Scientific Papers. Series D. Animal Science. Vol. LXV, No. 2, 2022
ISSN 2285-5750; ISSN CD-ROM 2285-5769; ISSN Online 2393-2260; ISSN-L 2285-5750

STUDY OF BEHAVIOR OF SCHOOL CHILDREN ON MILK CONSUMPTION IN SCHOOL PROGRAM

Ioana Cristina ȘERBAN, Nela DRAGOMIR, Livia VIDU

University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Marasti Blvd, District 1, Bucharest, Romania

Corresponding author email: nela.dragomir@usamv.ro

Abstract

The paper is based on the study of various reports and different type of articles regarding the milks in school programs. In order to determine the Romanian consumers' perception regarding the milk consume, a questionnaire was prepared which was completed during a school year by scholar from Romania. We want diversity in the milk assortments served in the Milk and Croissant school program. One-third of respondents suggested that milk be replaced with yogurt or fruit yogurt and various dairy based on products. The concern of young people for a healthy diet should be made from infancy and this is reflected in the answers provided.

Key words*: milk, school program, students.*

INTRODUCTION

Globally, most consumers still have a strong positive opinion about the goodness of milk, they understand its nutritional value, but they believe that the diversity and benefits of this product do not keep up well enough with their modern lifestyle and expectations.

The influences of globalisation on eating habits have led to an increase in the variety of diets by including new foods, ingredients, and preparations. At the same time, the growing influence of ethical, health or sustainability values in attitudes and preferences has led to substantial changes in individual consumption behavior and this is reflected in the diet of consumers (Allen et al., 2020). These values are extremely important for the European consumer, as reported by recent Eurobarometer data (80% of Europeans buy sustainable products (European Commission, 2019). The evolution of consumer preferences determines the inclusion of new foods in the diet and, unfortunately, the exclusion of others.

Foods consist of a large number of different nutrients that are contained in a complex structure. The nature of the food structure and the nutrients therein (i.e., the food matrix) will determine the nutrient digestion and absorption, thereby altering the overall nutritional properties of the food. Thus, the food matrix may exhibit a different relation with health indicators compared to single nutrients studied in isolation (Thorning et al., 2017).

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 at al., 2011).

Milk has always been considered a fundamental component of human nutrition; it is healthy, beneficial, and fortifying for all age groups. Cow's milk is included in one of the seven basic food groups developed for providing high biological value proteins, calcium, and phosphorus, as well as being a relevant source of bioactive components (e.g., immunoglobulins, conjugated linoleic acid, lactoferrin, etc.) with beneficial effects on human health. Even considering the negative effects on human health from excessive milk consumption, the

essentiality of milk in human nutrition in a balanced diet has been demonstrated in several researches. However, this product is no longer part of the consumers' dietary plan, especially in some countries of the world (Houg et al., 2007; Gomez-Cortez et al., 2018; Liang et al., 2018; Merlino et al., 2022).

Growth and development are the most important indicators of adequate and balanced nutrition. The determination of age-appropriate growth is possible with the help of body weight and height measurements assessed according to the age and sex of children.

The first sign of inadequate protein and calorie intake in children is the growth and development retardation. Children, who cannot get sufficient and balanced nutrition, are prone to diseases and become often sick. They may have problems of absenteeism and low school success rates (Tüfekci, 2019).

School milk programme represent an important vehicle for the promotion of milk. Such programme are currently seeing a resurgence of interest and are enjoying a renaissance more imaginative and appealing way (Șerban et al., 2021).

MATERIALS AND METHODS

A hybrid (online and writable) survey was conducted, reaching 340 Romanian children consumers (N = 340) between September 2021 and March 2022. The questionnaire was made available by Google Form and print. Data regarding the consumer's perception on milk consumption has been collected by filling a questionnaire with 25 questions.

The study carried out is in fact a statistical survey, which was based on the questionnaire survey, the questions referring both to the preferences regarding the milk product consumed in "Milk and Croissant" school program and their opinion on the improvement of the program and the possible milk replacements in the program.

The aspects of the research methodology were: establishing the topic of this research, determining the objectives that were pursued by the survey method, determining the respondent population and its sample size, determining the question models used and printing the questionnaire, postcoding all answers received, processing the results obtained and their interpretation, the drafting of the final report and its presentation.

Data collected via questionnaires was graphic processed and presented based on each characteristic investigated and it will be detailed for each item.

RESULTS AND DISCUSSIONS

School milk programs 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 (Bulletin of the IDF N° 505/2020).

The main objective of the article is to identify the cause of the decrease in milk consumption among children and the cause of the rejection of milk consumption in the Milk and Croissant Program. In this sense, students from several schools in Bucharest, aged between 8-14, participated in the survey. The sample is balanced in terms of gender 45.6% girls and 54.4% boys (Table 1).

Table 1. Socio-demographic profiles of scholar milk consumers (n = 340)

Variable	%	N
Age		
8-10	7.4	250
10-12	19.1	65
12-14	73.5	25
Gender		
Female	45.6	155
Male	54.4	185
Education		
Primary school	10.3	35
High school	89.7	305
Place of residence		
Urban	86.8	295
Rural	13.2	45

The students participating in the survey come from family backgrounds. The study involved children from families with 4 members (52.9%), 3 members (25%) and 5 members (8.8%), respectively families with at least 2 children, most cases. The behavior of milk consumption in the family is derived from the question "What is the most common time you drink milk?".

Where 73.5% of respondents consume milk for breakfast and 25% in the evening.
Frequency of milk consumption among students, 44.1% of respondents stated that they consume milk 2-3 times a week and 38.2% every day. Data processing shows that approximately 15% consume milk occasionally or never (Figure 1).

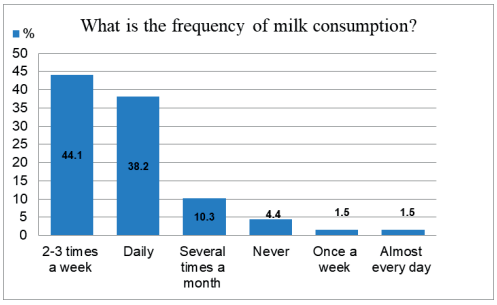

Figure 1. Frequency of milk consumption

The most consumed milk is cow's milk (95.6%), milk from other species is in the order of preferences goat's milk (5.9%), the rest at values below 1.5% (Ilie et al., 2021; Kempen et al., 2017). The preference for cow's milk is also justified in terms of greater shelf availability and a much more affordable price. In terms of goat's milk, it is the second most popular in the list of respondents' preferences, being preferred due to its health benefits and its lower allergenicity, due to the lack of beta-lactoglobulin protein.
The reason they buy milk is that it is good for the body (67.2%), followed by taste (51.6%), useful for the diet (17.2%), and 14.1% of respondents appreciate milk as an indispensable food for the body.
It was looked at whether the students have the necessary information on the benefits of consuming milk on the body. Thus, when asked about the positive effects of milk consumption on the body, approximately 45.6% of respondents said that milk is important for bones, 42.6% said that milk gives a good feeling to the body and an energizing 22.1%.
Milk is one of the most complex foods, with benefits for both the skeletal system and the brain. However, milk consumption in Romania is 4.4 times lower than the average milk consumption in Western Europe and 2.4 times lower than the average in Eastern Europe. Although various programs have been set up at national level to encourage milk consumption, the number of milk consumers is declining. Reduced milk consumption affects health in the country and is also an economic problem.
Fluid milk consumption among children has declined for decades. Adequate consumption of milk and dairy products, especially during childhood, has beneficial health outcomes for growth, development, and reduced risk of osteoporosis, hypertension, obesity, and cancer during adulthood. Satisfaction with milk flavor, perceived health benefits derived from milk, and habit are primary drivers of lifelong milk consumption. Child preferences and attitudes for milk may differ from those of adults, and as such, understanding and fulfilling the needs of children is crucial to reverse the decline in milk consumption (Sipple et al., 2020).
To the question, which refers to the students' opinion about the milk received through the "Milk and Croissant" school program. Most students mentioned that the milk received in the program is not always as tasty and often creates digestive problems. It was also mentioned that the individual milk packaging has no straw or has difficulty consuming.
School meals make liquid milk accessible to millions of children every day; however, school lunch regulations and procurement systems sometimes make it difficult to provide new or value-added dairy products in these programs.
Milk and Croissant school programme, part of the European School Milk Scheme, aims at providing healthy food choice to all Romanian pre-school to secondary school students (ages 5-6 to 14-15) by offering them in each school day, at lunch time, a small bottle of milk/yoghurt and a croissant/bagel.
Since the introduction of the *Milk and Croissant Program* of 1995, the government has provided subsidized milk to schools to ensure adequate nutrition of Romanian schoolchildren. The program allows schools to offer this nutritious beverage to low-income students in place of other drinks that may have been at their reach instead, such as sodas or fruit juice.
But there’s an important drawback to consider. Because many health organizations now recommend lower fat milks for kids due to the obesity epidemic, schools are limited to serving only fat-free or low-fat milk.

Whole milk is creamier, making it tastier and more generally accepted by younger kids. Therefore, the milk being offered may be harder to be accepted by kids and more likely to be wasted and thrown out (Sipple et al., 2020).
The purpose of the study is to find out the students' opinion regarding the milk received through the *Milk and Croissant school program.* Most of the students mentioned that the milk received in the program "does not taste", "does not attract me", "is very watery" etc. and most often creates digestive problems. They have no straw or have difficulty consuming.
The fact that children consume less milk is a problem with more girls. There is several other factors are contributing to the decline in childhood milk consumption: (1) parents are opting for milk alternatives; (2) increased consumption of juice and carbonated soft drinks; (3) lactose intolerance or other allergy-based.
When asked about the milk replacement suggestions in the *Milk and Croissant school program*, the most frequently mentioned was the replacement with apple juice, fruit yogurt, milk-based soft drinks, cocoa milk or a greater diversity of products offered. The students also mention that most of the time they receive a simple dough bun, respectively a piece of bread that is not attractive to the studied age segment (Figure 2).

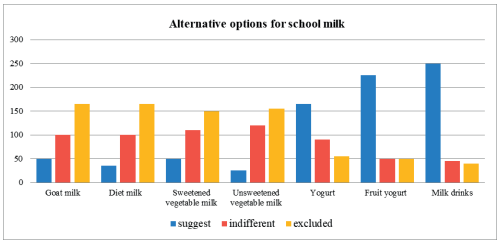

Figure 2. Alternative options for school milk

Lactose intolerance is a clinical syndrome that manifests with characteristic signs and symptoms upon consuming food substances containing lactose, a disaccharide. Normally upon lactose consumption, it is hydrolyzed into glucose and galactose by the lactase enzyme, which is found in the small intestinal brush border. Deficiency of lactase due to primary or secondary causes results in clinical symptoms. This activity describes the pathophysiology of lactose intolerance and highlights the role of the interprofessional team in its management (Vesa et al., 2000; Malik et al., 2022).
In the first years of school, the incidence of people with lactose intolerance is higher. Thus, of those interviewed, over 41.2% mentioned that they know of a colleague who has intolerance to lactose or beta-lactoglobulin. It is important to take into account this aspect and to be concerned with a distribution, in parallel with milk, of analogous drinks with no allergens.
Ask "What type of alternative milk product are you consuming?" The answers were varied and highlight that many students know and consume these alternatives to milk (Figure 3). Milk alternatives can include beverages made from plants, such as soy, oat, rice, coconut, cashew, and almond. The graph shows that the best known alternative to milk, by students, is coconut milk, followed by almond milk.

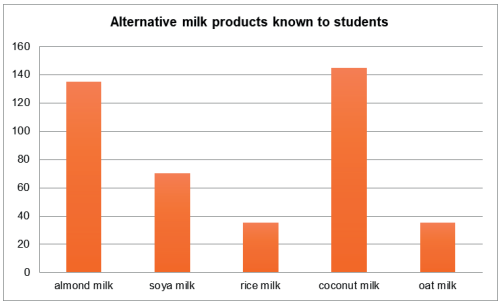

Figure 3 Alternative milk products known to students

Extremely important is the justification provided by each respondent to the question about the benefits to the body through the consumption of milk alternatives.
Many types of innovative food drinks from plant sources are promoted as an alternative to cow's milk, but there are many technological impediments, either to processing or to preservation. Most of these milk alternatives do not have a nutritional balance compared to cow's milk, however they contain functionally active components with health-promoting properties that attract health-conscious consumers. In the case of legume-based milk alternatives, sensory acceptability is a major limiting factor for its widespread popularity (Sethi et al., 2016; Vanga et al., 2018).

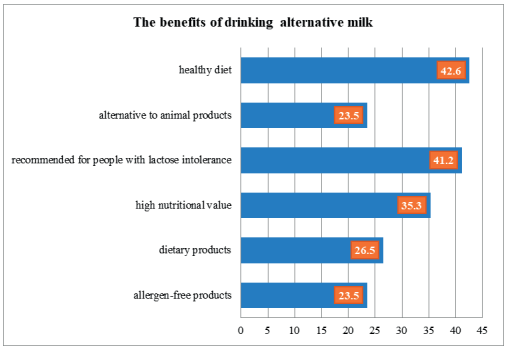

Figure 4. The benefits of drinking alternative milk for health

About 42.6% of respondents believe that they have a beneficial effect on health and about 41.2% know that these products are intended for people with lactose intolerance (Figure 4).

We can say that the flow of information, from all information channels, regarding food allergies and intolerances, has been extremely well assimilated by children. This leads us to believe that if we use the same model of information, we can increase awareness of the positive effects of milk and dairy products on the body and increase consumption among young people.

Both promoting and providing healthy food in schools has been shown to improve food choices and may have an influence on long-term food behavior and health. This ability to influence food choice is known as choice architecture and has been used in a number of school settings to influence healthy food behaviors, such as increasing the consumption of plant based foods (Marsh et al., 2018; Ensaff et al., 2015).

CONCLUSIONS

In conclusion, the study found that students prefer to drink less milk than ever before, and opinions about milk as a healthy choice change, with vegetable milk growing rapidly in popularity.

One way to revitalize the consumption of milk and dairy products in all markets is to delight consumers about the benefits of milk. It is also important to create new products and develop communication campaigns to show that milk is beneficial, tasty, even a treat and important for all of us.

This is the first study to explore the determinants of milk consumption in the *Milk and Croissant school program*, in a sample of boys and girls between the ages of 6 and 14, and thus makes a significant contribution to the literature. Complete their decision-making process regarding increasing milk consumption in this age segment.

These aspects can be used in planning the next steps for promoting food consumption through milk school program. A better understanding of young people's opinion about the milk offered in the milk school program is important for the milk and dairy products sector, the Romanian and European regulatory system. Future dietary assessments and recommendations should also carefully consider evidence of the effects of whole foods and similar plant products, as well as evidence of the effects of individual nutrients.

ACKNOWLEDGEMENTS

This research work was a part from PhD thesis elaboration “Research on the quality of milk raw material and technology for obtaining dairy products for children” and was carried out with the support of Faculty of Engineering and Management of Animal Production, University of Agronomic Sciences and Veterinary Medicine of Bucharest, Romania.

REFERENCES

Allen, S., & Goddard, E.W. (2012) *Consumer Preferences for Milk and Yogurt Attributes: How Health Beliefs and Attitudes Affect Choices*. Available online: https://ageconsearch.umn.edu/record/125012 (accessed on 30 March 2022).

Bulletin of the IDF N° 505/2020: The contribution of school milk programmes to the nutrition of children worldwide - Edition 2020

Ensaff, H., Homer, M., Sahota, P., Braybrook, D., Coan, S., & McLeod, H. (2015). Food choice architecture: an intervention in a secondary school and its impact on students' plant-based food choices. *Nutrients*, 7(6), 4426-4437.

European Commission. Single Market for Green Products 2019. Available online: https://ec.europa.eu/environment/eussd/smgp/ (accessed on 27 April 2022).

Feskanich, D., Willett, W.C., & Colditz, G.A. (2003). Calcium, vitamin D, milk consumption, and hip fractures: a prospective study among postmenopausal women. *Am J Clin Nutr.,* 77(2), 504–511.

Fishbein, M., & Ajzen, I. (2010). *Changing behavior: theoretical considerations, in Predicting and*

changing behavior: The reasoned action approach, Fishbein M, Ajzen I, Editors, New York, USA: Psychology Press, 321–368.

Gómez-Cortés, P., Juárez, M., & de la Fuente, M.A. (2018) Milk Fatty Acids and Potential Health Benefits: An Updated Vision. *Trends Food Sci. Technol*., 81, 1–9.

Haug, A., Høstmark, A.T., & Harstad, O.M. (2007) Bovine Milk in Human Nutrition—A Review. *Lipids Health Dis.,* 6, 25.

https://www.euromonitor.com/article/trends-to-watch-in-plant-based-milk

Ilie, D., Lădaru, G.R., Diaconeasa, M., & Stoian, M. (2021). Consumer Choice for Milk and Dairy in Romania: Does Income Really Have an Influence? *Sustainability*, 13, 12204. 10.3390/su132112204 (accessed on 27 April 2022).

Kempen, E., Kasambala, J., Christie, L., Symington, E., Jooste, L., & Van Eeden, T. (2017). Expectancy-value theory contributes to understanding consumer attitudes towards cow's milk alternatives and variants. *Int. J. Consum. Stud*., 41, 245–252.

Lacroix, M.J., Desroches, S., Turcotte, M., Painchaud Guérard, G., Paquin, P., Couture, F., & Provencher, V. (2016). Salient Beliefs among Canadian Adults Regarding Milk and Cheese Consumption: A Qualitative Study Based on the Theory of Planned Behaviour. *BMC Nutr.,* 2, 48.

Lasater, G., Piernas, C., & Popkin, B.M. (2011). Beverage patterns and trends among school-aged children in the US, 1989-2008. *Nutr J*., 10(1), 103. doi:10.1186/1475-2891-10-103

Liang, J., Zhou, Q., Kwame Amakye, W., Su, Y., & Zhang, Z. (2018). Biomarkers of Dairy Fat Intake and Risk of Cardiovascular Disease: A Systematic Review and Meta Analysis of Prospective Studies. Crit. Rev. *Food Sci. Nutr.,* 58, 1122–1130.

Malik, T.F., & Panuganti, K.K. (2022). *Lactose Intolerance*. [Updated 2022 May 2]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK532285/

Marsh, S., Jiang, Y., Carter, K., & Wall, C. (2018). Evaluation of a Free Milk in Schools Program in New Zealand: Effects on Children's Milk Consumption and Anthropometrics. *The Journal of school health, 88*(8), 596–604. https://doi.org/10.1111/josh.12649

Merlino, V. M., Massaglia, S., Borra, D., Mimosi, A., & Cornale, P. (2022). Which Factors Drive Consumer Decisions during Milk Purchase? New Individuals' Profiles Considering Fresh Pasteurized and UHT Treated Milk, *Foods*, 11/1, https://www.mdpi.com/2304-8158/11/1/77

Șerban, I. C., Dragomir, N., & Vidu, L. (2021). Study on the Use of Milk and Dairy Products in the Diet of Children in Schools. *Scientific Papers: Series D, Animal Science,* 64(2), 385–393.

Sethi, S., Tyagi, S. K., & Anurag, R. K. (2016). Plant-based milk alternatives an emerging segment of functional beverages: a review. *Journal of food science and technology*, 53(9), 3408–3423. https://doi.org/10.1007/s13197-016-2328-3

Sipple, L.R., Barbano, D.M., & Drake, M. (2020). Invited review: Maintaining and growing fluid milk consumption by children in school lunch programs in the United States. *J Dairy Sci.,* 103(9), 7639-7654. doi:10.3168/jds.2020-18216

Skinner, M.L., Simpson, J.A., & Buchholz, A.C. (2011). Dietary and total calcium intakes are associated with lower percentage total body and truncal fat in young, healthy adults*. J. Am. Coll. Nutr.,* 30(6), 484–490.

Smit, E., Nieto, F.J., Crespo, C.J., & Mitchell, P. (1999). Estimates of animal and plant protein intake in US adults: results from the Third National Health and Nutrition Examination Survey, 1988–1991. *J Am Diet Assoc.,* 99(7), 813–820.

Thorning, T.K., Bertram, H.C., Bonjour, J.P., De Groot, L., Dupont, D., Feeney, E., Ipsen, R., Lecerf, J.M., Mackie, A., & McKinley, M.C. (2017). Whole Dairy Matrix or Single Nutrients in Assessment of Health Effects: Current Evidence and Knowledge Gaps. *Am. J. Clin. Nutr*., 105, 1033–1045.

Tüfekci, S. (2019). The School Milk Project Conducted in Primary Schools and Parents' Views on the Issue. *Namık Kemal Tıp Dergisi*, 7, 222-227.

Vanga, S. K., & Raghavan, V. (2018). How well do plant based alternatives fare nutritionally compared to cow's milk? *Journal of food science and technology*, 55(1), 10–20. https://doi.org/10.1007/s13197-017-2915-y

Vesa, T.H., Marteau, P., & Korpela, R. (2000). Lactose intolerance. *J. Am. Coll. Nutr*., 19(2 Suppl), 165S-175S.