Survey on Labeling of Health Functional Foods in Internet Shopping Malls

Sang-Kyu PARK*, Tai-Hwan UHM**

Abstract

Purpose - This research is to review the state of standard labeling compliance and identify the factors that are conducive to compliance with the Labeling Standards of the Health Functional Foods Act in internet distribution.
Research design, data, and methodology - We checked 9 labels including product name, expiration date, manufacturing date, raw material, ingredient, operative dose, nutritional information, daily intake, and functional effect which are based on Labeling Standards of the Act from 100 health functional foods in the internet shopping malls. These 9 structure & function claims were compared using a Chi-square test.
Results - There was a statistically significant difference in the use of standard labeling between domestic product and imported products ($p<.001$). The related strength between these two variables showed a moderate effect size. Also, there was a statistically significant difference between accredited advertising/unaccredited advertising distinction and use of standard labeling ($p<.001$). The related strength between these two variables showed a moderate effect size.
Conclusions - The Labeling Standards of the Act were not followed and found to be related to imports or unauthorized advertising in internet distribution. The information displayed according to the Labeling Standards was only about 2 on the average, so many labels have been posted unreadably without arrangement.

Keywords: Internet Distribution, Labels, Claims, Accredited Advertising, Standard Labeling.

JEL Classifications: I11, I12.

1. Introduction

1.1. Backgrounds

In 2017, domestic internet shopping markets in Korea grew by 36.4% from 75 trillion 368 billion won of 2016 to 102 trillion 830 billion won. In 2018, domestic internet shopping grew by 40.2% over the previous year to 92 trillion 2 billion won, showing more than two-fold growth in 5 years from 39 trillion 68 million won of 2013 (The Asia Business Daily, 2018). In 2017, sales of health functional foods amounted to 2 trillion 237.4 billion won, increasing each year with an annual import of 575 billion won (Ministry of Food and Drug Safety, 2018). In 2017, citizens over 12 years of age purchased health functional foods 21.9 times

on the average on their personal computer using internet shopping. The number of purchases by the elderly in their 60s and older was 69.8 times, much higher than the average showing a different pattern of purchasing than the items purchased by young people (Korea Internet & Security Agency, 2018). This situation, preferring shopping as well as search on the internet (Korea Internet & Security Agency, 2018), shows that internet shopping is becoming a common practice. This is due to the advantage of being able to save time on-line and to purchase goods at a reasonable price. However, since it is not possible to check the product directly before purchasing, there can be side effects such as false advertising or exaggerated advertising (Telecommunication Technology Association, 2009).

Purchasing of health functional foods through internet shopping is increasing, and purchasing by the elderly is also increasing, however, this raises a problem regarding the adequacy of information display. Even when a health-related problem arises, it is not easily discovered since, unlike medicine, cause and effect cannot be easily identified and side effect is not clearly visible. However, as health functional foods have a physiological effect on the structure and function of the human body (Health Functional Foods Act, 2015) information related to health functional foods should be easily identifiable on the Internet.

 * First Author, Department of Emergency Medical Technology, College of Health Science, Gachon University, South Korea. Tel: +82-32-820-4344, E-mail: psk@gachon.ac.kr
** Corresponding Author, Department of Emergency Medical Services, College of Health Sciences, Eulji University, South Korea. Tel: +82-31-740-7258, E-mail: emtec@eulji.ac.kr

Functionalities of health functional foods can be more widely expressed than those of general food for scientifically proven cases and can assist consumer's subjective choice by providing accurate and verified information. For health functional foods are helpful in preventing diseases, however, admitted that there are side effects. Hence, there is a need to provide sufficient and accurate information to address consumer concerns. Also, there is a necessity to deliver accurate information on the functionality of health functional foods based on consumption behavior of health functional foods. Labeling of health functional foods should be described in terms and expressions that consumers can easily understand. Although the Labeling Standards are stipulated in the Health Functional Foods Act enacted subsequently, they are not observed well.

1.2. the Purpose of the Research

Lawrence and Rayner (1998), Berner and Oconnell (1998) urged that there was need to have claims on conventional foods, foods for special dietary use, medical foods, and dietary supplements based by scientific recommended. And Parker (2003), Shimizu (2003) asserted that the labelling of functional foods should be based on scientific evidence and global standards. Further, this labelling could be able to avoid potential regulatory risk. Williams (2005) founded that health claims are useful when these are short, easy claims approved by the government. Arvanitoyannis and Houwelingen-Koukaliaroglou (2007) pointed out that functional foods had poor claims and legislation was progressing in some countries. In summary, labeling of health functional foods should be needed and readable, however, there has been no research on the actual condition regarding labeling of health functional foods in online distribution.

Accordingly, an attempt was made in this research to review the state of standard labeling compliance and identify the factors that are conducive to compliance with the Labeling Standards of the Health Functional Foods Act. The purpose of this research is to help internet shopping consumers of health functional foods select the suitable products by inducing readable labeling based on factors obtained through a survey of labeling of health functional foods in internet distribution.

2. Literature Review

Lawrence and Rayner concluded that the need to maintain a general prohibition on health claims while accommodating specific exemptions supported by scientific substantiation is recommended. Nutrition education and monitoring and evaluation are to encourage research and development of innovative food products while avoiding an inappropriate medicalization of the general food supply (Lawrence & Rayner, 1998).

Berner and Oconnell explained that four categories of foods: conventional foods, foods for special dietary use, medical foods, and dietary supplements regulated by the US Food and Drug Administration. And they found that nutrient content claims and approved health claims can appear on all qualifying foods, while structure/function claims are allowed on dietary supplements (Berner & Oconnell, 1998).

Parker reported that the use of nutrient content, health, and structure/function claims found in food advertisements of high circulation magazines published between 1998 and 2000. Overall, food marketers made substantial use of nutrient content claims, however, very limited use of health claims. Structure/function claims may be attributable to a more relaxed regulatory environment and avoidance of potential regulatory risk associated with health claims (Parker, 2003).

Shimizu asserted that the labelling of functional foods should be based on scientific evidence and be in harmony with global standards. The structure function claim, which is similar to the enhanced function claim, was enacted by the Dietary Supplement Health and Education Act in the USA in 1994 (Shimizu, 2003).

Williams founded that consumers see health claims as useful; they prefer short, succinct wording rather than long and complex claims; and they believe that claims should be approved by the government. Consumers view a food as healthier if it carries a health claim and do not clearly distinguish between nutrient content, structure-function, and health claims (Williams, 2005).

Arvanitoyannis and Houwelingen-Koukaliaroglou argued that consumers' main skepticism regarding functional foods resides in the veracity of health claims and in the low and often inadequate control of their claimed properties. Legislation concerning this matter was progressing at an extremely low pace and currently only Japan, the U.K., U.S.A., and Scandinavian countries have managed to make notable progress. Moreover, the labeling of functional foods was far from informative, providing scanty information about nutritional value, storage, and cooking recipes (Arvanitoyannis & Houwelingen-Koukaliaroglou, 2007).

Lee and Cormier showed that equal positive adoption rates across all demographics of age, education, and income, except for gender, in terms of attitudes toward mobile shopping. The rate of mobile commerce adoption was relatively stronger among females than males (Lee & Cormie, 2010).

Bleiel argued that the food companies have not adapted their strategies and their communication to the health awareness and request of consumers. The analysis of this phenomenon shows that the invention of new food products has to start in the mind of the consumers. A consequent orientation at consumer insights, translated into relevant, noticeable benefits, added to trustworthy and adequate brands, may be one potential route to market success (Bleiel, 2010).

Kang, Kim, and Park indicated that systematic attributes

resulting in website attractiveness and user's characteristics, thereby triggering customers' flow, play a crucial role in inducing customers' affective commitment. Moreover, familiarity, reputation, and uniqueness all have a significant effect on website attractiveness, and the research showed that uniqueness took the first place, and that familiarity and reputation followed in order of magnitude (Kang, Kim, & Park, 2011).

Shim and Kim showed that the quality of the system, customer-support service, shopping-mall perception and security, the users' propensity to pursue pleasure and pragmatic interest on shopping intention had an influence on the purchase intent of internet shopping-mall users (Shim & Kim, 2012).

Lee, Ahn, Kim, and Youn founded that the subjects comprised those who had made purchases at least once at an internet shopping mall. The common flow attributes of past researchers to the internet shopping mall environment, to gauge customers' e-commerce involvement. Skill, convenience, and shopping mall display design affirmatively influenced the computer-mediated environment from the internet marketing control implications perspective regarding the contents of the marketer's website (Lee, Ahn, Kim, & Youn, 2014).

3. Methodology

3.1. Research Design and Data

On Oct. 15, 2018, we examined health functional foods listed on NAVER Shopping Ranking which are sorted

according to fitness index, product popularity, and reliability index using a personal computer. Since most consumers access internet shopping malls using a portal service, We chose NAVER, which has the largest share of portal service (67.86%), as our target. NAVER Shopping Ranking not only contained internet shopping malls of various sizes, it also provided an easy access to information on health functional foods of domestic and foreign shopping malls <Figure 1>.

Excluding a few items that were sold out or could not be bundled, we selected top 100 health functional foods. Out of these 100 health functional foods, we have checked 9 labels including product name, expiration date, manufacturing date, raw material, ingredient, operative dose, nutritional information, daily intake, and functional effect which are based on Labeling Standards of the Act from the internet shopping malls one by one. Price was defined as the selling price at the internet shopping malls, and quantity was defined as the number of capsules and pills, etc. concerned. The function is summarized in one of the representativeness mainly considering the emphasis or common elements among various things. Domestic products are based on domestic packing or bottling, not on the origin of raw materials, and accredited advertising is confirmed by an approved advertising number. The standard labeling was limited to the labeling of some or all of the label lists in internet shopping malls in accordance with the Labeling Standards of the Act. Arrangements were limited to those marked with a clear indication, and unarranged posting, package picture posting, etc. were defined as other because it was difficult for consumers to easily recognize.

Note: *; https://search.shopping.naver.com

Figure 1: 100 health functional foods in NAVER* Shopping Ranking

3.2. methodology

Continuous variables such as prices were expressed using the mean, standard deviation, and interquartile range. Categorical variables including domestic product, accredited advertising, and labelling standards were expressed as percentages. The percentages of existence on standard labelling which had product name, expiration date, manufacturing date, raw material, ingredient, operative dose, nutritional information, daily intake, functional effect and domestic product, accredited advertising were compared using a Chi-square test. A p<.05 was considered a statistically significant difference. SPSS for Windows (v 19.0; IBM Inc., New York, USA) was used for the data analysis. G*Power (v 3.1.9.4; Universität Kiel, Kiel, Germany) was also used for power analysis in condition of effect size=.437 & .439; α=.05; sample size=100; degree of freedom=1. Calculated statistical power .99 & .99 were high compared to Cohen's recommendation for acceptable power .80 (Cohen, 1988).

4. Results

As a general characteristic of 100 health functional foods, mean price was about 69,900 won and mean quantity was 122. Mean lists arranged were 1.7, and only two of the 9 label lists according to Labeling Standards were arranged. In the function, 26 cases were not posted. Domestic products were 43 cases, which was relatively small compared to imported products. Accredited advertising was 19 cases, which was very small in comparison to unauthorized advertising. Cases which complied with the standard labeling were 40, which was relatively small in comparison to cases which did not comply. Overall, it was difficult to easily find the necessary information on health functional foods in online distribution <Table 1>.

Table 1: General characteristics of health functional foods in internet shopping malls

N=100

Continuous variables		Mean(IQR)
Price(₩)		69962(55973)
Quantity		122(150)
Lists arranged		1.7(3)
Categorical variables		**N(%)**
Function	Liver	21(21)
	Immunity	7(7)
	Vital energy	6(6)
	Blood circulation	6(6)
	Sexual function	6(6)
	Other	28(28)
	No label	26(26)

	Yes	43(43)
Domestic product*	No	57(57)
Accredited advertising	Yes	19(19)
	No	81(81)
Standard labelling	Yes	40(40)
	No	60(60)

Note: IQR; interquartile range, ₩; Won, *; based on country packaging the product

When lists arranged are checked in domestic products (mean 14.2), there were 20 raw materials, 20 operative doses, and 19 ingredients. When lists arranged are checked in accredited advertising (mean 9.7), there were 20 raw materials, 13 ingredients, and 13 operative doses. When lists arranged are checked in standard labeling (mean 18.0), there were 26 operative doses, 25 raw materials, and 24 ingredients. Overall, in lists arranged (mean 41.9), there were 59 raw materials, 59 operative doses, and 56 ingredients. When lists arranged are checked in mean, there were 19.7 raw materials, 19.7 operative doses, and 18.7 ingredients. To sum up, there were more operative doses in lists arranged of standard labeling and more product names in other of domestic product, whereas, there were more other (489) than lists arranged (377). In other words, rather than gathering health functional foods information with a clear indication on 9 labels, there were relatively less posting or package picture posting where arrangements are not made. So, these labels defined as other have been posted unreadably without arrangement <Table 2>.

To test whether there is any difference in the use of standard labeling between domestic products and imported products, Pearson's X^2 was applied. There was a statistically significant difference in the use of standard labeling between domestic product and imported products (p<.001). The percentage of cases with standard labeling in domestic products was relatively high (29%), whereas, the rate of non-standard labeling was relatively low (14%). The proportion of standard labeling in imported products was relatively low at 11%, whereas, the proportion of non-standard labeling was relatively high at 46%. In other words, health functional foods tend to follow standard labeling if they are domestic products, whereas, tend not to follow standard labeling if they are imported products. According to Cramer's V, the related strength between these two variables showed a moderate effect size (Contingency coefficient=.437).

To test whether there is any difference between accredited advertising/non-accredited advertising distinction and use of standard labeling, Pearson's X2 was applied. The result was, there was a statistically significant difference between accredited advertising/unaccredited advertising distinction and use of standard labeling (p<.001). The proportion of standard labeling in accredited advertising was

Table 2: Labelling on health functional foods in internet shopping malls

Labelling lists	Domestic product* (n=43)		Accredited advertising (n=19)		Standard labelling (n=40)		Overall (n=102)		Mean (SD)	
	Arrange- ment**	Other	Arrange- ment**	Other	Arrange- ment**	Other	Arrange- ment**	Other	Arrange- ment**	Other
Product name	6	37	3	16	8	32	17	85	5.7 (2.5)	28.3 (11.0)
Expiration date	11	30	8	11	15	25	34	66	11.3 (3.5)	22.0 (9.8)
Manufacturing date	11	30	9	10	16	24	36	64	12.0 (3.6)	21.3 (10.3)
Raw material	20	20	14	5	25	14	59	39	19.7 (5.)	13.0 (7.5)
Ingredient	19	20	13	6	24	15	56	41	18.7 (5.5)	13.7 (7.1)
Operative dose	20	20	13	6	26	14	59	40	19.7 (6.5)	13.3 (7.0)
Nutritional information	16	21	11	7	19	17	46	45	15.4 (4.0)	15.0 (7.2)
Daily intake	13	20	8	9	15	19	36	48	12.0 (3.6)	16.0 (6.1)
Functional effect	12	26	8	11	14	24	34	61	11.3 (3.1)	20.3 (8.1)
Overall	128	224	87	81	162	184	377	489	125.7 (37.6)	163.0 (73.8)
Mean (SD)	14.2 (4.8)	24.9 (6.2)	9.7 (3.5)	9.0 (3.5)	18.0 (6.0)	20.4 (6.2)	41.9 (14.2)	54.3 (15.7)		

Note: SD; standard deviation, *; based on country packaging the product,
**; gathering health functional foods information with a clear indication on 9 labels

relatively high at 17%, whereas, the proportion of non-standard labeling was relatively low at 2%. The proportion of non-standard labeling was relatively low at 23% in the case of unauthorized advertising, whereas, the proportion of non-standard labeling was relatively high at 58%. That is to say, health functional foods tend to follow standard labeling if they are accredited advertising, whereas, tend not to follow standard labeling if they are not accredited advertising. According to Cramer's V, the related strength between these two variables showed a moderate effect size (Contingency coefficient=.439) <Table 3>.

Table 3: Univariate analysis of standard labelling predicted by domestic product and accredited advertising

N(%)

Conditions		Standard labelling		Contingency coefficient	x^2	p
		Yes	No			
Domestic product*	Yes	29(29)	14(14)	.437	23.671	.000
	No	11(11)	46(46)			
Accredited advertising	Yes	17(17)	2(2)**	.439	23.922	.000
	No	23(23)	58(58)			

Note: *; based on country packaging the product, **; expected count 7.6

5. Discussion

As a result of a survey of 100 health functional foods in internet shopping malls, it was found that the Labeling Standards of the Health Functional Foods Act were not followed and found to be related to imports or unauthorized advertising. The information displayed according to the Labeling Standards was only about 2 on the average, so many cases have been posted without arrangement. In order to know the information on the remaining 7, it is necessary to check the posting one by one, or to contact the distributor or the manufacturer if it is not posted, a situation requiring improvement. When health functional foods are domestic products, standard labeling was performed, however, if they are imported products, standard labeling was not performed. And the relationship between two variables was significant statistically. Also, if advertising for a health functional food was accredited advertising, standard labeling was performed, however, if it was an unaccredited advertising, standard labeling was not performed. And the relationship between two variables was significant statistically. Hence, there is a need to strengthen Labeling Standards for imported health functional foods that are sold at internet shopping malls, and have 9 label lists displayed

for immediate recognition at a glance by getting accredited advertising for all health functional foods.

Health functional foods are required to receive functional labeling and advertising review. However, functional labeling and advertisement review are not received when the report is presented by submitting the contents to the relevant organization at the time of import declaration. On such occasions, there is a possibility of omitting the posting or displaying only a part of it. This problem was revealed in the survey as well. Considering internet shopping of health functional foods is now a common practice and groups over 60 years of age are purchasing much more than the group below that age (Korea Internet & Security Agency, 2018), 9 label lists should be made easy to find. Hence, there is a need to pay more attention to a number of recent studies on this topic. Although it did not mention the importance of information delivery. Providing more accurate and verified information on health functional foods than on other general food could help subjective selection of consumers. The necessity of providing accurate and sufficient information to address concerns about side effects of health functional foods. The arguments that emphasized delivery of accurate information on the functionality of health functional foods and that stressed the information on health functional foods must be written using easy to understand terms and methods should also be considered.

In 2017, the sales amount of health functional foods in Korea was 2 trillion 237.4 billion won, and the import amount was 575 billion won (Ministry of Food and Drug Safety, 2018). In the survey, there were 57 imports and 43 domestic products, which is somewhat different from the overall Korean market. This may be a sign that the on-line market is selling a lot of imports and that imports are in line with the shopping ranking criteria. Although it differs from the overall market situation in Korea, it is judged to be a subject of research that is consistent with the research theme. However, this study was conducted only on 100 health functional foods selected according to the shopping ranking of a portal service with high share. Therefore, application of statistical methods cannot but be limited since the data were collected based on the information posted by internet shopping malls only. This suggests that there is a limit to the generalization of our research results.

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