

THE INFLUENCE OF ANDROID-BASED EDUCATIONAL GAME MEDIA ON THE KNOWLEDGE OF SELECTING FOOD SNACKS IN CHILDREN BASIC SCHOOLS IN BINJAI CITY

Aslina Siagian^{*1}, Albiner Siagian², Namora Lumongga Lubis³

¹ Alumni of Master's Programs in Public Health Sciences, University of Sumatera Utara.

² Department of Administration and Health Policy, Faculty of Public Health, University of Sumatera Utara

³ Department of Health Promotion and Behavioral Science, Faculty of Public Health, University of Sumatera Utara

**Corresponding author: Aslina Siagian, email: aslinasiagian@gmail.com*

ABSTRACT

Background: Food snacks for school children (PJAS) until now there are still many types of snacks containing dangerous ingredients, which can endanger health. Children are vulnerable and easily exposed because they do not understand about healthy snacks. To reduce exposure of school children to unhealthy snacks, it is necessary to do android-based health education

Materials and Methods: The research method is a quasi-experimental method, namely pre-test and post-test with control group design. The research subjects were 30 students Class III SDN 026602 as the experimental groups and 30 students SDN 020617 as the control groups. Data analysis used an independent sample t-test.

Result: The results of the study were the experimental groups given educational game media intervention had a significant effect on knowledge $p = 0.000$ ($p < 0.05$). It is necessary to improve health promotion by using modern technology-based educational media.

Conclusion: Based on the research results, there is an effect of providing nutrition education with Educational Game media on the knowledge of elementary school children in Binjai City. This means that the educational media can increase the knowledge of elementary school children in choosing snack foods.

Keywords: Educational game, knowledge, food snacks.

1.0 Introduction

Snack food sold by traders is not necessarily healthy, because most of the traders offer food that is incomplete nutritionally, the composition is more carbohydrates and fat. These snack foods are indeed high in calories but lack fiber and nutrients. They also tend to use preservatives, dyes, flavorings and artificial sweeteners that can trigger various health problems, allergies to the body and brain of children, besides that it can also cause diarrhea (Ramadani, 2017).

The problem of food safety that is contaminated by microbes and harmful substances is still widely found in Indonesia as well as in other countries, especially Southeast Asia. In Indonesia, there are many extraordinary events (KLB) due to contaminated food and beverages. Based on the collection of KLB data by BPOM RI in 2017, it shows that the location of the highest outbreak was in the residence as many as 25 incidents (47.17) percent, followed by educational institutions with 15 incidents (28.30) percent and the highest occurred in elementary schools (BPOM RI, 2017).

Based on the annual report of the BPOM of North Sumatra Province in 2018, the Supervision of School Snacks for School Children (PJAS), which was intervened by 36 schools. The number of samples sampled at school in the 2018 mobile laboratory car revitalization activities were 2,226 samples. The test results were 2141 samples (96.18) percent MS and 93 samples (4.175) percent TMS. Samples that did not meet the requirements consisted of 93 samples, containing hazardous materials, namely Formalin, Rhodamine B, Methanyl Yellow (BPOM, North Sumatra Province, 2018).

The government also promotes the PJAS program, a food and nutrition intervention program through nutrition education or education in schools. The nutrition education program is an effort to help individuals be critical of food choices. Health and nutrition education programs will increase children's knowledge, with increasing knowledge it is hoped that there will be a change in behavior for better nutrition and health. Nutrition education will be more influential and more effective if it is started early and targets directly at children, because children are considered easy to accept change because they are still in the stage of growth and development. Easy to guide and direct in instilling good habits in choosing healthy snack foods (Nuryanto, 2014).

The results of various previous studies have shown that intervention through health education using educational media can improve knowledge, attitudes and practices in school children with different effectiveness (Shen M, Hu M, and Sun Z., 2015). The results of research conducted by Syofi, Siagian and Nasution (2014) showed that there was an effect of extension with flash cards on increasing students' knowledge and attitudes about nutritious, diverse, balanced and safe food. In addition, the results of research by Wahyuningsih and Adriyani (2015) state that there are significant differences in the level of knowledge after being given nutrition education using nutrition card media. School age children love to play and like challenges. Playing is the most appropriate teaching method for school-age children because education combined with the development of games is more fun and children easily pick up on messages or materials being taught and don't experience boredom (Meghan, 2015). One of the educational media to play that is both fun and useful is games.

Public Elementary School 026602 is one of 34 public elementary schools in Binjai Selatan District, Tanah Seribu Village. SD Negeri 026602 is the favorite school, accredited A and the highest number of students is in Binjai Selatan District. Based on the observations of researchers, this school has one canteen, where the building is still semi-permanent and the floors are not clean. A large number of food vendors sell outside and inside the school complex by selling a wide variety of street food. The sample test results show the low level of safety of snacks in SD Negeri 026602.

Based on these problems, and educational game media based on android has never been studied to increase the knowledge of school children in choosing healthy snacks. Therefore, researchers are interested in examining the effect of android-based educational game media on knowledge of school children in choosing healthy snack foods.

2.0 Materials and Methods

The research design used a quasi-experimental method, namely pre-test and post-test with control group design. The intervention given to the experimental group of this study was carried out for three consecutive days and the post-test on the 14th day. The experimental group will get intervention with educational game media 3 times using an Android smartphone. This research will be carried out at SD Negeri 026602 and SD Negeri 020617 District of Binjai Selatan Kota and the research will be carried out from May 2019 to completion.

The sample in this study was determined by purposive sampling, namely class III (three) students with the requirements of being third grade students, students having Android smartphones that support games and can read fluently, enjoy playing, are easier to direct, willing to be research respondents and game media. games made by researchers are more suitable for third graders. Students who were the samples in this study were third grade students of SD Negeri 026602 and SD Negeri 020617, Binjai Selatan District, Binjai City. The sample consisted of case samples and control samples. The number of students in grade III (three) SD Negeri 026602 is 30 students and the number of students in grade III (three) SD Negeri 020617 is 30 students. The number of samples based on groups, namely, the experimental group was the third grade students of SD Negeri 026602, totaling 30 (thirty) students. And the control group is the third grade students of SD Negeri 020617, totaling 30 (thirty) students.

The research framework or flow can be seen as follows:

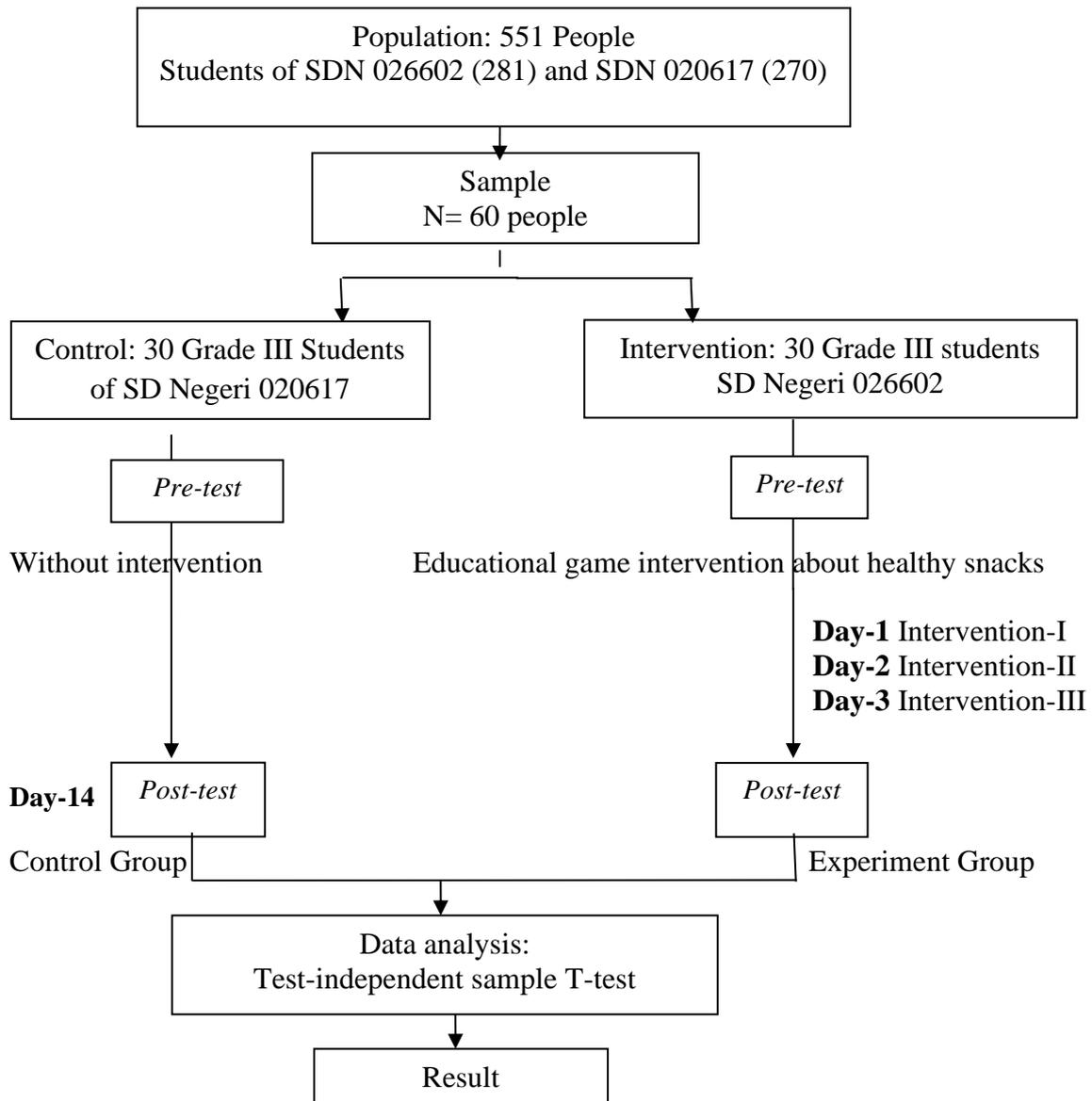


Figure 1. The Research Framework

3.0 Result

3.1 Educational Game Design

The design of educational games is part of the development of educational games, which are designed or designed in the form of a game with several game stages equipped with educational videos about choosing healthy snack foods using an Android smartphone playing tool.

Item	Description
Game type	Game simple application equipped with pictures, text and sound.
Playing time	5-15 minutes. The time to use this game is influenced by proficiency, habits and understanding of the material topics played by users of my snack game on the smartphone.
Study time / follow educational videos	10-15 minutes. After each game with a score, it will be continued with learning according to the game being played
Usage tool	<i>Android smartphone</i>
How to distribute games to students	Sending via Whatsapp group class III, the researcher, assisted by the homeroom teacher, teaches students how to download and how to play my snack educational game application.
Repeat game intervention	Game is played once per day and played for three consecutive days.
Creation program	Macromedia Flash. Is a program that can be used to create an animated work

Table 1. Description of the Educational Game "Jajananku" Based on Android

3.2 Univariate Analysis

3.2.1 Gender

Gender	Experiment Group		Control Group	
	n	%	n	%
Male	19	63,3	14	46,7
Female	11	36,7	16	53,3
Total	30	100	30	100

Table 2. Distribution of Characteristics of Respondents in Experiment Group and Control Group by Gender.

3.2.2 Age

Age	Experiment Group		Control Group	
	n	%	n	%
7	2	6,7	1	3,3
8	25	83,3	21	70,0
9	3	10,0	8	26,7
Total	30	100	30	100

Table 3. Distribution of Characteristics of Respondents in Experiment Group and Control Group by Age.

3.3 Bivariate Analysis

3.3.1 The influence of android-based educational game media on knowledge and attitudes in choosing healthy snack foods

Knowledge (Score)	Eksperiment				Control			
	Pre-test		Post-test		Pre-test		Post-test	
	n	%	n	%	n	%	n	%
Well (score ≥ 11)	9	30,0	19	63,4	9	30,0	11	36,7
Enough (score 8-10)	10	33,4	10	33,4	9	30,0	7	23,3
Less (score ≤ 7)	11	36,6	1	3,2	12	40,0	12	40,0
Total	30	100	30	100	30	100	30	100

Table 4. Frequency Distribution of Respondents based on Knowledge of Healthy Snack Food Selection

Based on the results of the data analysis, there was an increase in the average score between the pre-test and post-test results in the experimental group and the control group, but the increase in the control group was not as big as the experimental group. In the experimental group, during the pre-test, an average score of 8.63 was obtained with a standard deviation of 2.580 and at the time of the post-test it increased to be 11.47 with a standard deviation of 2.030.

Group	Knowledge						Average Score Difference	P
	Pre-Test			Post-Test				
	Mean	T	Std. Deviation	Mean	T	Std. Deviation		
Eksperiment	8,63		2.580	11,46		2.030	2,83	
Control	8,36	0,389	2.723	8,13	5,438	2.675	0,23	

Table 5. Distribution of Respondents' Knowledge Based on Average Pre-Test and Post-test Scores on Selection of Healthy Snack Foods Using Educational Game Media

The results of the independent sample T-test analysis obtained in the experimental group and the control group can be seen the probability value ($p = 0.0001$) where $p < 0.05$. These results indicate that on average there is a significant difference between students' knowledge in the experimental group and the control group.

4.0 Discussion

Based on the results of the research conducted, it shows that the use of health promotion media is very necessary to increase the dissemination of information through health education, especially among school children. Health education is defined as an effort to translate what is known about health into the desired behavior of individuals and society through the educational process in accordance with the Stimulus-Organism-Response (SOR) behavior change theory, which explains that individual behavior can change depending on the quality of stimulation. The influence of nutrition education on increasing knowledge is in line with research conducted by Hastuti (2015) where from the results of his research he stated that there were significant differences before and after the implementation of balanced nutrition education in obese students with a probability value ($p < 0.05$). The research of Laura, Joseph, Gorin and Mobley (2015) states that there is a significant difference in the knowledge of school children about choosing healthy snacks, but there is no difference in action before and after providing long-term media card game education.

In this study, it can be seen that before the educational game media was carried out about the selection of healthy snack foods, the category of students' knowledge was still more dominant in the moderate category of knowledge, where students preferred food and drinks that contained artificial sweeteners which were important sweet, delicious and tasty. They also prefer meatballs to taste chewy and they rarely see the expiration date on their snack food packaging, they are more often attracted to the brand and color of the acid without considering the nutrition and benefits of the food. This can be seen from the pre-test results of the experimental group students before being given intervention through educational game media where only 9 students (30,0%) had good category knowledge and more moderate and less student knowledge.

After being given education through android based educational game media related to healthy snacks that were played individually on Android smartphones for three consecutive games for 3 days each, the post-test results in the experimental group showed an increase in student knowledge, namely as many as 19 students (63, 4%) have good knowledge. The knowledge referred to in this case is the student's ability to correctly answer questions about the selection of good and healthy snacks, namely how to choose safe and healthy snacks, students answer more clean, closed and not infested with flies, choose meatballs that smell like meat and not too chewy also choose fried foods that are not fried in black oil and not wrapped in paper or newspaper.

This can result in an increase in students' knowledge because they have received good information regarding healthy snacks from Android-based educational game media and in accordance with Brigham's research in Azwar (2012), that using a sleeper effect which states messages conveyed for 10-14 days can still be remember the message recipient the content of the message.

Based on the results of the independent sample T-test, it shows that the provision of intervention in the form of information related to the selection of good and healthy snack foods through Android-based educational game media is effective in increasing student knowledge ($p = 0.0001$) less than 0.005 which indicates that there is media influence.

Android-based educational game in increasing student knowledge regarding the selection of good and healthy snacks at SDN 026602 Kota Binjai.

The advantages of this educational game media are more inherent and quickly understood by students because digital android games can stimulate all of the students' five senses because in the game media there are elements of text, images, sound, animation and interactivity. Therefore, they generally like to play games, it is proven by the first time we test their knowledge with the pre-test questionnaire, the score is the most category knowledge being, after we intervened with educational game media, their knowledge increased considerably from the post-test results after 14 days of messages. accepted them. Also the information we got from their homeroom teacher was that they were very enthusiastic about playing the game because they were challenged by the score at the end of the game so they really tried to understand and understand the information played in the "jajananku" game.

5.0 Conclusion and recommendation

Based on the research, it can be concluded that there is an effect of providing nutrition education with Educational Game media on the knowledge ($p = 0.0001$) of elementary school children in Binjai City. This means that the educational media can increase the knowledge of elementary school children in choosing snack foods.

Declaration

Author(s) declare that this article is our original work and has never been published before.

Authors contribution

Author 1: Research concepts and designs, preparing research proposals, collecting data, analyzing data and writing manuscripts.

Author 2: Research concepts and designs, supervising the research process, actively involved in data analysis, reviewing manuscripts and final editing.

Author 3: Research concepts and designs, supervising the research process, actively involved in data analysis, reviewing manuscripts and final editing.

References

- Azwar. (2012). *Metode penelitian*. Yogyakarta : Pustaka pelajar.
- BPOM RI. (2018). *Laporan Tahunan Badan Pengawasan Obat dan Makanan Republik Indonesia Tahun 2017*. Diakses dari https://www.pom.go.id/new/browse/more/laporan_tahunan/17-09-2019/17-09-2020/1
- BPOM. (2019). *Laporan Tahunan Badan Pengawasan Obat dan Makanan Provinsi Sumatera Utara Tahun 2018*. Diakses dari https://www.pom.go.id/new/admin/dat/20190708/Lapkin_BBPOM_di_Medan.pdf
- Hastuti. (2015). *Promosi kesehatan*. Jakarta : Pustaka Pelajar
- Laura, S., Joseph, M.S., Gorin,phd., Mobley,phd.,amy r, & Mobley,phd, rd. 2015. Child care pilot intervention preschool Childrens intention to choose healthy snack choices. Journal of advanced Nutrisionist. Diakses dari liebertpub.com/doi/full/10.1089/chi.2015.0028.
- Meghan, L. (2015). *Toying with healthy eating: developing a play-based nutrition education program*. thesis university of toronto. Diakses dari <https://tspace.library.utoronto.ca>
- Nuryanto. (2014). Pengaruh pendidikan gizi terhadap pengetahuan dan sikap tentang gizi anak sekolah dasar. *Jurnal Gizi Indonesia*, 3(1), 32-36. Diakses dari <https://ejoernal.undip.ac.ad>.
- Ramadani, R.E., Nirmala, F. & Mersatika, H.A.(2016) Higiene sanitasi makanan jajanan di Kecamatan Buke Kabupaten Konawe Slatan. *Jurnal Ilmiah Mahasiswa Kesehatan Masyarakat*, 2(6).
- Shen M, Hu M, Sun Z. 2015. *Assessment of school-based quasi – experimental nutrition and food safety health education for primary school students in two China*. Plos One: 10(12). Diakses dari <https://www.ncbi.nlm.nih.gov>
- Syofi, Siagian dan Nasution. (2014). *Pengaruh penyuluhan makanan bergizi beragam seimbang dan aman dengan menggunakan flash card dalam meningkatkan pengetahuan dan sikap anak kelas 1-3 SD Islam Titi Berdikari Kecamatan Medan Labuh (Skripsi, Univesitas Sumatera Utara)*. Diakses dari <https://repository.usu.ac.id>.
- Wahyuningsih, N., Rahayu, N.,& Adriyani, M.,(2015) Media Pendidikan Gizi Nutrition Card Berpengaruh terhadap Perubahan Pengetahuan Makanan Jajanan Anak Sekolah Dasar. *Media Gizi Indonesia*, 10(1) 26-31.