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Health Education Media to Increase Vegetable and Fruit Consumption in School-Aged Children

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ABSTRACT

***Background**: The lack of regulatory substances from fruits and vegetables is related to individual factors. **Aims**: The purpose of this study is to determine the effect of using educational media, lift-the-flap books, and leaflets on increasing knowledge, attitudes, parental support, and consumption of vegetables and fruit in elementary school children. **Methods**: This type of research was a quasi-experiment with a pre-and post-design approach to see the causal relationship between before and after counseling intervention with lift-the-flap book and leaflet media on increasing knowledge, attitudes, parental support, and consumption of vegetables and fruits in school-age children. Measuring knowledge scores, attitudes, and parental support was using a Likert scale, and vegetable and fruit consumption using a 2x24-hour recall. Statistical analysis was conducted using the Test correlation test with a 95% confidence level (a = 5%). **Results**: Based on the research, it can be seen that using the lift-the-flap books and leaflet media can increase knowledge, attitudes, parental support, and consumption of vegetables and fruit compared to before using the media in elementary school children Pontianak. **Conclusion**: Lift-the-flap books are more effective in increasing knowledge, attitudes, parental support, and consumption of vegetables and fruits than leaflets.*

***Keywords**: Children, Consumption of Fruits and vegetables, Health Education Media, Lift the Flap Book*

INTRODUCTION

In Indonesia, the problem of dual nutrition is still a public health problem (Tzioumis & Adair, 2014). The dual nutritional problems are undernutrition and overnutrition. Undernutrition impacts low birth weight and stunting, while overnutrition results in obesity and overweight. Body weight is more at risk of degenerative diseases such as stroke, coronary heart disease, and diabetes (Schlam *et al.*, 2013). The proportion of nutritional status in Indonesia is namely malnutrition 5.7%, low nutrition 13.9%, poor nutrition and malnutrition 17.7%, and stunting (concise children) 30.8% (Badan Penelitian dan Pengembangan Kesehatan, 2018). The proportion of nutritional problems is higher when compared to nutritional problems in the world; the WHO reports the occurrence of nutritional problems in preschool children, namely underweight 15.7% and weight 6.6% (Ariati *et al.*, 2018).

Lack of mineral intake (such as iodine, iron, zinc, and vitamin A) in children is associated with high mortality and morbidity rates and increasing growth and development disorders. Lack of vitamins and microminerals in school-age children will impact the balance of growth, physical and neuropsychological development, optimization of work capacity, adaptation to environmental hazards, normalization of metabolic processes, and learning achievement (Sharps & Robinson, 2016b, 2016a). The major nutritional problem is due to the lack of balanced nutritional intake that fulfills various functions such as a source of energy, protective substances, and regulatory substances. A lack of vitamins and minerals that function as regulatory substances will interfere with children's growth and physical and mental

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development, and they are at risk of developing chronic diseases.

Several factors are related to the lack of sources of regulatory substances, such as the physical environment, government policies, and individual factors. These individual factors are due to a lack of understanding, knowledge, attitudes, and behavior about the importance of sources of regulatory substances in the body's metabolism. Lack of intake of vitamins and minerals from vegetables and fruits in the long term will impact public health, such as the risk of chronic diseases, heart disorders, and diabetes (Kochkorova *et al*., 2018).

The intake of regulators, which consist of vitamins and minerals, comes from vegetables and fruits. The WHO recommends the consumption of vegetables and fruit at a rate of 400 grams per person per day. In Indonesia, the consumption of vegetables and fruit is still low; the average consumption of vegetables is 70 g/person/day, fruit is 38.8 g/day, and the total consumption of vegetables and fruit is 108.8. In children aged >10 years, 93.6% consume less vegetables and fruit (Rachman *et al*., 2017).

Based on the 2013 Basic Health Research results, children aged 5 years who consume less fruit and vegetables are 93.5%, while in 2018 it increased to 95.5%. Meanwhile, the proportion of less fruit and vegetable consumption among children aged 5 years in West Kalimantan is also quite high, namely >90% (World Health Organization (WHO) in Rachman, Mustika and Kusumawati, 2017) (Rachman *et al*., 2017). A lack of fruit and vegetable consumption can cause degenerative diseases such as obesity, diabetes, hypertension, high blood pressure, and cancer. The global mortality rate attributable to insufficient intake of fruits and vegetables stands at 28%.

Several factors are related to the problem of low intake of vegetables and fruit, including the internal environment (such as government policies and economic status), the physical environment (dietary guidelines, media exposure, community, and school), and personal factors (habits, preferences, attitudes, knowledge, and experience) (Krølner *et al*., 2011).

The children's consumption of fruit and vegetables still needs to be higher because these food groups are usually less liked by children. Factors that influence the lack of fruit and vegetable consumption include low family welfare levels, less availability of fruits and vegetables at home, and lack of parental support for fruit and vegetable consumption.

Another factor that can also affect fruit and vegetable consumption is knowledge (Hidayati *et al*., 2017). Another study stated that nutrition knowledge in grade 4 and 5 school children still needs to be improved (Azadirachta & Sumarmi, 2017).

Education is one way to increase one's knowledge. Education can be provided in various fields, including the health sector. Health education can be given to all targets but must use the correct method so that the information provided can be well-received (Ulya *et al*., 2018).

Various kinds of health education media, including the lift-the-flap book, can be used. Lift-the-flap book, often referred to as a flap book, is a windowed book with pictures or information in or behind it so that the book, in addition to providing knowledge, is also interesting to read and can provoke a child's motor response (Rahmawati, 2018). The research results from Pratiwi (Wibowo & Pratiwi, 2018) say that students' responses to the lift-the-flap book media are fun and exciting, facilitate understanding of the material, and increase concentration and creativity. Based on the explanation above, the researcher wants to research educational media, lift-the-flap books, and compare to leaflets to increase knowledge, attitudes, parental support, and consumption of vegetables and fruit among elementary school children in Pontianak.

METHODS

This type of research is quasi-experimental, with a pretest-posttest design in two groups. A pretest is carried out to determine the initial state before being given treatment with different media, and both are also given a posttest. The media used is a lift-the-flap book, or a windowed book, which is an interactive book containing material about vegetables and fruits whose pages must

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be opened to discover the surprises behind the pages.

The nutritional knowledge measured is the respondent's understanding of fruits and vegetables, including the kinds, benefits, and nutrients contained in fruits and vegetables and the consequences of not consuming fruits and vegetables. The measured nutritional attitude is a statement or response of a person before taking the action of consuming fruit and vegetables. Vegetable consumption is seen from the number of respondents' daily vegetable consumption. This data collection was done by interviewing the respondents using the 2x24 Hour Food Recall method to see the respondents' vegetable consumption, which was carried out pre and post-to get an overview of individual vegetable consumption. Parental support is one way to increase children's consumption of vegetables and fruit. The variable score is determined using a Likert scale.

The population of this study was elementary school students in North Pontianak, and the samples taken in this study were sixth-grade students at elementary schools 33 and 09. The sampling locations consisted of two elementary schools, with elementary school 33 as the control group utilizing leaflet educational media and elementary school 09 as the intervention group utilizing lift-the-flap book media. Both elementary schools were in the same sub-district area. The number of samples used is 70 respondents. The sample is selected using quota sampling for two elementary schools in North Pontianak. Thirty-five students will be distributed to each elementary school and their parents for grade V with SDN 09 and 33 each, 35 students in class V and their parents. Determining each student in each elementary school was by a simple random sampling technique.

To find out the difference in changes in the average value of knowledge scores and the average intake of vegetables and fruits before and after treatment in each group, t-test analysis was used if the data were normally distributed. Meanwhile, to determine the effect of media use on knowledge, attitudes, and consumption of vegetables and fruits before and after treatment between the two groups, a paired t-test was performed. The data are normally distributed, but if the distribution is not normal, then Mann-Whitney analysis is used, with a 95% confidence level. (α = 5%). The normality test used is the Shapiro-Wilk test. All of the above tests used data processing software. The data obtained in this study will be presented in tables or graphs (univariate data) and tabular form (bivariate data). Explanations are presented in narrative form. The health education ethics committee reviewed the study protocol, and ethical permission was provided. Official approval was obtained from the Ethics Committee of Poltekkes Kemenkes Pontianak in West Kalimantan (number 99/KEPK-PK.PKP/III/2022).

RESULTS AND DISCUSSION

Lift-the-flap is a book whose pages contain pictures equipped with a window opening system to obtain the surprise information or images behind it. These are pictures and information about vegetables and fruit, the benefits of vegetables and fruit for body health, examples of vegetables and fruit, their nutrients, and the consequences of not consuming them. The lift-the-flap book used can be seen in Figure 1.

Figure 1. Lift-The-Flap Book

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The leaflets used in the research contained pictures accompanied by information about vegetables and fruit, the benefits of vegetables and fruit for body health, examples of vegetables and fruit, their nutrients, and the consequences of not consuming them. The leaflet used can be seen in Figure 2.

Figure 2. Leaflet

Table 1. Description of student attitude scores before and after giving counseling treatment using lift-the- flap book media

	Leaflet		Lift-The-Flap Book	
	Mean±Median	SD	Mean±Median	SD
Pre	19.51±19.00	2.75	19.60±20.00	2.82
Post	23.80±24.00	3.79	23.77±24.00	3.08

Table 1 shows the measurement of the mean attitude score obtained by students before and after giving counseling treatment through lift-the-flap book media increased from 19.60 to 23.77. At the same time, the control group also experienced an increase in scores from 19.51 to 23.80.

Table 2. Description of students' knowledge scores before and after giving counseling treatment using lift-the-flap book media

	Leaflet		Lift-The-Flap Book	
	Mean±Median	SD	Mean±Median	SD
Pre	5.14±5.00	1.39	5.49±6.00	1.76
Post	6.09±6.00	1.79	6.89±7.00	1.491

Table 2 shows that the average knowledge obtained by students before and after giving counseling treatment through lift-the-flap book media increased from 5.49 to 6.89. At the same time, the control group also experienced an increase in scores from 5.14 to 6.09.

Table 3. Description of student parental support scores before and after giving counseling treatment using lift-the-flap book media

	Leaflet		Lift-The-Flap Book	
	Mean±Median	SD	Mean±Median	SD
Pre	5.46±5.00	0.61	5.69±5.00	0.83
Post	6.83±6.00	1.60	8.17±8.00	1.27

Table 3 shows that the mean score of parental support before and after giving counseling treatment through lift-the-flap book increased from 5.69 to 8.17, while the control group also experienced an increase in score from 5.46 to 6.83.

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Table 4. Description of the amount of vegetable consumption by students before and after giving counseling treatment using lift-the-flap book media

	Leaflet		Lift-The-Flap Book	
	Mean±Median	SD	Mean±Median	SD
Pre	33.86±25.00	31.62	56,90±45.00	64.89
Post	86.71±60.00	72.01	135.57±110.00	84.64

Table 4 shows that students' average amount of vegetable consumption before and after counseling treatment through lift-the-flap book media increased from 56.90 g/day to 135.57 g/day. At the same time, the control group also experienced an increase in score from 33.86 g/day to 86.71 g/day.

Table 5. Description of the amount of fruit consumption by students before and after giving counseling treatment using lift-the-flap book media

	Leaflet		Lift-The-Flap Book	
	Mean±Median	SD	Mean±Median	SD
Pre	122.50±75.00	123.78	146.74±107.50	134.97
Post	181.83±120.00	163.44	269.49±150.00	228.19

Table 5 shows the average amount of fruit consumption by students before and after giving counseling treatment through lift-the-flap book media increased from 146.74 g/day to 269.49 g/day while the control group also experienced an increase in score from 122.50 g/day to 181.83 g/day.

Table 6. The effect of counseling without using lift-the-flap book media on increasing attitudes, knowledge, parental support, and the amount of vegetable consumption and students as if basic

Variable	Difference	SE	95% CI		p*
			Lower	Upper	
Attitude	-4,286	0.807	-5.926	-2.646	0.000
Knowledge	-0.943	0.397	-1.750	-0.135	0.023
Parental Support	-1.371	0.299	-1.978	-0.764	0.000
Vegetable Consumption	-52.857	14.19	-81.688	-24.026	0.001
Fruit Consumption	-59.329	36.56	-133.624	14.967	0.114

*Paired sample t-test

Table 6 shows the effect of providing counseling without using lift-the-flap book media on elementary school students in Pontianak. The results of statistical tests showed that there was a difference before and after counseling without using the lift-the-flap book media on attitudes (p = 0.000), knowledge (p = 0.023), parental support (p = 0.000), awareness of vegetable consumption (p = 0.001), but for the fruit consumption vehicle there was no significant difference before and after counseling (p= 0.114).

Table 7. The effect of counseling using lift-the-flap book media on increasing attitudes, knowledge, parental support, and the amount of vegetable consumption and students as if basic

Variable	Difference	SE	95% CI		p*
			Lower	Upper	
Attitude	-4.171	0.717	-5.628	-2,715	0.000
Knowledge	-1.400	0.389	-2.191	-0.609	0.001
Parental Support	-2.486	0.230	-2.952	-2.019	0.000
Vegetable Consumption	-78.67143	18.933	-117.147	-40.196	0.000
Fruit Consumption	-122.7554	36.887	-197.720	-47.791	0.002

*Paired sample t-test

Table 7 shows the effect of providing counseling using lift-the-flap book media on elementary school students in Pontianak. The results of statistical tests showed that there was a difference before and after counseling using the lift-the-flap book media on all the variables measured, namely attitudes (p = 0.000), knowledge (p = 0.001), parental support (p=0.000), awareness of

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vegetable consumption (p = 0.000) p=0.000), and fruit consumption (p=0.002).

Table 8. Differences in extension media using leaflets with lift-the-flap books on attitudes, knowledge, parental support, and the amount of vegetable consumption in elementary school students

Variable	Mean Difference	SE	95% CI		p*
			Lower	Upper	
Attitude_Pre	-0.086	0.666	-1.414	1.242	0.898
Knowledge_Pre	-0.343	0.379	-1.099	0.414	0.369
Parental Support_Pre	-0.229	0.174	-0.557	0.120	0.195
Vegetable Consumption_Pre	-23.043	12.202	-47.391	1.306	0.063
Consumption of Fruit_Pre	-24.236	30.956	-86.008	37.536	0.436
Attitude_Post	0.029	0.827	-1.622	1.679	0.973
Knowledge_Post	-0.800	0.394	-1.585	-0.015	0.046*
Parental Support_Post	-1.343	0.345	-2.032	-0.654	0.000*
Vegetable Consumption_Post	-48.857	18.343	-86.343	-11.372	0.011*
Consumption of Fruit _Post	-87.663	47.444	-182.335	7.011	0.069

Table 8 shows the counseling group using leaflet media and lift-the-flap book before the treatment of respondents in general, attitudes, knowledge, parental support, and consumption of vegetables and fruits had no statistically different scores (p≤0.005). After the counseling group, the extension media using leaflets and lift-the-flap book showed significant differences in the knowledge variable (p=0.046), parental support (0.000), vegetable consumption (p=0.011), but the attitude and fruit consumption variables did not show any significant difference.

The results of the initial survey showed that before health education was carried out, awareness of vegetable and fruit consumption in elementary school students was still with an average of 33.86 g/day for vegetables and 56.90 g/day for fruit consumption in the control group and 122 g/day in the treatment group. 50 g/day for vegetables and 146.74 g/day for fruit. Compared to other areas, vegetable and fruit consumption in elementary school-aged children in Metro City are more interested in consuming fresh fruit from traditional markets (Ayesha *et al*., 2020). Health education obtained by parents and educators to children about the importance of awareness of consuming vegetables and fruit every day that is less can be the cause of the low awareness of children to consume vegetables and fruit (Bjelland *et al*., 2013; Valmórbida & Vitolo, 2014).

Extension with the help of media is needed to help increase acceptance by children. The principle of delivering material is carried out by considering the aspect of acceptance or the ability of the five senses to respond and transmit to the brain to remember. The more senses are involved, the easier it is for the brain to capture the memory (Utami *et al*., 2019). Submission of material with the help of props will further assist students in receiving the information they want to convey. Using informative extension media props by completing color pictures is easier for students to accept.

Knowledge of students can be increased through exposure to information either using the media or without using media aids. However, conveying information with the help of media such as a lift-the-flap book will be accepted by students more quickly. Media use is important as a trigger or tool for delivering information to children as objects in counseling (Bissell *et al*., 2018; Jatmika & Maulana, 2018). The results of research conducted on students to increase knowledge, attitudes, and foster parental support for the importance of consuming vegetables and fruit for students show that extension without using the media, there is an increase in knowledge, attitudes, parental support, and the number of vegetables consumed by students. However, counseling with the help of the media showed better results with proven significant differences in all the variables measured: knowledge, attitudes, people's support, and consumption of vegetables and fruit.

Increased knowledge will accompany a child's attitude toward the information received. A positive attitude will occur due to the impact of increased knowledge (AhbiRami & Zuharah, 2020; Shanbhog *et al*., 2014). With increased

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knowledge and positive response attitudes shown by a child and parental support for the importance of consuming vegetables and fruit, it can encourage children's behavior to consume vegetables and fruit regularly. However, to achieve this, the knowledge stimulus provided to children and parents must continue running continuously using an easy-to-understand educational approach.

Using a lift-the-flap book as a medium for conveying information has advantages, such as being able to be used by bears and carried anywhere. Media that is easy to use for health extension officers in areas where it is difficult to provide electronic media is beneficial (Al Bardaweel & Dashash, 2018; Sanadhya *et al*., 2014). In addition, lift-the-flap book media has a more positive impact on increasing knowledge, attitudes, parental support, and consumption of vegetables and fruit compared to counseling using leaflet media. From the advantages possessed by the lift-the-flap book media, it was developed into a more informative media by increasing the visualization function of the media into animated media, which elementary school-age children prefer. The study limitation education must be carried out continuously, not only at the beginning and end of the research. So, it requires monitoring and evaluation.

CONCLUSION

Health education using lift-the-flap books and leaflet media can increase the knowledge, attitudes, and support of parents toward the consumption of vegetables and fruit in school-age children.

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