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Effects of pharmaceutical cost containment policies on doctors' prescribing behavior: Focus on antibiotics

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ABSTRACT

Objectives: We analyzed the effect of the outpatient prescription incentive program and price cuts of listed medicines in South Korea on prescription drug expenditures and prescription behaviors, focusing on antibiotics for the most common infectious diseases.
Methods: We used the National Health Insurance claims data from January 1, 2009 through December 31, 2012. For 1625 primary clinics randomly sampled, we included all claims with principal diagnoses of acute upper respiratory tract infections (URTIs, J00–J06), acute lower respiratory tract infections (LRTIs, J20–J22), or otitis media (H65, H66). An interrupted time-series analysis was conducted.
Results: Pharmaceutical spending per claim dropped immediately after the outpatient prescription incentive program only for otitis media (adults), but the secular trend shifted downward after the incentive program for all target diseases. The incentive program lowered the trend of antibiotic prescribing rate in otitis media (adults). The program was associated with an increase of the number of antibiotics prescribed in URTI (adults) and LRTI (children) and decrease in otitis media (adults). The broad markdown of drug prices reduced pharmaceutical expenditures immediately for all diseases, but without lasting effect.
Conclusion: The direct financial incentives to physicians to reduce in prescription spending had the intended effect over time and can be an important tool to improve pharmaceutical spending management.

1. Introduction

Effective management of pharmaceutical expenditure is a challenge facing many countries [1–6]. Korea, too, experienced skyrocketing prescription drug expenses over the past decade. Prescription drug expenses reimbursed by the National Health Insurance Service of Korea (NHIS) grew sharply at an annual average rate of 12.2%between 2002 and 2011, above the growth rate of total medical expenditures (annual average of 10.3%). Furthermore, pharmaceutical spending in Korea accounted for 29% or more of the total medical expenditures in the NHIS since 2005 [7].

Pharmaceutical expenditures are driven by two major factors: price and volume. Policy tools to control pharmaceutical spending therefore are aimed at both. Direct controls over prices such as price cuts have been enforced in many countries, given that they can bring about immediate reduction in pharmaceutical spending [2,3,5]. The Korean government also focused on controlling drug prices, as price is easier to control than volume through a relatively simple administrative mechanism that tends to yield direct results. This is particularly true in Korea where the

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National Health Insurance Service (NHIS) operates as the sole public health insurer with all Koreans as compulsory beneficiaries. Nevertheless, the ratio of pharmaceutical expenditures to the total medical expenditures of the NHIS has not dropped below 29% [8]. Physicians in primary care in Korea only prescribe medicines, which are dispensed in local pharmacies, and thus do not have a direct financial interest in the price cut of drugs. The NHIS also reimburses physicians under the "fee for service" system. Therefore, physicians have little motivation to cut down on the volume of medical supplies used, although studies in Korea report high numbers of drugs per prescription, a habit of prescribing unnecessary medicine for the digestive system [9], and preferences for higher-cost drugs [10], implying that there exists room for reduction of prescribing volume.

When it comes to drug prescriptions, physicians are the most important decision-makers and therefore are the focus of a number of strategies to encourage reasonable pharmaceutical spending [2,3,5]. One such strategy, a new policy called "Outpatient Prescription Incentive Program" was introduced in Korea in October 2010. This program pays a financial incentive to any physician in primary care who achieves savings by incurring less actual expenses for the half of the current year than the forecast estimates, based on the expenses of the second half of the previous year and records lower pharmaceutical expenditures than average across physicians in primary care. The financial incentive is 20–40% of the savings. Such a policy was expected to change drug expenditure through changes in prescription behaviors.

Several studies evaluated changes in drug expenditure and prescription volumes by budgetary policies [11], or new structures of the reimbursement schedule such as reimbursement restrictions [12,13]. However, the literature exploring the effects of financial incentives for prescribing physicians to control drug spending is limited, and most of those studies were based in the UK and Ireland [14–19]. Some studies report that the financial incentives increased physician prescriptions of lower-cost drugs [15,16], reduced the number of drug items prescribed [17], or reduced spending on prescription drugs [14–16,18]. Conversely, others report that financial incentives for primary care physicians introduced in the UK were not very effective in changing the way they prescribed [19]. We provide the first research evaluating a financial incentive program to contain pharmaceutical expenditure outside Europe.

The Korean government carried out a markdown of prices for 7500 drugs from an estimated 4000 listed drugs by an average of 14% in April 2012. However, the drug price mark down is unlikely to influence prescribing behaviors due to lack of direct rewards or incentives to physicians, particularly given that physicians only prescribe medicines and do not dispense them.

We analyzed the impact of the outpatient prescription incentive system and price cuts on prescription drug expenditures and prescription behaviors, particularly focusing on antibiotics for the most common infectious diseases. Antibiotic consumption in Korea was measured at 27.9 DDD/1000 inhabitants/day in 2010, much higher than the OECD average of 19.8 DDD/1000 inhabitants/day [20]. The overall prescription rate of antibiotics per claim was 29.63% in 2008 and 26.07% in 2012, and the rate was even higher (32.47% in 2008 and 29.12% in 2012) in primary clinic level. The rate of antibiotics prescribed by clinics for acute upper respiratory tract infections (URTIs) in 2012 was 44.26%, much higher than the rate in tertiary hospital (25.47%). Most antibiotics listed in the NHIS in Korea are generic products, and originators were less than 10% of the listed antibiotics during the study period [9,21,22]. The most widely used antibiotics in Korea are amoxicillin with enzyme inhibitor and cefaclor, primarily prescribed in clinics. Although antibiotic prescription in clinics has dropped since 2002 when the government started monitoring antibiotic prescribing behavior of all clinics and hospitals, it still needs attention and control [23,24].

The current study builds on the literature and improves it by assessing the combined impact of financial incentive program for physicians and broad reduction of drug prices. This study is expected to serve as a reference for many countries that seek multiple policies targeting both price and volume controls to achieve pharmaceutical cost savings.

2. Methods

2.1. Data

NHIS claims data for clinics providing primary care in outpatient facility were used for the current study. More than 95% of the Korean population subscribe to NHIS, and all medical institutions in Korea are obligated to provide medical services to NHIS subscribers. Clinics file claims for medical expenses with the NHIS on a daily basis, and the claims data include consultation and treatment as well as prescription details for each patient on each visit.

We extracted the outpatient claims data filed by clinics with the NHIS for four years from January 1, 2009 through December 31, 2012 (with the treatment start date as the index date). Since the purpose of this study is to analyze changes in prescribing patterns relative to policy changes, we included only the clinics that treated patients throughout the entire target period. To this end, we first selected, from the NHIS medical care institution file, clinics that treated patients continuously between 2009 and 2012 without opening or closing business or changing geographic location during the period (20,118 clinics remained). Next, we chose clinics specializing in 11 specialties (family medicine, internal medicine, anesthesiology, urology, obstetrics and gynecology, pediatrics, neurology, otolaryngology, orthopedics, dermatology, and general practice), numbering 17,566. This study focused on prescription decisions by individual physicians in relation to policy changes and therefore any potential influence of corporate goals on physicians' decisions needed to be eliminated. Thus, institutions established by a corporation were excluded (16,248 clinics remained), and among those remaining we drew a 10% random sample of 1625 institutions for analysis (Fig. 1).

After preliminary investigation of all diseases with antibiotic prescriptions, target diseases were selected from