

# Health-Promotion and Disease-Prevention Behaviors of Primary-Care Practitioners

Original  
Article

Hwa-Yeon Seong, Eal-Whan Park\*, Yoo-Seock Cheong, Eun-Young Choi, Ki-Sung Kim<sup>1</sup>, Sang-Wook Seo

Department of Family Medicine, Dankook University College of Medicine; <sup>1</sup>Yonsei Family Clinic, Cheonan, Korea

**Background:** In the 1990s the primary focus of medicine was shifted to disease prevention. Accordingly, it became the responsibility of primary-care physicians to educate and counsel the general population not only on disease prevention specifically but health promotion generally as well. Moreover, it was, and is still today, considered important that physicians provide positive examples of health-promotion behaviors to patients. The purpose of this study was to investigate physicians' health-promotion behaviors and to identify the factors that influence them.

**Methods:** We conducted a postal and e-mail survey of the 371 members of the Physician Association of Cheonan City between May 16th and June 25th, 2011. The questionnaire consisted of 18 items, including questions relating to sociodemographic factors, screening tests for adult diseases and cancer, and health habits.

**Results:** There were 127 respondents. The gender breakdown was 112 men (88.2%) and 15 women (11.8%), and the mean age was 47.8 years. Fifty-nine (46.4%) were family physicians or interns, and 68 (53.6%) were surgeons. Twenty-six percent (26%) were smokers, and 74.8% were drinkers; 53.5% did exercise; 37% had chronic diseases; 44.9% took periodic cancer screening tests, and 72.4% took periodic screening tests for adult diseases.

**Conclusion:** It was found that general characteristics and other health-promotion behaviors of physicians do not affect physicians' practice of undergoing periodic health examination.

**Keywords:** Health Promotion; Physical Examination; Primary Care Physicians

## INTRODUCTION

Beginning in 1990s, the main focus of medicine was shifted from diagnosis and treatment of disease to disease prevention and health promotion. Health promotion implies activities

that encourage the improvement of health status, and involves management of nutrition, control of body weight, exercise, smoking cessation, moderation of drinking habits, good sleep habits, and stress management.<sup>1)</sup> In Korea, Law for the Promotion of National Health was passed in 1995, the Management Center for Health Promotion was established in 1998, and since 2011, the Korean Health Promotion Foundation which oversees respective regional community health centers, has been active.<sup>2)</sup>

In this context, a consensus on the importance and effectiveness of periodic health examination for early detection or prevention of disease has emerged. The first periodic health examination was the Canadian Task Force on Periodic Health Examination<sup>3)</sup> in 1976. In 1988, the Department of Family Medicine at Seoul National University Hospital in Korea held the symposium, "Clinical application of periodic health exam program for Korean people." Thereafter, periodic health

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\*Corresponding Author: Eal-Whan Park

Tel: +82-41-550-3997, Fax: +82-41-550-7163

E-mail: ewpark@dku.edu

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examination programs began at the general hospitals in Seoul and the general capital area.<sup>4)</sup> In 2011, a national health examination program was instituted, along with a variety of health examination programs at private hospitals and clinics. Primary-care physicians, should assume the central role in health-promotion and periodic health examination programs in counseling patients on matters relevant to the maintenance of healthy lives.<sup>5,6)</sup> Regarding the building of the doctor-patient rapport that is so integral to effective health counseling, it is certain that the physician's health-promotion behaviors have a great effect.<sup>6)</sup> Wells' study<sup>7)</sup> showed definitively that such behaviors have a positive effect on patient counseling and education. Indeed, they seem to be an indicator of the level of health-related education and awareness within a community.<sup>8,9)</sup>

Over the past 30 years or more, many studies on health-promotion behaviors have been published, though most of them focused on the general population or specific age groups. More pertinently, Park et al.<sup>10)</sup> and Oh et al.<sup>11)</sup> studied physicians' health-promotion behaviors; however, more than 20 years have passed since their findings were reported. Moreover, they did not examine physician populations specifically, but rather compared resident physicians or university hospital faculty with the general population. Therefore, in this study we surveyed the status of health-promotion and disease-prevention behaviors as well as other health-related behaviors of practicing primary-care physicians, and assessed the factors affecting their taking of periodic health examinations.

## METHODS

### 1. Research Subjects

The 371 members of the Physician Association of Cheonan City were posted or e-mailed a questionnaire between May 16th and June 25th. We also directly called physicians in an attempt to encourage or confirm their participation. A total of 138 physicians, or just over 37%, replied to the questionnaire or survey. We excluded one questionnaire completed by a physician who did not practice the required specialty, along with another 10 questionnaires that were only partially completed. Thus, we analyzed 127 questionnaires.

For the purposes of our study, periodic health examination

was defined as a periodic screening test for disease prevention. Included under this rubric were National Health Insurance Service examinations as well as examinations taken in private hospitals and clinics. The items on the periodic health examination checklists were based on National Health Insurance Service screening tests for the five major cancers (i.e., gastric cancer, colon cancer, breast cancer, hepatocellular cancer, cervical cancer)<sup>12)</sup> along with total cholesterol, fasting blood glucose, liver function, and urinalysis tests. The screening tests for the five major cancers are esophagoduodenoscopy, colonoscopy, mammography, abdominal ultrasonography, and Papanicolaou smear, respectively.

The contents of the questionnaire included five questions relating to perspectives on and the practice of periodic health examination, five questions on smoking habits, alcohol consumption, exercise, sleep habits, and coffee or soda consumption, and nine questions on sociodemographic characteristics. The questions were as follows: 1) Do you think that periodic health examination is needed?, 2) Where do you take your periodic health examination (for example: National Health Insurance Service, hospital, or private clinic)?, 3) How often do you take the five major cancer screening tests?, 4) Do you take periodic tests of total cholesterol, fasting blood glucose, liver function, and urinalysis?, 5) Do you take vitamins or dietary supplements?, 6) How often do you physically exercise longer than 30 minutes per day?, 7) How many hours do you sleep per day?, 8) Do you smoke? (If you smoke, how many cigarettes do you smoke?, Have you ever quit smoking before, and which method did you use?), 9) Do you drink alcohol?, How often?, How much per day?, 10) Do you drink coffee or other beverages?, How much?, 11) What are your sociodemographic characteristics (gender, age, height, weight, marriage status, disease status, work type, number of patients seen per day, and specialty)?

Specialties were classified into three groups: family medicine, internal medicine, and surgery. The internal medicine group included internal medicine, pediatrics, dermatology, rehabilitative medicine, and radiology. The surgery group included general surgery, orthopedics, neurosurgery, otolaryngology, plastic surgery, chest surgery, obstetrics and gynecology, and anesthesiology. For statistical analysis purposes, the family medicine group was combined with the internal medicine group.

The respondents regularly undergoing the five major cancer

screening tests were defined as the ‘regular cancer screening group,’ and those not regularly undergoing them were defined as the ‘irregular cancer screening group.’ We analyzed the differences between the two groups according to the factors that can affect periodic test-taking. Likewise, the group of respondents regularly undergoing adult disease screening tests were defined as the ‘regular adult disease screening group,’ and those not regularly undergoing them were defined as the ‘irregular adult disease screening group.’ We also analyzed the differences between these two groups according to the factors that can affect periodic testing. These factors include gender, age, physician’s specialty, number of patients seen per day, smoking habit, alcohol consumption, use of dietary supplements, coffee or other-beverage consumption, exercise, sleep habits, and disease status.

## 2. Statistical Analysis

The chi-square and Fischer’s exact tests were conducted to analyze the correlations between perspectives on periodic health examination and examination practice. The chi-square and Fischer’s exact tests were utilized also to analyze the correlations

among health-risk factors, sociodemographic characteristics, and examination practices. The statistical analysis was performed using PASW SPSS ver. 18.0 (SPSS Inc., Chicago, IL, USA).

## RESULTS

### 1. Sociodemographic Characteristics of Research Subjects

A total of 127 physicians replied to the questionnaires, 112 males (88.2%) and 15 females (11.8%). The most common age group, representing 60 individuals (47.2%), was the 40s, and the mean age was  $47.8 \pm 8.3$  years. Among the 127 respondents, 121 (95.3%) were married, and six were unmarried. According to the work type, there were 14 employed physicians (11%), 83 sole-practice physicians (65.4%), and 30 group-practice physicians (23.6%). As for specialty, family medicine accounted for 13 physicians (10.2%), internal medicine for 46 (36.2%), and surgery for 68 (53.5%). With regard to the number of patients seen per day, ‘less than 60’ was the most common group,

**Table 1.** General characteristics of subject physicians

Variable	Classification	Group of internal medicine* (n = 59)	Group of surgery† (n = 68)	Total (n = 127)
Age (y)	30–39	11 (18.6)	11 (16.2)	22 (17.3)
	40–49	27 (45.8)	33 (48.5)	60 (47.2)
	50–59	15 (25.4)	15 (22.1)	30 (23.6)
	60–69	5 (8.5)	9 (13.2)	14 (11.0)
	≥70	1 (1.7)	0 (0)	1 (0.8)
Marriage	Married	56 (94.9)	65 (95.6)	121 (95.3)
	Single	3 (5.1)	3 (4.4)	6 (4.7)
Working type	Solo practice	41 (69.5)	42 (61.8)	83 (65.4)
	Group practice	13 (22.0)	17 (25.0)	30 (23.6)
	Employed	5 (8.5)	9 (13.2)	14 (11.0)
No. of patients seen per day	<60	22 (37.3)	31 (45.6)	53 (41.7)
	60–79	12 (20.3)	15 (22.1)	27 (21.3)
	80–99	14 (23.7)	12 (17.6)	26 (20.5)
	≥100	11 (18.6)	10 (14.7)	21 (16.5)

Values are presented as number (%).

\*It included family medicines, internal medicine, pediatrics, psychiatry, neurology, dermatology, rehabilitation medicine, radiology, and so on. †It included surgery, orthopedic surgery, neurosurgery, urology, ophthalmology, plastic surgery, thoracic surgery, obstetrics and gynecology, anesthesiology, otolaryngology, and so on.

numbering 53 (41.7%) (Table 1).

The mean height of the subject physicians was  $169 \pm 7.3$  cm, the mean weight was  $70.1 \pm 10.9$  kg, and the mean body mass index (BMI) was  $24.4 \pm 2.7$  kg/m<sup>2</sup>. The number of obese subjects (i.e., BMI more than 25 kg/m<sup>2</sup>) was 47 (37%). The subjects with diagnosed diseases numbered 47 (37%): hypertension, 22 (44%); hepatitis, 5 (10%); dyslipidemia, 5 (10%); diabetes mellitus, 4 (8%), heart disease, 3 (6%); cancer, 1 (2%); thyroid disease, 1 (2%); ureteral stone/pancreatic disease/liver transplantation, 9 (18%) (Figure 1). Three physicians had two or more diseases.

## 2. Health-related Behaviors of Research Subjects

### 1) Smoking, alcohol consumption

The distribution for smoking habit was as follows: smoker, 33 (26%); former smoker, 48 (37.8%); non-smoker, 46 (36.2%). Twenty-eight (84.8%) of the 33 smokers tried to quit; the methods used were nicotine patch (9), electronic cigarettes (9), medication such as Champix (7), herbal cigarettes (5), and other including 'just quit, no special aids (14)'. The mean smoking quantity was  $19.7 \pm 12.5$  per day. Among the 59 family physicians or internists, there were eight smokers (13.6%) and 26 former smokers (44.1); among the 68 surgeons, there were 25 smokers (36.8%) and 22 former smokers (32.4%).

Alcohol consumers numbered 95 (74.8%), 42 of whom (44.2%) drank less than twice per week, and 11 (11.6%) drank more than four times per week. As for quantities per session,

60 (47.2%) had two drinks to less than a bottle (ethanol, 6.2 to 28.1 g), and 25 (27.5%) drank a bottle or more. By specialty, 39 (66.1%) of the 59 family physicians or internists drank alcohol, whereas 56 (82.4%) of the 68 surgeons did so. The family physicians or internists had significantly lower smoking and drinking rates than the surgeons ( $P < 0.05$ ) (Table 2).

### 2) Dietary supplements

Sixty-nine (54.3%) of the 127 physicians took dietary supplements: 51 (45.1%) took multivitamins, 19 (16.8%) omega-3, 18 (15.9%) vitamin C, and 17 (15%) red ginseng. One hundred and five (82.7%) physicians drank coffee or soda: 80 (63%) drank two or fewer glasses per day, 23 (18.1%) three to six glasses per day, and two (1.6%) seven or more glasses per day. There were no dietary supplement differences according to specialty, though surgeons drank significantly more coffee or soda than the family physicians or internists ( $P < 0.05$ ) (Table 2).

### 3) Exercise and sleep hours

One hundred and nineteen (93.7%) of the physicians exercised regularly more than once per week: 71 (48.3%) walked, hiked or jogged, 40 (27.2%) played golf, 15 (10.2%) exercised at fitness centers, 10 (6.8%) swam, and 10 (6.8%) exercised in other ways. Eight (6.3%) of the physicians were non-exercisers. Eighty-three (65.4%) of the physicians slept five to seven hours, 41 (32.3%) seven to nine hours, and three (2.4%) less than five hours. There were no differences in exercise habits or sleep hours according to specialty (Table 2).

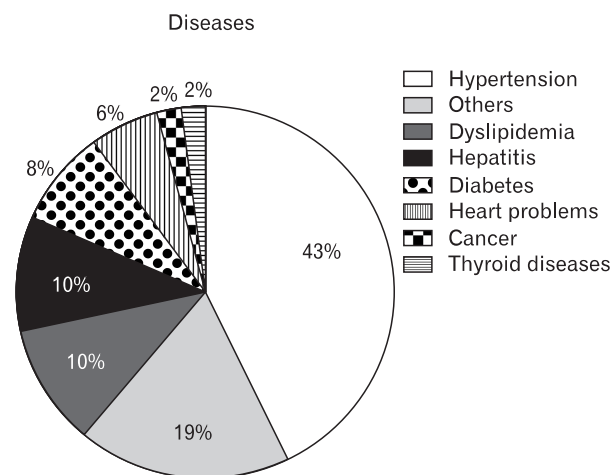


Figure 1. Proportion of diagnosed diseases of subject.

## 3. Screening-Test Practices

One hundred and twenty-three (96.9%) of the physicians replied positively to the question of the necessity of periodic health examinations. Fifty-seven (44.9%) regularly underwent the five major cancer screening tests: 29 (50.9%) had them performed biennially, 15 (26.3%) annually, and 13 (22.8%) every three years (Table 3). Seventy (55.1%) of the physicians, meanwhile, had the tests performed irregularly, which seems a low rate in light of the physicians' acknowledgement of the importance and high priority of such testing.

Ninety-two (72.4%) of the physicians regularly had adult disease screening tests performed (total cholesterol, fasting plasma glucose, liver function, urinalysis): 53 (57.6%) annually,

**Table 2.** Smoking, alcohol, and eating dietary supplements of subject physicians

Specialty	Group of internal medicine* (n = 59)	Group of surgery <sup>†</sup> (n = 68)	Total (n = 127)	P-value
Gender				0.986
Male	52 (88.1)	60 (88.2)	112 (88.2)	
Female	7 (11.9)	8 (11.8)	15 (11.8)	
Smoking				<0.05 <sup>‡</sup>
Smokers	8 (13.6)	25 (36.8)	33 (26.0)	
X-smokers	26 (44.1)	22 (32.4)	48 (37.8)	
Nonsmokers	25 (42.4)	21 (30.9)	46 (36.2)	
Alcohol				<0.05 <sup>‡</sup>
Drinkers	39 (66.1)	56 (82.4)	95 (74.8)	
Nondrinkers	20 (33.9)	12 (17.6)	32 (25.2)	
Dietary supplements				0.487
Yes	34 (57.6)	35 (51.5)	69 (54.3)	
No	25 (42.4)	33 (48.5)	58 (45.7)	
Coffee and beverages				<0.05 <sup>‡</sup>
Yes	44 (74.6)	61 (89.7)	105 (82.7)	
No	15 (25.4)	7 (10.3)	22 (17.3)	
Exercise (time/wk)				0.07
<1	4 (6.8)	4 (5.9)	8 (6.3)	
≥1	55 (93.2)	64 (94.1)	119 (93.7)	
Sleep (h)				0.71
<5	2 (3.4)	1 (1.5)	3 (2.4)	
5–7	37 (62.7)	46 (67.6)	83 (65.4)	
7–9	20 (33.9)	21 (30.9)	41 (32.3)	

Values are presented as number (%).

\*It included family medicines, internal medicine, pediatrics, psychiatry, neurology, dermatology, rehabilitation medicine, radiology, and so on. <sup>†</sup>It included surgery, orthopedic surgery, neurosurgery, urology, ophthalmology, plastic surgery, thoracic surgery, obstetrics and gynecology, anesthesiology, otolaryngology, and so on. <sup>‡</sup>By chi-square test.

21 (22.8%) biennially, 15 (16.3%) biannually, and 3 (3.3%) every three years. As for the health examination type, the survey results were as follows: selective self-examination, 53 (41.7%); National Health Insurance Service, 28 (22%); hospital health examination program, 19 (15%) (Table 3). With respect to the acknowledged need for periodic health examination, there was a significant correlation with regular adult disease screening ( $P < 0.05$ ), but no correlation with five major cancer screenings.

#### 4. Factors Affecting Periodic Health Examination

##### 1) Five major cancer screening tests

The results of Fisher's exact and chi-square tests analyzing the correlations with factors affecting the cancer screening examination behaviors of the two groups revealed that regular exercisers underwent more screening examinations than non-exercisers ( $P < 0.05$ ). Further, there was no correlation between screening-test regularity and age, gender, specialty, number of patients seen per day, smoking, alcohol consumption, dietary

**Table 3.** Time interval and sites of taking health screening tests

Variable	Screening for cancers (n = 57)	Screening for adult diseases (n = 92)
Interval of taking screening tests		
Every year	15 (26.3)	53 (57.6)
Every 2 years	29 (50.9)	21 (22.8)
More than 2 years	13 (22.8)	3 (3.3)
Every 6 months		15 (16.3)
Site of taking screening tests		
Self screening		53 (41.7)
National health promotion programs		28 (22)
General hospital		19 (15)

Values are presented as number (%).

supplements, coffee or soda consumption, sleep hours, or disease status (Table 4).

## 2) Adult disease screening tests

The results of Fisher's exact and chi-square tests analyzing the correlations with factors affecting the adult disease screening examination behaviors of the two groups showed no correlation between screening-test regularity and age, gender, specialty, number of patients seen per day, smoking, alcohol consumption, dietary supplements, coffee or soda consumption, exercise, sleep hours, or disease status (Table 5).

## DISCUSSION

In this study we investigated the health-promotion and disease-prevention behaviors of primary-care physicians and analyzed the factors affecting how often they received periodic health examinations. With the recent improvement in Korean national socioeconomic status, public interest in health has grown. The most important goal of health-promotion efforts is the modification of overall life style and of specific behaviors that are considered to be causative factors in disease occurrence and progression.<sup>13)</sup> Physicians have a dual role in this regard, in that they are in a strong position to set good examples of health-

**Table 4.** Variable factors that influence on periodic cancer screening

Variable	Responders (%) <sup>*</sup> (n = 57)	Non-responders (%) <sup>†</sup> (n = 70)	P-value <sup>‡</sup>
Gender			0.338
Male	52 (91.2)	60 (85.7)	
Female	5 (8.8)	10 (14.3)	
Age (y)			<0.05
30–39	3 (5.3)	19 (27.1)	
40–49	29 (50.9)	31 (44.3)	
50–59	15 (26.3)	15 (21.4)	
60–69	10 (17.5)	4 (5.7)	
≥70	0 (0)	1 (1.4)	
Specialty			0.109
Group of internal medicine <sup>‡</sup>	22 (38.6)	37 (52.9)	
Group of surgery <sup>§</sup>	35 (61.4)	33 (47.1)	
No. of patients seen per day			0.662
<60	21 (36.8)	32 (45.7)	
60–79	13 (22.8)	14 (20.0)	
80–99	14 (24.6)	12 (17.1)	
≥100	9 (15.8)	12 (17.1)	
Smoking			0.131
Non-smoker	16 (28.1)	30 (42.9)	
X-smoker	22 (38.6)	26 (37.1)	
Smoker	19 (33.3)	14 (20.0)	
Alcohol			0.073
Drinker	47 (82.5)	48 (68.6)	
Non-drinker	10 (17.5)	22 (31.4)	
Dietary supplements			0.072
Yes	36 (63.2)	33 (47.1)	
No	21 (36.8)	37 (29.1)	
Coffee and other beverages			0.953
Yes	47 (37.0)	58 (45.7)	
No	10 (7.9)	12 (52.9)	
Exercise (time/wk)			<0.05
<1	6 (10.5)	20 (28.6)	
≥1	51 (89.5)	50 (71.4)	
Sleep (h)			0.624
<5	1 (1.8)	2 (2.9)	
5–7	35 (61.4)	48 (68.6)	
7–9	21 (36.8)	20 (28.6)	
Disease			0.738
Yes	22 (38.6)	25 (35.7)	
No	35 (61.4)	45 (64.3)	

\*Responders: participants who performed regular periodic health screening test. †Non-responders: participants who didn't performed regular periodic health screening test. ‡It included family medicines, internal medicine, pediatrics, psychiatry, neurology, dermatology, rehabilitation medicine, radiology, and so on. §It included surgery, orthopedic surgery, neurosurgery, urology, ophthalmology, plastic surgery, thoracic surgery, obstetrics and gynecology, anesthesiology, otolaryngology, and so on. ‖From Fisher's exact test and chi-square test between 2 groups.

**Table 5.** Variable factors that influence on implementation of periodic screening tests for adult diseases

Variable	Responders (%) <sup>*</sup> (n = 92)	Non-responders (%) <sup>†</sup> (n = 35)	P-value <sup>‡</sup>
Gender			0.251
Male	83 (90.2)	29 (82.9)	
Female	9 (9.8)	6 (17.1)	
Age (y)			<0.05
30–39	9 (9.8)	13 (37.1)	
40–49	45 (48.9)	15 (42.9)	
50–59	25 (27.2)	5 (14.3)	
60–69	12 (13.0)	2 (5.7)	
≥70	1 (1.1)	0 (0)	
Specialty			0.768
Group of internal medicine <sup>§</sup>	42 (45.7)	17 (48.6)	
Group of surgery <sup>§</sup>	50 (54.3)	18 (51.4)	
No. of patients seen per day			0.346
<60	37 (40.2)	16 (45.7)	
60–79	20 (21.7)	7 (20.0)	
80–99	19 (20.7)	7 (20.0)	
≥100	16 (17.4)	5 (14.3)	
Smoking			0.840
Non-smoker	32 (34.8)	14 (40.0)	
X-smoker	36 (39.1)	12 (34.3)	
Smoker	24 (26.1)	9 (25.7)	
Alcohol			0.073
Drinker	71 (77.2)	24 (68.6)	
Non-drinker	21 (22.8)	11 (31.4)	
Dietary supplements			0.229
Yes	53 (57.6)	16 (45.7)	
No	39 (42.4)	19 (54.3)	
Coffee and other beverages			0.974
Yes	76 (82.6)	29 (82.9)	
No	16 (17.4)	6 (17.1)	
Exercise (time/wk)			0.367
<1	17 (18.5)	9 (25.7)	
≥1	75 (81.5)	26 (74.3)	
Sleep (h)			0.926
<5	2 (2.2)	1 (2.9)	
5–7	61 (66.3)	22 (62.9)	
7–9	29 (31.5)	12 (34.3)	
Disease			0.225
Yes	37 (40.2)	10 (28.6)	
No	55 (59.8)	25 (71.4)	

\*Responders: participants who performed regular periodic health screening test. <sup>†</sup>Non-responders: participants who didn't performed regular periodic health screening test. <sup>‡</sup>It included family medicines, internal medicine, pediatrics, psychiatry, neurology, dermatology, rehabilitation medicine, radiology, and so on. <sup>§</sup>It included surgery, orthopedic surgery, neurosurgery, urology, ophthalmology, plastic surgery, thoracic surgery, obstetrics and gynecology, anesthesiology, otorhinolaryngology, and so on. <sup>||</sup>From Fisher's exact test and chi-square test between 2 groups.

promotion behaviors and also are counselors and teachers of their patients in health-related matters.<sup>5)</sup> If physicians themselves do not set those good examples, their relationships with patients will suffer, and the interests of community-wide health promotion will fail to be served.

In the present survey results, the smoking rate among the 127 subject physicians was 26%, which is comparable to the 27% reported for the general population by the Korean National Health and Nutrition Examination Survey (KNHANES) of 2009.<sup>14)</sup> The rate of alcohol consumption was 74.8%, higher than the 60.6% of the general population 19 or older as reported in KNHANES. However, a confounding factor was the predominance of males among the subject physicians; indeed, that rate was lower than the KNHANES-reported 88% rate of alcohol consumption among males 19 or older in the general population.

A total of 53.5% of the subject physicians engaged in regular exercise three times per week. They exercised aerobically, for example by walking, hiking, or jogging (48.3%), or they played golf (27.2%). The mean BMI of the subject physicians was 24.38 kg/m<sup>2</sup>. The prevalence of obesity, defined as a BMI higher than 25 kg/m<sup>2</sup>, was 37% (47 physicians) which was higher than the 34.2% rate reported for those 30 years or older by KNHANES. Among the subject physicians, five (3.9%) had a BMI higher than 30 kg/m<sup>2</sup>, which is the American obesity criterion.<sup>15)</sup>

Among the subject physicians, the prevalence of hypertension, diabetes mellitus and dyslipidemia was 17.3%, 3.1%, and 3.9%, respectively, which were markedly lower rates than the corresponding KNHANES numbers for those 30 years or older: 28.5%, 9.8%, and 13.8%, respectively. The discrepancy here was considered to be due to the mean-age difference between the two groups.

The proportion of subject physicians regularly taking the five major cancer screening tests was 44.1%, which was very similar to the 44.3% of those 19 years or older reported by KNHANES. The proportion taking regular adult disease screening tests meanwhile was 72.4%, which was considerably higher than the KNHANES-reported 51.8% of the general population aged 19 years or older.

In the report by Park et al.,<sup>10)</sup> there was little difference in smoking rates between physicians in practice (26%) and resident physicians (21.7%). The rate of alcohol consumption among physicians in practice (74.8%), however, was higher than that

among resident physicians (30.5%). The rate of exercising less than one time per week among physicians in practice (20.5%) was lower than that among resident physicians (88.4%).

It was found that most physicians in practice (96.9%) were aware that periodic health examination is necessary; even so, the rate of regularly taking the five major cancer screening tests was only 44.9%, and the rate of regularly taking adult disease screening tests was 72.4%. We analyzed the differences in the rates of taking regular health examination according to the survey participants' socio-demographic characteristics (diseases, specialty, and number of patients seen per day) and health-promotion behaviors (smoking, alcohol consumption, exercise, and sleep hours) considered to be dispositive. However, we found that almost none of the factors (except 'exercising more than one time per week' significantly affected the rate of taking regular periodic health examinations.

Kim et al.<sup>16)</sup> reported that the factors affecting the general population's cancer-screening motivations were gender, monthly income, previous cancer diagnosis, interest in health, smoking status, exercise, and regular diet. In our results though, these factors did not significantly affect physicians' periodic health examinations.<sup>16)</sup> The reasons for the physicians' low rate of regular screening, despite their awareness of the importance of such examinations, were considered to be lack of knowledge, job stress, difficulty in finding reliable examination centers or physicians, and overconfidence in self-health. It is expected that a systemic investigation of these issues will be needed in the future.<sup>17-19)</sup>

With regard to the limitations of this study, first, the primary-care physician subjects were a small population who all belonged to a local association of physicians. The results of this study, then, cannot be generalized to a general population of physicians. In the future, a national survey of a larger physician population, including systematic sampling in a variety of different areas, will be needed. As for the second limitation of this study, although the screening test periods should differ by disease, the questionnaire did not differentiate them. Nonetheless, our survey results reflect the current Korean health screening system, which is based on annual or biennial periodic examination irrespective of age, sex, and individual health-risk factors. Third, 63% of physicians who were mailed a questionnaire did not reply, and we did not compare the sociodemographic characteristics of the non-respondents with those of the respondents.

## CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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