

Dietary supplement use by South Korean adults: Data from the national complementary and alternative medicine use survey (NCAMUS) in 2006

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Abstract

There has been little data on the prevalence of supplement use and the characteristics of the dietary supplement users in the Republic of Korea. This study presents the prevalence and the details of any dietary supplement use and the characteristics of the adults who use dietary supplements in the Republic of Korea. Between May 18 and June 16, 2006, nationwide and population-weighted personal interviews with 6,201 adult aged from 30 to 69 years were conducted and the final sample consisted of 3,000 people with a 49.8% response rate. We examined the prevalence and details of the use of dietary supplements and the characteristics of those who use the dietary supplement among adults. About sixty two percent of adults had taken any dietary supplement during the previous 12-month period in 2006. The most commonly reported dietary supplement was ginseng, followed by multivitamins, glucosamine, probiotics, and vitamin C. Female (versus male), an older age group, a higher family income, those living in metropolitan cities, those with marital experience, those with a higher level of education, and those having medical problems had a greater likelihood of reporting the use of any dietary supplements. The particular relationships differed depending on the type of supplement. The most Korean adults took one more dietary supplement and the dietary supplement users had different demographic and health characteristics compared to those of the nonusers. Research on diet supplements by the medical community is needed in the future.

Key Words: Adult, dietary supplements, demography, health status, surveys

Introduction

The use of dietary supplements is prevalent in many countries and also in the Republic of Korea. Interest in the dietary supplement users is increasing and previous studies in many countries have shown that supplement users differ from nonusers according to their demographic and health characteristics [1-11].

A recent National Complementary and Alternative Medicine Use Survey in 2006 (2006 NCAMUS) found that approximately 60% of the South Korean population aged from 30 to 69 years had used some type of dietary supplement [12]. We also need the additionally detailed national data on the prevalence of supplement use and the detailed characteristics of dietary supplement users in the Republic of Korea. In our study, we present the prevalence and details of any dietary supplement use and the characteristics of the adults who use dietary supplements in the Republic of Korea.

Materials and Methods

Data source

We used the data of the Complementary and Alternative Medicine Use Survey in 2006 (2006 NCAMUS). The 2006 NCAMUS was designed to obtain information on the prevalence, costs and patterns of use of CAM in the Republic of Korea. Between May 18 and June 16, 2006, nationwide and population-weighted personal interviews were conducted on 6,201 adults aged from 30 to 69 years, and the final sample consisted of 3,000 people with a 49.8% response rate.

The 2006 NCAMUS interview included the self-reported demographic and socioeconomic data, the self-perception of general health, the medical conditions, the personal use of any of the 27 types of CAM therapies, including dietary supplements in the previous 12 months, the primary reason for using each type of CAM, the main sources of advice about the use of CAM therapies, and the mean out-of-pocket expenditures for using

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CAM in the previous 12 months. The recently published National Complementary and Alternative Medicine Use Survey in 2006 (2006 NCAMUS) also used the same data source [12].

Collecting the dietary supplement data

Dietary supplement was defined as ‘a product (other than tobacco) intended to supplement the diet that bears or contains one or more of the following dietary ingredients: a) a vitamin; b) a mineral; c) an herb or other botanical; d) an amino acid; e) a dietary substance for use by man to supplement the diet by increasing the total dietary intake; or f) a concentrate, metabolite, constituent, extract, or combination of any ingredient described in clause (a-e)’ by the Dietary Supplement Health and Education Act of 1994 (DSHEA) [13]. Dietary supplement intake was assessed by asking the participants whether they had taken any vitamins, minerals, ginseng, non-processed plant-based dietary supplements, animal extracts and other dietary supplements within the preceding 12 months.

They were shown a card with examples of the 32 types of supplements (9 types of vitamins and minerals, 3 types of non-processed plant-based dietary supplements, 5 types of animal

extracts, 14 types of other supplements, and ginseng).

For the vitamin and mineral supplements, they were shown multivitamins with and without minerals, vitamin C, vitamin E, vitamin B12, vitamin B complex, beta-carotene, magnesium, calcium and other minerals (selenium, chromium, zinc, etc). For the non-processed herbs, they were shown mushrooms, and any part of *Acanthopanax*, and *Hovenia dulcis*. For animal extracts, they were shown extract from snakes, gall bladder of bear, dog, soft shell turtle, and black goat. For other supplements, they were shown glucosamine, royal jelly, prunus mume, squalene, spirulina and/or chlorella, aloe vera, probiotics including Cheonggukjang (a fermented Korean soybean paste), chitonic acid, propolis, safflower, grape seed extract, Gamma linolenic acid, EPA/DHA complex, and shark cartilage.

The supplement users were asked about the perceived effectiveness of the supplements they had taken and the number of dietary supplements they had taken.

Statistical analysis

Prevalence and perceived effectiveness with standard errors of dietary supplements were shown. Multivariable logistic regression

Table 1. The prevalence (% (standard error)) of dietary supplement use among adults, 2006 NCAMUS (n=3,000)

Characteristics	No. of adults	Any dietary supplement	Ginseng	Multivitamin	Glucosamine	Probiotics	Vitamin C
Total	3,000	62.4 (0.9)	23.1 (0.8)	14.0 (0.6)	9.6 (0.5)	9.5 (0.5)	9.0 (0.5)
Gender							
Male	1,493	55.9 (1.3)	24.0 (1.1)	11.9 (0.8)	5.4 (0.6)	5.6 (0.6)	6.4 (0.6)
Female	1,507	68.9 (1.2)	22.2 (1.1)	16.1 (0.9)	13.7 (0.9)	13.3 (0.9)	11.5 (0.8)
Age, years							
30-39	1,088	56.5 (1.5)	20.0 (1.2)	14.2 (1.1)	3.2 (0.5)	8.7 (0.9)	9.1 (0.9)
40-49	925	64.9 (1.6)	22.9 (1.4)	16.2 (1.2)	8.1 (0.9)	9.7 (1.0)	11.4 (1.0)
50-59	572	68.0 (2.0)	26.7 (1.9)	11.5 (1.3)	17.0 (1.6)	11.2 (1.3)	7.5 (1.1)
≥60	415	64.8 (2.3)	26.5 (2.2)	11.6 (1.6)	19.3 (1.9)	8.7 (1.4)	5.3 (1.1)
Live in metropolitan area							
No	1,464	59.0 (1.3)	21.4 (1.0)	13.6 (0.9)	9.0 (0.7)	9.5 (0.7)	7.6 (0.7)
Yes	1,536	66.1 (1.2)	24.9 (1.1)	14.3 (0.9)	10.2 (0.8)	9.5 (0.8)	10.4 (0.8)
Marital status							
Single	225	44.9 (3.3)	12.0 (2.2)	11.6 (2.1)	2.7 (1.1)	3.6 (1.2)	7.1 (1.7)
Married	2,775	63.9 (0.9)	24.0 (0.8)	14.2 (0.7)	10.1 (0.6)	10.0 (0.6)	9.1 (0.5)
Education level							
Under high school	511	65.0 (2.1)	24.1 (1.9)	8.6 (1.2)	20.5 (1.8)	9.6 (1.3)	5.1 (1.0)
High school graduate	1,581	61.9 (1.2)	22.6 (1.1)	13.5 (0.9)	8.7 (0.7)	9.2 (0.7)	9.7 (0.7)
College or more	908	62.0 (1.6)	23.5 (1.4)	17.7 (1.3)	5.0 (0.7)	10.0 (1.0)	9.8 (1.0)
Family income, million won/month							
<2.0	552	58.7 (2.1)	17.8 (1.6)	11.6 (1.4)	14.9 (1.5)	10.5 (1.3)	6.2 (1.0)
2.0-2.9	1,136	60.1 (1.5)	21.7 (1.2)	12.9 (1.0)	8.6 (0.8)	9.8 (0.9)	9.2 (0.9)
3.0-3.9	1,001	64.9 (1.4)	25.9 (1.4)	14.5 (1.1)	7.6 (0.8)	8.2 (0.9)	10.0 (0.9)
≥4.0	311	69.5 (2.6)	28.6 (2.6)	19.3 (2.2)	10.0 (1.7)	10.9 (1.8)	10.0 (1.7)
Self-perceived health status							
Healthy	2,070	60.1 (1.1)	22.2 (0.9)	13.9 (0.8)	7.3 (0.6)	8.3 (0.6)	8.3 (0.6)
Intermediate	620	65.0 (1.9)	23.7 (1.7)	14.8 (1.4)	11.6 (1.3)	11.8 (1.3)	9.8 (1.2)
Unhealthy	310	72.9 (2.5)	27.7 (2.5)	12.9 (1.9)	20.3 (2.3)	12.9 (1.9)	11.9 (1.8)
Chronic medical problem							
No	2,109	58.7 (1.1)	22.0 (0.9)	13.8 (0.8)	6.4 (0.5)	8.3 (0.6)	8.3 (0.6)
Yes	891	71.4 (1.4)	25.8 (1.5)	14.4 (1.2)	16.9 (1.3)	12.5 (1.1)	10.7 (1.0)

Table 2. Multivariate analyses of the demographic and health characteristics associated with dietary supplement use by adults, 2006 NCAMUS (n=3,000)

Characteristics	Any dietary supplement		Ginseng		Multivitamin		Glucosamine		probiotics		Vitamin C	
	OR [†]	95%CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Gender												
Male	1.0		1.0		1.0		1.0		1.0		1.0	
Female	1.6	1.3, 1.9	0.9	0.7, 1.1	1.5	1.2, 2.0	2.5	1.8, 3.5	2.6	1.9, 3.6	2.2	1.6, 3.0
Age, years												
30-39	1.0		1.0		1.0		1.0		1.0		1.0	
40-49	1.3	1.0, 1.6	1.0	0.8, 1.3	1.2	0.9, 1.6	2.4	1.6, 3.7	1.1	0.8, 1.5	1.3	0.9, 1.7
50-59	1.4	1.1, 1.8	1.3	1.0, 1.7	1.0	0.7, 1.4	4.4	2.8, 7.1	1.3	0.9, 1.9	0.8	0.6, 1.3
≥60	1.3	0.9, 1.7	1.5	1.1, 2.1	1.2	0.8, 1.8	4.3	2.6, 7.3	0.9	0.6, 1.5	0.7	0.4, 1.3
<i>p</i> trend		0.02		0.01		0.57		<0.01		0.66		0.11
Live in metropolitan area												
No	1.0		1.0		1.0		1.0		1.0		1.0	
Yes	1.4	1.2, 1.6	1.2	0.9, 1.4	1.0	0.8, 1.2	1.4	1.1, 1.8	1.0	0.8, 1.4	1.4	1.1, 1.8
Marital status												
Single	1.0		1.0		1.0		1.0		1.0		1.0	
Married	1.5	1.1, 2.0	2.1	1.4, 3.3	1.2	0.8, 1.9	1.0	0.4, 2.5	2.4	1.1, 5.0	1.1	0.6, 1.9
Education level												
Under high school	1.0		1.0		1.0		1.0		1.0		1.0	
High school graduate	1.1	0.8, 1.4	1.0	0.7, 1.3	1.8	1.2, 2.8	0.8	0.6, 1.2	1.4	0.9, 2.1	1.8	1.1, 3.1
College or more	1.3	0.9, 1.8	1.0	0.7, 1.5	2.8	1.8, 4.5	0.8	0.5, 1.2	2.1	1.3, 3.5	2.1	1.2, 3.8
<i>p</i> trend		0.05		0.71		<0.01		0.20		<0.01		0.02
Family income, million won/month												
<2.0	1.0		1.0		1.0		1.0		1.0		1.0	
2.0-2.9	1.2	0.9, 1.5	1.5	1.1, 2.0	0.9	0.7, 1.3	0.9	0.6, 1.3	0.8	0.6, 1.2	1.2	0.8, 1.9
3.0-3.9	1.4	0.9, 1.5	1.9	1.4, 2.5	1.0	0.7, 1.4	0.8	0.6, 1.3	0.6	0.4, 1.0	1.2	0.8, 1.9
≥4.0	1.6	1.1, 2.2	2.1	1.4, 3.0	1.3	0.8, 1.9	1.0	0.9, 1.7	0.8	0.5, 1.3	1.1	0.6, 1.9
<i>p</i> trend		<0.01		<0.01		0.21		0.95		0.12		0.48
Self-perceived health status												
Healthy	1.0		1.0		1.0		1.0		1.0		1.0	
Intermediate	1.1	0.9, 1.4	1.1	0.9, 1.4	1.1	0.8, 1.4	1.2	0.9, 1.7	1.3	0.9, 1.7	1.2	0.9, 1.7
Unhealthy	1.3	0.9, 1.7	1.3	0.9, 1.8	0.9	0.6, 1.4	1.4	0.9, 2.0	1.2	0.8, 1.8	1.6	1.0, 2.5
<i>p</i> trend		0.07		0.11		0.97		0.06		0.14		0.04
Chronic medical problem												
No	1.0		1.0		1.0		1.0		1.0		1.0	
Yes	1.7	1.3, 2.0	1.1	0.9, 1.4	1.2	0.9, 1.5	1.7	1.3, 2.3	1.4	1.0, 1.9	1.4	1.0, 1.9

* All odds ratio were adjusted for all other characteristics included in the table.

† OR, odds ratio; CI; confidence interval.

was used to assess associations of supplement use with demographic and health characteristics of interest accounting for the other characteristics simultaneously. Odds ratios and 95% confidence intervals were shown. *P* for trend was calculated by treating variables with at least three hierarchical categories as continuous using Wald test. All statistical analyses were carried out using Stata version 10.2 (StataCorp, College Station, Texas).

Results

The prevalence of dietary supplement use

About sixty two percent of the adults in our study (55.9% of the men and, 68.9% of the women) had taken any dietary supplement during the previous 12-month period in 2006.

The most commonly reported dietary supplement was ginseng

(23.1 percent), followed by multivitamins (14.0 percent), glucosamine (9.6 percent), probiotics (9.5 percent), and vitamin C (9.0 percent) (Table 1).

Other dietary supplements for which the prevalence rates were greater than 2 percent were any product of calcium (7.1 percent), prunus mune (6.1 percent), *Acanthopanax* (5.6 percent), mushrooms (5.4 percent), *Hovenia dulcis* (5.2 percent), vitamin B complex (4.6 percent), aloe vera (3.5 percent), dog extract (3.4 percent), black goat extract (3.1 percent), vitamin E (2.8 percent), squalene (2.7 percent), spirulina and/or chlorella (2.4 percent) and royal jelly (2.2 percent).

The dietary supplements for which the prevalence rates were 2 percent or less included vitamin B12, beta-carotene, magnesium, other minerals (selenium, chromium, zinc, et al), extract from snake, gall bladder of bear and soft shell turtle, chitonic acid, propolis, safflower, grape seed extract, Gamma linolenic acid, EPA/DHA complex and shark cartilage.

Table 3. The perceived effectiveness (%(standard error)) of the dietary supplements taken by adults, 2006 NCAMUS

Characteristics	Ginseng (n=693)	Multivitamin (n=419)	Glucosamine (n=287)	Probiotics (n=285)	Vitamin C (n=269)
Total	67.1 (1.8)	49.6 (2.4)	53.3 (3.0)	48.8 (3.0)	40.1 (3.0)
Gender					
Male	62.8 (2.6)	43.5 (3.7)	51.3 (5.6)	46.4 (5.5)	37.9 (5.0)
Female	71.6 (2.5)	54.1 (3.2)	54.1 (3.5)	49.8 (3.5)	41.4 (3.7)
Age, years					
30-39	65.6 (3.2)	48.4 (4.0)	37.1 (8.3)	51.6 (5.2)	32.3 (4.7)
40-49	65.6 (3.3)	50.7 (4.1)	52.0 (5.8)	45.6 (5.3)	47.6 (4.9)
50-59	68.6 (3.8)	51.5 (6.2)	49.5 (5.1)	48.4 (6.3)	32.6 (7.2)
≥60	70.9 (4.4)	47.9 (7.3)	66.3 (5.3)	50.0 (8.5)	54.5 (10.9)
Live in metropolitan area					
No	62.9 (2.7)	44.0 (3.4)	47.1 (4.3)	41.1 (4.1)	35.0 (4.4)
Yes	70.9 (2.4)	55.2 (3.4)	59.1 (4.0)	56.8 (4.2)	44.1 (4.0)
Marital status					
Single	48.1 (9.8)	42.3 (9.9)	0.0 (0.0)	50.0 (18.9)	25.0 (11.2)
Married	67.9 (1.8)	50.1 (2.5)	54.4 (3.0)	48.7 (3.0)	41.1 (3.1)
Education level					
Under high school	62.6 (4.4)	52.3 (7.6)	49.5 (4.9)	44.9 (7.2)	26.9 (8.9)
High school graduate	65.5 (2.5)	48.1 (3.4)	56.9 (4.2)	44.8 (4.1)	44.2 (4.0)
College or more	72.3 (3.1)	50.9 (4.0)	51.1 (7.5)	57.1 (5.2)	37.1 (5.1)
Family income, million won/month					
<2.0	62.2 (4.9)	45.3 (6.3)	47.6 (5.5)	43.1 (6.6)	32.4 (8.1)
2.0-2.9	61.5 (3.1)	47.9 (4.1)	51.0 (5.1)	44.1 (4.7)	39.4 (4.8)
3.0-3.9	71.0 (2.8)	53.0 (4.1)	59.2 (5.7)	53.7 (5.5)	48.0 (5.0)
≥4.0	76.4 (4.5)	50.0 (6.5)	61.3 (8.9)	61.8 (8.5)	25.8 (8.0)
Self-perceived health status					
Healthy	68.5 (2.2)	52.6 (3.0)	58.6 (4.0)	47.7 (3.8)	43.9 (3.8)
Intermediate	61.2 (4.0)	42.4 (5.2)	40.3 (5.8)	47.9 (5.9)	27.9 (5.8)
Unhealthy	70.0 (5.0)	45.0 (8.0)	55.6 (6.3)	55.0 (8.0)	43.2 (8.3)
Chronic medical problem					
No	68.0 (2.2)	50.5 (2.9)	50.7 (4.3)	50.6 (3.8)	41.4 (3.7)
Yes	65.2 (3.1)	47.7 (4.4)	55.6 (4.1)	45.9 (4.8)	37.9 (5.0)

Multivariate analysis of the demographic and health characteristics with dietary supplement use

Table 2 presents the adjusted odds ratios with the 95 percent confidence intervals for the demographic and health characteristics associated with any supplement and the 6 most common types of supplements.

Female (versus male) (OR 1.6, 95% CI 1.3-1.9), metropolitan city residents (versus those who live in other areas) (OR 1.4, 95% CI 1.2-1.6), those with marital experience (versus those who had never been married) (OR 1.5, 95% CI 1.1-2.0), those with medical problems (versus those without medical problems) (OR 1.7, 95% CI 1.3-2.0) and those with a higher level of education (p trend =0.05), an older age (P trend =0.02) and, a higher family income (P trend <0.01) were positively associated with a greater likelihood of any dietary supplement use.

Particularly high were the positive associations of female gender with multivitamins (OR 1.5, 95% CI 1.2-2.0), glucosamine (OR 2.5, 95% CI 1.8-3.5), probiotics (OR 2.6, 95% CI 1.9-3.6), and vitamin C use (OR 2.2, 95% CI 1.6-3.0), an older age with ginseng (p trend =0.01) and glucosamine use (P trend <0.01), metropolitan city residents with glucosamine (OR 1.4, 95% CI

1.1-1.8) and vitamin C use (OR 1.4, 95% CI 1.1-1.8), those with marital experience with ginseng (OR 2.1, 95% CI 1.4-3.3) and probiotics use (OR 2.4, 95% CI 1.1-5.0), a higher education with multivitamin (P trend <0.01), probiotics (P trend <0.01), and vitamin C use (p trend =0.02), a higher family income with ginseng use (P trend <0.01), a lower self-perception of the general health status with vitamin C use (P trend =0.04), and those having medical problems with glucosamine (OR 1.7, 95% CI 1.3-2.3), probiotics (OR 1.4, 95% CI 1.0-1.9), and vitamin C use (OR 1.4, 95% CI 1.0-1.9).

The perceived effectiveness of the 5 dietary supplements commonly taken by adults

The self-reported perceived effectiveness of the 5 most commonly used dietary supplements is shown in Table 3.

The majority of ginseng (67.1 percent) and glucosamine (53.3 percent) users perceived that their dietary supplement was effective.

Percent distribution of the supplements that were taken

Of the supplements users, 42.9% reported taking just 1 supplement, while 25.6% took 2, 13.6% took 3 and 17.9% took more than 4 supplements, respectively.

Discussion

In this study, we investigated the prevalence and details of dietary supplement use and the demographic and health characteristics of the users and nonusers of dietary supplements in 2006 in the Republic of Korea.

Our study suggests that 62.4% of adults in South Korea had taken dietary supplements during a 12-month period between 2005 and 2006, and the supplement users differed from the nonusers in terms of their demographic and health characteristics.

In this study, an older age, a higher education level and female gender were positively associated with supplement use and these demographic characteristic associations were consistent with the general trends noted in the previous supplement surveys [2-9,11,14]. Residency in a metropolitan area, a marital status, and a higher family income were positively associated with supplement use in this study as well. But the particular relationships differed depending on the type of supplement.

The other previous studies have reported that multivitamins are the most frequently used supplement type [5,6,9,11,14], while our study indicated that ginseng is the most frequently used supplement type, with multivitamins following as second. Ginseng has been one of the most frequently used supplements because of the traditional perception of ginseng, which is that ginseng restores and enhances normal well-being while improving the cognitive and physical performance, as well as improving the sexual function of men [15,16].

In this study, ginseng use was higher for the individuals with a higher income, and for those who were married, older and male. This result is probably because of the high price of ginseng and the general perception in South Korea of ginseng, which is that it improves the sexual function of men [17].

The use of multivitamins, the second most-frequently used supplement type, was higher in educated women, and this demographic characteristic association was consistent with that of the other previous surveys [5,11,14].

Glucosamine use was high among older women. Glucosamine is a popular alternative medicine that is used by older consumers for the symptomatic relief of osteoarthritis.

There were several interesting results in this study, one of which was the use of supplements in relation to the educational status. The education level was positively associated with most supplement use, and this association was consistent with that of the previous supplement surveys [2-7,10,11]. But for there was no such relation for ginseng, and glucosamine, which are commercially well-known supplements. The educational status and family income were generally positively associated with

supplement use, as was the case for most of the previous epidemiological surveys. Yet, in our study, we found that ginseng use was related to family income, but it had no relation to the level of education, while multivitamin use was higher among the individuals with a higher level of education, while it had no relation to family income.

In terms of health characteristics, the supplement usage in our study was higher among the people with an underlying chronic medical problem, but this was not consistently found in the prior studies [3,5,7].

In our study, the use of glucosamine, probiotics, and vitamin C was high among the people with an underlying chronic medical problem. Although we took the existence of the disease into account, we did not research the type of chronic diseases and the population subgroups. Thus, further studies on which type of supplement use is increased in relation the type of disease and on the specifics of the population subgroups are needed.

In our study, self-perceived health status was not associated with the use of supplements. The results of the other prior studies were also complex [1,3,6].

In this study, the self-reported perceived effectiveness of dietary supplements was high for ginseng and glucosamine, and the results differed depending on the type of dietary supplements.

The limitation of study is as follows. In defining 'dietary supplements', we used a broad definition of dietary supplements and we included all the people who had taken dietary supplements during a 12-month period. This probably resulted in overestimation of the prevalence of dietary supplement usage.

We also did not research the specific efficacy and safety of the dietary supplements.

Even though the perceived efficacy of taking supplements may be influenced by regularly taking the supplement and the time-period over which the supplement had been used, we did not include such factors as the length of regular use and the regularity of supplement intake in our study.

This could have resulted in a bias when evaluating the perceived effectiveness.

Thus, further studies that will address these factors are needed in the future.

In our study, about 42% of adult supplement users took just one supplement and 57.1% of users took more than one. Seventeen point nine percent of adult supplement users took more than four supplements, and further studies that will focus on the risk of multiple supplement use might be needed, as well as studies that will determine the efficacies and safety of over-dosage and the interaction of the nutrients in the supplements. Additional studies are also required concerning the efficacy of the specific qualities the supplement possesses.

In our study, the prevalence of dietary supplement usage was high, and this prevalence was higher than that of the data from the Korea National Health and Nutritional Examination Survey 2005.

The 2005 third Korea National Health and Nutrition Survey

(KNHANES III) reported that 29.5% of adults over 20 years of age in South Korea had taken dietary supplements during a 12-month period in the year 2005. Our study suggests that 62.4% of adults in South Korea had taken dietary supplements during a 12-month period between 2005 and 2006. This difference of the prevalence of dietary supplement use is probably due to the difference in research methods, and especially the different definitions of dietary supplements and users.

We used the definition of dietary supplement by the DSHEA, and it was broadened to include the traditional and Korean definition of dietary supplements, and the original definition had encompassed only essential dietary nutrients. Also, while the 2005 KNHANES included those who had taken dietary supplements for more than 2 weeks into account, in our study we did not take into account the period of time the supplement was used, and instead we included the people who had taken dietary supplements during a 12-month period. This could have been the reason for the higher prevalence of dietary supplement use than was noted in the other surveys.

In conclusion, most Korean adults took one more dietary supplements and the dietary supplement users had different demographic and health characteristics as compared to those of the nonusers. Further well-designed basic and clinical research is needed on the efficacy, bioavailability and safety of supplements, and especially the commonly used dietary supplements.

We also think that the medical community should focus more research efforts on dietary supplements.

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