

Nutritional Education Model Through Crossword Puzzles Toward Knowledge And Macro Nutrient Intake Of Primary School Student In Bengkulu City

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ABSTRACT

Crossword puzzles are one of the preferred education models for school-age children. The purpose of this study was to analyze the effect of the balanced nutrition education model via the crossword puzzle on the knowledge and intake of macronutrients for elementary school students in Bengkulu. This study used a pre-experimental research design with one group pre-test and post-test design. The sample in this study was about 30 children by purposive sampling. It was providing education by giving 14 times crossword puzzles for 14 days. The Paired T-Test was used to analyze the differences in respondent characteristics, knowledge, energy, protein, and fat intake, while carbohydrate intake used the Wilcoxon test before and after an intervention. The results showed that the provision of nutrition education along the crossword puzzle had a significant effect on elevating knowledge ($p < 0.05$) and intake of energy, carbohydrates, and protein ($p < 0.05$). However, it was not significant for fat intake. The improvement of knowledge and macronutrient intake (except fat) obtained a significant effect before and after nutrition education is given. This research concludes that learning model as an alternative in providing nutritional education lessons should be attractive for school children.

Keywords: Crossword puzzle, education model, nutritional education, primary student

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INTRODUCTION

Nutrition is an essential factor that influences the growth and development of children at school age (Karavida et al., 2019; Li et al., 2019). Consuming well nutrition contributes to maintaining health and provides protection against chronic diseases and reduces the risk of premature death (Ojo, 2019; Schulze et al., 2018). Several non-communicable diseases, such as diabetes, osteoporosis, and hypertension, are also linked to unhealthy eating habits that develop during childhood (Uauy et al., 2008). Thus, it is crucial to improve good eating habits from an early age so that healthy eating habits can continue into adulthood (Neumark-Sztainer et al., 2011; Nicklaus & Remy, 2013). School-age children should be of particular concern to families, communities, and governments since the children are experiencing rapid growth (growth spurt), i.e., the age of 10-11 years for girls and 12-13 years for boys, so nutrients also have increased (Soliman et al., 2014). Childhood is a good start in providing education about balanced healthy eating. This is very important in developing dietary practices according to the guidelines for balanced nutrition in the following years (Özdoğan, 2015).

Schools are famous places in implementing health promotion and preventive interventions, especially in increasing nutritional knowledge and practices for school-age children, starting with promoting healthy behaviour from an early age (Lee et al., 2019). Data from Riskesdas (2018), as many as 26 % of Indonesian children only consume the drinks at breakfast, either water, tea, or milk. Not all children who eat breakfast have adopted a healthy and balanced breakfast pattern. Based on the same data source, only 10.6 % have enough energy intake by 30 %. School-age children with BMI/Age indicators for the skinny category of 2.4%, 6.8%

categorized as thin, 10.8% categorized as fat, and 9.2% categorized as obese (Kemenkes RI, 2019).

According to previous studies, it shows there are still many elementary school children who do not know about balanced nutrition, so nutrition education is needed (Asakura et al., 2017; De Villiers et al., 2016). Nutritional education about healthy eating during childhood can not only prevent some of the leading causes of illness and death but can also reduce health costs and can improve the quality of human life (Hamulka et al., 2018; Shahid & Bishop, 2019). One step in increasing children's nutritional knowledge through learning media (Nova et al., 2019).

Learning media has an important role in supporting the learning process (Tafonao et al., 2019). The use of learning media in the learning process can generate new desires and interests (Sudarsana et al., 2019). Also, learning media can generate motivation and stimulation of learning activities and even have psychological influences on students (Puspitarini & Hanif, 2019). Crossword puzzles are a form of learning media in the form of games that are liked by school-age children. Previous research has shown that card games can improve children's knowledge and practice of school-age children's nutritional intake (Andressakis, 2001). Games are an effective form of media in promoting nutrition education. School-age children tend to act like to play and ask many questions so that the method chosen allows children to play a full role in learning so that children appreciate the knowledge and skills acquired on their efforts (Darling-Hammond et al., 2020).

METHODOLOGY

This study used a pre-experimental design with a one-group pre-test and post-test design. In this research

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design, there was a comparison group. This research was conducted by doing preliminary observation (pre-test) that had not been given balanced nutrition education. This research was conducted at Public Primary Schools of SDN 01 and SDN 05, Bengkulu City, from July to October 2019 on male and female subjects aged 9-10 years.

The provision of education was carried out in 2 stages. The first stage was the provision of balanced nutritional material two times a week. The second stage was giving the crossword puzzles for 14 times with a duration of 2 times a week. The level of students' knowledge was measured by giving pre-test and post-test before and after prevention. The macronutrient intake of school children was carried out before and after being given nutrition education using a 3x24 hour recall and knowledge using a questionnaire. The Paired T-Test analyzed the data obtained if the data were normally distributed for abnormal data distribution; the Wilcoxon test was used. This test was conducted to analyze the differences in the level of knowledge, energy, carbohydrates, protein, and fat of nutritional education.

RESULTS AND DISCUSSION

Following Table 1, it can be seen that the characteristics of subjects based on age and sex found no significant

Table 1. Distribution of respondent characteristics based on age and sex of primary school children in Bengkulu City

Variable	Total	Frequency (%)	p
Age			
10-11	14	46.7	0.659
11-13	16	53.3	
Sex			
Male	15	50	0.160
Female	15	50	

Table 2: Effect of nutritional education on knowledge and nutrient intake

Variable	N	Pre	Post	P
		Mean ±SD	Mean ±SD	
Knowledge	30	70.00±16.19	90.00±10.83	0.000*
Energy	30	1089.11±561.28	1421.83±478.36	0.004*
Protein	30	53.96±13.05	67.90±24.48	0.000*
Fat	30	36.76±8.79	39.23±11.23	0.065
Carbohydrate	30	116.53±144.97	155.27±197.85	0.001*

The implementation of nutrition education into the primary school curriculum must indirectly support the increase in nutrition knowledge (Kostanjevec et al., 2011). Based on Table 2 it shows that the provision of nutritional knowledge has a significant effect on increasing student knowledge. This is following previous research conducted by (Tavassoli et al., 2015) stated that the provision of nutrition education has an effect on increasing knowledge, attitudes and has a positive effect on changes in student diet. Nutrition education also affects cognitive enhancement towards changing attitudes towards food selection (Anderson et al., 2005; Ruzita et al., 2007). Besides, this education can influence positive behaviour change in creating sustainable changes in the future (Demirozu et al., 2012).

Nutritional education has a vital objective in improving diet and lifestyle and at the same time, reducing non-communicable diseases and obesity in the future (Hamulka et al., 2018). The effect of nutrition education significantly affects changes in nutrient intake, such as energy, protein and carbohydrate intake. This is in accordance with previous research by (Said et al., 2020)

differences. In this study, there were 30 subjects aged 10-11 years 14 (46.7%), and 11-13 years old 53.3%), consisting of 15 men (50%) and 15 women (50%).

Table 2 shows a significant difference found in the effect of nutritional education on knowledge ($p = 0.000$). The provision of nutritional education significantly affects the improvement in student knowledge. Nutrition education also had a significant effect on increasing the nutrients intake, such as energy ($p = 0.004$), protein ($p = 0.000$), and carbohydrates ($p = 0.001$), while fat intake did not have a significant effect (0.065).

Health promotion through nutritional education is the initial stage in encouraging healthy eating practices and increasing knowledge that has great potential for health during childhood and the later stages of life. Organizing school-based nutrition education must consider the needs of students in schools. Educational strategies include efforts to increase students' health awareness and improve the practice of changing better eating patterns (Pérez-Rodrigo & Aranceta, 2003). Besides, nutrition education for primary school children can provide information and skills for children to choose healthy foods and change good eating habits (Perera et al., 2015).

shows that the provision of nutrition education has a positive effect on better nutrient intake for school children. Nutrition education also affects the selection of healthier foods and snacks for school children (de Vliieger et al., 2019; Yeom & Cho, 2019). Nutritional education is one of the recommended nutrition support strategies to increase nutrient intake and to correlate with improving the nutritional status of elementary school students (Kooshki et al., 2018)

CONCLUSION

The knowledge and the nutrient intake (energy, protein, fat, and carbohydrate) of elementary school children before and after nutritional education intervention was increased. Except for fat intake, there was an effect of knowledge, energy, protein, and carbohydrate intake of the student of Public Primary School of SDN 05, Bengkulu City before and after education. Nutrition education is a strategy that supports the improvement of knowledge and nutrients intake, so it needs to be recommended for inclusion in the primary school curriculum. It is suggested that the nutritional education provided can be

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maintained throughout their lives for the next superior generations.

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CONFLICT OF INTEREST

All authors declare that there is no conflict of interest in this study.

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