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The Use of Online Game Media "Sailing in Search of Treasure " as an Increase in Knowledge of Vegetables and Fruits for Young People Aged 15-21 Years

Penggunaan Media Game Online "Berlayar Mencari Harta Karun" sebagai Peningkatan Pengetahuan Sayur dan Buah pada Anak Muda Usia 15-21 Tahun

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ABSTRACT

Background: Consumption of vegetables and fruit for young people in Indonesia is still far from the sufficient category (<400g/day). One of the contributing factors is the low knowledge of balanced nutrition, especially in the guidelines that recommend consuming vegetables and fruit per day. Online game media is used as an effort to increase young people's knowledge of vegetables and fruits because they prefer technology-based games.
Objectives: Measuring the influence of the application of the online game *"Berlayar Mencari Harta Karun"* to the increase in knowledge of vegetables and fruits in young people aged 15-21 years.
Methods: This study uses quantitative research, a pre-experimental type with one group pre-posttest design. Subjects as many as 20 people using the inclusion criteria that have been determined by the researcher. The instruments used are knowledge questionnaires and online game media *"Berlayar Mencari Harta Karun"* which can be accessed through each respondent's cellphone. Data analysis performed with paired T-Test and Wilcoxon test with a significance level of 0.05.
Results: The results of the paired T-Test and the Wilcoxon test showed a significant difference in the value of knowledge about vegetables and fruit (p = 0.000) seen from initial nutritional knowledge and after being given the online game media "Berlayar Mencari Harta Karun."
Conclusions: The application of educational media using the online game "Berlayar Mencari Harta Karun" succeeded in significantly increasing nutritional knowledge about vegetables and fruits.

ABSTRAK

Latar Belakang: *Konsumsi sayur dan buah anak muda di Indonesia masih jauh dari kategori cukup (<400g/hari). Salah satu faktor penyebabnya adalah rendahnya pengetahuan gizi seimbang, terutama pada pedoman yang menganjurkan untuk mengonsumsi sayur dan buah per harinya. Media game online digunakan sebagai upaya peningkatan pengetahuan sayur dan buah anak muda, sebab mereka lebih menggemari permainan yang berbasis teknologi.*
Tujuan: *Mengukur pengaruh dari penggunaan media game online "Berlayar Mencari Harta Karun" sebagai peningkatan pengetahuan sayur dan buah pada anak muda usia 15-21 tahun.*
Metode: *Penelitian ini memakai penelitian kuantitatif, berjenis pre-experiment dengan desain one group pre-posttest. Subjek sebanyak 20 orang menggunakan kriteria inklusi yang sudah ditentukan peneliti. Instrumen yang digunakan yaitu kuesioner pengetahuan serta media game online "Berlayar Mencari Harta Karun" yang dapat diakses melalui handphone setiap responden. Dilakukan analisis data dengan uji paired T-Test dan uji wilcoxon dengan taraf signifikansi sebesar 0.05.*
Hasil: *Hasil pengujian paired t-test dan uji wilcoxon menunjukkan adanya perbedaan peningkatan yang signifikan dari nilai pengetahuan mengenai sayur dan buah (p=0,000) yang dilihat dari pengetahuan gizi awal dan setelah diberikannya media game online "Berlayar Mencari Harta Karun".*
Kesimpulan: *Penggunaan media edukasi game online "Berlayar Mencari Harta Karun" berhasil meningkatkan pengetahuan gizi tentang sayur dan buah secara signifikan.*

Kata kunci: *Pengetahuan gizi, Sayur dan buah, Anak muda, Game online*

INTRODUCTION

Balanced nutrition is used as a guideline to embody good eating habits[1], through the application of consumption according to the needs of the body both in portions and types[2]. Based on the results of Aslina's research (2019) it was found that the majority of adolescents had low knowledge of balanced nutrition (50.8%) and 92.75% did not apply balanced nutrition[3]. Getting used to eating vegetables and fruits is one way to live a healthy life according to balanced nutrition guidelines[4]. Guidelines in Indonesia are regulated in the Balanced Nutrition Tumpeng which recommends the consumption of fruit 2-3 servings/day and vegetables 3-5 servings/day[5].

A distinctive feature of the nutritional content of vegetables and fruits is vitamins, fiber, minerals as well as antioxidants that cannot be replaced by other nutrients[6]. Foods high in fiber have a longer period to digest in the stomach, because water-soluble fiber in vegetables and fruits has the advantage of retaining water and forming a viscous liquid in the digestive system. A higher crude fiber content usually contains low calories, as well as low sugar and fat levels, so it can help overcome obesity[7]. Vegetables and fruits are very useful for the body, because they play an active role in maintaining health, growth, development and preventing non-communicable diseases[1,8]. Insufficient consumption of vegetables and fruits can result in weight gain so that the body is prone to obesity. The positive impact of eating vegetables and fruits regularly and directed according to guidelines includes a low risk of contracting stroke, gastrointestinal cancer, and ischemic heart disease[8,9].

In Indonesia, the pattern of vegetables and fruits consumption is still far from the figure categorized as sufficient by the recommendations of the World Health Organization (WHO), which is 400g / day, in terms of portions and consumption patterns[10]. Indonesia is a tropical country with wealth in vegetable and fruit diversity[11]. Based on the 2014 balanced nutrition guidelines, every meal must have vegetables and fruits on the plate for consumption, this applies to all age groups[12]. Young people in Indonesia consume less on average, due to eating habits that tend to lack sources of fiber, especially from vegetables and fruits, and prefer ready-to-eat foods that are high in calories of salt and cholesterol[5], as in the study of Ramadhani and Hidayati, which was 80.7% low consumption of vegetables and fruits with only an average consumption of 270.3 grams per day[13]. Based on the results of Riskesdas (2018), in residents aged 5 years and above the proportion of vegetable and fruit consumption is less than five servings per day[14]. This is due to the lack of awareness of the importance and usefulness of vegetable and fruit consumption[5]. Adolescence and early adulthood are quite important periods of life travel, because the diet that is routinely carried out in childhood will tend to be the same and remain until when in adulthood, so it will become the same habit in life[15].

One of the trigger factors to realize sufficient consumption of vegetables and fruits is to have a good nutritional insight into vegetables and fruits, including their application. Knowledge is the result of the process of "knowing" something after the existence of a process of sensing a certain object. The five senses can capture information then make it into knowledge through the eyes and ears or sight[16]. Nutritional knowledge is an educational approach that has an important goal, namely increasing the nutritional knowledge of the targeted subject and bringing about more positive changes[14]. The results of the Total Diet Survey in 33 provinces conducted by the Ministry of Health in 2014 concluded that there needs to be a policy to increase vegetable and fruit consumption through education[17].

Based on the problems that have been presented, there needs to be efforts to prevent and overcome the low knowledge of vegetable and fruit nutrition in young people. In order to attract the enthusiasm of young people, it is necessary to use the educational media for instance online games[18] because young people today are more fond of games that can be played on their gadgets[19]. Online game media can increase the knowledge of young people because this method brings fun, takes away seriousness, and they can learn while playing, so that the material presented is easier to digest well compared to other methods[20]. Researchers are interested in testing the effectiveness of knowledge change through nutrition education using the online game media "Sailing in Search of Treasures" as a medium to increase the knowledge of young people aged 15-21 years which is the purpose of the study. Online games are easily accessible for all ages, especially in young people aged 15 years and over who are already fluent in using online-based systems including online games.

METHODS

The research conducted used quantitative research, type pre-experiment with a one-group pre-posttest design[6]. The data were analyzed with a paired T-Test and a Wilcoxon test with a significance level of 0.05. The subjects of the study were 20 people[21,22], using inclusion criteria with the age of 15-21 years, willing to be subjects and respondents, and understanding using Google Forms. The use of Google Forms was carried out to speed up the recapitulation process of data collection and to reduce mobility to meet other people because of the spread of the COVID-19 virus. The display on the Google Form made it easy and as similar as possible to the pre-test and post-test knowledge assessment questionnaires in general.

The data collected include respondents' characteristics and nutritional knowledge. BMI categorization was obtained from recording the weight and height of each respondent. The calculation of respondents in the age range of 15-19 years was calculated using the BMI / U formula according to the Children's Anthropometric Standards issued by the Ministry of Health of the Republic of Indonesia, namely

using z-score[23], while young adults used the BMI formula in general, namely weight in kilograms divided by height in square meters[24]. The value of nutritional knowledge was taken before and after the intervention regarding fruits and vegetables using the website-based online game media "Sailing in Search of Treasure." The research methods and instruments used were questionnaires and game media, knowledge level questionnaires sourced from Dede Hariani's (2010) research which had been developed and accessed through Google Forms, as well as the IEC media online game "Sailing for Treasures" varied using vegetable and fruit knowledge materials accessed through the cellphones of each subject with the condition that they remained connected to the internet. The systematic game in "Sailing in Search of Treasure" resembled a puzzle quiz with a multiple choice question type with a total of 10 questions[25]. Unlike puzzle quizzes in general, in addition to the music in the game, the main appearance of this online game was a treasure map that must be passed by players; to achieve the final result players must answer the puzzle questions that had been provided. If the question was answered correctly, the system would take the player to walk forward one to six steps according to the number on the player's dice shuffle. If respondents answered the questions correctly in a row, they would gain strength, but if respondents answered the questions incorrectly, the system would rewind 1 step from the player and show the correct answer. Players could see the steps of other players so that they would be more motivated to answer the questions correctly and be first to reach the finish as the target goal.

Questions about vegetable and fruit nutrition knowledge were presented in the pre-test and post-test, ranging from nutrients contained in fruits and vegetables, the benefits of eating vegetables and fruits, consequences if they are less consumed and so on. The level of knowledge of vegetable and fruit nutrition was obtained from the pre-test value because the pre-test was the actual knowledge value of respondents, which has not been given in educational media. The level of change in nutritional knowledge regarding vegetables and fruits was obtained from an assessment using a knowledge questionnaire that was distributed online through social media. Points of acquisition of grades were determined using the criteria of knowledge levels grouped into five levels[26]: Failed, (value 0-49); Less, (value 50-59); Enough, (grades 60-69); Good, (grades 70-79); Excellent, (value 80-100)

The data collected were then carried out a relationship test with p-value of <0.05 (Sig. 2-tailed) using the Spearman rank correlation test, then the level of strength in the correlation relationship could be seen based on the coefficient value (correlation strength), with five kinds of relationships with the criterion level, namely: very weak (0.00-0.25), sufficient (0.26-0.50), strong (0.51-0.75), very strong (0.76-0.99) and perfect (1.00)[27].

RESULTS AND DISCUSSION

The respondents' characteristics data taken (primary data) for this study included gender, the age of young people in the range of 15 to 21 years, nutritional status, respondent education level, as well as characteristics of father's education and maternal education. These characteristics can be seen in Table 1.

Table 1. Distribution of respondents' characteristics

Characteristics	Frequency (n)	Percentages (%)
Gender		
Male	7	35
Female	13	65
Adolescence Category		
Adolescence (Aged 15-19)	10	50
young adults (Aged 20-21)	10	50
Nutritional Status		
Underweight	7	35
Normal	9	45
Overweight	2	10
Obesity Level 1	1	5
Obesity Level 2	1	5
Education Level		
Junior High School (Equivalent)	2	10
Senior High School (Equivalent)	5	25
Undergraduates	13	65
Paternal Education Level		
Elementary (Equivalent)	1	5
Junior High School (Equivalent)	2	10
Senior High School (Equivalent)	10	50
Diploma	3	15
Undergraduates	3	15
Graduates	1	5
Maternal Education Level		
Elementary (Equivalent)	2	10
Junior High School (Equivalent)	2	10

Characteristics	Frequency (n)	Percentages (%)
Senior High School (Equivalent)	12	60
Diploma	2	10
Undergraduates	2	10
Graduates	0	0

The respondents were 65% women and 35% men, the difference between the sexes can determine the magnitude of a person's nutritional needs, because the needs of each individual are quite different between women and men in terms of growth and development[5]. The age characteristics of young people are divided into two groups, namely adolescents 15 - 19 years and young adults 20-21 years; each age group has an equally large percentage of 50%. Silalahi (2018) found the age of adolescents according to WHO is in the range of 10-19 years, and according to the UN has the term "youth," which is at the age of 15-24 years, while the grouping of adolescents based on BKKBN is 10 to 24 years with the condition that they are not married[28.29]. In contrast to the age categorization in Alabanyo (2016) adulthood is divided into three stages, namely young adults when aged 20-40 years, at the age of 40 to 60 years they are called intermediate adults and advanced adults are aged 60 to the end of life[30]. Young age is a period that is included as productive in doing work; therefore, the choice of food consumption that is good for their body will have a positive effect on their level of productivity. Kasim (2014) said the productive age is in the age range of 15-29 years which includes the age phase of young people[31]. One of the factors for choosing good food consumption is having good nutritional knowledge as well; knowledge that is based on correct and careful understanding will build the expected positive attitude, including nutritional knowledge about vegetables and fruits[16].

The relationship test shown in Table 2 resulted in a correlation relationship between age and education level (0.000), with a strength level of 0.852 which is very strongly correlated; this is said to be true because, based on daily life, generally the older the age, the higher the level of education that is being taken and lived will be higher[32]. However, this does not show that the older the age and higher education taken, the more good nutritional knowledge, including in vegetable and fruit knowledge, because in the correlation test it was found that the age and level of education did not show any relationship with the level of knowledge of vegetable and fruit nutrition (0.922 and 0.391). As in the results of the research of Widyastuti et al. (2020), there was no relationship between age and anemia knowledge in respondents (p= 0.927)[33]. Likewise, a 2020 study by I Nengah et al. found there was no relationship between age and the level of knowledge of subjects regarding the selection of supplements, which meant that different ages had no influence on the level of knowledge of respondents[34].

The education level of the respondents' fathers and mothers was almost similar and the majority were at the high school level (equivalent). According to statistical tests, it was found that there was no significant relationship between the father's last level of education and the level of knowledge of vegetable and fruit nutrition in respondents (0.335). This is in line with previous research in Cimahi City in 2015 by Wisdyana and Tri with the result that there was no significant relationship between the father's last education and his child's knowledge with a significant value of 0.794[35]. This may happen because the parenting role is more dominated by the mother, while the father works more so that there is less time to be with his child[36].

The results of the post-test have a correlation with maternal education (0.018) with a strong relationship category (0.523), so it is concluded that the better the mother's education, the better the final result of providing nutrition education as evidenced by increased knowledge. In line with research conducted by Katarina Lit with Telly Katharina (2019), it was found that there was a significant correlation between maternal education and adolescent knowledge with a p value = 0.043[37]. According to Said and Pratomo (2013), mothers who have higher education have the opportunity to have children with high intelligence. In their research, it was also stated that the intelligence of children from highly educated mothers is 3.56 times greater than that of low-educated mothers[38].

Table 2. Characteristic of correlation test

Characteristics	Education Level		Level of Knowledge (Pre-test)		Level of Knowledge (Post-test)	
	r	p	r	p	r	p
Age	0.852*	**0.000**	-.023	0.922	0.000	1.000
Gender	0.054	0.821	0.028	0.905	0.105	0.660
Education Level	1	.	0.203	0.391	0.069	0.774
Paternal Last Education	0.014	0.952	0.228	0.335	0.357	0.123
Maternal Last Education	-0.177	0.457	0.192	0.418	0.523*	**0.018**
Nutritional Status	0.099	0.679	-0.007	0.976	-0.341	0.141
*Significant Correlation						

Meanwhile, in other characteristic data, there was no correlated relationship using the Spearman rank test (>0.05), including the relationship between sex and knowledge (0.905). The results of this test are in accordance with a study by Wulan et al. (2020) which showed sex characteristics did not have a significant correlation with knowledge in the context of treatment of type II diabetes mellitus (p=0.658)[39]. According to Mulyani (in Risma et al.,2019) gender is only an analytical concept that is used as an identification of differences between women and men observed through non-biological glasses, including social, cultural and psychological aspects[40.41].

The relationship between nutritional status and the level of nutritional knowledge of vegetables and fruits did not produce a significant relationship (0.976). Insignificant testing between nutritional status and the level of nutritional knowledge of vegetables and fruits also resulted from the Pearson chi-square test which can be seen in Table 3. It can be seen that the significance figure is 0.495, because the p-value is more than 0.05 so it is said that there is no significant relationship between nutritional status and vegetable and fruit nutrition knowledge levels in young respondents aged 15-21 years.

Table 3. Pearson chi-square nutritional status test with vegetable and fruit nutrition knowledge level

Nutritional Status	Nutritional Knowledge Level of Vegetables & Fruits					Total	p
	Fail	Lacking	Adequate	Good	Very Good		
Underweight	0	1	2	2	2	7	0.495
Normal	1	1	0	2	5	9	
Overweight	0	0	1	0	1	2	
Obesity Level 1	0	1	0	0	0	1	
Obesity Level 2	0	0	0	1	0	1	
Total	1	3	3	5	8	20	

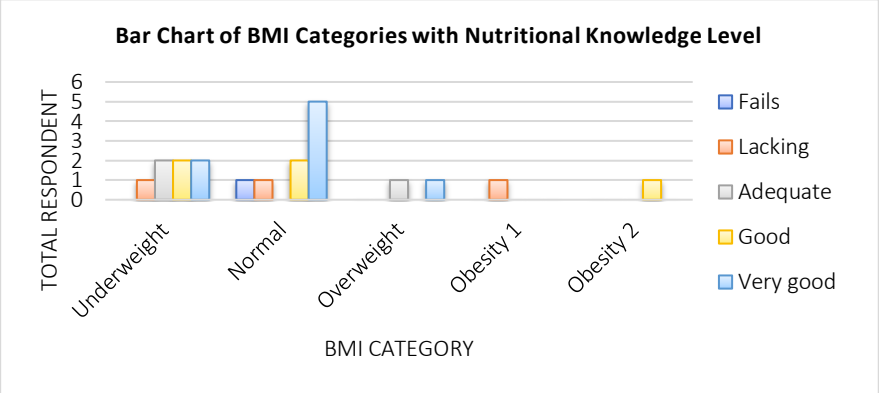

Figure 1. Nutritional status distribution diagram based on vegetable and fruit nutrition knowledge level

Although in statistical testing using Pearson chi-square there was no significant relationship between Nutritional Status and Vegetable and Fruit Nutrition Knowledge Level in young people aged 15-21 years, but when viewed based on Figure 1, namely a nutritional status bar chart with a level of knowledge, there were most subjects who had excellent nutritional knowledge, namely as many as five respondents who had normal nutritional status. Meanwhile, the nutritional status in knowledgeable subjects was lacking, three respondents found different nutritional statuses, namely malnutrition, normal, and obesity class 1. Based on this test, it is in line with the results of research by Albertina (2017) with the subjects of students in the second semester of the Midwifery Academy, with the result that there was no significant relationship between nutritional status and respondents' knowledge with material about balanced nutrition (0.189), besides that the results in the table also showed that some respondents who had a good knowledge category had a normal Body Mass Index (BMI)[42].

Table 4. Paired T-test before and after awarded online game media "Sailing in Search of Treasure"

Nutritional Knowledge	Pre-Test	Post-Test	p-value
Mean	70	90.5	0.000
SD	17.5	9.9	
n	20	20	

The results of statistical tests using the paired t-test in Table 4 shows that the p value is 0.000 (p < 0.05) this proves a significant difference in vegetable and fruit knowledge based on the pre-test value and post-test value after being given an educational intervention through the online game media "Sailing in Search of Treasure." The knowledge value of respondents before the provision of online game media "Sailing for Treasure" obtained a mean value (average) of 70 + 17.5, while after providing intervention, the average knowledge of fruit vegetables respondents obtained an increase to 90.5 + 9.9; the difference between the post-test and pre-test values was quite far and.

, based on the results of the test, the knowledge value increased by 20.5 points.

Table 5. Wilcoxon pre– and post–test results

Value Difference	N	Average difference	Z and Asymp. Sig. (2-tailed)*
Negative Difference	0[a]	0.00	
Positive Difference	16[b]	8.50	-3.573 dan
Same Value (Ties)	4[c]		0.000
Total	20		

Judging from the calculation results using the Wilcoxon test to compare the results of the assessment of vegetable fruit knowledge in young people aged 15-21 years before and after the provision of nutritional education media using the online game "Sailing in Search of Treasure." In Table 5 of the Wilcoxon test, it shows asymp Sig (2-tailed) figures of 0.000, meaning there is a significant influence of the use of the game media "Sailing in Search of Treasure" on the results of vegetable and fruit nutrition knowledge in respondents. The negative difference amounts to 0, interpreted as no subject experiencing a decrease in value from pre-test points to posttest points. The value of Sama (ties) indicates the number 4, meaning that there are four subjects who do not experience a change in value between pre-test and post-test. Meanwhile, the positive difference value of 16 subjects, namely an increase in value from pre-test to post-test, means that as many as 80% of respondents experienced an increase in vegetable and fruit knowledge as a result of the provision of online game media "Sailing in Search of Treasure"[44].

Table 6. Categorical Distribution of Vegetable Fruit Knowledge Values Before and After Being given Online Game Learning Media

Level of Knowledge	Before (*Pre-test*)		After (*Post-test*)	
	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)
Fails	1	5	0	0
Lacking	3	15	0	0
Adequate	3	15	0	0
Good	5	25	2	10
Very good	8	40	18	90
Total	20	100	20	100

Table 6 shows that, in the measurement of knowledge before being intervened using the online game media "Sailing in Search of Treasure" the level of knowledge is still diverse; 5% is at the failure rate, 15% at the less level, 15% at a sufficient level of knowledge, the good level is 25%, and the highest level of knowledge is the very good category with eight people (40%). Meanwhile, after being given educational media and testing post-tests, the level of good knowledge is 10% and knowledge is very good at 90%. Nutritional knowledge about fruits and vegetables respondents obtained a significant increase, in addition to the Wilcoxon test and the Paired T-Test, the increase in knowledge can be seen through Table 6. After being given a web-based online game educational media, it was seen that at the level of failure, less and sufficient when the pre-test measurement experienced an increase in the value of vegetable and fruit nutritional knowledge; it was proven by no more respondents who got a score with a fail rate, less and enough on the post-test measurement. In addition, the level of knowledge is very good, the percentage increases, when the pre-test of the category of excellent knowledge by 40% experienced a considerable increase to 90% in post-test testing.

Nutrition education media using games is enough to provide positive changes to the improvement of nutritional knowledge in the targeted subjects. Like the analysis by Irma et al. (2018) by using snakes and ladders game media on the vegetable and fruit knowledge of elementary school students, the study had a positive influence with the increase in fruit and vegetable knowledge after intervention or treatment 1.

Similarly, an assessment by Anja and Lailatul (2017) showed that there was a significant increase in knowledge and attitudes toward fruit and vegetable consumption of elementary school students, namely experiencing an increase in knowledge by 109.7% and an attitude of 5.2% using game-based educational book media6. Research by Rinayati, Mulyono and Sri (2016) using web-based games as a tool in educating the nutrition of MI students or equivalent to elementary schools found that the average nutritional knowledge increased and had a significant effect (p = 0.0001),

where before the intervention was obtained a mean of 42.9, after providing interventions with website-based games it experienced an increase in the average score of 66.3[46].

Another innovative educational media was carried out by Aldera et al. (2021), namely by using board game educational media with material on lifestyle to prevent obesity with the target subject of the board game community in Jakarta which is used to playing board games. Respondents' knowledge was analyzed using a Paired Sample T-Test which resulted in a p value of 0.000 ($p < 0.005$), then it was interpreted as the emergence of differences in initial knowledge and after the provision of educational interventions using board game media, which was measured using pre-test values with post-test[48]. Similar to this research, using quiz-standard online-based game media applied in ladiba's research (2021) resulted in the effectiveness of educational media which was proven by 85.7% of respondents experiencing an increase in knowledge about the importance of eating vegetables and fruits[49].

The use of game media as a nutrition education medium has shown success in increasing vegetable and fruit knowledge. In addition to being seen through previous research, it can be seen from the results of research carried out so that from the Paired T-Test there was an increase in the average value of vegetable and fruit knowledge by 20.5 points and the excellent category on vegetable and fruit knowledge increased from 40% during the pre-test to 90% during the post-test in young people 15-21 years and the Wilcoxon test with the results of 80% of subjects experienced an increase in knowledge. It's just that the image resolution in the game is still standard and the game "Sailing in Search of Treasure" is online-based so if you want to play it, you must have a device connected to the internet.

CONCLUSIONS

The use of the online game media "Sailing in Search of Treasure" in young respondents with an age range of 15-21 years succeeded in increasing nutritional knowledge about vegetables and fruits significantly, or it can be said to be effective in increasing respondents' nutritional knowledge. The study subjects experienced an increase in knowledge which can also be seen in the observation of data on the distribution of knowledge level categories before treatment (pre-test) with after treatment (post-test) in the provision of web-based online game nutrition education media; the category of "excellent" knowledge increased from pre-test 40% to 90% during post-test. It is recommended that young people who already have good nutritional knowledge about vegetables and fruits should also apply it in terms of attitudes and behaviors, because it is not uncommon to find someone having good knowledge but not applying it to their daily lives, which means that there is a lack of awareness in themselves to behave healthil[50]. This may be discussed for future research, both with the same and different targets and media.

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CONFLICT OF INTEREST

All authors have no conflict of interest in this study.

REFERENCES

1. Handayani, I., Lubis, Z. & Aritinang, E. Y. Pengaruh Penyuluhan dengan Media Permainan Ular Tangga Terhadap Pengetahuan tentang Buah dan Sayur pada Siswa MTs-S Almanar Kecamatan Hamparan Perak. *JUMANTIK* **3**, 115–123 (2018).
2. Azadirachta, F. L. & Sumarmi, S. Pendidikan Gizi Menggunakan Media Buku Saku Meningkatkan Pengetahuan Dan Praktik Konsumsi Sayur Dan Buah Pada Siswa Sekolah Dasar. *Media Gizi Indones.* **12**, 107 (2018).
3. Aslina. Perilaku Remaja Terkait Gizi Seimbang di SMU Negeri 6 Pekanbaru Tahun 2016. *Ensiklopedia J.* **1**, (2019).
4. Azhari, M. A. & Fayasari, A. Pengaruh Edukasi Gizi dengan Media Ceramah dan Video Animasi terhadap Pengetahuan Sikap dan Perilaku Sarapan Sarapan Serta Konsumsi Sayur Buah. *Aceh Nutr. J.* **2020**, 55–61 (2020).
5. Lestari, A. D. Faktor-faktor yang berhubungan dengan perilaku konsumsi buah dan sayur pada siswa SMP Negeri 226 Jakarta Selatan Tahun 2012. (Universitas Islam Negeri Syarif Hidayatullah, 2013).
6. Ferwanda, A. F. & Muniroh, L. Efektivitas Buku Edukatif Berbasis Games Terhadap Perubahan Pengetahuan Serta Sikap Tentang Sayur Dan Buah. *Amerta Nutr.* **1**, 389 (2017).
7. Siagian, D. M. *Hubungan Konsumsi Sayur dan Buah dengan Obesitas pada Anak SD Kelas IV–VI di SD Pantekosta Magelang Tahun 2017*. (2017).
8. Mahmudah, U. & Sari, S. P. Pengaruh penggunaan media cakram gizi terhadap pengetahuan remaja mengenai konsumsi buah dan sayur. *Ilmu Gizi Indones.* **3**, 155 (2020).
9. Farisa, S. Hubungan Sikap, Preferensi, Pengetahuan, Ketersediaan, dan Keterpaparan Media Massa pada Siswa SMP Negeri 8 Depok Tahun 2012. *Fmipa Ui* 1–95 (2012).
10. Zafira, D. & Farapti, F. Konsumsi Sayur dan Buah pada Siswa Sekolah Dasar (Studi pada Makan Siang Sekolah dan Bekal). *Amerta Nutr.* **4**, 185 (2020).
11. Yulianto, Y., Hadi, H. & Budiningsari, R. D. Pengaruh penyuluhan manfaat sayur dan buah terhadap asupan zat gizi remaja obesitas siswa/siswi SLTP di Kota Palembang. *Jurnal Gizi Klinik Indonesia* vol. 4 53 (2007).
12. Pangestika, D. O. Faktor yang Berhubungan dengan Konsumsi Sayur dan Buah pada Remaja (Studi di SMP Negeri 3 Silo Kabupaten Jember). (2019).

13. Ramadhani, D. T. & Hidayati, L. Faktor-Faktor yang Mempengaruhi Konsumsi Sayur dan Buah pada Remaja Putri SMPN 3 Surakarta. *Semin. Nas. Gizi* (2017).
14. Nur, T. D., Syarief, O., Pramintarto, G., Mutiyani, M. & Selviyanti, sofi siti. Pendidikan gizi menggunakan cerita bergambar terhadap pengetahuan dan frekuensi konsumsi sayur buah pada siswa. *J. Ris. Kesehat. Poltekkes Kemenkes Bandung* 165–172 (2019).
15. Oktavia, A. R., Syafiq, A. & Setiarini, A. Faktor - Faktor yang Berhubungan dengan Konsumsi Buah-Sayur pada Remaja di Daerah Rural-Urban, Yogyakarta. *J. Keperawatan Raflesia* **1**, 1–1 (2019).
16. Florence, A. G. *Hubungan Pengetahuan Gizi dan Pola Konsumsi dengan Status Gizi Pada Mahasiswa TPB Sekolah Bisnis dan Manajemen Institut Teknologi Bandung*. (2017).
17. Kementerian Kesehatan. Studi Diet Total : Potret Pola Makan Penduduk Indonesia Saat Ini. *Kementerian Kesehatan Republik Indonesia* https://www.kemkes.go.id/article/view/15041400003/studi-diet-total-potret-pola-makan-penduduk-indonesia-saat-ini.html (2014).
18. Permana, D. I. Profil Kecenderungan Perilaku Agresif Remaja yang Bermain Online Game: Studi Deskriptif terhadap Siswa SMP Negeri 9 Kota Cimahi Tahun Ajaran 2011-2012. (Universitas Pendidikan Indonesia, 2012).
19. Wijaya, A. Children's Traditional Game Center Di Palembang. (Musi Charitas Catholic University, 2018).
20. Ramadhan, A. F., Sitika, A. J. & Syarief, C. Pengaruh Metode Belajar dengan Simulation Game Terhadap Penyerapan Pengetahuan Remaja Masjid Tentang Sejarah Agama Islam. *J. Ilmu Sos. dan Pendidik.* **5**, (2021).
21. Laraeni, Y., Luthfiyah, F., Abdi, L. K. & Lestari, A. Pengaruh Penyuluhan Gizi pada Santriwati dengan Maslah Gizi Melalui Penyuluhan dengan Media Booklet di Kelas X Pondok Pesantren Nurul Hakim Lombok Barat. *Media Bina Ilm.* **16**, 6787–6796 (2021).
22. Caesar, D. L. & Dewi, E. R. Pengaruh Media Buku Saku Terhadap Pengetahuan Tentang Sanitasi Lingkungan Pada Kader Kesehatan Desa Cranggang. *JKM (Jurnal Kesehat. Masyarakat) Cendekia Utama* **6**, 137 (2018).
23. Permenkes. *Peraturan Menteri Kesehatan Republik Indonesia Nomor 2 Tahun 2020 Tentang Standar Antropometri Anak*. (Menteri Kesehatan Republik Indonesia, 2020).
24. Syahputra, D. Sistem Pengukur Tinggi dan Berat Badan Menggunakan Mikrokontroler Arduino Uno Berbasis Android. (Universitas Sumatera Utara, 2020).
25. Hariani, D. Pengaruh Penyuluhan Terhadap Pengetahuan dan Sikap Konsumsi Buah dan Sayuran Siswa Sekolah Dasar di SD Negri 06 Kecamatan Medan Denai Kota Medan. (2011).
26. I G A Ayu Dharmawati & I Nyoman Wirata. Hubungan Tingkat Pendidikan, Umur, dan Masa Kerja dengan Tingkat Pengetahuan Kesehatan Gigi dan Mulut pada Guru Penjaskes Sd di Kecamatan Tampak Siring Gianyar. *J. Kesehat. Gigi* **4**, 1–5 (2016).
27. Beatrix Hayudityas & Herry Sanoto. Hubungan antara Supervisi Akademik dengan Kompetensi Profesional Guru Sekolah Dasar. *J. Stud. Guru dan Pembelajaran* **4**, 105–110 (2021).
28. Silalahi, R. H. Pola perilaku seks pranikah di kalangan siswa sma negeri 1 silalahi. *J. Kesehat. Bukit Barisan* **2**, 31–48 (2018).
29. Istawati, R. Hubungan Keterpaparan Media Massa, Peran Teman Sebaya Terhadap Tindakan Seksual Di Sma an-Naas. *J. Endur.* **2**, 124 (2017).
30. Brebahama, A. & Listyandini, R. A. Gambaran Tingkat Kesejahteraan Psikologis Penyandang Tunanetra Dewasa Muda. *J. Mediapsi* **2**, 1–10 (2016).
31. Kasim, F. Dampak Perilaku Seks Berisiko terhadap Kesehatan Reproduksi dan Upaya Penanganannya (Studi tentang Perilaku Seks Berisiko pada Usia Muda di Aceh). *J. Stud. Pemuda* **3**, 39–48 (2014).
32. Pantu, E. A. Moderasi Usia dalam Pengaruh Semester Terhadap Efikasi Diri Akademik pada Pembelajaran Online. *Psikostudia* **10**, 78–89 (2021).
33. Utari, W. R., Lisum, K. & Marlina, P. W. N. Hubungan Karakteristik Responden dan Sumber Informasi dengan Pengetahuan Anemia Defisiensi Zat Besi pada Remaja. *J. Keperawatan* **12**, 379–386 (2020).
34. S, I. N. B. *et al.* Hubungan Usia Dengan Pengetahuan Dan Perilaku Penggunaan Suplemen Pada Mahasiswa Institut Teknologi Sepuluh Nopember. *J. Farm. Komunitas* **7**, 1–7 (2020).
35. SPWP, W. & Setiowati, T. Hubungan Karakteristik Remaja dengan Pengetahuan Remaja Mengenai Kesehatan Reproduksi di Kota Cimahi. *IRWNS* (2015).
36. Maulida. Hubungan Karakteristik Keluarga dan Status Gizi dengan Kejadian Stunting pada Anak Balita di Wilayah Kerja Puskesmas Darul Aman Kabupaten Aceh Timur Tahun 2021. *Getsempena Heal. Sci. J.* **1**, 19–35 (2022).
37. Telly Katharina & Katarina Iit. Hubungan Pengetahuan Tentang Seksualitas dan Implikasinya pada Remaja di SMP Adisucipto Kabupaten Kubu Raya Tahun 2018. *J. Kebidanan* **9**, 311–322 (2019).
38. Said, M. & Pratomo, H. Pendidikan Ibu dan Durasi Pemberian Air Susu Ibu dalam Peningkatan Kecerdasan Siswa Usia Sekolah Dasar Mother Education and Breastfeeding Duration in Increasing Elementary. *J. Kesehat. Masy. Nas.* **8**, 169–173 (2013).
39. Ningrum, W. A., Muthoharoh, A., Fajriyah, N. N. & Bahrie, M. S. Hubungan Karakteristik dan Tingkat Pengetahuan Responden Prolanis Terhadap Pengobatan Diabetes Melitus Tipe II di Wilayah Kerja Puskesmas Wonopringgo .... *Proceeding ...* 26–30 (2020).

40. Susenti, R. T. E., Askandar, N. S. & Mawardi, M. C. Analisis Pengaruh Jenis Kelamin, Pendapatan Orang Tua dan Status Berkelas terhadap Persepsi Etis Mahasiswa Akuntansi dengan Love Of Money sebagai Variabel Intervening. *E-JRA* **8**, 14–25 (2019).
41. Sri, M. Analisis Pengaruh Jenis Kelamin Dan Status Pekerjaan Terhadap Persepsi Etis Mahasiswa Akuntansi Dengan Love Of Money Sebagai Variabel Intervening. (2015).
42. Albertina Elpa Liana, Soharno & Arip Ambulan Panjaitan. Hubungan Antara Pengetahuan Tentang Gizi Seimbang Dengan Indek Masa Tubuh Pada Mahasiswa . *J. Kebidanan* **7**, 132–139 (2017).
43. Nuryanto, Adriyan Pramono, Niken Puruhita & Siti Fatimah Muis. Pengaruh pendidikan gizi terhadap pengetahuan dan sikap tentang gizi anak Sekolah Dasar. *J. Gizi Indones.* **3**, 32–36 (2014).
44. Ratnasari, A. D. & Fitri, R. Pengaruh Model Pembelajaran Sentra Bermedia Picture Clamp terhadap Kemampuan Mengenal Konsep Bilangan Kelompok A di TK Raudlotul Jannah Sidoarjo. *PAUD Teratai* **7**, 1–5 (2018).
45. Salim, M., Ambarita, L. P., Margarethy, I. & Nurmaliani, R. Pelaksanaan Gerakan Satu Rumah Satu Jumantik (G1R1J) dengan Pola Pendampingan Terhadap Pengetahuan, Sikap dan Tindakan Masyarakat Dalam Di Kota Jambi. *J. Ekol. Kesehat.* **19**, 196–210 (2020).
46. Rinayati, R., Mulyono, M. & Wahyuning, S. Keefektifan Game Edukasi Gizi Sebagai Media Promosi Gizi Anak Sekolah di MI Nurul Islam. *Visikes* **15**, (2016).
47. Styaningrum, S. D. & Metty, M. Games Kartu Milenial Sehat sebagai media edukasi pencegahan anemia pada remaja putri di sekolah berbasis asrama. *Ilmu Gizi Indones.* **4**, 171 (2021).
48. Aldera, Rosmida M Marbun, Tugiman Atmasumarta & M. Alfatih Alfien Al Farouq Marzuki. Daya Terima Media Board Game dan Perbedaan Pengetahuan Remaja Sebelum dan Sesudah diberikan Edukasi Gaya Hidup Cegah Obesitas di Komunitas Board Game Jakarta. *Kocenin Ser. Konf.* (2021).
49. Ladiba, A. *et al.* Pengaruh edukasi gizi terhadap peningkatan pengetahuan dan asupa sayur buah pada siswa sekolah dasar dengan status gizi lebih. *Darussalam Nutr. J.* **5**, 110 (2021).
50. Setyowati, R. & Mulasari, S. A. Pengetahuan dan Perilaku Ibu Rumah Tangga dalam Pengelolaan Sampah Plastik. *Kesmas J. Kesehat. Masy. Nas. (National Public Heal. Journal)* **7**, 562–566 (2013).