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Can nutrition label recognition or usage affect nutrition intake according to age?

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ABSTRACT

Objectives: The aim of this study was to investigate the effect of the use of nutrition labeling on nutritional intake according to age groups, focusing on Korean elderly.
Methods: Study participants (N = 5223) were adults at least 20 y of age and had participated in the Korean National Health Examination and Nutrition Survey in 2012. Data for recognition/use of nutrition labels were obtained by self-report. Nutrition intake also was estimated by 24-h dietary recall. Participants were categorized into three age groups: 20 to 39 y, 40 to 59 y, and ≥60 y. Generalized linear model was conducted to test mean differences between nutrition label recognition (NLR) and nutrition label use (NLU) groups for nutrient intake, according to the age groups.
Results: Results from this study indicated that younger individuals (age groups of 20–39 and 40–59 y) in the NLU group showed a significant association with nutrient intake compared to those in the NLR group. Additionally, nutrition intake status in the NLU group improved positively. Whereas older participants (≥60 y) in the NLR group showed a significant association with most nutrient intake compared with the NLU group. The study also found that protein intake was reduced in the NLU group compared with the non-NLU group across the age groups, except for older participants (age group 20–39 y: 79.16 versus 86.30 g, $P = 0.050$; age group 40–59 y: 69.97 versus 75.58 g, $P = 0.040$; age group of ≥60 y: 64.72 versus 64.89 g, $P = 0.967$).
Conclusions: The present study revealed that nutrition labeling cannot be effective for the elderly, and there were several areas of misunderstanding. Therefore, more systematic education on the topic of nutrition labeling is required to help the elderly make healthier food decisions.

Introduction

Over the past 2 decades, eating habits have shown an increase in consumption of prepared foods and take-out meals. This phenomenon has resulted in diet-related chronic diseases including obesity, diabetes, and cardiovascular diseases (CVDs) [1]. One study demonstrated that the frequency of dining out is significantly associated with nutrients and thus as the frequency of dining out increased, so did energy intake in Korea [2]. Recognition of these problems motivates people to select healthy foods. Nutrition labeling is an important educational and practical tool for promoting healthier food choice and laws on nutrition labeling for all prepackaged foods as well as for restaurant menus have been enforced in many countries. Since the enforcement of nutrition labeling laws in the 1990s, risks for CVD and cancer have decreased, and the average life span has been extended [3,4]. Since the Nutrition Labeling and Education Act (NLEA) of 1990 was promulgated to change nutrition labeling regulations and also to strengthen the education, making additional nutrition information available for consumers, which allows them to choose healthier and more nutritious foods [5]. Therefore, consumers have a right to know existing nutrition labeling formats and the nutrient contents defined for any age group by education.

Hak-Seon Kim and Chorong Oh contributed equally to this study and should be considered co-first authors.

CRO, JKN, and HSK designed the study. CRO carried out the data analysis and wrote the manuscript. JKN and HSK advised on the data analysis. All authors contributed to the revising of the paper. All authors had full access to all of the study data and took responsibility for the integrity of the data and the accuracy of the data analysis. The authors have no conflicts of interest to declare.

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The regulation of nutrition labeling has changed since it was introduced in South Korea in 1995. Nutrition labels were displayed on 18.7% of all food products in 2001. That percentage increased in 2005 by 24.1% and in 2007 by 79% [6]. But how many consumers actually read the labels displayed on the package when purchasing foods? As consumer interest in health rises, their attention to nutrition labeling also increases. However, there are still differences between nutrition label recognition (NLR) and actual nutritional label use (NLU). It has been reported that consumers showed higher NLR than the actual usage level and that they were mainly aware of calories [7]. According to the Korean Food and Drug Administration (KFDA), 85% of respondents said they recognized nutrition labels; however, only 50% actually used them [6]. Other studies [8–10] reported that the NLU depends on the individual's various characteristics and is expected to improve meal quality by increasing recommended nutrient intake, and reducing excessive fat and cholesterol intake. NLU levels were influenced by demographic, social, and psychological factors [11]. Different age groups might show differences between awareness and usage. Differences will vary depending on how individuals were educated. The younger generation, part of an aggressive food marketing age, has much opportunity to receive education on nutrition labeling. However, only limited data exist on nutrition labeling for the elderly in Korea. Today, as consumer interest in obesity and calorie restriction is increasing, nutrition labeling could be an important factor that can be implemented effectively [12]. In this regard, we could conjecture that NLU after proper education is more important than NLR for all age groups.

To properly manage and settle on a food nutrition labeling system and the accurate assessment of needs, a feasibility study on food NLU must be studied. To our knowledge, few studies have assessed the difference between NLR or NLU and nutrition intake among different age groups, but especially for the elderly. The present study was conducted with Korean adults ages ≥20 y who participated in the 2012 Korean National Health Examination and Nutrition Survey (KNHANES). The present study can enhance the nutrition labeling system, and the results can help individuals to be healthier as well as can provide guidelines for health care providers.

Participants and methods

Study population

This study used the 2012 KNHANES of noninstitutionalized Korean civilians. All analyses were based on the KNHANES conducted in 2012 in South Korean. The study protocol was approved by the Institutional Review Board at the Korea Centers for Disease Control and Prevention (IRB No: 2012-02 CON-06-C). The KNHANES consisted of health records based on a health interview, a health examination, and a nutrition survey. Each participant was interviewed and asked to complete a questionnaire regarding his or her alcohol consumption, smoking status, presence of diabetes mellitus or hypertension, and physical activity level. The physical activity level was calculated using the metabolic equivalent of task values based on self-reported frequency and duration of activities during the week. In all, 34 145 individuals from a stratified, multistage probability sampling design were selected for the Health Interview study. Of the individuals included in the study, 5223 satisfied the age category (i.e., ≥20 y) and participated in the KNHANES [13]. Participants were categorized into three age groups: 20 to 39 y, 40 to 59 y, and ≥60 y.

Data collection

A general questionnaire was administered to obtain basic demographic information such as age, sex, education, income, occupation, weight control, and body image. These data were gathered by self-report. Dietary intake was measured by the single 24-h dietary recall method. Trained staff instructed respondents to recall and describe all foods and beverages they consumed the previous day. Food models and measuring bowls, cups, and spoons were used to assist in estimating portion sizes. A self-reported survey was adopted for measuring the recognition and usage levels of nutrition labels Binominal questions were used to ask about NLR and NLU. Respondents were required to answer either "yes" or "no." There were two questions on nutrition label recognition and use to screen the participants: 1) Do you know the nutrition label? 2) Do you use nutrition labels when you purchase food products? Only respondents who answered "yes" on the NLR question could answer the NLU question.

Statistical analysis

All statistical analyses were conducted using SPSS 20.0 for Windows (SPSS Inc., Chicago, IL, USA). All data were weighted based on a stratified, multistage, and probability sampling design. Relationships between general characteristics of respondents and NLR/NLU were assessed using χ^2 tests. The generalized linear model was used to test mean differences between NLR and NLU groups for nutrient intake according to the three age groups. Level of significance was set at $P < 0.05$.

Results

The general characteristics of the respondents according to NLR and NLU status are shown in Table 1. There were 3280 (62.8%) respondents in the NLR group and 1943 (37.2%) in the non-NLR. All variables except sex were significantly different according to NLR status; 37.38% of the respondents were men, and 62.62% were women. Participants were categorized into three age groups: 20 to 39 y, 40 to 59 y, and ≥60 (38.23%, 42.23%, and 19.54%, respectively). The recognition level in the 40 to 59 y group was higher than other age groups, followed by 20 to 39 y group. In terms of the education level, respondents with a higher education level tended to have the higher NLR. The results also indicated that unemployed participants showed the highest recognition level (39.62%). The agriculture and fishing industry

Table 1
Associations of demographic characteristics according to nutrition label recognition and nutrition label use

Variable	NLR group n = 3280 (62.8%)	*P*-value*	NLU group n = 1141 (34.78%)	*P*-value*
Sex				
Male	1226 (37.38)	0.415	268 (23.50)	0.000
Female	2054 (62.62)		872 (76.49)	
Age (y)				
20–39	1254 (38.23)	0.000	545 (47.80)	0.000
40–59	1385 (42.23)		479 (42.01)	
≥60	641 (19.54)		116 (10.17)	
Education level				
Up to elementary school	326 (10.37)	0.000	45 (4.07)	0.000
Middle school	282 (8.97)		72 (6.52)	
High school	1265 (40.24)		455 (41.25)	
College or higher	1271 (40.43)		531 (48.14)	
Occupation				
Manager & expert	534 (17.00)	0.000	216 (10.01)	0.000
Clerk	332 (10.57)		120 (5.56)	
Service industry & seller	400 (12.73)		139 (6.44)	
Agriculture & fishing industry	128 (4.07)		28 (1.29)	
Mechanic	265 (8.43)		67 (3.10)	
Laborer	238 (7.57)		483 (22.39)	
Unemployed†	1245 (39.62)		1104 (51.18)	
Income (Korean 10,000 Won)‡				
≤199	714 (22.08)	0.000	183 (16.28)	0.017
200–299	590 (18.24)		192 (17.08)	
300–399	529 (16.36)		184 (16.37)	
400–499	444 (13.73)		166 (14.76)	
≥500	957 (29.59)		399 (35.49)	

NLR, nutrition label recognition; NLU, nutrition label use
Level of significance was set at $P < 0.05$
* *P* from χ^2 test.
† Unemployed included housewife and student.
‡ Income is monthly household income: 1 USD = 1000 Korean Won.