



MODIFICATION OF SNAKE AND LADDER GAME ON KNOWLEDGE AND EATING PATTERN IN SCHOOL AGE CHILDREN IN BENGKULU

Jumiyati*¹, Demsa Simbolon¹, Desri Suryani¹, Yandrizal² and Arie Krisnasary¹

¹Jurusan Gizi Politeknik Kesehatan Kementerian Kesehatan Bengkulu.

²Stikes Tri Mandiri Sakti Bengkulu.

*Corresponding Author: Jumiyati

Jurusan Gizi Politeknik Kesehatan Kementerian Kesehatan Bengkulu.

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ABSTRACT

When the children enter school-age, children start to form food likes and dislikes. Bad eating habits in school-age children can lead to obesity for those who are overweight or undernourished and stunted for those who are malnourished. The prevalence of short school-aged children approximately 48-56%, while the prevalence of malnutrition approximately 34-62%. Health education can be used in order to fulfill the nutritional needs in school-age children. The aim of this study was to determine the effect of a modified diverse foods snake and ladder game media on knowledge and consumption patterns in Elementary School Children. The design of this research was quasi experimental study with a non randomized control group pre-test post-test design. The samples were taken from 76 people, 38 each in SDIT Rabbani intervention group and 38 people in SDIT Generasi Rabbani as a control group based on purposive sampling with inclusion and exclusion criteria. The analysis used was Brivat analysis and Mcnemar. The result of this study has differences in knowledge and consumption patterns between the intervention group and the control group after counseling by using a modified snake and ladder game media.

KEYWORD: Knowledge, Consumption Patterns, Counseling Media.

INTRODUCTION

School-age children is crucial period of growth and development and still experiencing growth and development and require adequate nutritional needs. Inappropriate nutrient intake during childhood can lead to various of nutritional problems. (Setiawan, 2012). Nutritional problem can lead to obesity for those who are overweight and stunted for those who are malnourished. (Almatsir, 2011).

The prevalence of short school-age children in the world approximately 48-56%, besides the prevalence of malnutrition approximately 34-62%. The result of Basic Health Research, overweight and obesity caused by the excess of nutrition, The prevalence of obesity from 6-19 age years increased from 5,2% to 5,9%. Bengkulu province prevalence of very fats was classified as high nationally at 26% (Kementrian Kesehatan RI, 2013).

The excess of nutrition arises due to intake of food and energy-rich drinks, rich in saturated fats, additional sugar and salt, but lack of nutritional intake such as fruits and vegetables that can cause vitamin and mineral deficiencies. Fruit and vegetable are the sources of vitamin and mineral that the body need, can not be replaced by other food ingredients (Andriani, 2012).

Dietary patterns in school-age children is the most important behavior that can affect the nutritional status, because the quality and quantity of food and drink consumed will affect child health level. In order to keep healthy and protected from many nutritional disease, then dietary patterns need to be improved of diverse foods. Optimal nutrient intake is very important to normal growth and physical development and children's intelligence (Kemenkes RI, 2014).

Nutritional problems in school-age children are often associated with eating habit, consumption patterns, and good behavior both at home and school. Diverse foods can be so useful for health, especially for school-age children (Arisman, 2007). The more diverse types of food consumed, the easier it is to meet the nutritional needs. Even, the more diverse foods consumed the easier body to obtain various other nutrients that are beneficial to the body. Therefore the consumption of diverse foods is one of the important advice in realizing balanced. The way to apply this word is by consuming five foods group everyday or every meal. This five foods group are staple foods, vegetables, fruits, and drinks. (Almatsir, 2011).

The result of Riskesdas 2013 stated that consumption of vegetables and fruits in the age group above 10 years is

still low, only 6,5% Indonesian consume adequate fruits and vegetables. Likewise with the results Lock's research (2005) conducted in several African, American, and Asian states consisting of 14 parts states that children aged 5 to 14 years have a 20% tendency to consume fruits and vegetables lower when compared to adults 30 to 59 years.

One of the factors that affect consumption patterns is knowledge, lack of knowledge about diverse foods will also reduce the ability to apply this information in everyday life. One way to prevent nutritional problems is by increasing children's knowledge. Increasing children nutritional knowledge can be done by education health, using visual media like game. The benefit of using game media can attract student's attention without being rigid, able to interact, develop emotions and imagination well, and make grow motivation to do. By playing a game, children recall the information that has been conveyed and is more easily accepted because it will link directly with the sense of sight and hearing. (Suryani S, 2007).

According to a computer research and publishing institution (Putu Suiroaka, 2012), Computer Technology Research (CTR) showed that people who are able to remember 20% from what is seen, and 30% from what is heard. But people who are able to remember 50% from what is seen and heard, and 80% from what is seen, heard, and done at once. (Suiroaka, 2012).

Likewise with the result of Yuliana's research, (2006) in her research "The effect of health education counseling and other factors on the growth or or peshool children, stated that after counseling to the sample, an increase in knowledge scores was 25.2 points for the control group and 29.8 points for the treatment group compred to the knowledge score before counseling that was only 20.3 points for the control group and 26.4 points for treatment group.

Based on the decription, researchers will conduct research on the effect of counseling by using a modified snake and ladder game media on knowledge and consumption patterns of diverse foods in elementary school children in Bengkulu city.

METHOD

The reasearch design uses *quasyexperimental study* with non-randomized control group pre-test and post-test design. Held in September-October 2017, intervention in the form of counseling by using a modified snake and ladder game media that was developed and through trials. Media trials were held by using *Focus Group Discussion* (FGD) to 10 elementary children. The instrument used for the intervention was a modified snake and ladder game by own handiwork. This Snake and ladder game measures 1,5 x 1,5m consisting of thirty boxes. In addition, there were 4 questionand answer boxes if the respondent enters the question box before making a movement to answer.

Questions and answers were on the card so that all children can use snake and ladder game easily. Modified snake ladder and card sample can be seen in figure 1. Instrument for evaluating pre and post test knowledge were measured by questionnaire, consumption patterns in the form of FFQ (Food Frequency Questionnaire). Population in this study were elementary school 5th grade students at SDIT Rabbani Bengkulu city totaling 76 people. Sample of 38 students in the intervention group and 38 in the control group were selected by purposive sampling. Data collection was done in grade 5th elementary school and the pre test was done 25 minutes before the intervention. Intervention in the form of game was given for 1 hour, the game was done 1 week 1 time for 4 weeks. After the invertentiom, post test was conducted by using the same question the result of bivariate analysis using the Mcnemar test.



Figure-1.

RESULT

Table 1: Characteristics of respondents and parents of students in the treatment and control groups.

Characteristics	Treatment		Control		P
	f	%	f	%	
Father's Education					
1. JHS	1	100	0	0	0,601
2. SHS	10	50	10	50	
3. College	28	49,1	29,9	16,7	
Mother's Education					
1. JHS	0	0	0	0	0.615
2. SHS	10	45,5	12	54,5	
3. College	29	51,8	27	48,2	
Father's Occupation					
1. Non-Government	18	56.2	14	43,8	0,357
2. Civil Servant	21	45,7	25	54,3	
Mother's Occupation					
1. Non-Government	10	55,6	8	44,4	0,387
2. Civil Servant	16	42,1	22	57,9	
3. Housewife	13	59,1	9	40,9	
Student age					
1. 9 years	1	33,3	2	66,7	0,616
2. 10 years	35	52,2	32	47,8	
3. 11 years	3	37,5	5	62,5	
Student gender					
1. Male	26	40,6	20	59,4	0,167
2. Female	13	56,5	19	43,5	
Resources					
1. < 1 media source	15	75,0	5	25,0	0,010
2. ≥ 1 media sources	24	41,4	34	58,6	

Based on table 1 the description of the education level with college in treatment group was 49,1% fathers and 50,9% mothers, while the control group of mothers with college was 51,8% as well as fathers 48,2%. Distribution based on occupations in the treatment and control groups was mostly civil servants where fathers 45,7% and 54,3% while mothers 42,1% and 57,9%. Most of the treatment group of students aged 10 years were 35 people (52,2%) and the control group 32 people (47,8%).

The statistical test results of the education, father's and mother's occupation and age of the students were

obtained with score $p > 0,05$ it can be concluded that there was no difference between the treatment group and the control group.

The source of information most frequently heard by students in the treatment and control group was more than one source of media were 24 people (41,4%) and 34 people (58,6%). Statistical test results obtained score $p = 0,01$, can be concluded there were differences in the source of information between the treatment group and the control group.

Table 2: Description of the frequency of student knowledge pre test and and post test in each group.

Knowledge	Groups					
	Treatment			Control		
	Min	Max	Mean± SD	Min	Max	Mean± SD
Pre test	7	92	71,6 ±1,85	57	100	78,5±1,25
Post test	50	100	87,1±10,89	57	100	88,4±10.69

The average pre test student knowledge in the treatment group and the control group had a different score higher in the control group that was 78.5 with a standard deviation of 1.25, while the score of the knowledge score of the treatment group was 71.6 with a standard deviation of 1.85 and for post test student's knowledge

between the treatment group and the control group can be seen from the average score of the treatment group that was 87.1 with a standard deviation of 10,89 the control group's score of knowledge was 88.4 with a standard deviation of 10.69.

Table 3: Description of diverse food consumption patterns pre test in each group.

Variable	Treatment				Control			
	Pre test		Post test		Pre test		Post test	
	F	%	F	%	F	%	F	%
Consumption patterns								
1. Frequently	10	25,6	14	35,9	16	41,0	20	51,3
2. Rarely	29	74,4	25	64,1	23	59,0	19	48,7

Frequency distribution of diverse student food consumption patterns based on the pre test of treatment

group 74.4% for the control group 59.0% while the post test treatment group 64.1% and the control group 48.7%.

Table 4: The Differences of knowledge pre test and post test in the treatment group.

Number	Pre Test Knowledge	Post Test Knowledge		Total
		Good	Conclusion	
1.	Good	29	0	29
2.	Poor	9	1	10
Amount	38	1	39	

Mcneemar test

The analysis results of 10 students with poor knowledge after being an intervention turned out good for 9 people,

did not change for 1 person. Statistical test results obtained score $p=0.004$, there was an effect of counseling by using snake and ladder game media on knowledge.

Table 5: The Differences of knowledge pre test and post test in control group.

Number	Pre Test Knowledge	Post Tes Knowledge		Total	p
		Good	Poor		
1.	Good	34	0	34	0,125
2.	Poor	4	1	5	
Amount	38	1	39		

Mcneemar test

The analysis results of 5 respondents who lacked knowledge after being given an intervention 4 people turned out good, 1 person did not change. Statistical

results obtained score $p=0.125$, there was no effect of counseling with diverse food knowledge in control group.

Table 6: The differences in consumption patterns pre test and post test in treatment group.

Number	Pre Test Consumption Patterns	Post Test Consumption Patterns		Total	p
		Frequently	Rarely		
1.	Frequently	12	0	12	
2.	Rarely	10	17	27	
Amount	22	17	39		

Mcneemar test

The analysis results of 27 respondents, the rare diverse food consumption patterns after the intervention, 10 people turned out frequently, while 17 people did not

change. Statistical test results obtained score $p=0.002$, there was an effect of counseling using snake ladder game media with diverse dietary consumption patterns in the treatment group.

Table 7: The differences in consumption patterns pre test and post tes in the treatment group.

Number	Pre Test Consumption Patterns	Post Tes Consumption patterns		Total	p
		Frequently	Rarely		
1.	Frequently	20	3	34	0,687
2.	Rarely	4	13	17	
Amountn	24	15	39		

Mcneemar test

The analysis results of 17 respondents, the rare diverse food after the intervention, 4 people turned out frequently and 13 people became rarely. The statistical

results obtained score $p=0.687$, there was no effect of counseling with diverse eating patterns.

DISCUSSION

Student's knowledge of diverse foods

The result showed that students' knowledge did not differ before treatment, both the treatment group and the control group. This shows that the students have the same characteristics. At the time of pretest, most students did not know the benefits of consuming vegetables and fruit, and the examples of diverse foods.

The different test results of diverse foods knowledge with modified snake and ladder game media have an effect, can be seen from the increase in average knowledge after the intervention. Counseling was done once a week and held for 1 month. The participants were very enthusiastic during the game. Providing the information with an interesting snake and ladder game, and a pleasant atmosphere can make students more receptive. With regular counseling in the intervention group, there was an increase of knowledge where the change obtained by students is the result of information and images about diverse foods.

The result of this research is parallel with Zualekah's research (2012) showed that the nutritional knowledge in sample has increased (17.44 point), Nutritional education is effective to increase the nutritional knowledge of anemic elementary school children before and after being given an intervention, likewise Rizki's research (2012) in Semarang there was a difference in knowledge of the increased knowledge of adolescent reproductive health among students between groups with Focus Discussion Group (FGD) and Simulation Game (SIG) method. SIG method is more influential on increasing knowledge in students compared to the FGD method.

Knowledge is mostly obtained from the sense of sight and sense of hearing. At the time of the game snake and ladder rely on vision so that it can increase the understanding and strengthen memory. Snake and ladder game media is a media that combines facts and ideas that can be expressed in the form of words and images, so that through this media can describe children's imagination (Nugrahanu, 2007). This can be seen from the results of research conducted by Nachiappan *et al* (2014) in Selangor, Malaysia. In middle school children found that the use of snake and ladder game can improve cognitive in mathematics.

According to Dewi (2011) Educational games are games that are designed and created to stimulate the power of thought to socialize with others and can improve the ability to concentrate. In addition, children become more skilled in developing personality. Snake and ladder game is an educational game that can increase the socialization of children with friends. Game play that is done in the intervention group is information that is delivered to participants in the form of health knowledge.

The results of Khusnul's research (2016) in Semarang there was a change in student's knowledge in the

selection of school food for children after giving the product. Kurnia's research (2012) there was an increase of respondents' knowledge about brushing their teeth after being given an intervention in the form of health education in brushing teeth with a simulation method of snake and ladder game.

According to Contento (2007), games using visual media can increase children's motivation and interest in learning. The information provided in the form of images and words that have meaning is called graphic media. This media has a function to deliver health messages. Messages used regarding the sense of sight are poured into the form of attractive and clear symbolic images.

Diverse food consumption patterns

Based on the research result of the modified snake and ladder game, there is an effect on diverse food consumption patterns. This can be seen from the increase in the frequency distribution of students in consuming diverse foods. Prior to intervention with the modified snake and ladder game media, students were less likely to consume vegetables and fruits. According to Almatsier (2011), consumption of fiber derived from fruits and vegetables also contributes to the intake of various types of vitamins and minerals needed by the body as a regulator. After being given the intervention, this study showed that fiber intake had increased. The result of this study is parallel with W.Y.Sun *et al* in Chinese-American, there is a change significantly pre and post eating patterns using the media, although there was no significant change in consumption patterns of group 2.

Unequal eating patterns of school children will have an impact on the nutritional status of either undernutrition or excess nutrition, because school-age has a higher activity so the nutritional needs must be fulfilled. In order to fulfill the nutritional need at the age of 7-12 years should pay attention to diverse and nutritious balanced food intake. Diverse foods play an important role in creating optimal health (Andriani, 2012). Lytle, *et al* (2000) stated that the role of family, school, and environment can influence the knowledge of children's attitudes and skill, so it is very necessary in promoting healthy eating patterns and eating choices in children.

The results of counseling using games, students do not know the nutritional content of food sources. According to Khomsan (2003), children generally do not understand the content of nutrients in food and the effect of nutrients for health. Someone who does not know the nutrients contained in food will be difficult in choosing the right foods to consume and foods that can meet the need of optimal nutrients for the body. Student eating behavior is influenced by family and environmental factors.

The factors that influence the nutritional status of Elementary School age children are the behavior of choosing and determining the type of food they like.

Children often choose the wrong foods, especially if parents do not give the right instruction. In this age, children are very fond of snacks due to habits at home or the influence of friends. Snacking habits makes children refuse to eat at home that has been provided (Sartika, 2012).

The body's need for energy is more greater than the previous age because school children do more physical activities such as playing game and exercise. Entering the age of 10-12 years. Children increasingly need more energy and nutrients than children under the age. At this age, the feeding of boys and girls is distinguished (Almatsier, 2011).

The research results of Riskesdas (2007) showed that 93.6% of the population aged 10 years and over, consume less fruits and vegetables (<5portion/day). There is no difference in consumption of vegetables and fruits between boys and girls. The research results of Vereecken *et al* (2015) from 5 countries (Latvia, Germany, Lithuania, Poland, and Russia) in adolescents who still lack of fruits and vegetables consumption and have decreased from 2006 to 2010.

CONCLUSION

There is an effect of the modified snake and ladder game on knowledge enhancement and consumption patterns of diverse foods in 5th grade elementary school students which is indicated by an average knowledge enhancement before and after counseling, and a change in dietary patterns before and after. But, this activity needs to be done consistently to improve knowledge and dietary patterns.

REFERENCES

- Almatsier S, Soetardjo S, Soekatri M., *Gizi Seimbang dalam Daur Kehidupan*. Jakarta: Pt Gramedia Pustaka, 2011.
- Arisman., *Gizi dalam Daur Kehidupan*. Jakarta: penerbit EGC, 2007.
- Andriani M, Wirjatmadi B., *Peranan Gizi dalam Siklus Kehidupan*. Jakarta: Kencana, 2012.
- Contento IR, *Nutrition Education: Linking Research, Theori, and Practice*. Sudbury: Jones and Bartlett Publishers, 2007.
- Dewi, dkk, Peningkatan Pengetahuan Gizi Anak USia Sekolah Melalui Pengoptimalan Pendidikan Jasmani dan Kesehatan (PENJASKES) Menggunakan Media Ular Tangga, IPB, 2011.
- Kementerian Kesehatan RI., *Pedoman Gizi Seimbangan*. Jakarta. Badan Penelitian dan Pengembangan Kesehatan Dapertemen Kesehatan RI, 2014.
- KemertianKesehatan RI, Riset Kesehatan Dasar. Pusat Penelitian dan Pengembangan Gizi, Departemmn Kesehatan RI, 2013.
- Khomsan, Ali, *Pangan dan Gizi untuk Kesehatan*. Jakarta: PT Raja Grafindo Persada, 2003.
- Kurnia, Ulfiana,E., Dian P. Pengaruh Pendidikan Kesehatan Gosok Gigi dengan Metode permainan Simulasi Ular Tangga Terhadap Perubahan Pengetahuan, Sikap dan Aplikasi Tindakan Gosok Gigi Anak Usia Sekolah Di SD Wilayah Paron Ngawai, *Journal Universitas Erlangga*, 2012; 1(1).
- Khusnul Latifa, Irawan Budiono., Pengembangan Model Media KIE Gizi Untuk Peningkatan Pengetahuan, Sikap dan Praktik Pemilihan Pangan Jajan Anak Sekolah, *Jurnal UNNES Journal of Public Health*, 2016.
- Lock K, Pomerleau J, Causer L, Altmann DR, Mckee M., The global burden of disease attribute to low consumption of fruit and vegetable: implications for the global strategy on diet. *Bull World Organ*, 2005; 83(2): 100-8.
- Lytle, L.A., *et al.*, How do Children's Eating Patterns, and Food Choices Change Over Time? Results from A Cohort Study. *Am J. Health Promot*, 2000; 14(4): 222-8.
- Rizki NA., Metode Focus Group Discussion dan Simulation Game Terhadap Peningkatan Pengetahuan Kesehatan Reproduksi. Semarang: *Jurnal Kesehatan Masyarakat*. UNNES, 2012; 8(1).
- Nugrahani, R., *Media Pembelajaran Berbasis Visual Berbentuk Permainan Ular tangga Untuk Meningkatkan Kualitas Belajar Mengajar Di Sekoalh Dasar*. Lembaran Ilmu Kependidikan, Jilid, 2007; 36(1).
- Nachiappan, S., Rahman, N.A. Andi H., Fatimah, Z.M., *Snake and Ladder Games in Cognition Development on Students With Leraning Difficulties*. *Jurnal American Research Institute*, 2014; 3(2): 217-229.
- Sartika, Ratu Ayu Dewi, Penerapan Komunikasi, Informasi dan Edukasi Gizi terhadap Perilaku Sarapan Siswa Sekolah Dasar. *Jurnal Kesehatan Masyarakat Nasional*, 2012; 7(2): 76-82.
- Suiraoaka, Putu, dkk. *Media Pendidikan Kesehatan*. Yogyakarta: Graha Ilmu, 2012.
- Suryani, S., Pendidikan Kesehatan bagian dari promosi Kesehatan. Yogyakarta. Fitramaya, 2007.
- Setiawan Yahmin dan Dharma A.C. Masalah Gizi pada anak Sekolah dasar. Diakses tanggal 16 Agustus 2016. <http://www.ike.or.id/2012/09/14/masalah-gizi-pada-anak-sekolah-dasar/2012>).
- Vereecken, C., Pedersen, T.P., Ojala, K., Krolner, R., Dzielska, Ahluwalia, N., Giacchi, M., Kelly, C., *Fruit and Vegetable Consumption Trends Among Adolescents From 2002 to 2010 in Countries*. *European Journal of Public Health*, 2015; 25: 16-19.
- Wei Yue Sun, Beatrice Sangweni, Jian Chen, Smith Cheung. Effects of a Community-Based Nutrition Education Program on The Dietary Behavior of Chinese-American College Students. *Health Promotion International*, 14(3): 241-249.
- Yuliana, dkk., *Pengaruh Penyuluhan Gizi-Kesehatan dan Faktor Lainnya Terhadap*

Pertumbuhan Anak Usia Prasekolah. Bogor: Jurnal Gizi dan Pangan Departemen Gizi Masyarakat Fakultas Ekologi Manusia (FEMA) IPB, 2006.

23. ZulaekahSiti, *Pendidikan Gizi Dengan Media Booklet Terhadap Pengetahuan Gizi*, Jurnal Kesehatan Masyarakat, 2012; 7(2): 127-133.