

The Effect of Nutrition Education Through *Flashcard* Media on Knowledge of Iron Sources Food Consumption in Adolescent Women at SMP N 33 Bekasi City

Miswah Alfaresti Sutrisna^{1*}, Arindah Nur Sartika².

^{1,2}Department of Nutrition Science, Sekolah Tinggi Ilmu Kesehatan Mitra Keluarga, Bekasi, Indonesia.

*Correspondence author : miswahresti@gmail.com

Abstract

In young women the nutritional problems that are still experienced are nutritional anemia caused by a lack of consumption of food sources of iron. Adolescent girls who consumed food sources of iron were still relatively low in the animal food group (meat, chicken, liver, fish, eggs) 39% and from the vegetable side dishes (tofu and tempeh) 31.2%. One of programs to improve nutritional anemia that can be done is through nutrition education. In the process of nutrition education it is necessary to have visual aids that can help the learning process to be effective and attract students' attention regarding the consumption of iron intake in young women at school. *Flashcards* can be applied to junior high school students, because students can understand from the contents of the picture cards which contain information related to knowledge of consumption of food sources of iron. This study aims to analyze the effect of nutrition education through flashcard media on knowledge of consumption of food sources of iron in young women at SMPN 33 Bekasi City. The research design is a quasi-experimental design in the form of a one group pretest-posttest design. The research subjects consisted of 34 female students as the intervention group. The media used is flashcard media for food sources of iron from the carbohydrate, animal, vegetable, legumes, vegetables, fruits, and dairy product groups referring to the 2017 Indonesian Food Composition Table. The results of statistical analysis using the Wilcoxon Rank Test showed that providing nutrition education using flashcard media on knowledge of consumption of food sources of iron in female adolescents was $p\text{-value} = 0.00005 (<0.05)$. This means that there is an effect before and after providing nutrition education using flashcard media on knowledge of consumption of food sources of iron in young women at SMPN 33 Bekasi City

Keywords: Nutrition Education; Flashcard; Consumption of Food Sources of Iron.

Introduction

The nutritional problem experienced in adolescents is nutritional anemia. Adolescent girls need to pay attention to their health because they experience anemia caused by factors such as long periods of menstruation resulting in a lack of nutritional intake in the formation of hemoglobin. Based on the 2018 Basic Health Research, the prevalence of anemia in young women is 48.9%. The leading causes of adolescent girls experiencing anemia are : low intake of food sources of iron, increased iron requirements during pregnancy and breastfeeding, significant blood loss during menstruation.

One effort to improve the situation of nutritional anemia in adolescents is by fulfilling iron intake, one of which is consuming food sources of *heme* iron found in animal food sources and *non-heme* iron found in plant foods. However, in Indonesia, there still needs to be more knowledge about preventing anemia and consuming iron intake by nutritional adequacy rates in adolescent girls. One program to improve nutritional anemia is through nutritional education. Efforts to provide nutrition education in schools have several advantages, namely that the knowledge and attitudes received can become the basis for consumption patterns for young women at school. Providing nutritional education to young women at school is a strategic step in improving nutritional anemia because the impact is directly related to preventing stunting in Indonesia.

Nutrition education provides information related to nutrition so that school teenagers can change their food consumption behavior and increase their knowledge because it can form positive attitudes and behavior. In the nutrition education process, there is a need for teaching aids that can help the learning process be effective and attract students' attention regarding the consumption of iron intake in young women at school. *Flashcards* can be applied to all age groups, including junior high school students, because students already read well and can already understand the contents of the picture cards, which contain information related to knowledge of consuming food sources of iron. According to Wahyuni's (2020) research, there was an increase in the average knowledge score after being given education using flashcard media in the pretest from 69.00 to 80.40 in the implementation of SIKLUS II learning activities.

Based on this background, researchers are interested in examining the influence of nutritional education through *flashcard* media on knowledge of consuming food sources of iron among young women at SMPN 33 Bekasi City.

Methods

This quantitative research uses a quasi-experimental design as a one-group pretest-posttest design and has received approval from the Muhammadiyah University Research Ethics Commission, Prof. Dr. Hamka, with No.03/23.03/02357. This research was conducted in March at SMPN 33 Bekasi City.

The sampling technique in this study used a consecutive sampling technique. The inclusion criteria in this study were a) All female students in class VII-IX of junior high school, b) Female students aged 12–15 years, and c) Students willing to be respondents during the study. In the intervention group, 34 female students met the inclusion criteria.

The data taken included data on the characteristics of female student respondents, data on the demographic characteristics of the female respondent's family, as well as data on knowledge of source food consumption. Knowledge data was obtained by filling out an independently prepared questionnaire totaling 18 questions in *Multiple Choice* form, which validated and accepted a *Cronbach's Alpha* value of 0.912. The questions asked were related to the consumption of food sources of iron. The questionnaire refers to *flashcard* media food sources of iron. In the intervention group, education was given using *flashcard* media on food sources of iron from the carbohydrate, animal, vegetable, legumes, vegetables, fruits, and dairy product groups referring to the 2017 Indonesian Food Composition Table.

The statistical test was used to see whether or not there was an effect of nutrition education through *flashcard* media on knowledge of the consumption of food sources of iron. The statistical test method used is the parametric statistical test of the Dependent Paired T-test if it is not normally distributed using the *Wilcoxon Test*. Testing the normality of this data uses the *Shapiro-Wilk* normality test.

Results and Discussions

In the intervention group (SMPN 33 Bekasi City), the total number of children sampled in this study was 34 students who were in class VII, where the highest results were found in students aged 13 years (70.6%) and students with nutritional status of most were nutritional status normal (79.4%). In addition to age and nutritional status, there is a student school pocket money of 0-50.000, whereas, in the intervention group, the highest results were found in respondents with a student school pocket money of 0-10.000 (41.2%) (Table 1).

Table 1. Characteristics of Female Student Respondents

Variable		Treatment	
		Number (n)	Percentage (%)
Gender	Female	34	100.0
Student Class	VII. G	17	50.0
	VII. H	17	50.0
Age	12 years	10	29.4
	13 years	24	70.6
Nutritional Status	Malnutrition	1	2.9
	Normal	27	79.4
	Overweight	4	11.8
	Obesity	2	5.9
Student School Pocket Money (day)	0 – 10.000	14	41.2
	11.000 – 20.000	13	38.2
	21.000 – 30.000	5	14.7
	31.000 – 40.000	0	0
	41.000 – 50.000	2	5.9
Total		34	100.0

In the demographic characteristics of the family of the respondent's parents' occupation, it was found that the results were more significant for the work of businessman fathers (44.1%) and housewife (79.4%). Regarding the educational characteristics of fathers and mothers, the average respondent has parents who are educated with an educated status of senior high school (Table 2).

Table 2. Demographic Characteristics of Respondent's Family

Variable		Treatment	
		Number (n)	Percentage (%)
Father's Occupation	PNS/TNI/Polri	7	20.6
	Private Employes	11	32.4
	Businessman	15	44.1
	Doesn't work	1	2.9
Father's Last Education	Elementary School	2	5.9
	Junior High School	4	11.8
	Senior High School	22	64.7
	College	6	17.6
Mother's Occupation	PNS/TNI/Polri	2	5.9
	Private Employees	3	8.8
	Business woman	2	5.9
	Housewife	27	79.4
Mother's Last Education	Elementary School	3	8.8
	Junior High School	5	14.7
	Senior High School	19	55.9
	College	7	20.6
Total		34	100.0

Table 3. Distribution of Knowledge Scores on Food Consumption of Iron Sources

Variable	n	Min-Max	Median	Interquartile Range	$\Delta \bar{x}$
<i>Pre-test</i>					
Knowledge	34	50 - 100	66.67	78 - 61	50
<i>Post-test</i>					
Knowledge	34	78 - 100	94.44	94 - 94	22

Based on (Table 3) above, in the sample, it can be seen from the variable knowledge of consumption of food sources of iron that the median score before providing education (*pre-test*) has a value of 66.67 while the median score after providing education (*post-test*) has a value of 94.44.

Table 4. Data Normality Test Results

Variable	n	P-Value (Shapiro Wilk)	Information
Knowledge			
Before Providing Education	34	0,027	Abnormal Distribution (P-Value <0.05)
After Providing Education	34	0,000	Abnormal Distribution (P-Value <0.05)

In (Table 4) the results of the normality test with shapiro wilk ($N < 50$) show that the p-value for knowledge before providing education and after providing education is 0.027 and 0.000, respectively. So, the knowledge variables before and after schooling are not normally distributed. So, the analysis test used is the *wilcoxon rank test*.

Table 5. Distribution of Knowledge Level of Respondents Before and After Participating in Education

Variable	Median	Interquartile Range	P-Value
Knowledge			
Before Providing Education	67	78 - 61	0,00005
After Providing Education	94	94 - 94	

$N = 34$; Wilcoxon rank test; significant if the p-value is <0.05



Figure 2. Providing Education to the Intervention Group

In (Table 5), the statistical test results showed that the p-value was 0.00005, so it can be concluded that there was an increase in respondents' knowledge before and after providing education regarding knowledge of consuming food sources of iron using flashcard media.

DISCUSSION

Description of Sample Characteristics

Women have higher memory than men because men's memory centers are smaller than women's (Ariska *et al.*, 2023). School-age adolescents are between 12-15 years old. During this period, children naturally experience a period of growth and development both psychologically and cognitively (Mauliya, 2019). According to Rizky *et al.* (2019), nutritional status is influenced by a person's food consumption and physical activity. The choice of food ingredients and determining the amount of food consumed is influenced by nutritional knowledge. Father's and mother's education is related to consumption of food sources of iron, as well as pocket money, family income, parental education, and the availability of other food ingredients which have a significant positive relationship with consumption of food sources of iron such as animal, vegetable, vegetable, and fruit among students (Oktavia *et al.*, 2019).

Based on the parents' employment data results, it was found that most of the father's work was as a businessman, and the mother's work was as a housewife. According to research by Yonatha *et al.* (2019), the better a person's job, the higher the income will be used to access family food, including providing a source of food at home.

Distribution of Respondents' Level of Knowledge Before and After Participating in Education

There was an increase in knowledge scores after carrying out nutrition education through flashcard media regarding the consumption of food sources of iron in adolescent girls in line with research by Rusdi *et al.* (2021) which stated that there was an increase in knowledge in adolescent girls regarding changes in balanced nutritional behavior to prevent anemia after intervention in the form of nutrition education using instagram media. Research conducted by Febriyanto and Yanto (2019) also shows that using flashcard media affects students' knowledge. Education is a process of ongoing interaction between humans and the environment, producing changes in knowledge, attitudes, and skills.

According to research by Dwi *et al.* (2021), which provided nutrition education to junior high school teenagers through flashcard media, showed that there was an increase in knowledge scores in the first pre-test and post-test by 48.76 points and between the pre-test and post-test In the second test, there was an increase in the knowledge score of 72.27 points. Through education, someone will learn from what they didn't know to become knowledgeable (Mordayanti *et al.*, 2022).

Effect of *Flashcard* Media on Food Consumption Knowledge of Substance Sources during *Pre-test* and *Post-test*

There is an influence of nutritional education through flashcard media regarding the consumption of food sources of iron on young women's knowledge. This is in line with research conducted by [Mardiana \(2018\)](#), which stated that nutritional education about iron consumption to prevent anemia using flashcard media influenced knowledge of food choices among female students at SMP Negeri 45 Surabaya and SMP Unggulan Bina Insani Surabaya. One factor that can affect the knowledge level is the information source. So, the presence of media in education can make students more active ([Utami and Alvionita, 2019](#)).

When providing education using flashcard media, researchers explained the cards' contents in a unique way, namely playing, which included nutritional education about consuming food sources of iron. Pictures on the cards are easily recognized by female students, thereby triggering female students' interest in observing during the learning process. This is reinforced by research by [Hasanah et al \(2019\)](#), which states that the presence of pictures with a few words or sentences in media that are easily recognized by students can easily influence them in receiving information so that each picture card can influence changes in knowledge—accompanied by a shift in attitude.

Conclusions

Based on the research and discussion results, providing education using flashcard media is going well and has improved. Female students experience changes in terms of students' understanding and values. During the process of delivering education, students are always active. Students pay attention to explanations and respond to what is explained.

There is an effect of education through *flashcard* media on knowledge of the consumption of food sources of iron in class VII students of SMPN 33 Bekasi City. It is hoped that the students will be able to absorb the knowledge they have received through education using flashcard media to apply it to their daily lives and remind each other to be fond of consuming food sources of iron. Future researchers are expected to be able to pay attention to educational success factors such as timing by making a rundown of events and a closed room that is comfortable for conducting education well.

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