



Impact of co-payment for outpatient utilization among Medical Aid beneficiaries in Korea: A 5-year time series study

Ki-Bong Yoo^{a,1}, Hong-Uk Ahn^{b,1}, Eun-Cheol Park^{c,d}, Tae Hyun Kim^{c,e}, Sun Jung Kim^f, Jeoung A Kwon^g, Sang Gyu Lee^{c,e,*}

^a Department of Healthcare Management, Eulji University, Republic of Korea

^b National Health Insurance Service, Republic of Korea

^c Institute of Health Services Research, Yonsei University, Republic of Korea

^d Department of Preventive Medicine, College of Medicine Yonsei University, Republic of Korea

^e Graduate School of Public Health, Yonsei University, Republic of Korea

^f Department of Health Administration and Management, College of Medical Science, Soonchunhyang University, Republic of Korea

^g Cancer Policy Branch, National Cancer Control Institute, National Cancer Center, Republic of Korea

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ABSTRACT

Background: The Korean government implemented an outpatient co-payment scheme in July 2007 to control Medical-Aid beneficiaries' overutilization of healthcare services.

Objectives: To assess changes in the utilization of medical services resulting from the outpatient co-payment scheme.

Methods: 410,142 subjects were selected and health insurance reimbursement data from July 2006 to June 2011 was examined. We assessed the changes in the total medical cost, total adjusted patient days, inpatient days, inpatient total medical cost, the number of outpatient visits, and outpatient total medical cost using segmented regression analysis.

Results: Following the introduction of the policy, the number of outpatient visits per person fell by 0.16 days in July 2008, and by 0.06 days in July 2010, compared to June 2007. The outpatient total medical cost per person rose by \$4.11 in July 2010 compared to June 2007. The inpatient utilization increased constantly during the period of the study. So the total medical cost as well as the total adjusted number of patient days also increased constantly.

Conclusion: The outpatient co-payment policy was effective for reducing the number of outpatient visits. It could not control the cost per outpatient visit and inpatient utilization. So the total medical cost was increased.

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1. Introduction

The National Health Insurance system in Korea was first implemented in 1977, and achieved universal coverage for the population in 1989 [1]. The Korean government, division of healthcare for the poor in Ministry of Health, has been operating the Medical-Aid scheme since 1977, which is for low-income people who have difficulty paying health insurance premiums [2]. There are 1.83 million Medical-Aid beneficiaries, which is 3.8% of the population of Korea [3].

Abbreviations: CCI, Charlson comorbidity index.

* Corresponding author at: Department of Hospital Administration, Graduate School of Public Health, Yonsei University, 50 Yonsei-ro, Seodaemun-gu, Seoul 120-752, Republic of Korea. Tel.: +82 2 2228 1524; fax: +82 2 392 8133.

E-mail addresses: kb53545@gmail.com (K.-B. Yoo), hongahn@nhis.or.kr (H.-U. Ahn), ecpark@yuhs.ac (E.-C. Park), thkim@yuhs.ac (T.H. Kim), sunjkim0623@gmail.com (S.J. Kim), kwon.jeounga@gmail.com (J.A. Kwon), leevan@yuhs.ac (S.G. Lee).

¹ These authors contributed equally to this work.

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There are two types of Medical-Aid beneficiaries. The basic concept to distinguish type 1 and type 2 is whether a beneficiary is able to work or not. So type 2 Medical-Aid beneficiaries have to pay co-payment for any medical services. Prior to 2007, type 1 Medical-Aid beneficiaries were not required to make any co-payment, and the regional and central government paid all medical expenses when a type 1 Medical-Aid beneficiary used any medical service [4]. The cost of Medical-Aid payments accounts for 16.9% of the total National Health Insurance expenditure [5], and has increased on average by 15.9% year-on-year in the period of 2002–2006. The outpatient cost of type 1 beneficiaries rose by 12.5% year-on-year in 2006, while the cost for the other types of beneficiaries rose by 4.5% in the same period [6].

To address the growing cost of type 1 Medical-Aid beneficiaries, the Korean government implemented a co-payment scheme in July 1, 2007, whereby type 1 beneficiaries were required to pay outpatient fees of \$1 (about 1000 KRW) to primary medical institutions, \$1.50 to secondary medical institutions, \$2 to tertiary medical institutions, and \$0.5 per prescription or \$0.9 without prescription to pharmacy. To prevent unmet medical needs from occurring, the government also introduced the Healthy Life Maintenance Aid Program and Copayment Exemptions Program. The Healthy Life Maintenance Aid Program was that the governments provides \$6 per month to each type 1 beneficiary via a virtual account. This program is effectively a health savings account: whenever beneficiaries receive a medical service as an outpatient, they make the co-payment via the virtual account. If beneficiaries spend the total amount in the virtual account, they must meet the additional costs themselves. If money remains over \$2 in a virtual account, it can be converted into cash once in a year. However, this policy is not implemented for inpatient treatment, which is still available at no cost [7]. The Copayment Exemptions Program is literally to exempt copayment for type 1 Medical-Aid beneficiaries who might use more than the limited amount by the Healthy Life Maintenance Aid Program, people who were pregnant, homeless, under 18 years old, with organ transplants, or with rare incurable diseases.

The co-payment system is intended to restrain improper use of medical resources, and therefore to reduce outpatient cost [8]. However, there may be effects on inpatient utilization, which differ depending on the healthcare system. According to a study of the US medical system conducted by Manning et al. [9], outpatient co-payment reduced inpatient utilization. It follows that we can expect the total medical cost to be reduced by increasing outpatient co-payments. However, the referral system in Korea is different from that in the US [10], and so the effects on inpatient care due to outpatient co-payment may also be different. Changes in the total cost of outpatient and inpatient treatment in response to the introduction of the co-payment system are not easy to predict, as medical service utilization depends upon individual circumstances [11–14].

In the 6 years since the policy was implemented, a comprehensive investigation into the impact of the co-payment for type 1 beneficiaries has not yet been carried out. The

purpose of this study was to assess the effects of the outpatient co-payment scheme and Healthy Life Maintenance Aid Program on the usage of medical services.

2. Material and methods

2.1. Data and study population

We used Medical-Aid health insurance reimbursement data between July 1, 2006, and June 30, 2011 received from the National Health Insurance Corporation. Among total 1,044,060 type 1 Medical-Aid beneficiaries in July 2007, those who were included in the Copayment Exemptions Program ($N=264,544$). Those who had lost the type 1 Medical-Aid beneficial or had not received medical services in all study period, and had not been subject to the Healthy Life Maintenance Aid Program ($N=368,799$) were excluded. After excluding missing data ($N=575$), a total of 410,142 patients were included.

2.2. Study variables

Data on age, sex, and region for each study subject were collected and the regions were categorized as Seoul, Metropolis, urban, and rural. The Charlson comorbidity index (CCI) was also calculated monthly [15]. Data on each subject's medical service utilization (i.e., the number of inpatient days and outpatient visits) and data on the medical costs (i.e., inpatient and outpatient total medical cost) were collected every month. The total adjusted number of patient days was the sum of the number of inpatient days and the number of outpatient visits, based on methodology of the American Hospital Association [16]. The total medical cost was calculated as the sum of the total inpatient and outpatient cost. All medical costs were adjusted for inflation to the level of medical costs for the year 2010 [4]. We assumed an exchange rate of 1000 KRW to 1 USD.

2.3. Statistical analysis

The primary statistical model was segmented regression, which is commonly used for estimating the effects of interventions in interrupted time series studies [17–19], and this was used to assess changes in the inpatient and outpatient utilization. Segmented regression can be expressed as follows:

$$\begin{aligned} \log(Y_{it}) = & \text{intercept} + \beta_0 \times \text{time}_t + \beta_1 \times \text{time}_t^2 + \beta_2 \\ & \times \text{policy change}_t + \beta_3 \times \text{time after policy changed}_t \\ & + \beta_4 \times \text{time after policy changed}_t^2 + X_{it}\lambda + u_{it} \end{aligned} \quad (1)$$

where Y_{it} is the dependent variable (i.e., the total inpatient and outpatient medical costs, the number of outpatient visits, the number of inpatient days, the total medical cost, and adjusted number of patient days) during a time period t for unit i . The variables *time*, *time*², *policy change*, *time after policy changed*, and *time after policy changed*² are related to the policy; *time* is the time in months from July 2006; *policy change* is a binary indicator of whether the policy

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