

A Study on the Attitude toward Food Safety of the Elderly in Single House Holds

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Abstract: Background/Objectives: This study is to develop an elderly education program and support plan so that the elderly can understand the food safety and food storage methods according to refrigerator usage.

Methods/Statistical analysis: The collected data was computerized by SPSS 18.0 statistical program and the data analysis method is as follows. Cronbach's α was used as the reliability analysis for the scale and a correlation analysis was conducted to determine the relevance among the factors. Also Regression analysis was conducted to examine variables that affect attitude toward food safety.

Findings: The results of this study were as follows; Female kept their refrigerator hygiene condition cleaner than male, and the male elderly needed assistance in managing refrigerator more than the female elderly. The demand level for education about food safety was higher in female than male. There were significant differences in the hygiene status and general. Elderly with experience of food safety education maintained better their refrigerator and hygiene and were well aware of the general method of using refrigerators than those without it. The age increases, the interest in the hygiene state of the refrigerator decreases. Also the elderly who have higher subjective financial status are likely to have higher interest in refrigerator hygiene and higher understanding in food storage and method.

Improvements/Applications: Health is closely related to the quality of life, it can suggest the necessity of social welfare they have intervention and approach to improvement of food safety and education of the elderly.

Keywords: Elderly, Single household, Food Safety, Food storage, Refrigerator hygiene

I. INTRODUCTION

The rapid aging of Korean society has changed the social and family structure as well as the demographic structure, leading to increase in elderly households and the elderly living alone. The statistical data published in 2017 showed that one-elderly households account for 33.5% of all elderly households by 2016[1]. They have burden of taking care of themselves even though they are olders. The elderly people who have more economic ability than welfare beneficiaries, in particular, are placed in a blind spot where no assistance from government is expected. The aging is likely to result in decreased physical function and immunity, higher risks of infection, chronic degenerative disease, malnutrition, and lack of exercise, leading to increased disease prevalence and mortality. The most serious problem of elderly people is that difficulties in preparing meals themselves and managing hygiene of food materials due to poor visual acuity and decrease of exercise capacity[2]. The elderly people are,

therefore, more likely to manage foods in insanitary manner than general consumers. The dietary studies on the Korean elderly have mainly focused on nutrition such as nutrition knowledge, status of nutrient intake, nutrition education, and meal service for the elderly, while the studies on food safety knowledge, food hygiene attitude, and food handling behavior of the elderly has been limited. The studies on food hygiene safety of the socially vulnerable groups such as the elderly and the children were mainly carried out in the group meal service facilities. The results of the questionnaire survey, conducted as a part of previous study[3] on the improvement measure of sanitary management standards for group meal service facility, on a total of 100 group meal service facilities, including 34 elderly welfare facilities expected to be weak in sanitation management, located in the Seoul and Gyeonggi area showed that, in the case of elderly welfare facilities, the rate of application of the correct method for cooling food was 57.6%, which is relatively low compared to other group food service facilities such as day care centers. This means that elderly welfare facilities have difficult in using correct method in storing food. As for the United States, elderly-specific standards for safe food handling are generally available and strict guidelines are applied. The food safety media and tools for specific groups such as the elderly, in addition, have been developed and used in education[4]. It was proposed that the elderly are willing to change their dietary behaviors in the right direction, thus are needed to be encouraged to change their eating habits[5]. The most of elderly have difficulties in safety management ranged from purchasing food to cooking because they received no education about food safety[6]. In addition, elderly people who are cooking by themselves in the home are poor in food hygiene knowledge and use wrong methods in cooking process, thawing, freezing, and refrigeration storage, therefore, it was suggested that education on food safety should be prepared in order to lead them to correct eating behavior[7]. Chang et al. (2015)[8] suggests that as a target group of the middle class healthy and capable of living activities, the development of the food safety and nutrition education programs considering the factors generally affecting health should be needed. Food safety is not a problem to be addressed only in the food-related field, and health is closely related to the quality of life, meaning that social welfare interventions into this issue are needed. The purpose of this research was, therefore,

Revised Manuscript Received on January 03, 2019.

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to develop the elderly education program and support plan to help the elderly understand the food safety by grasping the food handling and storage methods in the home based on the status of refrigerator use. This study investigated the problems of long-term storage of food using refrigerator and proposed some solutions focused especially on the elderly living alone in the welfare blind spot.

II. RESEARCH METHODS

2.1 Research participants and research methods

This research, to examine the attitudes of the elderly living alone to food safety, randomly sampled elderly people aged 65 years or older from those living in the G region and attending elderly welfare centers and visited the institutions to administer questionnaire to the participants. The questionnaire consisted of items on how to store food at home and perception of refrigerator management. Data was collected with the consent of the participants. A total of 150 questionnaires were distributed and 137 copies were collected, from which, after excluding incomplete ones, 122 ones were finally used in analysis.

2.2 Research problems

First, is there any difference in attitude toward food safety according to gender?

Second, is there any difference in attitude toward food safety by experience about food safety?

Third, is there any effect of age, subjective health status, and subjective economic status on attitudes toward food safety?

2.3 Measuring instruments

The questionnaires used in this study were developed, modified, and refined based on the literature review[9,10,11,12]. The questionnaire consisted of items on perception of refrigerator hygiene, refrigerator use and food management (general, storage and methods, and refrigerator reliability), demand level for help, and desire for education.

The reliability of the sub-scales contained in questionnaire were Cronbach's $\alpha = .751$ for perception of refrigerator hygiene, refrigerator use and food management (Cronbach's $\alpha = .699$ for general, Cronbach's $\alpha = .687$ for storage and methods, and Cronbach's $\alpha = .801$ for refrigerator reliability), Cronbach's $\alpha=.657$ for demand level for assistance in managing refrigerator, and Cronbach's $\alpha=.75$ for desire for education about food education, meaning good reliability.

2.4 Analysis method

The collected data was computerized by SPSS 18.0 statistical program and the data analysis method is as follows.

Cronbach's α was used as the reliability analysis for the scale and a correlation analysis was conducted to determine the relevance among the factors. Also Regression analysis was conducted to examine variables that affect attitude toward food safety.

III. RESEARCH RESULTS

3.1 General characteristics

The general characteristics of the subjects are shown in < Table 1>.

Table 1: General characteristics

Division		N	%
Gender	Male	59	48.4
	Female	63	51.6
Age	65~70 years	10	8.2
	71~79 years	68	55.7
	80~89 years	39	32.0
	Above 90 years	5	4.1
Final education	Elementary school	30	24.6
	Middle school	39	32.0
	High school	43	35.2
	college and over	10	8.2
Perceived Health status	Very poor	2	1.6
	poor	19	15.6
	Neutral	40	32.8
	Good	43	35.2
Perceived Economic status	Very good	18	14.8
	Low	3	2.05
	Intermediate low	17	13.9
	Intermediate	74	60.7
Experience of food safety education	Intermediate high	22	18.0
	High	6	4.9
Experience of stomachache	Yes	74	60.7
	No	48	39.3
Experience of stomachache	Yes	95	77.9
	No	27	22.1

3.2 Perception and Behavior of Food Storage and Refrigerator Management

The results of perceptions and behaviors of the participants on food storage and refrigerator management are shown in Table 2. In the hygienic state of the refrigerator category, the average scores of two items, 'The food in my refrigerator is hygienic and safe.' and 'I clean the refrigerator once or twice a month', were 3.16 and 2.71, respectively, meaning that the participants think that their refrigerator is hygienically safe and maintained to be clean relatively. In the general category, the average score of an item "The use of refrigerator with filling up to maximum capacity is efficient." was 2.18, suggesting that this knowledge is not yet widely known to them. The average score of food storage and methods category was 2.60 out of 5.0 The scores of items, in particular such as 'I put the remaining foods (including hot food) in the refrigerator to prevent food poisoning,' and 'I store the remaining food from can in the can' showed that many elderly have no exact method to store food in the refrigerator. The average score of the item 'I usually discard the food stored in the refrigerator if it seems to be decay even a little.' showed that they are practicing this relatively well. In the refrigerator reliability category, the average scores of two items, 'The remaining part of food after discarding decayed part has no problem in eating.' and "The food stored in the refrigerator is safe from microorganism" were 3.41 and 2.83, respectively,



suggesting that the participants need to pay more attention to food safety. In the demand for assistance in managing refrigerator and food safety education, the average scores of two items, 'I think the elderly need assistance for managing refrigerator.' and 'I think the elderly need education about

refrigerator management and food safety.' were 3.21 and 3.41, respectively, indicating that the participants were aware of the needs of education about refrigerator management and food safety.

Table 2: Perception and Behavior of Food Storage and Refrigerator Management

Category	Items	M±SD ¹⁾	
Refrigerator Hygiene	1. The food in my refrigerator is hygienic and safe.	3.16±0.94	
	2. I clean the refrigerator once or twice a month.	2.71±1.13	
	M ±SD2.93±0.88		
Refrigerator Use and Food management	General	3. I check manufacturing(production) date or expiration date in purchasing food.	3.24±1.04
		4. The optimum temperatures are 0~10°C for cooling room, and under -18°C for freezing room.	2.90±1.00
		5. The use of refrigerator with filling up to maximum capacity is efficient.	2.18±1.07
		M ±SD3.07±0.90	
	Storage and Method	6. I keep the food in refrigerator with separating by vegetables / meat / fish.	3.15±1.09
		7. The thawed food should not be frozen again.	2.87±1.11
		8. I usually discard the food stored in the refrigerator if it seems to be decay even a little.	3.32±1.02
		9. I check the storage method before putting them into refrigerator.	3.18±0.97
		10. I put the remaining foods (including hot food) in the refrigerator to prevent food poisoning.	2.64±1.27
		11. I put the meat into other container or package with discarding the vinyl before putting them into refrigerator.	3.04±1.04
		12. I store the remaining food from can in the can.	2.96±1.03
		13. I know the list of foods stored in my refrigerator.	2.85±1.01
		14. I have experience of storing foods beyond the expiration date in refrigerator.	3.04±0.96
		M ±SD2.60±0.56	
	Reliability	15. The foods stored in the refrigerator is safe from microorganism.	2.83±1.12
		16. Storing food in freezing room is helpful in extending available period.	2.25±1.23
		17. The foods stored in refrigerator have no problem even 1-2 months after expiration date.	2.41±1.16
		18. The remaining part of food after discarding decayed part has no problem in eating.	3.41±0.92
M ±SD2.73±0.72			
Management and Education	Assistance	19. I think the elderly need assistance for managing refrigerator.	3.21±1.04
	Education	20. I think the elderly need education about refrigerator management and food safety.	3.41±0.91

1) 1= Not at all, 2= Not to some extent, 3= Slightly, 4= Very much

3.3 Difference in Attitude toward Food Safety by Gender

The difference in attitudes toward food safety by gender is shown in Table 3 and there were significant differences in

hygiene, reliability, assistance, and education categories. Female kept their refrigerator hygiene condition cleaner than male,



and the reliability of the refrigerator was lower in male than in female. On the other hand, the male elderly needed assistance in managing refrigerator more than the female elderly. The demand level for education about food safety was higher in female than male.

Table 3: Difference in Attitude toward Food Safety by Gender

Variables	N		M	Std.	t	p
Refrigerator hygiene	Male	59	2.745	.657	-4.987	.000***
	Female	63	3.214	.813		
General use of refrigerator	Male	59	2.914	.957	.084	.135
	Female	63	2.811	.956		
Food storage & Method	Male	59	3.014	.814	1.119	.311
	Female	63	3.081	.806		
Reliability on refrigerator	Male	59	2.749	.934	-4.524	.000***
	Female	63	2.994	.867		
Needed assistance	Male	59	3.097	.964	-3.007	.000***
	Female	63	2.890	.857		
Demand for Food safety education	Male	59	2.888	.946	-3.524	.000***
	Female	63	3.121	.877		

3.4 Difference in Attitude toward Food Safety by Experience of Food Safety Education

The differences in attitude toward food safety by experience of food safety education are shown in Table 4 and there were significant differences in the hygiene status and general. Elderly with experience of food safety education maintained better their refrigerator and hygiene and were well aware of the general method of using refrigerators than those without it. These results suggested that education about refrigerator management and food safety are needed.

Table 4 : Difference in Attitude toward Food Safety by experience of food safety education

Variables	N		M	Std.	t	p
Refrigerator hygiene	No	59	2.748	.977	5.497.	.000***
	Yes	63	3.124	.995		
General use of refrigerator	No	59	2.897	.948	6.524	.000**
	Yes	63	3.009	.954		
Food storage & Method	No	59	2.748	.911	1.757	.067
	Yes	63	2.954	.749		
Reliability on refrigerator	No	59	3.074	.859	1.904.	.069
	Yes	63	3.104	.729		
Needed assistance	No	59	2.847	.669	1.649	.046
	Yes	63	2.997	.947		
Demand for food safety education	No	59	2.947	.843	.987	.057
	Yes	63	3.104	.974		

3.5 Regression Analysis of Attitude toward Food Safety

3.5.1 Effects of Age Attitude toward Food Safety

The simple regression analysis on the effect of age on food

safety showed significant result only on the refrigerator hygiene state, which are shown in Table 5. The effect of age on the refrigerator hygiene state was significant and negative, meaning that as the age increases, the interest in the hygiene state of the refrigerator decreases.

Table 5 : Effects of Age on Attitude toward Food Safety

Independent Variable	b	β	t	p
Age	-.300	-.301	-5.954	.000**

F=752.432, R²=.612
Dependent Variable : Refrigerator hygiene

3.5.2 Effects of Subjective Health Status on Attitude toward Food Safety

The effects of subjective health status on attitudes toward food safety were not significant, indicating that the subjective health status had no effect on attitudes toward food safety.

3.5.3 Effects of Subjective Financial Status on Attitude toward Food Safety

The subjective financial status was shown to have significant effect refrigerator hygiene status, storage and method, and refrigerator reliability. The results of the simple regression analysis of the effect of the financial status on the hygienic condition of the refrigerator are shown in Table 6, which showing significant positive effect, meaning that those who have higher subjective financial status are likely to have higher interest in refrigerator hygiene.

Table 7: Effects of Subjective Financial Status on Attitude toward Food storage & Method

Independent Variable	b	β	t	p
Subjective Financial Status	.410	.337	7.548	.000

F=124.568, R²=.315
Dependent Variable : Food storage & Method

The results of the simple regression analysis of the effect of the financial status on the storage and method are shown in Table 8, which showing significant positive effect, meaning that the those who have higher subjective financial status are likely to have higher understanding in food storage and method.

The result of the simple regression analysis of the effect of the financial status on the reliability on refrigerator is shown in Table, which showing significant positive effect.

Table 8: Effects of Subjective Financial Status on Attitude toward Reliability on refrigerator

Independent Variable	b	β	t	p
Subjective Financial Status	.372	.352	5.514.	.000

F=78.457, R²=.199
Dependent Variable : Reliability on refrigerator

IV. CONCLUSION AND DISCUSSION

This research sought to provide fundamental data to develop the elderly education program for food safety by investigating their attitude toward to food safety and analyzing harmful factors. Most of the elderly living alone in this research have stored food for a long time in the refrigerator or freezer,



meaning that the food freshness is not guaranteed or they may forget the existence of food, leading to the risk of serious food accident. The previous researches showed that the elderly live alone or even the elderly couple living together have difficulties in managing the food in the refrigerator and the external help is needed for the refrigerator management if they have problem in mobility. The most contributor for the difficulty in storing food in the refrigerator was 'forgotten'. The specific alternatives in food safety and dietary safety education such as correct food storage and hygienic food intake for elderly people are needed. It is necessary, in addition, to apply a device such as a bar code notification system to a refrigerator to inform the existence and freshness and thus expiration date of foods to elderly, ensuring they consume the fresh food. On the other hand, some of the basic living security beneficiaries and low-income elderly had no way to respond to questionnaire just because they have no food to be stored in the refrigerator. Their poverty made them to solve their meals mainly through packed lunch and side dishes delivery services once or twice per a week. It is considered that they need more support to solve the nutritional imbalance problem due to food shortage rather than improving food safety through food safety and nutrition education. Since this research was conducted mainly in the elderly using elderly welfare organizations in some regions of Korea, it seems to have limitation in general application to elderly population. The results of this research, however, are expected to be used as a basic data for identification of food safety problems of single elderly households and development of dietary safety education program for them. It is important to note that the health problems of the elderly are closely related to the diet, therefore, if we are to improve the quality of life of them, prevention should be emphasized rather than treatment after the onset. This study, accordingly, suggests the necessity of social welfare intervention and approach to improvement of food safety and education of the elderly.

ACKNOWLEDGMENT

This work was supported by the 2018 Gimcheon University Research Grant. gc18010

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