Pattern of Statins' Utilization at Ramathobodi Hospital, 2005 to 2007

Oraluck Pattanaprateep MBA*, Petcharat Pongcharoensuk PhD*,
Patcharin Suvanakoot MSc**, Sming Kaojarern MD***

** Department of Pharmacy, Faculty of Pharmacy, Mahidol University, Bangkok, Thailand*
*** Pharmacy Division, Ramathibodi Hospital, Mahidol University, Bangkok, Thailand*
**** Department of Medicine, Faculty of Medicine, Ramathibodi Hospital, Mahidol University, Bangkok, Thailand*

Background: *The use of statins at Ramathibodi, a teaching hospital, has been rising rapidly.*
Objective: *Determine how price, volume, and drug mix (use of five brands and one generic) affect expenditure.*
Material and Method: *Dispensing records of the six statins were retrieved from database and analyzed for factors contributing to increased drug expense.*
Results: *Overall, statins' expenditure rose 35.6% and 6.4% in 2006 and 2007 respectively, mainly from civil servant outpatients who are more likely to be prescribed with brand drugs, even among new patients. In all schemes, volume effect was positive, more people use statins, and each one used a larger quantity of drug in 2007 than in 2005. The price effect was negative. Drug mix effect indicated that there was a shift from higher to lower priced drugs in capitation scheme and from lower to higher priced original drugs in a fee-for-service scheme.*
Conclusion: *There is a trend of more statins utilization but with a different pattern of drug prescribed between health schemes and possible drug over-prescribed in some patients. However, indication for statin use was not studied, which needs to be considered. With high use of original drugs, effective policy initiative to promote generic drug use should be implemented in order to efficiently use the limited health care resources.*

Keywords: *Statins, Drug expenditure, Price, Quantity*

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Dyslipidemia is a key independent risk factor for cardiovascular disease (CVD), which was the third cause of death among Thai people between 2005 and 2007, after cancer and accident[1]. The National Cholesterol Education Program (NCEP) reports that dyslipidemia is a major cause of morbidity and mortality of CVD, and statin use is an effective measure to prevent cardiovascular events[2]. For treatment of dyslipidemia, statin drugs accounted for a major sector of the CVD global market, which expanded from $US 21.6 billion in 2002 to 35.2 billion in 2006 and slightly down to 33.7 billion in 2007[3]. Among antilipidemia drugs, statins had the highest share at more than 90%[4,5].

Correspondence to:
Kaojarern S, Department of Medicine, Faculty of Medicine, Ramathibodi Hospital, Mahidol University, Bangkok 10400, Thailand.
Phone: 0-2201-1610
E-mail: raskj@mahidol.ac.th

In Thailand, statins are also the most frequently prescribed drug. In 2006, the Lipid Treatment Assessment Project II (LTAP-II) reported that 64% of hyperlipidemia patients in 48 Thai hospitals were prescribed with statins, followed by fibrate at 25%[6]. Another study in 2005 revealed that 6.6% and 38.5% of diabetic patients were actually taking statins in the regional and teaching hospital; although, according to the American Diabetes Association (ADA) recommendation, almost all patients (96%) in a diabetes population in southern Thailand were candidates for statins treatment[7]. Data between 2005 and 2007 at Ramathibodi Hospital in Thailand showed that statins expenditure was rising 35.6% in 2006 and another 6.4% in 2007. Statins group alone accounted for 6.23, 7.12, and 6.15% of total drug expenditure in 2005, 2006, and 2007, respectively[8].

The increasing expenditure can be decomposed into price and quantity factors by applying economic theory. A simple price and quantity indices are functions that summarize the change in

the prices or quantities of many products from one situation that may be a time period or place to another situation[9].

$$P = \left[\sum_{n=1}^{N} p_n^2 q_n\right] \Big/ \left[\sum_{n=1}^{N} p_n^1 q_n\right]$$

Where P is price index of period or place 2 from 1
p_n is price of product n in period or place 1
p_n is price of product n in period or place 2
q_n is quantity of product n

Several studies in Canada were done to determine the impact of three main economic determinants-price, quantity, and mix of products (use of different brand or generics) on drug expenditure per capita[10-14]. Price index measures change in unit cost of drug or use of generic drugs. Quantity index measures change in population size with drug use in different therapeutic categories, number of prescriptions and day supplies per prescription. Since drugs are not like the ordinary commodities where asymmetric information and imperfect decision-making are all common, mix of products are added to measure different drug products within the same therapeutic or change of drug use among therapeutic groups. Each factor measures the impact of change while holding others constant.

In 2002, Morgan SG modeled the drug expenditures for seniors in British Columbia, Canada, as a function of four determinants: 1) the pattern of patients' exposure to drug treatment of different therapeutic categories, 2) the quantity and type of drugs used from within therapeutic categories, 3) the level of generic drug product selection, and 4) the prices paid for the drug products purchased[10]. Over the period 1985 through 1999, the results revealed that changes in exposure to prescription drug treatment (use of one or more drug from many therapeutic categories), and changes in the types of products prescribed within therapeutic categories, each accounted for about 40% of inflationary pressures per capita. Changes in pharmaceutical prices had about 22% impact on the cost increase. In other words, the majority of increase in drug expenditure was a result of more people needing more drug treatment.

In another study, Morgan SG measured the changes in per capita expenditures on four oral solid prescription drugs-cardiovascular, cholesterol agents, psychotherapeutic, gastrointestinal and arthritis, during 1998 to 2002[11]. The decomposition of changes in drug cost was attributed to six determinants that fall into three board categories: volume effects, price effects, and therapeutic choices. There are 1) prescription volume, 2) prescription size, 3) price changes, 4) generic use, 5) therapeutic mix, and 6) drug mix within each therapeutic category. The study found that total per capita expenditures on oral solid drugs increased almost three times of the gross domestic product over the period. Volume effects had the largest impact, 44% increase from prescription volume and 4% from prescription size. Therapeutic choices were 15% from therapeutic mix and 4% from drug mix. The least impact was from price effects, 2% from price changes and -4% from generic use. Cardiovascular drugs were the leading category of treatment, with cholesterol agents the fastest growing treatment category; per capita spending on cholesterol agents almost doubled between 1998 and 2002.

Another study by Morgan SG in 2005[12] aimed to find magnitude and determinants of change in per capita expenditure on oral solid prescription drugs among Canadian provinces between 1998 and 2004. The study revealed that in most provinces, per capita expenditures grew at a rate of over 10% per year, which was faster than economic growth over the same period. This rapid expenditure growth was a result of increased utilization of drugs and a trend towards prescribing higher cost drugs over time. Price changes had little impact on drug spending in all provinces.

In 2006, NPDUIS or National Prescription Drug Utilization Information System introduced price and quantity indices in their report[13], using claims database from 2000-2001 to 2003-2004 in Canada. In four therapeutic categories - drugs for acid-related disorders, serum lipid reading agents, psychoanaleptics, and agents acting on the rennin-angiotensin system; the overall changes in price levels were small, ranging from -3.7% to 1.3%. Quantity levels, however, increased significantly for all drugs, from 36.8% to 67.6%. There was also the general trend of small changes in price indices and positive and significantly increases in the quantity indices in each of the four drug groups.

The present study_aimed to determine how price, volume, and drug mix affect statins utilization at Ramathibodi Hospital during fiscal year 2005-2007. The information will help the administration understand trends and effect of policy to drug utilization in the hospital.

Material and Method

The present study was approved by the ethics committee on April 17, 2008. Based on statins'

Table 1. Statins available at Ramathibodi Hospital

Name	Type	DDD mg*
Atorvastatin calcium	Original	10
Fluvastatin	Original	40
Pravastatin sodium	Original	20
Rosuvastatin	Original	10
Simvastatin	Original	15
Simvastatin	Generic	15

* Defined daily dose (DDD) is the estimated average daily adult maintenance dose for a drug when used for its main indication. The official DDD is determined by the WHO Collaborating Centre for Drug Statistics Methodology, Oslo, Norway

list in the hospital formulary (Table 1), data of drug prescribing for fiscal year 2005 to 2007 and health scheme of patients were retrieved from the hospital database in the format of Microsoft Visual Fox Pro 9.0. Retrieved data was imported to Microsoft Access 2007 and analyzed by Microsoft Access 2007 and Excel 2007. Data were then cleaned for any duplication and validated with hospital manual records. All patients' hospital number (HN) with at least one statins prescription was identified. Based on the HNs, drug utilization data from outpatient and inpatient module were combined. Drug quantity was calculated as defined daily dose (DDD)[15] by this formula: (strength in milligram) x (unit of drug dispensed)/(DDD). DDD is a standard measurement of unit of utilization in many countries in Europe and Canada to assess and validate statins' utilization data[16-21]. Drug expenditure was adjusted to 2005 Baht by consumer price index for medical care from the Bureau of Trade and Economic Indices, the Ministry of Commerce[22].

To classify unidentified health scheme in fiscal year 2005 and 2006, each patient's health scheme was updated to the latest one registered during the present study period. For example, if the patient is under civil servant medical benefit scheme (CSMBS) in 2007 and self-pay in previous year, he/she will be put under CSMBS for all three years.

Drug utilization is analyzed in terms of change in statins' expenditure and DDD per capita by health scheme-universal coverage (UC), social security scheme (SSS), civil servants medical benefit scheme (CSMBS), and self-pay. In addition, patients with high utilization or outliers, defined as more than three standard deviations from the mean of issued DDD per year, are identified. The authors then decompose the increase (or decrease) in statins' expenditure into four components; volume, price, drug mix, and cross effect using the follow equation.

$$\frac{\text{Volume effect + Price effect + Drug mix + Cross effect}}{\text{Total statins expenditure in last year – total statins expenditure in first year}} = 100\%$$

Volume effect is the sum of number of patients and number of DDD per capita.

- Number of patients = $\Sigma^a(C_f \times D_f \times (N_l - N_f))$
- Number of DDD per capita = $\Sigma^a(C_f \times (D_l - D_f) \times N_f)$

Price effect is the sum of price change and generic use.

- Price change = $\Sigma^o((C_l - C_f) \times D_f \times N_f)$
- Generic use = $\Sigma^g((C_l - C_f) \times D_f \times N_f)$

Drug mix is change in use of different drug

$$= \Sigma^a((C_f - C_{avg,f}) \times (D_l - D_f) \times (N_l - N_f))$$

Cross effect is the product of the three factors

$$= \Sigma^a((C_l - C_f) \times (D_l - D_f) \times (N_l - N_f))$$

Where C is Price/DDD (baht); D is DDD/capita; and N is No of patient; C_{avg} is average original drug price/DDD; Σ^a is summation of all drugs; Σ^o is summation of original drugs; Σ^g is summation of generic drugs; $_f$ is first year (2005); and $_l$ is last year (2007).

The sum of these effects equals 100%. That is all of the increase (decrease) in drug expenditure can be categorized into one of these effects. Decomposition of the change in drug expenditure for various schemes revealed the expected signs (positive or negative) and magnitude of the effects.

Results

Trend of statins' expenditure

Table 2 shows that more people are getting statins, total number of patients grew by 20% in 2006 and another 10% in 2007; almost half of them are self-pay. Overall, antilipidemia drugs at Ramathibodi Hospital accounted for 7.2, 8.3, and 7.5% of total drug expenditure in 2005, 2006, and 2007 respectively. Statins were the main drug group, accounted for 86.9, 86.0, and 81.9% among antilipidemia drugs respectively. Almost all expenditure is for the outpatient sector, which increased by 35.8 and 6.7% in 2006 and 2007. For quantity of drug use measured in DDD, growth rate was high in both 2006 (25.8%) and 2007 (14.1%).

By health scheme, patients under fee-for-service (CSMBS and self-pay) accounted for almost all statins expenditure with an increasing trend during 2005 and 2007 (Table 2, Fig. 1), whereas patients under capitation (UC and SSS) accounted for 3.3% in 2005 but down to 2.5% in 2007, even though the proportion of these patients were stable, 7.9 and 7.7% in 2005 and 2007 respectively (Table 1). By source of manufacturing,

Table 2. Statins' expenditure (in 2005 Baht) and quantity (as DDD, defined daily dose) by service, and health scheme

	2005	2006	% change in 2006	2007	% change in 2007
Number of patients (% to total)					
UC	1,220 (3.8)	1,496 (3.9)	22.6	1,747 (4.1)	16.8
SSS	1,310 (4.1)	1,391 (3.7)	6.2	1,532 (3.6)	10.1
CSMBS	12,106 (38.2)	15,124 (39.8)	24.9	18,084 (42.9)	19.6
Self-pay	17,088 (53.9)	19,964 (52.6)	16.8	20,827 (49.4)	4.3
Number of visit (% to total)					
UC	11,395 (4.3)	13,120 (4.6)	15.1	13,805 (4.8)	5.2
SSS	13,654 (5.2)	14,493 (5.1)	6.1	14,739 (5.1)	1.7
CSMBS	117,094 (44.4)	130,529 (46.1)	11.5	142,309 (49.7)	9.0
Self-pay	121,571 (46.1)	125,235 (44.2)	3.0	115,697 (40.4)	-7.6
Expenditure (in 2005 Baht)					
Antilipidemia drugs	145,402,175	199,285,681	37.1	222,820,635	11.8
Statins' expenditure by scheme, Baht	126,410,125	171,443,147	35.6	182,463,106	6.4
UC	1,707,967	2,310,719	35.3	2,030,115	-12.1
SSS	2,422,165	3,109,349	28.4	2,470,570	-20.5
CSMBS	63,749,784	90,279,900	41.6	105,842,337	17.2
Self-pay	58,530,209	75,743,178	29.4	72,120,084	-4.8
Quantity, DDD	9,044,259	11,378,788	25.8	12,984,435	14.1
By service					
Inpatient	1,338,695	1,591,235	18.9	1,301,544	-18.2
Outpatient	125,071,430	169,851,912	35.8	181,161,562	6.7

UC = universal coverage, SSS = social security scheme, CSMBS = civil servants medical benefit scheme

Table 3. Average cost per capita, number of patients, average DDDs per capita, and average cost per DDD (in 2005 Baht) by health scheme in 2005 and 2007

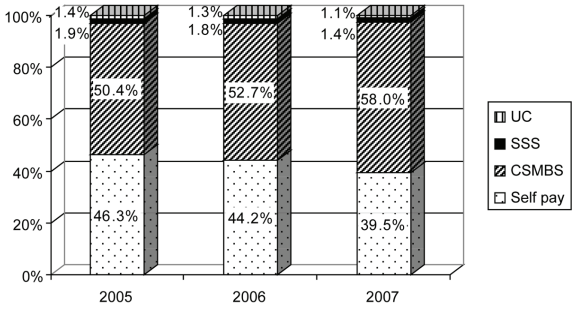
	2005				2007			
	Average cost per capita, baht	No. of patients	Average DDD per capita	Average cost per DDD, baht	Average cost per capita, baht	No. of patients	Average DDD per capita	Average cost per DDD, baht
UC	1,400.0	1,220	303.5	4.6	1,162.1	1,747	304.2	3.8
SSS	1,849.0	1,310	300.3	6.2	1,612.6	1,532	343.8	4.7
CSMBS	5,266.0	12,106	318.8	16.5	5,852.8	18,084	341.1	17.2
Self-pay	3,425.2	17,088	258.7	13.2	3,462.8	20,827	276.4	12.5
Total	3,984.7	31,724	285.1	14.0	4,324.8	42,190	307.8	14.1

DDD = defined daily dose, UC = universal coverage, SSS = social security scheme, CSMBS = civil servants medical benefit scheme

original drug use keep increasing, both in monetary terms and by quantity. For expenditures, original, or brand drug accounted for 84.5% in 2005 and increased to 93.7% two years later (Fig. 2). By contrast, Fig. 3 shows that quantity of generic drug use accounted for about two-thirds but with a decreasing trend, for both quantity and price. This is because of the declined price of only one generic Simvastatin, from the average 3.30 baht per DDD in 2005 to 3.26 baht in 2006 and 1.47 baht in 2007.

Decomposition of increased expenditure

Table 3 shows that not only the number of patients has increased, but also the average DDD per



UC = universal coverage, SSS = social security scheme, CSMBS = civil servants medical benefit scheme

Fig. 1 Statins' expenditure by health scheme, 2005-2007

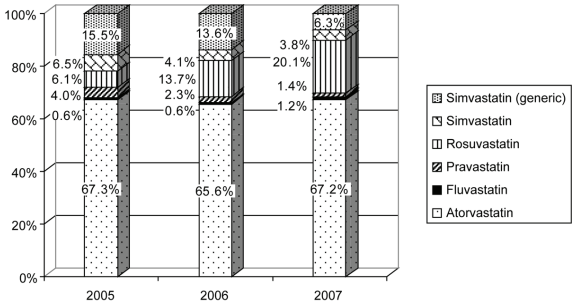


Fig. 2 Proportion of statins' expenditure (baht) by drug product, 2005-2007

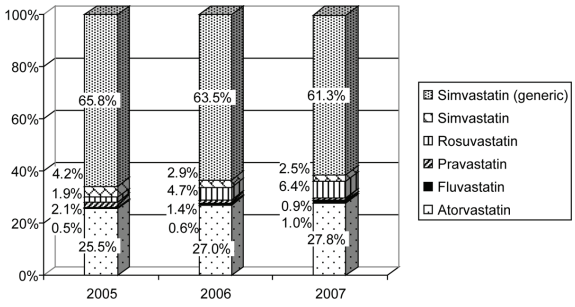


Fig. 3 Proportion of statins' quantity (defined daily dose, DDD), 2005-2007

capita in all schemes, except for patients under UC. For expenditure per capita, patients under capitation (UC and SSS) had lower expense, 1,400.0 and 1,849.0 baht in 2005 and decreased to 1,162.1 and 1,612.6 baht in 2007, which is the result of lower drug cost. Patients under fee-for-service scheme (CSMBS and self-pay), not only had the higher expenses at average 2 to 4 times of those under capitation, but the gap was also wider since their expense tended to increase. In addition, trend of average cost per DDD had fallen down in 2007, except CSMBS where its average cost per DDD increased from 16.5 in 2005 to 17.2 baht in 2007. This price differential in average cost/DDD indicates that patients under fee-for-service schemes are more likely to get brand drugs, and capitation schemes, generics.

The unusually high issued DDD among patients (or outliers) is shown in Table 4. The outlier average expense per capita is 2-3 times the average patients had in each scheme.

Table 5 shows percentage of the effect of volume, price, drug mix, and cross effect to change of statins' expenditure from 2005 to 2007 in each scheme. All effects add up to 100%. All schemes has the high positive impact from number of patients, followed by number of DDD per capita, except SSS where the higher impact was from number of DDD per capita. Price effect was near zero for UC but negative (range of -9.9 to -70.0%) for others, while generic use has a negative effect in all schemes, indicating the sharp fall of generic drug price. Drug mix effect was varied, which indicated that there has been a shift from higher to lower priced drugs in capitation scheme (-7.8 and -52.8 for UC and SSS respectively), and a shift from lower to higher priced original drugs in fee-for-service scheme (5.5 and 6.9 for CSMBS and self-pay respectively).

Discussion

Statins utilization in this Thai teaching hospital tends to be rising rapidly for two reasons, more people are prescribed with the drugs and each patient receive a larger quantity, measured in DDDs. This indicates that more patients are diagnosed with cardiovascular diseases, similar to the study in Canada[11-13] and some patients may require a higher dose of drug in 2007 to better control the symptoms. Another explanation is that disease guidelines also became stricter, with a trend of lower LDL target level, leading to more drug utilization. Furthermore, recently, Rosuvastatin was approved by the US FDA in 2007 as an adjunct to diet to slow the progression of atherosclerosis in patients with elevated cholesterol[23]. These, as a result, expand the use of statins for patients. From another perspective, increase in number of patients and number of DDD per capita basically indicate more CVD risk in Thai people. People are not taking good care of their health. From the report of the Ministry of Public Health, 75-80% of Thai adults did not eat enough fiber, 20-24% did not exercise routinely, 2-17% drink alcohol, and 2-46% smoked cigarettes[24].

Table 4. Number of outliers** for statins' issued DDD, its average issued DDD per capita, and average expense, 2005 and 2007

	2005				2007			
	No. of patients	Percent to total patients	Average issued DDD per capita	Average cost per capita, baht	No. of patients	Percent to total patients	Average issued DDD per capita	Average cost per capita, baht
UC	197	16.1%	850.0	3,437.4	262	15.0%	852.8	2,886.3
SSS	176	13.4%	876.8	5,169.5	270	17.6%	846.2	3,701.6
CSMBS	1,721	14.2%	868.0	12,716.5	2,818	15.6%	873.5	12,626.0
Self-pay	1,596	9.3%	848.0	9,300.1	2,105	10.1%	836.8	8,358.9

DDD = defined daily dose, UC = universal coverage, SSS = social security scheme, CSMBS = civil servants medical benefit scheme

** Outlier is annual statins issued DDD per capita per year of more than 3 standard deviations from mean

Table 5. Percent decomposition of statins' expenditure by health scheme of different effects from 2005 to 2007

	Volume effect		Price effect		Drug mix	Cross effect
	No. of patients	No. of DDD per capita	Price change	Generic use		
UC	197.6	36.4	1.2	-133.3	-7.8	6.0
SSS	274.0	363.7	-70.0	-414.7	-52.8	-0.2
CSMBS	91.1	24.1	-9.9	-9.9	5.5	-0.8
Self-pay	93.6	64.3	-24.2	-40.2	6.9	-0.4
Total	89.9	39.1	-14.2	-19.9	5.8	-0.8

DDD = defined daily dose, UC = universal coverage, SSS = social security scheme, CSMBS = civil servants medical benefit scheme

However, for drug choices, it is evident (in average drug price /DDD) that there is different drug use among patients with fee-for-service and those with capitation. Although generic drugs are available, physicians tend to prescribe brand drugs, particularly for patients under fee-for-service.

With the rapid rise in drug expenditure, many policies and regulations were implemented in the hospital to control use of original drugs, but they are not quite effective for fee-for-service schemes, since more brands are used, as evidenced in Rosuvastatin, the market grew rapidly from 6.1% in 2005 to 20.1% of total statin expense in 2007. In June 2007, the hospital launched a policy-therapeutic interchange - to motivate physician to prescribe generic Simvastatin for other originals, in addition to generic substitution policy, which was launched in the hospital since the availability of generic Simvastatin. Moreover, patients under capitation who needed to be prescribed with originals had to be evaluated for its necessity first. This policy is effective for patients under capitation since more patients are prescribed with generic (Table 5).

In addition, irrational drug use may be a problem since new patients who start using statins in 2006 or 2007, but not in 2005 were given higher priced Atorvastatin or Rosuvastatin instead of generic Simvastatin as indicated by the Essential Drug policy. From the study at another teaching hospital in 2002[25], among 40% of 490 patients who took statins, diet control was attempted in only 22.5% of these patients prior to initiation of statins, and based on NCEP II guideline, 39.6% has received statins appropriately. It is a limitation of the present study, not taking into consideration patients' diagnoses and guidelines of statin, which is an important factor for rational drug use.

The increasing trend of statins use may be explained in part by the direct reimbursement policy, which provides civil servants with easier access to more statins from outpatient service without any advance payment. Moreover, part of the increase in drug expenditure may also be due to oversupply as indicated by higher DDD per capita (Table 4). This oversupply could be a problem for chronic medications when patients have regular physician visits. In another study by Sripathomsawatdi O[26] at the same hospital, it is revealed that refill clinic for patient with chronic diseases can save drug cost by 419,214.48 baht after one-year implementation. The savings were mainly from physician's overprescribed drug (more than hospital's guideline) and 30.27% of them were for drugs in cardiovascular and hematopoietic system. Oversupplied drug may also come from drug fraud, a loophole of direct reimbursement policy for civil servants[27], some of whom have been indicted by the government. Some of the outliers or patients with unusually high drug cost (Table 4) may be from drug fraud. This group of patients is increasing and their drug costs are several time the average patients had.

Another limitation of the present study is classification of patient's health scheme, particularly self-pay, which accounted for almost half of all patients. Some of these may actually be civil servants who are not yet registered for direct reimbursement. People who pay out of their own pocket may prefer drug choices.

However, more study would be recommended to determine if statins drug use is done according to standard guidelines, effect of civil servants direct reimbursement policy, lower LDL target level on statins utilization, and outcomes of drug used. Since the majority of drug expenditure were for brand drugs with generic available, thus, if generic substitution or therapeutic substitution were put in place without compromising for quality of care, a sizable saving would be resulted. This would make more efficient use of limited health resources. Clinical outcomes should also be taken into account, this is to determine the effectiveness of drug treatment that would restrict the use of high drug price for those who deem necessary.

Conclusion

The present study found that quantity effect of more patients who use larger quantity of drugs is the major contributing factor for increased statin expense. However, price effect and generic use had a negative impact on drug expenditure. Over time, there tends to be a different pattern of drug use for patients with capitation and those under fee-for-service.

This present study demonstrated not only trends of statins prescribed in a Thai teaching hospital, but also show what factors are leading to higher drug expense, especially use of original brand drugs. This would provide hospital administrators with evidence for policy initiation to counteract the rising drug costs. For the national policy makers, incentives should be provided for prescribers to use more generics without compromising for quality of care and patients' outcomes.

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รูปแบบการใช้ยากลุ่ม statins ในโรงพยาบาลรามาธิบดี, พ.ศ. 2548-2550

อรลักษณ์ พัฒนาประทีป, เพชรรัตน์ พงษ์เจริญสุข, พัชรินทร์ สุวรรณกูฏ, สมิง เก่าเจริญ

มีการใช้ยากลุ่ม statins เพิ่มขึ้นอย่างรวดเร็วในโรงพยาบาลรามาธิบดี ซึ่งเป็นโรงเรียนแพทย์ การศึกษานี้ประเมินปัจจัยด้านราคา, ปริมาณ, และส่วนผสมของการเลือกใช้ยา (จากยาต้นแบบ 5 ชนิด และยาสามัญ 1 ชนิด) ที่มีต่อค่าใช้จ่ายยา เก็บข้อมูลจากฐานข้อมูลใบสั่งยาลดไขมันทั้ง 6 ชนิด และนำมาวิเคราะห์หาปัจจัยที่ส่งผลต่อการเพิ่มของค่าใช้จ่ายด้านยาโดยรวมเพิ่มขึ้นร้อยละ 35.6 และ 6.4 ในปี พ.ศ. 2549 และ พ.ศ. 2550 ตามลำดับ อันเป็นผลมาจากผู้ป่วยสิทธิข้าราชการเป็นหลัก ซึ่งมีโอกาสได้รับต้นแบบสูง แม้ในผู้ป่วยรายใหม่ เมื่อรวมทุกสิทธิปัจจัยด้านปริมาณส่งผลบวกต่อค่าใช้จ่ายเนื่องจากจำนวนผู้ได้รับยา และจำนวนยาที่จ่ายต่อคนเพิ่มขึ้น ขณะที่ปัจจัยด้านราคาส่งผลด้านลบ ส่วนปัจจัยการเลือกใช้ยาพบว่าในกลุ่มผู้ป่วยเหมาจ่ายรายต่อหัว มีการเปลี่ยนไปใช้ยาราคาต่ำลง ขณะที่ในกลุ่มผู้ป่วยจ่ายตามบริการจริง มีการเปลี่ยนไปใช้ยาที่มีราคาสูงขึ้น โดยสรุปการใช้ยากลุ่ม statins มีแนวโน้มสูงขึ้น โดยมีรูปแบบที่ต่างกันระหว่างผู้ป่วยต่างสิทธิ และยังอาจมีผู้ป่วยบางกลุ่มที่ได้รับยามากเกินควร การศึกษานี้มีข้อจำกัดเนื่องจากไม่ได้พิจารณาข้อบ่งชี้ของการใช้ยาลดไขมันกลุ่มนี้ซึ่งเป็นปัจจัยที่สำคัญด้วยเหตุที่มีการใช้ยาต้นแบบอยู่มาก ดังนั้นนโยบายที่มีประสิทธิภาพเพื่อส่งเสริมการใช้ยาสามัญ จึงมีความสำคัญในการควบคุมการใช้ทรัพยากรสุขภาพอันจำกัด