

Attitudes and Reported Practices of Korean Primary Care Physicians for Health Promotion

To examine attitudes and practice patterns of primary care physicians in health promotion and to probe factors associated with active involvement, a nationwide cross-sectional postal questionnaire survey of randomly sampled Korean family physicians and internists was performed. The areas of health promotion examined were; smoking, alcohol consumption, stress, exercise, and diet. Overall response rate was 38.0% and an interview survey of sub-samples of non-responders found no differences in socio-demographic characteristics or survey results versus original responders, except for the rate of collecting information on smoking and diet. Smoking cessation was considered important by 92% of responders, while other lifestyle factors were considered important by less than 70%. Approximately 80% of responders believed in effectiveness of lifestyle counseling, except for stress. The frequency of collecting information, providing counseling, and the level of preparedness to undertake counseling were higher for smoking and alcohol than for other factors. Beliefs in effectiveness of health promotion and preparedness to undertake counseling were positively associated with frequency of information collection and providing counseling, even after adjusting for socio-demographic factors. Efforts should be made to change the physicians' perception of effectiveness and importance of health promotion, and to improve physician's preparedness to actively intervene.

Key Words : Counseling; Physicians, Family; Health Promotion; Life Style

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INTRODUCTION

Given the safety and the low cost of advising patients on lifestyle factors, and the important health benefits that accrue when applied to a large population, counseling on lifestyle is recommended routinely even when its long-term effectiveness has not yet been definitely proven (1). As primary care physicians have a continuous relationship with patients, they have a special opportunity to be an effective providers of health promotion. Evidences indicate that primary care physicians can change a patient's lifestyle through simple counseling intervention in terms of, quitting smoking (2), moderating alcohol consumption (3), taking more physical exercise, and eating a healthier diet (4).

In Korea, after the inception of national health insurance in 1989, the accessibility of health services improved dramatically. In 2000, the mean frequency of outpatient visits per person was 8.7 times in a year, and primary care physicians were responsible for 71% of all outpatient visits (5). This datum suggests that primary care physicians have a potentially significant role in promoting health and lifestyle changes in the Korean population.

However, despite the importance of the role of primary care physicians in health promotion, no national data is available on the attitudes and practice patterns of primary care physicians in Korea.

The primary purpose of this study was to examine how frequently internists and family physicians collect information on the lifestyle factors (smoking, alcohol consumption, exercise, stress, and diet) of patients, and provide lifestyle counseling. Primary care physicians include by definition, the family physician, general internists, general pediatricians, and general practitioners (6). General practitioners in other countries are usually trained to provide adequate primary care after graduating medical school, but in Korea, they do not undergo such training and sometimes they have received training in another specialty. Pediatricians mainly take care of children. Therefore, we confined study subjects to family physicians and internists, as they are the main providers of comprehensive primary care for Korean adults, regardless of sex, or the type of diseased organ.

The secondary aim of this study was to investigate the factors associated with active involvement of primary care physicians in health promotion.

MATERIAL AND METHODS

Postal questionnaire survey

We performed a postal questionnaire survey of a random stratified nationwide sample of Korean physicians specialized in family or internal medicine. Using a PC/SAS program, we randomly sampled 330 family physicians and 569 internists from among the 1,377 family physicians and 2,397 internists registered with the Korean National Health Insurance Corporation in 2000. Thus, a questionnaire was sent in March 2000 to 899 physicians who represented approximately 24% of all

office-based physicians that specialized in either family medicine or internal medicine. Non-responders to the first mailing were followed-up by mail in May 2000 and again in June 2000. We excluded 18 physicians from the initial sample because they could not be located. Of the 881 physicians remaining, 335 responded giving an overall response rate was 38.0% (Fig. 1). We compared demographic characteristics (sex and age) of the responders with those of all family physicians and internists registered with the Korean National Health Insurance Corporation in 2001 using the secondary data reported by the Korean National Health Insurance Corporation.

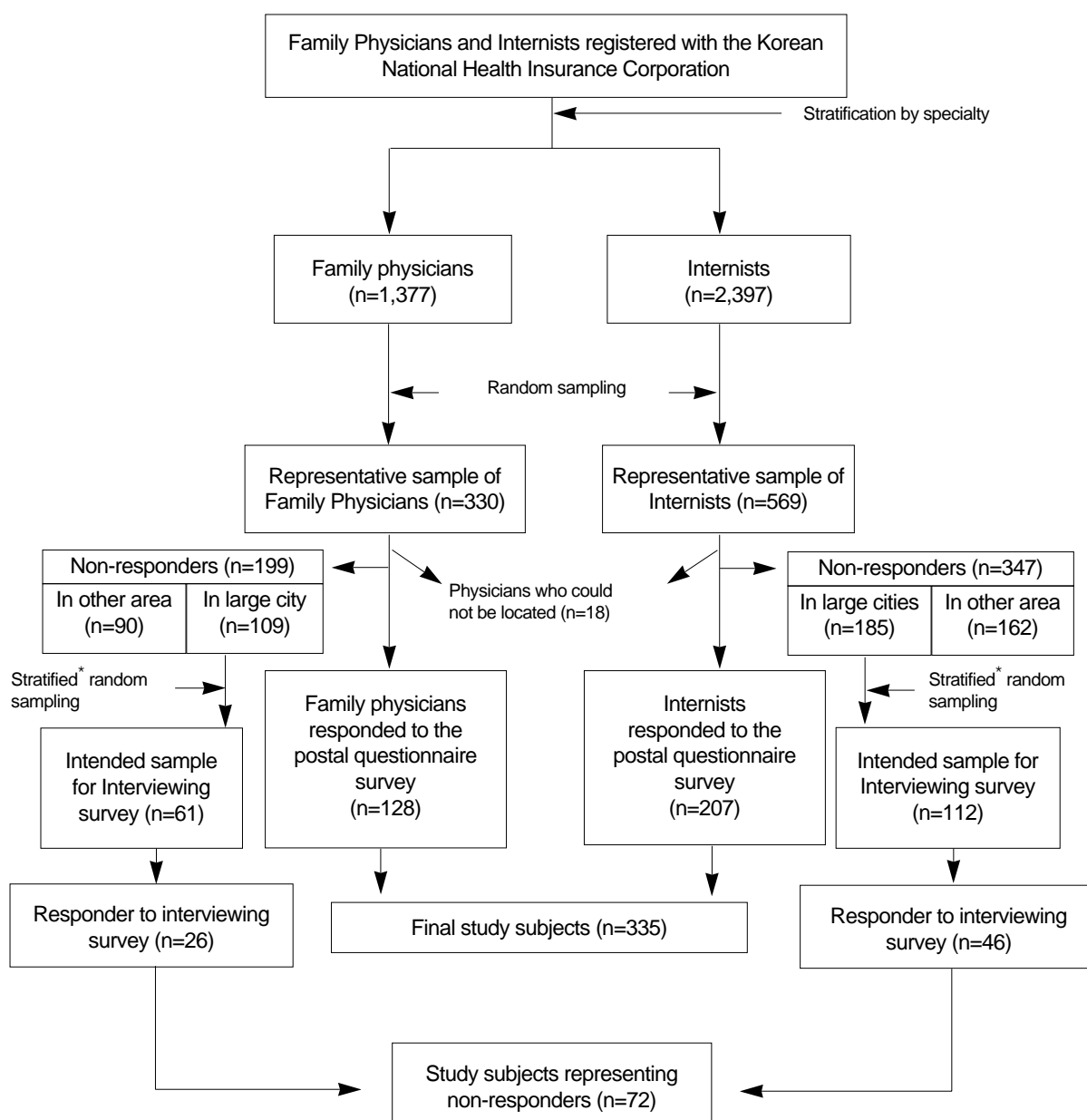


Fig. 1. The steps used to select study subjects. *Samples for the interview survey were selected according to the distribution of practicing area and specialty of responders to postal questionnaire survey.

Contents of the questionnaire

A questionnaire consisted of multiple-choice items was developed by the authors and fifteen other family physicians. The first part of the questionnaire evaluated attitudes, perceived skills, and current practices related to several areas (smoking, alcohol consumption, stress, exercise, and diet) of lifestyle intervention for health promotion with following questions: How important do you consider health promotion in terms of patients' health? How effective do you believe you are at modifying the lifestyles of your patients? How do you perceive yourself in terms of your preparedness to undertake lifestyle counseling? How often do you evaluate the life-style of your patients? How often do you counsel your patients on lifestyle?

Table 1. General characteristics of study participants

Variables		Number	(%)
Gender	Male	286	(85.4)
	Female	49	(14.6)
Area of practice	Large city	184	(54.9)
	Medium or small city	116	(34.6)
	Rural area	35	(10.5)
Level of vocational training	None*	6	(1.9)
	Internship*	20	(6.3)
	Residency	266	(83.1)
	Fellowship	28	(8.8)
Specialty	Internal medicine	207	(61.8)
	Family medicine	128	(38.2)
Age (yr)	<40	112	(33.4)
	40-49	124	(37.0)
	50-59	39	(11.6)
	60≤	60	(17.9)
Duration of working as a primary care physician (yr)	<5	85	(25.4)
	5-9	85	(25.4)
	10-14	74	(22.1)
	15≤	91	(27.2)
Patient consultation per day (persons)	<50	83	(24.8)
	50-69	81	(24.8)
	70-89	75	(22.4)
	90≤	96	(28.7)

*Some physicians acquired certificate of specialty through the God Father program without residency training.

Responses to the questionnaire were divided into four (e.g. very effective, probably effective, probably ineffective, ineffective) or five categories (e.g. 'all the time', 'most of the time', 'sometimes', 'rarely', 'never'). The second part of the questionnaire contained socio-demographic characteristics of the physicians such as, age, sex, level of vocational training, practicing geographical location, duration of working years as a primary care physician, and number of patient consultations per day.

Interview survey of sub-samples of non-responders

To evaluate the non-response bias, we compared the findings from the postal survey of responders practicing in large-sized cities with the findings obtained from face-to-face interviews with a sub-sample of non-responders. A trained interviewer carried out the face-to-face interview using the same questionnaires after obtaining verbal consent by placing a telephone call. The findings from the survey of physicians practicing in medium- or small-sized cities or rural areas were excluded from the responder/non-responder comparison because of procedural difficulties. The selection of sub-samples of non-responders was performed in two stages; by stratifying non-responders according to their practicing area and specialties, and by random sampling from each strata considering the relative distribution of practicing areas and responders' specialties, as determined by the postal questionnaire survey. We intended to complete the interview survey with 25% of the non-responders from each specialty (26 from family medicine and 46 from internal medicine). So, having considered the possibility of being refused, we selected 173 physicians (60%) from the list of non-responders using the stratified random sampling method and assigned the number of non-responders to be essentially surveyed to each strata. If the interviewing survey of initially assigned number of non-responders were completed in a predetermined stratum, then the remaining non-responders in the stratum were not surveyed further. Of the the initially selected 173 physicians, 5 physicians had given up their practice or could not be located were excluded, and 47 physicians refused to participate, and 49 physicians were excluded additionally as they belonged to the strata where the interviewing survey of initially assigned number of non-responders were

Table 2. Attitudes and reported practice of primary care physicians for health promotion

Items	Lifestyle factors									
	Smoking		Alcohol		Stress		Exercise		Diet	
	No.	(%)*	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Perceive lifestyle "important" or "very important"	301	(91.8)	166	(50.8)	201	(61.7)	227	(69.6)	221	(67.6)
Perceive lifestyle counseling "effective" or "very effective"	262	(79.1)	259	(78.7)	222	(67.2)	278	(83.7)	279	(84.0)
Perceive themselves as "prepared" or "well prepared" for lifestyle counseling	261	(78.6)	258	(78.4)	159	(48.2)	197	(59.7)	216	(65.9)
Collect information on lifestyle "always" or "nearly always"	279	(83.8)	243	(73.2)	131	(39.7)	123	(37.0)	131	(39.3)
Counsel lifestyle factors "always" or "nearly always"	238	(72.1)	231	(70.6)	159	(48.3)	167	(51.1)	175	(53.4)

*Some participants who did not answer to the items were excluded from the percentage calculations.

Table 3. Multivariate adjusted associations* of the reported practice of physicians' information collection on patients' lifestyle factors with socio-demographic characteristics and the perceptions of primary care physicians

Variables		Lifestyle factors									
		Smoking (No. [†] =259)		Alcohol (No.=226)		Stress (No.=119)		Exercise (No.=110)		Diet (No.=118)	
		OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)
Gender	Female	1		1		1		1		1	
	Male	1.19 (0.47, 3.01)		0.94 (0.41, 2.14)		0.93 (0.43, 2.01)		0.59 (0.28, 1.24)		0.53 (0.25, 1.15)	
Age (yr)	<40	1		1		1		1		1	
	40-49	1.19 (0.46, 3.09)		1.38 (0.61, 3.13)		1.19 (0.55, 2.59)		1.53 (0.73, 3.21)		1.02 (0.47, 2.21)	
	50-59	1.05 (0.19, 5.69)		0.94 (0.26, 3.39)		1.05 (0.33, 3.41)		1.36 (0.45, 4.13)		0.59 (0.19, 1.84)	
	60≤	0.60 (0.12, 2.95)		0.87 (0.23, 3.35)		0.67 (0.19, 2.38)		0.70 (0.20, 2.44)		0.49 (0.14, 1.72)	
Specialty	IM [‡]	1		1		1		1		1	
	FM [§]	0.48 (0.22, 1.05)		0.45 (0.23, 0.87)		0.97 (0.50, 1.89)		1.08 (0.57, 2.03)		0.60 (0.30, 1.16)	
Area of practice	County	1		1		1		1		1	
	Medium city	1.68 (0.56, 5.02)		0.45 (0.16, 1.21)		2.78 (0.98, 7.94)		2.80 (0.98, 8.05)		1.18 (0.43, 3.25)	
	Large city	2.72 (0.93, 8.00)		1.22 (0.45, 3.30)		1.84 (0.65, 5.18)		2.26 (0.80, 6.40)		1.17 (0.44, 3.15)	
Level of vocational training	Intern	1		1		1		1		1	
	Resident	0.55 (0.13, 2.24)		1.06 (0.33, 3.38)		0.87 (0.25, 3.01)		1.05 (0.33, 3.41)		0.97 (0.29, 3.29)	
	Fellow	1.85 (0.15, 23.1)		2.06 (0.41, 10.4)		0.73 (0.16, 3.38)		0.55 (0.12, 2.56)		1.45 (0.31, 6.68)	
Duration of working as a primary care physician (yr)	<5	1		1		1		1		1	
	5-9	1.16 (0.43, 3.08)		2.10 (0.90, 4.88)		1.02 (0.45, 2.34)		0.74 (0.34, 1.63)		1.01 (0.45, 2.26)	
	10-14	1.32 (0.39, 4.47)		1.44 (0.53, 3.94)		1.33 (0.50, 3.52)		1.01 (0.41, 2.53)		1.53 (0.59, 4.01)	
	15≤	1.51 (0.34, 6.62)		0.97 (0.29, 3.20)		1.78 (0.56, 5.64)		1.27 (0.43, 3.74)		1.93 (0.63, 5.95)	
Patient consultation per day (persons)	<50	1		1		1		1		1	
	50-69	2.15 (0.73, 6.31)		1.14 (0.45, 2.86)		1.04 (0.44, 2.43)		1.25 (0.55, 2.85)		1.13 (0.49, 2.62)	
	70-89	1.40 (0.49, 3.97)		0.92 (0.37, 2.28)		0.90 (0.37, 2.14)		0.74 (0.31, 1.77)		0.49 (0.20, 1.19)	
	90≤	1.60 (0.57, 4.44)		0.78 (0.32, 1.88)		1.12 (0.48, 2.61)		1.15 (0.50, 2.66)		1.03 (0.44, 2.39)	
Perceiving physician's intervention on lifestyle as effective	No	1		1		1		1		1	
	Yes	2.67 (1.08, 6.59)		2.58 (1.23, 5.43)		2.65 (1.32, 5.32)		1.72 (0.92, 3.24)		2.88 (1.55, 5.34)	
Perceiving lifestyle as important	No	1		1		1		1		1	
	Yes	2.71 (0.98, 7.49)		0.85 (0.48, 1.49)		3.09 (1.73, 5.54)		1.64 (0.91, 2.95)		1.50 (0.86, 2.63)	
Being prepared to counsel upon lifestyle	No	1		1		1		1		1	
	Yes	2.42 (1.16, 5.05)		1.72 (0.91, 3.25)		3.07 (1.78, 5.31)		2.45 (1.42, 4.22)		3.74 (2.07, 6.75)	

*Adjusted for age, gender, specialty, area of practice, area of practice, level of vocational training, duration of working as a primary care physician, number of patient consultation per day, perception about the effectiveness of physicians' intervention on health, perception about the importance of lifestyle and perception about preparedness for counseling upon lifestyles by multiple logistic regression analysis; [†]Number of subjects who reported collecting information on patients' lifestyles (persons); [‡]Internal medicine; [§]Family medicine.

completed before they were offered to participate in the interview survey.

Analysis

Comparison between responders and non-responders was performed using the chi-square test and the t test. Independent predictors of a physician actively collecting information and counseling on lifestyles were evaluated by multiple logistic regression analysis. To perform this analysis, five-leveled reported practice of information collection on patients' lifestyle factors and physician's lifestyle counseling was re-categorized into two levels; all the time, and not all the time. The attitudes and the perceived skills of physician and socio-demographic variables were included in the model as candidate predictors.

RESULTS

The mean age of the study participants was 46.7 yr (standard deviation=11.6) and 85% were male. The distribution of sex was not different from that of all family physicians and internists registered with the Korean National Health Insurance Corporation in 2001 (male=87.6%; female=12.4%) while the age distribution was significantly different. The proportion of those who were in their thirtieth, fortieth, fiftieth, and sixtieth or over among all family physicians and internists registered with the Korean National Health Insurance Corporation in 2001 were 27.0%, 43.9%, 14.6% and 14.5%.

Most of the responders were practicing in an urban area and 62% were internists, and half of the responders performed more than 70 consultations in a normal day (Table 1). More than 90% of the responders indicated that they believed smok-

Table 4. Multivariate adjusted association* of the reported practice of physicians' lifestyle counseling on patients' lifestyles with socio-demographic characteristics and perception of primary care physicians

Variables		Lifestyle factors									
		Smoking (No. [†] =222)		Alcohol (No.=215)		Stress (No.=147)		Exercise (No.=156)		Diet (No.=160)	
		OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)
Gender	Female	1		1		1		1		1	
	Male	1.12	(0.50, 2.51)	1.03	(0.47, 2.29)	0.72	(0.34, 1.54)	0.76	(0.34, 1.65)	0.83	(0.38, 1.78)
Age (yr)	<40	1		1		1		1		1	
	40-49	0.96	(0.42, 2.17)	0.87	(0.40, 1.88)	0.74	(0.34, 1.59)	0.52	(0.24, 1.13)	0.49	(0.23, 1.05)
	50-59	0.95	(0.25, 3.59)	1.32	(0.36, 4.91)	0.95	(0.30, 3.05)	0.59	(0.18, 1.92)	0.76	(0.24, 2.40)
	60≤	2.09	(0.50, 8.76)	1.84	(0.47, 7.18)	1.51	(0.42, 5.37)	0.73	(0.21, 2.59)	0.93	(0.26, 3.29)
Specialty	IM [‡]	1		1		1		1		1	
	FM [§]	0.48	(0.25, 0.95)	0.62	(0.32, 1.18)	1.02	(0.53, 1.95)	1.42	(0.74, 2.74)	0.96	(0.50, 1.84)
Area of practice	County	1		1		1		1		1	
	Medium	1.02	(0.37, 2.83)	1.19	(0.44, 3.18)	0.68	(0.25, 1.87)	1.40	(0.53, 3.68)	0.91	(0.34, 2.40)
	Large	1.10	(0.41, 2.98)	1.06	(0.41, 2.76)	0.66	(0.24, 1.81)	1.06	(0.41, 2.72)	0.75	(0.29, 1.93)
Level of vocational training	Intern	1		1		1		1		1	
	Resident	0.79	(0.21, 2.96)	1.81	(0.52, 6.24)	0.84	(0.25, 2.85)	2.27	(0.65, 8.00)	1.84	(0.54, 6.25)
	Fellow	1.44	(0.25, 8.38)	1.63	(0.35, 7.72)	0.70	(0.15, 3.19)	3.37	(0.74, 15.4)	1.24	(0.27, 5.63)
Duration of working as a primary care physician (yr)	<5	1		1		1		1		1	
	5-9	1.42	(0.61, 3.29)	1.13	(0.51, 2.51)	1.56	(0.70, 3.45)	1.30	(0.59, 2.85)	1.07	(0.50, 2.31)
	10-14	1.27	(0.46, 3.52)	1.48	(0.55, 3.98)	2.62	(0.99, 6.94)	3.15	(1.17, 8.47)	2.04	(0.79, 5.24)
	15≤	0.65	(0.19, 2.20)	0.93	(0.29, 3.02)	1.37	(0.44, 4.27)	2.46	(0.79, 7.66)	1.96	(0.64, 5.97)
Patient consultation per day (persons)	<50	1		1		1		1		1	
	50-69	1.21	(0.48, 3.10)	1.27	(0.51, 3.17)	0.84	(0.36, 1.95)	1.09	(0.47, 2.51)	1.16	(0.51, 2.68)
	70-89	0.53	(0.21, 1.30)	0.59	(0.25, 1.42)	0.81	(0.35, 1.92)	0.70	(0.30, 1.66)	0.75	(0.32, 1.75)
	90≤	1.00	(0.40, 2.49)	0.83	(0.34, 2.00)	1.29	(0.56, 2.98)	1.62	(0.69, 3.81)	1.27	(0.55, 2.95)
Perceiving physician's intervention on lifestyle as effective	No	1		1		1		1		1	
	Yes	2.45	(1.24, 4.84)	1.77	(0.89, 3.54)	2.80	(1.34, 5.84)	2.74	(1.36, 5.52)	3.26	(1.66, 6.39)
Perceiving lifestyle as important	No	1		1		1		1		1	
	Yes	1.79	(0.68, 4.73)	1.25	(0.72, 2.16)	1.87	(1.09, 3.22)	1.87	(1.04, 3.35)	1.70	(0.99, 2.92)
Being prepared to counsel upon lifestyle	No	1		1		1		1		1	
	Yes	4.68	(2.48, 8.82)	4.01	(2.19, 7.34)	3.89	(2.28, 6.65)	5.05	(2.91, 8.76)	3.91	(2.27, 6.76)

*Adjusted for age, gender, specialty, area of practice, area of practice, level of vocational training, duration of working as a primary care physician, number of patient consultation per day, perception about the effectiveness of physicians' intervention on health, perception about the importance of lifestyle and perception about preparedness for counseling upon lifestyles by multiple logistic regression analysis. [†]Number of subjects who reported to collecting information on patients' lifestyles (persons); [‡]Internal medicine; [§]Family medicine.

ing cessation was "probably important" or "very important" for health, and other lifestyles were considered less important by comparison. Physicians' perceptions of the effectiveness of lifestyle changes were dependent upon the lifestyle factors. Primary care physicians had an optimistic view of the potential effects of lifestyle counseling. 80% of the physicians believed in the effectiveness of counseling for most lifestyle factors, but they had a pessimistic view on the effectiveness of counseling stress; less than 70% believed in the effectiveness of counseling. Physicians reported that they were better prepared for counseling smoking cessation (78.6%) and moderating alcohol consumption (78.4%), and they more frequently collected information on smoking (83.8%) and alcohol consumption (73.2%). Not surprisingly, they also more frequently counseled on for smoking (72.1%) and alcohol (70.6%) than for stress, exercise, or diet (Table 2).

Internists reported that they probed the alcohol consuming habits of patients more frequently than family physicians. Other than this, the rate of collecting information on patient lifestyles was not different according to the socio-demographic characteristics, level of training, years in primary care practice, of the number of patient consultations. By perceiving lifestyle counseling as effective (odds ratio [OR], 1.72 to 2.88) and by perceiving themselves as well-prepared for lifestyle counseling (OR, 1.72 to 3.74) were positively associated with the reported frequency of collecting information on most items of lifestyle (Table 3).

Most socio-demographic characteristics were not associated with the provision of counseling on lifestyles, with the exception that family physicians provided smoking cessation counseling less frequently than internists (Table 4). Physicians who considered counseling as an effective means of changing life-

Table 5. Comparison of attitudes and reported practice of lifestyle counseling between responders and non-responders* to mail questionnaire survey

	Smoking			Alcohol			Stress			Exercise			Diet		
	No.	(%)	<i>p</i> value	No.	(%)	<i>p</i> value	No.	(%)	<i>p</i> value	No.	(%)	<i>p</i> value	No.	(%)	<i>p</i> value
Proportion of physicians who believe lifestyle "important" or "very important"															
Responder	166	(92.2)	0.14	89	(49.7)	0.40	113	(63.1)	0.91	126	(70.8)	0.20	125	(69.8)	0.55
Non-responder	62	(86.1)		40	(55.6)		46	(63.9)		45	(62.5)		53	(73.6)	
Proportion of physicians who perceive lifestyle counseling "effective" or "very effective"															
Responder	144	(79.1)	0.12	144	(79.6)	0.55	122	(67.0)	0.77	156	(85.1)	0.43	158	(86.8)	0.31
Non-responder	58	(80.6)		57	(79.2)		51	(70.9)		58	(80.6)		58	(80.6)	0.31
Proportion of physicians who perceive themselves as "prepared" or "well-prepared" for lifestyle counseling															
Responder	136	(74.3)	0.73	133	(73.5)	0.51	79	(43.4)	0.12	104	(57.1)	0.41	116	(64.1)	0.66
Non-responder	52	(72.2)		50	(69.4)		39	(54.2)		37	(51.4)		58	(80.6)	
Proportion of physicians who collect information on lifestyle "always" or "nearly always"															
Responder	85	(77.3)	<0.01	141	(77.1)	0.73	70	(38.3)	0.13	67	(36.6)	0.62	69	(37.9)	0.01
Non-responder	19	(51.4)		54	(75.0)		35	(48.6)		24	(33.3)		40	(55.6)	
Proportion of physicians counseling patients about lifestyle modification "nearly always"															
Responder	70	(58.3)	0.40	125	(69.1)	0.07	87	(47.5)	0.18	90	(49.7)	0.97	94	(51.9)	0.26
Non-responder	27	(65.9)		58	(80.6)		41	(56.9)		36	(50.0)		43	(59.7)	

*This information of non-responders was obtained by face-to-face interviewing; [†]*p* values were obtained by chi-square test.

style, counseled their patients two or three times more frequently than those who did not. Moreover, physicians who considered themselves to be well-prepared for counseling lifestyle change gave advice four or five times more frequently than those who did not. The physician's perception of lifestyle as an important health factor was associated positively with providing advice on stress (OR, 1.87; 95% confidence interval [CI], 1.09 to 3.22) and exercise (OR, 1.87; 95% CI, 1.04 to 3.35) (Table 4).

On comparing responders and non-responders we found no significant differences in, the age and sex distributions, years as a primary care physician, level of vocational training or in the number of patient consultations per day. Non-responders reported collecting information on smoking habits more frequently but on diet less frequently than responders. However, no significant differences between the two groups were found in terms of the rates of collecting information on other lifestyle factors. The proportion of physicians who replied that they counseled on healthy behaviors 'always' and 'nearly always' was not significantly different between the two groups (Table 5).

DISCUSSION

From this nationwide survey, we found that most Korean primary care physicians had favorable attitudes towards preventive health services; 95% of them recognized preventive health services as their job, and 57% agreed that preventive services should account for more than 25% of their clinical activities. These results are comparable to a British study, in which 75% of British general practitioners considered disease prevention as 'somewhat' or 'very' important in terms of their clinical priorities (7). However, Korean primary care physicians

considered lifestyle factors to be less important for health promotion, perceived themselves as less well-prepared for counseling, collected information on lifestyle less frequently, and counseled upon lifestyles less frequently for all lifestyle factors compared with general practitioners in the U.K. (8) and with family physicians in the U.S.A. (9). However, in terms of physicians' perception of the effectiveness of health promotion activity, Korean physicians valued the potential effectiveness of lifestyle counseling for all items of lifestyle more highly than U.K. general practitioners.

The reported frequencies of information collection on smoking status (83.8%) and alcohol consumption (73.2%) were higher than that for diet (39.3%), exercise (37.0%) and stress (39.7%). Compared with the findings from studies of general practitioners in the U.K. and internists in the U.S.A. (10, 11), the rankings were similar but the rate of collecting information was generally lower. The reported rates of undertaking lifestyle counseling among Korean primary care physicians were approximately 50% for exercise and stress, 60% for smoking cessation and diet, and 70% for alcohol in this study, which were also lower than those reported for internists in the U.S.A. (11) and for general practitioners in the U.K. The reasons why Korean primary care physicians asked and advised less frequently on lifestyles may be attributed in part to their larger patient volumes and higher workloads. Korean primary care physicians in this study attended to 73 patients daily on an average. The lack of reimbursement for the time spent collecting information and counseling on lifestyle may be another important reason. In a health care system where doctors are reimbursed on a fee-for-service basis and where most preventive services are not covered by insurance benefits, the preventive service offered was relatively poor (12). Doctors considered 'a lack of time' as the most important obstacle in im-

plementing preventive services, which means that doctors do not have enough time to spend on 'important but unpaid services' such as preventive services. In previous studies of internists in the U.S.A., age, specialty, and the lifestyle of physicians were related to the provision of disease prevention services or counseling (10, 11). However, Korean primary care physicians' socio-demographic characteristics were not found to be related to information collection and the provision of lifestyle counseling in our study.

Because the response rate of the mailing survey was relatively low, the external validity of this study could be limited. To overcome this limitation, we tried to compare the demographic characteristics (sex and age) of the responders with those of all family physicians and internists registered with the Korean National Health Insurance Corporation in 2001. Furthermore, we performed an interview survey upon a representative subsample of non-responders living in metropolitan areas, and compared these findings with those of the original postal questionnaire survey. Even though the degree of bias would depend on the response rate, a claim that non-response can be a predominantly random process (13) suggests that it is important to compare the different characteristics of responders and non-responders. Although the age distribution of responders and all family physicians/internists was significantly different from each other, this difference does not seem to incur a significant bias as age was not associated with the practice pattern of physicians in this study. In general, responders and sample of non-responders surveyed by interviewing were not significantly different in terms of almost all socio-demographic characteristics and reported practice pattern except for the age distribution and the rates of acquiring information on smoking and diet. Therefore, the rate of collecting information on smoking as determined from the postal questionnaire survey might have been overestimated and that on diet underestimated. The same trend was found among general practitioners in Britain, where the attitude of responders and non-responders differed significantly with respect to physicians' work on their patients' alcohol consumption, though the difference was small (14). Although the high non-response rate in this study did not seem to cause bias significant enough to interfere with the generalized study results, careful interpretation of the results is needed.

Some caution is also warranted, because this study was based on physicians' self-reports. Physicians' over-reporting the rate of counseling lifestyle factors seems highly possible, because physicians consider this as desirable. A large gap between the reported practice of lifestyle counseling by physician and that by patients was observed in a Korean study, in which only 29%, 9%, 7% and 18% of patients recalled that they had been counseled by physicians on smoking cessation, regular exercise, animal fat consumption and moderate alcohol consumption, respectively (15).

In this study, Korean primary care physicians' attitudes and reported practice patterns concerning health promotion did

not compare favorably with those of primary care physicians in Western countries. Korean primary care physicians' perceptions of the effectiveness of counseling and the importance of lifestyle for health promotion, and their well-preparedness for counseling were significantly associated with the rate of information collection and the provision of counseling. These findings suggest that efforts directed at changing the physicians' perceptions of health promotion and at improving their preparedness for active intervention are essential if we are to improve primary care physicians' health promoting activities.

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