

Assessment of the Dieticians' Attitudes about Functional Foods and Their Needs for Training

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Abstract

The object of this study was to examine attitudes and knowledge of Korean dieticians about functional foods. We investigated their perceived knowledge and their attitudes regarding risks versus benefits, and recommendation about the use of functional foods; as well as their frequency of personal use, and the educational supports and training needs of dieticians. We developed a questionnaire to assess the dieticians' attitudes related to functional foods. This questionnaire was used for characterizing functional food-related attitudes on the basis of factor and reliability analysis in the following study. The questionnaires were distributed to 802 practicing dieticians working in Daegu and Gyeongsangbukdo. A total of 244 respondents (mean age 34 ± 5.7 years) returned the completed questionnaires through online surveys. Descriptive statistics and ANOVA were used to analyze data. Fewer than 2% of dieticians claimed themselves to be knowledgeable about functional foods, more than 79% consumed functional foods more than once a week, and 88% of dieticians expressed an interest in receiving training about functional foods. Dieticians had favorable attitudes about the rewards from functional foods but were not confident about the safety and usage recommendation of these foods. The level of knowledge and educational support at their universities about functional foods affected the dieticians' attitudes regarding the rewards from and recommendation about the use of functional foods. These results suggest a need for additional educational opportunities to facilitate a better understanding of the risks and benefits of functional foods and their proper usage. Dietetics professionals must adapt to changes in health practices through effective educational programs integrating sufficient knowledge about functional foods.

Key words: dieticians, functional foods, perceived knowledge, attitudes

INTRODUCTION

Functional foods, defined as foods that provide health benefits beyond basic nutrition, play a role in disease prevention and health promotion (1,2). The usage of functional foods has increased dramatically in recent years and the consumption of functional foods is an important health-related trend (3). The functional food world market was estimated to have reached at least 138 billion US dollars in 2000 and it is steadily growing (3). Today's consumers use a more proactive strategy for improving health through foods and want foods to provide more than just their daily nutrient requirements (4,5). In a recent survey of 1000 consumers, 95% of respondents believed that certain foods could reduce the risk of disease thus improving health (6). Similarly, 9 out of 10 consumers believed that healthy eating is a key component in disease prevention (7). In another survey, 52% of those questioned believe that food can

reduce the use of medicines and therapies and 33% were eating a food as a substitute for a medicine (8). In Korea, sales of functional foods reached ₩120,000 million in 2001. The market grew almost 17% in 2002 resulting to ₩135,000 million in sales. The primary categories were aloe and chitosan products with sales in 2001 of ₩6,850 and 3,510 million, respectively. At present, over 39 multinational companies, such as Namyang Aloe, Pulmuwon and Semo, etc., are aggressively working to develop new functional food products (9,10).

Manufacturers encourage consumers to act upon and respond to potential health problems with functional foods (11). The recent position paper about functional foods from the American Dietetic Association (ADA) stated that functional foods benefit health when consumed as part of a varied diet on a regular basis and at an effective level (12). The marketplace for functional foods will continue to grow significantly throughout the 21st century and the future looks quite optimistic due

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to the following trends: an aging population, increased health care costs, awareness for enhancing personal health, and advancing scientific evidence that diet can alter the prevalence and progression of disease (12). This rapid expansion in both the marketplace and consumer use of functional food has increased the need for healthcare practitioners to have a solid foundation in functional foods.

Since the healthcare professionals are primarily responsible for nutrition education and medical nutrition therapy, dietitians are generally recognized as experts on food and nutrition (13). According to a recent position statement from ADA, dietetics professionals have a unique opportunity to play a central role in the evaluation and implementation of functional foods by translating the information into practical language for consumers (12). Dietitians are in a position to either encourage or discourage the use of functional foods among their clients. They play an important role in consumer education programs. Also they are in a position to promote and assist with scientific research into the beneficial and harmful effects of functional food use. As consumers seek alternate ways to enhance health and prevent disease, dietitians could incorporate functional foods into nutrition counseling plans and educational programs. The ADA paper further emphasizes the need to prepare more nutrition professionals for the growing consumers' interests in functional foods (12).

Few studies about the perceptions of dietitians towards functional foods have appeared in international literatures (14,15). Lee et al. (14) reported that most of the participants in his study of American dietitians ate functional foods themselves (86%) and had confidence in the effectiveness (96%) and safety (97%) of functional foods for the maintenance of good health. de Jong et al. (15) concluded that 69% of Dutch dietitians consumed functional foods, although 70% reported that they were skeptical about the efficacy of functional foods. There is no available study of the attitudes and knowledge of Korean dietitians in the area of functional foods. This current study examined perceived knowledge and attitudes about the rewards, risks, and recommendations with respect to functional foods, the training interests and personal use of functional foods by Koreans dietitians, and identified influencing variables.

METHODS

Data collection and respondents

The respondents for this study were dietitians working in Daegu and Gyeongsangbukdo. A total of 802 questionnaires were distributed to be completed over a two

week period through an online survey. A reminder email was delivered to the respondents one week later. Of the 802 questionnaires, 244 were returned completed. The survey was conducted with the support of the Department of Statistics at Yeungnam University.

Survey instrument

The attitude statements related to functional food were generated based on the studies by de Jong et al. (15), Roininen et al. (16,17) and Urala and Lahteenmaki (18). A pilot test was conducted with 42 college students to evaluate the clarity of instruction and statements. Based on the pilot test results, one statement was discarded because of its high correlation with another statement and three statements were reworded to improve clarity. Altogether there were 13 statements in the final questionnaire, the survey instrument included questions regarding attitudes [health rewards from functional food (FF REW), risk perceptions in functional foods (FF RIS), intended consumption and recommendations to be given to others in the near future (FF REC)], perceived knowledge and educational supports received at their universities, interests for additional training about functional food, and current frequency of the use of functional foods. Demographic and professional characteristics were also addressed. Each item on the scale was scored from 1 to 5 (1=strongly disagree, 5=strongly agree). Information about preferred functional food educational modules was obtained through multiple-choice response categories. The respondents' current consumption was determined on a 5-point scale (1=less than monthly, 2=monthly, 3=weekly, 4=2~3 times per week, 5=daily) with 10 generic product names (milk with extra Ca, drink with extra fiber, juice with extra vitamins, yoghurt with probiotics, etc.). Because the range of so-called functional products is wide, we assumed it would be easier for respondents to answer questions using the generic product names. An operational definition of the term "functional foods" was stated in the instructions accompanying the questionnaire. Functional foods were defined as "foods to which one or more ingredients have been added or which have been modified to enhance their contribution to a healthy diet" (10).

Data analysis

Statistical analyses were performed using SPSS for windows, version 12.0 (SPSS, Chicago, IL, USA). A confirmatory factor analysis (Maximum Likelihood with Varimax Rotation) was conducted to assure that all items loaded on factors were as expected and the internal reliability of each factor was tested using Cronbach's alpha. The lack of response to a question was treated as a missing value. The questions, perceived educational

level and knowledge level and interests in participating in training, were converted from the 5-point scales to three subscale groups according to their answers: strongly disagree and disagree were regarded as “Low” group, neutral as “Moderate” group, and agree and strongly agree as “High” group. With regards to the question of frequency of the use of functional foods, the respondents were divided into three groups according to their scale mean based on their consumption of functional food with 10 generic product names: Low=lowest 25% (0~25%), Moderate=middle 50% (26~75%), High=upper 25% (76~100%). These two sets of three groups were used to compare the functional food-related attitudes (FF REW, FF RIS, FF REC) and showed the effect of functional food-consumption habits. Descriptive analysis was conducted on all measurement items and determined the overall characteristics of participating dieticians by gender, age, work experience, and job types. Statistical comparison of the means of functional food-related attitudes about rewards from functional foods (FF REW), risk perception in functional foods (FF RIS), and recommendation for functional foods (FF REC) among the different characteristic groups were performed by ANOVA followed by Duncan’s multiple range tests.

RESULTS

Construction of the functional food-related attitude scales

According to the confirmatory factor analysis, item

evaluation using factor loadings resulted in the retention of 13 functional food-related items loading on three factors with an internal consistency (Cronbach’s alpha) of 0.82~0.86. This procedure confirmed that three factors accounted for 65.3% of the variance. The result of the confirmatory factor analysis is presented in Table 1.

Factor 1 consisted of five statements related to health related rewards in eating functional foods and was therefore labeled as *Functional food reward* (FF REW). Factor 2 included five statements related to risk perception in eating functional foods and this factor is labeled *Functional food risk* (FF RIS). Factor 3 was composed of 3 items involving an intention to recommend or repurchase functional foods, and this factor was labeled *Functional food recommendations* (FF REC). These subscales were constructed by computing the means of the individual items in each factor; thus the scores on the subscales ranged from a minimum of 1 to a maximum of 5. A high score on the FF REW and FF REC subscales means a positive attitude toward functional foods, and a high score on the FF RIS scale implies a high level of perceived risk for functional foods.

Respondents characteristics

After exclusion of those with an incomplete responses, the response rate was 29.7% (n=244 out of a total of 802). Most of the respondents were women and worked in educational institutions from elementary school to high school (Table 2). The mean age was 34.6 ± 5.7 years

Table 1. Description of the subscales used to determine attitudes about functional foods

Statement	Mean \pm SD ¹⁾	Factor loading	Variance %
FF REW			
<i>Reward from using functional foods</i> (Cronbach’s Alpha=0.854)	3.22 \pm 0.68		36.7
1. My performance improves when I eat functional foods.	3.27 \pm 0.73	0.757	
2. Having functional foods will ensure a long and healthy life.	3.00 \pm 0.78	0.726	
3. People would avoid common health problems by using functional foods.	3.26 \pm 0.81	0.684	
4. People would be healthier if taking functional foods than by not eating functional foods.	3.35 \pm 0.72	0.663	
5. Functional foods make it easier to follow a healthy life.	3.42 \pm 0.80	0.654	
FF RIS			
<i>Risks of functional foods</i> (Cronbach’s Alpha=0.823)	3.69 \pm 0.68		19.6
1. There may be vagueness about doses and ways of using functional foods.	3.86 \pm 0.70	0.661	
2. The new properties of functional foods carry unforeseen risks.	3.61 \pm 0.82	0.660	
3. The safety of functional foods has not been very thoroughly studied.	3.75 \pm 0.75	0.633	
4. The stated health effects of functional foods are not adequately proven.	3.58 \pm 0.80	0.629	
5. If used in excess, functional foods can be harmful to health.	4.00 \pm 0.80	0.620	
FF REC			
<i>Recommendation for using functional foods</i> (Cronbach’s Alpha=0.867)	2.95 \pm 0.78		9.6
1. I will repurchase functional foods in the near future.	3.14 \pm 0.82	0.543	
2. I will try to recommend the use of functional foods.	2.65 \pm 0.85	0.489	
3. I will intend to take functional foods in the near future.	3.09 \pm 0.82	0.475	

¹⁾Based on 5-point Likert scales: 1=strongly disagree, 5=strongly agree.

Table 2. Demographic and professional characteristics of the respondents reporting having attitudes about functional foods¹⁾

Characteristics	Respondent n ²⁾	FF REW ³⁾ (Mean ± SD) ⁶⁾	FF RIS ⁴⁾ (Mean ± SD)	FF REC ⁵⁾ (Mean ± SD)
Total	244	3.22 ± 0.68	3.69 ± 0.68	2.95 ± 0.78
Gender				
Female	240	3.23 ± 0.66	3.71 ± 0.67	2.94 ± 0.77
Male	4	2.60 ± 1.6	3.15 ± 1.48	3.50 ± 1.11
Age (y)				
< 30	67	3.12 ± 0.63 ^a	3.74 ± 0.49 ^a	2.93 ± 0.69
31 ~ 35	67	3.19 ± 0.01 ^a	3.80 ± 0.59 ^a	2.93 ± 0.82
36 ~ 40	77	3.23 ± 0.65 ^a	3.65 ± 0.84 ^{ab}	2.86 ± 0.78
> 41	33	3.68 ± 0.53 ^b	3.30 ± 0.47 ^b	3.09 ± 0.79
	F-value	6.320**	3.930*	1.060
Work experience (y)				
< 5	65	3.19 ± 0.59	3.68 ± 0.49	2.98 ± 0.65
6 ~ 10	91	3.19 ± 0.68	3.79 ± 0.61	2.84 ± 0.84
11 ~ 15	67	3.22 ± 0.71	3.70 ± 0.84	2.97 ± 0.76
16 ~ 20	10	3.72 ± 0.63	3.44 ± 0.31	3.50 ± 0.67
> 20	11	3.45 ± 0.48	3.45 ± 0.87	2.82 ± 0.25
	F-value	1.611	1.153	1.153
Foodservice type				
Business & Industry	29	3.07 ± 0.69	3.72 ± 0.49	3.07 ± 0.59
Healthcare facility	29	3.29 ± 0.63	3.72 ± 0.65	2.93 ± 0.81
Educational institute	164	3.24 ± 0.66	3.71 ± 0.69	2.88 ± 0.79
Others	21	3.12 ± 0.85	3.51 ± 0.89	3.17 ± 0.79
	F-value	0.738	0.551	1.133

¹⁾ANOVA computed to compare means of attitudes about functional foods by age, work experience and types of job. * $p < 0.05$, ** $p < 0.001$.

²⁾Number of respondents answered applicably was different (unapplicable answers were treated as missing data); therefore, only number of respondents in each sociodemographic category was given without the percentage.

³⁾FF REW means "rewards from using functional foods".

⁴⁾FF RIS means "risk in functional foods".

⁵⁾FF REC means "recommendation toward functional foods".

⁶⁾Based on 5-point Likert scales: 1=Strongly disagree, 5=Strongly agree.

⁷⁾Values with different superscripts within a column are significantly different.

(range: 24 ~ 52 years).

Attitudes about effectiveness, safety, and recommendation of using functional foods

Dietitians had favorable attitudes (3.22 ± 0.68) about the health effectiveness of functional foods (Table 1). The fact that functional foods may make a significant contributions to good health (3.35 ± 0.72) and a healthy life (3.42 ± 0.80) is more positively approached. Participants were rather uncertain as to the safety and health effects aspects (3.69 ± 0.68). Risk issues concerning the harmfulness of excessive consumption was seen as highly relevant (4.00 ± 0.79). These dietitians were less positive about recommending functional foods to their customer (2.65 ± 0.85).

Effects of age, work experience, and types of job on dietitians' attitudes about functional foods

There was a significant difference between the age groups on the attitude scales for FF REW and FF RIS,

even though the differences in the scale means of these groups were quite small (Table 2). Younger respondents scored lower on the FF REW, $F(3,240)=6.32$, $p < 0.001$, and slightly higher on the FF RIS scale than the older respondents, $F(3,240)=3.93$, $p < 0.05$. Younger dietitians seemed to get less reward from using functional foods, and they did not think that they could receive health benefits by using functional foods. No statistically significant differences were observed according to years of work experience and job types.

Effects of perceived education and knowledge level, interest in receiving training, and frequency of functional food consumption on dietitians attitudes about functional foods

Sixty-nine percent of the dietitians ($n=168$) were skeptical about the status of educational support during their dietetics training (Table 3). About 50 percent of the dietitians said that their knowledge about the role of

Table 3. The effects of perception of the educational support, knowledge, interests of training, and frequency to use functional foods about the attitudes of dieticians¹⁾

Variables ³⁾		n (%)	FF REW (mean ± SD)	FF RIS (mean ± SD)	FF REC (mean ± SD)
Education received at university	High ²⁾	12 (4.9)	3.32 ± 0.40	4.02 ± 0.40	3.36 ± 0.77 ⁴⁾
	Moderate	62 (25.6)	3.31 ± 0.57	3.65 ± 0.58	3.10 ± 0.76 ^{ab}
	Low	168 (69.4)	3.17 ± 0.73	3.69 ± 0.73	2.86 ± 0.77 ^b
	F-value		1.207	1.428	4.080 ^{**}
Perceived knowledge	High	6 (2.4)	3.90 ± 0.68 ^a	3.60 ± 0.36	4.22 ± 0.62 ^a
	Moderate	111 (46.3)	3.31 ± 0.57 ^b	3.59 ± 0.71	3.01 ± 0.75 ^b
	Low	123 (51.3)	3.09 ± 0.74 ^b	3.80 ± 0.67	2.83 ± 0.73 ^c
	F-value		6.126 ^{**}	2.693	10.603 ^{***}
Interests in participating in training course	High	126 (52.3)	3.27 ± 0.72	3.75 ± 0.67	3.02 ± 0.81
	Moderate	88 (36.5)	3.18 ± 0.58	3.67 ± 0.62	2.89 ± 0.66
	Low	27 (11.2)	3.02 ± 0.74	3.54 ± 0.93	2.76 ± 0.84
	F-value		1.601	0.204	0.198
Frequency of the use of functional foods	High	61 (24.5)	3.56 ± 0.69 ^a	3.41 ± 0.77 ^b	3.51 ± 0.67 ^a
	Moderate	122 (55.0)	3.25 ± 0.69 ^b	3.75 ± 0.53 ^b	3.05 ± 0.64 ^b
	Low	39 (17.6)	2.96 ± 0.63 ^c	3.79 ± 0.85 ^a	2.47 ± 0.86 ^c
	F-value		9.861 ^{***}	4.610 [*]	26.710 ^{***}

¹⁾Total number of respondents who applicably answered the questions was 240 to 244 (missing values excluded).

²⁾Answers on the 5-point Likert scales were recoded for three categories: 'strongly disagree' and 'disagree' were regarded as 'Low group', 'neutral' as 'Moderate group', and 'strongly agree' and 'agree' as 'High group'.

³⁾The effects of education received at school, current knowledge, and interests to participate in training course on functional food attitudes (REW, RIS, and REC) were compared using ANOVA, in which three of attitude scale values were categorized. FF REW=Reward from using functional foods, FF RIS=Risk in functional foods, FF REC=Recommendation toward functional foods.

⁴⁾Values with different superscripts within a column are significantly different.

*p<0.05, **p<0.01, ***p<0.001.

functional foods for disease prevention and health improvement was very limited. Nonetheless, more than 79% of the dieticians said that they consumed functional foods more than once a week.

There was a significant difference between the perceived education level at their university on the FF REC (p<0.01). Respondents with higher educational levels from their university were more confident about the rewards from functional foods than the less educated respondents (Table 3). The perceived knowledge level affected the two subscales, such as FF REW (p<0.01) and FF REC (p<0.001). Dieticians who felt they had more knowledge were more positive about the effectiveness of functional foods and actively recommended functional foods to others. The frequencies of the use of functional foods were significantly related to the FF REW (p<0.001) and FF REC (p<0.001). Thus, heavy users had more positive attitudes about the effectiveness of functional foods and a greater intention to recommend them to others.

Preference for training in the role of functional food

Most dieticians (88%) were strongly interested in re-

ceiving training and further information about functional foods. Course work and seminars were by far the preferred training formats: they were selected by 82% and 78%, respectively (Table 4). Other training formats offered were long distance education, CD-Rom, audio conference, and video.

DISCUSSION

Our results demonstrate that dieticians in Daegu and Gyeongsangbukdo have positive attitudes about functional foods and believe they can contribute to healthy life, disease prevention, and good physical performance.

Table 4. Weighed percentage of respondents who choose preferable education module¹⁾ (n=242)

Module	Count (n)	Weighed percentage
1. Course work	200	82.6
2. Seminar	191	78.9
3. Long distance education	127	52.5
4. CD-Rom	75	31.0
5. Audio conference	68	28.1
6. Video	54	22.3

¹⁾Respondents could choose all that applied.

Although they presently eat these foods themselves, they do not intend to recommend them to others and repurchase them for themselves in the near future. Despite their beliefs that the perceived risks of functional foods are consequential and constitute a barrier to recommending and repurchasing functional foods, they still have positive attitudes about the potential preventive function of these foods. Until the safety of functional foods has been thoroughly proven, dietitians do not seem to consider functional foods as safe as conventional foods. These results differ from the study of American dietitians (14). Most licensed dietitians in Oregon were reported to be confident that functional foods are safe (97%) and they are likely to recommend functional foods at a much higher rate (between 67% to 91%) than their Korean colleagues. Dutch dietitians have recommended only a limited variety of functional foods and were less confident about the safety as well as product-handling features, and they did not eat these foods frequently themselves, even though they were positive about the roles of functional foods and their contribution to health (15). These divergent results were assumed to be caused by the different degrees of involvement with functional foods concepts in the dietitians' practices and the respondents' different job types. The American Dietetics Association's position paper emphasized that the dietetics professional response to functional food-related inquiries must be scientifically sound (12). The ADA recommends cautious evaluation of the clinical efficacy of individual products and dietary supplements before recommending their use to promote a specific health outcome (19). Anderson (20) also reported that dietitians should recognize and exercise professional judgment within the limits of their qualification based on scientific principles and current information.

In a study of general consumers, older respondents were more interested than younger respondents in healthy dietary practices (16). This finding is inconsistent with this study, in which a positive correlation was not found between age and intention to use functional foods that contain healthy ingredients. No differences were found among dietitians according to years of working experience or the types of job. In our study, dietitians working in educational institutions were slightly over-sampled and might account for a more uniform attitude. However, the 802 members of the Korean Dietetic Association in Daegu and Gyeongsangbukdo are distributed between 587 dietitians working in educational institutions, 78 dietitians in health care institutions, 105 dietitians in business and industry and 22 in other institutions. Our study sample was thus deemed to be a reasonable distribution, and representative of Korean dietitians at

large.

Considering the fact that over 90% of the dietitians perceived their knowledge level and educational support to be below the moderate level, it is not surprising that 89% of them expressed interest in receiving training on the role of functional foods. Perceived knowledge about functional foods is positively correlated with attitudes when recommending functional foods to clients (FF REC) and the perception of rewards from functional foods (FF REW). This suggests that dietitians' levels of knowledge about functional foods may need improvement. Although dietitians perceived that they had received little academic training or course work at their university, they strongly intend to expand their knowledge about the role of functional foods. One explanation for this preference may be that dietitians consider the use of functional foods to be one part of the field of dietetics that is responding to consumer's demands for a more healthful food supply. The International Food Information Council March 2002 survey reported that 94% of consumers agreed that certain foods have health benefits that go beyond basic nutrition, and 85% of survey participants expressed interest in learning more about functional foods (21). The variety of functional foods currently available to consumers has grown tremendously, and functional foods account for an increasing percentage of all new food products (22). Therefore, professional dietitians with extensive educational training should prepare themselves to be able to advise and educate consumers how to integrate functional foods into a healthy eating plan. Dietetics and nutritional programs need to emphasize functional foods in current courses and require expanded functional foods contents in the overall curriculum for dietetics and nutrition students. Additional functional foods content in the curriculum of dietetics and nutrition programs may improve future dietitians' professional competence in this area. For the continuing education of current dietitians, an effective training module should be developed to meet the needs of the profession.

The results of this study, carried out for only one district, might be difficult to generalize to all Korean dietitians. The study does underscore the timely need for evidence based information to meet the demand for training about the role of functional foods. More educational training must be made readily available to assist dietitians in becoming well-prepared and knowledgeable, and help them achieve professional competency.

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