

RESEARCH STUDY

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Nutrition Fact Literacy in Productive Age Communities in Semarang City, Indonesia

Literasi Informasi Nilai Gizi Pada Masyarakat Usia Produktif di Kota Semarang, Indonesia

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ABSTRACT

Background: Lack of attention to reading nutritional value information labels on packaged food can harm one's health, such as an increased risk of obesity and degenerative diseases. The results of a study by the National Consumer Protection Agency stated that only 6.7% of consumers in Indonesia paid attention to nutritional value information labels.

Objectives: This study aims to determine the relationship between demographic characteristics and nutritional value information literacy.

Methods: This quantitative study with a cross-sectional design was conducted on Semarang City residents aged 15-65. The sample size used the Slovin formula so that a minimum sample size of 1,029 respondents was selected using multistage random sampling based on characteristics of educational level and social status. The relationship between nutrition fact literacy and demographic characteristics was used using the Chi-Square statistical test, and the relationship between nutrition fact literacy and body mass index using the Spearman Rank statistical test.

Results: The study showed that nutrition fact literacy was still problematic, 96.1%. Respondents have normal nutritional status, as much as 64.1%. Factors related to nutrition fact literacies were educational level ($p=0.039$, $OR=1.968$) and occupation ($p=0.002$, $OR=4.668$). Demographic variables unrelated are domicile, gender, marital status, and residence status. There is no relationship between nutrition fact literacy and nutritional status.

Conclusions: Respondents with low nutritional value information literacy live in rural areas, are married, live with their families, have a low level of education, and do work, not in the health sector.

INTRODUCTION

Understanding food product labels in Indonesia needs to be realized by the entire community. The Balanced Nutrition Guidelines (PGS) message states the importance of reading food labels. A good label will make it easier for consumers to choose the food products needed, educate the community, and provide added value to a product. Food labels represent prices, brands, and shelf life and unlock the nutritional facts behind processed foods¹.

The purpose of implementing food labels and providing information about food labels to consumers is also to educate them on the quality of the nutritional content of the products they buy. The application of food labels also makes people aware of the consequences of consuming these products on their health. This food label provision is part of the Health and Safety Regulation of the U.S. Food and Drug Administration (FDA), which applies to all food products². According to a study on American teenagers, about 75% of teenagers read food labels "always" or "sometimes," yet this has no bearing on their chosen foods. However, research including

people from the European Union (EU) produced different results. A quarter of respondents (27.0%) have examined their food labels, leading them to choose more healthful options. Although differing groups (adults vs. adolescents) may explain why these findings differ, labeling techniques may also be a factor. The secret to increasing treatment regimen adherence is having adequate health literacy³.

As briefly mentioned above, each packaged food item's Indonesian labels include serving size, calories per serving, nutritional data, and percent of daily value based on a 2,150 Kcal diet, and a footnote with the recommended daily value and a list of the ingredients. Indonesians who are compelled to adhere to dietary regimens must first be aware of their dietary recommendations based on their sex, age, and level of physical activity. Then, to comprehend and recalculate the information shown on the product label, kids must possess the necessary literacy and numeracy skills. Having the right portion size estimate abilities is vital to follow and accomplish nutritional goals. In order to construct a nutrition education program, it is crucial to

understand the relationship between food label use behaviors and health literacy.

Based on the Indonesian Food and Drug Administration's routine supervision of food product labels circulating in 2015, it was found that 21.24% of the 8,082 labels supervised did not meet the requirements. This figure decreased in 2016 to 13.6% of the total 7,036 supervised labels but increased in 2017 to 13.68% of the 8,603 labels examined⁴. This condition reflects that many manufacturers are unaware of the importance of meeting established regulations. Food that does not meet the provisions can impact consumer food safety guarantees^{5,6}.

Lack of attention to reading nutrition information labels on packaged foods can adversely affect a person's health. One of them is the increased risk of obesity. A person who has obesity can occur due to excessive consumption of sugar, fat, or energy contained in packaged foods⁷. The National Consumer Protection Agency study results stated that only 6.7% of consumers in Indonesia pay attention to nutrition information labels⁸. Previous studies have stated that the level of knowledge of students with normal nutritional status is better at reading nutrition information labels on packaged foods than those who are obese⁴. Another study said 61.4% of respondents were non-compliant in reading nutrition labels and food composition because it was considered unimportant⁹. Several studies have reported aspects of a person's adherence to reading food labels. Research by Devi et al. Showed a strong positive relationship between respondents' level of knowledge about packaged food labels and the practice of selecting packaged foods. Research on homemakers shows a link between knowledge of nutrition, attitudes toward health, and the ability to read food labels with adherence to reading nutrition information labels. Perception of product characteristics is also related to nutritional knowledge in homemakers in Pasar Basah Mandonga (Nurzakia et al., 2016)^{2,10}. Research from Asgha results in most consumers (55%) sometimes reading nutritional value information labels. They (53%) consider current nutrition information labels too scientific and difficult to understand. The results of the different tests were evident in the variables of age, education level, and monthly income against the use of nutritional value information labels. Older consumers, consumers with better education, and consumers with higher incomes tend to read and use nutrition value information labels¹¹. Based on this background, this research was conducted to determine the nutrition fact literacy of the people in Semarang City and then analyzed based on demographic characteristics and nutritional status.

METHODS

This observational study used a cross-sectional design. IRB approval from the relevant institutions and informed consent from the participants were obtained before the study. The population is Semarang City residents over 15-65 years old. The sample size used the Slovin formula; the total sample was 1,029 respondents. Sample techniques used multistage random sampling with classification based on education level and social status were done. This research was conducted in 2019 in

Semarang City. A Socioeconomic Variables Questionnaire was used to measure sociodemographics (SDQ). Additionally, a professional research nurse in an academic research interaction unit calculated the participants' body mass indices (BMI) based on their height and weight measurements. The National Institutes of Health's clinical guidelines on overweight and obesity were used to define overweight and obesity.

Participants' health literacy for understanding food labels was evaluated using the Newest Vital Sign. Six questions on an ice cream container are used to evaluate participants' prose literacy, numeracy skills, and document literacy. The question "How many calories will you eat if you eat the full container?" is an example of one of these things. Correct responses receive a 1, and incorrect ones receive a 0. The available range of scores on the NVS is 0-6, and each response score is added together for a final NVS score. It is recommended that scores be divided into problem-solving and enough knowledge of dietary information. The independent variable is categorized into two. Scores of 0-3 determined problematic nutrition facts literacy, and 4-6 determined sufficient nutrition facts literacy. The dependent variable in this study is the residence location, categorized into two: rural and urban areas. Rural areas if the respondent comes from Mijen, Gunungpati, Ngaliyan, and Genuk sub-districts. Marital status is categorized into two, namely married and not married. The residence status is categorized into two: living alone and living with family. Education level is categorized into low education level if the respondent graduated from elementary and junior high school and higher if the respondent graduated from high school and university. Types of work are categorized into two: working as health workers and non-health workers. Body mass index is categorized into undernutrition, normal, and overweight or more, including those with obesity nutritional status.

According to the Asian Health Literacy Survey Consortium, 1,029 respondents were interviewed by trained enumerators (AHLS). As academic representatives of the Asian Health Literacy Association, research partners founded the consortium in these invited nations. The consortium is in charge of organizing surveys and setting up guidelines for organizing and guaranteeing interview quality. Each respondent is asked to sign a consent form. The survey includes case study questions with illustrations of the nutritional value of ice cream items. This research was declared to have passed the ethics review from the Research Ethics Commission of Diponegoro University with No: 33/EC/FKM/2014.

Univariate data analysis using frequency distribution was obtained to explain the dependent variables of gender, marital status, residence status, education level, type of work, the current location of residence, and body mass index. Bivariate analysis was conducted to determine the relationship between the independent variables (gender, marital status, residence status, education level, type of work, the current location of residence, and body mass index) and dependent variables (Nutrition fact literacy). Bivariate data analysis using the Chi-Square test because the data scale is nominal, the data is said to have a significant relationship if the p-value is less than 0.05. The relationship's strength

was analyzed using the odds ratio and confidence interval value. The relationship between nutritional fact literacy and body mass index was analyzed using the Spearman Rank test.

RESULTS AND DISCUSSION

Demographic Characteristics and Body Mass Index

The study participants included 1,029 adolescents, 55.4% females and 44.6% males. The marital status of the respondents was married 50.3%, single 47.7%, divorced 0.3%, and widow/widower 1.7%. Most respondents live with a family, 51.7%, and live alone,

48.3%. The education level of the respondent majority was high school education 49.6%, Junior high school 18.5%, Bachelor's degree 18.5%, elementary school 7.6%, not passing elementary school 1.2%, Master's degree 3.7%, and doctorate 1.0%. The majority of the respondents majority were non-health professionals, 96.1%, and the health sector, 3.9%. Most respondents were domiciled in urban areas, 77.3%, and in rural areas 22.7%. The body mass index mainly was average weight 64.1%, overweight or more 18.6%, and underweight 17.3%; recent research suggests that low literacy or numeracy skills are linked to a poorer understanding of food labels, subpar performance of³.

Table 1. Sociodemographics characteristics of Semarang City residents over 15-65 years old

Variables	n	%
Gender		
Men	459	44.6
Women	570	55.4
Marital status		
Single	491	47.7
Married	518	50.3
Divorce	3	0.3
Widow/Widower	17	1.7
Housing		
Living alone	497	48.3
Living with family	532	51.7
Education		
Not passing elementary school	12	1.2
Elementary school	78	7.6
Junior high school	190	18.5
Senior high school	510	49.5
Bachelor degree	191	18.5
Master	38	3.7
Doctor	10	1.0
Occupational		
Health sector	41	3.9
Not in the health sector	988	96.1
Current location		
Urban area	795	77.3
Rural area	234	22.7
BMI		
Underweight	174	17.3
Normal weight	642	64.1
Overweight or more	186	18.6

Nutrition Fact Literacy

Based on Table 2. It is known that most respondents do not know about the safe dosage of ice cream (87.9%) and do not know the maximum amount of ice cream that can be consumed as dessert (98.6%). Of the respondents who answered that it was not safe to consume ice cream if they had allergies to the ingredients contained in ice cream, 17.4% were able to answer correctly because only 45.2%. In the present study, young

adults with low health literacy scores reported having poorer diet quality and were less likely to choose food items using food labels. In order to enhance nutritional quality in young adults with low health literacy, developing health literacy would, therefore, be a key objective. However, when people achieved a certain degree of health literacy, there was no discernible correlation between the use of food labels and dietary quality.¹²

Table 2. Distribution frequency of nutritional fact literacy of Semarang City residents over 15-65 years old

Questions	Results			
	True		False	
	n	%	n	%
- How much energy (kcal) do you consume if you eat all the ice cream in the container?	124	12.1	905	87.9
- If you are advised to eat no more than 60 grams of dessert carbohydrates, what is the maximum amount of ice cream you can eat?	14	1.4	1015	98.6
- Imagine your doctor advises you to reduce the amount of saturated fat in your diet. You typically eat 42 g of saturated fat daily, some of which comes from ice cream. If you stopped eating ice cream, how many grams of saturated fat would you eat daily?	173	16.8	856	83.2
- If you usually eat 2,500 kilo calories per day, what percentage of calories (kcal) do you eat if you eat a serving of ice cream?	186	18.1	843	81.9
- Imagine you are allergic to the following ingredients: penicillin, peanuts, rubber gloves, and bee stings. Are you safe to eat ice cream?	179	17.4	852	82.6
- Reasons not safe for consumption*	82	45.8	97	54.2

*) Select cases from those who answered unsafely

Table 3. Nutrition fact literacy of Semarang City residents over 15-65 years old respondent

Variables	n	%
Problematic	988	96.02
Sufficient	41	3.98

Based on the answers to the questions in Table 2, respondents are categorized as having sufficient nutrition fact literacy if they can answer at least four questions correctly. If the answer is less than four questions correctly, it is categorized as problematic nutrition fact literacy. Based on Table 3, it is known that the majority of respondents have less literacy about nutrition facts, which is 96.02% problematic. Food labeling aims to provide Information regarding the origin, safety, quality, nutritional content, and other Information to the public regarding each packaged food product¹³. Reading nutritional value labels on packaged food products is very important because it provides benefits in the form of nutritional content information listed on packaged food labels that are included correctly and are easy to understand, which will positively impact

consumers to choose this products¹⁰. The results of this study indicate that the nutritional value of information literacy is still shallow, namely 96.02%. Research by Bahramfard showed that 50.8% of respondents had poor nutritional information literacy. Bahramfard's research results are lower for respondents with nutritional value information literacy because the research respondents are health students, while this study was conducted on the general public¹⁴. Ineffective and inefficient use of health services and resources is caused by poor health literacy. Because of this, having poor health literacy, that is, having it at a basic level or less- contributes to health inequities, and achieving health equity requires improving health literacy. Health-seeking habits and health outcomes, however, might be affected differently by health literacy levels.

Table 4. Bivariate analysis of nutritional fact literacy and demographic factor of Semarang City residents over 15-65 years old

Variable	Nutrition Fact Literacy				p-value	OR	CI
	Sufficient		Problematic				
	n	%	n	%			
Current location							
Urban area	37	4.7	758	95.3	0.067 ^a	0.356	0.126 – 1.010
Rural area	4	1.7	230	98.3			
Gender							
Men	17	3.7	442	96.3	0.8 ^a	1.143	0.606 – 2.154
Women	24	4.2	546	95.8			
Marital status							
Married	15	2.9	503	97.1	0.101 ^a	0.556	0.291 – 1.063
Single	26	5.1	485	94.9			
Housing							
Living alone	25	5.0	472	95.0	0.134 ^a	0.585	0.309 – 1.110
Living with family	16	3.0	516	97.0			
Education							
Lower education	26	3.3	764	96.7	0.039 ^{*a}	1.968	1.024 – 3.779
Higher education	15	6.3	224	93.7			
Occupational							

Variable	Nutrition Fact Literacy				p-value	OR	CI
	Sufficient		Problematic				
	n	%	n	%			
Not in the health sector	35	3.5	953	96.5	0.002* ^a	4.668	1.843 – 11.823
Health sector	6	14.6	35	85.4			
Body mass index					0.922 ^b	-	-
Underweight	8	20.0	166	17.3			
Normal weight	26	65.0	616	64.0			
Overweight or more	6	15.0	180	18.7			

^a) Tested with Chi-Square, ^b) Tested with Spearman Rank, *) p-value is significant if <0.05

Table 4 shows that respondents with less Nutritional Value Information Literacy are more numerous than those living in urban areas (98.3%). Statistically, the $p=0.067$ means no significant relationship exists between domicile and nutritional value information literacy. The variable that is not statistically significant in this study is domicile. Domicile is not significantly related because this study was taken in Semarang City, where even though the respondents live in rural areas, they have access to urban areas to go to school or work. In addition, in Aygen's Research, there is a significant relationship between place of residence and literacy rate of nutritional adequacy because respondents who live in high-income areas of cities read fewer nutrition facts following labels than those in middle-income and low-income districts¹⁵. The results of this study differ from those of Christopher Sinaga, where men are better at reading food label behavior, which is 40.0%, so there is a significant relationship between gender and reading labels on food.

Furthermore, based on gender, it is known that respondents with Information Literacy on Nutritional Values are fewer and more male respondents. Statistically, the $p=0.8$ means no significant relationship exists between gender and nutritional value information literacy. In this study, literacy readings of nutritional values were better for women, namely 4.2%, but statistically, there was no significant relationship. Svendsen conducted research. Most of the employees and students at a Norwegian university claimed they were familiar with the national dietary recommendations and understood where to get Information on nutrition-related topics, demonstrating adequate functional NL abilities. Men appeared to be less likely than women to say they were familiar with particular dietary suggestions, and being a man was linked to a reduced likelihood of having a high functional NL score. However, more women than males admitted to being influenced by media advice and having trouble telling the difference between non-scientific and scientific nutrition information (critical NL). Having a greater age, female, enrolled in or employed in the Faculty of Health Sciences¹⁶.

Based on marital status, it is known that respondents with nutritional value information literacy are married (97.1%). Statistically, the $p=0.101$ means no significant relationship exists between marital status and information literacy on nutritional values. Based on the residence status, it is known that if respondents with Nutritional Value Information Literacy are less, more respondents live with their families (97%). Statistically, the $p=0.134$ means no significant relationship exists between residence status and information literacy on

nutritional values. The marital status in this study showed that there was no significant relationship. The results of this study were in line with the Research by Mehdi Akbartabar.

Furthermore, Mehdi explained that residence status was associated with food nutrition label literacy. The results showed that students living in rented houses and university dormitories have higher nutritional literacy. A statistically significant relationship exists between students' nutritional literacy and their place of residence. This differs from this study, which shows no relationship between residence status and food nutrition label literacy. This could be due to Mehdi's Research, the lack of access to all students in various fields of study, and the small sample size of students in other majors except medicine. Meanwhile, this research was conducted with a relatively more extensive sample of the general public¹⁴.

Based on the level of education, it is known that respondents with Information Literacy on Nutritional Values are fewer respondents with primary education levels (96.1%). Statistically, the $p=0.039$ means that there is a significant relationship between education level and nutritional value information literacy with an OR value of 1.968 (CI = 1.024 - 3.779), meaning that respondents with a basic education level have a risk of 1.968 times having higher nutritional value information literacy. Less than respondents with advanced education levels. The higher the level of education, the higher a person's literacy rate for nutritional adequacy is in line with Eun Seok Cha's Research. Educated people have higher health literacy, use more food labels, and have better diet quality¹².

Furthermore, the professional variable has a significant relationship in this study; a person who has a profession in the health sector has an excellent nutritional literacy rate of $p=0.02$. In this study, since Bahramfar's Research, various student disciplines led to different nutritional literacy statuses. Statistically, there is a significant difference between levels of nutritional literacy based on the field of study. Nutrition students have the highest level of nutritional literacy compared to other groups of students¹⁴. Low income and lack of time may be significant obstacles to purchasing more basic and healthy foods; more Information (in the form of nutrition labeling) will not increase either. People with lower incomes and less education are also more likely to have poorer diets than people with higher incomes and more education¹⁷.

Additionally, people interested in healthy eating are more likely to study nutrition labels, have higher nutrition knowledge, and may already practice improved eating habits. In this context, it suggests that

adding more healthful products to an existing food or drink category can increase the overall healthfulness of the consumer's selection. Health emblems on nutrition labels, in particular, are seen to have the ability to encourage product reformulation in an¹⁸.

Based on the profession, it is known that the respondents with Information Literacy on Nutritional Values are less, more than respondents who have non-health professions (96.5%). Statistically, the $p=0.002$ means no significant relationship between the profession and Nutritional Value. Information Literacy with an OR value of 4.668 (CI = 1.843 – 11.823) means that respondents with non-health professions risk 4.668 times having poor nutritional information literacy. They were compared to respondents who work in the health sector. Improvements in nutrition labeling could make a small but significant contribution towards making the existing point-of-purchase environment more conducive to selecting healthy choices. In particular, interpretational aids can help consumers assess the nutrient contribution of specific foods to the overall diet¹⁹.

Furthermore, a correlation test was conducted between nutrition label literacy and body mass index. Based on Table 4, it is known that there is no relationship between nutrition label literacy and body mass index, with a p -value of 0.922. Food labeling must be used by customers in order for it to affect their health and weight status. Before making judgments regarding their food consumption, they must read the label, comprehend the Information, and know how to use it. Meanwhile, Information about the nutrients in food alone does not always influence dietary behavior. Numerous factors affect food choices. Thus, customers must be encouraged to apply the knowledge for their health. A significant motivator for dietary behavior is awareness of the connections between nutrition and health⁷. According to Ady and Sumarni's Research, adult women's practice of reading nutrition labels is associated with their sodium consumption. Respondents rarely read and pay attention to nutrition labels since they need more time²⁰.

CONCLUSIONS

The nutrition fact literacy of the respondents still needs to improve. There is a relationship between education level and nutrition fact literacy; respondents with a low education level are at 1.9 times the risk of having inadequate nutrition fact literacy compared to respondents with a higher education level. There is a relationship between occupational and nutrition fact literacy; respondents who do not work in the health sector are 4.6 times at risk of having low nutrition fact literacy compared to respondents who work in the health sector. There is no relationship between nutritional value information literacy and body mass index.

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