

Changes in Korean Consumers' Perception on Food Preservatives by a Risk Communication Booklet

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ABSTRACT - Food preservatives are very important food additives for the biological and chemical safety of processed foods. The purposes of this study were to investigate Korean consumer's perception and information needs on food preservatives, to develop an educational booklet as a risk communication material on food preservatives, and to assess the educational effect of the developed booklet. To understand perception on food preservatives, a self-administered questionnaire survey was conducted by 381 parents having elementary school students at Seoul and Geoynggi area in Korea. Based on the survey results, brain storming of the authors along with consultation from the professionals, we developed a risk communication booklet about food preservatives. It was exposed to 35 parents of elementary school children, and their evaluation was collected by using a questionnaire and analyzed statistically. Respondents considered food safety (44.8%) as the most important factor while purchasing processed foods. They still perceived food additives as the most hazardous one (41.5%), and among those, food preservatives were the most concerned (45.9%). Total 67.7% of the respondents considered the consumption of food preservatives as hazardous or very hazardous. However, 90.6% of respondents did not have any educational experience about food additives and food preservatives. Based on their information needs, a science-based booklet consisting of the definition, classification, safety, intake, and management of food preservatives was developed. When the booklet titled as 'Food preservatives, Just Know Them!' was exposed to the parents via elementary school teacher, their negative perceptions on food additives and food preservatives were changed positively by increasing the understanding level on preservatives from 18.9% to 90.9% and obtaining 72.7% positive answers on their safety. Therefore, it could be used as an effective risk communication material on food preservatives.

Key words: Food preservatives, Risk communication, Korean consumers, Booklet

Consumers' concern about healthy life and healthy eating caused the attention for food safety of artificially added or unintentionally adulterated components such as food additives, residual pesticides, radioactive pollution, various environmental contaminants, etc.^{1,2)}. In our previous study on the perceptions on food additives from 2008 to 2013 in South Korea³⁾, food safety was recognized as the most important factor in purchasing processed foods, and food additives has been recognized as the most hazardous factor in foods. This slanted view on food additives was also observed in

important information providers like elementary school teachers⁴⁾ and consumer organization⁵⁾. Such tendency is quite different from the United States (US) and European Union (EU) in which microbial pathogens are recognized as the most dangerous factors⁶⁻⁸⁾. These reasons might be related to the spreading of biased and unproven information through mass media along with marketing strategy in Korea^{6,9)}.

Food additives are used for specific and important functions such as protecting food from microorganism or oxygen, increasing or creating of organoleptic quality, fortifying nutrients, and increasing stability. Despite the strict safety evaluation by Korea Food Additives Code¹⁰⁾ before its approval for use, food additives have been blamed as the dangerous materials against food safety. Especially, food preservatives, added to prevent deterioration of food quality

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by microbial growth, were regarded as the most hazardous ones among Koreans during 2008-2013³). Nowadays, food labeling for food additives is enforced to know what kinds of food additives are used in processed foods¹⁰. Especially, Children's Favorite Foods Quality Certification has been implemented for the products with low calorie without synthetic preservatives, L-glutamate, and artificial colorant along with hazard analysis and critical control point (HACCP) certification from 2009 in South Korea¹¹). However, even though government regulated food additives based on objective and scientific knowledge, consumers have great confusions by a deluge of indiscriminate information by mass media and turned out to have very negative perceptions on food additives for human health. Risk and benefit perceptions for food additives were influenced by consumers' knowledge of regulation, their trust in regulators, and their preference for natural products¹²). Therefore, the importance of risk communication and education about food additives for consumers are emphasized as well as the increase of trust on regulators.

Elementary school parents are the most sensitive consumer group showing great concern on food safety and having a crucial role in family health, dietary habits and their knowledge. In addition, these parents are easily influenced by consumer organization that have very negative perceptions on food additives and serve as opinion leaders in food safety issues⁵). Therefore, it is very important to educate parents on food safety including the issues on food additives. Hong and Jeong¹³) suggested that TV, radio and school education are effective methods of informing parents. Surujlal and Badrie¹⁴) said that understanding of the consumers' behaviors and assuring of the consumers' education are an essential element in regarding the risk of unsafe food handling practices. Korean parents still perceived food additives as the most hazardous factor, on the contrary, children regarded microbial contaminants as being most hazardous, which might be the results of education in school³). However, biased recognition of parents for food safety might lead children to be confused for correct information because parents are influential dietary educators at home. Therefore, it is very urgent to find proper methods promoting risk communication with parents for spreading sound information about food additives.

As an approach to facilitate the risk communication on food preservatives, we surveyed the perception and purchase behavior of elementary school parents for processed food and food preservatives as they are influential dietary educators for their children at home, and developed a risk communication booklet based on the survey results. Also, its information delivering and educational effects about food preservatives were evaluated by exposing to the parents.

Subjects and Methods

Survey on the perception and information needs of elementary school parents for food additives and food preservatives

A self-administered questionnaire was distributed and collected from elementary school parents via their children by the help of homeroom teachers from April to May 2014 in the metropolitan area, South Korea, and a total 381 out of 425 parents responded for the survey (89.7%). The questionnaire, which was developed by literature reviews, focus group interview and expert consultation, consisting of general perception and purchasing behaviors for processed foods (11 queries), perception and information needs on food preservatives (4 queries) and educational experience and preferred information providers or channels about food preservatives (7 queries). Demographic characteristics (gender, age, and educational background) were also included in the questionnaire. Each query addressed 5-point Likert scale, nominal scale or short answer description. Totally 381 elementary school parents (male = 69, 18.1% and female = 307, 80.6%) participated in the survey, and their age was distributed in 40-49 yr (n = 288, 75.6%), 30-39 yr (n = 74, 19.4%), and > 50 yr (n = 3, 0.8%) and no reply (n = 3, 0.8%) (data not shown).

Development and application of booklet 'Food preservatives, Just Know Them!'

Considering parent's needs from the above survey, and brainstorming with researchers and government officers, we developed a booklet '*Food preservatives, Just Know Them!*' to five categories; 'What is food preservatives?', 'What kinds of food preservatives are used in processed foods?', 'Are food preservatives safe?', 'How can we enjoy safe dietary life?' and 'What does government do to manage food preservatives?'. The contents of booklet were described by infographic designs. The booklets were released to 35 elementary school parents for 2 wk in October 2014, and then we performed post-self-administered questionnaire survey for the monitoring of perception change for food preservatives after reading booklet.

Statistical Analyses

Collected survey data were analyzed by SPSS software (SPSS Inc., Version 18.0 Chicago, IL, USA). Frequency analysis was conducted to identify general characteristics, parents' perception and awareness of food additives and food preservatives. For the questions of 5 point-Likert scale, mean and standard deviation were calculated by assigning from 1 to 5 points to each answer. Cross-tabulation and chi-square tests were performed to determine the respondents'

general perception and purchasing behaviors for processed foods based on demographic data.

Results

Perception and purchasing behavior for processed foods

The perception and purchasing behavior of the subjects for processed foods are shown in Fig. 1. The most hazardous factor on food safety was recognized as food additives (41.5%) followed by microbial contamination (21.3%), environmental pollution (13.2%), heavy metals (8.6%), pesticide residue (6.3%), antibiotics (4.8%), and natural poison (2.5%) (Fig. 1A). The most concerned food additives

in processed foods was preservatives (45.9%) followed by color retention agents (11.8%), bleaching agents (11.5%), flavor enhancers (10.8%), food coloring (8.7%), artificial flavors (3.7%), antioxidants (2.9%), and emulsifiers (2.9%) (Fig. 1B). These results showed that the parents of the elementary school children have biased perception on preservatives as the most dangerous materials threatening food safety.

The most important factor during grocery shopping was the safety (44.8%), followed by nutrition (33.7%) and taste (16.5%) (Table 1). Except the production and expiration date, they checked the origin of food materials (40.2%) first, followed by main ingredients and contents (25.7%) and food additives (18.0%). The fact that only 30.9% of the subjects

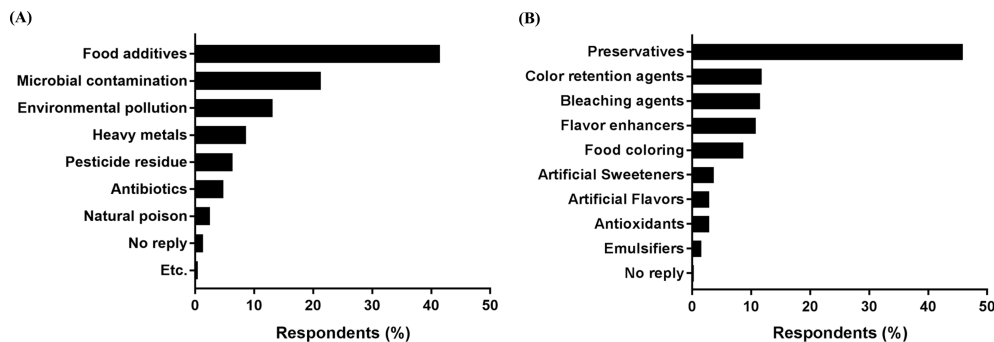


Fig. 1. Korean consumers' perception for the most hazardous factor on food safety (A) and for the most concerned food additives in processed foods (B).

Table 1. Korean consumers' perception and purchase behaviors on processed foods^a

Query	Response	Male	Female	No reply	Total	Significance ^b
What is the most important factor when you purchase processed foods? ^b	Taste	13 (17.6)	51 (16.1)	1 (20.0)	65 (16.5)	$\chi^2 = 7.101$ $p = .716$
	Price	3 (4.1)	9 (2.8)	1 (20.0)	13 (3.3)	
	Nutrition	27 (36.5)	105 (33.2)	1 (20.0)	133 (33.7)	
	Safety	31 (41.9)	144 (45.6)	2 (40.0)	177 (44.8)	
	Others	0 (0.0)	5 (1.6)	0 (0.0)	5 (1.3)	
	No reply	0 (0.0)	2 (0.6)	0 (0.0)	2 (0.5)	
What is the first checking item except production and expiration dates when purchasing processed foods? ^b	Nutrition	6 (7.9)	14 (44.4)	2 (25.0)	22 (5.4)	$\chi^2 = 18.342$ $p = .106$
	Main Ingredients	17 (22.4)	87 (27.1)	0 (0.0)	104 (25.7)	
	Certification mark	11 (14.5)	26 (8.1)	2 (25.0)	39 (9.6)	
	Food additives	16 (21.1)	57 (17.8)	0 (0.0)	73 (18.0)	
	Origin	25 (32.9)	134 (41.7)	4 (50.0)	163 (40.2)	
	Etc.	1 (1.3)	2 (0.6)	0 (0.0)	3 (0.7)	
Do you understand food labelling when you purchase processed foods?	Never	2 (2.9)	1 (0.3)	0 (0.0)	3 (0.8)	$\chi^2 = 48.798$ $p = .000^{***}$
	A little	10 (14.5)	27 (8.8)	0 (0.0)	37 (9.7)	
	Neutral	38 (55.1)	181 (59.0)	1 (20.0)	220 (57.7)	
	Somewhat	14 (20.3)	85 (27.7)	1 (20.0)	100 (26.2)	
	Very well	5 (7.2)	11 (3.6)	2 (40.0)	18 (4.7)	
No reply	0 (0.0)	2 (0.7)	1 (20.0)	3 (0.8)		

Table 1. (Continued) Korean consumers' perception and purchase behaviors on processed foods^a

Query	Response	Male	Female	No reply	Total	Significance
How much are you aware of food additives?	Never	0 (0.0)	2 (0.7)	0 (0.0)	2 (0.5)	$\chi^2 = 21.479$ $p = .006^{**}$
	A little	20 (29.0)	41 (13.4)	1 (20.0)	62 (16.3)	
	Neutral	33 (47.8)	186 (60.6)	1 (0.0)	220 (57.7)	
	Somewhat	13 (18.8)	73 (23.8)	2 (40.0)	88 (23.1)	
	Very well	3 (4.3)	5 (1.6)	1 (20.0)	9 (2.4)	
Do you read food labelling for food additives when you purchase processed food?	Never	4 (5.8)	3 (1.0)	0 (0.0)	7 (1.8)	$\chi^2 = 41.463$ $p = .000^{***}$
	A little	15 (21.7)	45 (14.7)	1 (20.0)	61 (16.0)	
	Neutral	29 (42.0)	128 (41.7)	1 (20.0)	158 (41.5)	
	Somewhat	16 (23.2)	117 (38.1)	0 (0.0)	133 (34.9)	
	Very well	5 (7.2)	14 (4.6)	3 (60.0)	22 (5.8)	
Do you understand food labelling for food additives?	Never	4 (5.8)	5 (1.6)	0 (0.0)	9 (2.4)	$\chi^2 = 20.424$ $p = .009^{**}$
	A little	15 (21.7)	44 (14.3)	1 (20.0)	60 (15.7)	
	Neutral	35 (50.7)	176 (57.3)	0 (0.0)	211 (55.4)	
	Somewhat	14 (20.3)	76 (24.8)	3 (60.0)	93 (24.4)	
	Very well	1 (1.4)	6 (2.0)	1 (20.0)	8 (2.1)	
Do you consider the amount of food additives when you buy foods?	Never	1 (1.4)	2 (0.7)	0 (0.0)	3 (0.8)	$\chi^2 = 7.728$ $p = .655$
	A little	5 (7.2)	17 (5.5)	1 (20.0)	23 (6.0)	
	Neutral	30 (43.5)	106 (34.5)	0 (0.0)	136 (35.7)	
	Somewhat	28 (40.6)	151 (49.2)	3 (60.0)	182 (47.8)	
	Very well	5 (7.2)	30 (9.8)	1 (20.0)	36 (9.4)	
Do you know there is legal standard and management system for food additives?	Strongly disagree	0 (0.0)	1 (0.3)	0 (0.0)	1 (0.3)	$\chi^2 = 2.717$ $p = .606$
	Yes	33 (47.8)	156 (50.8)	4 (80.0)	193 (50.7)	
	No	36 (52.2)	148 (48.2)	1 (20.0)	185 (48.6)	
	No reply	0 (0.0)	3 (1.0)	0 (0.0)	3 (0.8)	
How much are you aware of food preservatives?	Very unaware	4 (5.8)	6 (2.0)	0 (0.0)	10 (2.6)	$\chi^2 = 7.751$ $p = .653$
	Unaware	13 (18.8)	66 (21.5)	2 (40.0)	81 (21.3)	
	Neutral	39 (56.5)	177 (57.7)	1 (20.0)	217 (57.0)	
	Moderately aware	12 (17.4)	50 (16.3)	2 (40.0)	64 (16.8)	
	Very aware	1 (1.4)	7 (2.3)	0 (0.0)	8 (2.1)	
	No reply	0 (0.0)	1 (0.3)	0 (0.0)	1 (0.3)	

^a All data were expressed as numbers (%) of survey respondents.

^b multiple responses

** $p < 0.01$; *** $p < 0.001$

appeared to understand food labeling, suggested the needs of education on food labels. While 40.7% and 57.2% of respondents answered they read food labeling for food additives and considered the amount of food additives, respectively, only 26.5% appeared to understand food additives in food labeling. Only half of the respondents (50.7%) recognized the presence of legal standard and management system for food additives. Female respondents showed significantly higher level of reading and understanding food labels for food additives compared with male subjects ($p < 0.05$). Although there was no significant difference by age ($p > 0.05$), younger group showed higher

concern for taste and nutrition and older group showed higher concern for food safety (data not shown). Above results suggest that the parents of elementary school children, who are the most sensitive consumers in Korea have a negative or biased perception on food additives in processed foods and need proper dietary education on food safety.

Perception and information needs on food preservatives

Total 67.7% of the respondents replied that food preservatives are hazardous or very hazardous, and only 2.7% replied safe as shown in Fig. 2. It showed that most of the

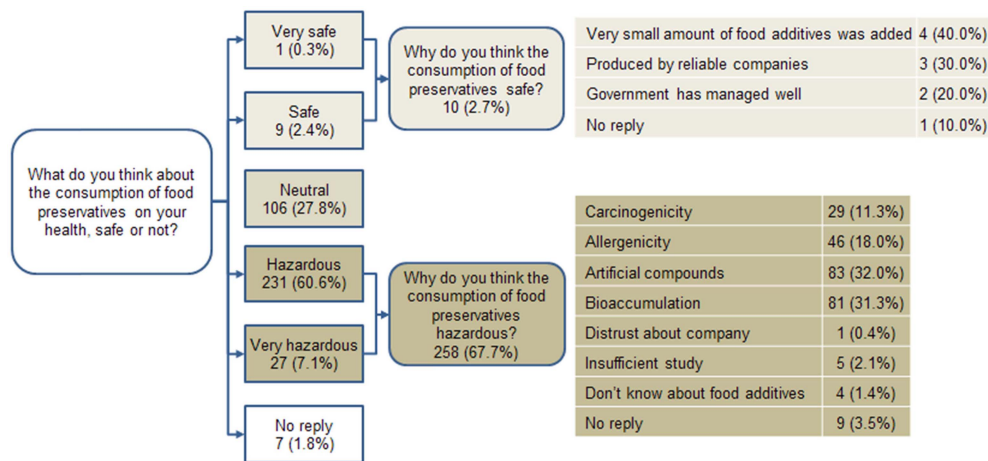


Fig. 2. Perception of Korean consumers on food preservatives in processed foods.

subjects have negative perception on food preservatives without considering any positive function of controlling microbial growth or undesirable chemical changes in food to protect food quality. The reasons of negative reply on food preservatives were because they are ‘artificial compounds’ (32.0%), ‘bioaccumulation in human body’ (31.3%), ‘cause of allergenicity’ (18.0%), ‘act as a carcinogen’ (11.3%), ‘insufficient study’ (2.1%), ‘don’t know about food additives’ (1.4%), and ‘distrust for food companies’ (0.4%). On the other hand, the reasons of positive reply were ‘very small amount is added’ (40.0%), ‘produced by reliable companies’ (30.0%) and ‘government has managed well’ (20.0%). It meant that ‘artificial’ term itself as well as incorrect information on food preservatives such as ‘bioaccumulation’, ‘allergenicity’ and ‘carcinogenicity’ have influenced to the negative or biased perceptions on food preservatives. These data suggest that most consumers have extremely negative perception on food preservatives due to the improper and incorrect information on food preservatives. Therefore, we confirmed that strategic risk communication is urgent for the improvement of consumers’ understanding on food preservatives.

Even though higher concern for food preservatives, most parents (90.6%) had no educational experience about food preservatives, and 85.3% agreed to the necessity of education and promotion on food preservatives in foods. The most curious information on food preservatives was their safety (62.7%), legal standards (10.6%), daily intake level (9.4%), and approved foods for the use of preservatives (9.2%), etc. (Fig. 3). The information channel about food preservatives appeared as TV (3.2 ± 1.1), internet (3.0 ± 1.1), food package with food labeling (2.8 ± 1.1), newspaper (2.8 ± 1.1), school letter (2.6 ± 1.0), and booklet or leaflet (2.3 ± 1.1), and etc. (Fig. 4A). The most credible infor-

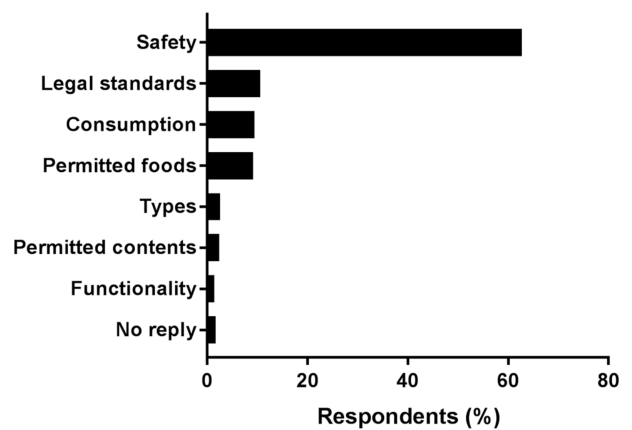


Fig. 3. The most curious information on food preservatives in processed foods.

mation provider appeared to consumer organizations (3.7 ± 0.8), and followed by hospitals (3.6 ± 0.8), universities & research centers (3.6 ± 0.8), schools (3.5 ± 0.8), broadcasting & newspapers (3.2 ± 0.8), government (3.2 ± 0.9), and food companies (2.5 ± 0.8) (Fig. 4B). Preferred education and promotion materials were in the order of lectures (3.8 ± 0.8), school letters (3.6 ± 0.7), food package with food labels (3.3 ± 0.9), paper books (3.2 ± 0.9), videos (3.1 ± 0.9), and electronic books (3.0 ± 0.8) (Fig. 4C). These results also show that risk communication on food additives including food preservative are essential by developing effective educational tools based on science and by delivering sound information through effective risk communicators.

Development of a booklet ‘Food Preservatives, Just Know Them!’ and information delivering effects via school education

Various educational tools such as video, booklet, leaflet,

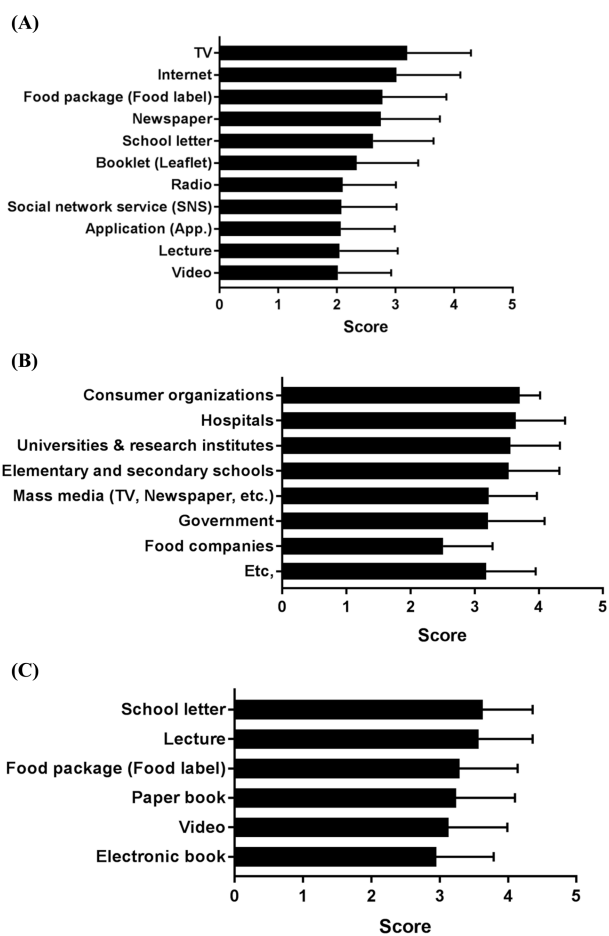


Fig. 4. Preference for information channel (A), credibility for information provider (B), and preference of education materials (C) promoting risk communication for food additives and food preservatives. The values in 5-point Likert scale were calculated by assigning points as 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree and expressed as mean ± standard deviation (SD).

press release, and mobile application, were developed for promoting risk communication on food additives. However, Korean consumers' concern has not been improved until now¹⁵). The survey results showed that the parents had few educational experiences despite high concerns on food additives. Therefore, we focused on the channel of delivering information about food preservatives. Parents wanted to know more information on the safety, dietary intake, and food with preservatives, etc. The Internet and TV were main preferred channel getting information on food preservatives as shown in Fig. 3A, however, these channels are too costly and have caused confusion by spreading unconfirmed information. Parents showed higher trust for consumer organizations, hospitals, universities & research centers, elementary schools as information sources (Fig. 3B). Therefore, we convinced that information delivering about food

Table 2. Information needs of elementary school parents for education and promotion on food preservatives in processed foods

Query	Response	N (%)
Did you have educational experience about food preservatives?	Yes	35 (9.2)
	No	345 (90.6)
	No reply	1 (0.3)
Do you think education and promotion about food preservatives are necessary?	Strongly disagree	0 (0.0)
	Disagree	2 (0.5)
	Neutral	50 (13.1)
	Agree	237 (62.2)
	Strongly agree	88 (23.1)
	No reply	4 (1.0)

preservatives via elementary school might be helpful for reducing vague anxiety on food preservatives and spreading science-based balanced knowledge among family members.

By reflecting the concerns of the respondents, we developed a booklet '*Food Preservatives, Just Know them!*' with the contents of five chapters; 'Chapter 1. What are food preservatives?', 'Chapter 2. What kinds of food preservatives are used?', 'Chapter 3. Are food preservatives safe?', 'Chapter 4. What is safe dietary practice with processed foods?', and 'Chapter 5. Food preservatives are well managed by the government'. In chapter 1, we included definition, function, and production of food preservatives. In chapter 2, we informed the kinds of food preservatives and each function. Chapter 3 explained the concept of the acceptable dietary intake (ADI) and average intake level of Korean. Chapter 4 gave information on sound guideline on balanced diet and explained food labeling including food additives. In chapter 5, we informed the role of government and provided further information sources on food additives.

When the booklet was distributed to a group of parents (n = 33) via elementary school, their understanding on food preservative was increased and negative perception was changed positively. As shown in Table 3, total 72.8% of respondents showed interests for the booklet, 84.9% answered the booklet was helpful for understanding about food preservatives and for being healthy and safe diets. Understanding for the roles and types of food preservatives were increased to 90.9% and 81.8%, respectively. Comparing with the pre-survey results that most of the respondents had negative perceptions on food preservative, 72.7% of respondents answered positively for the awareness of safety and for the understanding of the management by government, respectively. According to the above results, we ascertained the positive effects of the booklet along with the effective channel of releasing educational materials via elementary school.

Table 3. Perception changes of elementary school parents on food preservatives after reading booklet '*Food preservatives, Just Know Them!*'

Query	Response ^a	N (%)
Were the contents of the booklet interesting to you?	Disagree	1 (3.0)
	Neutral	8 (24.2)
	Agree	15 (45.5)
	Strongly agree	9 (27.3)
Was the booklet helpful for your understanding on food preservatives?	Disagree	0 (0.0)
	Neutral	5 (15.2)
	Agree	12 (36.4)
	Strongly agree	16 (48.5)
Was the booklet helpful to your healthy and safe eating habit?	Disagree	0 (0.0)
	Neutral	5 (15.2)
	Agree	23 (69.7)
	Strongly agree	5 (15.2)
Did you understand the role of food preservatives?	Unaware	9 (0.0)
	Neutral	3 (9.1)
	Aware	24 (72.7)
	Strongly aware	6 (18.2)
Did you understand the types of food preservatives?	Unaware	0 (0.0)
	Neutral	6 (18.2)
	Aware	21 (63.6)
	Strongly aware	6 (18.2)
Did you understand the safety of food preservatives?	Unaware	1 (3.0)
	Neutral	8 (24.2)
	Aware	18 (54.5)
	Strongly aware	6 (18.2)
Did you understand the management of food preservatives by government?	Unaware	2 (6.1)
	Neutral	7 (21.2)
	Aware	16 (48.5)
	Strongly aware	8 (24.2)

^a 'Strongly unaware' and 'Strongly disagree' in all queries were 0% and didn't write in table.

Discussion

Consumers are very concerned about food safety all around world¹⁶. Wilcock et al.⁸) reported that EU consumers have worried about the prevalence of bovine spongiform encephalopathy and *Escherichia coli* O157, abuse of hormone and antibiotics in animals. Liu and Niyongira¹⁵) reported that Chinese consumers had a high concern in food hygiene (52.0%), food poisoning (45%), and food additives (37.5%). According to the food and health survey in US, most Americans (68%) agreed that food additives extend the freshness of certain foods¹⁷). However, our study showed that Korean parents, sensitive consumers on food safety as

a manager of family dietary life, have quite different perception for hazardous factor of food safety comparing with other countries. Kang et al.¹⁸) also reported that most Korean consumers such as food experts, teachers, nutrition teachers, non-governmental organization members as well as general consumers have biased perception even though having perception gaps on food additives. Considering the function of food additives in processed foods, it would not be possible to maintain the current selection and quality of processed foods without food additives¹⁸). Experts asserted that the huge benefits of food additives should balance out the negligible anxiety for the potential health impact of regular food additive consumption¹²). However, our survey

showed that parents of elementary school children have vague anxiety rather than proper awareness about the benefit of food additives and food preservatives.

The mass media like TV and the Internet are easily assessable channels for getting information. McIntosh et al.¹⁹⁾ found that the mass media was the most common source of external influence. Kim et al.²⁾ showed that 61% participants obtained the information about food additives through mass media such as TV, radio, and newspaper, etc. However, it is very difficult to distinguish sound and reliable information from others. Lee²⁰⁾ has shown that high school students have higher negative concerns for sodium caseinate in instant coffee, which affected by advertising of instant coffee built up negative perception on sodium caseinate to teenagers. Previous study has shown that the perception of parents about food additives and food preservatives were not improved despite the governmental efforts of developing various risk communication materials like a leaflet, pamphlet, and press release for 'Daily intake of food preservatives based on experimental data'. It might be due to the lack of enough risk communication activities compared with the rapid spread of mass media or the choice of the wrong channel²¹⁾.

According to the dietary assessment for food preservatives in Korea, intake of food preservatives were 0.00-3.01% of ADI, which meant Korean intake level of food preservatives are quite low as not to worry about²²⁾. Benzoic acid and its salts, the most generally used food preservatives in processed foods, have low toxicity by a detoxifying mechanism in the human body, and generally recognized as safe (GRAS) up to 0.1% in the US²³⁾. Propionic acid and its salts are absorbed easily by high water solubility, and decomposed and excreted in the human body, which have no dosage limitation for usage in food²⁴⁾. Even though Korean government is tightly controlling the use of food additives based on scientific evidence, improper risk communication between the government and consumers caused to the continuous anxiety for the safety of food preservatives. In a previous study, we showed that consumer organization members (n = 111), potent stakeholders having higher credibility from consumers, had strongly negative perceptions on food additives, as well as low trust on governmental management⁵⁾. It meant the importance of communicator as an information deliverer. Tarnavölgy²⁵⁾ suggests that informational campaigns might decrease concerns related to food additives. However, ill-advised communication attempts might even enhance public insecurities²⁶⁻²⁸⁾. Therefore, communications for food additives should be carefully designed and contain the central topics from a risk-related perspective, as well as from consumers' viewpoints²⁹⁾. In our study, consumers have extremely negative perception on

food preservatives without proper education or sound information. Therefore, strategic risk communication is urgent for the improvement of consumers' perception. We developed a booklet for elementary school parents and confirmed its positive educational effects by exposing the information through school teachers who have credibility by the parents. From the above results, we could assure that the booklet, as a risk communication tool, was a very effective educational material for the formation of the sound perception on food preservatives, and school or school teacher, as a risk communicator, was an effective communication channel.

In conclusion, consumers' negative perception on food preservatives seemed to be due to the lack of proper risk communication, and the selection of proper communicator and communication channel are very important for the enhancement of risk communication. A science-based educational booklet like 'Food preservatives, Just Know Them!' via school teacher improved biased perception of the parents for food preservatives. It meant that development and distribution of educational tools based on the needs of targeted consumers should be an effective strategy or channel for the change of biased perceptions on food preservatives. Furthermore, the consumers' sound perception on food preservatives could be served for their balanced and safe dietary life.

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Conflict of Interest

The authors declare no potential conflicts of interests.

국문요약

본 연구는 학부모를 대상으로 식품첨가물 및 보존료에 대한 인식 수준과 정보요구도를 파악하고 이를 바탕으로 학부모의 식품첨가물 및 보존료에 대한 올바른 이해와 안전한 식생활을 위한 교육자료를 개발하고자 하였다. 2014년 서울 경기지역 초등학교를 둔 학부모 381명을 대상으로 식품첨가물 및 보존료에 대한 인식 및 정보요구도에 대한 설문조사를 수행한 결과 응답자 중 가공식품 구입 시 안전성을 가장 중요한 요소라고 응답하였으며, 41.5%가 식품 첨가물을 가장 식품안전을 위협하는 것이라고 응답하였으며, 식품 첨가물 중에서는 보존료가 가장 위험하다고 응답하였다. 그러나 응답자의 90.6%가 식품첨가물 및 보존료에 대한 교육 경험이 없다고 응답하였다. 설문 결과와 학부모들의 정보요구도에 따라 교육홍보책자인 '보

존료 바르게 알기'를 개발하였다. '보존료 바르게 알기'는 '보존료란 어떤 물질인가요?', '보존료는 어떤 종류가 있나요?', '보존료는 안전한가요?', '가공식품, 어떻게 섭취해야 하나요?', '식품첨가물은 식약처가 철저히 관리하고 있어요' 등의 5장으로 구성하여 소비자인 학부모들이 알고 싶어하는 내용들을 알기 쉽고 재미있게 전달할 수 있도록 구성하였다. 개발된 교육홍보책자를 초등학교 학부모에게 시범 적용한 결과, 사전 18.9%만이 보존료가 무엇인지 알고 있다고 응답한 수준에서 사후 90.9%가 그 역할을 이해하고 72.7%가 안전하다고 응답하여 개발된 책자가 보존료에 대한 이해도를 크게 높이고 보존료에 대한 오해를 바로잡을 수 있는 것을 확인할 수 있었다. 따라서 본 연구에서 개발된 교육홍보책자는 학부모를 비롯한 일반소비자들에게 보존료에 대한 이해를 높일 수 있는 효과적인 정보전달매체로 활용될 수 있을 것이다.

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