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The Effect of Nutrition Literacy on Food Labels through Audio Visual Media on the Behavior of Students at SMA Negeri 4 Kendari in Choosing Packaged Foods

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ABSTRACT

Background: Packaged food is a very popular food among teenagers because it is part of teenage socialization. Teenage consumers generally choose food according to taste without paying attention to nutritional content. The ability to understand labels on food products is expected to increase teenagers awareness of being more selective in choosing packaged foods. Increased understanding is achieved through nutrition education in an effort to improve food label reading behavior. Audio-visual learning media was chosen because it is able to activate the senses of sight and hearing, thus helping to increase focus in learning.
Objectives: The purpose of this study was to determine the effect of food label literacy nutrition education through audiovisuals on the behavior of high school students of SMA Negeri 4 Kendari in choosing packaged food.
Method: This research used a pre-experimental method with one group pretest-posttest, which involved 93 students of classes X and XI in SMA Negeri 4 Kendari. Samples were selected using proportional random sampling. Data analysis in this study was carried out with the McNemar test at the α=0.05 significance level. The event took place at SMA Negeri 4 Kendari using audiovisual media. A validated questionnaire instrument was used to measure food labeling behavior before and after the intervention.
Results: Based on the research, it was found that all respondents had sufficient knowledge (100%), good attitudes (100%), and good actions (100%). Thus, there is an effect of food label literacy nutrition education through audiovisual on knowledge (ρ=0.000), attitudes (ρ=0.000), and actions (ρ=0.000) in choosing packaged food at SMA Negeri 4 Kendari students.
Conclusion: Thus, food label literacy nutrition education through audio visuals can significantly affect knowledge, attitudes, and actions about food labels in choosing packaged foods.

Keywords: Audiovisual Aids, Behavior Change, Food Labeling, Health Education, Students

INTRODUCTION

The development of technology, economy, and culture has led to changes in people's consumption patterns, including an increasing dependence on packaged foods, which are considered practical, easily accessible, and affordable. Among teenagers, packaged snacks have become part of social trends and lifestyle, even though these products often contain high amounts of sugar, salt, fat, and food additives such as coloring, preservatives, and MSG (Masri, Nasution, & Ahriyasna, 2022). The urgency of this issue lies in the fact that many adolescents consume these foods without considering their nutritional value, which may lead to long-term health consequences.

Excessive consumption of these substances can increase the risk of Non-Communicable Diseases (NCDs) such as cancer, obesity, diabetes mellitus, and stroke. According to data from the Central Statistics Agency (BPS), 7 million out of 8.1 million deaths in Indonesia between 2017–2022 were caused by NCDs. One of the major risk factors is unhealthy eating habits, especially excessive

intake of sugar, salt, and fat beyond the daily recommended limits (Santika, 2023). The seriousness of this problem is further emphasized by the 2023 Indonesian Health Survey, which reports that among youth aged 15–19 years, 58.5% consumed sweet foods 1–6 times per week, 52.4% consumed salty foods, and 52.4% consumed fatty foods at the same frequency (BKPK, 2023).

Meanwhile, consumer awareness of food labeling in Indonesia remains low. Many believe that as long as the food is edible, there is no need to consider nutritional content or additives such as sugar, salt, preservatives, or dyes. A study by the National Consumer Protection Agency (BPKN, 2007) revealed that only 6.7% of consumers paid attention to food labels when purchasing packaged products. Furthermore, the National Agency of Drug and Food Control (BPOM) in 2015 found that only 25.3% of the population regularly checked food composition, 37.1% did so occasionally, 34.5% rarely checked, and 3.1% never checked at all (Widiawati & Komalasari, 2020).

Teenagers are among the most vulnerable groups, frequently influenced by food trends without assessing nutritional quality. Most of them prefer flavorful foods and ignore product labels (Septilia & FD, 2024). Research conducted in high schools in Bogor and vocational schools like SMK Wijaya Kusuma showed that only 61.2% and 68.7% of students, respectively, read food labels before purchasing packaged food (Susanto, 2019; Badriyah, 2019).

The growth potential of this issue will likely increase without effective intervention through education. One strategy to promote behavioral change in adolescents regarding food label literacy is nutrition education. Effective delivery of educational content requires engaging media. Audio-visual media has proven to be effective in learning as it stimulate both visual and auditory senses, enhances attention, and helps students better understand material through dynamic sound and visuals (Faujiah et al., 2022). Therefore, this study aims to analyze the effect of nutrition education on food label literacy using audio-visual media on the behavior of students at SMA Negeri 4 Kendari in choosing packaged foods.

METHODS

This study used a Pre-Experimental with one-group pretest-posttest design. Conducted on students of SMA Negeri 4 Kendari in January 2025. The research was conducted at SMA Negeri 4 Kendari because it is considered a strategic location for data collection. The school is located in the city center and holds an “Excellent” accreditation, which indicates that students have better access to a variety of packaged foods, both within and outside the school environment. Preliminary interviews with several students revealed that many of them do not read food labels due to a lack of knowledge and awareness regarding food label literacy. In addition, students tend to choose food based on taste preferences rather than nutritional considerations, and they often find it difficult to interpret the text and symbols presented on food labels. The population in this study was X and XI grade students, totaling 1192 students aged 16-18 years. The research was conducted by sampling using a proportional random sampling technique. The sample was determined based on the number of classes, and the selection was carried out using a random lottery method (draw system). The sample in this study was 93 respondents, which was determined using the Slovin formula. This research was conducted with Ethical Approval Number: 135a/Un29.20.1.2/PG/2025.

The research was conducted in two stages. In the initial stage of the research, the creation of nutrition education media using audio-visual media with the core of the material content, namely, food labels. The content of the material is the definition of labels and the benefits of food labels, the impact of not reading food labels, mandatory information on food labels, nutritional value information, healthy choice logos, and consumption recommendations for sugar, salt, and fat. In addition, education was provided using the lecture method related to the Recommended Nutritional Adequacy (RDA) for adolescents aged 15-18 years, reading and calculating the content of nutritional value information, and practicing reading food labels using real packaged food. The study was conducted for a week, in the first week, filling out the pretest to determine the initial competence of the subject, then providing nutrition education through audiovisual (video). During the week, observations were made regarding the consumption of packaged food through filling out Google Forms. In the second week, a post-test was conducted to determine the subject's competence as well as mastery of the material provided and the practice of reading food labels.

In the second stage of the study, data collection and analysis were carried out. Data were collected directly by the researcher using a closed-ended paper-based questionnaire consisting of Likert and Guttman scale items. The questionnaire included 16 items on knowledge, 10 items on attitude, and 16 items on behavior. The instrument was developed by combining self-developed questions with items adapted from previous studies (Ikrima et al., 2023; Maulida, 2019; Osman, 2022). Validity and reliability tests were conducted on 30 respondents from SMAN 2 Kendari, who shared similar characteristics with the target research population. The results confirmed that all questionnaire items were valid and reliable. Data were analyzed using SPSS software with the McNemar test at a significance level of $\alpha<0.05$. The study used objective criteria to avoid misinterpretation. For the

knowledge variable, there were 16 questions categorized as "simply" if the respondents' score was ≥8 and "less" if the score was <8. For the attitude variable, there were 10 questions categorized as "good" if the respondents' score was ≥25 and "bad" if the score was <25. Meanwhile, for the practice variable, there were 16 questions categorized as "good" if the respondents' score was ≥8 and "bad" if the score was <8.

Figure 1. Audiovisuals Food Labels

RESULTS AND DISCUSSION

A. Characteristics of Respondents

Characteristics of respondents, including gender, age, and class. Gender refers to the biological difference between females and males from birth. Age is the number of years from birth to the present. Class refers to the place where teaching and learning activities take place. The distribution of respondents is presented in the following table.

Table 1. Distribution of Respondents' Characteristics Based on Gender, Age, and Grade in Students of SMA Negeri 4 Kendari.

Characteristics of Respondents	Number (n)	Percentage (%)
Gender		
Male	34	36.6
Female	59	63.4
Age		
15	39	41.9
16	36	38.7
17	18	19.4
Class		
X	46	49.5
XI	47	50.5

In Table 1. The results showed that in gender, there were 34 male students (36.6%) and 59 female students (63.4%). The majority of respondents' age was at age of 15 years, with a total of 39 students (41.9%), age 16 years, as many as 36 students (38.7%), and age 17 years, as many as 18 students (19.4%). Based on class distribution, there were 46 students in class X (49.5%) and 47 students in class XI (50.5%).

B. Univariate Analysis

Univariate analysis is the first stage of presentation that provides an overview of the distribution of respondents from the variables studied, namely knowledge, attitudes, and actions towards food label literacy. Knowledge about food labels in this study was based on 16 questions related to the understanding of food labels, the benefits of food labels, food label information, nutritional information labels, and nutritional information descriptions. Attitudes toward food labels in this study are based on 10 questions consisting of decisions to purchase packaged food and assessments of health. Actions toward food labels in this study are based on 16 questions regarding reading food label information, purchasing decisions, and reading nutritional information. The results obtained in this study are as follows:

Table 2. Knowledge Category Distribution

Category	Pre-Test		Post-Test	
	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)
Simply	54	58.1	93	100
Less	39	41.9	0	0
Total	**93**	**100**	**93**	**100**

Table 2 shows that the results of the pre-test knowledge level of 93 people, with a categories of 54 people (58.1%) and one category of less as many as 39 people (41.9%). Then in the post-test, 93 people (100%) we found to be in the simple category. Thus, it can be seen that all respondents experienced changes in their knowledge of food labeling.

Table 3. Distribution of Attitude Categories

Category	Pre-Test		Post-Test	
	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)
Good	35	37.6	93	100
Bad	58	62.4	0	0
Total	**93**	**100**	**93**	**100**

Table 3 shows that the pre-test result of the attitude level of 93 people, with a good category of 35 people (37.6%) and a bad category of 58 people (62.4%). Then, in the post-test, 93 people were obtained in the good category. Thus, it can be seen that all respondents experienced changes in attitude towards food labeling.

Table 4. Distribution of Action Categories

Category	Pre-Test		Post-Test	
	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)
Good	42	45.2	93	100
Bad	51	54.8	0	0
Total	**93**	**100**	**93**	**100**

Table 4 shows that the pre-test results of the action level of 93 people, with a good category of 42 people (45.2%) and a bad category of 51 people (54.8%). Then in the post-test, 93 people (100%) were obtained in the good category. Thus, it can be seen that all respondents experienced changes in attitude towards food labeling.

C. Bivariate Analysis

Bivariate analysis was conducted to examine the influence of knowledge, attitudes, and behavior on the selection of packaged foods. The analysis technique used was nonparametric, namely the McNemar test with interpretation. If the $\rho<0.05$, then the hypothesis was accepted or audio-visual media was more influential in increasing knowledge, attitudes, and actions towards the selection of packaged foods among students at Kendari 4 Public High School. If $\rho>0.05$, the hypothesis is rejected, meaning that audiovisual media does not influence the improvement of knowledge, attitudes, and behaviors toward the selection of packaged foods among students at Kendari State High School 4.

Table 5. McNemar Test Results of Respondents' Food Label Knowledge at SMA Negeri 4 Kendari

Pre-Test	Post-Test		Total	ρ
	Simply	Less		
Simply	54	0	54	0.000
Less	39	0	39	
Total	**93**	**0**	**93**	

Table 5 shows that before being given nutrition education using audiovisuals, there were 54 respondents with a level of knowledge in the sufficient category and 39 respondents in the insufficient category. After being given nutrition education through audiovisuals, there was an increase in knowledge in respondents who were previously in the insufficient category, so that all respondents reached knowledge in the sufficient category. This is characterized by no decrease in knowledge score after intervention. Thus, it is concluded that there is a significant difference in knowledge about food labels before and after being given nutrition education through audiovisuals. Furthermore, the results of the McNemar test with a significance of $\rho=0.000$ ($\rho<0.05$) show that H0 is rejected and H1 is accepted, so there is an effect of food label literacy nutrition education through audio visuals on knowledge in choosing packaged food at SMA Negeri 4 Kendari students.

Knowledge is obtained through a cognitive process, where a person must first understand or recognize a science in order to know this knowledge. A person's knowledge about an object contains two aspects, namely positive aspects and negative aspects. These two aspects will contribute to determining a person's attitude, which, if more positive aspects and objects are known, will have an impact on the emergence of a positive attitude towards a particular object (Darsini, Fahrurrozi and Cahyono, 2019). This increase in knowledge is obtained through stimuli or stimuli that affect the brain. The brain has a crucial sensory role that functions to receive stimuli from outside the body to be conveyed to the brain. The role of the senses in the formation of knowledge is very important because it is through sensory experience (Hanifah, Bayu and Majid, 2024). This research utilizes audio-visual media, where students' absorption and memory of learning material increases significantly

if the initial information is obtained more through the senses of hearing and vision. In addition, audio-visual media have advantages such as sound, color, and movement that can stimulate student learning and help in acquiring knowledge, forming attitudes, and skills (Serungke *et al.*, 2023).

This study shows that there is an influence on students' knowledge about food labels, where there is an increase in pre-test to post-test scores. This is because students pay close attention to the content of food label videos and nutrition education that has been carried out, so that it brings significant changes in knowledge in students after intervention. This audio-visual media helps respondents understand the content or concepts of the video in an easier way. Using animation in the picture can help visualize the content of the video to be simpler, so that respondents can understand the video material better. The use of this animation makes respondents interested and focused on paying attention to the video. Animation has visual and audio appeal, and with the right use of animation, difficult learning material can be conveyed in a way that is more easily understood by students (Melati *et al.*, 2023). Furthermore, the use of simple language and repetitive video playback in the food labeling video can increase students' knowledge after the intervention.

This study is in line with Dewi Candra Puspitasari (2023), showing a statistically obtained sig value of 0.000<0.005. It is known that there is a significant effect of health education on balanced nutrition through video media on the knowledge of adolescent girls in Demakan Village, Mojlaban District, Sukoharjo Regency. Based on the research, changes in knowledge occurred as a result of health education provided through video. Video media is able to convey messages by displaying moving images, text, and voice explanations related to the images displayed. This makes health education through video media more interesting and the learning process more varied, interactive, and enjoyable. It was found that changes in knowledge were the result of health education through video.

The utilization of technology as a means of learning through audio-visual media that involves the senses of sight and hearing can effectively improve students understanding and knowledge in the short term. In addition, the use of this media is also able to increase engagement, which makes students more active and enthusiastic in the learning process (Rayhan, 2023). The existence of food labeling knowledge can encourage increased use of food labeling. This knowledge can help consumers pay attention to information related to food and food ingredients. In addition, knowledge about nutrition can also strengthen memories about food labels and support the absorption of information that is remembered when choosing packaged food products. Knowledge of food labels is one of the efforts to form a behavioral action to read food labels, so that increasing knowledge becomes an alternative to behavior change in these consumers (Bella, Majid and Prasetya, 2023).

Table 6. Results of the McNemar Test of Respondents' Food Labeling Attitude at SMA Negeri 4 Kendari

Pre-Test	Post-Test		Total	ρ
	Good	Bad		
Good	35	0	35	0.000
Bad	58	0	58	
Total	**93**	**0**	**93**	

Table 6 shows that the respondents' attitudes on food labeling in the good category were 35, and attitudes in the bad category were 58, before being given nutrition education using audiovisuals. After being given nutrition education through audiovisuals, it shows that all students have an attitude in the good category, which is characterized by no decrease in attitude scores. So it can be concluded that there is a significant difference between the attitude of food labels before and after being given nutrition education using audiovisual media. Furthermore, the results of the McNemar test with a significance of ρ=0.000 (ρ<0.05) show that H0 is rejected and H1 is accepted, so there is an effect of food label literacy nutrition education through audio visuals on attitudes in choosing packaged food in high school students, Negeri 4 Kendari.

Attitude can be understood as a condition within a person that encourages them to act or react to various objects or situations in their social environment. Attitude reflects the readiness of individuals to respond to an object or situation, either positively or negatively (Dwijayanti and Juliani, 2024). This study shows that there is an influence on attitudes about food labeling, which has increased from pre-test to post-test scores. The change in attitude is associated with the provision of nutrition education through audio-visual media that carries a suggestive message that reading food labels is important for the health of the body and must be done before deciding to buy packaged food products. The reason for using this media is that the information to be conveyed can be simplified through visuals and sound, so that the information can be more easily remembered and more easily stored in long-term memory. Audio-visual media can also foster interest and accelerate the process of understanding, with good understanding making it possible to make wiser and more responsible

decisions (Tewika Halawa, 2023). In addition, the method of education through lectures and combined with exercises in reading food label information and nutritional value information using real packaged food examples. This activity creates a two-way communication that is conducted face-to-face, allowing researchers to directly observe the responses of research subjects and find out whether or not they understand the activity. The good response from respondents can be interpreted that education with a combination of practice is effective in influencing attitudes because it provides direct experience that strengthens respondents' understanding and involvement.

This practical activity serves to train students' ability and compliance in reading food labels on packaged foods. Compliance increases when a person perceives benefits, which means that respondents who have an interest in the health and nutrition of the product will have the opportunity to comply with reading food labels. The existence of this practice can generate students' interest in always reading food labels before deciding to buy packaged food products (Athennia and Nurdini, 2024).

The results of this study are in line with research conducted by (Herviana *et al.*, 2024), showing that the majority of respondents have a positive or good attitude (63.8%) regarding attitudes towards health and food product labeling. Based on the results of his research, the increase in attitude is based on the ease with which a person receives information. Good information absorption will affect a person's attitude in responding to a stimulus. Attitude will build a person's readiness to act, so that a good attitude will also build good compliance in reading food labels. This means that a good attitude towards food labels will increase food label reading behavior.

Table 7. Results of the McNemar Test of Respondents Food Labeling Measures in SMA Negeri 4 Kendari

Pre-Test	Post-Test		Total	ρ
	Good	Bad		
Good	42	0	42	0.000
Bad	51	0	51	
Total	93	0	93	

Table 7 shows that the respondents actions on food labels in the good category were 42, and actions in the bad category were 51, before being given nutrition education using audiovisuals. After being given nutrition education through audiovisuals, it shows that all students have actions in the good category, which is characterized by no decrease in action scores. So it can be concluded that there is a significant difference between food labeling actions before and after being given nutrition education using audiovisual media. Furthermore, the results of the McNemar test with a significance of $\rho=0.000$ ($\rho<0.05$) show that H0 is accepted and H1 is rejected, so there is an effect of nutrition education on food labeling literacy through audio visuals on actions in choosing packaged food at SMA Negeri 4 Kendari students.

An action will be formed through exposure to information, which then builds confidence to behave. This belief comes from acceptance and understanding of behavior, both positive and negative. Implementing good health behaviors can help reduce the risk of disease and maintain a healthy lifestyle. Information that is accurate, relevant, easy to understand, and delivered in the right way can encourage recipients of this information to change their behavior (Aulia, Arifin and Hayatie, 2019).

Based on the results of the study that there is an influence on student action, which has increased pre-test to post-test scores. This research shows that audio-visual media affects action because it combines visual and auditory stimuli so that information can be more easily received and processed. Information or messages that have been conveyed through audiovisual media become a source to remember and familiarize themselves with the behavior of reading food labels. Education with a combination of lecture and practical methods can provide direct experience so as to encourage adoption of appropriate actions based on this information and experience, so it can be concluded that this method is effective in changing poor actions regarding food labels in respondents to good actions after the intervention.

The results obtained after the intervention, through observations for a week using a Google form that most respondents have read food labels and nutritional value information before buying packaged food products. One of the success factors of reading food labels is the influence of peers or groups. In interviews conducted after the intervention, most of them answered that the influence of peers or groups tends to remind them to read food labels before buying packaged food. In the results of research by (Novitamanda, Prayitno and Nurdianty, 2020), subjects who have been exposed to information about food labels always read food labels, while subjects who have never been exposed to information about food labels have less knowledge. Information exposure makes a person have the desire to read food labels. To improve the habit of reading food labels, exposure to the importance of reading food labels is needed.

The strength of this study lies in the use of nutrition label literacy education through audio-visual media, which provides practical skills that

students can directly apply when selecting packaged food products in their daily lives. However, a limitation of the study is that it was conducted in only one school with a total of 93 respondents, which may not be sufficient to represent the broader population accurately.

CONCLUSION

This study found that the provision of nutrition education on food label literacy through audiovisuals can have a significant effect on increasing participants' knowledge, attitudes, and actions. Educational media, in this case audiovisual in the form of animated videos, showed a good level of acceptance and interest. Gradual and continuous activities related to nutrition education on food label literacy through audiovisuals are needed. The aim of this approach is to encourage positive behavior change in reading food labels when deciding to buy packaged food. It is recommended that future researchers continue this study in greater depth regarding food label reading behavior, as well as increase the sample size, expand the number of variables, and modify the nutrition education learning media.

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Conflict of Interest and Funding Disclosure

None.

Author Contributions

RPD: conceptualization, investigation, methodology, writing–original draft, formal analysis, data curation, resources; LS methodology, conceptualization, writing–review and editing; SS: methodology, conceptualization, writing–review and editing

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