The Treatment Compliance of People with Lifestyle Diseases

- Current Status and Improvement Suggestions

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1 Introduction

1 Introduction 《

Section 1. Background and Purpose of the Study

As the increasing prevalence of chronic diseases such as hypertension and diabetes has led to growing medical costs globally, a need to control chronic diseases effectively is on the rise. The elderly as a share of the total population of Korea increased dramatically from 3.8% in 1980 to 11% in 2010, contributing to the rising prevalence of chronic diseases.

While the prevalence of hypertension in Koreans aged thirty or older stands at 33.9% for men and 27.8% for women, 64.6% of those aged sixty or older suffer from hypertension as the prevalence of the disease rises as age increases. Also, one in five aged seventies or older has diabetes (Ministry of Health and Welfare·Korea Centers for Disease Control and Prevention 2012, pp.54-57).

Unlike the case of acute diseases, which are treated under the control of a doctor, it is necessary for a patient with a chronic disease to comply with treatment and recommendations (medication regimen, smoking cessation, exercise, dietary therapy, etc.) of a doctor for effective cure and control of the disease. In order to treat and control hypertension, the patient needs cutting back on salt intake, weight loss, moderate drinking, physical activities, and medication use. A patient with

diabetes needs to self-care for blood sugar level, control diets, and do physical activities as well as take medications in order to treat and control diabetes.

Low rates of treatment compliance among patients leads to the occurrence of complications and worsening diseases, and ultimately the rise in health care costs. In 2003, the World Health Organization (WHO) indicated that non-compliance of patients with chronic diseases is a critical issue around the world (WHO 2003a, pp.1-7).

As the number of patients with chronic diseases is expected to grow significantly in the coming years due to the aging of the population, it is necessary to improve compliance rates among patients and control chronic diseases in an effective manner in order to stabilize the finance of the National Health Insurance and enhance the quality of life of the Korean people.

The purpose of this study is to examine the current status of treatment compliance of chronic diseases and analyze factors affecting compliance to find ways for improvement.

Section 2. Structure and Methods of the Study

This study consists of analysis on the current status of treatment compliance of major chronic diseases, including hypertension, diabetes, and qualitative research on factors affecting treatment compliance of diabetes.

1. Analysis of the Korea Health Panel

This study analyzed the 2011 Korea Health Panel in order to investigate the current status of treatment compliance of people with hypertension, diabetes. This study looked into compliance with medication regimens, the current status of treatment compliance with health behaviors (smoking cessation, moderate drinking, and physical activities), and factors influencing treatment compliance.

This study measured compliance with medication regimens based on Morisky Medication Adherence Scale-4 items (MMAS-4). MMAS-4 was developed in 1986 to measure self-reported medication regimens of outpatients diagnosed with essential hypertension. It is known that the sensitivity of MMAS-4, as a tool to identify non-compliant patients, is satisfactory and its reliability and specificity are moderate (Morisky & DiMatteo 2011). MMAS-4 includes four questions: "Do you ever forget to take your medicine?"; "Do you ever have problems remembering to take your medicine?"; "When you feel better, do you sometimes stop taking your medicine?"; "Sometimes if you feel worse when you take your medicine, do you stop taking it?" Each question is counted as one point, with all the questions adding up to four points. If the respondent answers non-compliance for one question or more, he/she is non-compliant to the medication regimens.

This study referred to "2013 Treatment Guidelines for Hypertension of the Korean Society of Hypertension (Korean Society of Hypertension)," "2014 Clinical Treatment Guidelines for Diabetes in Primary Care (Korean Academy of Medical Sciences)," for physical activities of patients with hypertension, diabetes.

Taking into account treatment guidelines and variables from the materials of the Korea Health Panel, this study analyzed, for treatment compliance with non pharmacotherapy, the conditions of no-smoking, no high-risk drinking, moderate or higher level of physical activities, and walking as exercise.

A respondent is considered a non-smoker if he selected "Never have smoked" or "Stopped smoking." If a respondent has seven drinks (five drinks for women) or more on mean at a time and he drinks twice or more a week, he/she is considered a high-risk drinker. A moderate or higher level of physical activity means doing physical exercise for at least 30 minutes a day, five or more days per week, or intense physical activities for 20 minutes or longer a day and three days or more a week. Walking for at least 30 minutes at a time, five or more days a week is recognized as a condition of walking as exercise.

2. Qualitative Research

This study conducted Focus Group Interview (FGI) targeting

diabetes patients to complement quantitative research utilizing secondary data. FGI, which targets a small group of respondents, is a method to obtain information on behavioral habits and medication behaviors of patients with diabetes through interviews, rather than typical survey or questionnaire. The subjects includes diabetes patients who have taken oral hypoglycemic agents for at least a year, but not those taking insulin injections. In addition, this study included patients with complications resulting from diabetes as well as ordinary diabetes patients and conducted FGI for two groups of patients with and without complications. After conducting a survey to determine suitability of the research subjects, this study selected 24 subjects considered most suitable for the research and performed FGIs four times. Furthermore, this study won approval from the Institutional Review Board before conducting FGI, explained fully the use of personal information to the subjects, and received consent for the use of personal information.

This study coded the results of the interviews first using magnitude coding, in vivo coding and structural coding, and coded secondly using focused coding. Then, the study compiled the results focusing on the theme and sub-theme derived.

Section 3. Limitations of the study

This study has limitations as follows, therefore, those should be considered when interpreting the research results.

First, while treatment compliance includes various behaviors for treatment as defined by the WHO as the extent to which patients comply with medical directions of doctors, this study covered behavioral changes in compliance with medication regimens, smoking, drinking, physical activities due to the limit to the survey, etc.[1] A set of compliance, such as visits to doctors, medication prescription, dietary therapy, self-measure of blood sugar and pressure, etc. should be addressed in the future study.

Second, this study deals with hypertension and diabetes, which are typical lifestyle diseases and major subjects of chronic disease management in Korea, without covering other various lifestyle diseases.

Third, the compliance with medication regimens was measured by a survey (M-MAS). As a result, there is a limitation that patients' compliance with medication regimens might not be reflected exactly.

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1) The qualitative research includes dietary therapy for diabetes patients.

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Treatment Compliance of Hypertension Patients

Section 1. Current Status of Treatment
   Compliance

2 Treatment Compliance of Hypertension Patients «

Section 1. Current Status of Treatment Compliance

The general characteristics of hypertension patients that are identified in the Korea Health Panel in 2011 are presented in Table 3-1. The population aged 50 to 74 accounted for 72.4% with the population aged 65 to 74 taking up 36.8%, aged 50 to 64 35.6%, and 75 or older 19.3%. Male patients accounted for 42.5% and female 57.5%. Among the overall patients with hypertension, 72.8% were married and 66.1% had a middle school diploma or less. While 46% of the patients were economically active, 54% were not.

While 90.5% of the patients were covered by the National Health Insurance, the rest of them were on medical aid benefits and special cases. Among the hypertension patients, 57.8% were those who visited different hospitals designated for each of their chronic conditions, and 35.2% of the patients were in treatment for all chronic diseases in one hospital or clinic. As for medical institutions that deal with hypertension, clinics took up the highest share of 63.9%, followed by general hospitals, university hospitals, and ordinary hospitals of 25.3%. In addition, the majority of hypertension patients, 78.8%, were

"very satisfied" or "satisfied" with medications and 71.9% perceived their health as "very good," "good," or "moderate." Those who had three or more chronic diseases accounted for 69.4% of the hypertension patients.

⟨Table 2-1⟩ The characteristics of hypertension patients

Variable	N(%)	Variable	N(%)
Age		Medical coverage	
20-49	202(8.3)	National health insurance	2,195(90.5)
50-64	863(35.6)	Medical aid benefit/ special case	230(9.5)
65-74	893(36.8)	Whether a patient visits the same hospital or clinic	
75 or over	467(19.3)	Get treatment for all chronic diseases in one hospital or clinic	853(35.2)
Gender		Visit specified hospitals by disease	1,402(57.8)
Male	1,030(42.5)	Not specified	170(7.0)
Female	1,395(57.5)	Medical institution	
Marital status		General hospital/ university hospital/ ordinary hospital	614(25.3)
Married	1,765(72.8)	Clinic	1,548(63.8)
Unmarried/widowed/ separated/ divorced	660(27.2)	Others[1]	263(10.8)
Educational attainment		Satisfaction with medication	
Middle school graduate or under	1,603(66.1)	Very satisfied/satisfied	1,910(78.8)
High school graduate or higher	822(33.9)	Moderate/unsatisfied/very unsatisfied	515(21.2)
Occupation		Self-reported health condition	
Economically active	1,119(46.1)	Very good/	1,743(71.9)

Variable	N(%)	Variable	N(%)
		good/moderate	
Not economically active	1,306(53.9)	Bad or very bad	682(28.1)
Income		Disability	
High	410(16.9)	Without disability	2,090(86.2)
Upper middle	479(19.8)	With disability	335(13.8)
Lower middle	608(25.1)	No. of chronic disease	
Low	927(38.2)	One	296(12.2)
		Two	445(18.4)
		Three or more	1,684(69.4)

1) Public health center/branch of public health center/health medical center/oriental hospital and clinic/etc.

The mean of compliance with medication regimens measured by MMAS was 3.59 points, and 71.9% of the respondents were compliant with medication treatment. Most of the patients were not engaged in high-risk drinking while 84.8% of them did not smoke at the point of the survey. Furthermore, 16.9% of the respondents were engaged in physical activities at a moderate level or higher and 27.2% were involved in walking as exercise (Table 3-2).

⟨Table 2-2⟩ Current status of treatment compliance of hypertension patients

Variable	Mean±SE/ N(%)
Compliance with medication regimens (measured by MMAS)	
Mean±SE	3.59±0.02
Compliant, N(%)	1,745 (71.9)
Not smoking, N(%)	2,058 (84.8)
Not high-risk drinking, N(%)	2,343 (96.6)

Variable	Mean±SE/ N(%)
Engaged in physical activities at a moderate level or higher, N(%)	409 (16.9)
Engaged in walking as exercise, N(%)	660 (27.2)

The compliance with medication regimens of hypertension patients was at the similar level for all ages and 70% of the patients were compliant with their medications. The compliance of the male patients were higher than female. The higher educational attainment is, the more compliant patient is, however, the differences were not significant. The patients in treatment for all chronic diseases in one hospital or clinic were most compliant (74.8%) among their group and the patients who visited general hospitals, university hospitals, and ordinary hospitals were most compliant (74.3%) among their group. The compliance of the patients who were satisfied with medication treatment (72.9%) was higher than that of the patients who were not satisfied (68.5%). The compliance of the patients whose self-reported health conditions were good or moderate and the patients with disabilities were higher than their counterparts (Table 3-3).

〈Table 2-3〉 Compliance with medication regimens by sociodemographic characteristic, medical institution use, and satisfaction with medications among hypertension patients

Variable	MMAS (Mean±SE)	MMAS	
		Compliant, N(%)	Non-compliant, N(%)
Age			
20-49	3.57±0.05	142(70.3)	60(29.7)
50-64	3.58±0.03	619(71.7)	244(28.3)
65-74	3.62±0.02	658(73.7)	235(26.3)
75 or over	3.54±0.04	326(69.8)	141(30.2)
Gender			
Male	3.61±0.02	750(72.8)	280(27.2)
Female	3.57±0.02	995(71.3)	400(28.7)
Marital status			
Married	3.60±0.02	1,285(72.8)	480(27.2)
Unmarried/widowed/ separated/ divorced	3.55±0.03	460(69.7)	200(30.3)
Educational attainment			
Middle school graduate or under	3.58±0.02	1,563(71.8)	613(28.2)
High school graduate or under	3.61±0.05	182(73.1)	67(26.9)
Occupation			
Economically active	3.59±0.02	800(71.5)	319(28.5)
Not economically active	3.59±0.02	945(72.4)	361(27.6)
Income			
High	3.57±0.04	293(71.5)	117(28.5)
Upper middle	3.58±0.04	342(71.4)	137(28.6)
Lower middle	3.58±0.03	439(72.2)	169(27.8)
Low	3.60±0.02	670(72.3)	257(27.7)
Medical coverage			
National health insurance	3.59±0.02	1,583(72.1)	612(27.9)
Medical aid benefit/ special case	3.57±0.05	162(70.4)	68(29.6)
Whether a patient visits the same hospital or clinic			
Get treatment for all	3.62±0.03	638(74.8)	215(25.2)

Variable	MMAS (Mean±SE)	MMAS	
		Compliant, N(%)	Non-compliant, N(%)
chronic diseases in one hospital or clinic			
Visit specified hospitals by disease	3.59±0.02	1,002(71.5)	400(28.5)
Not specified	3.36±0.07	105(61.8)	65(38.2)
Medical institution			
General hospital/ university hospital/ ordinary hospital	3.63±0.03	456(74.3)	158(25.7)
Clinic	3.58±0.02	1,104(71.3)	444(28.7)
Others[1]	3.53±0.05	185(70.3)	78(29.7)
Satisfaction with medication			
Very satisfied/ satisfied	3.61±0.02	1,392(72.9)	518(27.1)
Moderate/ unsatisfied/ very unsatisfied	3.49±0.04	353(68.5)	162(31.5)
Self-reported health condition			
Very good/ good/ moderate	3.61±0.02	1,277(73.3)	466(26.7)
Bad or very bad	3.52±0.03	468(68.6)	214(31.4)
Disability			
Without disability	3.58±0.02	1,489(71.2)	601(28.7)
With disability	3.65±0.04	256(76.4)	79(23.6)
No. of chronic disease			
One	3.59±0.05	218(73.7)	78(26.3)
Two	3.57±0.04	325(72.9)	121(27.1)
Three or more	3.59±0.02	1,203(71.4)	481(28.6)

1) Public health center/branch of public health center/health medical center/oriental hospital and clinic/etc.

The health behaviors of hypertension patients depending on sociodemographic characteristics, medical institution use, satisfaction with medications are presented in Table 3-4. The percentage of non-smoking women was higher than that of

non-smoking men.

   The most vibrant group doing physical activities at a moderate level or higher was aged 20 to 49 (29.2%), followed by 50 to 64 (21.9%). The rate of doing physical activities at a moderate level or higher of the group of high school graduates or more educated patients (23.7%) was higher than that of the group of middle school graduates or less educated patients. The rate of patients who got treatment for all chronic diseases in one hospital or clinic was higher (19.7%) than that of other groups.

   As for walking as exercise, the group aged 65 to 74 (30.5%) and 50 to 64 (27.8%) did a lot of walking compared to other age groups, and married patients (29.4%) and patients who got treatment for all chronic diseases in one hospital or clinic (27.9%) indicated a high rate of walking as exercise.

〈Table 3-4〉 Health behaviors of hypertension patients by sociodemographic characteristic, medical institution use, satisfaction with medications

(Unit: N(%))

Variable	No smoke	physical	walking
Age			
20-49	141(69.8)	59(29.2)	43(21.3)
50-64	717(83.1)	189(21.9)	240(27.8)
65-74	775(86.8)	124(13.9)	272(30.5)
75 or over	425(90.8)	37(7.9)	104(22.5)
Gender			
Male	707(68.6)	238(23.1)	314(30.5)
Female	1,351(96.9)	171(12.3)	346(24.8)
Marital status			
Married	1,455(82.4)	349(19.8)	519(29.4)
Unmarried/widowed/ separated/	603(91.4)	60(9.1)	141(21.4)

Variable	No smoke	physical	walking
divorced			
Educational attainment			
Middle school graduate or under	1,864(85.7)	350(16.1)	586(26.9)
High school graduate or higher	194(77.9)	59(23.7)	74(29.7)
Occupation			
Economically active	887(79.3)	262(23.4)	286(25.6)
Not economically active	1,171(89.7)	147(11.3)	374(28.6)
Income			
High	347(84.6)	102(24.9)	105(25.6)
Upper middle	389(81.2)	93(19.4)	130(27.1)
Lower middle	516(84.9)	116(19.1)	180(29.6)
Low	805(86.8)	98(10.6)	245(26.4)
Medical coverage			
National health insurance	1,876(85.4)	398(18.1)	607(27.7)
Medical aid benefit/ special case	182(79.1)	11(4.8)	53(23.0)
Whether a patient visits the same hospital or clinic			
Get treatment for all chronic diseases in one hospital or clinic	686(80.4)	168(19.7)	238(27.9)
Visit specified hospitals by disease	1,225(87.4)	216(15.4)	382(27.3)
Not specified	147(86.5)	25(14.7)	40(23.5)
Medical institution			
General hospital/ university hospital/ ordinary hospital	530(86.3)	92(15.0)	160(26.1)
Clinic	1,304(84.2)	271(17.5)	411(26.6)
Others[1]	224(85.2)	46(17.5)	89(33.8)
Satisfaction with medication			
Very satisfied/satisfied	1,629(85.3)	337(17.6)	505(26.4)
Moderate/unsatisfied/ very unsatisfied	429(83.3)	72(14.0)	155(30.1)
Self-reported health condition			
Very good/good/moderate	588(86.2)	338(19.4)	132(19.4)
Bad or very bad	1,470(84.3)	71(10.4)	528(30.3)
Disability			
Without disability	1,774(84.9)	377(18.0)	576(27.6)
With disability	284(84.8)	32(9.5)	84(25.1)

Variable	No smoke	physical	walking
No. of chronic disease			
One	223(75.3)	71(24.0)	84(28.4)
Two	362(81.4)	85(19.1)	124(27.9)
Three or more	1,473(87.5)	253(15.0)	452(26.8)

1) Public health center/branch of public health center/health medical center/oriental hospital and clinic/etc.

The proportion of the hypertension patients who were compliant with medications only was 6.4%, the proportion of the patients who were compliant with medications and did not smoke was 37.3%, and the proportion of the patients who were compliant with medications and did physical activities was 4.3%. The proportion of the patients who were compliant with medications, did not smoke, and did physical activities was 24.0% and the proportion of the patients who followed none of the three conditions was 2.6% (Table 3-5).

〈Table 3-5〉 Combination of medication compliance and health behaviors of hypertension patients

Variable	N(%)
Non-compliant+smoking+not doing physical activities	64(2.6)
Non-compliant+smoking+doing physical activities	43(1.8)
Non-compliant+no smoking+not doing physical activities	385(15.9)
Non-compliant+no smoking+doing physical activities	188(7.8)
Compliant+smoking+not doing physical activities	156(6.4)
Compliant+smoking+doing physical activities	104(4.3)
Compliant+no smoking+not doing physical activities	904(37.3)
Compliant+no smoking+doing physical activities	581(24.0)

3

Treatment Compliance of Diabetes Patients

Treatment Compliance of Diabetes Patients «

Section 1. Current Status of Treatment Compliance

In the 2011 survey of the Korea Health Panel, the number of the diabetes patients surveyed was 916, with those aged 50 to 74 accounting for 70%. The number of the patients aged 75 or higher was 156, 17% out of the total. The number of female patients was 484, 52.8% of the total, higher than that of male patients. As for marital status, the number of married patients was approximately triple the number of unmarried patients, and as for educational attainment, 35.7% of the patients were high school graduates.

In terms of occupation, the patients who were not economically active accounted for 55.6%, implying that many of them were elderly patients. As for income level, 39.7% of the patients belonged to the low income group, which means a considerable number of the patients are at a low income level.

Regarding the question of whether patients visit the same hospital or clinic, 36.3% of the patients answered that they got treatment for all chronic diseases in one hospital or clinic and 8.2% of the patients replied that they did not specify one hospital or clinic for treatment. Clinics accounted for 61.4% out of

medical institutions, followed by general hospitals, university hospitals, and ordinary hospitals, 32.3%, and 6.3% of the patients visited public health centers, branches of public health centers, health medical centers, and oriental hospitals or clinics.

The number of the patients who were "very satisfied" or "satisfied" with their medications was 707, 77.2% of the total, and 66.0% of the patients reported that their health conditions were "very good," "good," or "moderate." While 85.7% of the patients answered that they had no disabilities, 131 patients, only 14.3% of the total, answered that they had disabilities.

The proportion of the patients who had three chronic diseases or more diagnosed by doctors was 78.3%, followed by two (16.5%) and one (5.2%).

〈Table 4-1〉 General characteristics of diabetes patients

Variable	N(%)	Variable	N(%)
Age		Medical coverage	
20-49	84(9.17)	National health insurance	804(87.8)
50-64	328(35.8)	Medical aid benefit/ special case	112(12.2)
65-74	348(38.0)	Whether a patient visits the same hospital or clinic	
75 or over	156(17.0)	Get treatment for all chronic diseases in one hospital or clinic	333(36.3)
Gender		Visit specified hospitals by disease	508(55.5)
Male	432(47.2)	Not specified	75(8.2)
Female	484(52.8)	Medical institution	

Variable	N(%)	Variable	N(%)
Marital status		General hospital/ University hospital/ Ordinary hospital	296(32.3)
Married	697(76.1)	Clinic	562(61.4)
Unmarried/widowed/ separated/ divorced	219(23.9)	Others[1]	58(6.3)
Educational attainment		Satisfaction with medication	
Middle school graduated or under	589(64.3)	Very satisfied/satisfied	707(77.2)
High school graduated or higher	327(35.7)	Moderate/unsatisfied/ very unsatisfied	209(22.8)
Occupation		Self-reported health condition	
Economically active	407(44.4)	Very good/good/ moderate	605(66.0)
Not economically active	509(55.6)	Bad or very bad	311(34.0)
Income		Disability	
High	141(15.4)	Without disability	785(85.7)
Upper middle	197(21.5)	With disability	131(14.3)
Lower middle	214(23.4)	No. of chronic disease	
Low	364(39.7)	One	48(5.2)
		Two	151(16.5)
		Three or more	717(78.3)

1) Public health center/branch of public health center/health medical center/Oriental hospital or clinic/Etc.

The mean MMAS of the diabetes patients stood at 3.63 points and 72.7% of the patients were compliant with their medication regimens. As for the questions related to lifestyle of the patients, 81% of the patients replied that they did not smoke at the point of the survey and 95% replied that they were not engaged in high-risk drinking. In addition, only 17.7% of the patients replied that they did physical activities at a moderate lev-

el or higher and the proportion of the patients who were engaged in walking as exercise was 31.1% (Table 4-2).

〈Table 4-2〉 Current status of treatment compliance of diabetes patients

Variable	Mean±SE/ N(%)
Compliance with medication regimen (MMAS)	
Mean±SE	3.63±0.02
Compliant, N(%)	666 (72.7)
Not smoking, N(%)	742 (81.0)
Not high-risk drinking, N(%)	870 (95.0)
Engaged in physical activities at a moderate level or higher, N(%)	162 (17.7)
Engaged in walking as exercise, N(%)	285 (31.1)

The compliance with medication regimens of diabetes patients depending on sociodemographic characteristics, medical institution use, and satisfaction with medications is presented in Table 4-3. The mean of the compliance measured by MMAS among the elderly aged 75 or over was the highest, 3.74 points and 76.9% of them were compliant with medication regimens, which indicates that the compliance of the elderly was higher than other age groups.

The compliance depending on gender, marital status, educational attainment, and economic activity was not significantly different from the overall mean of 3.63 points. The compliance of the low income level group was 3.65 points, higher than other income groups, and the proportion of the compliant patients in the low income level group was the highest as well, 74.7%.

While 73% of the patients who visited specified hospitals by

disease and the patients who got treatment for all chronic disease in one hospital or clinic replied that they were compliant with medications, only 64% of the patients who did not have specified hospitals or clinic replied that they were compliant with medications. As for medical institutions, 77.4% of the patients who visited general hospitals, university hospitals, ordinary hospitals for treatment answered that they were compliant to medication regimens, which is higher compliance than that of the patients who visited clinics or other institutions.

Regarding the question of satisfaction on medications, 73.7% of the patients who were very satisfied or satisfied with medications were compliant with medication regimens and 69.4% of the patients whose satisfaction level is moderate or who were unsatisfied or very unsatisfied with medications were compliant with medication regimens. As the compliance depending on self-reported health conditions indicated a similar result to the compliance depending on medication satisfaction, 74.4% of the patients who reported their health conditions as very good, good, or moderate were compliant with medication regimens.

The compliance rate of the patients with disabilities was higher than that of the patients without disabilities. As the patients with more chronic diseases were less compliant, only 23 patients with three or more chronic diseases, 10.6% of the total, were compliant to medication regimens while the compliance rate of the patients with one chronic disease was 72.9%.

〈Table 4-3〉 Compliance with medication regimens by sociodemographic characteristic, medical institution use, and satisfaction with medications among diabetes patients

	MMAS (Mean±SE)	MMAS	
		Compliant, N(%)	Non-compliant, N(%)
Age			
20-49	3.52±0.09	55(65.5)	29(34.5)
50-64	3.64±0.04	240(73.2)	88(26.8)
65-74	3.59±0.04	251(72.1)	97(27.9)
75 or over	3.74±0.04	120(76.9)	36(23.1)
Gender			
Male	3.66±0.03	320(74.1)	112(25.9)
Female	3.60±0.03	346(71.5)	138(28.5)
Marital status			
Married	3.62±0.03	505(72.5)	192(27.5)
Unmarried/widowed/ separated/ divorced	3.64±0.05	161(73.5)	58(26.5)
Educational attainment			
Middle school or under	3.63±0.03	430(73.0)	159(27.0)
High school or higher	3.62±0.04	236(72.2)	91(27.8)
Occupation			
Economically active	3.62±0.03	289(71.0)	118(29.0)
Not economically active	3.63±0.03	377(74.1)	132(25.9)
Income			
High	3.63±0.06	103(73.0)	38(27.0)
Upper middle	3.63±0.05	141(71.6)	56(28.4)
Lower middle	3.58±0.05	150(70.1)	64(29.9)
Low	3.65±0.04	272(74.7)	92(25.3)
Medical coverage			
National health insurance	3.61±0.03	576(71.6)	228(28.4)
Medical aid benefit/ special case	3.77±0.05	90(80.4)	22(19.6)
Whether a patient visits the same hospital or clinic			
Get treatment for all chronic diseases in one hospital or clinic	3.61±0.04	243(73.0)	90(27.0)
Visit specified hospitals by disease	3.66±0.03	375(73.8)	133(26.2)

	MMAS (Mean±SE)	MMAS	
		Compliant, N(%)	Non-compliant, N(%)
Not specified	3.49±0.09	48(64.0)	27(36.0)
Medical institution			
General hospital/ university hospital/ordinary hospital	3.67±0.04	229(77.4)	67(22.6)
Clinic	3.61±0.03	396(70.5)	166(29.5)
Others[1]	3.60±0.09	41(70.7)	17(29.3)
Satisfaction with medication			
Very satisfied/satisfied	3.63±0.03	521(73.7)	186(26.3)
Moderate/unsatisfied/very unsatisfied	3.61±0.05	145(69.4)	64(30.6)
Self-reported health condition			
Very good/good/moderate	3.67±0.03	450(74.4)	155(25.6)
Bad or very bad	3.55±0.05	216(69.5)	95(30.5)
Disability			
Without disability	3.62±0.02	566(72.1)	219(27.9)
With disability	3.67±0.06	100(76.3)	31(23.7)
No. of chronic disease			
One	3.67±0.09	35(72.9)	13(27.1)
Two	3.62±0.06	108(71.5)	43(28.5)
Three or more	3.63±0.03	23(10.6)	194(89.4)

1) Public health center/branch of public health center/health medical center/ oriental hospital and clinic/etc.

Health behaviors of diabetes patients depending on socio-demographic characteristics, medical institution use, and satisfaction with medications are presented in Table 4-4. The proportion of the patients aged 65 to 74 who did not smoke was 87.2%. The Table 4-4 indicates that the proportion of doing physical activities at a moderate level or higher decreased as age increased, and only 8.3% of the patients aged 75 or over replied that they did physical activities at a moderate level or

higher. In terms of walking as exercise, the proportion of the patients aged 50 to 64 was 33.8% and the proportion of the patients aged 75 or over was 25%. As for smoking, the health behaviors of the female patients were better than those of the male patients, and the proportion of the male patients who did physical activities at a moderate level or higher was slightly higher than that of the female patients. While the health behaviors of the unmarried patients were better than those of the married patients in terms of smoking, the proportion of the married patients who did physical activities at a moderate level or higher (20.2%) was higher than that of the unmarried patients (9.6%). As for educational attainment, the health behaviors regarding smoking of the patients who were middle school graduates or under (84.6%) were better than those of high school graduates or higher (74.6%). In addition, 23.9% of the group of high school graduates or higher did physical activities at a moderate level or higher.

The Table 4-4 presents that the lower the income level, the better the health behavior related to smoking. Among the patients at the low income level, 85.2% replied that they did not smoke at the point of the survey. Moreover, while only 10.2% of the patients at the low income level did physical activities at a moderate level or higher, 28.4% of the patients at the high income level did so.

While 21.3% of the patients who got treatment for all chronic

diseases in one hospital or clinic did physical activities at a moderate level or higher, 13.3% of the patients who did not have specified hospitals or clinics did so. The health behaviors regarding smoking of the patients who used general hospitals, university hospitals, and ordinary hospitals for treatment were worst, the patients who used other medical institutions indicated that their health behaviors, such as physical activities at a moderate level or higher and walking as exercise, were good. The health behaviors of the patients who were very satisfied or satisfied with medications were better than those of the patients whose satisfaction level is moderate or who were unsatisfied or very unsatisfied.

The health behaviors related to smoking and physical activities at a moderate level or higher were better among the patients whose self-reported health conditions were bad or very bad than other groups. While the health behaviors regarding smoking among the patients with disabilities were better than their counterparts, the health behaviors of physical activities at a moderate level and walking as exercise among the patients without disabilities were better than their counterparts. The Table 4-4 presents that health behaviors regarding smoking get better as the number of chronic diseases rises since 84% of the patients with three or more chronic diseases did not smoke while 68.8% of the patients with one chronic disease did not smoke.

⟨Table 4-4⟩ Health behaviors of diabetes patients by sociodemographic characteristic, medical institution use, and satisfaction with medications

(Unit: N(%))

	No smoking	Physical	Walking
Age			
20-49	59 (70.2)	17 (20.2)	25 (29.8)
50-64	253 (77.1)	76 (23.2)	111 (33.8)
65-74	294 (84.5)	56 (16.1)	110 (31.6)
75 or over	136 (87.2)	13 (8.3)	39 (25.0)
Gender		· ·	·
Male	275 (63.7)	110 (25.5)	132 (30.6)
Female	467 (96.5)	52 (10.7)	153 (31.6)
Marital status		· ·	·
Married	547 (78.5)	141 (20.2)	221 (31.7)
Unmarried/widowed/ separated/ divorced	195 (89.0)	21 (9.6)	64 (29.2)
Educational attainment		· ·	·
Middle school graduate or under	498 (84.6)	84 (14.3)	178 (30.2)
High school graduate or higher	244 (74.6)	78 (23.9)	107 (32.7)
Occupation		· ·	·
Economically active	299 (73.5)	95 (23.3)	115 (28.3)
Not economically active	443 (87.0)	67 (13.2)	170 (33.4)
Income		· ·	·
High	112 (79.4)	40 (28.4)	43 (30.5)
Upper middle	153 (77.7)	35 (17.8)	63 (32.0)
Lower middle	167 (78.0)	50 (23.4)	70 (32.7)
Low	310 (85.2)	37 (10.2)	109 (29.9)
Medical coverage		· ·	·
National health insurance	653 (81.2)	150 (18.7)	255 (31.7)
Medical aid benefit/ special case	89 (79.5)	12 (10.7)	30 (26.8)
Whether a patient visits the same hospital or clinic		· ·	·
Get treatment for all chronic diseases in one hospital or clinic	257 (77.2)	71 (21.3)	100 (30.0)
Visit specified hospitals by	420 (82.5)	81 (15.9)	162 (31.9)

	No smoking	Physical	Walking
disease			
Not specified	65 (86.7)	10 (13.3)	23 (30.7)
Medical institution			
General hospital/ university hospital/ordinary hospital	235 (79.4)	43 (14.5)	86 (29.1)
Clinic	458 (81.5)	103 (18.3)	180 (32.0)
Others[1]	49 (84.5)	16 (27.6)	19 (32.8)
Satisfaction with medication			
Very satisfied/satisfied	575 (81.3)	132 (18.7)	224 (31.7)
Moderate/unsatisfied/very unsatisfied	167 (79.9)	30 (14.4)	61 (29.2)
Self-reported health condition			
Very good/good/moderate	482 (79.7)	131 (21.7)	214 (35.4)
Bad or very bad	260 (83.6)	31 (10.0)	71 (22.8)
Disability			
Without disability	630 (80.3)	148 (18.9)	258 (32.9)
With disability	112 (85.5)	14 (10.7)	27 (20.6)
No. of chronic disease			
One	33 (68.8)	13 (27.1)	17 (35.4)
Two	107 (70.9)	35 (23.2)	41 (27.2)
Three or more	602 (84.0)	114 (15.9)	227 (31.7)

1) Public health center/branch of public health center/health medical center/oriental hospital and clinic/etc.

The combination of compliance with medication regimens and health behaviors of diabetes patients is presented in Table 4-5. The patients who were compliant with medication regimens, did not smoke, and did not do physical activities accounted for the biggest share, 33.5%. While the proportion of the patients who were compliant with medication regimens, did not smoke, and did physical activities was 25.5%, the proportion of the patients who were not compliant, did not smoke,

and did not do physical activities was 13.2%.

〈Table 4-5〉 Combination of medication compliance and health behaviors of diabetes patients

Variable	N(%)
Non-compliant+smoking+not doing physical activities	29(3.2)
Non-compliant+smoking+doing physical activities	20(2.2)
Non-compliant+no smoking+not doing physical activities	121(13.2)
Non-compliant+no smoking+doing physical activities	80(8.7)
Compliant+smoking+not doing physical activities	77(8.4)
Compliant+smoking+doing physical activities	48(5.3)
Compliant+no smoking+not doing physical activities	307(33.5)
Compliant+no smoking+doing physical activities	234(25.5)

Section 2. FGI Results on Factors Affecting Treatment Compliance

A. Compliance with medication regimens

Most of the patients answered that they did not forget to take medications for diabetes and understood how important medications were for the control of diabetes. Some patients stated that they relied on medications.

"I take medications every day even though I forget everything else."

"Basically lifestyles are important of course. Among them, such as medications, exercise, and diets, I believe medications are the most important thing because taking

medications every day is a habit and an effort. I think taking medications is the first among other things."

However, some patients put priority on diets and physical activities over medications as a supplement.

"Many patients talk about whether we have to take medications every day or not. I believe that medications are a supplement and what is more important is to have a healthy diet and do exercise hard."

On the contrary, there were patients who did not take medications well. They did not take medications every day, so they had remaining medications at home or they just took a half of medications.

"As I think many people these days have diabetes, I get a regular health screening every three months and receive medications. My disease is not that serious because I just talk with a doctor for two to three minutes after I wait for one or two hours. While I was packing for moving, I found these medications that I had not taken."

B. Dietary control

The patients with diabetes focused on dietary therapy most as well as medications. They ate less carbohydrate and more vegetables. They were cautious about what they ate, such as cakes or foods made of flour, however, they did not understand well or follow specific dietary therapy, including the amount they ate.

"I changed my diets a lot with less starch and more vegetables."

"In the beginning, I followed my doctor's directions for a while, but it became meaningless. Instead, I am following the direction regarding steamed rice because steamed rice products are sold on the market, but it is impossible for other diets."

The patients had experiences of nutritional counseling for dietary control, but they did not agree with what they counseled and they thought that the contents of the counseling were not applicable to their diets.

Furthermore, the patients did not have enough specific information on dietary therapy and did not receive information on specific dietary therapy from medical staff.

"Hospital staff tell me to do dietary therapy or do exercise without giving any specific information on how to."

C. Smoking cessation

The diabetes patients believed that they needed to stop smoking since smoking affected other health conditions as well as diabetes. However, due to the addiction to smoking, they were not able to stop. Instead of smoking cessation, they reduced the amount they smoked after the occurrence of diabetes.

"These days I smoke one pack of cigarettes a day, which is one third of the amount I smoked most. I used to smoke one and a half or two packs a day when I did not drink. Since then I cut back on the amount intentionally."

In particular, being with smokers when drinking alcohol made it hard for the patients to stop smoking.

"I smoke several cigarettes when I drink alcohol. I smoke sometimes because not smoking alone when everybody is smoking looks awkward and it is temptational."

As the recently implemented ban on secondhand smoking at restaurants and other public places makes it difficult for smok-ers to smoke, the diabetes patients was considering smoking cessation or cut back on the amount they smoke in effect.

"What is more bothering is the environment where I am forced to stop smoking than diabetes itself. As you might know, these days smoking is not allowed in restau-rants and bars, so I have to go outside to smoke even it is raining, hot or humid. It is so bothering. Therefore, I just put up with for a day, it becomes three days, a week, then I smoke when there is a drinking bout from time to time."

D. Drinking

Most patients with diabetes understood the need to stop drinking or the need of moderate drinking. While the female patients tended not to drink before the occurrence of diabetes, the male patients stated that it was difficult to stop or reduce drinking due to frequent drinking bouts after work or with friends.

"When I met friends who drink, I just had one or two drinks and started smoking. It repeated back and forth so I cannot stop now."

However, when the patients revealed their diseases, people around them helped drink in a moderate way, so that they

could control diabetes.

"There is a saying that you need to let others know about your disease. I do not expect help from others, but by letting them know that I have diabetes, I take medications, and I am drinking, they consider me for control."

E. Physical activities

All the patients with diabetes understood that they needed to do physical activities. However, they did not exercise regularly and a little number of the patients exercised their muscles rather than walking.

"I walk or ride a bicycle for exercise, but not regularly. I walk to my work, but I do not take time to ride a bicycle or work out regularly."

The patients who exercised their muscles stated that muscle workout was effective to control blood sugar.

"At first, I just walked as I had been told to do aerobic exercise. But blood sugar did not go down after I walked for just thirty minutes. Blood sugar lowers after forty minutes to one hour walking at least. I don't have much time and I need to lower my blood sugar. Now I do muscle workout for thirty minutes, then blood sugar drops a lot."

The patients pointed out that they could not exercise regularly due to lack of time because of work and weak willingness.

"I leave the office irregularly and sometimes work on weekend. I get tired and just sleep when I have a time, so this is what happens."

4 Conclusion

4

Conclusion «

The increasing lifestyle diseases incur medical costs to society and deteriorates the quality of life. It is critical not only to prevent lifestyle diseases but also to control the diseases which are already occurred and stop them developing further or into complications. The purpose of this study is to analyze the current status of treatment compliance and factors affecting the compliance focusing on hypertension, diabetes, and to find measures for improvement.

The mean compliance with medication regimens measured by MMAS among hypertension patients scored 3.59 points out of 4.0, the mean compliance among diabetes patients was 3.63. The proportion of the patients with hypertension, diabetes who were compliant with medications was 72, 73% respectively.

The proportion of the patients who were not compliant with treatment of doing physical activities was higher than other treatment, such as smoking and moderate drinking. While 85% of the hypertension patients, 81% of the diabetes patients did not smoke, 15-19% of the patients with hypertension and diabetes smoked. Considering that the smoking rate of Korean women is very low, the smoking rate of the male patients is significantly high.

As a result of the combination of compliance with medication regimens and health behaviors, only 24% of the hypertension patients and 26% of the diabetes patients were compliant with all of medication regimens, no smoking, moderate drinking, and doing physical activities The result indicated that 72% of the hypertension patients and 46% of the diabetes patients were compliant with medications but not with doing physical activities.

The United States conducts national campaigns to raise awareness of the public on compliance with medication regimens and provides healthcare professionals with guidance on how to improve communication with patients.[2] Korea has been striving to enhance treatment compliance, such as initiating a project of personalized chronic disease control system, however, evaluation of the project effect and establishment of infrastructure are needed to settle down the system. This study suggests as follows to improve treatment compliance of lifestyle diseases:

First, treatment compliance with changes in health behaviors, including smoking cessation and doing physical activities, as well as medication regimens, should be improved. While the com-

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2) ①Show patience and empathy when interacting with a patient, ②Consider the number of prescribed medications and frequency and dose of medication regimens, ③Prescribe medications of affordable prices and give coupons pharmaceutical companies issue to cut the costs, ④Explain the result if not taking medications and suggests how to improve compliance with medication regimens, ⑤Introduce team-based care to improve compliance with medication regimens, ⑥Recognize the role and responsibility of team-based care to deliver better patient-centered health care

pliance with medication regimens among the hypertension and diabetes patients was quite high, the compliance with smoking cessation and doing physical activities was low. In addition, 72% of the hypertension patients and 46% of the diabetes patients were compliant with medications, but did not do health behaviors. It is presumed that the patients did not recognize the importance of smoking cessation or doing physical activities for disease control, or they were addicted to smoking or had little time to take actions even though understood the importance. The FGI targeting diabetes patients indicated that most of the patients understood they needed to stop smoking and do physical activities and, although some of them were recommended stop smoking and do exercise from medical staff, they did not change their behaviors due to addiction to smoking and lack of specific information on how to do physical activities. It is needed to educate patients with lifestyle diseases and promote the smoking cessation and doing physical activities for the control of the diseases and to identify factors that make patients change their behaviors.

Second, health care providers, including doctors, nurses, and pharmacists, need to be engaged in strong interventions to improve treatment compliance of patients.

The analysis on the materials of the Korea Health Panel indicated that the compliance with medication regimens among patients with hypertension and diabetes was significantly high,

however, the result of FGI targeting diabetes patients showed that there were many cases where the patients did not take medications as prescribed and many medications were left, or patients did not take medications on their own or took two doses at once. Doctors need to understand exactly how the patients take their medicines and give directions for medications repeatedly when treating the patients. Moreover, to raise patients' treatment compliance with smoking cessation and doing physical activities, medical staff need to provide counseling for smoking cessation and doing physical activities in an active and specific way and engage patients in smoking cessation clinics or exercise programs, if needed. Treatment compliance can be enhanced when patients and health care providers agree with treatment based on mutual trust and the patients are actively involved in disease treatment and control.

Third, patients should be provided with specific measures for treatment compliance by treatment, including medications, smoking cessation, moderate drinking, and physical activities, however, service for disease control should be offered in an integrated way.

While smoking cessation programs are necessary since it is hard to be compliant with smoking cessation due to addiction to smoking, patients need specific directions and exercise programs for physical activities by disease. However, in order patients to control lifestyle diseases, they have to do everything

from being compliant with medication regimens, changing be-
haviors, to measuring blood pressure/blood sugar by themselves.
Therefore, integrated service covering all mentioned above
needs to be provided to improve treatment compliance.

Fourth, attention to influences that health care system, includ-
ing a treatment environment, has on treatment compliance is
needed. Not only patient factors, such as sociodemographic char-
acteristics of patients, but also health care provider actors and
health care system affect treatment compliance of patients with
lifestyle diseases. Since this study found that short consultation
hours have a negative effect on treatment compliance, it is nec-
essary to study how a treatment environment in hospitals and
clinic, a prescribing environment in pharmacies, and a patient's
living environment, including working environment, affect treat-
ment compliance and build a health care providing environment
and living environment to induce treatment compliance of
patients.

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