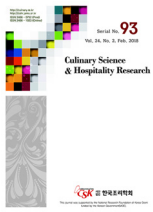
Information available at the Culinary Society of Korea (http://www.culinary.re.kr/)

Culinary Science & Hospitality Research

Journal & Article Management System: https://cshr.jams.or.kr/



http://dx.doi.org/10.20878/cshr.2018.24.2.003

# Understanding of Nutrition Labelling Use and Related Factors among Korean Adults

Chorong Oh & Hak-Seon Kim†

*Dept. of Food & Nutrition, Kyungsung University, Busan, South Korea*

**KEYWORDS**

Nutrition labeling,
Korean National Health and Nutrition Examination Survey,
Population characteristics,
Korean adults.

**ABSTRACT**

This study was conducted to investigate that the nutrition labeling use is associated with demographic and psychosocial factors according to each nutrition information on the nutrition labeling in Korean adults. The study subjects (N=1,140) were individuals who were aged 20 years and more and answered on the question of nutrition label use and who participated in the Korean National Health Examination and Nutrition Survey (KNHANES) in 2010.As age older, there was more interest in information such as sugar, protein, fat, cholesterol than calories. In contrast, as age younger, there was more interest intrans-fat, sodium as well as calories. As higher education level, there were more aware of trans-fat, sodium and calories. From the result that the most interested nutrition items were significantly different by democratic factors, we could understand interested nutrient information on the nutrition labels could change according to individual specific education. Therefore, this can also provide basic data for systematic education program by nutrition label use.

## 1. INTRODUCTION

Food nutrition labelling is systems that protect consumers by displayed various information on food ingredients such as calories, carbohydrates (sugars), protein, fat (saturated fat, trans-fat), cholesterol, and sodium on the packaging or container of the product (Korean Food and Drug Administration, 2005). It has been utilized when consumer decide to purchase some food to eat. Also, it has been used as a practical tool of nutrition education (Lee, Lee, & Park, 2010) for people who has health problem include obesity and students at school who changed diet like rich in fat and poor in fruits and vegetables by increased fast food consumption (Kim, Han, Ahn, & Lee, 2013). The group using nutrition labelling showed higher health-related attitudes and healthy meal intake than not using group (Drichoutis, Lazaridis, & Nayga, 2006). For those reason, most of countries include Korea have reinforced nutrition label for all pre-packaged foods and restaurants as well.

There were many studies on the association between nutrition labelling and demographic factors or healthy related attitude or prevalence of disease in the foreign countries (Cheung, 2005; Kang, Joung, Lim, Lee, & Song, 2011; Nayga, 2000) and the study with Korean were focused on the status of its using according to specific age (Kim & Lee, 2009; Kim, Nayga, & Capps, 2000; Kwon et al., 2007). But it is first time to examine the relationship between each nutrition item and demographic factors in Korea. These data will refer to the food and nutrition labelling system to fix, complement and to help in-

* CRO designed and carried out the study, analyzed the data and drafted the manuscript. HSK contributed to study design and article revision. All authors read and approved the final manuscript. There is no financial support.

† Corresponding author: Hak-Seon Kim, School of Hospitality & Tourism Management, Kyungsung University, 309, Suyeong-ro, Nam-gu, Busan 48434, Republic of Korea, Tel. +82-51-663-4473, Fax. +82-51-627-6830, E-mail: kims@ks.ac.kr

dividuals as well as health care providers make healthier choices with food for our country.

## 2. LITERATURE REVIEW

### 2.1. Nutrition Labeling and Related Factors

Understanding of nutrition information on food packages is different and the group which is very health conscious tends to pay attention to nutrition labelling to make decisions (Ollberding, Wolf, & Contento, 2011). Overall, although, the effect of nutrition labelling use approved by many researches but there were still confusion with though it is too complicate to understand and the accuracy of calculated values on the labelling. Therefore, more substantial data on nutrition labelling were need and this data might be useful to establish education tool with it. Is there difference between the interest of each nutrition items and democratic characteristics? Nutrition labelling use was influenced by various factors, as reported previous studies (Ollberding, Wolf, & Contento, 2011; Satia, Galanko, & Neuhouser, 2005) such as sex, age, education level and income level. These days, most of consumers were interested in beneficial of calorie restriction for lifespan and healthy as well as weight loss by abundance of reports of risk of obesity so calories is most interesting item on nutrition labelling. Previous research on the association between obesity and utilization of nutrition labelling by Satia (2005) showed that the more obese adults and people who are in trying loss of weight significantly read nutrition labels more. One of the effects of nutrition labelling use was significant reduced fat, calories, cholesterol, saturated fat and sugar intake more than non-user (Cheung, 2005). Whereas, Bae (2014) reported opposite result that people who are using nutrition labelling showed higher intake of fat. For fat, it is not easy to evaluate the accurate relationship between fat intake and nutrition labelling use because it includes cholesterol, saturated fat, and unsaturated fat as well. In Korea, there was increased prevalence of chronic disease induced high fat intake therefore, the divided fat intake into cholesterol, saturated fat, unsaturated fat, and trans-fat like nutrition labelling is need in the future study.

## 3. METHODS

### 3.1. Study Population

This study was used with data obtained from the third Korean National Health and Nutrition Examination Survey (KNHANES III) of non-institutionalized Korean civilians in 2010. A total of 34,145 individuals from a stratified, multistage probability sampling design were selected for the Health Interview study (Moon, 2014). Among them, 1,140 subjects who were aged 20 years or more and who answered 'yes' on question of nutrition label use and had participated in the Health Examination Survey were included in this study. The study was performed with consent form and approved by the Korea Centers for Disease Control and Prevention (IRB No: 2012-02 CON-06-C).

### 3.2. Data Collection

A general questionnaire was administered for basic demographic information such as age, sex, education level (elementary school, middle school, high school, college and more), marriage status(single and married), experience of weight control, smoking, experience of diet therapy, prevalence of metabolic syndrome, residence, body image and the interested nutrition items on the nutrition labels whose data were gathered by self-report.

### 3.3. Data Analysis

All statistical analyses were conducted using SPSS 20.0 for Windows (SPSS Inc., Chicago). All the data is weighted data based on a stratified, multistage, probability sampling design. The interested nutrition items on the nutrition labels among nutrition label user and the interested nutrition items on the nutrition labels among different obese status were used frequency analysis to test. Associations between nutrition information on the nutrition labels and democratic factors were assessed using chi-square tests. The level of significance was set at $p<0.05$.

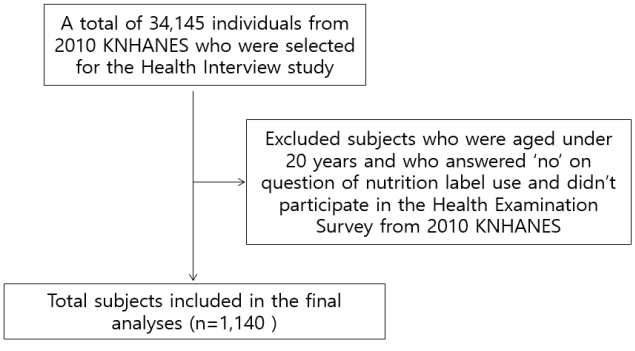



**Fig. 1.** Flow chart of the study subjects.

## 4. RESULTS

The sixty three present of our subjects in this study were aware of nutrition label (Data was not shown). This is result from education of nutrition labels (Satia, Galanko, & Neuhouser, 2005). However, only about 35%, 1,140 peoples among 3,289 people of aware nutrition label answered yes on question of using nutrition label. Considering definite benefits of using nutrition label, we have to reinforce more consistent and accurate training that could change recognition of nutrition label to acting.

Fig. 2 showed the results for what first looks in nutrition label. People who answered are interesting of calories (42.23%), followed by trans-fat, sodium, cholesterol, total fat, protein, sugars, carbohydrates, and saturated fat among nutrition information on the nutrition label.

Fig. 3 showed the difference of nutrition item use on the nutrition label according to obesity status. Normal group was more interesting for most nutrition items. But underweight group wasn't. Other study reported that obese group was showed using nutrition label more than other groups but our finding was different (Cheung, 2005). More training with nutrition label was necessary for obese people that could be effective as Kim's report that nutrition labelling use reduces obesity (Drichoutis, Lazaridis, & Nayga, 2006; Larson, Neumark-Sztainer & Laska, 2011).


**Fig. 2.** The interested nutrition items on the nutrition labels among label user in Korea.

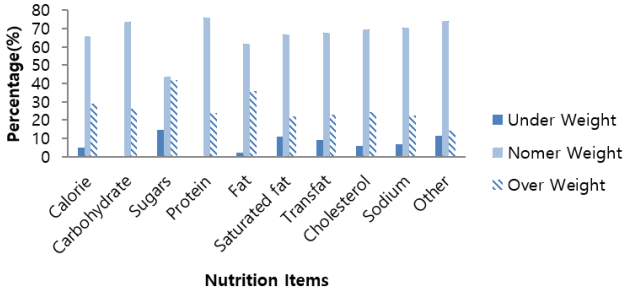



**Fig. 3.** The interested nutrition items on the nutrition labels among different obese status.

Table 1 showed that there were significant association between demographic factors (sex, age, educational level, marriage status, body image, experience of weight control) and nutrition information on the nutrition label. There was significant differentiation of interest of nutrition item according to sex. The men showed their interest in calories first, followed by, sodium, protein, cholesterol, and fat, while, the women showed interest in calorie first, followed by, trans-fat, sodium, fat, and protein .It showed that young aged group who are aged 20～30 years is more interesting of calorie and the aged are 40～59 years is interested in sodium and trans-fat, and older aged group who are over 60 years is interested in cholesterol than any other age. As higher education level, they were more aware of trans-fat, sodium and calories while as lower education level, they are interesting of fat. The single group who live alone are interesting of calorie, while the married group are interesting trans-fat and sodium. People who answered to have experience of weight control and thought their own body image is fatty showed about 50% of interest in calories by followed fat, sodium, protein and trans-fat.

## 5. DISCUSSION

This study is the first study to analysis on the nutrition labelling use and democratic factors by each nutrition item with Korean adults using national data, KNHANES 2010. The first of our findings was that consumers were most interesting of calories (42.23%), followed by trans-fat, sodium, cholesterol, total fat, protein, sugars, carbohydrates, and saturated fat among nutrition items on the nutrition label. The other study in USA reported consumers consider calories (58%) and total fat first, followed by sodium and saturated fat, sugars, cholesterol, and carbohydrates, when purchasing or choosing food (Borra, 2006).

Using nutrition labelling on food packages may enable to make a better decision on food purchase and healthy dietary attitude. It was influenced by various factors, as reported previous studies (Ollberdin, Wolf, & Contento, 2011; Satia, Galanko, & Neuhouser, 2005) such as sex, age, education level and income level. Another finding was there was significant association between demographic factors (sex, age, educational level, marriage status, body image, experience of weight con-

**Table 1.** The nutrition information and demographic and psychosocial factors

| | Calorie | Carbohydrate | Sugars | Protein | Fat | Saturated fat | Trans fat | Cholesterol | Sodium | Other | $P^{1)}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Sex | | | | | | | | | | | 0.020 |
| Male | 46.0 | 4.1 | 1.6 | 8.5 | 6.3 | 3.3 | 6.0 | 7.7 | 13.0 | 3.6 | |
| Female | 45.4 | 1.9 | 4.1 | 5.9 | 7.2 | 1.8 | 14.1 | 5.9 | 11.7 | 2.0 | |
| Age | | | | | | | | | | | 0.000 |
| 20～39 | 54.2 | 3.0 | 3.1 | 5.8 | 4.5 | 3.5 | 10.3 | 2.4 | 11.0 | 2.0 | |
| 40～59 | 36.2 | 2.4 | 2.3 | 7.1 | 9.4 | 0.4 | 13.3 | 11.7 | 14.4 | 2.8 | |
| ≥60 | 16.5 | 1.0 | 12.3 | 16.9 | 14.9 | 3.3 | 4.7 | 14.6 | 8.2 | 7.7 | |
| Education | | | | | | | | | | | 0.000 |
| Elementary school | 10.3 | 3.5 | 6.4 | 8.6 | 35.1 | 2.5 | 0.0 | 11.1 | 13.5 | 9.0 | |
| Middle school | 33.6 | 3.5 | 5.1 | 9.9 | 16.7 | 3.2 | 5.5 | 16.0 | 3.7 | 2.8 | |
| High school | 49.0 | 3.1 | 2.3 | 7.3 | 5.4 | 3.3 | 8.5 | 5.8 | 12.2 | 3.2 | |
| ≥College | 45.5 | 2.3 | 3.6 | 5.1 | 5.7 | 1.4 | 15.7 | 5.8 | 13.2 | 1.7 | |
| Marriage | | | | | | | | | | | 0.000 |
| Single | 58.9 | 3.9 | 2.2 | 5.5 | 6.0 | 5.3 | 6.2 | 2.1 | 8.4 | 1.4 | |
| Married | 38.2 | 2.0 | 3.8 | 7.3 | 7.4 | 0.7 | 13.9 | 9.0 | 14.4 | 3.2 | |
| Weight control[2)] | 45.4 | 2.8 | 3.2 | 6.3 | 7.1 | 2.4 | 11.3 | 6.6 | 1.2. | 2.7 | 0.959 |
| Smoking[3)] | 46.6 | 4.0 | 4.6 | 6.5 | 4.5 | 2.2 | 9.4 | 7.0 | 9.3 | 5.9 | 0.355 |
| MS[4)] | 44.1 | 2.6 | 6.3 | 8.1 | 9.5 | 1.2 | 9.3 | 5.4 | 12.2 | 1.3 | 0.655 |
| Body image[5)] | 49.5 | 3.3 | 3.6 | 4.2 | 7.8 | 1.9 | 12.7 | 4.5 | 11.2 | 1.3 | 0.047 |
| Residence | | | | | | | | | | | 0.276 |
| Urban | 46.2 | 2.9 | 3.2 | 6.5 | 6.3 | 2.7 | 11.4 | 6.1 | 12.5 | 2.1 | |
| Rural | 41.5 | 1.4 | 3.4 | 6.7 | 10.7 | | 9.4 | 9.4 | 9.8 | 5.7 | |
| Diet therapy[6)] | 52.1 | 1.3 | 2.7 | 7.0 | 9.4 | 2.1 | 6.8 | 6.5 | 8.9 | 0.9 | 0.010 |

Note. 1) All the values were analyzed by chi-square tests. 1) The level of significance was set at $p<0.05$. 2) The group who answered 'YES' on the question about weight control experience. 3) The group who answered 'YES' on the question about smoking now. 4) Prevalence MS; Metabolic syndrome. 5) the group who believe their own body image is fatty. 6) the group who answered 'YES' on the question about experience of diet therapy.

trol) and nutrition items on the nutrition label such as calories, carbohydrates, sugars, protein, fat, saturated fat, trans-fat, cholesterol, and sodium, but was not with metabolic syndrome, smoking habits and residence. By Bae (2014), women 38.1% showed more use nutrition labelling than men 17.9% and their interest of item was also significantly different like out results according to sex. In this study, the men showed their interest in calories first, followed by, sodium, protein, cholesterol, and fat, while, the women showed interest in calorie first, followed by, trans-fat, sodium, fat, and protein. For men, they are interested in building up their muscle, so they are interested in sodium and protein first and adolescent men need especially more protein intake than women for developing more skeletal muscle tissue. For women, they are interested in loss weight, so they are interested in fat and sodium first. To develop sustainable nutrition policies and feasible programs for reduction of sodium intake by WHO and Korea as well, excess sodium intake and increased the prevalence of hypertension have been recently emphasized as a major problem that must be managed for the health of our people. There are reports that among Korean, 28% among them are with salt-sensitive (salt sensitivity) (Rhee et al., (2011), therefore the government, academia and industry have been begun to reduced sodium intake and its related health promo-

tion plan.

It showed those young aged groups who are 20～30 years old were more interesting of calorie and the aged group who are 40～59 years old were interested in sodium and trans-fat, and older aged group who are over 60 years old were interested in cholesterol than any other age group. As the age was younger and education level was higher, nutrition labelling use is higher than non-user (Kang et al., 2011; Ollberding, Wolf, & Contento, 2011; Satia, Galanko, & Neuhouser, 2005). From 1996, there has been increased recognition on the importance of nutrition labelling use and education for the students (Chang, Lee, & Lee, 2008). There were reports on its positive effect to improve their eating habits, but yet, the understanding and awareness of nutrition labelling were still short (Kim, 2009; Lee, & Kim, 2007), and that label use is less than awareness of nutrition labelling only. By previous our study, nutrition label use is more effective to manage healthy than only awareness of it (Kim, Oh, & No, 2016). By Kim (2009), they emphasized the requirement of nutrition labelling education program to easy understanding for each age by reporting lack of educational and promotional opportunity for the food nutrition labelling. In this study another finding was that as age older, there was more interesting in information such as sugar, protein, fat, cholesterol than calories. In contrast, as age younger, there was more interesting in trans-fat, sodium as well as calories. As higher education level, there was more aware of trans-fat, sodium and calories. People who answered to have experience of weight control and thought their own body image is fatty showed about 50% of interest in calories, by followed fat, sodium, protein, and trans-fat. The overall goal of the Nutrition Labelling and Education Act (NLEA) is to make the nutrition information of food labels for consumers to understand more easily and to compare nutrient contents with foods, so it plans to make it easier for them to make out their healthful diet after all (Kim, Nayga, & Capps, 2000; Balasubramanian & Cole, 2002). There were many reports that increased prepared food intake and food away from home by economic development influenced prevalence obesity, metabolic syndrome in Korea as well as western countries (Larson, Neumark-Sztainer, & Laska, 2011). Additionally, the immediate effect of the nutrition labelling use, especially, calories control to fight obesity was increased (Lim, Park, Lee, & Cho, 2005). The purpose of using nutrition labelling tends to association with recognition status on healthy. According to the 2004 Food Marketing Institute's shopping for Health survey, 48% of subject for purchasing healthy foods and nearly 23%do for lose weight (Borra, 2006). In this study, among 3 different groups according to obese status, normal group was more interesting for most nutrition items. But under weight or obese group wasn't. This indicated that more education should be provided for obese or underweight consumers. There were a difference in food consumer's behaviour and it was associated with demographic characteristics in market segments (Yo & Kim, 2017; Yang, 2016; Hwang & Jeoun, 2016).

There were several strengths and limitations in this study. To our knowledge, this is the first study to evaluate the nutrition information on nutrition label and demographic/ psychosocial factors in Korean. Our data, also, was analysed with a large percentage of Korean adults. More studies warranted on this subject. However, several limitations exist in this study as follows; we used data from KNHANES questionnaire on nutrition label but this survey did not include the other food information of confirmed items in nutrition labels such as date of expiration, serving size, ingredients, place of origin, and food additives etc. So we couldn't analyse and report data profoundly about the patterns of information on the nutrition labels in Korean adults. This may limit statistical analysis of our data. Another limitation was that dichotomized variables for body image, experience of weight control and experience of diet therapy were used in this study, which would limit the nature of its own variables. Lastly, the cross-sectional design of our study limited causal inference between nutrition information on the nutrition labels and demographic/ psychosocial factors. Therefore, this study should be continued to confirm with additional longitudinal study for the next research.

In conclusion, there was the association between the nutrition items and demographic factors that were influenced by education such as sex, age, education level, marriage status, body image, and experience of diet therapy excluding metabolic syndrome, smoking habits and residence. From the result, there were significantly different in subject's interested nutrition items that could be changed by subject's specific education level and their psychological self-awareness. Overall, appropriate education of food nutrition labels could be solution for managing and setting proper for the accurate assessment of needs and awareness. Among 3 different groups according to obese status, normal group was more interesting for most nutrition items. But under weight or obese group wasn't. This indicated that more education should be pro-

vided for obese or underweight consumers. Calorie was the most interested item on the nutrition labels, followed by, trans-fat and sodium because recently, there was warning of the obesity and the risk of instant foods in media and internet. Here, we also wanted to emphasize the importance of protein on the nutrition labels, because there was less interest in the nutrition labels in Korea. Additionally, the effective education of recognizing good fat or bad fat referring to nutrition labels is one of best dietary practice and affects the quality of nutritional intake and selection of food. And it shall provide basic data for specific nutrition education regarding use of nutrition labelling. Our findings suggest in this paper that using nutrition labelling could be like a simple way to help for people make healthier choices with foods. Therefore, the enlightenment campaigns on nutrition labelling using must be necessary, especially for the elderly of systematically educating and changing their dietary patterns.

## CONFLICTS OF INTERESTS

The authors declare that they have no conflicts of interests.

## REFERENCES


A Manual for Food Labellingstandard. Korean Food and Drug Administration 2005.

Bae, Y. J. (2014). Evaluation of nutrient and food intake status, and dietary quality in Korean adults according to nutrition label utilization: Based on 2010-2011 Korean National Health and Nutrition Examination Survey. *Journal of Nutrition & Health, 47*(3), 193-205.

Balasubramanian, S. K., & Cole, C. (2002). Consumers' search and use of nutrition information: The challenge and promise of the nutrition labelling and education act. *Journal of Marketing, 66*(3), 112-127.

Borra, S. (2006). Consumer perspectives on food labels. *The American Journal of Clinical Nutrition, 83*(5), 1235-1235.

Chang, S. O., Lee, O., & Lee, K. S. (2008). Intake of processed foods and the effects of nutrition label education in 5th grade children. *Journal of the Korean Dietetic Association, 14*(2), 166-175.

Cheung, B. M. (2005). The cardiovascular continuum in Asia - A new paradigm for the metabolic syndrome. *Journal of Cardiovascular Pharmacology, l46*(2), 125-129.

Drichoutis, A., Lazaridis, P., & NaygaJr. (2006). Consumers' use of nutritional labels: A review of research studies and issues. *Academy of Marketing Science Review; Vancouver, 9*, 1-22.

Hwang, D. H., & Jeoun, M. S. (2016). A study on the use of mass media for nutrition knowledge: Focusing on Daejeon-Chungnam. *Culinary Science & Hospitality Research, 22*(5), 95-113.

Kang, M., Joung, H., Lim, J. H., Lee, Y. S., & Song, Y. J. (2011). Secular trend in dietary patterns in a Korean adult population, using the 1998, 2001, and 2005 Korean National Health and Nutrition Examination Survey. *The Korean Nutrition Society, 44*(2), 152-161.

Kim, T. Y., Han, D. B., Ahn, J. H., & Lee, S. H. (2013). Effect of mothers' identification on nutrition labelling to children's obesity. *Korean Health Economic Review, 19*(3), 51-82.

Kim, N., & Lee, J. (2009).A Study on perception and utilization of food-nutrition labelling by age in Busan residents. *Journal of the Korean Society of Food Science & Nutrition, 12* (38), 1801-1810.

Kim, J. (2009). Perception and utilization of food labels depending on educational experience with the food labelling system in middle school students. *Korean Journal of Community Living Science, 20,* 51-59.

Kim, H. S., Oh, C., & No, J. K. (2016). Can nutrition label recognition or usage affect nutrition intake according to age? *Nutrition, 32*(1), 56-60.

Kim, S. Y., Nayga, R. M., & Capps, O. (2000). The effect of food label use on nutrient intakes: An endogenous switching regression analysis. *Journal of Agricultural & Resource Economics, 25*(1), 215-231.

Kwon, K. I., Park, S. H., Lee, J. H., Kim, J. Y., Yoo, K. S., & Lee, J. S. (2007). Prevalence of nutrition labelling and claims on processed, and packaged foods. *Korean Journal of Community Nutrition, 12*(2), 206-213.

Larson, N., Neumark-Sztainer, D., & Laska, M. N. (2011). Story M. Young adults and eatingaway from home: Associations with dietary intake patterns and weight status differ by choice of restaurant. *Journal of the American Dietetic Association 111*(11), 1696-1703.

Lee, K., Lee, H., & Park, E. (2010). The effect of use of nutrition labelling on knowledge and perception of nutrition labelling, and awareness of nutrition labelling usefulness with among college students. *Journal of Korean Society of Food Science & Nutrition, 39*(2), 253-266.

Lee, K., & Kim, Y. (2007). Consumer's practicality, acknowledgement, trust, satisfaction, necessity degrees about food nutrition labelling system. *Journal Korean Living Science Association, 16,* 761-773.

Lim, S., Park, K. S., Lee, H. K., & Cho, S. I. (2005). Changes in the characteristics of metabolic syndrome in Korea over the period 1998-2001 as determined by Korean National Health and Nutrition Examination Surveys. *Diabetes Care, 28*(7), 1810-1812.

Nayga, R. M. (2000). Nutrition knowledge, gender, and food label use. *Journal of Consumer Affairs, 34*(1), 97-112.

Moon, S. S. (2014). Low skeletal muscle mass is associated with insulin resistance, diabetes, and metabolic syndrome in the Korean population: The Korea National Health and Nutrition Examination Survey (KNHANES) 2009-2010. *Endocrine Journal, 61*(1), 61-70.

Ollberding, N. J., Wolf, R. L., & Contento, I. (2011). Food label use and its relation to dietary intake among US adults. *Journal of the American Dietetic Association 111*(5), 47-51.

Rhee, M. Y., Yang, S. J., Oh, S. W., Park, Y., Kim, C. I., & Park, H. K. (2011). Novel genetic variations associated with salt sensitivity in the Korean population. *Hypertension Research, 34*(5), 606-611.

Satia, J. A., Galanko, J. A., & Neuhouser, M. L. (2005). Food nutrition label use is associated with demographic, behavioural, and psychosocial factors and dietary intake among African Americans in North Carolina. *Journal of the American Dietetic Association 105*(3), 392-402.

Yang, D. H. (2016). A study on consumer eating out purchases in accordance with the food lifestyle - Focusing on the moderating effects of consumer culture - *Culinary Science & Hospitality Research, 22*(5), 13-24.

Yo, L., & Kim, D. J. (2017). A study on the food service selection attributes and consumption behaviors based on lifestyle market segments: Empirical evidences from Luoyang. *Culinary Science & Hospitality Research, 23(3)*, 111-122.

Received: 28 Novemberr, 2017
Revised: 14 February, 2018
Accepted: 23 February, 2018