

ORIGINAL STUDIES

Regression of food plans quality in Romanian nurseries under the influence of the SARS-CoV-2 pandemic

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Abstract

Background. The pandemic brought a major global change. The rules imposed worldwide forced the education system to step into unknown and unexplored territory without preparing or leaving time for adaptation.

Aims. The purpose of this paper was to analyze the quality of the nurseries’ menus under the influence of the SARS-CoV-2 pandemic.

Methods. A cross-sectional study was conducted over 3 consecutive years, respectively between 2019 and 2021. Food ingestion was calculated using the national recommendation for food ratio by transforming all complex food products into simple equivalents.

Results. There was an increase in the amount used in some perishable foods such as meat and derived from meat, milk and dairy products, or eggs. At the same time, a small decrease in sweeteners was observed, but the values were still high compared to international or national needs. In the fat category, the values for all 3 years did not show such a large discrepancy from the legislative values.

Conclusions. Although the pandemic caused disorganization, there were a few positive aspects and since 2020 the percentage of foods not recommended for preschoolers such as high-sugar and high-fat foods has started to decrease; however, dairy products are still insufficiently procured and consumed.

Keywords: nursery, pandemic, nutrition, menu.

Introduction

The pandemic has brought a major global change. Every area has been faced with the problem of having to stop working, change the principles or modify the usual activity.

The rules imposed on the globe forced the education system to step into unknown and unexplored territory in a short time without preparing or leaving time for adaptation for both educators and students. The vast majority of teaching activity moved to an online system, with distance learning becoming a new educational context. During this period, digitized methods were adopted by the Ministry of Education, which put teachers, pupils, and parents in difficulty. The family played a very important role in this complex process, often becoming a transmitter of information between the teacher and the child (Flugelman et al., 2021; Goudeau et al., 2021)

The purpose of this paper was to analyze the quality of the nurseries’ menus under the influence of the SARS-CoV-2 pandemic.

Material and method

Research protocol

A cross-sectional study was conducted over 3 consecutive years, respectively between 2019 and 2021. The year 2020 represents the SARS-CoV-2 quarantine year.

a) Period and place of the research

The study was carried out at an educational and care institution (nursery) from Vatra-Dornei, Suceava county, Romania. The chosen period consists of 14 consecutive days from the same period of each year (January).

b) Subjects and groups

The study group consists of a wide range of children from the chosen nursery with a minimum age of 3 months and a maximum age of 3 years. The community is divided into 2 groups: the small group included children aged between 3 and 12 months; the large group consists of children aged between 1 and 3 years.

The virus infection greatly influenced both the number of children present and the amount of products purchased by the nursery, therefore the number of subjects was

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variable throughout each year.

c) *Applied tests*

The analysis used information from the menu archive provided by the nursery, where the amount of food provided to children each day was specified. Food ingestion was calculated using the national recommendation for food ratio by transforming all complex food products into simple equivalents. After the transformation, all data were recorded in 12 major food groups: meat, fruits, vegetables, total fats, oils, animal fats, eggs, fish, grains, sweeteners, and beans. The obtained results were compared with national laws and with international recommendations.

d) *Statistical processing*

The data were analyzed statistically using the GraphPad Prism 7.0 software. Descriptive statistical measures used were minimum and maximum values, means or medians, and standard deviations.

Results

In 2019 there was a significant difference from the national recommendations of the Ministry of

Health for the nursery program for all food groups, especially for: meat and meat products, animal fats, grains, and sweeteners (Table I).

In 2020 there were much greater differences in all food groups; in addition to the above-mentioned, specific groups are added to the list: total fats, oils, vegetables, and eggs. At the same time, there was a decrease in fruits, animal fats, and sweeteners (Table I).

Table I
Differences from national recommendations for the nursery program (%).

Food groups	2019	2020	2021
Meat and meat products	137.29	163.22	148.92
Fruits	21.68	0.00	27.27
Animal fats	145.20	125.86	148.92
Total fats	96.53	159.41	121.52
Oils	23.53	209.73	80.41
Milk and dairy products	47.24	49.73	61.59
Vegetable	157.48	272.85	60.10
Eggs	5.24	19.49	28.39
Grains	197.93	206.36	194.19
Sweeteners	326.78	172.94	127.25

There is an increase in the amount used in some perishable foods such as meat and derived from meat,

milk and dairy products, or eggs. At the same time, a small decrease in sweeteners can be observed, but the values are still high compared to international or national needs (Table II).

Table II
Difference from national recommendations for 24h (%).

Food groups	2019	2020	2021
Meat and meat derivatives	102.97	122.42	111.69
Fruit	16.26	0.00	20.45
Animal fat	108.90	94.39	111.69
Total fat	72.40	119.56	91.14
Oils	17.65	157.30	60.31
Milk and dairy products	35.43	37.30	46.19
Vegetable	118.11	204.63	45.08
Eggs	3.93	14.62	21.29
Grains	148.45	154.77	145.64
Sweeteners	245.09	129.71	95.44

From a statistical point of view, it can be observed that none of the food groups complies with the legislative percentage of 75% of the daily national and international needs for the nursery programs (Table III).

Table III
Difference from international recommendations for nursery program (%).

Food groups	2019	2020	2021
Meat and meat derivatives	274.58	326.45	297.85
Fruits	12.39	0.00	15.58
Animal fats	128.12	111.05	131.40
Total fats	75.42	124.54	94.94
Oils	15.69	139.82	53.61
Milk and dairy products	67.49	71.05	87.99
Vegetables	165.36	286.49	63.11
Beans	54.00	4.54	48.87
Eggs	15.71	58.47	85.16
Fish	23.64	19.98	0.00
Grains	304.52	317.47	298.76
Sweeteners	1143.73	605.29	445.37

We noticed that since the start of the pandemic, the institution has not operated at its maximum capacity (35 children) due to the pandemic, imposing a limited number of children because of social distancing (maximum 15 children). During this period, no one could predict how many children will be present the next day.

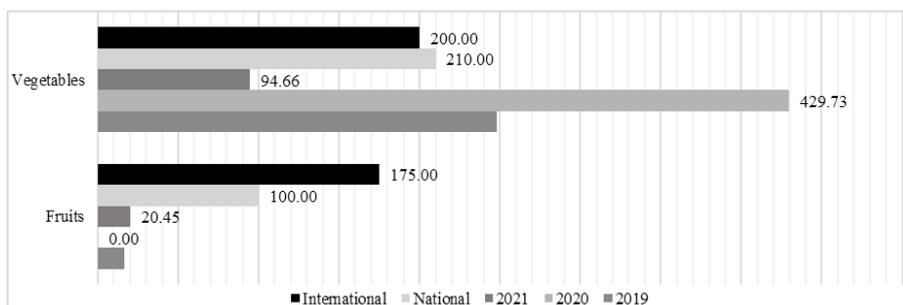


Fig. 1 – Comparative graphical representation with internationally and nationally recommended values for vegetables and fruits.

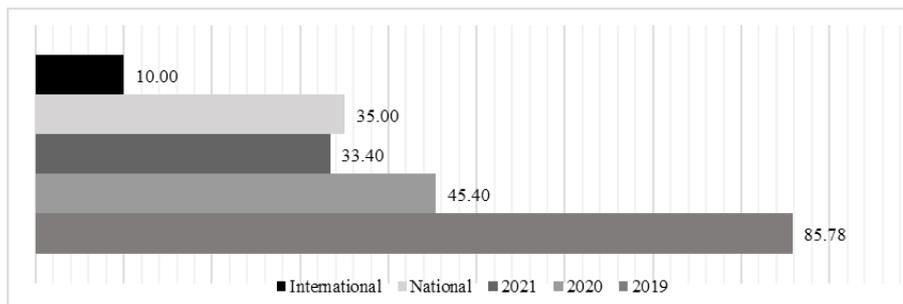


Fig. 2 – Comparative graphical representation with internationally and nationally recommended values for sweeteners.

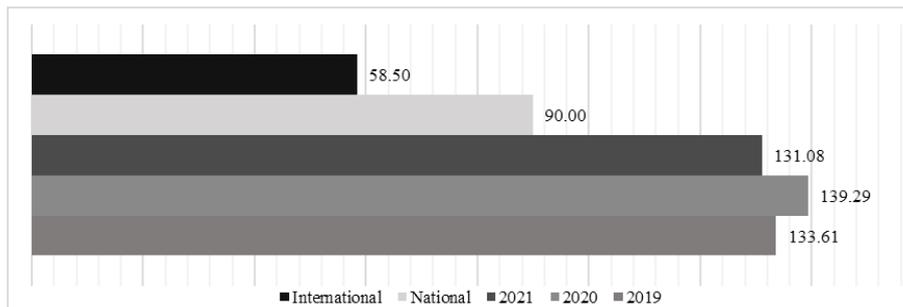


Fig. 3 – Comparative graphical representation with internationally and nationally recommended values for grains.

The category of food that was closest to both international and national legislative recommendations was vegetables in 2019. At the opposite pole, we have fruits in 2020 (Fig. 1).

In the fat category, the values for all 3 years analyzed do not show such a large discrepancy with the legislative values. Thus, in 2020, vegetable fats (oils) reached the value of 15,73 grams, reaching the value of the international requirement of 15 grams. Also in this year, the value of 29,88 grams of total fat was very close to the value of 32 grams for international recommendations. Animal fat values for all 3 years analyzed were very close to international (17 grams butter equivalent) and national (15 grams butter equivalent) recommendations.

Sugar and sugary products have changed significantly from 2019 to 2021, managing to reduce as much as possible high-sugar foods that are not recommended for preschoolers (e.g. candy, cakes) (Fig. 2).

Cereal products are another specific food group that has far exceeded legislative requirements, reaching the maximum value recorded in this analysis in 2020 (Fig. 3).

Discussion

The increase in perishable food consumption may be due to the very fluctuating number of children present daily and because all purchases are made in advance. Thus, during the pandemic period, to ensure a proper supply for the number of children enrolled, food needs were overestimated, so perishable food purchased for a large number of children was redistributed to a smaller number of children.

National scientific papers have often analyzed nutritional imbalances in preschool collectives, resulting

in similar situations as in this study: high consumption of sugary and meat products; low consumption of dairy and derivatives (Hadmaş et al., 2017). At the same time, it turned out that the intervention of a qualified nutrition specialist is very important for the quality of menus in preschool care institutions (Hadmaş et al., 2018).

In international scientific projects food equivalents have often been used to group food consumption into food categories, thus managing to identify more easily which categories are predominantly used or ingested (Shanthy & Linda, 2022; Carrie et al., 2021), principle used also in this study. This evaluation does not include a qualitative analysis of food products, including only the amount of products used. In future studies, we recommend a combination of this type of menu evaluation with a qualitative investigation and a caloric/macronutrient estimation.

A study conducted in Brazil during the coronavirus pandemic included 589 children and 720 adolescents, looking at the impact of the pandemic on their eating behavior. This study found that home isolation led them to eat more vegetables, dried legumes, and fruits (Teixeira et al., 2021). Another study in Norway surveyed the parents of 144 one-year-old children wanting to reduce food neophobia, promote and encourage the consumption of vegetables in institutions, but did not detect any effect on food neophobia (Blomkvist et al., 2021).

In a nursery in Poland, the analysis resulted in a low fat intake compared to the current study where statistical values are close to the legislative recommendations, except in 2020 when they were below international recommendations (Trafalska, 2014). Thus, it is recommended that the menus in institutions be lower in fat, but higher in fiber (Crepinsek et al., 2009).

A population-based sectional study of children from kindergartens in Guaratuba, which assessed the consumption of food groups among children aged 6 to 23 months in daycare centers and at home, turned out that children had a higher consumption of dairy at home than in daycares, where their diet was more qualitative (Siqueira et al., 2022).

Weight deficit and weight excess in children represent one of Romania's important problems (Pop et al., 2021). According to our study, one of the involved factors is the menu from the nursery, completed by the quality of the menus from kindergartens, schools, and/or home meals. One of the possible solutions includes nutritional education for the staff implied in meal planning (Harton & Myszkowska-Ryciak, 2021), nutritional national policies (Wolfenden et al., 2020) and various nutrition education programs for children (Myszkowska-Ryciak & Harton, 2019).

Conclusions

1. The pandemic has affected the number of children present in the institution, with fluctuations in both the number of children present daily and the need for raw materials.

2. Although the pandemic has caused disorganization in the nursery, a few positive aspects have also resulted, and since 2020 the percentage of foods not recommended for preschoolers such as high-sugar and high-fat foods has started to decrease.

3. Dairy products are insufficiently procured and consumed in the institution, the statistical values being very low compared to the values recommended by national and international data. Meat and meat products have values close to the legislative data, but it is unknown whether they are qualitative or not.

Conflict of interests

The authors declare no conflict of interests.

Acknowledgment

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References

- Blomkvist EAM, Wills AK, Helland SH, Hillesund ER, Øverby NC. Effectiveness of a kindergarten-based intervention to increase vegetable intake and reduce food neophobia amongst 1-year-old children: a cluster randomised controlled trial. *Food Nutr Res.* 2021;65. doi: 10.29219/fnr.v65.7679
- Carrie LM, Lois CS, Joseph DG, Alanna JM. Usual intakes of food pattern components by U.S. children: WWEIA, NHANES 2013-2016. *J Food Compos Anal.* 2021;104063(102):0889-1575.
- Crepinsek MK, Gordon AR, McKinney PM, Condon EM, Wilson A. Meals offered and served in US public schools: do they meet nutrient standards? *J Am Diet Assoc.* 2009;109(2 Suppl):S31-S43. doi: 10.1016/j.jada.2008.10.061.
- Flugelman MY, Margalit R, Aronheim A, Barak O, Marom A, Dolnikov K et al. Teaching During the COVID-19 Pandemic: The Experience of the Faculty of Medicine at the Technion-Israel Institute of Technology. *Isr Med Assoc J.* 2021; 23(7):401-407.
- Goudeau S, Sanrey C, Stanczak A, Manstead A, Darnon C. Why lockdown and distance learning during the COVID-19 pandemic are likely to increase the social class achievement gap. *Nat Hum Behav.* 2021;5(10):1273-1281. doi: 10.1038/s41562-021-01212-7.
- Hadmaş RM, Neghirlă A, Martin ŞA. Evolution of kindergartens' food plan, with and without dietetic intervention. *Journal of School and University Medicine* 2018;5(1):16-21.
- Hadmaş RM, Tarcea M, Neghirlă A, Mărginean O, Martin A, Martin ŞA. Nutritional value of kindergartens menus from Mures / Romania, related to national and international dietary recommendations. *Medicine in evolution* 2017;23(3): 271-278.
- Harton A, Myszkowska-Ryciak J. Nutritional Education Is an Effective Tool in Improving Beverage Assortment in Nurseries in Poland. *Healthcare.* 2021; 9(3):274. doi: 10.3390/healthcare9030274.
- Myszkowska-Ryciak J, Harton A. Eating Healthy, Growing Healthy: Outcome Evaluation of the Nutrition Education Program Optimizing the Nutritional Value of Preschool Menus, Poland. *Nutrients.* 2019;11(10):2438. doi:10.3390/nu11102438.
- Pop TL, Maniu D, Rajka D, Lazea C, Cismaru G, Ştef A, Căinap SS. Prevalence of Underweight, Overweight and Obesity in School-Aged Children in the Urban Area of the Northwestern Part of Romania. *Intern J Environ Res Public Health.* 2021;18(10):5176. doi: 10.3390/ijerph18105176.
- Shanthy AB, Linda SK. Methodology for developing a nutrient and food pattern equivalents database for selected branded foods in the USDA National Household Food Acquisition and Purchase Survey-1. *J Food Compos Anal.* 2022;205(104167):0889-1575.
- Siqueira IMBJ, Godinho APK, de Oliveira ECV, Madruga FP, Taconeli CA, Almeida CCB. Consumption of food groups and associated factors among children aged 6 to 23 months. *Rev Paul Pediatr.* 2022;40:e2021080. doi: 10.1590/1984-0462/2022/40/2021080.
- Teixeira MT, Vitorino RS, da Silva JH, Raposo LM, Aquino LA, Ribas SA. Eating habits of children and adolescents during the COVID-19 pandemic: The impact of social isolation. *J Hum Nutr Diet.* 2021;34(4):670-678. doi: 10.1111/jhn.12901.
- Trafalska E. Assessing diets for energy and nutrients content in nursery school children from Lodz, Poland. *Rocz Panstw Zakl Hig.* 2014;65(1):27-33.
- Wolfenden L, Barnes C, Jones J, Finch M, Wyse RJ, Kingsland M, Tzelepis F, Grady A, Hodder RK, Booth D, Yoong SL. Strategies to improve the implementation of healthy eating, physical activity and obesity prevention policies, practices or programmes within childcare services. *Cochrane Database Syst Rev.* 2020;2(2):CD011779. doi: 10.1002/14651858.CD011779.pub3.