The participation of government, schools and licensed supplier and the support of the society, this programme achieve remarkable progress (WHO, 2017).

The *School Milk Programme* in Japan has a long history and tradition. During the period after the war, child malnourishment was a major issue across Japan. A more comprehensive solution was needed to solve this challenge as it became a serious social and education problem. In 1946, the First Educational Delegation recommended a systematic health education and a school lunch programme in Japanese schools, and in 1951, after attaining full independence, external aid to supply milk and foodstuffs for the school lunches was proposed to be stopped due to budget reasons. Since 1959, he supply locally produced liquid milk in schools is resumed.

India's Mid-Day Meal (MDM) Scheme is the world's largest school meal programme designed to improve the nutritional status of school children since 1995. It is a centrally sponsored scheme implemented in association with the State Government. Incorporating 200-250 ml milk daily into the menu of MDM at national level would be having long-lasting effects on society. It will improve the nutrition

and health of millions of vulnerable children and also stimulate the rural economy by boosting the demand of milk (The Indian Express, 2020; World Food Programme, 2017). While school milk programme still predominantly rely on government support, a number of examples of programme without a direct financial contribution from government can be cited. Children, and the food they eat, are influenced by an environment much wider than that of the school; however, school-based programme provide an excellent opportunity to promote milk consumption among children and in so doing establish a life-time's habit.

The development and implementation of school meal programs benefits both children and small local producers who manage to distribute their local production (Dragomir et al., 2017).

CONCLUSIONS

The purpose of the present work was to present different applications of meal scholar scheme around the world and importance for health children. Despite the current situation, governments and local authorities want to support healthy eating programs in schools. Ideally, governments should integrate nutrition into their approaches to agriculture; take action to eliminate the factors that increase the costs of food production, storage, transport, distribution and marketing - including by reducing inefficiencies, food loss and waste; support small-scale local producers to grow and sell more nutritious food and ensure market access; to prioritize the nutrition of children, as the category with the highest degree of need; to encourage behavior change through education and communication; to introduce nutrition into social protection systems and investment strategies at national level.

Experience shows that the fact that milk is more nutritious than competing beverages is not enough for it to maintain, let alone expand, its role in children's diets. School milk programme; therefore, represent an important vehicle for the promotion of milk. Such programme are currently seeing a resurgence of interest and are enjoying a renaissance as more imaginative and appealing ways to presenting milk to children are sought.

Schools and educational institutions provide a key environmental framework in which to facilitate actions that promote healthy choices as the norm. By focusing on establishing a holistic school approach to health and targeting the wider community, a concrete food and nutrition policy in schools can not only bring short-term improvements in the daily lives of young people, but also establish attitudes healthy, preventing the onset of obesity and chronic diseases in later life.

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