FOOD AND NUTRITION IN COLLECTIVE HEALTH

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Food and Nutrition Education in Schools: the view from Brazil

Educação Alimentar e Nutricional em escolas: uma visão do Brasil

Abstract

Objective: To analyze food and nutrition education initiatives in Brazilian towns and cities to provide further insights into Food and Nutrition Education-related theoretical and methodological strategies and the application of them in schools. *Methods:* Cross-sectional exploratory study that used a secondary database obtained from the "Efficient School Meal Manager" Award database, in 2010. A total of 786 municipal schools enrolled in this award. The variables relative to Food and Nutrition Education were execution of activities and theoretical-methodological strategies used to perform them, as well as frequency of activities. Descriptive statistics was performed using Pearson's Chi-square test for quantitative data and Content Analysis method for qualitative data. *Results:* The activities reported most often were development of pedagogical gardens and use of food from family farmers, manly in the south region of Brazil, with a significant statistical difference ($p < 0.05$). *Discussion:* There was predominance of passive methods and one-off activities in the implementation of food and nutrition education in Brazilian towns and cities, as well as appreciation of nutrition (nutrients and functions) to the detriment of food and local food culture. *Conclusions:* The implementation of active methodologies with

a comprehensive approach to food should be encouraged in the school environment. This experience of the program can be important for implementation of Food and Nutrition Education guidelines in schools.

Keywords: School feeding. Food and nutrition education. Brazilian school nutrition program. Public policy.

Resumo

Objetivos: Analisar as ações de educação alimentar e nutricional no Brasil e ampliar nossa compreensão sobre sua aplicação nas escolas. ***Métodos:*** Estudo exploratório transversal que utilizou banco de dados secundário obtido do Prêmio de Gestor Eficiente da Merenda Escolar, de 2010. Participaram do prêmio, neste ano 786 municípios. As variáveis relacionadas à Educação Alimentar e Nutricional foram: execução de ações e as estratégias teórico-metodológicas utilizadas para realizá-las. Utilizou-se estatística descritiva com o teste Qui-quadrado de Pearson para dados quantitativos e o método de Análise de Conteúdo para dados qualitativos. Resultados: A maioria relatou a execução de hortas pedagógicas e uso de alimentos da agricultura familiar, principalmente na região Sul do Brasil, com diferença estatisticamente significante (p <0,05). ***Discussão:*** Houve predomínio de métodos passivos e ações pontuais na implementação da educação alimentar e nutricional nas cidades brasileiras, assim como a valorização da nutrição (nutrientes e funções) em detrimento da alimentação e da cultura alimentar local. ***Conclusões:*** A implementação de metodologias ativas com abordagem integral à alimentação deve ser estimulada no ambiente escolar. A experiência do Programa pode ser importante para a implementação de diretrizes para a educação alimentar e nutricional e sua execução em escolas.

Palavras-chave: Alimentação escolar. Educação alimentar e nutricional. Política nacional de alimentação e nutrição. Política pública.

INTRODUCTION

The school environment is a privileged space to improve health conditions and nutritional status of children, and to increase their preferences for adequate food intake.[1] Food and Nutrition Education (FNE) is conceived as an ongoing, transdisciplinary, intersectoral field of knowledge, involving a multitude of professionals to encourage autonomous and voluntary healthy eating habits. It uses problematization and active educational approaches and resources, while taking into consideration the food system and the interactions and meanings that make up food behavior.[2] However, there is predominance of expository methods, based on traditional methodology trends, on transmission of information through the hegemony of passive techniques,[3] which should be overcome with a view to promoting popular and scientific knowledge, as well as mobilizing institutional and public resources to resolve the multiple health problems that affect human populations and their environments.[4]

Brazil's School Meal Program - ***Programa Nacional de Alimentação Escolar*** (PNAE)- is considered to be one of the most successful school meal programs in the world, and it is not only a welfare-oriented and emergency food program.[5] PNAE guidelines follow the principles that meals prepared in schools should use fresh or minimally processed food. Also, they indicate other strategies to ensure food security and the human right to adequate food. To receive the budget to serve at least one meal per day, towns and cities must follow norms to promote healthy eating habits among students, thereby enhancing their development and school performance.[6] In 2009, FNE was included in the teaching and learning processes in the school curriculum.[5,7,8]

Schools are an excellent place to develop FNE initiatives, but this space also lacks the use of effective educational methodologies that favor the active learning of healthy eating habits.[9] Research in this area should be encouraged, and since education is a social science, it must be analyzed as such. The qualitative approach has been gaining ground in health and education research that seeks to contextualize the investigated phenomena and it has prevailed over statistics.[10]

Therefore, this study seeks to analyze FNE activities in Brazil to provide further insights into theoretical and methodological approaches of FNE-related activities and their application in schools, in order to increase the theoretical background on the subject.

METHODS

This is a cross-sectional exploratory study that used a secondary database obtained from the "Efficient School Meal Manager" Award (***Prêmio Gestor Eficiente da Merenda Escolar***) database, in 2010, formulated on the voluntary registration of towns and cities throughout Brazil.

Organized by the Non-Governmental Organization ***Ação Fome Zero***, this award sought to support food security projects developed by civil society and to find and disseminate best practices of municipal management authorities within PNAE. An application form was sent to all towns and cities in Brazil, composed of several questions that evaluated four indicators: administrative and financial aspects; nutritional efficiency and FNE; local development; participation of School Feeding Council (CAE). Each indicator was associated with a set of questions to be answered by municipal managers, which later were tabulated for further analysis.[11] For this study, only questions about Food and Nutrition Education activities and sociodemographic aspects were analyzed.

In that year, 786 towns and cities participated in the award. The municipal managers answered questions about the development of FNE initiatives. The study variables for FNE reported in this paper were:

- Implementation of FNE activities: Description of the towns and cities that reported the presence of FNE activities and of FNE content in the school curriculum. Such information was stratified according to the Great Regions of Brazil: South; Southeast; West central; North; Northeast.
- Theoretical-methodological approaches used to perform FNE activities: Characterization of the most common methods, categorized into: conduction of lectures; application of ludic activities; training of employees –FNE multipliers; development of school gardens; development of cooking workshops; educational activities for parents/guardians - community integration; offer of healthy foods; interdisciplinary methods; distribution and/or design of information material. The approach and content of the activities were also analyzed, according to the Food and Nutrition Education Reference Framework for Public Policies.[2]
- Regular Food and Nutrition Education activities; classified into: one-off (less than three activities a year or during celebration dates), regular (more than three activities a year or when the words "regular", "constant", "some" were used without describing methods) and continuous activities (more than six activities a year or using the words "weekly", "monthly" and "all year long" with descriptions of methods).

The number of towns and cities that reported the presence of FNE in the school curriculum was described. To evaluate the difference between presence and absence of FNE in

the school curriculum according to the major regions, school gardens, cooking workshops and food use in food agriculture, Pearson's Chi-square test was used at a 5% level of significance.[12] To describe and discuss the most frequent theoretical-methodological approaches, a qualitative analysis was used with the Content Analysis method.[10] The managers' reports on the subject were analyzed, and the activities carried out were compared with those described in the literature for a discussion about the efficiency and effectiveness of these activities. The main objective of content analysis was to summarize the messages and highlight indicators that allow inferences about other realities that were not the same as the message itself. It is a research instrument that has a social nature and multiple applications; it forms associations with the surface of the texts described and analyzes the factors that determine their characteristics, e.g., psychosocial variables, cultural context, context of the message production process.[13] For this analysis, the following processes were used: 1. Information preparation: floating reading was performed, before the analysis was started, for familiarization with the nature of the messages. 2. Unitarization: information was summarized in units that could be analyzed. 3. Categorization: the units were condensed into categories. 4. Description: the messages were analyzed carefully. 5. Interpretation: The data were interpreted and analyzed critically, and inferences were made about the reality addressed in the study.[14]

The approach used in the implementation of FNE activities described by the managers was analyzed according to the following aspects: social, environmental and economic sustainability and approach to the food system as a whole; appreciation of local food culture and respect for different opinions and perspectives; food and eating as references, the value of cooking as an emancipatory practice, and promotion of self-care and autonomy.[2]

Since secondary data from the award database were used, there was no need to use the terms of consent for this study. The project was sent to the Ethics and Research Committee (CEP) of UNIFESP and approved (protocol number 02519/2016).

RESULTS

In 2010, 786 municipal schools (which corresponds to 14.1% of the cities in Brazil) enrolled in the "Efficient School Meal Manager" Award. Most of them reported including the theme FNE in the school curricula, but less than half of them held cooking workshops, developed pedagogical gardens or used food provided by family farmers. There was a statistical difference between the Great Regions and the development of school gardens and use of food provided by family farmers, as shown in Table 1.

Table 1. Food and nutrition education actions associations according to Great Regions of Brazil in 2010.(n=786)

Variable	FNE[a] in school curricula		Purchase from family farmers		Development of pedagogical Gardens		Offer of cooking Workshops	
Greater Region	n	%	n	%	n	%	n	%
West central (n=75)	43	59.7	36*	49.3	35*	74.5	24	34.8
Northeast (n=138)	79	58.5	59*	43.7	41*	68.3	47	35.1
North (n=27)	16	64	13*	54.2	11*	68.8	8	34.8
Southeast (n=322)	185	59.3	101*	32.2	117*	62.2	89	28.5
South (n=224)	143	65.9	134*	61.2	118*	83.1	75	33.8
Total	466	59	343	44	322	41	243	31

* Descriptive level of significance for Pearson's x^2 association test: $p < 0.05$

[a] FNE - Food and Nutrition Education

There was predominance of passive methods in the implementation of FNEs actions, as shown in Table 2.

Table 2. Description of the theoretical-methodological approaches in FNE reported by the Brazilian cities enrolled in the Manager Award in 2010. (N = 601)

Methods	n(%)
Conduction of lectures	281(46,7%)
Interdisciplinary strategies	203(33,7%)
Staff training - teachers and school cooks	192(31,9%)
Community Integration - Education for parents/guardians	186(30,9%)
Educational ludic activities	169(28,1%)
Offer of healthy food	142(23,6%)
School gardens	119(19,8%)
Iconographic image sources (Food Pyramid)	114(19%)
Cooking workshop	105(17,5%)
Design and/or distribution of information material and videos	62(10,3%)

Out of those who reported holding cooking workshops as an FNE method, 47.6% did not specify the theme. The most frequent theme was preparation of fruit and fruit salad (20%), followed by food from the school garden (8.6%), cakes (7.6%), reuse of food waste (6.6%), juices (6.6%), sandwiches (6.6%) and traditional regional meals (3.8%). Among the 169 (28.1%) towns and cities that performed educational ludic activities, the performance of theater plays and puppet shows were the most frequent method (56.2%), followed by pedagogical games (20.1%) and art and painting (17.1%). Of those 192 (31.9%) towns and cities that reported training of employees, 76 (39.6%) reported training them in good practices and 73 (38%) in healthy eating. However, only 31 (16.1%) specifically reported training teachers and school staff in FNE multipliers. A manager from a town in the state of Santa Catarina pointed out that:

> "[...] In the meetings held with the CAE (School Feeding Council), the nutritionist sought to discuss issues and aspects relative to Nutrition and Food Education, Healthy Child Nutrition, Food Hygiene and Manipulation and menu design with the counselors, seeking to broaden their knowledge as well as raise awareness of their performance". 297SC

The analysis of sustainability and stages of the food system in the activities, strategies and approaches, only 19.8% reported activities in school gardens, as shown in Table 3.

Tabela 3. Description of the approaches and contents relative to sustainability, stages of the food system and strategies to appreciate the local culture reported by the Brazilian towns and cities enrolled in the Manager Award in 2010. (n = 601)

Approaches (A)	n(%)
Activities in School Garden	119(19,8%)
Menu adapted to the region/ Respect for the Local Culture	16(2,7%)
Lectures on the subject	11(1,8%)
Classroom Activities	11(1,8%)
Contents (B)	**n(%)**
Food production/ Industrialization/ Organic/ Agrochemicals/ Seasonality	19(3,2%)
Food Waste	18(3%)
Water	8(1,3%)

Among the towns and cities that described the themes of educational activities, 87 (14.5%) used the importance and function of nutrients as the main theme, as well as the consequences of a poor diet. A town in São Paulo reported the need to educate infants about the role of nutrients in a day care center:

> "Day care students need specific guidance because they are in the development and learning phase, and they need to understand the importance of each food for the body" 337 SP

Most of the educational activities described by the cities were reported as one-off activities (61.2%); they were carried out on specific dates and celebration dates, 191 (31.8%) towns and cities reported regular activities and only 18 (3%) described continuous activities. Twenty-four (4%) towns and cities did not report the frequency of activities.

DISCUSSION

The great number of towns and cities that reported FNE in the school curriculum, development of school gardens and purchase of food from family farmers shows that a public health policy can stimulate the implementation of FNE activities and positively influence population health. The results of the present study are consistent with those found in the Brazilian literature about the impact of PNAE on FNE activities. A study conducted in the state of Goiás pointed out that most towns and cities carried out FNE activities. However, they were one-off, semi-annual (25.26%), and they used a passive approach; 81.7% mentioned the conduction of lectures as their main method.[15]

The same predominance of passive methods was in a systematic review that sought to evaluate the different methods used in national studies from 2016 to 2017. There was a significant increase in the number of studies in the period of analysis, and the review pointed to the use of methods such as group dynamics, dialogue-based classes, workshops, panels, games, lectures, as well as use of audiovisual resources, e.g., the food pyramid, with testimonials about the positive effects on motivation and participation in the activities proposed. However, no study had used the term "active methods", which was indicative of the lack of knowledge about this concept and the importance of it. The authors concluded that the field of pedagogy should be included in the training of nutritionists and explored more thoroughly, and that it should be approached in the curriculum longitudinally, rather than only in one single course.[16] This conclusion is supported by the study of Cabral et al.[17]

Another systematic review sought to analyze the impact of FNE on obesity prevention initiatives in students over the last decade. It revealed a shortage of studies in the field, and discussed this paradox, since the subject has been approached continuously in scientific events and official documents in the last years. The analysis of methodological strategies showed a predominance of ludic and short-term activities, with little or no integration of active methods. However, there were positive results, such as improving knowledge about healthy eating and food behavior changes, as well as strong involvement of teachers in the interventions; thus, the importance of training in FNE multipliers was recognized. The authors concluded that there is an urgent need for research and academic publications on this subject.[18]

About the lack of the FNE studies in PNAE, the study of Libermann and Bertolini[19] shows that most research on PNAE tends to focus on food and nutritional security strategies, with analyses of production and acceptance of school meals and development of better living conditions for farmers. There are still few studies on the results of active FNE methods.

This predominance of passive and expository methods in FNE activities can be explained by the fact that the study of Food and Nutrition Education was, as in most sciences, negatively affected by the traditional, reductionist, cartesian biomedical model, based on information transmission with the hegemony of passive techniques.[20,21] In addition, these methods are easy to implement, inexpensive and require few materials. Moreover, nutritionists, who are responsible for implementing such methods,[15] can perform this task quickly, without undermining any compulsory school assignments.[22] However, the current tendency is to seek innovative and problematization methods that allow an ethical and transformational pedagogical practice that goes beyond the limits of technical training to reach the comprehensive education of man as a historical being.[23] Lectures can be used as an introduction to a topic but must necessarily be associated with other methodologies.[23] Access to information (cognition) is necessary, but not sufficient, because of the non-rational and unconscious dimensions that inhabit human volition and other determinants of food choice, e.g., the social and the food environments.[24]

The Southern region seems to adapt better to the requirements of PNAE, since it has the largest number of towns and cities that used food from family farmers and that carried out pedagogical gardens, and it presented a significant statistical difference. The south also stood out in other studies; for example, Chaves et al.[25] found that most school menus included a traditional preparation per week, and Machado et al.[26] pointed out a larger number of towns and cities that purchase food from family farmers, with significant differences. Thus, the southern region seems to better apply the principles of PNAE and the Food and Nutrition Education Reference Framework for Public Policies,[2] either by appreciating local cuisine or promoting sustainable food systems. Therefore, a cautious analysis of these phenomena is necessary to identify regional characteristics that allow greater adhesion to the program, so that these results can be achieved all over Brazil.

Family farming (FF) has a significant contribution to Brazil's Gross Domestic Product (GDP), mainly in the north, south and northeast regions.[27] The southern region is typically agricultural, culturally rural, unlike the southeastern region, which is predominantly urban. This may influence the use of food from family farmers, both in terms of access to this kind of food and appreciation of family farming. Therefore, family farming has to be strengthened to stimulate consumption of fresh regional food and promote social diversity and respect to local cuisine and traditional eating habits.[28]

School gardens and cooking workshops are excellent strategies to build environmental awareness and stimulate food autonomy; however, lack of time, appropriate location, materials, planning and skilled labor may be constraints on the execution of these activities.[29,30] Doria et al.[31] sought to analyze how a school garden could promote health from the perspective of students; they found that this method is a powerful strategy, and makes important contributions to the development of personal skills, social participation and empowerment. However, the authors also discussed the small number of papers published about this theme, and the outcomes of gardens relative to health promotion have been little explored by researchers. Silva et. al.[32] evaluated the effect of four cooking workshops offered to students in a Brazilian public school and found more acceptance of food from school meals, which they considered to be evidence that this method was effective even in the short term.

Interdisciplinary strategies were frequently cited by towns and cities, showing that most of them were adapting the school curriculum according to PNAE´s Law no. 11.947/2009, which establishes guidelines for school feeding,[8] while emphasizing the importance of including FNE in teaching, learning and school curricula. Several professionals and sectors can, and should, develop FNE activities,[2] provided that they are trained to do so.

FNE multiplier training with teachers, staff and school community is an excellent strategy to promote healthy eating habits in schools, since children are influenced by the adults around them,[33] who act as powerful role models and may increase students' awareness of health issues.[34] In the school environment, teachers are also responsible for these activities, and they must be encouraged to act as mediators.[15] Measures to stimulate teachers to act as mediators of FNE are important for the effective promotion of health in the school environment.[35] The School Feeding Council (CAE), which promotes social control of PNAE, could hold this training.

Regarding educational approaches, little was said about sustainability, stages of the food system and appreciation of local culture and cooking, and predominant teaching about nutrients over food, probably because nutrition is often viewed as a biomedical science based on the cartesian model.[36] However, the act of nurturing must be considered as a social practice that brings to light sociocultural dimensions, symbolic, affective and sensorial values of food, as well as the appreciation of different food cultures.[37] The Food and Nutrition Education Reference Framework for Public Policies[2] brought to light the importance of education on food and habits and culture, rather than nutrients, and the relevance of adding the word "Food" in all "Nutrition Education" initiatives, including courses in undergraduate nutrition programs "(Food and) Nutrition Education". Still, even if the teaching of nutrition and nutrients is necessary, the theme must be suitable to students' stage of development and their learning ability, as young, pre-school and school age children are not able to understand complex concepts of nutrition.[38]

In the international scenario, the Academy of Nutritional and Dietetics, the School Nutrition Association and the Society for Nutrition Education and Behavior also advocate comprehensive and integrated nutrition programs for schools in their Position Paper. These American agencies recommend specific strategies for improving students' health, e.g., food and nutrition services through all school years, nutrition initiatives such as farm and school gardens, wellness policies, nutrition education and promotion, food and beverage marketing at school and strong accountability mechanisms.[39]

The deficiencies pointed out by this research can be summarized as follows: lack of space and trained professionals, inadequate planning, methods and short duration - deficiencies also stated in the study of Silva et al.[15] When there is no space to carry out FNE activities, one can identify supporting structures to increase the feasibility and continuity of these activities.[40] The ongoing activities described in the award may probably achieve better results than those short-term actions carried out on specific dates,[41] but more research is in need to determine this phenomenon.

The extensive use of passive methods may be explained by the technical and biological nature of nutritionists' education, which still uses traditional approaches with the hegemonic biomedical model approach and a fragmented curricular structure. Thus, interaction with human and social sciences is hindered,[21] and professionals may not be properly supported in their pedagogical performance.[42] Nutritionists' workload and lack of management support can also be strong determinants of FNE activities in the school environment.[43]

The enrollment in the Award was voluntary and only those who considered their practices to be appropriate were the ones that participated; therefore, there could be a certain bias in the results. The data were filled in by the school manager without supervision or training, which resulted in differences in the amount and quality of answers. However, there was a large amount of information which highlighted important issues and shed some light to methods and development of FNE.

An integrated way to address these shortcomings could be to improve the syllabus of nutrition undergraduate courses, strengthening the curriculum with human and social courses, as well as to appreciate the role of this professional in the health and food public policies.

CONCLUSION

Food and Nutrition Education activities were present in most Brazilian towns and cities, and the method for development of school gardens was used more frequently. The theme FNE in the school curricula was present in most towns and cities, but less than half of them offered cooking workshops and pedagogical gardens. The purchase of food from family farmers was also present in most of the towns and cities; however, it was predominant in the south. The southern region seems to better adapt to the requirements of PNAE, indicating the need for continuous analysis of this phenomena, so that these results can be developed in all regions of Brazil.

There was a predominance of passive methods, and the conduction of lectures was the method reported most often, of one-off actions when implementing FNE in Brazilian cities, as well as appreciation of nutrition (nutrients and functions), to the detriment of food and local food culture, with little discussion on sustainability, stages of the food system and strategies to strengthen the local culture. There is evidence of a lack of knowledge about the definition and importance of active methods.

The implementation of active methodologies with a comprehensive approach to food should be encouraged. School gardens, cooking workshops, interactive ludic activities, interdisciplinary strategies and integration and training of the academic community and families should also be encouraged, since there is strong evidence that they are effective. A way to address this is to strengthen the nutrition undergraduate syllabus by including human and social courses, as well as to appreciate the role of nutritionists in health and food public policies.

A public health policy can stimulate the implementation of FNE activities and positively influence population health, but in order for that to happen, it must be carefully, comprehensively and consistently planned according to the current social and economic reality, with strong accountability mechanisms.

This research has increased the theoretical background about FNE in schools, specially involving in a public policy that offer meals to students. PNAE is one of the largest school meal programs in the world, and their experience can be important for implementation of FNE guidelines in schools.

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Collaborators

We certify that all authors have participated substantially in the conception of this work, since the discussion of the topic, preparation of the initial draft to the writing of the manuscript. Furthermore, all authors have read and approved the final version of the manuscript for submission, taking all responsibility for its content.

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