Development of Hexanutri Nutrition Education Media on Balanced Nutrition for Elementary School Students in Binjai

Achnia Azla[1*], Hardi FirmansYesh[2], Juliarti[3], Yestty Destani Sandy[4], Erni Rukmana[5]

Nutrition Study Program, Faculty of Engineering, Universitas Negeri Medan, Medan, North Sumatra, Indonesia
***Correspondence**: achniaazlaj17@gmail.com

ABSTRACT

Background: *The limited use of learning media has led to a lack of knowledge about balanced nutrition among students at SDN No.020267 Binjai. It was found that 10 out of 15 students had less knowledge about balanced nutrition.*

Objective: *This study aims to develop hexanutri nutrition education media that can increase balanced nutrition knowledge in elementary school students and find out the feasibility of hexanutri nutrition education media.*

Materials and Methods: *The location of this research was carried out at SDN No.020267 Binjai, with a period of December 2023 to February 2024. This type of research uses Research and Development research procedures using the ADDIE model (analyze, design, development, implementation, evaluation). The subjects of this study were elementary school students at SDN No.020267 Binjai. Data analysis in this study is descriptive, qualitative and descriptive quantitative using Likert scale.*

Results: *The results of this study showed that the material validation test got a feasibility percentage of 96.25% and the results of the media validation test got a feasibility percentage of 95%. Small group trials get a percentage of 100% and large group trials get a percentage of 93.22%. The average pretest result of 64.9 increased on the posttest average of 86.78 with an N-Gain percentage of 62%.*

Conclusion: *The conclusion of the study is that hexanutri nutrition education media is suitable for use and can increase students' balanced nutrition knowledge.*

Keywords: Balanced nutrition; Media; ADDIE

BACKGROUND

Children of school age represent a population vulnerable to nutritional problems. During this period, children undergo rapid physical growth as well as cognitive, mental, and emotional development, which requires adequate and high-quality nutritional intake to support optimal growth and development.[1] In Indonesia, nutritional problems among children aged 5–12 years remain a public health concern, as reported by the 2018 National Basic Health Research (Riskesdas), which showed a relatively high prevalence of nutritional disorders in this age group.[2]

Nutrition knowledge is recognized as an important indirect determinant of nutritional status. Insufficient understanding of balanced nutrition may hinder children's ability to select healthy foods that meet their nutritional requirements.[3] Previous studies have demonstrated that nutrition knowledge can be improved through appropriate nutrition education using effective media and methods.[4] For elementary school children, nutrition education should be delivered using engaging and age-appropriate learning media to enhance comprehension and retention of the material.[5]

This study was conducted at SDN No.020267 Binjai following preliminary observations indicating that 10 out of 15 students (67%) had inadequate knowledge of balanced nutrition. Interviews with a Grade V-A teacher revealed that classroom learning predominantly relied on lecture-based methods due to limited availability of learning media. When media were used, they were generally restricted to static visual displays, while most instructional activities were delivered verbally. Given these limitations, there is a need to develop innovative and interactive nutrition education media to improve students' knowledge of balanced nutrition. Therefore, the main aim of

this study was to develop Hexanutri nutrition education media and to evaluate its feasibility and potential to enhance balanced nutrition knowledge among elementary school students.

MATERIALS AND METHODS

This study employed a Research and Development (R&D) design using the ADDIE development model, which consists of five stages: analysis, design, development, implementation, and evaluation.[6] The study aimed to develop Hexanutri nutrition education media in the form of a game focusing on balanced nutrition for elementary school students. The research subjects consisted of two material experts (one elementary school teacher and one nutrition lecturer), two media experts with expertise in design, four elementary school students for the small-group trial, and twenty-six elementary school students for the large-group trial. Data collection was conducted using validated questionnaires. The assessment questionnaires for material experts and media experts were evaluated using a Likert scale and analyzed through descriptive qualitative and quantitative methods. According to Sugiyono, the Likert scale consisted of five scoring categories: a score of 5 for "very good," 4 for "good," 3 for "fair," 2 for "poor," and 1 for "very poor."[7]

Student response questionnaires were assessed using the Guttman scale with dichotomous answer options of "yes" and "no." Based on the Guttman scale criteria, a score of 1 was assigned for "yes" responses and a score of 0 for "no" responses.[7] The obtained scores were converted into percentages and interpreted using percentage range classifications to determine the quality of the developed media and materials. According to Nurjanah and Erita, percentage scores of 81–100% were categorized as very good, 61–80% as good, 51–60% as fairly good, and 0–50% as poor.[8]

RESULTS

The results of this study are presented according to the ADDIE development stages: Analysis, Design, Development, Implementation, and Evaluation. The analysis stage was conducted through teacher interviews and preliminary observations of students. Balanced nutrition material was considered appropriate for Grade V students, as it aligns with the basic competencies and indicators of Theme 3 (Science content), "Healthy Food," Subtheme 2, "The Importance of Healthy Food for the Body," in the elementary school curriculum. Initial observations indicated that students had limited knowledge of balanced nutrition and had never received structured balanced nutrition education.

Table 1. Student needs analysis

No.	Student Statements	Yes		No	
		n	%	n	%
1.	Student likes board games	29	96,7	1	3,3
2.	Student has received balanced nutrition education	8	26,7	22	73,3
3.	Teachers use nutrition education media	30	100	-	-
4.	Student is interested in learning about balanced nutrition	25	83,3	5	17,7
5.	Student is interested in learning balanced nutrition using board games	27	90	3	10

Design

At the design stage, learning materials were structured and integrated into the Hexanutri board game media. The content consisted of four main topics: definition of balanced nutrition, roles of nutrients in the body, introduction to the four pillars of balanced nutrition, and nutritional problems among school-aged children.

Table 2. Structure of learning materials in the Hexanutri

No	Materials
1	Definition of Balanced Nutrition
2	Roles of Nutrients in the Body
3	Introduction to the Four Pillars of Balanced Nutrition
4	Nutritional Problems among School-Aged Children

The materials were incorporated into a user guide, and the Hexanutri board game design was developed using the Canva application.

Figure 1. Hexanutri board game display

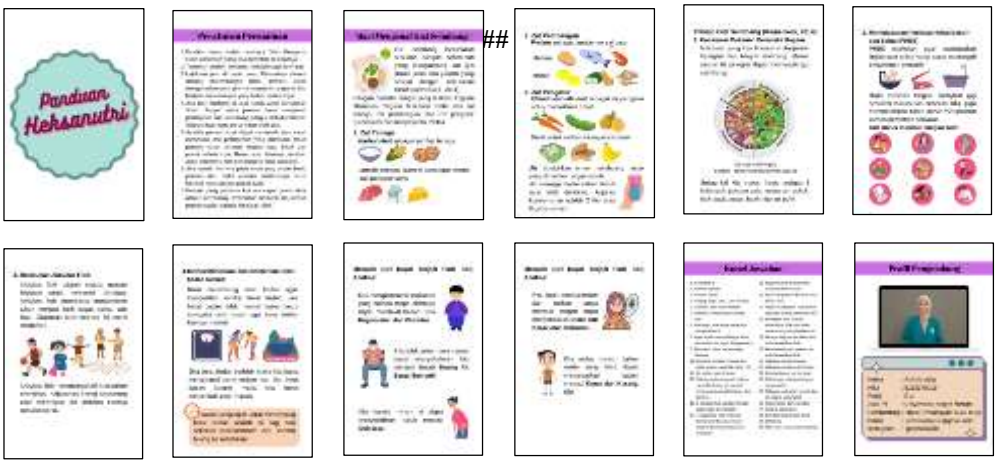

Figure 2. Hexanutri user guide display

Development

The development stage involved expert validation to assess the quality of the material and media. Data in Table 3 and 4 show the score of validation in material and media respectively.

Table 3. Material expert validation results

No	Validators	Results		
		Score	%	Interpretation
1	First validator	77	96.25	Very Good
2	Second validator	77	96.25	Very Good
	Average Score $= \frac{\sum x}{n} =$	**77**	**96.25**	**Very Good**

Table 4. Media expert validation results

No	Validator	Results		
		Score	%	Interpretation
1	First validator	93	93	Very Good
2	Second validator	97	97	Very Good
	Average Score $= \frac{\sum x}{n} =$	**95**	**95**	**Very Good**

Implementation

Implementation was carried out through small-group and large-group trials to evaluate students' responses to the Hexanutri media.

Table 5. Student response results in the small-group trial

No	Aspek	Yes		No		Total		Category
		n	%	n	%	N	%	
1	Student Interest	4	100	-	-	4	100	Very Good
2	Material Comprehension	4	100	-	-	4	100	Very Good
3	Operational Ease	4	100	-	-	4	100	Very Good
4	Language	4	100	-	-	4	100	Very Good
5	Media Usefulness	4	100	-	-	4	100	Very Good
	Average	**4**	**100**	**-**	**-**	**4**	**100**	**Very Good**

Table 6. Student response results in the large-group trial

No	Aspek	Yes		No		Total		Category
		N	%	n	%	N	%	
1	Student Interest	24.4	93.84	1.6	6.16	26	100	Very Good
2	Material Comprehension	24.16	92.95	1.84	7.05	26	100	Very Good
3	Operational Ease	24.67	94.87	1.33	5.13	26	100	Very Good
4	Language	24.5	94.23	1.5	5.77	26	100	Very Good
5	Media Usefulness	23.8	91.54	2.2	8.46	26	100	Very Good
	Average	**24.24**	**93.22**	**1.76**	**6.78**	**26**	**100**	**Very Good**

Evaluation

Evaluation was conducted by comparing students' balanced nutrition knowledge before and after the intervention using pretest and posttest scores. The analysis yielded an N-Gain score of 62.

Table 7. N-Gain score effectiveness categories

N-Gain Value	Criteria
< 40	Ineffective
40 – 55	Less Effective
56 – 75	Moderately Effective
> 76	Effective

DISCUSSION

Based on the above categories, an N-Gain score can be considered effective if it reaches a value of 76 or higher. Therefore, the N-Gain score of 62 obtained from the Hexanutri balanced nutrition education media falls into the "moderately effective" category. Considering the results of material and media expert validation, which indicated that the media were categorized as very good, the student response results in both small-group and large-group trials, which were also categorized as very good, and the moderately effective improvement in students' balanced nutrition knowledge, it can be concluded that the Hexanutri nutrition education media is feasible for use among elementary school students.

Board game–based nutrition education has been shown to improve students' knowledge. This is supported by previous studies, including research conducted at SDN Gunung Telu 1, Cilacap Regency, which demonstrated that the nutrition monopoly game (Monozi) was able to increase students' balanced nutrition knowledge.[9] Similarly, a study conducted at SDN 01 and SDN 02, Bogor

Regency also proved that monopoly-based games could improve balanced nutrition knowledge among students.[10]

CONCLUSION

This study resulted in the development of a nutrition education medium in the form of a board game called *Heksanutri*. The Heksanutri nutrition education media is capable of improving balanced nutrition knowledge among elementary school students and is feasible to be used as a nutrition education medium for elementary school students.

REFERENCES

1. Ahmada H, Antonia A, Muhamad Z. Balanced nutrition education for children at SD Negeri Pijorkoling, Padangsidimpuan City. Jurnal Ilmiah Pengabdian Kepada Masyarakat Bidang Kesehatan. 2023;1(1):1–6.
2. Ministry of Health of the Republic of Indonesia. Basic Health Research (Riskesdas) 2018. Jakarta: National Institute of Health Research and Development; 2018.
3. Syahroni MHA, Astuti N, Indrawati V, Ismawati R. Factors influencing eating habits. Jurnal Tata Boga. 2021;10(1):12–22.
4. Aditia C, Budhi G. Interactive learning media on nutritional content of vegetables and their benefits for the human body. Jurnal Infra. 2016;4(1):1–5.
5. Kartini T, Manjilala, Yuniawati SE. The effect of counseling on balanced nutrition knowledge and practices. Media Gizi Pangan. 2019;26(2):201–208.
6. Mulyatiningsih E. Applied Research in Education and Engineering. Yogyakarta: UNY Press; 2011.
7. Sugiyono. Research and Development Methods. Bandung: Alfabeta; 2017.
8. Nurjanah, Erita Y. Development of learning media based on the iSpring Suite application in thematic learning. Journal of Basic Education Studies. 2021;4(2):126–134.
9. Nur Adiningsih A, Wahyurin IS, Hapsari PW. The effect of the nutrition monopoly game (Monozi) on improving students' nutrition knowledge at SDN Gunung Telu 1, Cilacap Regency. Journal of Community Health Development. 2022;3(1):73–79.
10. Fitriyanti R, Sriprahastuti B, Cicih LHM. Monopoly game and balanced nutrition discussion interventions to improve knowledge and attitudes of elementary school students in Bogor Regency. Journal of Nutrition College. 2021;10(3):197–206.