



## The Correlation of Nutrition Knowledge and Nutrition Label Use Among Adolescents in Semarang City, Indonesia

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### Article Info

#### Article History:

Submitted 03 December 2022

Accepted 11 April 2024

Published 29 Juli 2024

#### Keywords:

Nutrition Knowledge;  
Nutrition Behavior; Nutrition Label; Food; Beverage

#### DOI

<https://doi.org/10.15294/jhe.v9i1.10013>

### Abstract

**Background:** Nutrition label is part of public health nutrition intervention, but it seldom studied in Indonesia. It is essential to measure the relationship between nutrition labels and nutrition knowledge to understand its impact, especially among adolescents. Peers and social life encourage adolescents to choose specific actions, including food and drink, which affects their nutrition status. **Methods:** This study used a cross-sectional design on 404 respondents in Semarang City. The instrument used was the Comprehensive General Nutrition and Nutrition Label Questionnaire (CGN2LQ). Data analysis includes univariate analysis and bivariate analysis. The statistical test used is the correlation test to determine the correlation between nutrition knowledge and nutrition label use for adolescents in Semarang City. The analysis showed a significant relationship between nutrition knowledge and nutrition label use ( $p < 0.05$ ).

**Results:** The direction of the correlation is positive or unidirectional, meaning that the higher the nutrition knowledge of adolescents, the higher the use of nutrition labels on packaged products. The test results showed that the strength of the correlation was weak ( $r = 0.333$ ). The significant correlation but weak strength means that the correlation was statistically significant but not practically relevant.

**Conclusions:** There is a need to increase the knowledge of nutrition in the adolescent age group to improve the habit of using nutrition labels on packaged products to determine the choice of packaged food and beverage consumed.

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## INTRODUCTION

According to the World Health Organization (WHO), adolescents are a population aged 10-19. Adolescence is the transitional age from childhood to adulthood. Adolescents are considered capable of making decisions in life compared to when they were children. Adolescents should get guidance and improve their health, continue life, and optimize physical and mental development. Peers and social life encourage adolescents to choose specific actions, including food and drink, which significantly affects their nutritional status (Ragelienė & Grønhøj, 2020).

Consuming packaged food and drinks among adolescents is also influenced by the excessive promotion/advertising of food and beverage products through the mass media. Adolescents are easily attracted to something new and can decide to buy food on their own. This curiousness makes food and beverage products promoted by big corporations affect adolescents' food choices in a way or another (Jefrydin et al., 2019). Moreover, if a product is promoted with advertising stars who become adolescents' idols, then adolescents will become active consumers of these products without paying attention to their nutritional content. Even though it is possible that the packaged food or drink consumed by adolescents is not as needed, too low, or even too excessive because of the excessive nutritional content in each package or due to frequent consumption (Andrias, 2016).

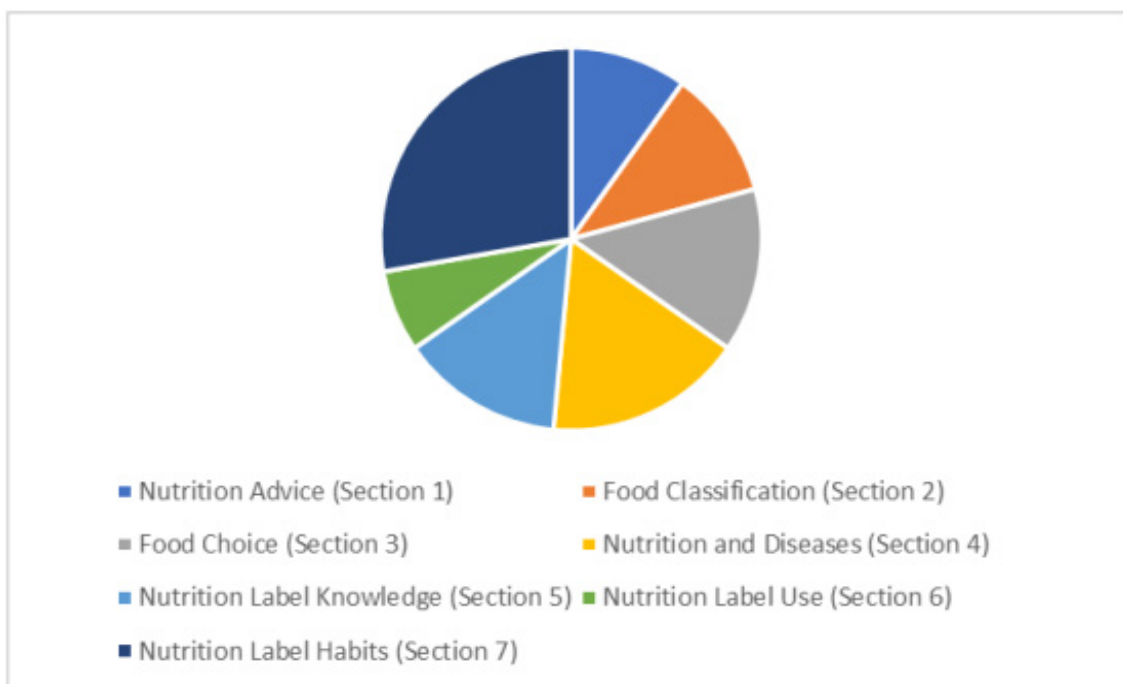
The results of the 2015 National School-Based Health Risk Behaviors Survey among Junior High and High School Students in Indonesia show that the percentage of the habit of consuming soft drinks once a day or every day in the last 30 days is 18.5%, where the percentage

is higher in male students (19.4%) than female students (17.6%), but the difference is not significant (Karuniawati, 2015). The prevalence of adolescents' central obesity in Indonesia was mainly in urban areas, which is 4,8% (CI= 4,4-5,2) compared to rural areas, which are only 3,1% (CI= 2,8-3,4) (Balitbangkes, 2018). One of the urban areas in the province of Central Java is Semarang City which has better access to information. This research aimed to find the correlation between nutrition knowledge and nutrition label use of adolescents in Semarang, Central Java, Indonesia.

## METHODS

This research was a quantitative observational study using a cross-sectional study design. The quantitative method in this study was using analytical research by analyzing the correlation between nutrition knowledge and nutrition label use. The independent variable in this study was nutrition knowledge, and the dependent variable was the use of nutrition labels use in adolescents. The confounding variable in this study is the level of education of adolescents, so in this study, we limit the participant to those high school and university students, especially those in newcomers and sophomore years (Talati, 2019).

The questionnaire used in this research were the Comprehensive General Nutrition and Nutrition Label Questionnaire (CGN2LQ). This questionnaire made by researcher in Universitas Negeri Semarang to closely monitor the knowledge about nutrition and nutrition label respectively (Prameswari et al., 2020). The questionnaire consists of 7 sections, with the composition of each section of the questionnaire can be seen on the Graph 1.



Note. Section 1 (10%); Section 2 (11%); Section 3 (14%); Section 4 (17%); Section 5 (14%); Section 6 (7%); Section 7 (28%)

Figure 1. Composition of the Comprehensive General Nutrition & Nutrition Label Questionnaire (CGN2LQ)

The Section 1: Nutrition Advice was mainly focusing to get about what the respondent knows about the current expert dietary recommendation are. The Section 2: Food Classification was aiming to understand whether they know the foods which provide nutrient recommended. The Section 3: Food Choice was trying to know their ability to identify the healthiest food from the different choices given. The Section 4: Nutrition and Diseases, was focusing on the knowledge about health implication of eating or failing to eat some particular food. The Section 5: Nutrition Label Knowledge was questioning their understanding about food and nutrition label from the basic to intermediate knowledge. The Section 6: Nutrition Label Use was assessing their use of nutrition label, whether it is only to know or further, to choose the healthier option. The Section 7: Nutrition Label Habits was detailed questions about the habits of using nutrition label. This section specifically asks the habits of using each part of the nutrition label and also their trust to the health claims on the label.

The population in this study were all adolescents aged 10-19 years in the city of

Semarang, Central Java Province, Indonesia. Based on 2018 data from the Central Statistics Agency (Badan Pusat Statistik/ BPS), the population of Semarang City aged 10-19 years is 287,386 people. The number of samples using the Slovin formula in this study was 403 samples of adolescents (Badan Pusat Statistik Kota Semarang, 2020). Those samples of adolescents taken from 16 districts in the city of Semarang.

The data collection was carried out online by distributing questionnaires via a google form, which were sent online through WhatsApp (WA) and emailed to several high schools and universities from July to September 2020. Adolescents who met the inclusion criteria then submit the questionnaires by themselves. The researcher used this technique to adhere to the COVID-19 protocol in Indonesia. The instrument used in this study was a specially developed questionnaire, the Comprehensive General Nutrition and Nutrition Label Questionnaire (CGN2LQ), which was a modified version of the General Nutrition Knowledge Questionnaire (GNKQ) (Kliemann et al., 2016; Parmenter & Wardle, 1999). The CGN2LQ questionnaire used the Indonesian language to measure nutrition knowledge in

adolescents and nutrition labels on food and beverage packaging products. The CGN2LQ score was counted by adding score for every question, divided by the maximum scores, and then multiplied by 100. The researchers carried out the validity and reliability study of the CGN2LQ before this study. The validity test was carried out using the Spearman Rank correlation statistical approach ( $r= 0.2494$ ), while the reliability test used Cronbach's alpha ( $\alpha=0.815$ ). The study concluded that the CGN2LQ questionnaire was proven valid and reliable (Prameswari et al., 2020).

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Written informed consent was obtained from the participants to ensure privacy. The questionnaires were self-administered and data were collected anonymously. The study was approved by the Universitas Negeri Semarang Health Research Ethics Committee (093/KEPK/EC/2020).

## RESULTS AND DISCUSSIONS

### Numerical Results

Data from the CGN2LQ then sorted and cleaned by the researcher. The valid subjects in this study were 403 adolescents. Table 2 shows the characteristics of the research subjects.

**Table 1.** Subject Characteristics

<i>Characteristics</i>	<i>N</i>	<i>%</i>
Age		
Early Adolescents	99	24.6
Adolescents	304	75.4
Total	403	100.0
Sex		
Male	117	29.0
Female	286	71.0
Total	403	100.0
Education		
High School	276	68.5
University	127	31.5
Total	403	100.0

**Table 2.** Correlation of Nutrition Knowledge and Nutrition label Use

	<i>Median</i>	<i>M</i>	<i>SD</i>	<i>Normality Test</i>	<i>p</i>	<i>r</i>
<i>Nutrition Knowledge Score</i>	70	68.1	13.0	0.001	0.001	0.333
<i>Nutrition Label Use Score</i>	61	60.8	13.7	0.055		

The mean age of the subjects was 17 years, the youngest subjects were 13 years old, and the oldest subjects were 19 years old. The research subjects were 403 adolescents, 117 boys (29.0%) and 286 girls (71.0%). This study consisted of 276 high school students (68.5%) and 127 college students (31.5%) in Semarang City, with the majority of them live in rural area.

The average score of nutrition knowledge was 68.1 with a standard deviation of 13.0, and the lowest score was 23.0, the median 70.0, and the highest score 96.0. The average score of nutrition label use was 60.8 with a standard deviation of 13.7, the lowest score was 26.0, the median was 61.0, and the highest score was 99.0.

The correlation test results in table 3 showed a significant correlation ( $p=0.001<0.05$ ) between nutrition knowledge and nutrition label use score. The direction of the correlation is positive or unidirectional, meaning that the higher the nutrition knowledge of adolescents, the higher the use of nutrition labels on packaged products. The test results showed that the strength of the correlation was 0.333, meaning that the strength of the correlation was weak.

Adolescents are an age group that is experiencing a transition from childhood to adulthood. This study has several female respondents reaching 70%. This study is in line with research that has been done that woman are more concerned about reading food labels in addition to knowledge because women have more positive attitudes towards diet and health. The changes that occur include social, cognitive, and knowledge changes (Sogari, 2018). These changes include how they perceive themselves so that it will affect food choices and food intake. Adolescents are considered capable of making decisions in life compared to when they were children (Zainol, 2019). Peers and social life encourage adolescents to choose specific actions, including in the choice of food and drink they consume, which significantly affects their nutritional status. Adolescent also tend to gather and try new things, including foods and beverages (Chen, 2020).

Nutrition knowledge is the understanding of food concerning optimal health. Nutrition knowledge includes the proper selection

and daily consumption and provides all the nutrients needed for normal body function. Nutrition knowledge has an essential role in determining a person's nutritional status. Good nutrition knowledge can make a person more careful to have the type of food consumed better (Choiriyah, 2022). Research in Nanjing, China shows that many factors influence a person's use of food nutrition labels. These factors include cognitive level, perception of health, knowledge of nutrition, and personal characteristics (Nieto C et al, 2020). The use of nutrition labels can encourage a person to adopt a balanced diet, reduce the prevalence of chronic diseases and improve public health (Kearney, 2010).

Some of the factors causing adolescent nutritional problems are the excessive preference for certain foods, including packaged foods and drinks. The layout of the labels given on the front of pack (FOP) or on the back of pack (BOP) greatly influences how consumers understand labeling. FOP or BOP is not merely a matter of aesthetics but more about health literacy, literacy, numeracy and making it easier for consumers to understand nutrition labeling. Today's adolescents prefer food and drinks that are practical and hassle-free, so one of the choices for adolescent consumption habits is packaged food and beverage products that are very easy to get by adolescents. Consuming inappropriate food and drinks can start with bad family eating habits that have been embedded since childhood and will continue to occur in adolescence. Adolescents tend to consume food or drinks without knowing their nutritional content and the impact on their health. Including in consuming packaged food and drinks, adolescents tend not to pay attention or not read the nutrition labels listed on the packaging (Bae, 2014). Consuming packaged food and drinks among adolescents is also influenced by the excessive promotion/ advertising of food and beverage products through the mass media. Adolescence is an age where they are very easily attracted to something new. Adolescents also have better physical and economic access skills than when they were children. This condition makes them easily exploited by the food and beverage industry by promoting food and beverage products to affect adolescents significantly (Vemula et al., 2014).



Product promoted by the popular young idol will make adolescents become active consumers of these products without paying attention to their nutritional content (Mohammed MS, 2018). There is a possibility that the packaged food or drink consumed by adolescents is containing excessive calories per package or due to frequent consumption. The nutrition label is an obligation imposed on the producer to provide nutritional product information on the packaging. The most read component of the nutrition label is the label on fat information, while the minor read is sodium (Miller et al., 2017). Several studies have shown that there is a link between the use of nutrition labels and food choices. Some report that the presence of nutrition labels triggers people to choose low-fat food intake, reduce consumption of fried food and increase fiber intake (Veronika, 2021). Research in Kenya shows that only 1/3 of Kenya's food products have information about sodium content. Government intervention including instructions related to nutrition labeling accompanied by monitoring of food supply is very necessary (Sudahono & Indrawani, 2014).

This study shows a correlation between nutrition knowledge and nutrition label use. The level of nutrition knowledge is related to the habit of reading nutrition labels on food and beverage packaging products. The behaviour of reading nutrition labels is related to the level of nutrition knowledge (Khan et al., 2020). Research shows that this nutrition label also acts as a guide to avoid various diseases and even adolescents use nutrition labels to support weight loss programs, choose healthier foods and avoid fast food. People who have good nutrition knowledge tend to read nutrition labels more often to determine the choices of packaged foods and drinks they consume (Mandle et al., 2015). Too much information on nutrition labels can hinder consumer understanding. When there is enough information, understanding and use will be better (Nørgaard & Brunsø, 2009). Good nutrition knowledge will make people read and pay attention to nutrition labels to affect the choice of food products purchased (Brunner et al., 2010; Kakinami et al., 2016).

## CONCLUSION

The correlation test results showed ( $p=0.001$ ), meaning a significant correlation between nutrition knowledge score and nutrition label use score. The direction of the correlation is positive or unidirectional, meaning that the higher the nutrition knowledge of adolescents, the higher the use of nutrition labels on packaged products. The value of correlation strength shows ( $r=0.333$ ), which means that the strength of the correlation is weak. It means that the correlation was statistically significant but not practically relevant. The advice given based on the results of this study is that there is a need to increase the knowledge of nutrition in the adolescent age group to improve the habit of using nutrition labels on packaged products to determine the choice of packaged food and beverage consumed.

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