



Correlation analysis between Hypertension and Dietary Supplements intake in Koreans: Report Based on Korean National Health and Nutritional Examination Survey (KNHANES)

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Abstract¹

Background/Objectives: The purpose of this study was to provide basic data for preparing an appropriate and correct dietary supplement management program by examining the correlation between hypertension and dietary supplements intake. **Methods/Statistical analysis:** Using the 2019 KNHANES VIII-1 data, the prevalence of hypertension and the intake of dietary supplements for 2 weeks in the past year were statistically analyzed by age, sex, house income and education level. **Findings:** High blood pressure was the highest with 'Yes' at 18.9%, and 'No' at 1.0%. A person with a 'yes' of hypertension took dietary supplements for at least 2 weeks in the past year (58.6%). **Improvements/Applications:** Based on this study, we intend to use it as a guideline for follow-up studies on the High Blood Pressure and whether dietary supplements are consumed according to the guidelines of education on the recognition of the benefits and harms of diseases.

Index Terms

Hypertension, Dietary supplements, Korea National Health and Nutrition Examination Survey, High Blood Pressure, Subjective Body Recognition

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I. INTRODUCTION

In 1994, Americans enacted the Dietary Supplement Health and Education Act, DSHEA). A dietary supplement or nutritional supplement refers to a product manufactured to be consumed in the form of pills, capsules, powders, or liquids as a compound to increase the amount of nutrients or consumption extracted from food [1]. One or more dietary ingredients include vitamins, minerals, herbs or other plants, amino acids and other substances. These dietary ingredients indicate products for supplementing the ingredients. And it must be labeled as a dietary supplement on the front panel [1]. Food supplements were intended to correct nutritional deficiencies, maintain adequate intake of certain nutrients, or support certain physiological functions. As it was not a drug, it cannot exert pharmacological, immunological or metabolic action. Therefore, it was regulated in the EU that it was not intended to treat or prevent human diseases or to modify physiological functions.

Therefore, food supplements were regulated as food in the EU. This law limits the vitamins and minerals that can be used in the manufacture of dietary supplements and the raw materials used as their sources. For ingredients other than vitamins and minerals, the European Commission has established strict rules to protect consumers from potential health risks, maintains a list of substances known or suspected of having adverse health effects, and controls the use of food supplements. [2]. According to the results of a study 10 years ago, women took more vitamin and mineral supplements than men. For the age group of 40-64 years, the higher the education level, the larger the city dweller, the higher the monthly income, the more tended to consume

supplements [3]. Dietary supplements contain substances other than essential nutrients and have been used not to correct deficiencies, but to increase the total dietary intake of some foods or plants that can enhance a person's health [4].

The purpose of this study was to investigate whether food supplements are adequately consumed in an effort to improve physiological functions while improving nutritional deficiencies and increasing or maintaining intake of specific nutrients.

In addition, since it was not a drug, it was intended to find out the amount of food supplements used by people with diseases, to prevent misuse of food supplements, and to suggest new alternatives to healthy physical activity.

II. RESEARCH METHOD

A. Investigation method

KNHANES VIII-1 (Korea Centers for Disease Control and Prevention, IRB No: 2018-01-03-C-A) collected survey data with the consent of the participants according to the survey items and purpose. The purpose of the Korea National Health and Nutrition Examination Survey was to calculate the national level of health, health behavior, and food and nutrition intake at the national level and produce reliable statistics. It was to be used as basic data for health policy such as development [5].

B. Research design

This study was a descriptive research study in which secondary analysis of data from the 8th Korea National Health and Nutrition Examination Survey (KNHANES VIII-1) was conducted to identify the factors affecting people who took dietary supplements for 2 weeks or more for one year in Korea and those with hypertension. In the case of taking dietary supplements, only the contents consumed one day before the survey during the food intake survey up to the 7th year 2 (2017) were investigated [5].

B. General Characteristics

For general characteristics in this study, gender was 'male' and 'female', and the age was reclassified into '20-29', '30-39', '40-49', '50-59', '60-69', '70-79', and '>80'. Education level was classified into '<Middle school', 'middle school', 'high school', and

'≥University'. As for house income, household income was divided into 'low', 'lower-middle', 'middle-high', and 'high' based on income quartiles.

C. Analysis Method

The data were analyzed using IBM SPSS 21.0 program. As for the statistical analysis method, cross-analysis (chi-square test) was performed to analyze the independence and relevance between the two variables. Pearson correlation coefficient was measured to find out the relationship between each variable.

III. RESULTS

A. General Characteristics

The results regarding the general characteristics of the study subjects were as follows. The total number of participants is 8107, and each item was the result of excluding missing values. Table 1 showed the results of the gender, age, education and house income of general characteristics of subjects were expressed through frequency analysis.

Table 1. General characteristics of subjects

Characteristics	Categories	N	%
gender	man	3729	46.0
	women	4378	54.0
age	20-29	749	9.2
	30-39	985	12.1
	40-49	1182	14.6
	50-59	1245	15.4
	60-69	1186	14.6
	70-79	846	10.4
	> 80	349	4.3
Education	<Middle school	2273	28.0
	Middle school	755	9.3
	High school	2011	24.8
	≥University	2293	28.3
House income	Low	1076	13.3
	Low & middle	1492	18.4
	Middle	1716	21.2
	Middle & high	1936	23.9
	High	1847	22.8

B. Subjective Body Recognition

Table 2 shows the comparison results according to subjective body recognition. Subjective body recognition was the highest with 'commonly' at 36.3%, followed by 'slightly overweight' at 28.9%. Looking at the subjective body recognition rate of those who answered that they took dietary supplements for 2 weeks or more in the past year,

'commonly' 39.4%, 'slightly overweight' 30.0%. The result of correlation analysis was -.045, which was a statistically significant probability as shown in Table 3.

Table 2. Frequency rate of subjective body recognition

Characteristics	Categories	N	%
Subjective Body Recognition	very skinny	346	4.3
	a little skinny	1001	12.3
	commonly	2939	36.3
	slightly overweight	2342	28.9
	very obese	626	7.7
	Unmatched	354	4.4
	Unknown	98	1.2
Total		7706	95.1

Table 3. Whether you have taken dietary supplements for 2 weeks or more in the past year according to subjective body recognition

Characteristics	Categories	Dietary Supplements			
		Yes		No	
		N	%	N	%
Subjective body recognition	very skinny	147	3.7	158	5.7
	a little skinny	495	12.5	382	13.7
	commonly	1558	39.4	1034	37.0
	slightly overweight	1186	30.0	846	30.3
	very obese	294	7.4	245	8.8
	Unmatched	247	6.2	91	3.3
	Unknown	30	0.8	36	1.3
	Total	3957	100	2792	100
$\chi^2(p)$		-.045(.000) **			

p**<.01

C. Weight control for 1 year

Table 4 shows the comparison results according to weight control for 1 year. Weight control for 1 year was the highest with 'weight loss efforts' at 33.7%, followed by 'I've never tried to control my weight' at 32.5%.

Table 4. Frequency rate of weight control for 1 year

Characteristics	Categories	N	%
Weight control for 1 year	weight loss efforts	2729	33.7
	weight maintenance effort	1364	16.8
	weight gain effort	528	6.5
	I've never tried to control my weight	2634	32.5
	Unmatched	354	4.4
	Unknown	97	1.2
	Total	7706	95.1

D. Weight control method: health functional food

Table 5 shows the comparison results according to Weight control method: health functional food. Weight control method: health functional food was the highest with ' No ' at 45.9%, followed by ' Unmatched ' at 43.4%.

Table 5. Frequency rate of weight control method in health functional food

Characteristics	Categories	N	%
Weight control method: health functional food	No	3720	45.9
	Yes	372	4.6
	Unmatched	3516	43.4
	Unknown	98	1.2
	Total	7706	95.1

Table 6. Correlation between whether you have taken dietary supplements for 2 weeks or more in the past year and weight control method in health functional food

Characteristics	Categories	Dietary Supplements			
		Yes		No	
		N	%	N	%
Weight control method: health functional food	No	1942	49.1	1293	46.3
	Yes	242	6.1	69	2.5
	Unmatched	1743	44.0	1394	49.9
	Unknown	30	0.8	36	1.3
	Total	3235	100	2792	100
$\chi^2(p)$.060(.000) **			

$p^{**} < .01$

E. Hypertension

Table 7 shows the comparison results according to hypertension. High blood pressure was the highest with ' Yes ' at 18.9%, and ' No ' at 1.0%. Table 8 shows a person with a 'yes' of hypertension took

dietary supplements for at least 2 weeks in the past year (58.6%).

Table 7. Frequency rate of hypertension

Characteristics	Categories	N	%
Hypertension	No	81	1.0
	Yes	1529	18.9
	Unknown	6096	79.1
	Total	1936	95.1

Table 8. Relationship between high blood pressure and dietary supplements

			Dietary Supplements		Total
			yes	no	
Hypertension	No	N	39	33	72
		%	54.2	45.8	100.0
	Yes	N	796	562	1358
		%	58.6	41.4	100.0
	Unknown	N	3122	219	5319
		%	58.7	41.3	100.0
Total		N	3957	279	6749
		%	58.6	41.4	100.0
$\chi^2(p)$.601(0.741)		

IV. CONCLUSION AND DISCUSSION

According to the data, when controlling weight in the last year, 33.7% had experience trying to lose weight. On the other hand, 32.5% of respondents said they had never tried it.

In terms of subjective body recognition, there was no difference in the ratio between those who took dietary supplements and those who did not in the group perceived as slightly overweight. However, in terms of subjective body type perception, when looking at the ratio of those who took dietary supplements to those who did not, in the group perceived as ' very obese', there were many people who answered that they did not take dietary supplements (8.8%). According to the results of this study, dietary supplements were not taken according to subjective body type perception.

It was found that exercise and diet reduction were the most common methods of weight control. It was found that the older people were and the more they perceived themselves as obese, the more they practiced various weight control methods, but there was no significant difference between the body type recognition groups. Among all age groups, it was found that women who perceived themselves as obese were the most likely to try diet for weight control [6].

It was found that the group taking health functional foods as a weight control method did not take dietary supplements (6.1%).

High blood pressure was the highest with ' Yes ' at 18.9%, and ' No ' at 1.0%. Not statistically significant, a person with a 'yes' of hypertension took dietary supplements for at least 2 weeks in the past year (58.6%).

Intake of omega-3 fats, one of the dietary supplements, did not clearly reduce total mortality and cardiovascular events. Higher omega-3 intake did not increase the risk of cancer, but the clinical harm could not be ruled out. In other words, long-chain and short-chain omega-3 fats did not have a clear effect on total mortality, complex cardiovascular disease, or cancer [7].

This study was the result of statistical analysis on the prevalence of hypertension and dietary supplement intake. Among those who took dietary supplements for 2 weeks or more in the past year, 58.6% of those with hypertension took dietary supplements. Although it was not statistically significant between the two groups, at least those with hypertension took dietary supplements. In the future, based on this study, we intended to provide basic data on proper and correct dietary supplement intake. Also, according to the type of dietary supplement, it was intended to provide basic data for education on the recognition of the benefits and harms of diseases.

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