

Higher cost sharing for visiting general hospitals and the changing trend in the first-visited healthcare organization among newly diagnosed hypertension patients

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Abstract

Unnecessary use of high-quality resources in general hospitals hinders treatment of patients with urgent and complicated conditions. Thus, the Korean Government has sought to reduce general hospital visiting of patients with 52 mild diseases, including hypertension. The higher cost sharing for medical expenses and medications from general hospitals were enacted in 2009 and 2011, respectively.

We determined whether these regulations were effective through evaluating changing trends in first-visited healthcare organizations and defined the first visiting healthcare organization level (primary clinics, hospital, and general hospital) as an outcome measure.

Data of 32,830 mild hypertension patients from 2004 to 2013 were retrieved from the Korean National Health Insurance Service National Sample Cohort. This was a retrospective study involving a large national cohort with patient samples (representing 2% of the total Korean population) stratified on the basis of sociodemographic information.

Multinomial logistic regression were performed for the first visiting to different health organizations, compared to the first visiting to primary clinics.

Patients in 2012 and 2013 had significantly lower odds (“2012”: 0.68, 95% confidence interval [CI]: 0.56–0.81/“2013”: 0.66, 95% CI 0.54–0.81) of first visiting general hospitals compared with those in 2008, although decreased tendencies (albeit nonsignificant) were already evident in 2010 and 2011.

Thus, government health policies for cost-containment seem effective in decreasing first visiting of general hospitals among patients with mild essential hypertension. These policies have since extended to Medical Aid beneficiaries; thus, it is needed to continue monitor their results carefully.

Abbreviations: CCI = Charlson comorbidity index, CI = confidence interval, DALYs = disease burden based on disability-adjusted life years, ICD = international classification of diseases, NHI = national health insurance, OOP = out-of-pocket, OR = odds ratio.

Keywords: cost, healthcare delivery system, hypertension, Korea, out-of-pocket money, sharing

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1. Introduction

With societal aging and increasingly Westernized lifestyles, hypertension has become one of the most common diseases in South Korea.^[1–3] The prevalence of hypertension was 31.5% in overall population, and it was higher in the population aged 65 years or over with 52% in 2012.^[1] In fact, hypertension-related cerebrovascular and cardiovascular diseases are the leading contributors to the chronic disease burden based on disability-adjusted life years (DALYs).^[4] For example, cerebrovascular disease, ischemic heart disease, and hypertensive heart disease accounted for more than 2000 DALYs lost per 100,000 people; more than half of Korea's total chronic disease burden in 2007.^[4]

However, if hypertension patients can control their blood pressure carefully with medication and lifestyle modification, their disease burden can be decreased tremendously.^[5,6] Indeed, the majority of hypertension patients taking antihypertensive medication might already have a chance to prevent other hypertension-related severe diseases including cerebrovascular and cardiovascular diseases.^[7–9]

A related public concern is that some of these individuals with well managed hypertension and no complications often visit outpatient clinics in general hospitals, despite their mild symptoms.^[10–12] The unnecessary medical use of the high-quality resources present in general hospitals can hinder the more urgent and complicated patients from being treated appropriately. Lee et al^[12] proved that approximately 85% of hospital outpatient utilizations are unnecessary and that a significant amount of money is wasted on unnecessary healthcare services. If all of these patients who received unnecessary hospital and general hospital outpatient services were redirected to primary clinics, the estimated savings would be 104,226 thousand USD in 2009. Moreover, according to another study, the number of beds in hospitals was associated with the increased emergency department crowding after the adjustment of patients' severity.^[11]

Unfortunately, in Korea, people have a right to visit any healthcare facility, from primary clinics in their community to hospital-level institutions, as their first contact point.^[13] This creates a competitive market between primary clinics and hospitals, rather than to be collaborative.^[10] Thus, the Korean Ministry of Health and Welfare has enacted several regulations to lower the general hospital visiting of patients with mild symptoms related to 52 diseases, including hypertension. First, the government increased all out-of-pocket (OOP) medical expenses from 50% to 60% for unnecessary outpatient visits to general hospitals in 2009. Two years later, legislators enacted another law, which decreased medication coinsurance rate in general hospitals from 50% to 70% (whereas primary care copayment rate remained the same).

By increasing the coinsurance rate, the Korean Government has made efforts to encourage patients with minor or simple diseases to utilize local primary clinics in their community instead of using general hospitals. These containment policies were steps toward increasing the fiscal sustainability of national health insurance (NHI) and the efficiency of the healthcare delivery system. To confirm whether these policies were effective, we sought to determine whether there have been changes in the trend of first-visited hospitals (primary clinics, hospital, and general hospitals) among hypertension patients from 2002 to 2013.

2. Methods

2.1. Data source

Data were retrieved from the Korean National Health Insurance Service National Sample Cohort, which includes information from approximately 1 million patients throughout South Korea. The data were extracted from a randomly selected sample and are stratified according to age, sex, region, health insurance type, income decile, and individual total medical costs from 2002 to 2013.

All Korean citizens are obligated to join the National Health Security System, which comprises NHI and Medical Aid, and is overseen by the Ministry of Health and Welfare. The data are labeled with a unique, anonymous number for each patient and comprise patients' age, gender, type of insurance, a list of diagnoses according to the international classification of diseases-10 (ICD-10), medical costs claimed, prescribed drugs, and medical history.

2.2. Population selection

This study analyzed individuals with a main medical history of essential hypertension (ICD-code I10). During the study period (2002–2013), a total number of 157,560 patients were diagnosed with essential hypertension (Supplementary figure 1, <http://links.lww.com/MD/B319>). In order to select the newly diagnosed hypertension without any complication as much, we excluded the patients who had the health records with hypertension from 2002 to 2003, 2 years. The patients with admission history for hypertension or incorrect hospital information were also excluded.

Some essential hypertension patients might need to visit general hospitals due to other medical conditions. Thus, we determined the Charlson comorbidity index (CCI) for each patient,^[14,15] which is one of the most widely used indicators for fatal medical conditions. If patients had CCI score more than 0, then we also excluded these participants from analysis.

2.3. Covariates and predictor variables

We adjusted for patients' demographic characteristics, including sex, age, and residential area, as well as 2 socioeconomic status indicators (income level and insurance type). These covariates are closely associated with the pattern of healthcare utilization.^[16–19] To determine income level, we used the average monthly insurance premium, which is determined by household income, as a proxy variable. In South Korea, health insurance is classified as either NHI or Medical Aid. People qualify for Medical Aid if their single-family household income is less than \$600 per month; otherwise, they qualify for NHI. People who have NHI based on their employment pay a monthly insurance premium that is determined by their annual salary, while people who are self-employed pay for their premium based on the value of their property. People who qualified for NHI were distributed from the first to 100th percentile in terms of premium, whereas people who had Medical Aid were considered as representing the 0th percentile. We then categorized participants by their individual household income as low (0–20 percentiles), middle (21–80 percentiles), or high (81–100 percentiles).

Our main predictor variables were the enactment of the health policies previous mentioned, namely, the increases in OOP expenses for consultations and antihypertensive agents. As a

proxy variable of these laws, we used the year in which they were enacted (2009 and 2011, respectively) in the analysis.

2.4. Outcome measure

Not all patients with mild hypertension take antihypertensive medication. Indeed, some such patients may even stop using their medication against doctors' recommendations and change their clinics for various reasons. As such, we did not believe that the number of follow-up visits would be a good measure of the effect of these health policies. To best capture their intended effect, we used the first-visited hospital as the outcome measure. Since the first-visited hospital is considered the most important predictor of regularly visited hospital, according to our supplementary results (data not shown), reducing the rate of first visits to general hospitals for mild hypertension would be a good means of deciding on the effectiveness of these policies. The hospital levels were divided into 4 categories under the healthcare delivery system: general hospitals, hospitals, primary clinics, and community health center. The primary clinics were defined as the reference group.

2.5. Statistical analysis

Descriptive statistics were computed for all variables as frequencies and percentages for categorical variables using a chi-square test. To investigate the association between year and the first-visited hospital, we used multinomial logistic regression analysis, with first visiting a primary clinic as the reference. All models were adjusted for sex, age, residential area, income level, and insurance type. We also performed a sensitivity analysis using the 3 different income groups. Odds ratios (ORs) and 95% confidence intervals (95% CIs) were calculated, and statistical significance was set at $P < 0.05$. We conducted all statistical analyses using SAS version 9.3 (Cary, NC).

3. Results

3.1. General characteristics at diagnosis

This study analyzed individuals with a main medical history of essential hypertension (ICD-code I10). During the study period (2002–2013), a total number of 157,560 patients were diagnosed with essential hypertension (Supplementary figure 1, <http://links.lww.com/MD/B319>). The number of 59,699 hypertension patients who had claims data for essential hypertension before 2004 were excluded. Another 1294 patients were excluded because they had an admission history for hypertension or incorrect hospital information. Based on the CCI, other 60,737 patients with an index of 1 or more were also excluded. This ultimately resulted in 32,830 essential hypertension patients without fatal conditions being enrolled in this study.

Among the 32,830 enrolled hypertension patients, there were 19,177 men (58.4%) and 13,653 women (41.6%; Table 1). Approximately 2/3 of patients (69.2%) lived in urban areas, and approximately 1/3 (28.4%) were aged over 60 years. The majority of hypertension patients were under the NHI (94.3%); only 1884 patients (5.7%) were receiving Medical Aid. In total, 22,331 patients (68.0%) were diagnosed with essential hypertension in primary clinics, while 4585 (14.0%) and 2946 (9.0%) were diagnosed in tertiary and hospitals, respectively.

According to the chi-square analyses by first-visited hospital and income level (Table 2), all independent variables were statistically related to the first-visited health organization. For example, males ($n=2784$, 14.5%), living in urban ($n=3331$,

Table 1

General characteristics of hypertensive patients at initial diagnosis.

	Total	%
Sex		
Female	19,177	58.4
Male	13,653	41.6
Residential area		
Rural	10,105	30.8
Urban	22,725	69.2
Age group		
<49	14,499	44.2
50–59	9007	27.4
60–69	5331	16.2
≥70	3993	12.2
Income level		
Low	9185	28.0
Middle	11,799	35.9
High	11,846	36.1
Insurance type		
NHI, employees*	12,394	37.8
NHI, self-employees*	18,552	56.5
Medical Aid	1884	5.7
The first-visited hospital		
General hospital	4585	14.0
Hospital	2946	9.0
Primary clinic	22,331	68.0
Community health center	2968	9.0
Total	32,830	100.0

* NHI = National Health Insurance, which is the solitary and mandatory health insurance in Korea.

14.7%), lower age group (40s: $n=2513$, 17.3%; 50s: $n=1169$, 13.0%), high income ($n=2006$, 16.9%), and Medical Aid ($n=215$, 26.7%) are associated with visiting the general hospitals more as the first-visited hospital. Specifically, men and patients with high income were found to be more likely to first visit general hospitals.

3.2. Changes in first-visited healthcare organization

According to the unadjusted results, there was a slight increase in the proportion of patients who first visited primary clinics over time, whereas there were sharp decreases in the proportions who visited community health centers and general hospitals (Fig. 1). We noted a similar tendency even after adjusting for the demographic and socioeconomic factors (Fig. 2).

According to Fig. 2, hypertension patients in 2012 (OR 0.68, 95% CI 0.56–0.81) and 2013 (OR 0.66, 95% CI 0.53–0.81), compared with those in 2007, showed a significantly lower odds of first visiting a general hospital compared with a primary clinic. It must be noted, however, that we detected this decreasing tendency already in 2010 (OR 0.94, 95% CI 0.80–1.10) and 2011 (OR 0.91, 95% CI 0.77–1.06), although the associations were nonsignificant.

In terms of the first visit to hospitals and community health centers (again, compared with primary clinics), we noted significant increases in odds over time for the former (in 2013, OR 1.43, 95% CI 1.17–1.755), but significant decreases for the latter (in 2013, OR 0.64, 95% CI 0.49–0.85).

3.3. Other factors associated with first-visited healthcare organization

We then analyzed the adjusted ORs for first visits to each type of healthcare organization compared with the visits to primary

Table 2**Chi-square analysis of general characteristics and first-visited hospital.**

	General hospital		Hospital		Primary clinic		Community health center		Total	P
	N	%	N	%	N	%	N	%		
Sex										
Female	1801	13.2	1094	8.0	9281	68.0	1477	10.8	13,653	<0.001
Male	2784	14.5	1852	9.7	13,050	68.1	1491	7.8	19,177	
Residential area										
Rural	1254	12.4	950	9.4	6327	62.6	1574	15.6	10,105	<0.001
Urban	3331	14.7	1996	8.8	16,004	70.4	1394	6.1	22,725	
Age group										
<49	2513	17.3	1345	9.3	10,114	69.8	527	3.6	14,499	<0.001
50–59	1169	13.0	862	9.6	6305	70.0	671	7.4	9007	
60–69	560	10.5	435	8.2	3538	66.4	798	15.0	5331	
≥70	343	8.6	304	7.6	2374	59.5	972	24.3	3993	
Income level										<0.001
Low	1032	11.2	866	9.4	6215	67.7	1072	11.7	9185	
Middle	1547	13.1	1118	9.5	8126	68.9	1008	8.5	11,799	
High	2006	16.9	962	8.1	7990	67.4	888	7.5	11,846	
Insurance type										<0.001
NHI, employees*	1555	12.5	1080	8.7	8640	69.7	1119	9.0	12,394	
NHI, self-employees*	2815	15.2	1703	9.2	12,487	67.3	1547	8.3	18,552	
Medical Aid	215	26.7	163	20.3	124	15.4	302	37.6	804	
Total	4585	14.0	2946	9.0	22,331	68.0	2968	9.0	32,830	

* NHI = National Health Insurance, which is the solitary and mandatory health insurance in Korea.

clinics (Supplementary table 1, <http://links.lww.com/MD/B319>) for the other variables. In terms of income level, middle- (OR 1.15, 95% CI 1.05–1.26) and high-income hypertension patients (OR 1.52, 95% CI 1.39–1.67) showed a greater odds of first visiting general hospitals than private clinics compared with the low-income group. Patients in their 60s (OR 0.62, 95% CI 0.56–0.69) and 70s (OR 0.55, 95% CI 0.48–0.62) had a lower odds of first visiting general hospitals, compared with patients in their 40s.

Table 3 shows the adjusted ORs for the first visits to general hospitals compared with visits to primary clinics by year and income group. According to these results, the low-income group first showed decreasing odds of first visiting general hospitals in 2013, while the middle- and high-income groups began showing these decreased odds in 2012, respectively. Across all the income

levels, the ORs had a decreased tendency with statistical significance in 2013.

4. Discussion

Hypertension without severe complications can usually be managed well and does not require visiting a general hospital. However, the disruption of the healthcare delivery system in South Korea has led many mild hypertension patients to unnecessarily visit general hospitals.^[12] To counteract this, the Korean Government enacted 2 health policies—namely, raising the OOP expenses for general hospital consultations in 2009 and reducing copayments for antihypertensive medication from general hospitals in 2011. Our results suggest that the proportion of first visits to general hospitals has declined significantly from

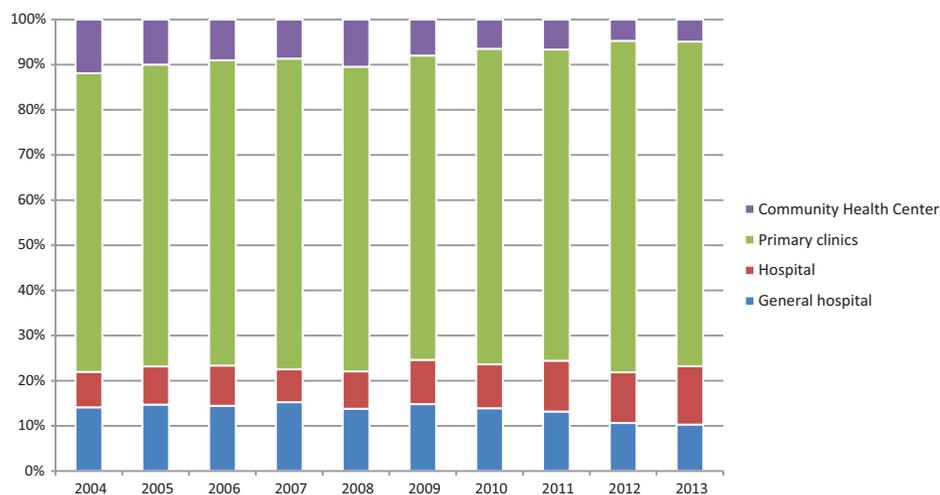


Figure 1. The proportion of the first-visited hospitals among newly diagnosed hypertension patients by year. Source: the Korean National Health Insurance Service National Sample Cohort, from 2004 to 2013.

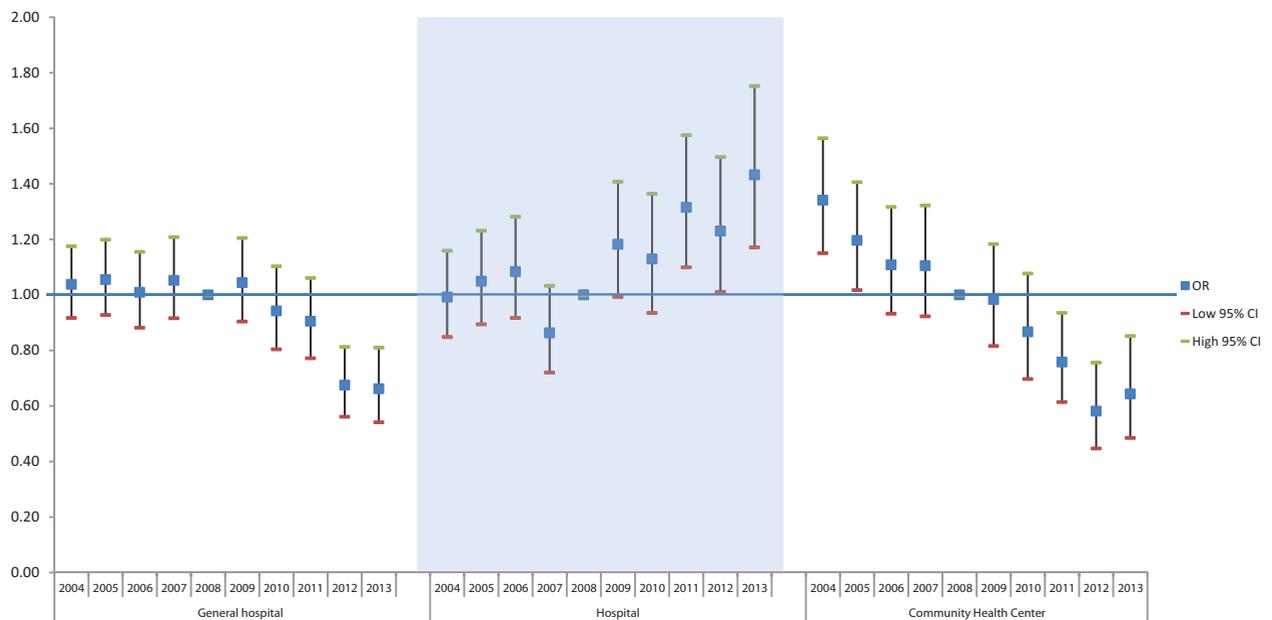


Figure 2. The adjusted odds ratios and 95% confidential intervals for the first-visited hospitals among hypertension, compared to primary clinics by year. Source: the Korean National Health Insurance Service National Sample Cohort, from 2004 to 2013.

2012 across all income levels, which suggests the effectiveness of these policies.

Some previous studies have attempted to determine the rate of unnecessary utilization of outpatient services among patients with chronic disease and who do not exhibit complications.^[12,20] Notably, Lee et al^[12] found that approximately 85% of hospital outpatient utilizations are unnecessary and that a significant amount of money is wasted on such utilizations. Specifically, the total healthcare expenditures from unnecessary hospital outpatient utilization for hypertension were estimated at 94.058 million USD, or over 38.6% of the total NHI expenditure in 2009.^[12] Our results coincide with the findings of another study in 2011,^[21] which suggested that the increase in OOP expenses for general hospital consultation significantly reduced the number of outpatient visits among patients with mild upper respiratory infections and hypertension.

It is a universal feature among other countries that an increased coinsurance rate leads to decreases in health utilization. Hartung

et al^[22] investigated the impact of a Medicaid copayment policy on prescription drugs and health services utilization in the United States. After introduction of coinsurance for Medicaid enrollees, there was a 17.2% decrease in the use of prescription medicine. According to another study on eligible enrollees for Medicare,^[23] after the rise in copayments, the creation of plans that increased cost sharing led to 19.8 fewer annual outpatient visits per 100 people.

It has been proposed that increasing copayments in order to contain costs might have adverse effects on overall health outcomes. For example, other studies have indicated that low-income and elderly groups were highly affected by this policy change.^[22-24] However, in our study, we did not include patients with fatal medical conditions (according to the CCI and a history of admission for essential hypertension). In addition, the 2 health policies we studied applied to general hospital visits, not secondary or primary care hospitals. Besides, according to data from 2014, South Korea had the highest number of outpatient visits per capita and the longest length of stays per admission among organisation for economic Co-operation and development countries.^[25] Taken together, our study results do not provide any direct evidence that necessary medical utilization decreased among hypertension patients with low socioeconomic status.

We further must clarify which of the study policies had a stronger effect on the decreased number of first visits in South Korea. Although it seemed that the first policy lowered the first visit rate for hypertension during the 2 consecutive years after implementation, this change did not appear to be statistically significant. In contrast, enactment of the second policy in 2012 indicated significantly decreased odds (according to adjusted ORs) of first visiting general hospitals compared with primary clinics. Furthermore, this effect was maintained until 2013.

When we consider the cumulative effect of these 2 policies, it is unlikely that the effect of the second policy (i.e., decreased copayment of medication) outweighed that of the first (i.e.,

Table 3
Ajusted ORs for visits to general hospitals compared to visits to primary clinics, by year and income level.

	High	Middle	Low
2004	0.91	1.10	1.19
2005	0.94	1.20	1.04
2006	0.98	1.03	0.97
2007	1.02	1.07	1.06
2008	ref		
2009	0.97	0.98	1.24
2010	0.83	1.12	0.83
2011	0.85	0.85	1.05
2012	0.59**	0.68*	0.82
2013	0.61*	0.74	0.62*

* P < 0.05.
** P < 0.001.

increased OOP medical expenditure for general hospital utilization). Rather, it is more likely that the decreasing tendency for first visits began with the first policy and was accelerated by the second, which led to the observed statistical significance by the time of the second policy's enactment.

Overall, our results further highlight the importance of reconstructing the healthcare delivery system. Further reasons are as follows. In theory, if any patient in South Korea wants to first visit a hospital other than a primary care hospital, that patient must receive a referral document from a physician in a primary care clinic.^[12,13] Despite this, many Korean patients are not reluctant to visit higher level hospitals initially due to the relatively low cost of referral documentation and lack of penalties for patients visiting the higher level hospitals first. Thus, higher level hospitals often operate as large-scale outpatient clinics.^[10,26]

This, in turn, creates a competitive relationship between primary care clinics and hospitals, rather than a collaborative one. This competition has been worsening through a "medical arms race" in which primary care clinics are purchasing more expensive medical equipment such as computer tomography and magnetic resonance imaging machines, while hospitals are markedly improving their outpatient services.^[25,27] This overheating competition has consequently induced greater delays for patients with severe conditions in visiting the doctor. In addition, the competition can promote supplier-induced demand, which increases NHI expenses unnecessarily.

Although this broken healthcare delivery system cannot be easily fixed immediately, its repair can be furthered by assessing the efforts of the Korean Government regarding health policies. The government has announced an extension of the increased OOP expenses for outpatient medication to include patients under Medical Aid in 2015. As shown in Table 2, patients under Medical Aid have a tendency to visit the general hospitals more frequently than the other NHI enrollees. We assume that the extremely low OOP expenses for Medical Aid enrollees (at less than 50 cents in USD) might be related to their greater utilization of general hospitals.^[28-30] Nevertheless, further investigation is required on whether previous successes in cost-containment will be effective in reducing this moral hazard situation for Medical Aid enrollees.

In terms of the strengths of this study, we used nationally representative data derived from the National Health Insurance Service National Sample Cohort. All Koreans are eligible for either NHI or Medical Aid. Thus, our results likely have high validity in reflecting the actual healthcare environment in South Korea.

In addition, the target population was highly homogenous in terms of medical conditions. In other words, we restricted the population to avoid fatal conditions and admission histories for hypertension in order to elevate the reliability of the results. We also adjusted for the demographic and socioeconomic characteristics in our analysis at the individual level (rather than at the aggregated population level). Many previous studies have used interrupted time series analysis to evaluate the effect of health policies. However, this method would not capture differences at the individual level.

Finally, there are few scholarly works at present with a focus on evaluating the 2011 policy implementation regarding increased copayment of outpatient medication. Thus, we are able to provide the most up-to-date information for cost-containment policies in South Korea.

In spite of these strengths, there are still several limitations. First, we could not adjust for socioeconomic status variables

other than income. Other factors, such as educational level or occupation, may influence healthcare utilization. Thus, this study could be improved if we can include other fundamental variables more.

Second, we cannot expect that the results would be the same for hypertension patients with severe conditions. For example, some hypertension patients with advanced cancer must obtain antihypertensive treatment in general hospitals in order to obtain integrated care. For these patients, we would not likely find any change in first visiting after the policy implementations; furthermore, it is possible that such patients would experience reverse discrimination.

Third, we only reflect the medical conditions using CCI. Since CCI was originally developed to estimate mortality in general population, it might not be enough to define the target population without other severe medical conditions. Thus, the definition of patients with mild symptoms should be carefully addressed in the limitations.

Fourth, we could not adjust other economic or political issues, which might be associated with the results. For example, the annual increase rate in NHI premium or the inflation under socioeconomic situation might have an influence on the trend. However, we believed that this decreased trend in the general hospitals for the first-visiting hypertension patients would be consistent under various socioeconomic situations.

Finally, we did not divide hypertension patients according to use of medication. Because many mild hypertension patients often do not take antihypertensive agents, we aggregated the target population in terms of medication use. However, patients might respond differently according to the different health policies.

5. Conclusion

The recent government health policies for cost-containment seem to have been effective according to decreases in first visits to general hospitals for the diagnosis of essential hypertension among the patients without fatal complications. However, since the reduction in medication copayment policy has extended to include Medical Aid beneficiaries, we must follow-up with their effects carefully.

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