

Knowledge, Attitudes and Practices of Primary School Teachers on Nutrition and Food

Conhecimento, atitudes e práticas de professores de escola primária em nutrição e alimentação

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Abstract

Introdution The teacher's formation is a paramount condition for the education in health.

Objective To develop a questionnaire and assess knowledge, attitudes and practices of early years school teachers.

Methodology a questionnaire about nutrition and feeding was applied. The subjects were teachers from pre-school to 5th grade of Elementary School.

Results There were 288 teachers in the survey. They were all in favor of the promotion of a healthy feeding in school. The source of information mostly used was the textbook. 76% thought they had good knowledge about a healthy diet. The average number of positive/correct answers was 21 (48%).

Conclusions The knowledge about nutrition and feeding were insufficient and the general performance in the questionnaire was low. Actions that aim at qualifying the teachers are urgent, so that they can develop the necessary tools to promote a healthy feeding in schools.

Keywords

- ► education
- feeding
- ► food and nutrition education

Resumo

Introdução A formação do professor é condição indispensável para a educação em

Objetivo Desenvolver um questionário e avaliar conhecimentos, atitudes e práticas de alimentação e nutrição de professores do ensino fundamental.

Metodologia Foi elaborado e aplicado questionário sobre nutrição e alimentação. Os sujeitos foram professores da pré-escola ao 5° ano do Ensino Fundamental.

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Palavras-Chave

- nutrição em saúde pública
- ► alimentação
- docentes
- educação alimentar e nutricional

Resultados Participaram da pesquisa 288 professores. Todos foram a favor da promoção da alimentação saudável na escola. A fonte de informação mais utilizada foi o livro didático. 76% consideraram ter bons conhecimentos sobre alimentação saudável. A média de respostas positivas/corretas foi 21 (48%).

Conclusões Os conhecimentos sobre alimentação e nutrição foram insuficientes e o desempenho geral no questionário foi baixo. Ações que busquem qualificar o professor são urgentes, de forma que ele desenvolva as ferramentas necessárias para a promoção da alimentação saudável na escola.

Introduction

Promoting child and adolescent health in the school context is a strategic action, since it is in this environment that this population spends a large part of its time. The use of the school environment to apply food and nutrition studies is therefore a realistic alternative, since there are no theoretical-methodological references that support the practices of Food and Nutrition Education.

School and community should give priority to provide students with good quality, affordable, nutritious food, promoting health and food and nutrition education.⁴ This scenario is the first space, after the family, to exert influence on children's eating behavior, and the main source of formal knowledge about nutrition.⁵ Teachers are pivotal players in the implementation of actions on food and nutrition education, and they report the need to raise awareness in order to promote healthy eating in this environment.⁶

Teachers are responsible for providing information, negotiating rules for food consumption, and should act as a model of behavior for students. ^{6,7} When they reflect on the world of food and nutrition, they often approach it in such a way that the students understand eating not only as a biological act, but also as a social factor, and relate it to a good quality of life and development of a healthy adult. ⁸ Training the teaching staff is therefore an indispensable condition for the promotion of healthy eating at school. ^{6,9,10}

Although the importance of the teachers in the process of promoting healthy eating in school is emphasized in the literature, little is known about teachers' knowledge, attitudes and practices regarding this theme in Brazil. In general, the training of these actors in the field of food and nutrition is insufficient. ^{7,11,12}

The objective of this study is to present the results of the evaluation of knowledge, attitudes, and feeding and nutrition practices of early grades teachers of the municipal school network in a city located in the State of Rio Grande do Sul.

Mehtods

Cross-sectional, descriptive study of prevalence. All teachers from pre-school to the fifth year of the 9-years elementary schools of the 24 schools of the municipal public network of Sapucaia do Sul were considered as subjects. All the teachers

who were responsible for planning and/or teaching activities were included.

Instruments for Data Collection

Some studies^{13–17} were used as reference for the construction of the research tool. A structured and self-administered questionnaire with open and closed questions was constructed. The topics included: demographic data, attitudes, practices, perceptions of personal health, and knowledge about nutrition and feeding. The preliminary version was submitted to evaluation by experts in the areas involved (three of Nutrition and four of Education). After the adjustments were made, the instrument was tested in a sample of vice principals of the schools, which were not included in the research. Nineteen teachers from 18 schools participated in this phase.

The objectives of the questions in each topic were: "Demographic Data" - characteristics of the study population; "Attitudes" - what teachers thought about feeding and nutrition in the school; "Practices" - teacher's daily practices at school in relation to food and nutrition; "Personal Health Perceptions" - to verify the personal satisfaction of the teacher in relation to his/her health, eating habits and physical activity, and estimate behavior and consumption of some foods and nutrients (sugars and fats); "Knowledge" - about nutrition and food.

A Likert-type scale was used, containing five response options. A multiple choice, open question addressed the source of information used in order to plan classes. The scale also contained a small questionnaire on how often they consumed fruits, vegetables, and milk and dairy products. The response options for the portions consumed were "N none, and 1 to 10". Regarding frequency, "per day (D), week (W), month (M), year (Y)" were the options for each food group. The questions of "knowledge" were elaborated according to the recommendations of the Food Guide for the Brazilian Population.¹⁸

Data Collection

Data collection took place in the second semester of 2012, in the municipal primary schools of Sapucaia do Sul. After accepting to participate, the visits were scheduled with a member of the board or of the pedagogy team. The visit to present the teachers the project and invite them to participate occurred during the teachers lifelong education sessions, during class breaks and, in some cases, through direct approach in the classroom. It was then established a date to return the completed questionnaire to the research reference person in the school. Those who were not present on the presentation date were later approached. Educators who did not return the completed questionnaires within the agreed timeframe were again addressed collective and/or individually, and/or through written messages.

At this stage, seven nutrition trainees from the School Nutrition Service who worked directly in schools supervising the production of meals, and in food and nutritional education projects participated as research assistants.

The database was built in the program Statistical Package for Social Sciences, version 18.0 for Windows.

Classification of Responses

In the topic on "Attitudes", the responses in which the school was perceived as a space for the promotion of healthy eating, and the teacher as an agent of this promotion, were considered as adequate (questions 1 to 12, except 5 and 6). The maximum number of correct answers was 10.

In the topic "Practices", practices in which the teacher discouraged the consumption of unhealthy food, did not use candies as reward, and had meals with the students were considered appropriate (questions 14 to 19, except 15). The maximum number of correct answers was five.

In "Personal Health Perceptions", the responses indicating satisfaction with own health, eating habits and physical activity, as well as limited consumption of sugars and fats were scored (questions 22, 24, 26, 27 and 33). Regarding the consumption of fruits, vegetables, milk and dairy products, it was considered adequate intake when equal to or greater than three servings per day - questions 28 to 30, which also scored. The maximum score was eight.

In relation to knowledge about nutrition and feeding, all questions were classified as right or wrong (questions 35 to 54). The statements consistent with the recommendations of the Food Guide for the Brazilian Population 18 were considered correct. The maximum score on this topic was 20.

Subsequently, the appropriate/positive/correct answers of the four topics were added, generating a maximum overall score of 43. The answers that expressed doubt or uncertainty did not score.

Classification of Responses

Esse estudo demonstrou que pacientes do SUS que receberam gratuitamente o suplemento polivitamínico apresentaram índices plasmáticos de ferritina e vitamina B12 superiores a aqueles que não receberam o suplemento gratuitamente. Neste contexto, a distribuição gratuita dessa suplementação no SUS interfere positivamente, com melhora dos níveis de ferritina e vitamina B12 dos pacientes com obesidade grau III submetidos à gastroplastia vertical associada à derivação gastrojejunal, além de poder atuar como fator de contribuição para aderência do paciente ao uso de polivitamínicos.

Como as deficiências nutricionais e alterações metabólicas são consequências do tratamento cirúrgico, e das alterações anatômicas e fisiológicas gastrointestinais, impõem a necessidade de suplementação polivitamínica em caráter permanente para evitar e corrigir carências nutricionais. O fornecimento gratuito aos pacientes submetidos ao BPGYR pelo SUS é uma medida fundamental para o controle adequado e a aderência do paciente.

Statiscal Analysis

Categorical variables were described in absolute and relative frequency. Quantitative variables were represented by mean and standard deviation, minimum and maximum.

For characteristics and topics, comparison of means test (Student's t test) or nonparametric test (Kruskal-Wallis) was conducted. In order to verify the association between quantitative variables, Spearman correlation (rs) or Pearson (rp) coefficients were calculated. The level of statistical significance adopted was 5% (P < 0.05).

This study did not receive any funding.

Ethical Aspects

All teachers received and signed a free, prior and informed consent for their participation in the research. The project followed the ethical precepts of Resolution 466 of December 12, 2012 and was approved by the Internal Review Board of the Federal University of Rio Grande do Sul, Pro-Rectory of Research, under Number: 55879.

Results

A total of 288 (62%) of the 462 teachers invited participated in the study. Of these, 97% were female, with mean age of 37 years; 60% reported having children. The workload of most teachers (71%) was 40 hours per week and 19% did not have college degree. The average time since graduation for those without college degree was of 16 years, and for those with college degree, six. The mean teaching experience was of 11 years. Eighteen (6%) had participated in a course related to food and nutrition.

Attitudes

The average of adequate responses/positive perceptions for "Attitudes" in relation to school feeding was 7.2 (► Table 1).

Most teachers agreed that the school environment should promote healthy food consumption by limiting access to lownutrient food in the cafeteria and that it is not good to sell high-fat or sugar-rich food (►Table 2).

The association between a more positive attitude profile towards school feeding and the perception of support from other teachers (rs = 0.297, p < 0.001) and from the school board (rs = 0.187, p = 0.001) for the promotion of healthy eating at school was statistically significant.

Table 1 Punctuation by Topic and General of Teachers's Initial Years of Elementary School, Sapucaia do Sul / RS, 2012

	Attitudes	Practices	Perceptions of health personal	Knowledge	General
Number of valid questions	10	5	8	20	43
Mean (SD)	7.2 (2.0)	2.0 (1.3)	2.5 (1.7)	8.1 (3.0)	20.5 (5.5)
Minimum	2	0	0	0	5
Maximum	10	5	5	15	33

Table 2 Attitudes of Teachers of the Initial Years of Elementary Education in Relation to Food and Nutrition in School, Sapucaia do Sul / RS, 2012

Question	Total	Inappropriate Answers / Negative Perceptions N (%)	Do not know N (%)	Appropriate Answers / Positive Perceptions N (%)
1.The school environment should promote the consumption of healthy foods by limiting access to low-nutrient foods in the canteen.	286	14 (5%)	4 (1%)	268 (94%)
2. To sell foods rich in fat and sugar (such as fried foods, snack foods, sweets, cookies, and soft drinks) in the school canteen is good because it helps raise funds for school activities.	283	42 (15%)	18 (6%)	223 (79%)
3. It makes no sense to offer students healthy food at school when they can choose to eat whatever they want out of school.	283	24 (9%)	4 (1%)	255 (90%)
4. I am in favour of promoting healthy eating habits at school.	288	-	-	288 (100%)
5. The teachers at my school are in favour of promoting healthy eating habits in school.	288	6 (2%)	98 (34%)	184 (64%)
6. My school's leadership team demonstrates supporting the promotion of healthy eating habits at school.	287	28 (10%)	43 (15%)	216 (75%)
7. I have the necessary skills to include food and nutrition activities in my lesson plans.	287	30 (10%)	27 (9%)	230 (80%)
8. I have the resources (didactic material, for example) needed to properly work on food and nutrition skills with my students.	287	108 (38%)	28 (10%)	151 (53%)
9. I have properly time to work on food	286	114 (40%)	19 (7%)	153 (%)
10. When necessary, I have access professionals (Nutritionists) to assist in teaching feeding and nutrition skills for my students	284	129 (46%)	58 (20%)	97 (34%)
11. My lesson plans include	280	73 (26%)	9 (3%)	198 (71%)
12. I know how to integrate food and nutrition skills with other areas in my lesson plans	265	28 (10%)	23 (9%)	214 (81%)

Practices

The average of adequate responses/positive perceptions of "Practices" in relation to school feeding was 2 (40%) (TABLE 1). Few teachers reported having breakfast/afternoon snack or lunch offered at school with their students (>Table 3).

Perceptions of Personal Health

The average of adequate/positive responses on "Personal Health Perceptions" was 2.5, out of a total of eight questions (31%) (**Table 1**). This was the lowest proportional score of the four topics. Most educators were satisfied with their health. Those who were dissatisfied or not sure had a higher prevalence of "being overweight" (39%).

Knowledge

In the topic "Knowledge" on food and nutrition, on average teachers got 41% of correct answers out of 20 questions (>Table 1). Regarding healthy eating, most teachers considered having good knowledge. In the questions concerning carbohydrates, many were not aware or disagreed that these were the basis of healthy eating (-Table 4).

As far as lipids are concerned, half the teachers agreed that a balanced diet should contain fat. They had doubts regarding the limits of the contribution of fat to total daily energy and whether all human beings must eat fat (>Table 4).

Almost 80% of the respondents did not know or believed that proteins are the most important nutrients in the diet. Slightly more than half agreed that the preparation of beans and rice is a healthy food combination and that the one daily serving of meat, fish or eggs is sufficient (►Table 4).

Most of the teachers were aware of the importance of vitamin C in enhancing the biological use of iron. The question that addressed the recommendation to avoid the consumption of milk and dairy products in the main meals, due to the interference of calcium in the absorption of iron, presented a high proportion of doubt (>Table 4).

Regarding salt, 76% responded correctly and 81% agreed on the restriction of industrialized meat in the prevention of hypertension. The highest proportions of correct answers were found in these questions (>Table 4).

In questions related to knowledge, teachers who considered that they had good knowledge about food and nutrition did not perform better than the others (Test Statistics = 5.797, gl = 4, p = 0.215).

General Score

The average number of correct answers was 20.5 out of a total of 43 questions, - less than half of the questions scored. There was no significant association between the number of years the teacher had been teaching (rs = 0.045, p = 0.453), age (rp = 0.182, p = 0.081), having children (t = 0.452, gl)= 266, p = 0.652) or training level (Test statistic = 4.904, gl = 4, p = 0.297) with better overall performance.

The associations between the most positive responses in "Attitudes", "Practices", and "Personal Health Perceptions", and the scores on knowledge (rs = 0.311, p < 0.001) were statistically significant. In other words: the teacher who presented greater knowledge about food and nutrition had

Table 3 Teacher Practices of the Initial Years of Elementary School in Relation to Food and Nutrition in School, Sapucaia do Sul / RS, 2012

Question	Total	Inappropriate Answers / Negative Perceptions N (%)	Do not know N (%)	Appropriate Answers / Positive Perceptions N (%)
14. Do you use treats (such as snacks, stuffed biscuits, candies, candy, chewing special treat for your students?	281	7 (3%)	63 (22%)	211 (75%)
16. Do you discourage your students from drinking soda and / or artificial juices at school (whether in the classroom, at recess, or at snack time)?	283	58 (20%)	95 (34%)	130 (46%)
17. Do you discourage your students from eating goodies (such as snacks, filled cookies, candies, candy, chewing gum, etc.) at school (whether in the classroom, at recess, or at snack time)?	283	32 (11%)	100 (35%)	151 (54%)
18. Do you have breakfast / afternoon snack with your class of students?	285	192 (67%)	52 (18%)	41 (15%)
19. Do you have lunch with your class students?	284	204 (72%)	40 (14%)	40 (14%)

 Table 4
 Knowledge of Early Years Teachers in Food and Nutrition at School, Sapucaia do Sul / RS, 2012

Question	Total	Inappropriate Answers / Negative Perceptions N (%)	Do not know N (%)	Appropriate Answers / Positive Perceptions N (%)
34. I consider that I have good knowledge about healthy eating	287	35 (12%)	34 (12%)	218 (76%)
35. Foods with a high concentration of carbohydrates (such as rice, bread, pasta, polenta, potato and cassava) are the basis of healthy eating and the main component of most meals.	284	160 (56%)	33 (12%)	91 (32%)
36. It is desirable to consume salty crackers instead of bread in the case of diets for weight loss.	284	89 (31%)	75 (26%)	120 (42%)
37. A balanced diet should not contain fats.	287	103 (36%)	38 (13%)	146 (51%)
38. As proteínas são os nutrientes mais importantes em uma alimentação saudável, pois têm o papel de gerar força. As fontes alimentares mais importantes são as carnes em geral, os ovos e as leguminosas (feijões).	283	168 (59%)	58 (21%)	57 (20%)
39. Proteins are the most important nutrients in a healthy diet, since they have role of generating force. The most important food sources are meats in general, eggs and legumes (beans).	286	176 (62%)	81 (28%)	29 (10%)
40. A high-carbohydrate diet will likely have a lower amount of fat, especially saturated fat, and less sugar, and can therefore protect people against overweight, obesity, some cancers and other noncommunicable chronic diseases (eg, High pressure, diabetes, heart disease).	284	152 (54%)	74 (26%)	58 (20%)
41. More recent scientific studies have linked the regular consumption of a minimum amount of 400 g/day of fruits and vegetables to the lower risk of developing many chronic non communicable diseases and maintaining adequate weight.	286	12 (4%)	124 (43%)	150 (53%)
42. The typical Brazilian preparation bean with rice, in proportion from one part bean to two parts cooked rice, is a healthy and complete protein combination.	288	58 (20%)	64 (22%)	166 (58%)
43. Iron in vegetables such as beans, spinach and beets is used by the body in the same way as iron in meat.	286	87 (30%)	140 (49%)	59 (21%)
44. To increase the biological use of iron, it is recommended to eat foods rich in vitamin C from fruits and vegetables during lunch and dinner.	287	9 (3%)	85 (30%)	193 (67%)

Table 4 (Continued)

Question	Total	Inappropriate Answers / Negative Perceptions N (%)	Do not know N (%)	Appropriate Answers / Positive Perceptions N (%)
45. Physically active children and adults need to consume a high-protein diet of animal origin.	286	105 (37%)	97 (34%)	84 (29%)
46. It is recommended that milk and dairy products should not be consumed along with the main salty meals (lunch and dinner), because calcium interferes negatively in the absorption of iron of vegetable origin and vice versa.	287	18 (6%)	174 (61%)	95 (33%)
47. Milk and derivatives should preferably be skimmed for adults and whole for children and pregnant women.	286	37 (13%)	54 (19%)	195 (68%)
48. The daily recommendation of consumption of meat, fish or eggs of 1 portion.	285	72 (26%)	61 (21%)	152 (53%)
49. Oils of plant origin also contain cholesterol, a lipid component that can accumulate in blood vessels, posing a risk for heart disease.	284	140 (49%)	99 (35%)	45 (16%)
50. The contribution of fats and oils from all sources should not exceed the limits of 15% to 30% of the total energy of the daily diet.	285	6 (2%)	176 (62%)	103 (36%)
51. Daily salt intake should be at most 5 g/day (1 teaspoon per person). That amount is enough to meet iodine needs.	288	7 (3%)	61 (21%)	220 (76%)
52. Fats are sources of essential fatty acids and fat-soluble vitamins (A, D, E, K), which must necessarily be carried by food because the body cannot produce them. So all humans need fat source foods.	285	30 (10%)	145 (51%)	110 (39%)
53. It is not necessary to avoid oils of vegetable origin if I have high cholesterol, because these oils do not have cholesterol, like all vegetable oil.	280	41 (15%)	119 (49%)	120 (43%)
54. Restricting the intake of salt added to food is an important measure in the prevention of high blood pressure. Taking this care, it is not necessary to reduce the consumption of sausages and industrialized products, such as sausage, hamburger and salami.	287	36 (13%)	18 (6%)	233 (81%)

more positive attitudes, practices and health perceptions than the others.

Discussion

In general, the teachers agreed that the school should be a space that promotes healthy eating habits. With regard to "attitudes", educators were aware of the school's role in promoting these habits. Although teachers are prone to promoting healthy eating at school, this alone is not enough to trigger a change in their behavior, as noted in the "Practices" topic. Teachers do not eat with their students the meals offered. They do not always discourage the consumption of unhealthy candies and drinks in the classroom. In addition, there is a level of dissatisfaction among almost half educators regarding their own eating habits.

Although most teachers considered having the skills and knowledge necessary to include food and nutrition in lesson plans, they clearly do not have them. This is a worrying factor, since 71% of educators include this topic in their lesson plans. Therefore, inadequate concepts and recommendations about diet and nutrition may be disseminated in schools. Therefore, if the teacher does not have adequate knowledge about nutrition, it is unlikely that they will be able to implement and effectively support obesity prevention programs for children. ¹⁹

On the four questions that addressed carbohydrates, especially on the six portions daily recommendation, the performance of the educators was poor. Similar results were found by Fernandez and Silva. ¹⁶ For some of the educators, food such as breads, cereals and tubers should be moderately consumed, as they were mistakenly classified as belonging to the group of extra energetics, rich in fats and sugars. In another study, ¹⁹ only 10% of educators correctly identified grains as the food group to be most consumed.

There was considerable doubt in the questions addressing lipids. There is a belief that fats as well as carbohydrates are not necessary in healthy eating. Less than 8 percent of preschool teachers in Texas, United States, ¹⁹ answered correctly the question about the participation of fats in the daily calorie percentage, and only 39 percent correctly answered the number of daily servings recommended for fruits and vegetables, findings similar to this study.

The teachers credited proteins "the role of generating force", as found by Fernandez and Silva. ¹⁶ The current dietary pattern values a diet based on lean meat, fruits and vegetables, with low amounts of carbohydrates, what is hugely reinforced by the media. The attractive aspects of these diets include emphasis on the pleasures of eating, the focus on eating meat; qualitative studies have explored the cultural aspects of these habits. ²⁰

There was a consensus that sodium consumption should be restricted, since the highest proportions of correct answers were found in these questions. This finding may be related to the numerous actions that have been carried out in the country in order to lower the average consumption to less than 5 grams of salt per day.²¹

Poor performance, with an average of less than half-adequate responses was already expected based on results from other studies. In a research on the knowledge of day care educators about nutrition in the first years of life, ²² most got 25 to 50% of the questions wrong (between six and 12 errors).

A study with nursery school teachers¹⁹ showed that 93% of educators agreed that learning/ knowing the relationship between food and health was important, but no teacher answered correctly the five questions on knowledge. Only 3% answered correctly four questions, and 18%, three. As in this study, Bezerra et al,²³ in Minas Gerais, obtained a moderate score (72.2%) in relation to nutritional knowledge.

Although there was no association between how many years the teacher had been teaching, age, having children or level of training with better performance, other studies showed different results.

Shimabukuro et al²² found a lower error rate in educators with college degree and younger than 38 years of age. The study by Silva et al,²⁴ with educators of children from 0 to 3 years old, demonstrated that the highest success rates were found among the educational agents, and not among teachers, demonstrating that training did not influence the results. However, this research was carried out with a small number of educators, which may be a bias. Fernandez and Silva,¹⁶ analyzing 288 teachers, found a significant association between age and knowledge about food groups - teachers older than 33 years presented better performance.

There was a positive profile of teachers for the promotion of healthy eating, however, none of the questions addressed directly if the teachers consider themselves as part of this process at school. Still, low participation in meals with students may be an indicator that they do not see themselves as concrete agents for the formation of students' eating habits. This fact corroborates a study in Mississippi, ¹⁷ USA, in which teachers believed in the importance of implementing health promotion, but that this was the responsibility of the school's physical education and nursing departments, suggesting that they did not see themselves as important subjects in this process. Albuquerque et al²⁵ qualitatively analyzed teachers' knowledge about food and nutritional education in the school environment. The teachers presented the desire to work on the subject, but also the fear of not being able to teach something that they did not know well. Yokota et al²⁶ demonstrated that an intervention conducted by teachers who participated in capacity-building workshops was positive regarding students knowledge about nutrition and to enhance teachers knowledge.

Despite insufficient training to promote healthy eating, all professionals involved in the process of building a healthy eating culture in schools should be made prone to produce and develop student training strategies.⁶ Although they are not trained in nutrition, teachers are able to develop educational activities that address this topic with critical thinking, creating a link between food, eating, health, environment and local development.²⁷

Conclusion

Although most teachers have undergraduate degrees, have taught for more than 10 years, and consider themselves knowledgeable about food and nutrition, the research results show that knowledge on nutrition and feeding is insufficient. Even if they are open to the idea and value the promotion of healthy eating in the school environment, maybe educators do not perceive themselves as subjects of this process. The results demonstrate the need for investment in the technical training of these educators, since most of them conduct activities on nutrition education based on unreliable sources, which, along with the knowledge gaps, can promote inadequate feeding concepts and practices among students. Therefore, actions intended to qualify teachers are urgent, in order for them to develop the tools necessary to promote healthy eating in school.

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