Determination of 2010 Reimbursed Drug Price and Its Budget Impact in Public Hospitals in Thailand

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Abstract Total drug expenditure for Civil Servant Medical Benefit Scheme (CSMBS) has rapidly increased. Reference pricing (RP, or maximum reimbursable limit) for drugs is proposed as a means to control drug expenditure. The objectives of this study were to determine the RP of five high expenditure drug groups and estimate the budget impact of RP implementation. Prescription records of 29 public hospitals in 2010 were collected. Drug utilization and several RP's of each drug product were determined. Then, overall budget impact was determined for RP under three different scenarios.

Results showed that there were 1.7 million prescriptions, accounted for 2.5 billion baht. By drug group, total number of prescriptions were 39.96%, 26.25%, 16.57%, 13.68% and 3.55% while total expenditures were 44.65%, 20.43%, 20.59%, 4.47% and 9.85% for statins, Proton Pump Inhibitors (PPI), Angiotensin Receptor Blockers (ARB), Angiotensin-Converting Enzyme Inhibitors (ACEI), and Bisphosphonates (BIS) respectively. Brand name drugs accounted for 94.8% of expenditures but 50.6% of prescriptions. If RP was implemented, the highest savings (50.39% of expenditure) would be from pharmacological substitution (eg. price of Atorvastatin is equal to median price of generic Simvastatin). Generic substitution (median price of generic for brand Simvastatin) would result in 20.56% savings while 15.91%-17.26% savings would be achieved if brand drugs were reimbursed at cost plus 50 or 30 baht dispensing fee per item respectively.

Use of high price, brand drugs has burdened the overall drug expenditure of government hospitals. Reference pricing would encourage generic drug use and thus, help not only to control overall expenditure, but also strengthen the local manufacturing drug industry.

Keywords: *reference pricing, drug expenditure, civil servant, government hospitals*

บทคัดย่อ **การกำหนดราคาเบิกจ่ายของยาและผลกระทบต่องบประมาณโรงพยาบาลภาครัฐในปีงบประมาณ ๒๕๕๓**

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ค่าใช้จ่ายสำหรับสวัสดิการรักษาพยาบาลของข้าราชการในประเทศไทยเพิ่มขึ้นอย่างรวดเร็ว การกำหนดราคาอ้างอิง (หรือเพดานเบิกจ่าย) ของยาเป็นกลไกที่สามารถควบคุมค่าใช้จ่ายได้ การศึกษานี้มีวัตถุประสงค์เพื่อนำเสนอราคาอ้างอิง

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ของยาที่มีค่าใช้จ่ายสูงจำนวน ๕ กลุ่ม และประมาณการณ์ผลกระทบต่องบประมาณเมื่อนำราคาอ้างอิงของยามาใช้ เก็บข้อมูลใบสั่งยาจากโรงพยาบาลรัฐจำนวน ๒๘ แห่ง เพื่อประมวลผลการใช้ยาและกำหนดราคาอ้างอิงแบบต่างๆ ของยาแต่ละรายการ จากนั้นจึงประมวลผลกระทบต่องบประมาณเมื่อนำราคายาอ้างอิงมาใช้ใน ๓ ลักษณะ

ผลการศึกษาพบว่าข้าราชการมีใบสั่งยาจำนวน ๑.๗ ล้านใบสั่งคิดเป็นงบประมาณ ๒,๕๐๐ ล้านบาท เมื่อจำแนกตามกลุ่มยา พบว่ามีการใช้ยาร้อยละ ๓๕.๘๖, ๒๖.๒๕, ๑๖.๕๗, ๑๓.๖๘ และ ๓.๕๕ ของใบสั่ง แต่คิดเป็นร้อยละ ๔๔.๖๕, ๒๐.๔๓, ๒๐.๕๘, ๔.๔๗ และ ๘.๘๕ ของงบประมาณในกลุ่ม Statins, Proton Pump Inhibitors (PPI), Angiotensin Receptor Blockers (ARB), Angiotensin-Converting Enzyme Inhibitors (ACEI), และ Bisphosphonates (BIS) ตามลำดับ ยาชื่อการค้าคิดเป็นร้อยละ ๘๔.๘๐ ของงบประมาณ แต่ใช้เพียงร้อยละ ๕๐.๖๐ ของจำนวนใบสั่งยา เมื่อนำราคาอ้างอิงมาใช้ จะประหยัดงบประมาณได้มากที่สุด (ร้อยละ ๕๐.๓๘ ของงบประมาณ) เมื่อมีการแทนยาตามกลุ่มเภสัชวิทยา (เช่น ใช้ราคามัธยฐานของยา Simvastatin สำหรับยา Atorvastatin) ส่วนการแทนที่ด้วยยาชื่อสามัญจะประหยัดงบประมาณได้ร้อยละ ๒๐.๕๖ และจะประหยัดงบประมาณได้ร้อยละ ๑๕.๘๑ - ๑๗.๒๖ เมื่อการเบิกจ่ายด้วยต้นทุนยาบวกด้วยค่าใช้จ่ายในการจ่ายยา (Dispensing fee) ๕๐ และ ๓๐ บาทต่อหนึ่งรายการยา ตามลำดับ

การใช้ยาชื่อการค้าที่มีราคาแพงส่งผลกระทบต่องบประมาณของโรงพยาบาลภาครัฐ การกำหนดราคาอ้างอิงจะส่งเสริมการใช้ยาสามัญ ซึ่งช่วยประหยัดงบประมาณและยังเป็นการสนับสนุนอุตสาหกรรมการผลิตยาในประเทศให้มีความเข้มแข็ง

คำสำคัญ: *ราคาอ้างอิง, ค่าใช้จ่ายด้านยา, ข้าราชการ, โรงพยาบาลรัฐ*

Introduction

Pharmaceutical expenditure is one of the major factors behind the growth of total health care expenditure. In Thailand, total health expenditure (for 65 million people) was 389,625 million baht or 4.3% of Gross Domestic Product (GDP) in 2009.[1] However, total health expenditure for 5-million people under Civil Servant Medical Benefit Scheme (CSMBS) had been increasing rapidly, from about 30,000 million baht in year 2005 to more than 62,000 million baht in 2010.[2] It is more than doubled in just five years. In fiscal year 2009, based on the 10-month prescription records from 34 public hospitals, there was a total of 16.6 million prescriptions, accounting for 15 billion baht expenditure, 66% of which was from 34% utilization of Non-Essential Drug (NED). Among the NEDs, single-source drugs are the contributing factor for the increase in drug expenditure at government hospitals. This study by Limwattananon et al. showed that the following drug groups: Angiotensin II Receptor Blocker (ARBs), single-source statins, clopidogrel, single-source Proton Pump Inhibitors (PPIs), Bisphosphonates and Coxibs had a major impact on overall drug expenditure.[3]

RP is one measure to control drug expenditure[4,5] in several European countries. RP is a maximum reimbursement limit for drug products classified in the same group. Products that treat the same medical condition are clustered together and a calculation is made as a common reimbursed price for all products in the cluster, eg. price of generic Simvastatin for all other statins. RP is not a direct price control mechanism as the pharmaceutical manufacturer is able to set any price for their drug products. However, RP would encourage price competition among drugs in the same cluster. The purpose of reference pricing of fixed reimbursement levels is to control the rise in pharmaceutical expenditure by setting a limit on the

price that health insurance payers will fully reimburse providers. A comprehensive review of reference-pricing literature by Lopez-Casasnovas and Puig-Junoy[4] showed that prices of products covered by reference pricing tended to decrease, leading to reductions in third-party pharmaceutical expenditure. A reduction in drug prices was found ranging from 11% to 26%[5] for different reference drug groups. Price reduction occurred in Germany after patients were switched to drugs listed under the reference price, and thus, avoid additional cost of co-payment.[6]

In Canada, reduction in expenditure for drug in the reference groups (anti-angina, Non-steroid anti-inflammatory, H_2-receptor antagonist, ACEI) was found ranging from -5% to 50%.[7-13] RP also affected drug utilization, Aaserud et al. reported a 60% and 196% increase in use of prescriptions under reference price during the transition period and following the implementation of the RP, compared to the period before the implementation.[5] With the implementation of RP in EU countries, it is expected to increase patient and physician awareness of the prescribed drug's price and increase the probability of the patient being switched to a drug listed under the reference price.[4,6]

With the rapid increase in drug expenditures under the health scheme for government employees as mentioned above, reference price was deemed a measure to reduce the rapid growth rate as there is no RP scheme ever initiated in Thailand. The objective of this study were to determine the RP of five high expenditure drug groups (two anti-hypertensives, anti-ulcer, Bisphosphonate and anti-hyperlipidemia drugs) and estimate the budget impact of RP implementation in public hospitals.

METERIALS AND METHODS

Design

This is retrospective study of drug prices from hospital database.

Data source

There are three sources of drug price data. Two databases are retail drug price from prescription utilization records, one from the National Health Security Office (1 September 2009 to 1 August 2010) and another from 29 public hospitals of CSMBS (1 October 2009 to 31 July 2010). The third is drug purchased cost gathered from Drug and Medical Supplies Information Center (DMSIC, http://dmsic.moph/price/price1.php), an information center under the Ministry of Public Health. At its website, purchased price of drugs that the hospitals reported to DMSIC were available for download.

Study population

Population are prescriptions for oral dosage forms of anti-hyperlipidemia (Statin group), Bisphosphonate, Angiotensin II Receptor Blocker (ARB), Angiotensin Converting Enzyme Inhibitor (ACEI), and Proton Pump Inhibitor (PPI). They are drug groups that accounted for a high proportion of the hospitals' expenditure under CSMBS.[3]

Data collection

Data retrieval

Data were retrieved in the format of Microsoft Excel 2007 from the two utilization databases. Only oral forms of the five drug groups were identified using the Anatomical Therapeutic Chemical (ATC) codes; A02BC for PPI, C09A for ACEI, C09CA for ARB,

C10AA for statins, and M05BA for BIS. Data of prescriptions records consist of hospital code, standard code, trade name, chemical name, dosage form, strength, quantity of drug dispensed and drug retail price per unit (tablet or capsule). For drug cost, the following data are retrieved from DMSIC's website: drug name (chemical name), trade name, strength, dosage form, drug company, minimum price, mode, median, and the time period of price calculation. An addition code was initiated to show the source of drug products as:

- Single source (S), a prototype drug with single manufacturer,
- Original (O), a prototype drug with generic available in Thailand,
- Imported (I) generics, and
- Locally (L)manufactured generics.

Data validation

Retrieved data in Microsoft Excel 2007 data format were checked for consistency. These data were then verified for completeness and accuracy. Duplicated record, which may occur from human key-in error were eliminated. Other errors from different hospitals data format and/or retrieval queries were then modified into correct ones.

Data analysis

Data were analyzed by Stata version 11.0 and Microsoft Excel 2007. Data analysis was divided into two parts. First, descriptive statistics of outpatient drug utilization and unit retail drug price (baht, mean and standard deviation, min, max, p25, p50 and p75) were determined for each drug product. Also determined were prices per defined daily dose (DDD) of each drug product, to be used as the unit reimbursable price of substitution among different drugs in the same cluster. Second is determination of cost savings under different scenarios of RP that is explained below. There are three scenarios of RP.

Scenario I

There is no generic substitution and RP is divided into purchased price or drug cost plus dispensing fee. Cost of drugs was from DMSIC data. However, cost data were not available for some single-source drugs. In these cases, drug cost was determined at 80% of retail price. Dispensing fee covers the administrative cost of drug distribution, purchasing and inventory control, as well as some patient care costs incurred by the pharmacy.[14] There are two dispensing fees, 30 baht and 50 baht per drug item, the former is based the 30-baht for Universal Coverage Scheme while the latter is the actual fee for pharmacy service at government hospitals. In this scenario, the fee is set per drug item, not per prescription.

Scenario II

There is generic substitution (of brand name with generic equivalent product) based on DDD. RP is set as baht/DDD of each drug product. The median price per DDD of generic (L) is the reimbursed drug price for original (O) and imported (I) drugs. Minimum price is set as reimbursable limit for single-source (S) drugs.

Scenario III

Pharmacological substitution (eg. Atorvastatin is substituted by generic Simvastatin) was used in this scenario. Pharmacological substitution is referenced from Franciscan Health System, March 11, 2005.[15]

As the second scenario, the median price per DDD of generic is used as reimbursed price of original (O) and single-source (S) drugs.

In scenario II and III, only 80% of total prescriptions were substituted. The remaining 20% will not be substituted for reasons such as patient preference or allergic to generics or under physician recommendations.

Results

Outpatient drug utilization and expenditure

There were a total of 1,696,976 prescriptions of CSMBS patients for the five drug groups, accounting for 2,498.66 billion baht expenditure (Table 1). It was shown that use of generic prescriptions (L and I, 49.40%) was approximately the same as brand names (O and S, 50.60%), however, total brand drug expenditure was 94.90%. In other words, brand name drugs were 20 times as expensive as generics.

By therapeutic classification, there were 39.96%, 26.25%, 16.57%, 13.68% and 3.55%, of total prescriptions, but 44.65%, 20.43%, 20.59%, 4.47%, and 9.85% of total expenditure for Statin, PPI, ARB, ACEI and BIS respectively (Table 2). The percentages of generic drug (L and I) use were 71.40%, 60.50%, 53.20% among ACEI, PPI, and Statin, but only 14.90% and 1.10% for ARB and BIS respectively, of which single source (S) were the majority of drug use, 49%, and 81.4% respectively.

Cost saving of reimbursed price

For reimbursed drug price in three scenarios, it was found that the cost saving in Scenario I (DF=30), I (DF=50), II and III was 17.26%, 15.91%, 20.55% and 50.39%, respectively. Pharmacological substitution (Scenario III) had the highest percentage of cost saving (Table 2). Across drug groups, Scenario I and III show more consistency in percent saving; whereas there were wide ranges of saving (0.09% for BIS to 31.01% for ARB) in Scenario II.

Discussions

Scenario I (drug cost + dispensing fee) had the lowest level of saving but with the advantage of easy implementation. There was no substitution, so patients get the drug as prescribed by physicians, therefore, treatment of patient is not affected. It is easy for implementation since it would not interfere with the physician-patient relationship. In addition, reimbursement based on drug cost would discourage the use of original and single-source drug because the profit

Table 1 Drug utilization of civil servants during 1 October 2009 to 31 July 2010 by type of manufacturers

Type	Total Prescriptions	%	Total Expenditure, baht	%
L	836,519	49.29	122,563,884	4.91
I	1,912	0.11	4,682,753	0.19
O	344,175	20.28	933,493,012	37.35
S	514,370	30.31	1,437,923,355	57.55
Total	**1,696,976**	**100.0**	**2,498,663,003**	**100.0**

L=generic drug, I=imported generic, O=original drug, S=single source drug

Table 2 Expenditure and cost saving of each drug groups when reimbursed drug price was implemented under three scenarios

Scenario/Expenditure	ACEI	ARB	BIS	PPI	Statin	Total
Total prescriptions	232,065	281,154	60,175	445,434	678,148	1,696,976
% Total prescription	13.68	16.57	3.55	26.25	39.96	100.00
% Generic prescription	71.40	14.90	1.10	60.50	53.20	49.40
Expenditure (baht)	111,676,845	514,582,077	246,131,383	510,516,399	1,115,756,299	2,498,663,003
% Expenditure	4.47	20.59	9.85	20.43	44.65	100.00
Scenario I (Drug cost + Dispensing fee)						
RP Drug cost (baht)	78,450,450	430,870,951	215,110,018	404,419,982	887,918,522	2,016,769,923
30 baht DF						
Total DF (30 baht)	6,961,950	8,434,620	1,805,250	13,363,202	20,344,410	50,909,250
Cost saving (baht)	26,264,445	75,276,506	29,216,115	93,113,236	207,493,363	431,363,664
% Cost saving	23.52	14.63	11.87	18.24	18.60	17.26
50 baht DF						
Total DF (50 baht)	11,603,250	14,057,700	3,008,750	22,271,700	33,907,350	84,848,750
Cost saving	21,623,145	69,653,426	28,012,615	84,204,556	193,930,431	397,424,172
% Cost saving	19.36	13.54	11.38	16.49	17.38	15.91
Scenario II (Generic substitution)						
RP expenditure (baht)						
80% substitution	89,522,789	354,994,790	230,313,010	510,072,859	800,199,716	1,985,103,163
Cost saving (baht)						
Cost saving (80% substitution)	22,154,057	159,587,286	15,818,373	443,540	315,556,584	513,559,840
% Cost saving	19.84	31.01	6.43	0.09	28.28	20.55
Scenario III (Pharmacologic substitution)						
RP expenditure (baht)						
80% substitution	89,522,789	310,408,226	154,969,242	343,107,489	341,505,069	1,239,512,814
Cost saving (baht)						
Cost saving (80% substitution)	22,154,057	204,173,851	91,162,141	167,408,911	774,251,230	1,259,150,190
% Cost saving	19.84	39.68	37.04	32.79	69.39	50.39

margin is not based on drug cost. The present reimbursement of cost + % margin method by the government provides incentives for use of brand name drugs since the providers would get higher drug margin, when compared with generics. In other words, with the same percentage margin, use of high-cost drug would earn higher margin for the providers. Dispensing fee would solve this problem. Another advantage of dispensing fee is to compensate the pharmacist for providing professional services of dispensing drug products. It covers all the administrative costs of purchasing, stocking and distribution of medication to patients. Additional cost of professional services or a profit margin could be added to this fee.

However, the data may not reflect the actual drug cost. If the hospital reports drug cost that exclude price discounts from promotions to DMSIC, drug cost would be overestimated. As a result, the reimbursed price is high and less money saving. Another limitation of the DMSIC drug cost is the completeness of data. DMSIC data report all drug cost in the national essential drug list plus some of Non-essential drugs. Therefore, estimation of other Non-essential drug costs were determined by 20% reduction from retail prices. Another limitation of this scenario is that different dispensing fees for different size of hospitals are needed to reflect the actual administrative costs for providing other professional services such as counseling or patient drug monitoring.

Generic substitution by the median price/DDD of generic for same brand name is set as reimbursed price for Scenario II. The number of generic products in the drug group is an important factor. ACEI, ARB and Statin would save 20-31% of total expenditure since there are several products with generics, whereas PPI and BIS would save much less since there is only one generic but many single-source drugs in each group. The percentage of cost saving will be greater if the number of generic drugs in each group are increased. Use of generic drugs would help the local manufacturing industry.

Pharmacological substitution by the median price/DDD of generics is set as the reimbursed limit in Scenario III. The cost saving of ACEI group is the same as scenario II, because there are several generic drugs in this group and drug utilization of generic drugs are already high. Statin group had the highest cost saving in this scenario (69.39%) because generic Simvastatin can substitute for four of the five drugs (Atorvastatin, Fluvastatin, Pravastatin and Rosuvastatin). When compared with ARB and PPI, ability to substitute is low since there is one generic in each group, only Irbesartan is substituted by generic Losartan in the former and Omeprazole can substitute esomeprazole and pantoprazole in the latter group. There are other single-source drugs with no therapeutic substitution. For BIS, even though ability to substitute is high, but price of the only imported Alendronate is also high, therefore, saving is low (37.04).

Pharmacological substitution is more complicated than generic substitution. It requires clinical evidence for its therapeutic interchangeability among different generics in the same drug cluster, before it can be substituted across different products. Therefore, acceptability among physicians may be low since it would interfere with physician's prescribing preference.

This study shows that the original and single source drug prices are expensive. In addition to the determination of a common reimbursed drug price, there are other cost controls methods that can be used in conjunction with RP such as price negotiation and international price comparison. These measures could lower the purchased price of drugs.

Furthermore, if RP measure is to be sustainable in the long-run, there should be other supportive mechanism for implementation, such as a drug information center to maintain an accurate and up-to-date drug cost or price as well as drug utilization for reimbursement, or an incentive for health care providers to prescribe drugs under the reference price.

The health care providers that promote generic use under RP should be compensated financially so that it would not negatively affect the financial status of the hospitals.

Conclusion

Use of brand name, expensive drugs has burdened the overall expenditures of civil servants of government hospitals in Thailand. Reference price could be a means for cost-containment and it can be done in different ways. RP would encourage generic drug use and thus, help strengthen the local manufacturing drug industry.

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