

## THE EFFECT OF EDUCATION THROUGH GAME MEDIA ON CHANGES IN NUTRITION KNOWLEDGE OF OVERWEIGHT STUDENTS

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### Abstract

*The prevalence of overnutrition is increasing every year. Based on the results of Rikesdas, it is known that the prevalence of overnutrition in Indonesia has increased from 2013 (10.8%) to 16% in 2018. This study aims to analyze the effect of education through game media on changes in nutritional knowledge of overweight students. This study used a Quasi Experiment design with Two Group Pretest-Posttest design. The sample was 42 overweight students, who were divided into two groups, namely the Quizizz and Crossword puzzle groups. Data analysis used t-dependent test and t-independent test. The results showed an increase in the average knowledge score of overweight students after education with Quizizz media to  $12.76 \pm 1.4$  while crossword media  $11.05 \pm 2.2$ . There is a significant influence on nutritional knowledge between quizizz education media and crossword puzzle media ( $p \leq 0,05$ ). Schools are expected to add material about balanced nutrition in the curriculum of subjects at school so that students better understand and can apply it in everyday life.*

**Keywords:** Quizizz, crossword, puzzle, overweight.

### 1. INTRODUCTION

The nutrition problem in Indonesia is currently entering a double nutrition problem, meaning that the problem of undernutrition has not been fully resolved, while the problem of overnutrition has emerged and the prevalence of its occurrence is increasing every year. Adolescents are one of the target groups at risk of overnutrition. (Simbolon and Tafrieani, 2018). Overnutrition is divided into two, namely overweight and obesity. Overweight and obesity affect a person's life expectancy. Changes in lifestyle lead to changes in diet that are high in calories, fat and cholesterol which unfortunately are not balanced with physical activity so that it will cause more nutritional problems (Salbe et.al, 2003) Adolescents are one of the target groups at risk of overnutrition. At this age it is said to be a period of nutritional vulnerability for various reasons, namely adolescents require higher nutrients due to increased physical growth, changes in lifestyle and eating habits (Kurdanti, 2021).

Based on the results of the Basic Health Survey (Rikesdas), it is known that the prevalence of overnourished adolescents aged 13-15 years in Indonesia in 2013 was 10.8%, which increased by 16% in 2018 and 14.7% in West Sumatra Province (Rikesdas, 2018). Based on data from the Padang City Health Office, the prevalence of overnourished students in 2021-2022 was higher in the Lubuk Begalung area, which was 11.3%, while the highest

prevalence of overnutrition at the junior/senior high school level was in SMPN 17 Padang, which was 18.1% (Padang City Health Office, 2018).

The causes of nutritional problems among adolescents include misunderstanding of nutrition, poor eating habits, overconsumption of certain foods, and overpromotion of ready-to-eat foods (Adriani, 2012). Overnutrition can lead to disturbances in bodily functions, is a risk factor for diseases such as diabetes mellitus, hypertension, coronary heart disease and cancer, and can shorten life expectancy (Almatsier, 2009). Nutritional problems in adolescents, if not corrected, will affect the quality of society in the future, so it is necessary to find information about nutritional problems in adolescents regarding the risk factors that cause overnutrition, so that these risk factors can be identified as early as possible and managed properly (Aini, 2013).

The level of a person's nutritional knowledge affects attitudes and behaviour in food selection, which in turn will affect the nutritional state concerned and affect the formation of one's eating habits. One way to improve a person's knowledge is to provide nutrition education. This nutrition education can be provided through counselling using the lecture method and providing media such as using the Quizizz application and crossword puzzles. Research conducted by Nuryanto, et al, showed that there was an average difference in the percentage of children's knowledge between before and after being given nutrition education, where the average nutritional knowledge before being given nutrition education was 66.5 (9.3%) increasing to 71.6 (9.6%) (Nuryanto, 2014).

Quiziz is a game-based educational application that makes classes more interactive by including multiplayer activities. Quizizz has game features such as avatars, themes, and music that make learning fun (nutrition to make teenage students more interested in improving their knowledge (Rahman and Kondoy, 2020). Crossword media, which is a type of print media, uses letters to fill in empty boxes with words according to clues, is expected to help in nutrition education more and obesity reduced. The purpose of this study was to analyse the effect of education through game media on changes in nutritional knowledge of overweight students.

## **2. METHODOLOGY**

This study used a Quasi Experiment design with Two Group Pretest-Posttest. which was conducted in January - February 2023. The sample totalled 42 people who were divided into two treatment groups, namely the group that received treatment with the lecture method using quiz media and the group that received treatment with the lecture method using crossword media. Sampling was done through screening with anthropometric measurements (weight and height) of students to obtain overweight nutritional status. Placement of samples for treatment was done by simple random sampling. The first and second interventions were conducted with an interval of one week.

Primary data included student identity and nutritional status data determined by anthropometric measurements, namely measuring student height and weight. Overweight nutritional status was obtained through the calculation of age-appropriate Body Mass Index (BMI) using the WHO Antro application. After collecting data on identity and nutritional status, students who have overweight nutritional status will be divided into two groups, namely treatment I which is given counseling with Quiziz application media and treatment II which is given counseling with crossword media.

The initial stage was to explain the purpose of the counselling and ask for consent to become a research respondent. Before being given counseling, respondents were asked to fill out a pretest sheet, this aims to see the knowledge of students before being given more nutrition counseling. After that, the material about overnutrition was delivered using the lecture

method using media according to the treatment, namely the Quiz application or crossword puzzle in the first stage. Furthermore, in the second stage, the delivery of material about more nutrition is carried out again with the lecture method using the media according to the treatment. The first stage and the second stage have an interval of one week. After the first and second stages of counselling were carried out, the sample was asked to do a Posttest using a questionnaire that had been provided to determine the difference in the sample's knowledge after being given counselling. Knowledge data was collected using a pre-test and post-test questionnaire containing 15 questions with the lowest score of 0 and the highest score of 15. The questionnaire was made by adjusting the educational material sourced from the Regulation of the Minister of Health of the Republic of Indonesia (PERMENKES RI) Number 41 of 2014 concerning General Guidelines for Balanced Nutrition.

Data were analysed univariately and bivariate. Bivariate analysis used t-dependent test to see the difference in knowledge before and after counselling in each treatment group and t-independent test to see the difference between the two treatments with 95% confidence level ( $\alpha = 5\%$ ). Before analysing the data with t-dependent test and t-independent test, data normality test was conducted. This study was ethically approved by the Health Research Ethics Commission of Universitas Perintis Indonesia with ethical clearance number 302/KEPK.F1/ETIK/2023. A paper should contain the description of your study and should be structured in different sections such as: Abstract, Introduction, Methodology, Results, Conclusions, Acknowledgements (if applicable) and References. Please note that title and authors list should be coincident with the accepted abstract.

### 3. RESULTS

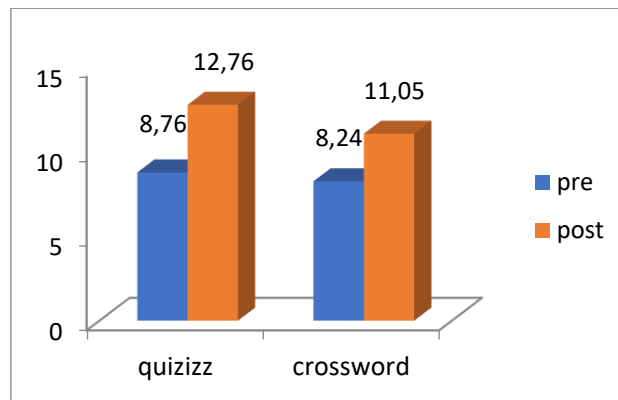
Table 1 shows the characteristics of the subjects including age and gender. The total subjects were 42 people aged from 13 to 16 years. The gender distribution in the treatment using the Quizizz Application media was more female (57.1%) while in the crossword media there were more males (61.9%). The age of most subjects was at the age of 14 years both in the Quizizz application media group (52.4%) and in the Crossword media (61.9%). The mean age of subjects in the quiz media group was  $13.52 \pm 0.51$  and the mean age of subjects in the crossword media group was  $14.05 \pm 0.74$ .

**Table 1:** Subject characteristics based on Gender and Age

	Quizizz media		Crossword media		Total	
gender	n	%	n	%	n	%
Male	9	42,9	13	61,9	22	52,4
Female	12	57,1	8	38,1	20	47,6
Age						
13 years old	10	47,6	4	19,0	14	33,3
14 years old	11	52,4	13	61,9	24	57,2
15 years old	0	0	3	14,3	3	7,1
16 years old	0	0	1	4,8	1	2,4

The results of the paired t test (dependent t test) of the subject's knowledge score can be seen in Figure 1. The average nutrition knowledge score of the quiz group subjects before being given nutrition education was 8.76 and after being given nutrition education to 12.76. The crossword group subjects had an average knowledge score before getting nutrition

education of 8.24 and after getting nutrition education to 11.05. The results of the paired t test showed that there was a significant difference ( $p < 0.05$ ) in the average score of nutritional knowledge before and after the intervention in the quizziz treatment group and the crossword treatment group.



**Figure 1: Average knowledge score before and after intervention**

Education with quizziz media increased the subject's knowledge related to foods that can cause overweight, including junk food which is a contemporary food and is often consumed by teenagers. There was also an increase in knowledge after being given education with crossword media about how to prevent overweight, namely by consuming more vegetables and fruits. Subjects also understand more about balanced nutrition including the four pillars of balanced nutrition. Increased subject knowledge is also related to diseases that can be caused if overweight.

Providing nutrition education through quiz media and crossword puzzles to subjects in this study can increase knowledge of balanced nutrition. These results are in line with Muliya's research (2022) on the application of Quizizz media in improving student learning outcomes in Indonesian language subjects. There was an increase in student learning outcomes with the provision of quizziz media by 45% where before the intervention the average student learning outcomes were 64.83 and after being given with quizziz education increased to 94, 14%. By utilising Quizizz media, students get a fun and interactive learning experience, so that student learning outcomes increase.

Quizizz is favoured by teenagers because it has game features such as avatars, themes, and music that entertain during the learning process. In addition, Quizizz motivates students to learn and allows them to compete with each other. Students will be more motivated to learn through innovative, challenging and fun games. Quizizz is not only used to deliver material, but it is also very interesting and fun to improve each student's ability and expertise. Learning now focuses more on fun learning rather than memorisation. Students' critical abilities are not demonstrated by memorised knowledge; moreover, memorised knowledge is not stored for future use. (Maunino, 2023)

The results of this study are also in line with Husna's research (2023) which shows that the use of Quizizz in learning mathematics affects student learning outcomes. This can be seen in the Pre-Test results before using Quizizz which resulted in learning completeness of 16.7% and Post-Test results after using Quizizz which resulted in learning completeness of 41.7%, which resulted in a 25% increase in student learning outcomes. This shows that using Quizizz App media is very beneficial because it improves the learning process. The study of Fazriyah et al. found that 75% of the participants gained increased knowledge after using the Quizizz App media for training and mentoring 25 teachers. This shows that using Quizizz App media is very beneficial as it enhances the learning process.

Crossword media also helps learning by improving memory, learning classification, improving analytical skills, entertaining, and encouraging creativity. As a vocabulary learning method, crossword puzzles are considered more interesting as they contain elements of entertainment and games, and can be done casually with a variety of variations. Therefore, students are motivated and excited to learn vocabulary that can stimulate their reasoning power to understand the topic. This will make the lesson a very memorable knowledge and not easily forgotten.

This is in line with Lakoro's research (2020) entitled *The Effect of Crossword Game Media on Student Learning Outcomes in Geography Learning*. The subjects of this study consisted of experimental classes and control classes, consisting of 32 students as experimental classes using crossword game media and 31 students as control classes using Power point media. Based on the results of data analysis, it was found that there was a significant difference in the learning outcomes of students taught using crossword game media with the learning outcomes of students taught using powerpoint media.

The results of Mahmudah's research (2022) found that there were differences in knowledge before and after nutrition education using crossword puzzle media and lecture media ( $p \leq 0.05$ ). The average increase in nutritional knowledge using crossword media is higher than using the lecture method in students. Hayati's research (2023) on the Effectiveness of Using Crossword Puzzles to Improve Critical Thinking Skills in Economic Learning in students can be concluded that the use of crossword media is quite effective in learning and there is an increase in the average critical thinking skills of students before and after using crossword media.

Juhaeni's research (2022) also obtained the same results. Crossword media can be used to help the teaching and learning process by attracting students' interest so that learning can be more fun and conducive. In addition, crossword media can train concentration in students, so that students will have a long memory of learning material. To find out how the effect of education using Quizizz and Crossword application media on student knowledge about overnutrition, an independent t test was conducted. The results of the analysis can be seen in the following table 2

**Table 2: Effect of education through game media on nutrition knowledge**

Media	n	Mean	SD	t	p value
Quizizz	21	12,76	1,41	2,98	0,005
Crossword	21	11,05	2,22		

Table 2 shows that out of 21 students who received education with quizziz media had an average knowledge score of 12.76, while out of 21 students who received education with crossword media had an average knowledge score of 11.05. From the statistical test results, it can be concluded that there is a significant difference between the knowledge of students who use quizziz media compared to crossword puzzle media ( $p \text{ value} = 0.005$ ). The results showed that education with the Quizizz application was more effective because the average score of knowledge was higher than the crossword media.

The use of educational media in online learning with quizizz and crossword media can form students 'critical thinking and can capture students' memory. The existence of a stimulus is able to provide stimuli so that students want to be more critical and find out more, this will certainly affect the learning process. critical and find out more, this will certainly affect the intelligence process, as well as the existence of concepts, and applications by assessing all



aspects of the learning process. create concepts, and applications by assessing all information obtained from an explanation (Arif, 2022).

#### 4. CONCLUSIONS

There was an increase in students' nutritional knowledge scores before and after education with quiz media and crossword media. Nutrition knowledge score after education using Quizizz media is higher ( $12.76 \pm 1.4$ ) than crossword media ( $11.05 \pm 2.2$ ). There is a significant effect of education using Quizizz media with crossword puzzles ( $p < 0.05$ ). Schools are expected to add material about balanced nutrition to the subject curriculum and can use media such as Quizizz at school so that students can more easily understand and can apply it in everyday life.

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