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Efficacy of Balanced Nutrition Comic as a Learning Medium in Nutrition Education Intervention for Primary School-Age Children in Sampang District



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Abstract

Indonesian skipping breakfast is common among school-age children. Several studies have revealed the importance of breakfast and its positive effects on health and productivity, especially for school-aged children. Schools are the most efficient place for health education targeting dietary or other health-related changes in school-age children. Balanced nutrition education can teach and demonstrate the importance of breakfast, healthy consumption and a balanced diet for the health of school-age children. The purpose of this study was to provide a balanced nutrition education intervention for elementary school-aged children in Sampang regency as an effort to improve the quality of nutrition knowledge and practices of children. Nutrition education interventions are carried out using comic compiled based on balanced nutrition guidelines in Indonesia. A quasi-experiment using pretest-posttest and control group and descriptive design were used in this research. A structured questionnaire which comprised of personal/demographic information, nutrition knowledge, attitude towards nutrition and nutritional practices was conducted to 75 students. The average score of nutrition knowledge from both the control and intervention group was still below 50%. Nutrition education intervention using nutrition balanced comic was significantly increase nutrition knowledge and nutritional practices of students, 75.73 ± 10.33 and 52.31 ± 10.61 respectively. Nutrition education through balanced nutrition comics provides new knowledge in a more interesting way for students. Fun learning conditions will make student more attentive and able to capture applicative value from the messages conveyed, so that students' nutrition practices are also higher compared to before the intervention.

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INTRODUCTION

Children skipping breakfast is common among schools and teenagers. Based on the study, it was revealed that around 16.9%-59% of elementary school age children in several big cities did not eat breakfast. In addition to the high frequency of skipping breakfast among children and adolescents, the quality of breakfast is also a concern related to the nutritional quality of breakfast which may not meet the daily recommendations. Based on the 2010 Riskesdas survey, out of 35,000 children aged 6-12 years, 44.6% consumed breakfast with low nutritional quality. Therefore, improving breakfast habits and the quality of breakfast for school-age children in Indonesia needs serious attention when it comes to the role of breakfast in providing daily nutritional intake.

Based on the 2010 Riskesdas survey, out of 35,000 children aged 6-12 years old, 44.6% consumed breakfast with low nutritional quality. Therefore, improving breakfast habits and the quality of breakfast nutritional intake in school-age children in Indonesia needs serious attention regarding the role of breakfast in providing balanced daily nutritional intake.

Several studies have revealed the importance of breakfast and its positive effects on health and productivity, especially for school-aged children. Breakfast is also considered as one of the most important determinants of health. Behaviorally, many studies have focused mainly on food intake and body mass index (Sönmez & Betül, 2021). Consumption of breakfast has a positive effect on the intelligence of children and adolescents, besides that it also has an effect on increasing cognitive performance. Meanwhile, skipping breakfast is associated with an increased risk of degenerative diseases such as diabetes mellitus type 2 (Adolphus et al., 2015; Edefonti et al., 2014).

The habit of delaying and skipping breakfast for elementary school age students is highly discouraged due to the growth period at school age. Malnutrition children can adversely affect children's growth and also can even cause stunting. Data from the Basic Health Research 2018 report shows that the prevalence of stunting and underweight in children aged 5-12 years is 30.7% and 11.2% respectively. East Java Province is included in the province with high of stunting rate above the average, which is 12.2%. This implies that malnutrition is a problem among school-age children. Childhood is a critical period in growth and development, so consumption habits are something that must be considered (Sekiyama et al., 2018; Zulkarnain et al., 2021).

The school breakfast (SBP) has been widely implemented in many countries as a form of approach to promoting healthy breakfast consumption and improving breakfast practices, nutritional status, and school performance on the quality of children's nutritional intake (Sekiyama et al., 2018). In 2014, the Ministry of Health of the Republic of Indonesia established Balanced Nutrition Guidelines which also included the promotion of breakfast as one of the ten messages to achieve a balanced nutritional status.

Nutrition education program is considered to be an effective approach to overcome unhealthy breakfast behaviour in children and adolescents. Balanced nutrition education can help children to obtain information and influence then to make healthier choices and lead to healthier eating habits. It is reported that nutrition education is effective in improving the knowledge, attitudes and practices of school-age children when applied with a behaviour-focused approach.

Schools are the most efficient place for health education targeting dietary or other health-related changes in school-age children. Balanced nutrition education can teach and demonstrate the importance of breakfast, healthy consumption and a balanced diet for the health of school-age children. An efficient school-based nutrition education program must be carried out comprehensively, namely not only targeting knowledge but also skills and several factors such as support from parents and teachers to help achieve optimal results (Sekiyama et al., 2018; Sinaga et al., 2021). The purpose of this study was to provide a balanced nutrition education intervention for elementary school-aged children in Sampang regency as an effort to improve the quality of nutrition knowledge and practices of children. Nutrition education interventions are carried out using comic compiled based on balanced nutrition guidelines in Indonesia.

METHODS

This research was conducted at elementary school located in Sampang, East Java, Indonesia from July until October 2022. A quasi-experiment using pretest-posttest and control group and descriptive design were used in this research. The subjects in this study were elementary students in grade III, IV, V and VI. Demographic data of students includes gender, age and mother's knowledge. Meanwhile, data on nutritional knowledge and attitudes towards nutrition were compiled based on balanced nutrition guidelines, namely based on the 4 pillars of balanced nutrition cone and my-plate. The inclusion criteria of this study

were elementary school students with grades III-VI; in a good health; 9-12 years old; willing and obtaining permission from parents to be a respondent. The exclusion criteria of this study were students who had certain health problems.

A structured questionnaire which comprised of personal/demographic information includes gender, age and mother's knowledge. Nutrition knowledge questionnaire was prepared based on the balanced nutrition guideline in Indonesia. The questionnaire consisted of 30 closed-ended question as follows: 10 questions for nutrition knowledge, 10 questions for

attitude towards nutrition, and 10 question for nutritional practices. For the score, nominal and ordinal data scale was used for personal information data and SOP in the kitchen. Linkert scale point (1-5) was used to describe children knowledge, attitude towards nutrition and nutrition practices. The data from this study were analysed using inferential statistics analysis for hypothesis testing. The relationship between level of education and knowledge, attitude towards nutritional, nutritional practices were analysed using chi square analysis in SPSS version 26.0.

RESULT

Table 1 shows the data of gender distribution of respondent. The data in Table 1 shows that 45.3% respondents are male students and 54% are female students. The control group consisted of 36 students, and the intervention group consisted of 39 students.

Table 1: Gender Distribution of Children

Gender	Control (n=36)		Intervention (n=39)		Total	
	n	%	n	%	n	%
Male	16	44.5	18	46.2	34	45.3
Female	20	55.5	21	53.8	41	54.7
Total	36	100	39	100	75	100

Table 2: Distribution of Mother's Educational Level

Level of Education	Control (n=36)		Intervention (n=39)	
	n	%	n	%
Grade I	6	16.7	7	17.9
Grade II	12	33.3	14	35.9
Grade III	16	44.4	17	43.6
College	2	5.6	1	2.6
Total	36	100	39	100

Based on preliminary data on indicators of students' nutritional knowledge, the average score of nutrition knowledge from both the control and intervention group was still below 50% (Table 2).

Table 3: Students Nutrition Knowledge

Knowledge	Pretest	Posttest
Control		
Mean ± SD	46.18 ± 10.53	47.18 ± 10.16
Intervention		
Mean ± SD	48.82 ± 11.07	75.73 ± 10.33

Table 3 presents the nutritional knowledge scores of students in both the control group and the intervention group, before and after giving nutritional education materials using balanced nutritional comic messages. There was a significant increase in the nutritional knowledge score in the intervention group with the average score of students' nutritional knowledge rising to 75.73; whereas there was no significant difference between the initial and final scores of students' nutritional knowledge in the control group.

Table 4: Students Nutritional Practices

Practices	Pretest	Posttest
Control Mean ± SD	41.61 ± 10.31	41.18 ± 10.22
Intervention Mean ± SD	40.42 ± 11.74	52.31 ± 10.61

Students' nutrition practices are presented in Table 4. It can be seen that in the intervention group there was an increase in the average score of students' nutrition practices from 40.42 to 52.31. There was almost no significant increase in the average score of nutrition practices in the control group.

DISCUSSION

Based on the data collection that has been carried out, it was found that the age range of students as research subjects is with the median characteristics of the subject's age being 10 years, with the lowest age being 9 years and the highest age being 12 years. Elementary school-age children (6-12 years) are an age group that still experiencing growth and development and requires adequate and appropriate nutritional needs to support growth and development. However, nowadays children have bad eating habits so that many nutritional needs cannot be met optimally. Inappropriate intake of nutrients during childhood can cause various problems and have an impact on learning achievement (Martony, 2019; Moza et al., 2019). Based on data distribution of mothers' education levels, it was found that the highest level of mothers' education was high school (grade III), both for the control group and the intervention group. Meanwhile, the education level of the subjects' mothers at the tertiary level was only 5.6% for the control group; and 2.6% for the intervention group. Mother's level of education is considered to be one of the factors that influenced children's health. Mothers with a better level of knowledge will influence parenting patterns, consumption patterns and even children's nutritional status (Abuya et al., 2012; Widiyanto & Laia, 2021). The majority of the respondent's mother had a high schools level of education which they felt was quite good. However, this might be different if the data is collected from elementary schools in different locations.

The pretest was carried out at the beginning before students were given nutrition education intervention in the form of balanced nutrition message comics. Similar to the level of mother's nutritional knowledge, children's understanding of healthy lifestyles and the nutritional quality of food also has an impact on consumption patterns and food intake. It is just that the role of the mother is needed as a companion in determining the choice of healthy

consumption patterns carried out by children. The role of mother's nutritional knowledge and parenting style greatly influences children's understanding of healthy living and nutritional status. The basis of a good understanding of the mother will provide parenting and a good understanding of the children's nutritional knowledge and behaviour (Kadir, 2019; Nurma Yuneta et al., 2019). Educational materials for intervention using balanced nutrition comics are based on balanced nutrition guidelines of the Ministry of health of The Republic of Indonesia. Comics are packaged as attractively as possible using simple language and communicative images. This is done to attract students' interest in studying nutritional material provided through comics.

The intervention education materials in comic about balanced nutrition is based on balanced nutrition guidelines (four pillars of balanced nutrition and my-plate). Comic was packaged as attractively as possible with simple language and communicative images. This is done to attract students' interest in learning nutrition material through comic. The nutrition education intervention will be carried out using an experiential learning model where students are invited to imagine through comic with the same storyline as students' daily activities both at school and home related to eating patterns and healthy living. Nutrition education intervention is carried out using an experiential learning approach model (an experience-based approach), where students are invited to imagine with the material of comics that already contain storylines that describe students; daily activities both at school and at home related to eating patterns and healthy living. The experiential learning model is considered to be effectively implemented in order to increase students' curiosity and encourage children to be involved and actively participate in learning activities (Barida, 2018; Martony, 2019). Based on the data obtained, it can be concluded that nutritional education intervention using balanced nutrition comic messages is effective and can improve nutritional knowledge and nutritional practices of

elementary school students. Learning media using illustrated comic significantly can improve student learning outcomes that fall into the medium criteria, increase student activity and get positive responses from students. The use of interactive comic has also been shown to be able to increase knowledge about health, nutrition and the benefits of sport for children, and can motivate children and parents to adopt a healthy lifestyle (Amresh et al., 2015; Nurmayanti et al., 2020). Messages transmitted to children through pictorial media have an impact on children's perceptions of food and their food choices. The animated characters that appear in these media are easily recognize by children, not even a few of these animated characters represent their favourite characters (Nurmayanti et al., 2020; Tzoutzou et al., 2019).

The effectiveness of instructional media intervention in the form of comic is inseparable from the form of delivery that is easily accepted by children. Comic are an interactive learning solution that can be used during a pandemic to increase student interest and focus in learning. More than that, interactive learning media using comic can also improve students' cognitive learning outcomes, so they are effectively used as a choice of intervention media with the aim of changing students' behaviour (Ambaryani & Airlanda, 2017; Tri Mulyati et al., 2021).

CONCLUSIONS

Nutrition education intervention with balanced nutrition guideline materials can improve nutrition knowledge and nutrition practices of elementary school students in Sampang district. Balanced nutrition comic is an effective nutritional education medium in helping to improve the healthy lifestyle of elementary school-age children through increasing knowledge and practices of children nutrition. Balanced nutrition comic can be developed as an alternative effective learning media for elementary school students with an interactive approach that is liked by children.

SUGGESTION

The importance of inserting balanced nutrition material into student subjects as a basic learning materials in implementing a healthy lifestyle and improving the quality of children's nutrition in areas with a high prevalence of stunting.

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CONFLICTS OF INTEREST

The authors in this research have no conflicts with any researchers or organization in the materials and subjects discussed in this manuscript.

AUTHOR CONTRIBUTION

The first author is responsible for coordinating the entire research process up to the writing of article manuscript. The second author is in charge of data collection, data processing and manuscript writing.

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