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Food and nutrition education actions based on Pestalozzi's intuitive method

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Abstract

Food and Nutrition Education (FNE) interventions have been increasingly essential in educational spaces for children and adolescents, requiring proposals for innovative methodologies that consider psycho-social and cultural factors involved in the formation of dietary patterns. Therefore, the objective of this study was to carry out FNE interventions based on the Intuitive Method proposed by Johaan Henrich Pestalozzi (1746-1827); which has never been applied to this theme before. Furthermore, this study aims to identify the relationship between skin color and the socioeconomic conditions of the participants. This method involves learning exercises of shapes, numbers, and language as elements that must be linked to the observation of the object or content. The interventions were carried out in children and adolescents from different socioeconomic conditions who practiced two different sports modalities. The study was carried out with 60 students, 40 athletes from artistic gymnastics (group A) and 20 athletes from taekwondo (group B) and was carried out in three stages: an initial assessment, interventions based on the Food Guide for the Brazilian Population, and a final assessment. The Brazilian Scale of Food Insecurity (BSFI) was applied to those responsible for the students to assess the situation of Food Insecurity (FI) of the family. Of the families participating in group B, 62.5% had FI. After the interventions, there was a significant reduction in the consumption of ultra-processed foods in group A (p=0.034), while in group B, there was an increase in the consumption of fresh foods (p=0.022). The Intuitive Method was effective in both groups, regardless of socioeconomic conditions, demonstrating that it is an efficient proposal for FNE actions.

Keywords: Health promotion. Eating behavior. Social vulnerability.

INTRODUCTION

Obesity is currently considered one of the syndemics that affect the planet[1], which can trigger other chronic diseases such as diabetes and cardiovascular diseases. Contrary to what is thought by many, excess weight is present with great intensity in the vulnerable population[2], as they live in areas that are characterized as food deserts; that is, socioeconomically vulnerable neighborhoods in which the availability and accessibility of healthy food is limited[3]. Situations like this have led to a high intake of sugary and fatty products (mainly ultra-processed ones), intensified by low levels of physical activity in addition to direct and indirect media influences,

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and genetic conditions.

Replacing balanced meals with fast snacks without adequate nutritional value is an example of an exogenous factor for the development of excess weight. In contemporary society, eating habits are influenced by advertisements and fads that encourage the consumption of foods with higher energy value. Concomitantly, the availability of technology, increased insecurity, and the progressive reduction of free spaces in urban centers (where most Brazilian children live) reduce opportunities for leisure and a physically active life, thus, favoring sedentary activities such as watching television, playing video games, and using computers[4].

As in other developing countries, the nutritional transition in Brazil is marked by the ambiguous presence of malnutrition, obesity, and specific deficiency diseases linked to malnutrition. Given the complexity of the current epidemiological picture and its determinants, a single measure is not enough to improve the nutritional profile of our population. Interventions must integrate incentive actions (they spread information and motivate individuals to adopt healthy practices), support (aimed at showing healthy options among people who are already motivated), and health protection (aimed at avoiding the exposure of individuals and communities to factors that encourage unhealthy practices)[5].

Knowing the need to use innovative methodologies that ensure the effectiveness of FNE actions, this study suggests using the Intuitive Method proposed by Johaan Henrich Pestalozzi (1746-1827), which is based on three pillars: brain (intellect), heart (feeling), and hands (senses) that work in harmony from the simple to the complex and from the concrete to the abstract. Studies reporting the use of the Intuitive Method in the teaching of Health Education in any age group were not found in the literature. There are only studies in the areas of geography, mathematics, and geometry. This methodology is close to the problematizing methodology proposed by Paulo Freire, and to constructivism proposed by Jean Piaget. Both position the learner as the center of the educational process, making them a constructor of their own learning. In the first, educators and students build knowledge based on dialogicity, mutual collaboration, without subordination[6]. In the second, learning occurs through experimentation, group research, the encouragement of doubt, and the development of reasoning[7].

In the intuitive method, the construction of knowledge is mediated by the child's own curiosity, that is, by their natural desire to learn. This is a methodology that directs teaching by putting the student in direct contact with the elements that surround him. It is by experiencing each representation of things, in a sensitive/perceptive/intuitive way, that the student learns the meaning and usefulness of objects. Thus, the foundations of this method are clarity in experiencing and precision in thinking[8]. For FNE to be effective, it must be founded on methodological bases that understand the individual, while respecting their characteristics, culture, beliefs, and at the same time arousing their curiosity so that they become more critical and empowered[9]. For this reason, we tested the Intuitive Method proposed by Pestalozzi in our study.

FNE has an essential role in changing eating behavior. However, the aim of the present study was to evaluate the effectiveness of applying the Intuitive Method in FNE actions in children and adolescents from different socioeconomic conditions who practice two different sports modalities. Furthermore, we also sought to i) assess the nutritional status of the study population; ii) assess students' knowledge about food and nutrition; iii) assess the food consumption of students; iv) know the housing conditions in which they live; v) identify the relationship between skin color and the socioeconomic conditions of the participants; and vi) carry out FNE interventions adapted from the Pestalozzi Intuitive Method.

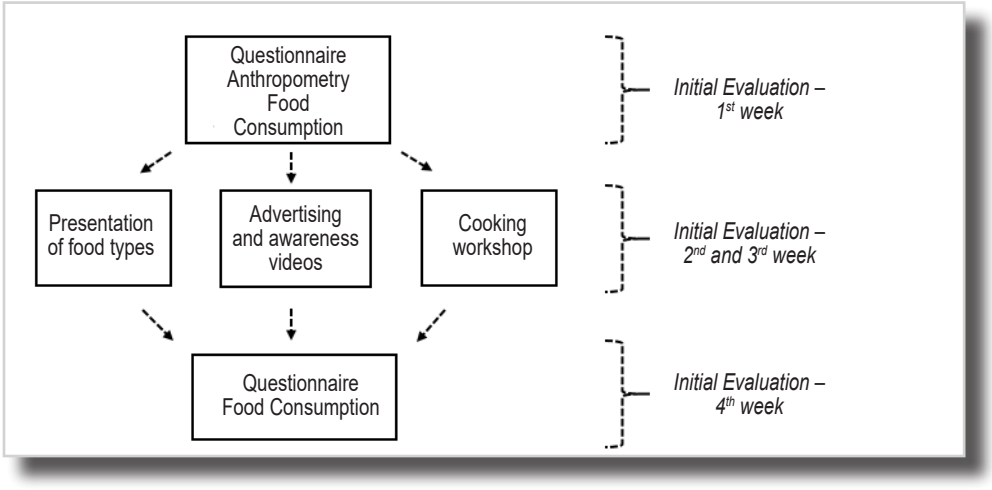
METHODOLOGY

Study Design

This was a comparative prospective intervention study, which aimed to identify the effectiveness of the application of the Intuitive Method in FNE for children and adolescents with different socioeconomic levels, who practiced different sports (artistic gymnastics and taekwondo). The study, carried out at the training sites of the respective teams (Department of Physical Education at the Federal University of Lavras (UFLA) and Projeto Renascer at the José Luiz de Mesquita Municipal School), after signing of the Informed Consent Form (ICF) and the Informed Assent Form (IAF). The study was approved by the Human Research Ethics Committee of the Federal University of Lavras, under opinion number 2.398.200.

From the sporting activities of artistic gymnastics and taekwondo, all practitioners were invited to participate in the study. Those who did not sign the ICF and IAF were excluded. The final number of participants was 60: 40 from group A (artistic gymnastics) and 20 from group B (taekwondo).

Three stages of research were carried out: initial assessment, consisting of anthropometric assessment (weight and height, for subsequent calculation of the Body Mass Index (BMI) and analysis of the BMI/Age parameter), assessment of food consumption (24-hour recall), and a questionnaire to identify sociodemographic characteristics and knowledge about food and nutrition. After the diagnosis of the initial evaluation, three nutritional interventions were carried out which had the issues addressed in the Food Guide for the Brazilian Population (FGBP) as central themes[10]. At the end, through the reapplication of the instruments used in the initial evaluation, the efficiency was analyzed of the interventions, as seen in Figure 1.



Those responsible for the study participants responded to the survey of the Brazilian Scale of Food Insecurity (BSFI) proposed by Santos *et al.*[11] and the questionnaire for the assessment of socioeconomic conditions adapted from the Brazilian Institute of Geography and Statistics (BIGS)[12].

Participants

The study was conducted with children and adolescents practicing artistic gymnastics (Group A) aged between 5 and 14 years or taekwondo (Group B) aged between 5 and 13 years. The participants in group A lived mostly in central neighborhoods of the city and studied in private or central public schools. Those in group B were residents of peripheral neighborhoods and studied in peripheral public schools.

The aim of the present study was to compare the use of the Intuitive Method in audiences of different socioeconomic conditions, but not in sports. The study was carried out in both places due to the fact that they have opposite social conditions.

For the formation of two comparative groups, group A consisted of 3 groups, with students aged between 5 and 7 years, 7 to 9 years, and adolescents aged 10 to 14 years. In group B there were 2 groups, with students aged between 5 and 8 years and another of teenagers aged between 9 and 13 years. This distribution respected the training already established by the organizers of the activities at the institution, which were carried out twice a week.

Questionnaires applied

The questionnaire applied (supplementary material 1) to the students consisted of 4 blocks of questions that assessed conditions in the place of residence, food attitudes and preferences, skills in cooking workshops, and knowledge about food and nutrition. It had multiple choice questions and also questions with dichotomous answers (yes or no). The collection of questions was presented to the students through an interview, which took place during week one (initial assessment) and at week four (final assessment). The questionnaires used as a basis for the preparation of the material in question were adapted from Hume *et al.*[13] Lohse *et al.*[14] and Framson *et al.*[15]. The last block of questions was prepared by the author and was based on the FGBP8. All materials were tested in a previous pilot study that took place in January 2018.

Those responsible were approached at the entrance to the training site to present the sociodemographic questionnaire adapted from the Brazilian Institute of Geography and Statistics (BIDS)[12] and the BSFI[11]. The first had 9 questions that addressed economic, family and housing conditions. And the BSFI with 7 questions addressing IAF conditions. All guardians were invited to participate in the study, but only 15 were willing to answer the questionnaires.

Pedagogical bases

The interventions applied were adapted based on the Intuitive Method proposed by Pestalozzi using as content the themes present in FGBP[10]. The methodology proposed by Pestalozzi is characterized by the verification of the essence before their definitions, where the student himself, intuitively, that is, after having observed, analyzed, compared, and worked on a certain issue or problem, discovers the solution for himself[8].

Interventions

Interventions applied to students were divided into three activities and always took place outside the classroom, close to nature, meeting the principles recommended by the Intuitive Method. All activities were planned and prepared considering the technical content of FGBP[10]. Each activity corresponded to a chapter of this document, starting with chapter two, which deals with food choice, followed by chapter three, which brings concepts about food production up to its preparation. Then, chapter four, which deals with the act of eating and dining, and finally, chapter five, which deals with understanding and overcoming obstacles to healthy eating.

1st Intervention - Presentation of types of food

In support of the principles of the Intuitive Method[16], examples of fresh, minimally processed, processed, and ultra-processed foods were exposed to the students. When they had contact with these foods, the students started to question what would be done with them. Participants were asked to separate foods from healthier to less healthy. During the intervention, the students touched the different foodstuffs, looked at packaging and labels, mentioned moments when they consumed these foods and what memories they brought with them, as well as people close to them who were related to the preparation and/or consumption of these foods. Next, they were asked about the reasons that led them to make the choices and listing the similarities between foods from the same group as well as their differences. From these questions, there was the deconstruction and construction of the concepts related to the NOVA classification of foods[10], that is, through the inquiries, the erroneous concepts about the types of foods were deconstructed and the correct definitions of each food group were constructed together (students and educators).

2nd Intervention - Advertising and awareness videos

A multimedia kit was used to present a video to students with media appeal of a certain ultra-processed food. While watching the videos, the students touched the product and observed its packaging, color, and label according to the principles of the Intuitive Method by Pestalozzi[16]. After that, they pointed out what made the video shown so attractive from the perspective of the ad. Then, another video about this same product was presented, but showing the health consequences of its high consumption. Subsequently, the students talked about the true intention of the food advertisement, as well as its influence on food choices and consequences of excessive consumption of these foods.

3rd Intervention - Culinary workshop

Based on the principles of stimulating the observations of objects proposed by Pestalozzi[16], kitchen utensils and fresh food were presented to the students, with the items which would then be worked on, always starting from the questions made by them and followed by the discussions according to the theme planned concerning uses and possible preparations. The groups listed several options already known and prepared by people affectionately close to them, such as mothers and grandmothers. After taking notes, they made the proposed recipe together, actively working with the food. Then they pointed out the difficulties and satisfactions of preparing the recipe, in addition to the pleasures of eating something they made.

After the interventions, a pamphlet elaborating the needs detected in the evaluation process, with information about the content presented to the students in the interventions, was given to the responsible ones.

Anthropometric measurements

Participants' weight and height were measured using a Wiso-w801® digital scale and an Alturaexata® stadiometer. These data were entered into the Anthro Plus® software and the nutritional diagnosis was verified. The parameters BMI/age and height/age for adolescents and BMI/age, height/age, weight/age, and weight/height for children were evaluated, considering the reference values recommended by the WHO[17] for ages from five to nineteen.

Food Consumption

For the assessment of food consumption, the twenty-four-hour food recall (24h Rec) was then applied. With the data from this instrument, the intake of fresh, minimally processed, processed, and ultra-processed foods were collected according to the NOVA classification that were consumed over the course of one day, by counting the portions of each type of food.

Statistical analysis

The effect of the methodology applied on the responses of children and adolescents was analyzed using the chi-squared test where $p<0.05$ was considered as a significant value. To verify the normality of the samples, the Shapiro-Wilk test was conducted ($p>0.05$). Levene's test was performed to verify the homogeneity of the variance, identifying non-significance. Data referring to food consumption were presented using the paired Student's t test and data referring to anthropometry, used proportion and frequency; both were analyzed in SPSS® software.

BSFI data were tabulated in Excel® software and shown in 95% confidence intervals (95%CI) and sociodemographic data in proportions and frequency.

RESULTS

The study included 60 students with different socioeconomic conditions, practitioners of one of two sports, and 15 guardians. Data related to nutritional diagnosis are shown in Table 1.

From the analysis of the different parameters, it was found through the results obtained in the Anthro Plus® software that the majority (70%) of the participants in group A (artistic gymnastics) are eutrophic and 85% of the participants in group B (taekwondo) displayed this same nutritional diagnosis. On the other hand, 22.5% and 5% were overweight, respectively. Data regarding sociodemographic characteristics assessed through interviews with those responsible are found in Table 2.

It was identified that the average number of people living in the same house was higher for those participating in group B, as well as the average number of people responsible for the income. On the other hand, it was observed that the monthly income of those participating in group A is more than twice as high as that of group B. However, the number of people dependent on this income is greater for those in the second group.

Through the BSFI data, it was found that 28.5% [4% - 60%] of the participants in group A and 62.5% [29% - 95%] of those in group B had FI.

Regarding the declared skin color, those belonging to group A were 85.7% (6) white and 14.3% (1) brown, while in group B, 25% (2) were white, 50% (4) brown, and 25% (2) black. As for the type of housing property, it was identified that of those practicing artistic gymnastics (Group A), 42.8% (3) rented; 42.8% (3) were owners, and 14.4% (1) were still paying. On the other hand, 62.5% (5) of taekwondo practitioners (Group B) had their own property, but were still paying installments, 12.5% (1) owned property, but already paid for, and 25% (2) rented their homes. Data related to food consumption are shown in Table 3.

Through the data presented in Table 3, a decrease in the consumption of ultra-processed foods by the participants in group A ($p=0.034$) and a decrease in the consumption of minimally processed foods by the students in group B ($p=0.030$) were identified. On the other hand, these same students showed a significant increase in fresh food intake ($p=0.022$). Data

regarding the effect of the Intuitive Method on cooking skills are described in Table 4.

The data in Table 4 showed that the participants in group A demonstrated a significant increase in the question regarding the practice of preparing salad (p=0.047), as well as for the question related to the information present in the recipe and success of the practice (p=0.008). Data on the effect of interventions based on the Intuitive Method on knowledge about food and nutrition are listed in Table 5.

It was identified that those participants in group A significantly increased their knowledge about food and nutrition in 7 of the 9 questions (questions 1, 3, 5, 6, 7, 8, 9, 10, and 11) and those participants in group B in 4 of the 9 (questions 2, 6, 7, and 8). It is noteworthy that through the data presented, it was possible to identify that FNE interventions based on the Intuitive Method had satisfactory results in both audiences, as it contributed to the growth of students' understanding of issues related to food and nutrition.

Table 1– Proportions and frequencies of students' nutritional diagnoses. Lavras, Minas Gerais, 2019.

Nutritional diagnosis	Group A (n=40)	Group B (n=20)
Extreme thinness	-	5% (1)
Thinness	2.5 % (1)	-
Eutrophy	70% (28)	85% (17)
Overweight	22.5% (9)	-
Obesity	5% (2)	5% (1)
Severe obesity	-	5% (1)

Table 2– Sociodemographic characteristics of the students participating in the study presented in mean, standard deviation, and amplitude. Lavras, Minas Gerais, 2019.

Characteristics	Group A			Group B		
	Mean	Sd*	Amplitude	Mean	Sd	Amplitude
Number of people residing in the house	3.00	0.75	2	3.75	0.66	2
Number of people responsible for income	1.57	0.76	2	1.62	0.48	1
Monthly Income (Reais)	4,312.90	3,204.90	8503.00	1,926.12	614.25	1802.00
Number of people dependent on this income	3.28	0.690	2	4.00	1.22	4

*SD: Standard deviation.

Table 3– Mean food consumption before and after the interventions in servings per day. Lavras, Minas Gerais, 2019.

Institution	Time	Up*	p	Pr**	p	Mp***	p	In****	p
Group A	Pre	2.43	***0.034***	2.51	0.950	6.30	0.172	3.49	0.061
	Post	1.65		2.49		5.51		2.30	
Group B	Pre	3.95	0.066	1.52	0.119	7.33	***0.030***	1.62	***0.022***
	Post	2.57		1.95		5.62		3.24	

*Up: ultra-processed foods; **Pr: processed foods; ***Mp: minimally processed foods; In****: in natura

Table 4– Effect of the Intuitive Method on cooking skills in different projects. Lavras, Minas Gerais, 2019.

Questions	Time	Group A	p	Group B	p
With help can you make a recipe?	Pre	95.1%	0.157	85.0%	0.292
	Post	100%		95.0%	
Can you snack using vegetables or fruits?	Pre	80.5%	*0.015*	85.0%	0.677
	Post	97.5%		80.0%	
Can you help your family with meals?	Pre	80.5%	0.015	65.0%	0.058
	Post	92.5%		90.0%	
Can you make a salad?	Pre	80.5%	***0.047***	85.0%	0.633
	Post	95.0%		90.0%	
Can you measure the ingredients?	Pre	68.3%	0.352	30.0%	0.110
	Post	77.5%		55.0%	
Can you follow the recipe information and put it into practice?	Pre	58.5%	***0.008***	70.0%	0.197
	Post	85.0%		50.0%	

Table 5– Effect of the Intuitive Method on knowledge about food and nutrition. Lavras, Minas Gerais, 2019.

Questions	Time	Group A	p	Group B	p
What kind of food should you eat the most, according to the FGBP?	Pre	46.3%	***0.040***	35.0%	0.113
	Post	77.5%		60.0%	
Which nutrient below should not be consumed in excess according to the alternatives?	Pre	68.3%	0.076	70.0%	***0.037***
	Post	85.0%		95.0%	
Which foods below are low in fat?	Pre	38.3%	***0.014***	75.0%	0.077
	Post	46.9%		95.0%	
Which foods below are low in sugar?	Pre	63.4%	0.882	60.0%	1.00
	Post	65.0%		60.0%	
Which foods below have the lowest salt content?	Pre	75.6%	***0.038***	60,0%	1,00
	Post	92.5%		60,0%	

Questions	Time	Group A	p	Group B	p
Instant noodles, stuffed cookies, and sodas are examples of what kind of food?	Pre	22.0%	***0.001***	20.0%	***0.001***
	Post	65.0%		70.0%	
Canned foods, fruit in syrup, cheeses, and breads made with wheat flour, water, and yeast and salt are examples of what types of food?	Pre	14.6%	***0.001***	0.00%	***0.004***
	Post	50.0%		35.0%	
Meat, rice, beans, peanuts, and pasteurized milk are examples of what types of food?	Pre	17.1%	***0.001***	0.00%	***0.002***
	Post	60.0%		40.0%	
Lettuce, carrots, papaya, kale, and spinach are examples of what types of food?	Pre	39.0%	***0.002***	45%	0.204
	Post	72.5%		65%	

DISCUSSION

In this study, the Intuitive Method proposed by Pestalozzi was effective in both groups, given the increase in knowledge about food and nutrition, regardless of socioeconomic conditions.

Regarding the social characteristics of the participants, more than half of the volunteers in group B (taekwondo) studied in peripheral public schools, while those in group A (artistic gymnastics) studied in private or centralized public institutions. This situation is due to the restricted purchasing power of group B, which has an income less than half of that of group A. In addition, because they live in the periphery, those belonging to group B studied closer to their residence.

Socioeconomic indicators[18] refer to the correlation between poverty and housing and between color and poverty. In a study conducted by Borelli[19], the high presence of black people in poverty statistics in Brazil was observed. This demonstrates how socio-environmental segregation in the peripheries was configured into socio-spatial and racial marginalization a century after the abolition of slavery, as the Afro-descendant population was being pushed to the most distant areas from the cities, characterized by extreme urban precariousness.

Data from the City of Lavras[20] showed that the inhabitants with the best financial condition (above 5 minimum wages) reside in the central area of the city, which corroborates the present study, since the participants in group A had an average monthly income of 4,312.90 reais and lived in the central area of the city, while those in group B lived mostly in the northern zone and had less than half the monthly income of those in group A. Furthermore, the number of people dependent upon this monthly financial amount was higher for those in group B.

In the present study, 62.5% of children and adolescents in group B were in an FI situation. These participants are those with a monthly income of less than half of group A, and who lived in the outskirts of the city. In these conditions, access to food of sufficient quality and quantity is threatened, as most families face at least one risk situation related to access to food; such as was identified in a study conducted with adolescents in the Brazilian Amazon[21], which found that 23.1% of the participants had moderate to severe FI. This FI was associated with low family income, poor basic sanitation conditions, and adolescent color (black). Along the same lines, in a study conducted by Santos and Gigante[22], which analyzed data from the National Household Sample Survey (NHSS), it was identified that 47% of the children assessed had FI.

FI can be characterized by anything that compromises the guarantee of access to quality food, in sufficient quantity, on a permanent basis and interferes with the acquisition of other essential needs[23]. FI cases occur due to several factors such as recurrent unemployment from low education that comes from few opportunities and social inequalities[10]. Inadequate access to basic services such as sanitation, health, education, and social assistance, living in urban areas, and residing with a large family also contributes to inequalities in access to food in developing countries, such as Brazil[24]. In developed countries, the main causes of AI are low income, the place of residence, and less education as[25].

Marin-Leon *et al.*[26] analyzed in their studies the relationship between cases of FI and skin color, identifying that people of a mixed race and black had a greater social and economic vulnerability and, therefore, had a higher index of FI. This corroborates the present study, since group B had a higher FI rate and 75% of its participants were brown or black.

In the 2000s, the social vulnerability of black people was 49% greater than that of white

people and this difference remained high in 2010, equal to 48%. In absolute numbers, the results show that color inequality remains significant, that is, the ten years referred to were not enough to minimize or reduce this inequality[27].

More than half of the families of the participants in group B had their own property, but not paid for. The State of Minas Gerais has been developing, since 2005, the Popular Habitation Homes Program (PHHP), which aims to grant financing and construction of housing projects for families that receive 1 to 3 minimum wages; the average salary of group B participants in this study. This program is a strategy to reduce the housing deficit linked to the most comprehensive objective of reducing poverty in the state, with housing being one of its dimensions[24]. The cost of housing is subsidized, reducing its final price and ensuring access to quality housing on land with water, sewage, electricity, paving, and drainage[28].

Regarding the participants' food consumption, a decrease in the consumption of ultra-processed foods in both groups was identified, which was statistically significant for group A. This decrease is important, since the excess consumption of this type of food is linked to the development of obesity and other CNCDs, due to the high intake of salt, sugars, and fats present in these foods[29]. On the other hand, a significant increase in the consumption of fresh food by the participants in group B was also identified. Corroborating this, Kuchenbecker *et al.*[30] identified the improvement in the food variability of children, even in the FI area, submitted to FNE interventions, in their study that as was in the present study.

FNE interventions are efficient when considering the demand of the population, using an adequate pedagogical basis, using appropriate assessment instruments, in addition to considering the culture of the study population while involving the family and the school in the teaching-learning process about food and nutrition[31].

An increase was observed in cooking skills in relation to preparing salads as well as following the steps of a recipe for group A. Through the cooking workshop, which is directly related to the items in question, it was possible to clearly perceive the solid representation of the three pillars recommended by the Intuitive Method, feelings, senses, and intellect. Therefore, the reason as to why the culinary workshop, using this methodology, achieved positive results was founded. Corroborating this, in a study conducted by Herbert *et al.*[32], where the effectiveness of cooking workshops in the establishment of healthy eating habits was evaluated, the authors observed that after the interventions there was a decrease in the amount spent on fast food and an increase in fruits and vegetables. The cooking skills of the participants, as well as knowledge about the health consequences of excessive consumption of salt, sugar, and fats also increased.

In the Intuitive Method, objects were presented in contrast, going from simple to complex and from concrete to abstract, so that feelings, senses, and intellect operated in synchrony[8]. During the interventions, foods were presented in contrast, that is, in comparison with each other. The students touched, smelled, observed, discussed the issues that permeated these foods and, thus, built the concepts by themselves, intuitively.

With regards to the assumptions of the Intuitive Method, the construction of knowledge is mediated by the student's own curiosity, that is, by their natural urge to want to know, to want to learn. It is a methodology that values the direct contact of the student with the elements that surround him/her. It is by experiencing each representation of things, in a sensitive/perceptive/intuitive way, that the child learns the meaning and usefulness of objects[8].

From this perspective, there was an increase in knowledge about food and nutrition in 7 out of 9 questions for group A, and in 4 out of 9 questions for group B. This corroborates with other studies in FNE, which identified an improvement in understanding of the theme after the interventions[33, 34, 35]. In view of these results, it was found that FNE interventions based on the Intuitive Method were effective not only in improving the understanding of this theme, but also in increasing the criticality and autonomy of its participants. This considers that these actions sought to develop the child's moral, intellectual, and physical aspects, while contemplating the environment in which they are inserted, causing the development of such forces to follow their natural course, progressively, and gradually[36].

It is important to emphasize that Pestalozzi did not have his works translated into Portuguese and his texts (in French) are not easily accessed, therefore, he is referred to through other authors.

CONCLUSION

No records in the literature exist for the application of The Intuitive Method proposed by Pestalozzi as in teaching in health areas. In the practice of FNE, it showed promising results in audiences from different socioeconomic situations, given the increased learning of students on the topic addressed. Furthermore, both groups were mostly eutrophic despite group B (taekwondo) showing higher levels of FI and socioeconomic vulnerability and living in peripheral areas of the city. More research is important for measuring the effects of applying this methodology in other age groups.

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