

Effects of Health Education Based on the CIPPA Model on Age-Appropriate Food Choice Skills in Fourth-Grade Students

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Abstract

This quasi-experimental research aims to examine the impact of teaching health education through the CIPPA model on age-appropriate food selection skills among fourth-grade elementary students. The sample consists of 24 students, divided into an experimental group of 12 and a control group of 12, utilizing purposive sampling. Pretest and posttest measurements were taken using a food selection skills assessment, which consists of three aspects: food variety, appropriateness to body weight, and adequacy of daily energy intake. Data analysis employed inferential statistics, incorporating descriptive statistics to summarize general group characteristics, Wilcoxon signed-rank test to compare pretest-posttest scores within the experimental and control groups, and Mann-Whitney U-test to compare pretest-posttest scores between the experimental and control groups. The research findings revealed that after teaching health education using the CIPPA model, the experimental group showed significant improvements in all three aspects of age-appropriate food choice skills. This increased skill was statistically significant at the .05 level and significantly higher compared to the control group, also at the .05 level.

Keywords: Art activities, Storytelling techniques, Creativity.

1. Introduction

Currently, school-age children are facing nutritional problems, including stunting, underweight, obesity, and anemia [1]. The primary cause of stunting is chronic malnutrition resulting from insufficient food intake, leading to children being undernourished and underdeveloped [2]. Consequently, they become more susceptible to diseases, experience frequent illnesses, and have lower cognitive abilities [1]. The problem of obesity, on the other hand, stems from excessive food consumption beyond the body's requirements and inadequate physical activity. Ultimately, such behaviors may lead to the development of non-communicable diseases in the long run. According to a health survey conducted in 2015, it was found that 7.5% of children were suffering from stunting, 5.2% were underweight, and 12.5% were overweight or obese [3]. Malnutrition problems in school-age children are a result of inadequate skills in selecting suitable foods for themselves [4]. In response to these challenges, the Thai Ministry of Public Health has implemented policies to promote the development and change of health behaviors by collaborating with the Ministry of Education. This initiative was first launched in 2010 with the goal of ensuring that children have good physical and mental health, possess the potential to live happily and harmoniously in society, and are prepared to grow into adults with a high quality of life.

To initiate changes in food choice skills, it is crucial to begin by providing knowledge, altering attitudes, and modifying individual nutritional behaviors. Additionally, when reinforcing age-appropriate food choice skills, it is important to consider the specific age group and activities that lead to lifestyle changes [5]. For addressing nutritional problems in children, schools must play a significant role in creating guidelines and promoting age-appropriate food choice skills to have a lasting impact on students' health in the long term [6].

Samut Songkhram is one of the provinces in Thailand where an increasing number of school children are facing nutritional problems. From the mentioned problem, the researchers recognize the importance of addressing

nutritional problems arising from a lack of age-appropriate food choice skills. Consequently, we conducted a study to investigate the effect of health education using the CIPPA Model in promoting age-appropriate food selection among school children in Samut Songkhram province. The CIPPA Model is an instructional approach that serves as a fundamental concept in organizing teaching and learning, with the learner at the center [7]. The goal was to develop targeted groups capable of changing their eating behaviors by considering skills in selecting age-appropriate foods, including food variety consumption skills, appropriate portion size intake skills, and energy intake management skills. By continuously developing and mastering these skills, individuals can establish a strong foundation for cultivating suitable dietary behaviors that contribute to optimal health outcomes and well-being throughout their lives.

2. Objectives

2.1 To compare the scores of food choice skills based on food variety within the experimental group and between the experimental and control groups, before and after the intervention (the provision of health education based on the CIPPA model).

2.2 To compare the scores of food choice skills based on the appropriateness of food portion size within the experimental group and between the experimental and control groups, before and after the intervention.

2.3 To compare the scores of food choice skills based on the adequacy of energy intake required per day within the experimental group and between the experimental and control groups, before and after the intervention.

3. Methods

This research is a quasi-experimental study that utilizes a two-group pretest-posttest design. The study comprises of two groups: an experimental group and a control group, and measurements are taken before and after the intervention.

3.1 Participants

In the first semester of the academic year 2019, fourth-grade male and female students were assigned to either the experimental group, which comprised 12 students receiving health education using the CIPPA Model, or the control group, consisting of 12 students receiving regular health education. Two schools under the Office of the Basic Education Commission (OBEC) in Samut Songkhram province were selected for this study, employing purposive sampling to ensure similar characteristics in terms of student numbers, school size, and location.

Ethical approval for human research was obtained from the Human Research Ethics Committee of Suan Sunandha Rajabhat University. Informed consent documents were provided to the research participants (parents or guardians) to obtain their consent for participation in the study. The research project was registered under the project number COA.1-057/2018, and parents or guardians were fully informed about the research before their participation.

3.2 Measures

The research tools can be categorized into two types: experimental tools and data collection tools.

3.2.1 Tool used for experimentation

The experimental tool used in this research is the teaching of health education using the CIPPA Model on the topic of age-appropriate food choice skills. It consists of three lesson plans: Lesson Plan 1 on food choice skills based on food variety, Lesson Plan 2 on food choice skills based on appropriateness to body weight, and Lesson Plan 3 on food choice skills based on energy intake from essential nutrients required daily.

Each lesson plan follows the seven steps of the CIPPA Model: Step 1 - Stimulating prior knowledge, Step 2 - Seeking new knowledge, Step 3 - Linking new knowledge with prior knowledge, Step 4 - Knowledge and understanding exchange within the group, Step 5 - Summarizing and organizing knowledge, Step 6 - Presenting students' work, and Step 7 - Applying the knowledge.

3.2.2 Tool used for data collection

The data collection tools used in this research are as follows: 1) Food Choice Skills Assessment Form based on food variety, which includes children's menu and snacks for a complete week, 2) Food Choice Skills Assessment Form based on appropriateness to body weight according to nutritional guidelines, and 3) Food Choice Skills Assessment Form based on the adequacy of energy intake required daily, assessed through a food lottery.

The evaluation criteria for each set of data collection tools are determined based on Bloom's criteria (1971, p. 129). Scores ranging from 80-100% indicate a high level of food choice skills, scores between 60-79% indicate a moderate level, and scores below 60% indicate a low level. The interpretation of the results is made according to Bloom's reference criteria.

3.2.3 Test quality analysis

To assess the content validity of the measurement tools developed by the researchers, three experts were enlisted to thoroughly examine the questionnaire items, ensuring their alignment with the intended definitions and content. The results of this examination were then used to compute the Index of Item-Objectives Congruence (IOC), employing a set passing criterion of 0.5 or higher. The findings of the analysis showed that each version of the measurement tools utilized in this research obtained an IOC value ranging from 0.70 to 1.00, indicating a high level of content validity. Thus, these measurement tools are deemed suitable and reliable for use in this study.

3.3 Experimental procedures

Approximately one week before starting the activities, the researchers introduced and explained the teaching methodology using the CIPPA Model to the experimental group. The students listened to the explanation and completed a pre-assessment questionnaire on food choice skills before proceeding with the activities. Subsequently, the researchers conducted the planned learning activities during the health education class for three weeks, with each session lasting 50 minutes. After completing the planned activities, the researchers administered the same test questionnaire to both the experimental and control groups for post-assessment.

3.4 Statistical analysis

The data analysis was performed using standard statistical software, with a significance level set at $p < 0.05$ as the criterion for accepting research hypotheses. Descriptive statistics, such as percentages, means, and standard deviations, were utilized to analyze general data of the sample groups. The Wilcoxon signed-rank test was employed to analyze and compare age-appropriate food selection skill levels before and after the experiment within each group. Additionally, the Mann-Whitney U-Test was used to compare the age-appropriate food selection skill levels before and after the experiment between the experimental and control groups.

4. Results

The results of our study are presented in two main sections. The first section includes the demographic characteristics of both the experimental and control groups. The second section focuses on the analysis of age-appropriate food choice skills for both the experimental and control groups.

4.1 Demographic characteristics

The experimental group is composed of 25% male and 75% female participants, while the control group consists of 58.33% male and 41.67% female participants. A majority of participants in both the experimental and control groups have a BMI lower than 18.5, indicating that they are underweight, accounting for 75% of the total number. Furthermore, the questionnaire revealed that a majority of participants in both the experimental and control groups (83.33% and 75%, respectively) were not aware of how to select age-appropriate foods for themselves. However, it is noteworthy that both groups have received some education on the topic of age-appropriate food choice skills in the classroom, with 50% of the experimental group and 33.33% of the control group having gained such knowledge.

4.2 Age-appropriate food choice skills

The results of the analysis of age-appropriate food choice skills can be categorized into three skills: food choice skills based on food variety, food choice skills based on appropriateness to body weight, and food choice skills based on the adequacy of daily energy intake. Additionally, a comparison of the differences in scores for age-appropriate food choice skills, across all three categories, was conducted before and after the experiment for both the experimental and control groups. These comparisons are presented in Tables 1 and 2.

Table 1. Number and percentage of the experimental and control groups, classified by the level of appropriate food choice skills, including food variety, appropriateness to body weight, and adequacy of daily energy intake, before and after the intervention (experimental group n = 12, control group n = 12).

Variable/Group	Before the experiment			After the experiment		
	High	Moderate	Low	High	Moderate	Low
Food variety						
Experimental group	1(8.33)	2(16.66)	9(75.00)	5(41.66)	7(58.33)	0
Control group	0	1(8.33)	11(91.66)	0	1(8.33)	11(91.66)
Appropriateness to body weight						
Experimental group	0	1(8.33)	11(91.66)	10(83.33)	2(16.66)	0
Control group	0	2(16.66)	10(83.33)	0	2(16.66)	10(83.33)
Adequacy of daily energy intake						
Experimental group	1(8.33)	9(75.00)	2(16.66)	10(83.33)	2(16.66)	0
Control group	4(33.33)	5(41.66)	3(25.00)	3(25.00)	7(58.33)	2(16.66)

Table 2. The comparison of mean rank for food choice skills based on food variety, appropriateness to body weight, and adequacy of daily energy intake of the experimental and control groups, as well as between the two groups, before and after the intervention (experimental group n = 12, control group n = 12).

Variable/Group	Mean Rank		Z	p-value**
	Experimental group	Control group		
Food variety				
Before the experiment	13.54	11.46	-1.114	.265
After the experiment	18.21	6.97	-4.267	< .001
p-value*	0.002	1.000		
Appropriateness to body weight				
Before the experiment	12.00	13.00	-.604	.546
After the experiment	18.33	6.67	-4.378	< .001
p-value*	0.001	1.000		
Adequacy of daily energy intake				
Before the experiment	11.71	13.29	-.619	.536
After the experiment	16.17	8.83	-2.860	.004
p-value*	0.005	1.000		

* Wilcoxon Signed Ranks Test, ** Mann-Whitney U – Test

From Table 1, in the category of food choice skills based on food variety, before the intervention, the experimental and control groups were mostly at a low level, comprising 75% and 91.66%, respectively. However, after the intervention, the experimental group improved to a moderate level at 58.33%, while the control group remained at a low level, comprising 91.66%. Regarding food choice skills based on appropriateness to body weight, before the intervention, both the experimental and control groups were mostly at a low level, comprising 91.66% and

83.33%, respectively. After the intervention, the experimental group improved to a good level at 83.33%, while the control group still remained at a low level, 83.33%. Concerning food choice skills based on the adequacy of daily energy intake, before the intervention, both the experimental and control groups were mostly at a moderate level, comprising 75% and 41.66%, respectively. After the intervention, the experimental group improved to a good level at 83.33%, while the control group remained at a moderate level, 58.33%.

From Table 2, it is evident that after the intervention, the experimental group showed a statistically significant increase in their age-appropriate food choice skills in terms of food variety, appropriateness to body weight, and adequacy of daily energy intake ($p \leq 0.05$). Conversely, the control group did not exhibit any significant differences in their skills before and after the experiment. Furthermore, when comparing the two groups, no significant differences were found in the average scores for food choice skills before the intervention. However, after the experiment, the experimental group demonstrated significantly higher average scores in these skill domains compared to the control group, with statistical significance ($p \leq 0.05$).

5. Discussion

In this study, we evaluated the effect of teaching health education using the CIPPA model on age-appropriate food selection skills in fourth-grade elementary students. The results demonstrated that this teaching approach led to significant improvements in the experimental group's ability to select nutritionally appropriate foods when compared to their initial levels and the control group. This increased skill was attributed to the implementation of the teaching method based on the CIPPA model, which emphasizes student-centered learning [9, 10]. Our observations from behavioral recordings indicate that students actively participated in the learning process by asking and answering questions driven by their curiosity. They also collaborated in groups to seek answers from various sources of information. Furthermore, the students engaged in activities that fostered social interactions and provided access to diverse knowledge.

Our study is in line with the research conducted by Tipakorn Sukchoosri and her team [11], which investigated the effects of teaching based on the CIPPA model on the English reading ability for grade 5 students. The findings revealed a statistically significant improvement in students' English-reading skills, with a significance level of .05. Additionally, the overall satisfaction of students towards learning with the CIPPA teaching model was rated as very high. Furthermore, our study aligns with the research conducted by Wassana Donsila and Prin Tanunchabuttra [12], which investigated the development of mathematics learning activities on fractions using the CIPPA model for sixth-grade elementary students. The findings demonstrated that the implementation of mathematics learning activities using the CIPPA model, consisting of seven operational steps and employing action research principles, facilitated students' active engagement in diverse learning activities. This approach empowered students to undertake various learning activities independently, fostering skills in self-directed inquiry and group processes. After the experiment, the majority of students achieved a high level of academic performance, with an average score of 79.71%.

6. Conclusions

Our study confirms that teaching health education using the CIPPA model can effectively develop age-appropriate food choice skills in fourth-grade students. Nonetheless, to gain clearer evidence of the impact over time, it is essential to conduct long-term studies, continuously monitoring and evaluating knowledge retention and critical thinking. Furthermore, enhancing the generalizability of the research findings necessitates expanding the study sample to include a larger and more diverse population, incorporating different genders, age groups, and geographical areas.

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References

1. Khan DSA, Das JK, Zareen S, Lassi ZS, Salman A, Raashid M, et al. (2022). Nutritional status and dietary intake of school-age children and early adolescents: Systematic review in a developing country and lessons for the global perspective. *Front Nutr*, 8: 739447.
2. Govender I, Rangiah S, Kaswa R, Nzaumvila D. (2021). Malnutrition in children under the age of 5 years in a primary health care setting. *South African Fam Pract*, 63(1): 5337.
3. Twelfth National Economic and Social Development Plan (2017-2021) [Thai]. (2017). Bangkok: Office of the National Economic and Social Development Council, Prime Minister's Office.
4. Mwaniki EW, Makokha AN. (2013). Nutrition status and associated factors among children in public primary schools in Dagoretti, Nairobi, Kenya. *Afr Health Sci*, 13(1): 39-46.
5. Brug J. (2019). Determinants of healthy eating: Motivation, abilities and environmental opportunities. *Family Practice*.
6. Saavedra JM, Prentice AM. (2023). Nutrition in school-age children: a rationale for revisiting priorities. *Nutr Rev*, 81(7): 823-843.
7. Anjirawaroj S. (2020). The effect of CIPPA instructional model and inquiry method on nursing students' achievement and scientific attitude. *JPBI (Jurnal Pendidikan Biol Indones)*, 6(2): 181-188.
8. Bloom ED, Gilman FJ. (1971). Scaling and the behavior of nucleon resonances in inelastic electron-nucleon scattering. *Physical Review D*, 4(9), 2901.
9. Nugkim K, Kerdsonboon C. (2021). The Development of Lesson Plan Based on CIPPA Model in Principles of Guidance Course. *The Asian Conference on Education 2020: Official Conference Proceedings*.
10. Hanrin C. (2014). Development of the learning result of innovation and information technology in education using CIPPA, for third year students in the Bachelor of Education Program, Nakhon Phanom University. *Res High Educ J*, 22.
11. Sukchoosri T, Phahonthep R, Chotikapanich R, Tungprapa T. (2007). A comparison of the english reading ability and satisfaction of Matthayom Sueksa five students with instruction using 3PS and CIPPA model activities. *Narkbhutparitat journal*, 9(1): 181-193.
12. Donsila W, Tanunchabuttra P. (2012). The development of mathematics learning activities on fraction using CIPPA model for grade 6 students. *Journal of Education Khon Kean University*, 35(4): 64-71.