

THE EFFECT OF NUTRITION EDUCATION USING CARDS AND VIDEOS ON FRUITS AND VEGETABLES KNOWLEDGE

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ABSTRACT

Background: Based on the results of the 2018 Riskesdas report, approximately 95.5% of the Indonesian population has insufficient consumption of vegetables/fruits. The impact of inadequate fruit and vegetable consumption can lead to several nutritional problems, such as obesity in schoolchildren and digestive disorders. One of the efforts that can be made to provide information related to fruits and vegetables is through educational interventions. **Objective:** To determine the influence of nutrition education using card games and animated videos on the knowledge of fruits and vegetables among school-aged children at Balekambang 01 Pagi Elementary School. **Method:** The research design used was a quasi-experimental design with a pre-post test group design involving 124 students from grades III, IV, and V selected through stratified random sampling technique. Data were analyzed using the Wilcoxon and Mann Whitney tests. **Result:** There were differences in the pre-post test knowledge of the respondents regarding nutrition education using card game media ($p = 0.000$) and animated video media ($p = 0.000$). There was no significant difference in the knowledge improvement between the two media, as indicated by a p -value of 0.221 (p -value > 0.05). **Conclusion:** There is an influence of nutrition education using card games and animated videos on the knowledge of fruits and vegetables among students at Balekambang 01 Morning Elementary School.

Keywords: Fruits and Vegetables, Nutrition Education, Card Games, Animated Videos

INTRODUCTION

In 2013, Riskesdas data reported overweight and obesity rates in Indonesia at 10.8% and 8.8% subsequently at ages 5-12 years. Obesity can increase the risk of degenerative diseases that endanger health such as type 2 diabetes mellitus and hypertension (Fridalni, 2019). Consuming adequate fruits and vegetables can be an effort to prevent obesity in school-aged children (Yuliah, Adam dan Hasyim, 2018). Previous research stated that the impact of not consuming enough fruit and vegetables can cause several nutritional problems, such as obesity in school children and digestive tract disorders (Anggraeni, 2016).

In 2018, Riskesdas data showed that as many as 95.5% of the Indonesian population did not consume enough vegetables/fruits. In DKI Jakarta

Province, the percentage of people over five years old who did not consume enough fruit and vegetables has reached 95.1%. The 10-14 year age group in DKI Jakarta, it is known that 97.4% of the population still did not consume sufficient fruit and vegetables. The school-aged children have varied snack choices and are dominated by unhealthy snacks because they taste good, but they don't like fruit and vegetables that have good nutritional content because they think they don't taste good (Prastikaningrum, *et al*, 2020). Insufficient consumption of fruit tended to occur in respondents who have low knowledge, 1,282 times compared to respondents with high knowledge of fruit and vegetables (Oktavia, *et al*, 2019).

The knowledge a person has can influence the way they choose food.

The better the knowledge, the better the behavior in consuming fruit and vegetables (Mohammad dan Madanijah, 2015). One of the efforts to provide information related to fruit and vegetables is by adding education. It can develop knowledge regarding fruit and vegetables in elementary school-aged children (Safitri *et al.*, 2021). In the education process, appropriate media is needed so that the message to be conveyed can be well received by respondents (Azhari dan Fayasari, 2020).

The Examples of media that can be used are card games and animated videos. Providing learning process using cards is more effective in increasing knowledge compared to lectures alone (Priawantiputri, *et al.*, 2019). The animated video media was chosen with the consideration that most of the information is transmitted through the eyes so that it can have an effect on changing information about fruit and vegetables (Andeka, *et al.*, 2019). Card media is a superior game medium because students are involved in the process. A good learning process requires high activity in learning, with game media students will participate and be active (Wahyuni dan Hidayah, 2016). Animated videos can be an alternative because students are attracted to colors and images that move and attract their attention (Sari, 2022).

A preliminary study of 11 students revealed that 81.8% of students did not consume fruit every day and 63.6% of students did not consume vegetables every day. The percentage of students who consume 1-2 portions of fruit and vegetables a week is 90.9% and 3-4 portions a week is 9.1%. Based on this study, researchers are interested in examining the effect of nutrition education using card games and animated videos on fruit and vegetable

knowledge in elementary school-aged children, especially at SDN Balekambang 01 Pagi.

METHODS

The research was conducted offline and used a quantitative approach. The research design used was quasi-experimental with a pre-post test group design. This research involved 124 students in grades III (31), IV (45), and V (48) who were selected using a stratified random sampling technique so that all members of the population had the same opportunity to become respondents. Each student in each class is shuffled to determine whether they become a card or video group. A total of 62 students in the card group and 62 students in the video group.

The tools and materials used in this research include nutrition education media (cards and animated videos), questionnaires (pre-test and post-test) consisting of 20 multiple choice questions (validity: 0.355; reliability: 0.745), as well as projectors and loudspeakers to display the media in front of the classroom. The pre-test was carried out for observation before carrying out the intervention. The post-test was carried out to find out whether there was a change in knowledge or not (Mahmudah *et al.*, 2020). The pre-post test processing time is 15 minutes each and is required over two days (one day for each media). The activity was carried out by collecting samples from each class in one room.

The material content of both media is the same, including the classification of fruit and vegetables, the nutritional content of fruit and vegetables, the benefits of fruit and vegetables, the impact of not consuming enough fruit and vegetables, and recommendations for consuming fruit and vegetables. The technique for collecting data on this

card media is as follows: carrying out the pre-test, playing the game, explaining the fruit and vegetable material, asking questions, and completing the post-test. The card media used is the work of researchers and teams and can be played by 5-7 people. The cards are made attractive by containing colorful pictures of fruit and vegetables accompanied by questions at the bottom of the card which can be seen in Figure 1.



Figure 1. The Card Media

Furthermore, it will be discussed along with the questions contained in the card, assisted by a power point and shown on a projector. If anyone wants to ask, they are welcome to ask. The animated video was made by the researcher himself using Canva with a duration of 7 minutes 19 seconds. Respondents in the video group were directed to fill out the pre-test first, then respondents would listen to the animated video carefully until it was finished. After the video has finished playing, the researcher will invite respondents to ask if they have questions related to the material provided.

The univariate analysis aimed to obtain the distribution of data for each variable, namely the characteristics of respondents which included age, gender, and the level of fruit and vegetable knowledge of respondents before and after being given nutrition education using card games and

animated videos. The data in this study was not normally distributed, so the bivariate test used was Wilcoxon test and Mann Whitney test

Apart from that, there are also "skip" cards, "turn back" cards, and "help" cards whose use is explained in how to play in Table 1.

Table 1. Illustration of How to Play

Illustration	Explanation
	The cards are dealt leaving 1 card as the opening question.
	The player has to determine the first turn, for the next player to follow clockwise.
	If the first player can answer the question, they may put down one of their cards.
	The second player should answer the question from the first player's card. If they cannot answer, they cannot issue a card and the game continues to the next player.
	A "skip" card means that the owner of the card does not need to answer questions and goes straight to the next player. "Skip", "turn back" and "help" cards can be used provided they are the same color as the previous question card.
	A "return" card causes the previous player to answer the question again.
	The "help" card received clue assistance from the researcher.
	The game is played until the cards run out. The player whose cards run out first is the winner.

RESULTS AND DISCUSSION

Respondent Characteristic

Table 2. Respondent Characteristics

Respondent Characteristics	Card Game (n=62)		Video Animation (n=62)		Total (n=124)	
	n	%	n	%	N	%
Age						
10	19	30.6	25	40.3	44	35.5
11	29	46.8	28	45.2	57	46
12	14	22.6	8	12.9	22	17.7
13	0	0	1	1.6	1	8
Gender						
Men	28	45.2	33	53.2	61	49.2
Women	34	54.8	29	46.8	63	50.8

In table 2, it is known that the research respondents' age were between 10 and 13 years and the most were 11 years old (46% or 57 people).

Respondents were dominated by women at 50.8% (63 people), while men were 49.2% (61 people).

Distribution of Respondents' Level of Knowledge

Table 3. Distribution of Respondents' Level of Knowledge

Level of Knowledge	Card Game				Video Animation			
	Pre Test		Post Test		Pre Test		Post Test	
	n	%	n	%	n	%	n	%
Poor	51	82.3	6	9.7	57	91.9	7	11.3
Enough	10	16.1	21	33.9	4	6.5	26	41.9
Good	1	1.6	35	56.5	1	1.6	29	46.8
Total	62	100	62	100	62	100	62	100

Table 3 contains the distribution of respondents' knowledge from the two media groups, both before being given education (pre-test) and after being given education (post-test). In the card game media group, the level of knowledge of respondents before being given nutrition education was more in the poor category, namely 82.3% or 51 people. After being given education, the level of knowledge of respondents increased to good, namely 56.5% or as many as 35 people. Knowledge in the sufficient category also increased, from the previous 16.1% (10 people) to 33.9% (21 people). In the animated video group, the level of knowledge of respondents

before being given nutrition education was greater in the poor category, namely 91.9% (57 people). After being given education, the level of knowledge of respondents increased to the good category, namely 46.8% (29 people). The sufficient category also experienced an increase, from the previous 6.5% (4 people) to 41.9% (26 people).

Knowledge related to fruit and vegetables can be increased, one of which is by providing nutritional education. Research conducted by Putri, *et al.*, (2017); Iryanti (2019); dan Aviana (2021) stated that fruit and vegetable consumption in school-age children is related to their knowledge.

Education requires media as an intermediary so that the message conveyed can be well received by respondents (Pohan, 2020). One of the factors that makes knowledge better is choosing the right media (Azhari dan Fayasari, 2020). The majority of pre-test scores are in the poor category because respondents have never received information or education regarding the amount of fruit and vegetables that should be consumed every day and the consequences are if they don't eat every day, apart from that it is estimated that respondents did not read the answer choices carefully so that in the pre-test they did not answer correctly.

There are several factors that can cause respondents not to answer questions correctly, including not being careful, not understanding the meaning of the questions, and not focusing when working on the questions (Armita *et al.*, 2020). The increased post-test score could be caused by providing intervention in the form of nutrition education using card games and animated videos so that respondents could answer better.

The Effect of Nutrition Education Before and After Card Game Media Intervention on Fruit and Vegetable Knowledge

The Wilcoxon test was used to determine differences in influence in this study. If the p value is <0.05 then there is an influence, whereas if the p value is >0.05 then there is no influence between before and after being given nutritional intervention using card games and animated videos.

Based on the Wilcoxon test results in table 4, there is an increase in the average value of fruit and vegetable knowledge, which means that there is an influence of providing nutrition

education using card games on fruit and vegetable knowledge in school-age children at SDN Balekambang 01 Pagi.

Table 4. Effect of Nutrition Education Before and After Card Media Intervention

Variable	Mean \pm SD	p value
Before	45.97 \pm 12.107	0.000
After	80.48 \pm 12.204	

Note: *significance test results ($p < 0.05$)

This is in line with research by Priawantiputri, *et al* (2019) that providing education using card media is more effective than just lectures in choosing healthy snacks for school-aged children with a p value of 0.031 (p value < 0.05). Card games, especially picture cards, can have a positive effect on the knowledge and attitudes of fifth grade students at SDN Tanjung Duren Selatan 01 Pagi towards balanced nutrition with the p value of the two post tests carried out < 0.05 (Afra, *et al.*, 2021). Counseling given to elementary school students regarding Balanced Nutrition Guidelines using Cards media showed that there was an increase in knowledge between before and after being given the counseling with a p value of 0.000 ($p < 0.05$), apart from that it was also shown by an increase in the mean score based on the correct answer was 5.13 (Fatimah, *et al.*, 2017).

Because the card media used in this research was made by the researcher himself, this card is different from other cards. Not only are the pictures attractive, but also questions about fruit and vegetables that players should answer in order to win the game. It will create interaction during the game and train players' understanding and speaking (Sumargono *et al.*, 2020). The card

media has several other advantages, namely that it is an educational medium that can be used repeatedly, it is not complicated to play, and many students can participate in the game (Nurfila, *et al.*, 2022). A study conducted by Damjana, *et al* (2020) showed that teaching and learning activities with the help of nutrition cards given to the treatment group had better learning outcomes compared to learning with regular presentations given to the control group with a p value of 0.000 ($p < 0.05$).

Table 5. The Differences in the Effect of Nutrition Education Before and After Animation Video Media Intervention

Variable	Mean \pm SD	p value
Before	45 \pm 10.163	0.000
After	77.26 \pm 13.780	

Note: *significance test results ($p < 0.05$)

Based on table 5, it is known that there is an increase in the average value of fruit and vegetable knowledge, which means that there is an influence of providing nutrition education using animated video media on fruit and vegetable knowledge in school-aged children at SDN Balekambang 01 Pagi. This is in line with previous research which stated that there was an increase in knowledge scores before and after being given education using animated video media with a p value of 0.000 ($p < 0.05$) (Sari, 2022). Other research also states that education using animated video media has a positive effect on student learning outcomes, which can be seen from the post test scores being more complete than the pre test scores (Rahmayanti dan Istianah, 2018). This is also in accordance with other research which states that providing fruit and vegetable education using animated video and power point media has an

effect on changes in the knowledge of class V students at SDN Cibogor 2 with a p value of 0.000 ($p < 0.05$) which indicates an increase in understanding. students the importance of consuming fruit and vegetables (Salsabila, 2019).

The increase in scores between before and after the intervention was given was due to the provision of education using animated video media. Videos with pictures can provide more appeal if used as educational media because they can help clarify material that is difficult to explain directly with words. Choosing animated videos as educational media has the advantage of attracting attention and making students focus more on paying attention to the content of the material and if combined with other media it will be better in efforts to increase knowledge regarding fruit and vegetables.

A study conducted in four elementary schools in Portugal in 2018 by Gonçalves *et al.*, (2018) related to providing animated shows called nutriventures (NV) containing healthy eating content and messages that promote it. This research involved 142 students from four different elementary schools in the northern region of Portugal. It was found that students in the experimental group tended to choose healthier food items after watching animated videos or cartoons compared to the control group with a p value < 0.05 .

Differences in Effectiveness between Card Game Media and Animation Video Media on Fruit and Vegetable Knowledge

The difference in the effectiveness of the educational media used can be seen from the difference in scores between the pre-test and

post-test, then followed by the Mann Whitney test.

Table 6. The Differences in the effectiveness of card game media and animated videos

	Mean Rank		<i>p value</i>
	Card Game	Video Animation	
Pre test	63.21	61.79	0.824
Post test	67.46	57.54	0.120
Average	65.33	59.66	
Difference	66.42	58.58	0.221

In table 6 it is known that the level of knowledge in the pre-test of the two groups is equivalent in the category of poor fruit and vegetable knowledge. This can be seen from the mean of each group, namely the card game group = 63.21 and the animation video group = 61.79. Apart from the low average pre-test results, the two groups had different test results with a *p* value (0.824) > 0.05, so based on this it can be said to be homogeneous in initial conditions and have the same or equivalent knowledge.

In the other research conducted by Wahyuni dan Hidayah (2016) stated that the effect of fruit and vegetable education on students' knowledge was that there was a significant change in students' learning completeness, seen from the average pre-test and post-test scores. The average post test scores between the card game and animation video groups were 67.46 and 57.54 respectively. After that, a different test was also carried out for the post test scores and the result was a *p* value (0.120) > 0.05, so it could be said that there was no difference in students' knowledge between card game media compared to animated videos after being given education. The results of the Mann Whitney test obtained a *p* value (0.221) > 0.05, which means there is no difference in the effectiveness of nutritional education related to fruit and vegetables.

This result showed that both media have an influence on respondents' knowledge regarding fruit and vegetables, which is characterized by an increase in knowledge scores so that there is no difference in the results of the effectiveness of the two media. These results are in accordance with research by Firdaus, *et al.*, (2019) which states that there is no difference in effectiveness between picture educational card media and other cards on children's language development with a *p* value of 0.551 (*p* > 0.05). The research that uses animated videos as one of the media shows that there is no difference in the effectiveness between animated videos and demonstration videos on students' Basic Life Support (BHD) knowledge with a *p* value of 0.816 (*p* > 0.05) (Anwar *et al.*, 2022).

During the research process, respondents gave good responses, participated in the research series with enthusiasm and passion so that the research could run smoothly. However, this research still has limitations, namely when the pre-post test was completed in the same day, it was different from the initial plan which wanted to be carried out on a different day because the time given by the school was limited.

CONCLUSION AND SUGGESTION

This study showed that there is a significant influence of providing nutrition education using card games and animated videos on fruit and vegetable knowledge among students at SDN Balekambang 01 Pagi. The effectiveness of test using the Mann Whitney test showed that there was no difference in effectiveness between media in providing nutritional education related to fruit and vegetable knowledge to respondents at SDN Balekambang 01 Pagi. In future research, it is hoped that there will be research related to the effect of nutrition education using card games and videos on fruits and vegetables consumption behavior as an effort to increase the amount of fruit and vegetable consumption by observing how respondents behave in consuming fruit and vegetables after being given education, how the amount increases fruit and vegetables consumed every day, and so on.

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