

## Health Education Program for Improving of Food Intake of Breakfast and Vegetables Consumption: A Quasi Experiment among Elementary School Students in Indonesia

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**Received:** December 13 2022; **Accepted:** April 4 2023

### Abstract

**Objective** – Undernutrition among elementary school students is too high in Indonesia. Elementary students in the Indonesian context have many problems in daily breakfast and vegetable consumption. Therefore, health education programs to improve their nutritional status should be conducted in context. Further, this study sought to examine a health education program using a SIMON Comic with an emic Papua approach for improving food intake of breakfast and vegetables among elementary school students in Indonesia. **Method** – A quasi-experimental study design with a pre-test-post-test control group was performed on 60 elementary school students (30 in the intervention and 30 in the control group). The intervention group received the comic for one month. Meanwhile, the control group received a leaflet. Food intake of breakfast and vegetable were measured using a self-administred questionnaire to measure knowledge, attitudes, and practice. Data were analysed using the independent T-Test. **Results** – The SIMON comic with an emic Papua approach significantly increased students' knowledge about improving breakfast and vegetable consumption, P-value=0.001). However, there was no significant attitude and practice change between comic and leaflet groups in breakfast and vegetables consumption (P-value>0.05). **Conclusion** – The SIMON Comic with an emic Papua approach improved knowledge of students about breakfast and vegetable consumption. Therefore, health education for elementary students using this comic should be implemented in the school curriculum.

**Keywords:** Emic Papua ▪ “SIMON” Comic ▪ Knowledge of Nutrition ▪ Elementary School.

### Introduction

Nutritional problems in school-age children in Indonesia are still high and are still the main problem caused by wrong eating behavior, where some children do not have breakfast, and there is a low rate of consumption of vegetables and fruit. This impacts the academic talent of school children due to malnutrition (1). From basic health research in Indonesia (In Indonesia known as *Risikesdas*) data from 2010, it is known that the majority of Indonesian children (76.1%) have a low nutritional

quality of breakfast (2). This low quality of food is related to the amount of nutritional content and the type of food. Research in Skouw, Jayapura City, found that 4.2% of elementary school children did not have breakfast and as many as 51.7% of students consumed breakfast but the energy provided was not adequate, and protein adequacy in as many as 67.5% of students was not enough (3)

Breakfast for school children is very important because school time is an activity that requires a large amount of energy and calories, and it has a significant impact on school performance (4, 5).

Breakfast also affects the level of concentration of children at school. Children who eat breakfast have better concentration than those who do not eat breakfast. This also affects good school attendance, academic achievement, nutrient intake, fitness, and healthy weight (6). Besides breakfast, children's intake of vegetables and fruit is also low. According to the WHO, the population is categorized as having 'adequate' consumption of vegetables and fruit if they consume at least 5 servings per day of vegetables and/or fruit (a combination of vegetables and fruit) for 7 days a week. Their consumption is categorized as 'inadequate' if the consumption of vegetables and fruit is less than the stipulated provisions. The Riskesdas of 2018 showed that 95.4% of the Indonesian population lacks vegetable consumption, and especially in Papua, where about 93.8% of the population consumes fewer vegetables and fruit. In children aged 10-14 years, 96% of children consume fewer vegetables and fruit (7).

The serious issues regarding breakfast and the low consumption of vegetables and fruit in children can negatively impact their health in the future, so Information Education and Communication (IEC), commonly known as nutrition education, is needed from an early age. IEC is a method used to change behavior by disseminating communication, information, motivation and nutrition education to the public to provide the same understanding, knowledge, and willingness to participate actively in implementing daily nutrition recommendations.

Nutrition education should be considered the medium or vehicle for delivering messages to achieve interaction between the giver of the message and the learner (8, 9). One medium in learning and delivering relevant messages for children is a comic. Comics can increase the knowledge of elementary school children about health (10–12). Besides increasing students' knowledge, comics can also change the attitudes and behavior of school children in living a healthy lifestyle (13). Previous studies have shown that the use of comic can correlate with changes in attitudes and behavior of school children, such as increasing students' health literacy

(14), healthy snack selection (15, 16), and increased consumption of vegetables and fruit (17–19).

The "Simon" comic is a comic in a local Papuan dialect, containing messages about balanced nutrition, breakfast, and consumption of vegetables and fruit. This comic tells the story of Simon, the main character of the comic and his daily life at school and home, who has not implemented a balanced nutritional diet.

This study sought to examine the outcomes of a health education program implementation using the SIMON Comic with a Papua emic approach for improving food intake of breakfast, and vegetables and fruit among elementary school children in Papua.

## Methods

### *Design*

This was a quasi-experimental research design with a pre-test-post-test control group.

### *Participant*

The study was conducted in 2 elementary schools in Jayapura City, selected by simple random sampling with the same characteristics, during October – December 2020. The population was all students in grades 3 and 4 at the Emereuw and VIM III elementary schools. The total population was 17 grade 3 students and 43 grade 4 students. The method used to find the research location was a stratified random sampling method, by selecting ten schools located on the outskirts of Jayapura city that matched the inclusion criteria where the majority of students were Papuans. Then, from the 10 elementary school they were randomized again to obtain 2 elementary schools which would become research locations. The two primary schools that were the research locations were randomized again to determine the type of intervention that students would receive. At the beginning of the study, 70 students participated, but the dropout was 10 students; only 60 students participated right up to the end of the study, 30 participants in the comic group and 30 participants in the leaflets group. The

determination of the treatment group was carried out by randomizing the schools, and it was found that students at Emereuw Elementary School were given comics, while at VIM III Elementary School the students were given leaflets.

### ***Instrument***

A self-administered questionnaire was used to measure the social demographics of the participants, including age and school grades. To assess the students' knowledge of nutrition, we used a questionnaire that included 15 multiple-choice questions. The questionnaire was created by the researchers. Before using this questionnaire, a Cronbach's alpha reliability test was carried out with a result of 0.78, which means that this questionnaire is able to measure an object consistently. Then, if the answer was right a score of 1 was given and if the answer was wrong, the score 0. For measure attitude, we used a questionnaire that included 15 questions using a Likert scale (agree = score 1, disagree = score 0, and hesitate = score 0) with Cronbach's alpha validity of 0.76. Meanwhile, to measure practice we evaluated the recall of students' food consumption over 1x24 hour regarding breakfast and consumption of vegetables and fruit (20).

### ***Program***

The intervention group received the comic. The Simon Comic uses an emic Papua approach, and deals with two topics. The first topic is about breakfast, with the title "Let's eat breakfast!" and the second topic is "Let's eat vegetables!". The comic's main character, Simon, is a grade 5 elementary school student. The comic tells about Simon's daily activities at home and school, slipping nutritional messages into the storyline. Comics are lent to each student to read at home for one month. After two weeks, the students return the comics. The Simon Comic is the work of a researcher who has been copyrighted.

The control group received a leaflet about breakfast and vegetable consumption. The nutritional message delivered in the comic is also contained in

the leaflet. The duration for borrowing the leaflets is the same as the time for the comics, which is one month.

Before the intervention, the students' knowledge, attitudes, and skills were measured in both groups. After the intervention, a follow-up was conducted in the second week to check whether any students had dropped out, and monitor whether the students still had the comics or leaflets to read. A measurement of their knowledge, attitudes, and skills was conducted again after one month.

### ***Ethics Statement***

This research obtained permission from the Ethics Committee with the number 094/KEPK-J/XI/2020.

### ***Statistical Analysis***

The paired sample T-Test was used to determine the differences in knowledge, attitude, and practice of breakfast and vegetable and fruit intake before and after the intervention. Meanwhile, the independent T-Test determined the difference between the two treatments. The statistical test was said to be significant if the results of the statistical test showed a P-value <0.05

### ***Results***

The study was conducted in the conditions of pandemic outbreak, where the selected school was considered a green zone for COVID 19, but during its implementation, there was a spike in cases, and VIM III elementary school could not be used directly. The researchers used the online method by distributing questionnaires and leaflets via WhatsApp. This was different from Emereuw Elementary School, which still worked face-to-face by implementing strict health protocols. The questionnaire questions included breakfast time, the benefits of breakfast, what is a balanced breakfast, the types of breakfast consumed, the food sources used, knowledge about balanced breakfast

**Table 1. Characteristics of Respondents**

Variables	Comic N (%)	Leaflet N (%)	Total N (%)	P-value*
<b>Gender</b>				
Males	15 (50.0)	14 (46.7)	29 (48.3)	0.796
Females	15 (50.0)	16 (53.3)	31 (51.7)	
<b>School grades</b>				
3	14 (46.7)	3 (10.0)	17 (28.3)	0.004
4	16 (53.3)	27 (90.0)	43 (71.7)	
Total	30 (100)	30 (100)	60 (100)	

\*Chi-Square Tests.

**Table 2. Changes in Knowledge, Attitudes and Behavior before and after the Intervention**

Intervention	Knowledge N (mean rank)	Attitudes N (mean rank)	Behavior N (mean rank)
<b>Comic</b>			
Post <pre	5 (7.80)	6 (10.17)	6 (8.75)
Post >pre	19 (13.74)	14 (10.64)	11 (9.14)
Post = pre	6 (0.00)	10 (0.00)	13 (0.00)
P-value*	0.001	0.096	0.242
<b>Leaflet</b>			
Post < pre	8 (11.38)	10 (11.85)	4 (6.00)
Post > pre	15 (12.33)	12 (11.20)	10 (8.10)
Post = pre	7 (0.00)	8 (0.00)	16 (0.00)
P-value*	0.15	0.79	0.06

Post <pre=post-test results are lower; Post >pre=the post-test results are higher; post=pre implies that the results of the post-test and pre-test are the same. \*Wilcoxon Signed Ranks Test.

nutrition, and the amount consumed. The answers were not analyzed per question but the total score of the questionnaire was used. The researcher tested the differences in knowledge between the sexes during the pre-post, and the analysis results showed no difference in terms of learning between boys and girls. The results are shown in Table 1 regarding the characteristics of the respondents.

Table 1 shows that 15 male students received comics (50.0%); more female students received leaflets, that is 16 students (53.3%). The students who were successfully interviewed were grade 3 and grade 4 students. There were differences in the distribution of classes between both groups.

Table 2 shows a significant change in knowledge before and after treatment in the comic group,

which did not occur in the leaflet group. As for attitudes and behavior, there were no differences before and after treatment between the two groups. Table 2 shows that in the comic group, there was an increase in knowledge in 19 respondents, with an average increase in value of 13.74 points. On the attitude variable, there was an improvement in 14 respondents by an average of 10.64 points; on the behavior variable, 11 respondents increased their practice by 9.14 points. In the leaflet group, there was an increase in knowledge in 15 respondents with an average increase in value of 12.33; in the attitude variable, there was an increase in 12 respondents with an increase in value of 11.20; and in the behavior variable, an increase occurred in 10 respondents with a value of 8.10.

Table 3. Changes in Knowledge, Attitudes, and Behavior of Respondents between Comic and Leaflet Groups

Variables	Mean±SD		P-value*
	Comic	Leaflet	
Δ Knowledge	2.36±3.45	0.83±2.90	0.09
Δ Attitudes	0.76±3.10	-0.10±3.83	0.49
Δ Behavior	0.23±1.19	0.30±0.84	0.96

\*Mann-Whitney.

Table 3 shows an increase in knowledge and behavior in the comic and leaflet groups. There was an improvement in attitude in the comic group, but the opposite occurred in the leaflet group; however, the changes were not statistically different between the two groups.

## Discussion

Information, Education and Communication, (IEC) is an effort to improve the health status of the community through changes in knowledge and nutrition practices/behaviors in a better direction. To change knowledge, IEC can only be conducted using informative communication. In providing nutrition IEC, the thing needs to be considered is the medium used as a vehicle for delivering messages so that interaction can be achieved between the message giver and the learner. Nutrition education for elementary school children is provided through attractive media, so that the delivery of information is more easily accepted, while entertaining children and is an alternative medium to create a pleasant learning atmosphere for students (21). One of the exciting and entertaining media for children that can be used is comics. Previous research has shown that children find comics more informative, engaging, and cognitively engaging (22).

Comics are educational tools enjoyed by many children and can be useful for increasing awareness about health (23). Comics have a positive role in developing reading habits. Comics also potentially convey factual information and offer opportunities for self-awareness, reassurance, empathy, friendship, and are a means to explore health information (24). The children's world is full of imagination and

creativity, leading them being enjoy drawing, sketches and comics (25). The weakness is that comics are too long, so children may become get bored and do not understand the purpose of the messages conveyed in comics, and sometimes children are more interested in seeing the pictures than the stories in the comic. In this study, the change in knowledge of the comic group was greater than that of the leaflet group. Previous research has shown that giving comics is more effective as a learning medium than leaflets in increasing students' knowledge (23, 26). This may be the case because comics are an interesting educational medium, with attractive pictures and colors to develop children's imaginations. One study (27) stated that when comics are presented in everyday language that is easily understood by students, and use bright colors, students are more motivated to read them. Another study (28) also stated that the comic medium increased knowledge and greatly influenced the nutrition knowledge of elementary school students.

States that good knowledge is not necessarily manifested in good behavior (29). The formation of new behavior begins in the cognitive domain. The subject knows in advance about the stimulus in the form of material or external objects, giving rise to new knowledge on the subject, and finally causing an inner response in the form of attitudes towards the known object. However, a person can act or behave without first knowing the meaning of the stimulus he receives, meaning that someone's actions are not necessarily based on knowledge or attitudes. This is in line with previous research that comic intervention does not affect knowledge and attitudes (22), unlike the study conducted by Damayanti *et.al*, which found that giving comics

to students could improve students' nutritional attitudes, and students who were part of the intervention had better nutritional attitudes than those who were only given counseling (30)

Our intervention did not show any significant differences in terms of changes in student behavior. IEC must be carried out with continuous communication, that is well-planned, and implemented systematically to change behavior. This is different from previous research, which showed that one time reading a comic showed that students have a high 50% appreciation in learning so that it had a positive effect on the knowledge, attitudes, and practices of elementary school children (23). Giving comic interventions can improve students' learning skills (31). The strength of this research is that the sample focuses on Papuan children to increase the nutritional knowledge of elementary school children in remote areas.

### *Limitations of Study*

The limitation of this research is that it was rather challenging to achieve a minimum sample in the light of activity restrictions due to the pandemic, and the research time was also longer than the original aim. This research was conducted in 2020 when the Covid-19 pandemic occurred and community activity restrictions were imposed. Likewise, regarding school children attending school, the number of those who came to school was limited, so the researchers experienced difficulty finding respondents because in order to return to meet the children, it was necessary to arrange a time. If the child could not attend school on the appointed day for some reason, it became difficult for the researcher, so the time needed for this research was prolonged.

### **Conclusion**

The SIMON Comic with a Papua emic approach was used to improve students' knowledge about breakfast and vegetable consumption. No difference was shown in attitudes and behavior before and after the intervention. IEC implementation

needs systematic and continuous communication over a long period of time to make a lasting change in student behavior. Therefore, health education for elementary students using comics should be implemented in the school curriculum to encourage altering the habits and behaviors of students in the long term.

**Authors' Contributions:** Conception and design: SAL and RNS; Acquisition, analysis and interpretation of data: SAL, AEY, and TS; Drafting the article: SAL; Revising the article critically for intellectual content: RNS, IRN, and AEY; Approved final version of the manuscript: SAL, and RNS.

**Acknowledge:** The authors express their thanks and appreciation to all lecturers and staff of Department of Nutrition, Health Polytechnic of the Health Ministry, Jayapura, for their guidance and support. The authors also express their thanks and appreciation to all respondents in this study.

**Conflict of Interest:** The authors declare that they have no conflict of interest.

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