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Care Food Alternative Needed in the Aging Society*

Youngsuk Yoo[1], Min-Young Kim[2]

[1]Dept. of Dental Hygiene, Hanyang Women's University, Korea (florays72@hanmail.net), Frist Author
[2]Dept. of Dental Hygiene, Howon University, Korea (6514114@hanmail.net), Corresponding Author

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ABSTRACT

The purpose of this study was to identify the factors influencing the use rate of nutritional labeling of food by focusing on care food for the elderly. Using the raw data from the 2019 community health survey, 74,547 people aged 65 or older were studied. The relationship between the demographic characteristics, lifestyle habits, masticatory disorders, systemic diseases, and nutrition labeling use rates of food of the study subjects was studied. As the result of the study, it was found that women than men, the lower the age, the higher the education level, two or more households, non-smokers, flexibility exercise, and no mastication disorder, the higher the nutritional labeling use rate, and it did not significantly affect the systemic diseases. Based on the results of this study, it was found that the need for maintaining full-body and oral health was very large in consideration of the characteristics of the elderly. In order to improve the quality of life of the elderly in the future, it is necessary to establish a research and policy support system to improve the awareness of the elderly that nutrition labeling should be used when choosing food.

1. Introduction

As of 2021, Korea is an aging society, where 16.5% of the total population is 65 years old or older. In the future, the proportion of the elderly population continues to increase to 20.3% in 2025, entering a super-aging society, 30.5% in 2036, and 43.9% in 2060. As aging progresses, the health problem of the elderly is emerging as a social problem. Due to aging, dysfunction and deterioration of body function, changes in the body, and decreased sensory function, elderly people often suffer from physical problems such as increased burden on meals and reduced food intake (Kim et al., 2015; Kim et al., 2019). The elderly's nutritional intake was found to be very poor compared to other age groups, which was related to an increase in health risk. These include physical health problems such as decline in physiological function, socioeconomic problems such as economic

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difficulties, lifestyle habits such as decreased physical activity, and poor mastication and digestive function due to poor tooth conditions, and dysphagia (Kwon & Oh, 2007; Lee et al., 2014; Kim et al., 2019).

Insufficient nutrient intake in the elderly increases the need for elderly care (Kaiser et al., 2010), and affects problems such as poor quality of life (Odlund et al., 2005), and increased hospitalization rate in healthcare facilities (Budzynéski et al., 2016). As a way to solve this problem, the importance of using a food nutrition labeling system that helps the elderly check and select foods needed for healthy meals by displaying nutrients and contents in containers or packages (Kim & Yoon, 2019). Various studies on the use of nutritional labeling by domestic consumers for housewives (Kim & Lee, 2010), adults (Jung & Kim, 2016), and college students (Ha & Moon, 2008) showed that some age groups did not recognize nutritional labeling or did not know its contents. Research related to the degree of use of nutritional labeling is being actively conducted, but studies targeting the elderly have been insufficient.

Care food is a food that allows each person in need of special nutrition, such as the elderly and patients (The Food & Beverage news, 2019). Care food is a functional home convenience food that not only certain consumers such as the elderly but also ordinary people can easily eat without special cooking for health care tailored to various needs. These include nutritious foods that help you have a balanced diet and elderly-friendly foods for the elderly who complain of discomfort due to digestive and masticatory disorders (Choi, 2020). Care food is related to three major eating disorders: chewing, swallowing, and digestive disorders due to deterioration of physical function in the elderly. Care has a greater meaning, especially for the elderly, because the decline in physical function due to aging acts as a factor that can determine the quality of life (Han & Kim, 2019).

Looking at cases overseas, as the population ages, Japan's product market is growing rapidly in response to various demands such as health food, nursing food, balanced food, and soft food as well as food for the elderly. In Japan, care food is growing in consideration of physiological characteristics that make it difficult for the elderly to eat food due to tooth loss, decreased digestive function, muscle strength, and reflective ability related to swallowing (UDF, 2020). Food for the elderly has already been on sale in Germany since 1980, and in the United States, various products that help the elderly chewing and swallowing have been applied (Kim et al., 2019). Since 2018, the food industry has been expanding its market to consumers, and the market for care food has been gradually expanding, focusing on chewing and swallowing well for the elderly (The Food & Beverage news, 2019). Leading food companies from Korea are actively developing care food in preparation for the super-aging society (Shin, 2021).

As the baby boomer generation with a high level of education becomes elderly, the existing demand and values for food and nutrition are expected to be differentiated. Individualistic values were formed, resulting in a high proportion of consumption for oneself and a high interest in medical care and health. In other words, as the desire for healthy food becomes stronger, demand related to improving the quality of life is expected to be high due to the high rate of self-oral health care and health care through dietary improvement and dietary preference, not for future treatment purposes (Choi, 2020). The ultimate purpose of diet management for the elderly is to supply them

in a form that is easy to chew and swallow based on their preferred food so that they can digest well and get the necessary nutrition (Shin, 2021). Therefore, this study aims to identify the use rate of nutrition labeling information according to the characteristics of the elderly in order to promote awareness and active consumption of nutrition labeling among the elderly and to investigate the effect of chewing disorders on the presence or absence of nutrition labeling of packaging when purchasing food.

2. Research method

2.1 Research subjects

The research subjects were 74,547 aged 65 or older of the 229,099 people aged 19 or older surveyed using raw data from the 2019 community health survey. This study was conducted after obtaining approval after deliberation by ○○ University's Bioethics Committee (IRB No. 1041585-202104-HR-002-01).

2.2 Research tools

A questionnaire related to diet conducted in a community health survey was used to analyze the demographic characteristics (gender, age, education level, number of household members), lifestyle (smoking, drinking, flexible exercise practice), oral health (masticatory disorder), systemic disease (hypertension, diabetes), and nutrition labeling (Kim et al., 2019). For the degree of use of nutritional labeling, recognition of nutritional labeling, reading of nutritional labeling, and use of nutritional labeling were measured. The question, "Do you know about the nutritional indication of processed foods?" confirmed whether the subjects were aware of the nutritional indication on food products. For those who responded that they were aware of nutritional labeling, whether they read the nutrition labeling through the question "Do you read the nutrition labeling contents displayed when buying or choosing processed foods?" was investigated as "Yes" or "No." Finally, for those who responded that they recognized and read nutrition labeling, the question "Does nutrition labeling affect your choice of processed foods?" was investigated whether they used nutrition labeling. The scores of the three questions were summed to calculate a value between 1 to 3 (e.g., 1 for "Yes" and 0 for "No"). It can be interpreted that the higher the score, the higher the degree of use of nutritional labeling.

2.3 Statistical analysis

Statistical analysis was performed using the STATA 12.0. Frequency analysis was performed on demographic characteristics. Chi-square test was used for the degree of use of nutritional labeling according to general characteristics. The analysis of the factors affecting the use of nutritional labeling of food was analyzed by applying binomial logistic regression. The statistical significance level was set to $p<0.05$.

3. Results

3.1 General characteristics of the research subjects

58.4% of the study subjects were women, and in terms of age, 65-69 years old was the most common at 27.6%. In terms of education level, 60.0% of elementary school and below accounted for the majority Table 1.

Table 1. General characteristics of the research subjects

Characteristics	Division	N	%
Sex	Male	30,983	41.6
	Female	43,564	58.4
Age	65-69 years	20,566	27.6
	70-74 years	18,538	24.9
	75-79 years	17,653	23.7
	≤ 80 years	17,790	23.8
Education level	Primary school or lowe	44,692	60.0
	Middle school or lower	12,669	17.0
	High school or lower	11,566	15.5
	University school and above	5,536	7.5
Household	Alone	19,626	26.3
	With	54,921	73.7
Total		74,547	100.0

*by frequency analysis

3.2 Food labeling use whether

As a result of analyzing the degree of use of nutritional labeling according to general characteristics, it was 2.3% for those aged 80 or older and 11.4% for those aged 65-69. This means that the higher the age, the lower the use rate of nutrition labeling in food selection ($p<0.001$). There was also a statistically significant difference according to the level of education ($p<0.001$). In other words, those who graduated from elementary school or lower reported a use rate of 3.4%, and those who graduated from university or higher showed a use rate of 18.0%, so the higher the education level, the higher the use rate of nutrition labeling. For lifestyle habits, the nutritional labeling use rate was confirmed at 7.0% for non-smokers and 11.5% for those who exercise for flexibility ($p<0.001$). In the case of masticatory disorder, the use rate of nutritional labeling was low at 4.8% ($p<0.001$). There was also a statistically significant difference depending on the systemic disease, with 6.4% ($p<0.001$) for hypertension and 6.4% ($p<0.05$) for diabetes, indicating low nutritional labeling utilization Table 2.

Table 2. Food labeling use whether

Characteristics		Division	Nutrition label use	Nutrition label unuse	*P*
			N(%)	N(%)	
Characteristics	Sex	Male	1,596(5.2)	28,940(94.8)	0.000
		Female	3,337(7.8)	39,363(92.2)	
	Age	65-69 years	2,322(11.4)	18,045(88.6)	0.000
		70-74 years	1,416(7.8)	16,864(92.2)	
		75-79 years	790(4.6)	16,525(95.4)	
		≤ 80 years	405(2.3)	16,869(97.7)	
	Education level	Primary school or lowe	1,498(3.4)	42,196(96.6)	0.000
		Middle school or lower	1,031(8.2)	11,484(91.8)	
		High school or lower	1,411(12.3)	10,038(87.7)	
		University school and above	988(18.0)	4,510(82.0)	
	Household	Alone	1,043(5.4)	18,138(94.6)	0.000
		With	3,890(7.2)	50,165(92.8)	
lifestyle	Smoking	Yes	272(4.2)	6,155(95.8)	0.000
		No	4,661(7.0)	62,144(93.0)	
	Drinking	Yes	2,141(7.3)	27,257(92.7)	0.000
		No	2,791(6.4)	41,046(93.6)	
	Flexibility exercise	Yes	3,391(11.5)	26,058(88.5)	0.000
		No	1,541(3.5)	42,240(96.5)	
Oral health	Masticatory dysfunction	Yes	1,942(4.8)	38,504(95.2)	0.000
		No	2,991(9.1)	29,798(90.9)	
Systemic diseases	Hypertension	Yes	2,566(6.4)	37,593(93.6)	0.000
		No	2,367(7.2)	30,674(92.8)	
	Diabetes	Yes	1,006(6.4)	14,795(93.6)	0.036
		No	3,926(6.8)	53,487(93.2)	

*p<0.05, *p<0.01, *p<0.001, by chi-squared test

3.3 Factors affecting of food labeling use

The results of analyzing the factors affecting the use rate of nutritional labeling of food are as follows. Compared to men, women's use of nutritional labeling was 2.702 times higher. Depending on the age, the use rate of food nutrition labeling was 0.790 times lower for 70-74 years old, 0.558 times lower for 75-79 years old, and 0.340 times lower for the elderly over 80 years old compared to those aged 65-69. Depending on the level of education, the use rate of food nutrition labeling of those who graduated from university or higher was 6.241 times higher than that of those who graduated from elementary school or lower. Depending on the number of household members, households with two or more people were 1.094 times higher than single-person households. As a result of analysis according to lifestyle habits, subjects who do not smoke were 1.304 times higher and subjects who do not exercise flexibility 0.438 times lower. For oral health, the use rate of nutritional labeling was 1.293 times higher for those without masticatory disorders Table 3.

Table 3. Factors affecting of food labeling use

Characteristics	Division	OR	SE	z	*P*>z	95% CI	
Sex	Male	1					
	Female	2.702	0.103	26.02	0.000	2.507	2.912
Age	65-69 years	1					
	70-74 years	0.790	0.029	-6.31	0.000	0.734	0.850
	75-79 years	0.558	0.025	-12.83	0.000	0.511	0.610
	≤ 80 years	0.340	0.019	-18.37	0.000	0.303	0.382
Education level	Primary school or lowe	1					
	Middle school or lower	2.272	0.100	18.50	0.000	2.083	2.478
	High school or lower	3.650	0.156	30.13	0.000	3.355	3.971
	University school and above	6.241	0.315	36.27	0.000	5.653	6.890
Household	Alone	1					
	With	1.094	0.042	2.34	0.019	1.014	1.181
Smoking	Yes	1					
	No	1.304	0.089	3.88	0.000	1.140	1.491
Drinking	Yes	1					
	No	1.015	0.033	0.47	0.637	0.952	1.083
Flexibility exercise	Yes	1					
	No	0.438	0.014	-24.58	0.000	0.410	0.468
Masticatory dysfunction	Yes	1					
	No	1.293	0.041	7.97	0.000	1.214	1.377
Hypertension	Yes	1					
	No	0.982	0.031	-0.55	0.582	0.923	1.045
Diabetes	Yes	1					
	No	0.957	0.037	-1.13	0.259	0.887	1.032

*p<0.05, *p<0.01, *p<0.001, by binomial logistic regression

4. Summary and suggestion

Nutrition is an important factor in improving the physical function and quality of life of the elderly. Overall, it was found that the energy intake of the elderly in Korea was insufficient and the nutritional status was poor. Lack of nutrition gets worse as one gets older, and it affects the development of chronic diseases such as high blood pressure and osteoporosis (Han & Yang, 2018). In order to solve these problems, it is necessary to expand the accessibility of the elderly so that the elderly can choose foods that are good to eat and nutritious (Ha & Moon, 2008; Han & Yang, 2018).

Care food is defined as simple food for consumers who need to control their diet due to physical discomfort or health concerns (Choi, 2020). Until now, care food has been variously defined as an age-friendly food or “silver food,” which is a factor that hinders accessibility as it approaches consumers negatively. However, due to the entry into an aging society and the influence of COVID-19, the care food market is growing as the number of people looking for healthy food increases (The

Food & Beverage news, 2020). Given these changes, it is important to identify what nutrients are contained in the food to choose healthy food. Nutrition labeling on processed foods helps the elderly grasp information on food so that they can choose healthy foods that suit them (Kang et al., 2011).

Depending on the demographic characteristics, the lower the age, the higher the education level, and women than men showed the higher the use rate of nutrition labeling. This supports the results of studies in which the nutritional labeling use rate was higher among women than men (Post et al., 2010; Kim et al., 2012; Bae, 2014), among those with higher education level (Post et al., 2010; Kim et al., 2012), and among the elderly living alone (Yang, 2015). Depending on lifestyle habits, those who smoke and do not exercise for flexibility showed a lower use rate of nutrition labeling, which is consistent with previous studies (Koo & Park, 2013; Yang, 2015) that are related to personal behavior factors such as healthy lifestyle.

As for oral health, use rate of nutritional labeling was high among those without masticatory disorders. This is interpreted in the same context as the results of the following studies: a study showing that the main causes of loss of appetite in the elderly were tooth loss, chewing disorder, swallowing disorder, and decreased immunity (de et al., 2013) and a study showing that chewing disorders caused by tooth loss in the elderly are highly correlated with the level of nutritional intake (Park et al., 2013). It was found that high blood pressure and diabetes, which require dietary control in terms of disease treatment, did not significantly affect the use of nutritional labeling. This means that despite a large number of elderly people with chronic diseases, the elderly in Korea are not aware of the nutritional labeling (Kang et al., 2013), and the nutritional labeling use rate is low (Kim et al., 2012; Kim & Lee, 2009; Hong, 2014). With the aging population, digestive and chewing functions are often accompanied by discomfort and chronic diseases, so the popularization of foods that are good to eat and nutritious for the elderly should be preceded

Based on the results of this study, which showed a high use rate of food nutrition labeling among the elderly with a healthy lifestyle and without chewing disorder, it was confirmed that the need for maintaining full-body and oral health was great. This shows that the importance of the elderly's physical and oral health and quality of life is increasing. Although care food is attracting social attention due to increased interest in health, elderly consumers often lack or cannot use knowledge of nutrients. Therefore, the active interest and publicity at the society level that can change these perceptions and attitudes should be formed. In addition, as part of efforts to resolve the imbalance in nutrient intake that affects not only oral health but also the general health of the elderly, policy support is needed in the care food sector to raise social awareness for the elderly to be aware of and select nutritious foods. Due to the limitations of secondary data analysis, this study could not reflect the factors of various eating disorders related to care food. However, this is a meaningful study in that it analyzed the relationship between the use rate of food nutrition labeling information and chewing disorders. Further research is needed to expand the relationship between the elderly's awareness of food nutrition labeling and nutritional intake in consideration of regional imbalances.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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