VALUE IN HEALTH REGIONAL ISSUES 12C (2017) 7–19

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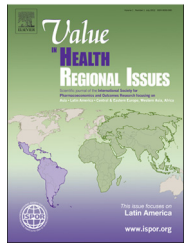

Prediction of Change in Prescription Ingredient Costs and Co-payment Rates under a Reference Pricing System in South Korea

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ABSTRACT

Background: The reference pricing system (RPS) establishes reference prices within interchangeable reference groupings. For drugs priced higher than the reference point, patients pay the difference between the reference price and the total price. **Objectives:** To predict potential changes in prescription ingredient costs and co-payment rates after implementation of an RPS in South Korea. **Methods:** Korean National Health Insurance claims data were used as a baseline to develop possible RPS models. Five components of a potential RPS policy were varied: reference groupings, reference pricing methods, co-pay reduction programs, manufacturer price reductions, and increased drug substitutions. The potential changes for prescription ingredient costs and co-payment rates were predicted for the various scenarios. **Results:** It was predicted that transferring the difference (total price minus reference price) from the insurer to patients would reduce ingredient costs from 1.4% to 22.8% for the third-party payer (government), but patient co-payment rates would increase from a baseline of 20.4% to 22.0% using chemical groupings and to 25.0% using therapeutic groupings. Savings rates in prescription ingredient costs (government and patient combined) were predicted to range from 1.6% to 13.7% depending on various scenarios. Although the co-payment rate would increase, a 15% price reduction by manufacturers coupled with a substitution rate of 30% would result in a decrease in the co-payment amount (change in absolute dollars vs. change in rates). **Conclusions:** Our models predicted that the implementation of RPS in South Korea would lead to savings in ingredient costs for the third-party payer and co-payments for patients with potential scenarios.

Keywords: co-payment, cost-containment, reference pricing system, South Korea.

Introduction

The South Korean National Health Insurance (NHI) system is managed by the government as a single payer and covers virtually all of its citizens, spending more than 7% of its gross domestic product on health care [1,2]. Pharmaceutical spending in South Korea was estimated at 20.6% of total health expenditures in 2013 and was much higher than the average (16.6%) estimated by the Organisation for Economic Cooperation and Development for 36 developed nations [3]. In South Korea, prescription drug expenditures paid by the NHI have increased about 13.2% annually from 2001 to 2010 [4]. The Korean government has adopted several drug pricing policies in an attempt to slow the growth of spending on prescriptions. In 2006, the government introduced the Drug Expenditure Rationalization Plan, which established a positive list system and price negotiations between the National Health Insurance Corporation (NHIC) and pharmaceutical manufacturers [5]. The Drug Reimbursement Examination Committee of the Health Insurance Review and Assessment Service (HIRA) determines reimbursement eligibility for new drugs on the basis of clinical usefulness, cost-effectiveness, budget impact, present status of reimbursement, and prices in other countries [6,7]. As part of this pricing reform, the Korean government has also re-evaluated drugs that had been previously listed, in some cases reducing the reimbursement amount or withdrawing the drug from the list of insured products [4,8]. In 2012, according to a new pricing system using the principle that the same active ingredients should have the same prices, the price of listed drugs decreased by 14.2% on average [1]. Despite these reforms, pharmaceutical expenditures have continued to rise 2.5% annually from 2010 to 2013 [9,10]. Patients have shown a preference for branded or high-priced generic medications even though their co-pay on lower priced generics is reduced [11,12]. Previous pricing policies have targeted manufacturers to reduce prices; it is, however, necessary to also address behaviors of patients, physicians, and

The authors have indicated that they have no conflicts of interest with regard to the content of this article.

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2212-1099$36.00 – see front matter

http://dx.doi.org/10.1016/j.vhri.2016.07.011

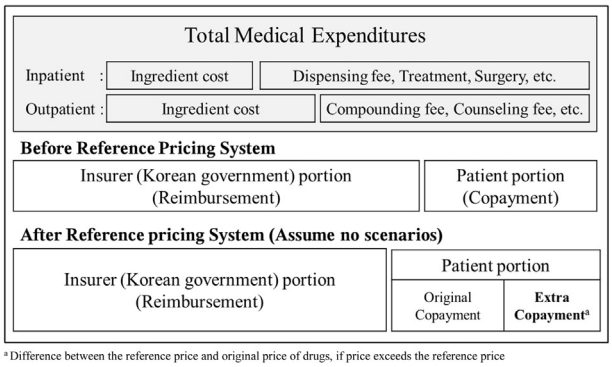

Fig. 1 – The diagram of Korea National Health Insurance before and after the reference pricing system.

pharmaceutical companies in tandem to reduce overall health expenditures [13].

A new type of policy, the reference pricing system (RPS), is being considered to encourage the use of low-cost drugs, promoting cost-consciousness among patients [14–16]. The RPS is a policy strategy that establishes a reimbursement level, or "reference price," within the same class of therapeutically interchangeable drugs, a "reference group" [15]. The third-party payer, in this case the NHI, reimburses only up to the established reference price for all products in a reference group, and patients are responsible for paying the difference between the reference price and the price of a more costly drug [14,15,17]. Various countries have accepted the RPS, using various groupings (such as chemical, therapeutic, or combined reference groups) and different levels of reimbursement (such as the lowest price, 30% less than the price of the original product, or the average price in a group) [18] (Appendix A). In 2002, the Korean government attempted to introduce a policy that would use the RPS, which would apply for only 11 therapeutic groups, but it was withdrawn because of health care providers, manufacturers, and patients' concern about the increased cost burden to patients and the small number of interchangeable generics [19,20]. The present Korean co-payment scheme sets a certain percentage of total medical expenditures that patients pay (Fig. 1) [4]. On the basis of the original proposal to institute the RPS in South Korea, if the drug price was higher than the reference value chosen, patients would have been required to pay the original co-payment rate plus the difference between the drug price and the reference price [21].

Reductions in pharmaceutical expenditures have been seen by other countries that have adopted the RPS [18] (Appendix B). The institution of the RPS was associated with a decrease in drug prices by 5% to 40%, subject to the reimbursement policy or pharmaceutical environment in various countries [15,16,22,23]. Prescription drug expenditures on specific classes decreased, and generic market shares increased across countries after introducing the RPS [16,24–26]. The RPS showed a switch to less expensive drugs, whereas studies based on a large number of patient-level observations showed no association between the introduction of the RPS and the health outcomes [16,27–29]. In 2012, the NHIC and the HIRA committees have reconsidered the RPS as a drug price reduction policy, noting that the RPS may cause patient behavior to change when they are responsible for a bigger share of the high-priced drugs, unlike previous drug price regulations [13]. In 2013, the HIRA report recommended that the RPS would encourage the use of low-priced drugs or generics, recommending that the policy should be considered as a long-term project after implementing a smaller pilot program for only one or two therapeutic groups [30]. The Korean NHIC also reported that the RPS would support the generic substitution in 2016 [31]. Nevertheless, because the potential effects of an RPS in Korea (for both the government and the patients) have not been estimated, the introduction of the RPS in Korea continues to be debated.

To our knowledge, no research has been conducted predicting the potential change in prescription drug expenditures under various scenarios after the introduction of an RPS in South Korea. Therefore, the purpose of this study was to predict the expected changes in prescription ingredient costs and co-payment rates after implementation of the RPS under various scenarios in South Korea.

Methods

Data Source

Data for this study were extracted from the Korean National Health Insurance Claims Database (KNHICD). These claims encompass medical utilization for about 97% of the South Korean population [32]. Korean health insurance includes payment for outpatient visits, inpatient visits, emergency care, and prescription drugs [4]. All drugs (except patented drugs [16], orphan drugs, and therapeutically noninterchangeable drugs), which were prescribed and dispensed in inpatient and outpatient settings for 4 months, for the months of January, April, July, and October in 2011 were included in this study. Prices of drugs, which were lowered after a new drug pricing regulation in 2012, were used to predict the effects of the RPS in the future.

Development of Models for the RPS in South Korea

To estimate the effect of possible RPS models, five features of a potential RPS policy were used when calculating the range of estimated costs: various levels of equivalence groupings, various methods of setting the reference price, inclusion of co-payment reduction programs, a reduction in prices by the manufacturers, and changes in prescribing patterns to less costly drugs.

First, in European countries, where implementation of the RPS is common, levels of equivalence (reference groups) are defined on the basis of the Anatomical Therapeutic Chemical (ATC) classification system [16,18]. The ATC codes are divided into different levels and grouped by their chemical, pharmacological, and therapeutic properties to function on the organ or system [33]. In this study, two categories of reference groups were used: 1) a chemical ingredient comparable group (chemical level), which used the same fifth level of ATC code (products with same active ingredient, e.g., amlodipine, felodipine, cimetidine, and ranitidine), dosage form, and dose (strength) and 2) a therapeutic and pharmacological comparable group (therapeutic level), which included the same fourth level of ATC code (chemically different but therapeutically and pharmacologically related products, e.g., selective calcium channel blockers and H2-receptor antagonists), dosage form, and dose (strength) [16] (Appendix C).

Second, the level of reimbursement (a reference price) was calculated using five methods:1) weighted average, the average for multiplications of drug price and quantity divided by quantity dispensed during study period; 2) mean, the arithmetic mean of all prices of drugs in a reference group; 3) mean without outliers, the arithmetic mean after removing prices higher than upper 10% and less than lower 10% for only reference groups including more than 10 drugs; 4) median, the median of all prices of drugs in a reference group; and 5) 33rd percentile, the price that is located at 33% from the minimum price within a reference group (note that the 33rd percentile is used for the German RPS). Many countries have accepted the lowest price as a reference price; this study, however, excluded the lowest price because it would be