FOOD AND NUTRITION IN COLLECTIVE HEALTH
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Knowledge and perception of self-efficacy and collective efficacy of teachers about the Food Guide

Conhecimento e percepção de autoeficácia e eficácia coletiva de professores sobre o Guia Alimentar

Abstract

Introduction: In the process of health education to change the individual's health habits, they need to have knowledge, present positive self-efficacy beliefs and share collective efficacy. ***Objective:*** To evaluate the knowledge and perception of self-efficacy and collective efficacy of teachers about the Food Guide for the Brazilian Population. ***Method:*** A cross-sectional study was conducted from December 2019 to December 2020. The study population consisted of 1,491 Basic Education teachers from the municipal public school system of Montes Claros, Minas Gerais. For the sample, the minimum size of 511 teachers was estimated and an online questionnaire was used to collect data. As for the evaluation of knowledge, perception of self-efficacy and collective efficacy of teachers about the Food Guide, self-administered and previously validated scales were used. The data collected were categorized and processed electronically through the Statistical Package for the Social Sciences (SPSS) software, version 22.0. ***Results:*** In the analysis of teachers' performance regarding the Food Guide, 79.7% (474) of the professionals had low knowledge; 70.4% (419), low self-efficacy; and 69.1% (411), low collective efficacy. High knowledge among teachers was associated with higher per capita income (p = 0.004). High self-efficacy was associated with higher educational level (p = 0.031). High collective self-efficacy was associated with the variables income (p=0.035) and schooling (p=0.004). ***Conclusion:*** The teachers of this study showed low knowledge and low perception of self-efficacy and collective efficacy about the Food Guide.

Keywords: Food and nutritional education. School health. Food. Food guide.

Resumo

Introdução: No processo de educação em saúde para que o indivíduo mude seus hábitos de saúde, é necessário que tenha conhecimentos, apresente crenças de autoeficácia positivas e compartilhe a eficácia coletiva. ***Objetivo***: Avaliar o conhecimento e a percepção de autoeficácia e eficácia coletiva de professores sobre o Guia Alimentar para a População Brasileira. ***Método***: Realizou-se estudo transversal no período de dezembro de 2019 a dezembro de 2020. A população do estudo foi composta por 1.491 professores da Educação Básica da rede pública municipal de ensino de Montes Claros, Minas Gerais. Para a amostra, estimou-se o tamanho mínimo de 511 professores e foi utilizado um questionário *on-line* para coleta de dados. Quanto a avaliação do conhecimento, percepção de autoeficácia e eficácia coletivados professores sobre o Guia Alimentar, utilizaram-se escalas autoadministradas e previamente validadas. Os dados coletados foram categorizados e processados eletronicamente através do *software* Statistical Package for the Social Science (SPSS),

versão 22.0. *Resultados*: Na análise do desempenho dos professores quanto ao Guia Alimentar, observou-se que 79,7% (474) dos profissionais apresentaram baixo conhecimento; 70,4% (419), baixa autoeficácia; e 69,1% (411), baixa eficácia coletiva. O alto conhecimento entre os docentes foi associado à maior renda *percapita* (p= 0,004). A alta autoeficácia foi associada ao maior grau de escolaridade (p= 0,031). A alta autoeficácia coletiva foi associada às variáveis renda (p=0,035) e escolaridade (p=0,004). *Conclusão*: Os professores do presente estudo demonstraram baixo conhecimento e baixa percepção de autoeficácia e eficácia coletiva sobre o Guia Alimentar.

Palavras-chave: Educação alimentar e nutricional. Saúde escolar. Alimentação. Guia alimentar.

INTRODUCTION

There has been, worldwide, a simultaneous transition in the epidemiological, demographic and nutritional profiles of the population. In Brazil, there were changes in the lifestyle of individuals and eating patterns, by replacing traditional meals based on fresh or minimally processed foods by processed and ultra-processed food. This has led to an increase in diseases related to overweight, such as obesity, diabetes and hypertension.[1-3]

An unhealthy diet is one of the four risk factors that lead to the development of chronic non-communicable diseases (CNCDs), in addition to alcohol and tobacco consumption and sedentary lifestyle. These diseases account for 63% of all causes of death in the world. They represent losses to society, and to deal with the overload brought by the CNCDs, the Brazilian government has created and implemented public policies in various governmental spheres.[4]

The Brazilian Ministry of Health included in the Federal Constitution the Human Right to Adequate Food.[5] Healthy eating should be stimulated even in the first years of the child's life.[6] Nutritional balance at this stage also has an impact on future adults, which will incur a lower risk of developing diseases and will have a longer life expectancy.[4]

The school is the main environment of coexistence of the child, thus healthy and adequate food in this place should be fostered.[7] Interministerial Ordinance No. 1,010, of May 8, 2006, established guidelines for the promotion of healthy eating in early childhood, elementary and secondary education schools in public and private networks, nationwide.[8] Currently, the school not only aims to meet the nutritional needs of students during their stay in the classroom, but also to promote the formation of healthy eating habits, which are one of the most important aspects for health and growth, learning and school performance, which can contribute to the quality of education.[9] Teachers, together with the school community, have the important role of performing actions for such promotion.[8]

Food and Nutrition Education (FNE) is a strategy for promoting health and healthy eating, and has in schools a place for its development.[10] For effective FNE actions, specific training of the professionals involved in these programs is important. To assist in the promotion of FNE, it is based on the Reference Framework for Food and Nutrition Education for Public Policies and the Food Guide for the Brazilian Population.[11] The Guide was designed to be used in any space, even in the school environment. It aims to promote the practice of healthy eating, improve the nutrition of the population and contribute to health promotion.[12,13]

The teachers have a recognized essential role in the process of dissemination of knowledge in food and nutrition, as they are the agents assigned to elaborate and execute the political projects.[14] The United Nations Food and Agriculture Organization (FAO) considers the training of facilitators important in order to universalize the Guide and its precepts.[15]

In the process of health education, for the individual to change behavior in relation to health habits, it is necessary to have knowledge, to present positive self-efficacy beliefs and to share in collective efficacy. Teacher self-efficacy concerns belief in one's own ability to have a relevant effect on student engagement and learning; collective efficacy is defined as a shared group belief of joint capabilities to organize and execute the courses of actions required to produce certain levels of tasks.[16] Self-efficacy beliefs work as drivers for behavior change. Individuals with high self-efficacy beliefs perceive obstacles as capable of overcoming, while individuals with low self-efficacy belief do not believe that their efforts would be valid.[17-19] It is a teaching-understanding strategy of more active essence, based on educational processes centered on the protagonism of the individual, on interparliamentary collaboration and on the establishment of goals.[20] The beliefs that individuals share can also influence their collective responsibility to change habits, important role in promoting healthy eating in the school context.

Due to the relevance of teachers' theoretical basis to develop nutritional education in the classroom, which can be acquired through the content of the Food Guide, it becomes important to evaluate their level of knowledge and self-confidence as the aspects involved in the theme of healthy eating. The objective of this research is to evaluate the

knowledge and perception of self-efficacy and collective efficacy of teachers about the Food Guide in the city of Montes Claros, Minas Gerais.

METHOD

This is a cross-sectional study conducted from December 2019 to December 2020. The study population was composed of all 1,491 teachers of basic education - early childhood, elementary and youth and adult education in the 114 schools of the municipal public school system distributed in urban and rural areas of Montes Claros, Minas Gerais, Brazil. All teachers linked to the municipal schools of basic education who practiced teaching were invited to participate, excluding those in deviation from the teaching function or away from work.

To define the size of the study sample, the following parameters were considered: estimated prevalence of 50%, 95% confidence level and 5% margin of error, with correction for the finite population (n=1,491). Correction was performed for the design effect by adopting Deff = 1.5 and, to compensate for possible losses, an increase of 20% was established. The minimum size of 511 teachers was estimated.

For data collection, an online questionnaire was used, sent via Google Forms, to teachers. The teachers were invited to participate in the research and received the Informed Consent Form (ICF), with the option to indicate "yes" to the question regarding agreement to participate in the research. Those who consented to participate in the survey answered the online questionnaire in the average time of 10 minutes. The instrument included the following variables: 1) sociodemographic: sex, age, marital status, per capita family income, skin color, marital status; 2) aspects of training and occupation: degree, teaching time; 3) approach of the contents of food in the classroom.

For teachers' evaluation of knowledge about the Food Guide, perception of self-efficacy and collective efficacy, self-administered and previously validated scales were used. The instruments, which already exist for health professionals, were adapted for the target audience of this study.[21] GAB1 is the first scale and directly measures the knowledge of teachers through 16 statements on recommendations contained in the Food Guide, with three answer options ("true", "false" and "I do not know"). Each correct answer corresponds to a point, with knowledge score ranging between 0-16 points. The final sum of the answers of each respondent for GAB1 was calculated, considering the answer "I do not know" as incorrect, and classified the participants in: "high knowledge" (percentile 75 or more) and "low knowledge" (percentile below 75).[19]

The second scale is GAB2 and contains 24 items with four response patterns on the Likert Scale. It evaluates two aspects that would be both the perception of self-efficacy for applying the instrument (1=not confident at all to 4=very confident), and collective efficacy, that is, the perception of the team's performance (1=false to 4=very true) to apply the Food Guide in actions to promote adequate and healthy eating. Then, the results of this application are grouped: performance on the 12 self-efficacy items generated the groups "*not confident*" (responses "*not confident at all*" and "*somewhat confident*") and "*confident*" (responses "confident" and "very confident"); and the 12 collective efficacy items generated the groups "*false*" (responses "*false*" and "*sometimes true*") and "*true*" (responses "*true*" and "*very true*"). And the percentiles of the sum of "*confident*" and "*true*" responses are calculated, classifying them into: percentiles 75 or more (respondents with "*high self-efficacy*" and "*high collective efficacy*") and percentiles below 75 (respondents with "*low self-efficacy*" and "*low collective efficacy*").[19]

The Municipal Department of Education of Montes Claros was asked to authorize the research by presenting the Institution Agreement Form (IAF). After signing the form, the directors were made aware of the importance of the research and invited to share with their team of teachers on digital communication platforms. They received a link to access the questionnaire, as well as guidelines and the Informed Consent Form (ICF).

The data collected were categorized and processed electronically through the Statistical Package for the Social Sciences (SPSS) software, version 22.0. Descriptive analyses of the variables were performed, with the presentation of absolute and relative frequencies (%). Pearson's chi-square test was used in the association analysis.

The research obeyed all ethical criteria and was approved by the Research Ethics Committee of the State University of Montes Claros (Unimontes), with the opinion n. 3,586,107.

RESULTS

The participants were 595 teachers from the city of Montes Claros, being 92.4% (550) women with a mean age of 44.9 years (±7.67). Among teachers, 65.0% (387) had graduate degree, 35.0% (208) had postgraduate degree, 72.8% (431) had non-white skin color, 66.1% (393) lived with a partner, 59.9% (345) had income below the average (1,474.35 BRL) and 67.9% (402) reported being teaching for less than 20 years (Table 1).

Table 1. Sociodemographic and work characteristics of the teachers. Montes Claros, MG, 2020.

Variable	n	%
Sex		
Female	550	92.4
Male	45	7.6
Age (years)		
≤ 45	325	54.8
> 45	268	45.2
Schooling		
Post-graduation	208	35.0
Technician/Graduated	387	65.0
Marital Status		
With partner	393	66.1
Without partner	202	33.9
Skin color		
White	164	27.6
Non-white	431	72.8
Per capita income		
Average (1,474.35 BRL)	231	40.1
< Average (1,474.35 BRL)	345	59.9
Years teaching		
≤ 20	402	67.9
> 20	190	32.1

In the analysis of teachers' performance regarding the Food Guide, 79.7% (474) of professionals had low knowledge; 70.4% (419), low self-efficacy; and 69.1% (411), low collective efficacy (Table 2).

Table 2. Knowledge and perception of self-efficacy and collective efficacy of the teachers. Montes Claros, MG, 2020.

Variable	n	%
Knowledge (GAB 1)		
Percentiles below 75	474	79.7
Percentiles 75 or more	121	20.3
Self-efficacy (GAB2)		
Percentiles below 75	419	70.4
Percentiles 75 or more	176	29.6
Collective efficacy (GAB2)		
Percentiles below 75	411	69.1
Percentiles 75 or more	184	30.9

Regarding the approach to the theme "Healthy Eating" in schools, 21.8% (63) of educators reported not addressing continuously throughout the year. In the way of working this theme, 79.8% (475) of teachers make use of playful resources and 81% (482) of schools report receiving external interventions of food and nutritional education for students. In the perception of 89.7% (534) of teachers, students assimilated the content about healthy eating in food and nutrition education actions in schools.

In planning the class with the theme of healthy eating, the main resources used by teachers to prepare are books and the internet. In the actions on food education in the classroom, teachers reported as the main approaches the "importance of food" (97.1%), "what is a good diet" (96.1%) and "food hygiene" (95.0%) in nutritional education activities (Table 3).

Table 3. Actions of food education in the classroom. Montes Claros, MG, 2020.

Actions	n	%
The importance of eating	578	97.1
Good eating	572	96.1
Food hygiene	565	95.0
Food origin	504	84.7
Food pyramid	393	66.1
Eating groups	405	68.1

The analysis of factors associated with knowledge, self-efficacy and collective efficacy of teachers is represented in Table 4. High knowledge among teachers was associated with higher per capita income (p = 0.004). High self-efficacy was associated with higher educational level (p = 0.031). High collective self-efficacy was associated with the variables income (p=0.035) and schooling (p=0.004).

Table 4. Analysis of the association between sociodemographic and work characteristics with the knowledge, self-efficacy and collective efficacy of teachers. Montes Claros, MG, 2020.

	High knowledge n (%)	High Self-efficacy n (%)	High Collective efficacy n (%)
Sex			
Female	112 (20.4)	150 (27.3)	164 (29.8)
Male	9 (20.0)	26 (57.8)	20 (44.4)
p-value	0.954	<0.001	0.041
Age (years)			
≤ 45	64 (19.7)	104 (32.0)	103 (31.7)
> 45	56 (20.9)	72 (26.9)	81 (30.2)
p-value	0.717	0.173	0.700
Schooling			
Post-graduation	50 (24.0)	73 (35.1)	80 (38.5)
Technician/Graduated	71 (18.3)	103 (26.6)	104 (26.9)
p-value	0.100	0.031	0.004
Marital Status			
With partner	77 (19.6)	118 (30.0)	127 (32.3)
Without partner	44 (21.8)	58 (28.7)	57 (28.2)
p-value	0.530	0.740	0.306
Skin color			
White	39 (23.8)	48 (29.3)	54 (32.9)
Non-white	82 (19.0)	128 (29.7)	130 (30.2)
p-value	0.198	0.918	0.514
Per capita income			
Average (1,474.35 BRL)	62 (26.8)	74 (32.0)	82 (35.5)
< Average (1,474.35 BRL)	58 (16.8)	96 (27.8)	94 (27.2)
p-value	0.004	0.278	0.035
Years teaching			
≤ 20	84 (20.9)	123 (30.6)	126 (31.3%)
> 20	37 (19.5)	53 (27.9)	58 (30.5)
p-value	0.689	0.502	0.841

DISCUSSION

The teachers of this study demonstrated low knowledge, self-efficacy and collective efficacy, which can negatively influence their teaching practice to promote healthy eating in school. The school environment is a prominent place in the teaching-learning process through the development of actions aimed at promoting and educating children in health. Schools allow the education through knowledge from different sources of knowledge, including teachers' knowledge, who play a relevant role from the ability to encourage healthy behavior and attitude from students.[7]

A research conducted in 2015 by Aldubayan,[20] in Saudi Arabia, verified the perspectives of teachers on nutritional education in public high schools for boys. The sample consisted of teachers from the areas of Biological Sciences, Physical Education and Health Education. The author concluded that most teachers had an interest in teaching nutrition, but there were obstacles, such as training and insufficient teaching materials, which consequently affected their confidence in teaching nutritional education in the classroom.

A study previously carried out with public school teachers in the city of this research found that most had moderate knowledge about healthy eating and did not have specific training to work on the subject in the classroom.[22] These results corroborate the findings of this research that these professionals, as responsible for educational actions on healthy eating, still need training to be able to play this important role.

In an investigation carried out in the context of Primary Health Care, knowledge and perception of self-efficacy and collective efficacy were compared to apply the Food Guide among nutritionists and other health professionals (non-nutritionists) and showed that being the professional specialist was associated with greater knowledge and greater self-efficacy.[19] The teachers of the present study showed results similar to those of non-nutritionists in terms of knowledge, self-efficacy and collective efficacy. This result suggests how actions aimed at food and nutritional education are seen exclusively as the field of action of the nutritionist, when, in fact, the FNE proposes a sharing of responsibility, in which educational interventions need to overcome their biomedical links, starting from an individual responsibility to the collective.[23]

Among the participating teachers, the variable sex was associated with high self-efficacy. A survey conducted with graduate students in Physical Education, being 43.9% female and 56.1% male, found a difference in relation to sex concerning self-efficacy for control of the classroom, favoring the male sex in this sense. As in this study, the variable sex was associated with high self-efficacy for males.

The variable schooling was associated with high levels of self-efficacy and collective efficacy.[25] For Dunn et al.,[26] teachers are responsible for offering various classroom education programs that address nutrition, although such professionals have gaps in knowledge and self-efficacy in nutritional education. The solution found for this was the professional development of teachers as a strategy to improve the effectiveness of these programs in nutritional education. Several activities can be carried out in this sense, such as workshops, conferences and other organized activities.[27] This indicates that engaging in other professional development activities helps to improve teaching skills, as was found in this study, where higher levels of schooling were associated with high self-efficacy and high collective efficacy.

The income variable was associated with knowledge and high collective efficacy. The WHO defines "health literacy" as "cognitive and social skills that determine the motivation and ability of individuals to have access to understand and use information in order to promote and maintain good health".[28] There is a relationship between this literacy and social inequalities. Factors such as low income were associated with lower levels of health literacy, which, in turn, leads to worse health outcomes.[29] This finding is in agreement with the results of this study, which associated teachers with higher per capita income with higher levels of knowledge about the Food Guide.

The Interministerial Ordinance n. 1.010, of May 08, 2006, and the National School Feeding Program (PNAE - *Programa Nacional de Alimentação Escolar*) bring in their guidelines the need to address issues related to food education and nutrition in schools.[8,30] Law n. 13,666, of May 16, 2018, amending Law n. 9,394 of 20 December 1996 (National Education Guidelines and Bases Law), which includes, among the

cross-sectional themes food and nutrition education in the school curriculum, pointing out that the actions of the FNE can use the different knowledge and themes related to food, in the fields of culture, history, geography, among others, so that food and eating are specific learning content and a resource for learning different themes.[30] In the present study, a relevant percentage of teachers reported that the theme "Healthy Eating" is not part of their programmatic content, contrary to what is advocated by public policies. This datum has considerable social impact, because the school as a place of knowledge has the power to transcend its physical boundaries. That is, what is taught in the classroom extends to the community and outside it, because the students take to their living environment the teachings acquired there, being able to exert strong sociocultural influence.[7]

Still within the scope of Brazilian public policies aimed at promoting the health of the school population, it is necessary to maintain and carry out the School Health Program (PSE - *Programa Saúde na Escola*). The creation of the PSE as an intersectoral policy of Health and Education took place through Presidential Decree n. 6.286, of December 5, 2007, and is the result of the integration of the Ministry of Health and the Ministry of Education, in order to contribute to the training of public school students through integrated and articulated actions between schools and health teams. The PSE is part of the Health Promotion axis, present in the Strategic Action Plan for Coping with Chronic Non-Communicable Diseases (CNCD) in Brazil – 2011-2022, whose one of its objectives is to reduce the prevalence of obesity in children. The PSE, in turn, is configured in different components and their respective actions, including the promotion of healthy eating of students.[7]

Students' knowledge of healthy eating can have a positive social impact. Silveira et al.[31] sought to raise, from the perspective of parents, the effect of school activities on healthy eating among school children. The authors found that there were changes in the eating habits of the children after performing school activities, including the interest in trying new foods and increased consumption of fruits and vegetables. This had an impact on family relationships, as it favored mutual adherence to improved living habits.

Regarding the use of different methodologies in the educational scenario, Vale et al.[32] conducted research with teachers and elementary school students on the relevance of recreational activities during nutrition education actions in schools as an incentive to healthy eating. Their study showed that the use of booklets that contained various play-based activities contributed to encourage the improvement of eating habits, being excellent support material for teachers to disseminate this theme in the school environment. In this research, most teachers reported using playful resources during the teaching of FNE actions in the classroom.

Organized civil society may be able to develop actions of FNE.[33] However, for this to occur, there is need to have, on the part of the State, public processes guided by transparency aimed at selection and accreditation so that institutions can act legally, and their actions have the landmark as a foundation. Among the teachers participating in the research, a large part reported receiving external interventions of nutritional education actions in their schools, which is a positive point, because the exchange of information can improve knowledge of students about healthy eating.

Adequate nutrition has an impact on the physical and mental well-being of the individual, as it is able to meet biological needs, ensuring the necessary conditions for the proper functioning of the human organism, maintaining the quality of life, preventing and treating diseases, having influence on the process of growth and development, as well as on cognitive and psychomotor capacity, thus intervening in the

social and economic aspects.[5] The teachers investigated reported the relationship between poor nutrition of students and performance in the classroom.

Given the above, regarding the relevance of performing the FNE in the classroom, as well as the importance of the teacher as an agent of transformation, there is a need for continued training for these professionals. Although the nutritionist does not assume the direct responsibility of teaching classes in the FNE, this professional is responsible for coordinating, with the school community, the ways of approaching the content in this area, whether pedagogical, playful, among others.[8]

Schools are expected to realize the relevance of maintaining and performing activities related to healthy eating in their pedagogical planning. Changes in eating habits can be beneficial not only to the individual, since they reach the entire family and social context. Raising the level of preparation perceived by teachers to perform the actions of the FNE allows the contribution to better reflection of how the resources available for the foundation have been used. Subsidies can be provided for the establishment of public policies, as well as the creation of campaigns to reinforce the need to continuously work on the theme involving food and nutrition in the school environment.

This study has limitations. The cross-sectional design hinders the definition of cause and effect. The sample is restricted to professionals from a single city, despite being representative. Moreover, due to the application of questionnaire in the online format, there is impossibility of aid when the participant does not understand a question, despite not knowing the circumstances in which the questionnaire was answered.

The dispersion of teachers between schools was not evaluated in this study. The lack of identification of the thematic area of the teacher's performance was also a limitation.

CONCLUSION

The teachers of this study demonstrated low knowledge, self-efficacy and collective efficacy. They reported that external interventions, as well as playfulness, were used and encouraged the improvement of eating habits by students, in which the relationship between food and performance in the classroom was observed. Teachers also presented gaps in knowledge about healthy eating, which is detrimental to the promotion of healthy eating in school.

Considering the results, broader and more effective interventions should be performed in the qualification of education professionals, so that health promotion is performed optimally, as recommended. Investigating how teachers from other locations are implementing the recommendations of the Food Guide becomes essential as a diagnosis for public policies for permanent education in healthy eating. Public policies for the effective institutionalization of nutritional education actions in the school environment are necessary.

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Contributors

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