

Expenditures on High-cost Drugs and the Difference in Their Use under Various Health Insurance Schemes in a Regional Hospital in North-Eastern Thailand

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Abstract

Background: Essential drugs in Subclass 4 are high-cost drugs (HCDs). Their use was an important factor in influencing pharmaceutical expenditure. Exploring drug items, extent of their use, and the difference in their use among health insurance schemes would provide in-depth understanding of the efficiency and equity of their use. The objectives of this study were to identify items of HCDs, to assess their impact on pharmaceutical expenditure, and to explore HCD users classified by age and type of health insurance schemes.

Methods: Retrospective data on overall drug expenditure including the top 10 HCDs in Subclass 4 of the Essential Drug List in three fiscal year (2003-2005) were obtained from the Hospital Inventory Database. Drug use data of the top 10 HCDs in 2005 were obtained from the Dispensing Database. The rates of the top 10 HCD use per 1,000 patients were classified by age and health insurance scheme, including the Universal Coverage Scheme (UC), Civil Servants Medical Benefit Scheme (CSMBS), and Social Security Scheme (SSS), and compared.

Results: In the three consecutive years, the six HCDs most highly used were human erythropoietin 4000 u. inj., atorvastatin 10 mg tab., meropenem 1g inj, imipenem/cilastatin 500 mg/vial IV, cefoperazone/salbactam 1g inj and clopidogrel 75 mg tab. The top 10 HCDs used in the hospital consumed 45.6 million, 50.5 million, and 68.8 million baht in 2003, 2004 and 2005 respectively. Expenditures on erythropoietin 4000 u., atorvastatin 10 mg., clopidogrel 75 mg and meropenem inj. 1g increased every year. In 2005, 63.8 percent or 46.8 million baht of the expenditure of the top 10 HCDs was on CSMBS. These items were the drugs used for chronic diseases: erythropoietin, atorvastatin, clopidogrel. and mycophenolate. HCD spending in UC was 32.3 percent or 23.6 million baht, but it was only 1 percent in SSS. In UC, the drug items mainly used were anti-infectious drugs, including meropenem, imipenem/cilastatin and cefoperazone/salbactam. The rate of use of atorvastatin and clopidogrel per 1,000 patients in the aging group in CSMBS were 20.08 and 6.47 respectively. In UC, they were only 0.05 and 1.45 respectively. The rate of use of meropenem per 1,000 patients in every age group in UC was greater than in CSMBS.

Discussion: The impact of HCD use on pharmaceutical expenditure is quite high since only 10 HCDs account for 18-20 percent of overall pharmaceutical expenditure. There is a difference in HCD use based on the insurance schemes. Further studies should be focused on the evaluation of HCD use, effective measures to control HCD use, and methods to balance equity of HCD access among health insurance schemes.

Key words: high cost drug, health insurance, expenditure

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บทคัดย่อ รายงานของยาที่มีค่าใช้จ่ายสูงและความแตกต่างของการใช้ยาเหล่านี้ในระบบประกันสุขภาพประเภทต่างๆภายในโรงพยาบาลศูนย์แห่งหนึ่งในภาคตะวันออกเฉียงเหนือ, ประเทศไทย

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ยาในบัญชียาหลักแห่งชาติบัญชี ง. เป็นยาที่มีค่าใช้จ่ายสูง. การใช้ยาเหล่านี้เป็นปัจจัยสำคัญที่มีผลต่อค่าใช้จ่ายด้านยาในภาพรวม. การสืบค้นรายการยา, ปริมาณการใช้และความแตกต่างของการใช้ยาเหล่านี้ในระบบประกันสุขภาพต่าง ๆ จะทำให้เกิดความเข้าใจอย่างลึกซึ้งเกี่ยวกับประสิทธิภาพและความเท่าเทียมในการใช้ยา. การศึกษานี้มีวัตถุประสงค์เพื่อค้นหารายการยาที่มีค่าใช้จ่ายสูง ประเมินผลกระทบของยาที่มีค่าใช้จ่ายสูงต่อรายจ่ายด้านยาโดยรวม และค้นหาผู้ป่วยที่ใช้ยาที่มีค่าใช้จ่ายสูงโดยจำแนกตามกลุ่มอายุของผู้ป่วยและประเภทต่าง ๆ ของระบบประกันสุขภาพ.

ได้ทำการศึกษาข้อมูลด้านค่าใช้จ่ายโดยรวมของรายการยาในบัญชี ง ๑๐ อันดับแรกจากการเก็บข้อมูลย้อนหลัง ๓ ปีงบประมาณ (๒๕๔๖ - ๒๕๔๘) จากฐานข้อมูลคลังเวชภัณฑ์. ข้อมูลการใช้ยาในปี ๒๕๔๘ เก็บจากฐานข้อมูลการจ่ายยา. เปรียบเทียบอัตราการใช้ยาที่มีค่าใช้จ่ายสูง ๑๐ อันดับแรกระหว่างกลุ่มอายุต่างๆและเปรียบเทียบอัตราใช้ยาดังกล่าวระหว่างประเภทของระบบประกันสุขภาพต่าง ๆ ซึ่งประกอบด้วยระบบหลักประกันสุขภาพถ้วนหน้า ระบบสวัสดิการรักษายาพยาบาลข้าราชการและระบบประกันสังคม.

จากการศึกษาพบว่ายาที่มีค่าใช้จ่ายสูง ๖ รายการคือยาฉีด human erythropoietin ๔,๐๐๐ ยูนิต ยาเม็ด atorvastatin ๑๐ มก. ยาฉีด meropenem ๑ ก. ยาฉีด imipenem/cilastatin ๕๐๐ มก. ยาฉีด cefoperazone/salbactam ๑ ก. และยาเม็ด clopidogrel ๗๕ มก. เป็นยาที่มีการใช้สูงในทั้ง ๓ ปีงบประมาณ รายงานของยาที่มีค่าใช้จ่ายสูง ๑๐ อันดับแรกของโรงพยาบาลคิดเป็นมูลค่า ๔๕.๖, ๕๐.๕ และ ๖๘.๘ ล้านบาทในปี ๒๕๔๖, ๒๕๔๗ และ ๒๕๔๘ ตามลำดับ. รายงานของยาฉีด erythropoietin ๔,๐๐๐ ยูนิต ยาเม็ด atorvastatin ๑๐ มก. ยาเม็ด clopidogrel ๗๕ มก. ยาฉีด meropenem ๑ ก. เพิ่มขึ้นทุกปี. ใน พ.ศ. ๒๕๔๘ รายงานของยาที่มีค่าใช้จ่ายสูง ๑๐ อันดับแรกใช้ยาในระบบสวัสดิการรักษายาพยาบาลข้าราชการคิดเป็นร้อยละ ๖๑.๘ หรือ ๔๖.๘ ล้านบาท ซึ่งส่วนใหญ่เป็นรายการยาที่ใช้ในโรคเรื้อรังประกอบด้วยยาฉีด erythropoietin ยาเม็ด atorvastatin ยาเม็ด clopidogrel และยา mycophenolate. รายงานของยาค่าใช้จ่ายสูงในระบบหลักประกันสุขภาพถ้วนหน้าคิดเป็นร้อยละ ๓๒.๓ หรือ ๒๑.๖ ล้านบาท และในสวัสดิการประกันสังคมเพียงร้อยละ ๑. ยาที่มีค่าใช้จ่ายสูงที่ใช้ในระบบหลักประกันสุขภาพถ้วนหน้าส่วนใหญ่เป็นยาต้านการติดเชื้อประกอบด้วย ยาฉีด meropenem imipenem/cilastatin cefoperazone/salbactam. อัตราผู้ป่วยที่มีการใช้ยา atorvastatin และยา clopidogrel ในกลุ่มผู้สูงอายุในสวัสดิการรักษายาพยาบาลข้าราชการคือ ๒๐.๘ และ ๖.๔๗ ต่อผู้ป่วย ๑,๐๐๐ รายตามลำดับ. ขณะที่ในระบบหลักประกันสุขภาพถ้วนหน้ามีเพียง ๐.๐๕ และ ๑.๔๕ ต่อผู้ป่วย ๑,๐๐๐ รายตามลำดับ. ผู้ป่วยที่ใช้ยา meropenem ทุกกลุ่มอายุในระบบหลักประกันสุขภาพถ้วนหน้ามีอัตราสูงกว่าในระบบสวัสดิการรักษายาพยาบาลข้าราชการ.

วิจารณ์: การใช้ยาที่มีค่าใช้จ่ายสูงมีผลกระทบต่อรายจ่ายด้านยาค่อนข้างสูง เพราะยาที่มีค่าใช้จ่ายสูงเพียง ๑๐ รายการทำให้เกิดรายจ่ายคิดเป็นร้อยละ ๑๘-๒๐ ของรายจ่ายด้านยาโดยรวม. การใช้ยามีความแตกต่างกันระหว่างระบบประกันสุขภาพประเภทต่าง ๆ. ในการวิจัยต่อไปควรเน้นการประเมินผลการใช้ยาที่มีค่าใช้จ่ายสูง มาตรการการควบคุมการใช้ยาที่มีค่าใช้จ่ายสูงที่มีประสิทธิภาพ และวิธีการที่จะทำให้เกิดความเท่าเทียมกันระหว่างระบบประกันสุขภาพประเภทต่าง ๆ ในการเข้าถึงยาที่มีมูลค่าสูง.

คำสำคัญ: ยาที่มีค่าใช้จ่ายสูง, ระบบประกันสุขภาพ, รายงานจ่าย

Introduction

The very rapid growth of pharmaceutical expenditure is a major problem in many countries. In Thailand it was found that the proportion of drug expenditure in 1998 was 29.2 percent of total health

expenditures, which was very high when compared with developed countries where the proportion of drug expenditures was only 10-22 percent of total health expenditure.⁽¹⁾ The growth rate of drug expenditure has grown in the same direction as the growth rates



of health expenditure and economics. It was found that the highest average growth rate of pharmaceutical expenditure was 6.95 percent, which is higher than the average economic growth rate (6.22%) but lower than the average health expenditure growth rate (9.23%).⁽¹⁾

Use of high-cost drugs, both essential and non-essential new drugs, is one of the most important factor affecting the increasing rate of pharmaceutical expenditure in both price and drug utilization. A study by the National Institute for Health Care Management Research and Educational Foundation reported that the increase in drug expenditure (15-18% per year in the United States of America) resulted from new drug consumption (65%): 42 percent of that amount caused by the increasing prices for new drugs and 23 percent owing to increasing use of new drugs.⁽¹⁾ Excessive pharmaceutical expenditure can be caused by inappropriate high-cost drug use. A study showed that the cost of inappropriate use of coxibs in patient at low risk of gastrointestinal effects was 2.4 million baht per year.⁽²⁾ To control high-cost drug use, the monitoring and evaluation of high-cost drug use policies has been implemented in many countries. However, there are still some gaps related to the effectiveness of high-cost drug use. The study of high-cost drugs for individual patient use (IPU) showed that there were no explicit criteria for IPU approvals; 67.1 percent of the IPU approvals were for off-label indications. Requested feedback on clinical outcome was provided in only 18 percent of cases. In addition, the proportion of the drug expenditure on IPU drugs increased significantly ($p < 0.001$) from 1.6 percent in 1999 to 3.6 percent in 2001.⁽³⁾ Consistent with this result, a Manitoba study reported that high-cost drugs were prescribed with both clear and unclear explanations. Some patients were prescribed high-cost drugs because the primary drugs were not effective.

However, some patients, mainly in fee-for-service payment schemes, were prescribed these drugs without clear clinical reasons.⁽⁴⁾ In Thailand, there were some studies about the irrational use of high-cost drugs. One study showed that the patients who get reimbursed for the drugs tend to be over prescribed high-cost drugs, such as COX-2 inhibitors together with misoprostol (which is not necessary if COX-2 inhibitors were prescribed); meanwhile, misoprostol was not prescribed in a group of patients paying out of pocket who had received NSAIDs, which may cause a higher risk of adverse drug reaction in the gastrointestinal tract than COX-2 inhibitors.⁽⁵⁾ The use of high-cost essential Subclass 4 drugs studied in three hospitals revealed that outpatients diagnosed with the same disease as others but who were in the Civil Servants Medical Benefit Scheme (CSMBS) and Social Security Scheme (SSS) received erythropoietin much more frequently than patients treated on the Low-income Card in all hospitals.⁽⁶⁾ These results lead to the question of whether all patients could access HCD.

Although there have been some studies on the impact of some high-cost drug use on pharmaceutical expenditures in Thailand, no study has been conducted on the effect of high-cost drug use on overall pharmaceutical expenditures. A few studies on access to essential high-cost drugs among UC patients have been undertaken. Therefore, it would be useful for policy makers to conduct a preliminary study of the impact of HCD use on pharmaceutical expenditures and the difference in HCD use in various health insurance schemes in a regional hospital. Such a study would be useful in the formulation of drug financing plans and to enable management to improve efficiency and equity in the quality of care being afforded to patients. The aims of this study are to identify the main HCD items in the hospital assess their impact

on pharmaceutical expenditure and explore HCD users classified by age and type of health insurance.

(Note: HCD are defined as the essential drugs in Sub-class 4 contained in the National List of essential medicines 2004, Thailand)

Method

This retrospective study was conducted at a 1,000-bed tertiary-care regional hospital in the North-eastern part of Thailand. The Hospital Inventory Database and Dispensing Databases of the Pharmacy Department were the sources of the data. Overall drug expenditures, including that on the top 10 HCD in three fiscal years (2003-2005), were obtained from the Hospital Inventory Database. All of these data for each drug were reviewed; generic drug names, drug strength, dosage form, the quantity of drug use and its cost were reviewed. Data on the top 10 HCD used in various health insurance schemes in 2005 were obtained from the Dispensing Database. All prescriptions containing the top 10 HCD items in 2005 contained the patients' hospital number (HN) patients' age, type of health insurance, quantity of HCD use, drug costs were reviewed. The number of all the patients who received health-care services at this hospital was classified by their age and health insurance in the period 2003-2005; these data were obtained from the Hospital Policy and Planning Department. Patients' age was classified into four groups: ≤ 12 years, <40 years (12 years of age < 40 years), <60 years (40 years of age < 60 years), and ≥ 60 years.

The Microsoft of Excel 2003 program was used for data analysis. Descriptive statistics, such as frequency, percentage, and rate, were used in the analysis. To identify the top 10 high-cost drug use items and to evaluate their impact on pharmaceutical expenditure, all the drugs were ranked from high to low by expenditure. The top 10 HCDs by expenditure

were computed and compared with overall drug expenditure each year. In addition, the ratio of percentage change between the top 10 HCDs and overall drug expenditure was calculated as well. To identify the top 10 HCD users, the proportion of top 10 high-cost drug consumption under the three health insurance schemes (UC, CSMB, and SSS) was compared. Also, the rate of use of HCD per 1,000 patients, classified by age and type of health insurance, was compared.

Results

Impact of HCD use on pharmaceutical expenditure

The trend in expenditures on all drugs is to increase every year, for example, from 238.92 million baht in 2003 to 285.33 million baht in 2004 and 347.07 million baht in 2005, with the rates of increase being 19.42 percent and 21.4 percent in 2004 and 2005 respectively. The top 10 HCDs accounted for 18-20 percent of overall drug expenditure and increased every year, from 45.57 million baht in 2003 to 50.24 million baht in 2004 and 68.80 million baht in 2005, with the rate of increase being 10.26 percent and 36.94 percent respectively (see Figure 1). The increasing change in overall drug expenditure resulted from the increasing change in top 10 HCD use in 2005, which was higher than in 2004. Thirty percent of the increasing change in overall drug spending in 2005 resulted from the increasing change in top 10 HCD. However, only 10 percent of the increasing change in overall drug expenditure resulted from the increasing change in top 10 HCD use in 2004 (Figure 1 and Table 1).

In reviewing the top 10 HCD items in the three years (from 2003 to 2005) there were 10 drug groups composed of 14 HCD items. Ten groups of drugs were drugs used in hypoplastic, haemolytic and renal



anemias (human erythropoietin 4,000 U inj. and erythropoietin beta 2,000 IU inj.), lipid regulating drugs (atorvastatin 10 mg tab), anti-infectious drugs (meropenem 1 g inj, imipenem/cilastatin 500 mg inj.,

cefoperazone/salbactam 1 g inj. and cefoxitin 1 g inj.), antiplatelet drug (Clopidogrel 75 mg tab), drugs affecting gonadotrophins (goserelin 3.6 mg inj), anti-coagulants (enoxaparin sod. 40 mg/0.4 ml), cytotoxic drugs (paclitaxel 100 mg inj), ulcer healing drugs and drugs used in variceal bleeding (octeriotide 0.1 mg/ml inj), drugs affecting the immune response (mycophenolate mofetil cap 250 mg), and drugs used in cardiovascular catheterization (iopromide 370 100 ml inj.) (Table 1).

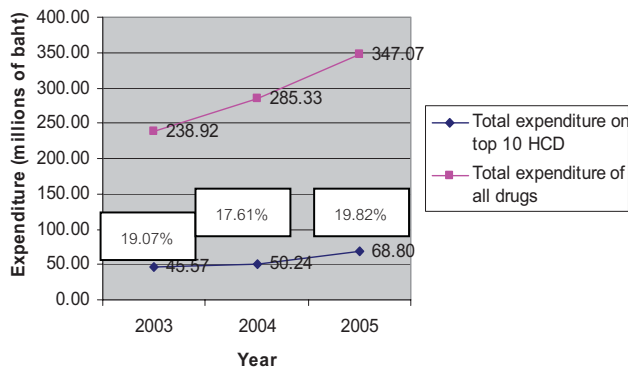


Fig. 1 Total expenditure on top 10 HCDs and all drugs in 2003, 2004, 2005

Six HCD items, erythropoietin 4,000 u.inj., atorvastatin 10 mg, meropenem inj., imipenem/cilastatin 500 mg inj., clopidogrel 75 mg, and cefoperazone/salbactam 1g inj., were found to be the most widely used in all three fiscal years. It was ob-

Table 1 Top 10 use items in 2003, 2004, and 2005

HCD items	Year					
	2003		2004		2005	
	Value (order) (millions of baht)	Quantity (units)	Value (order) (millions of baht)	Quantity (units)	Value (order) (millions of baht)	Quantity (units)
Human erythropoietin 4,000U inj	9.95 (1)	6,966	9.85 (1)	6,894	14.83 (1)	10,380
Atorvastatin 10 mg	6.36 (3)	173,800	8.75 (2)	239,100	13.35 (2)	364,900
Meropenem 1g inj	4.82 (4)	3,902	6.59 (3)	5,500	8.90 (3)	7,425
Imipenem/cilastatin 500 mg inj.	6.62 (2)	10,360	4.15 (6)	6,500	7.76 (4)	12,150
Clopidogrel 75 mg	3.77 (6)	50,274	4.19 (5)	55,370	5.89 (5)	75,530
Cefoperazone/salbactam 1g.inj.	4.69 (5)	9,650	4.21 (4)	8,660	4.44 (6)	9,240
Octeriotide 0.1 mg/ml inj	2.25 (9)	3,650	-	-	3.94 (7)	6,400
Erythropoietin beta 2,000 IU inj	-	-	3.99 (7)	6,035	3.78 (8)	5,720
Enoxaparin sod 40 mg/0.4ml inj	-	-	3.10 (8)	11,140	3.11 (9)	11,200
Mycophenolate 250 mg	-	-	-	-	2.80(10)	49,100
Goserelin 3.6 mg inj	2.63 (7)	376	3.04 (9)	439	-	-
Iopromide 370 100 ml inj.	2.39 (8)	1,737	-	-	-	-
Paclitaxel 100 mg inj	-	-	2.37(10)	161	-	-
Cefoxitin 1 g inj	2.08(10)	16,495	-	-	-	-
Total cost of top 10 HCD	45.57	-	50.24	-	68.80	-
Total cost of all drugs	238.92	-	285.33	-	347.07	-
Percentage of top 10 HCD	19.07	17.61	19.82			
Change in HCD (%)	-		10		30	
Cange in all drugs						

served that the trend of spending on erythropoietin 4,000 u.inj., atorvastatin 10 mg tab, and clopidogrel 75 mg tab increased every year. In the anti-infectious group, the spending on only meropenem inj. 1 g increased, while that of the others was varied (Figure 2).

HCD use among health insurance schemes

Regarding the expenditure on top 10 HCD use among health insurance schemes, HCD spending for CSMBS patients was twice as high as that on UC patients, with the amounts being 46.82 million baht (63.8% of top 10 HCD spending) for CSMBS and 23.67 million baht (32.3%) for UC patients respectively, while the number of UC patients receiving hospital services (298,683 patients) was 2.3 times greater than those under CSMBS (130,000 patients). SSS consumed very little of the spending on HCDs (0.7 million baht), and only 1 percent of the expenditure on the top 10 HCDs (Table 2). Concerning HCD items, it should be observed that all of the drug items commonly used for treatment of chronic diseases, including human eryth-

ropoietin, atorvastatin, clopidogrel, and mycophenolate, were widely used for CSMBS patients; they accounted for 38.87 million baht in expenditures (52.71% of top 10 HCD expenditure) while UC and SSS patients accounted for only 0.63 million and 0.03 million baht respectively. However, spending on anti-infectious and life-saving drugs for UC patients accounted for 18.34 million and 4.71 million baht respectively in expenditure, which was more than the spending on CSMBS patients (4.82 million and 3.13 million baht respec-

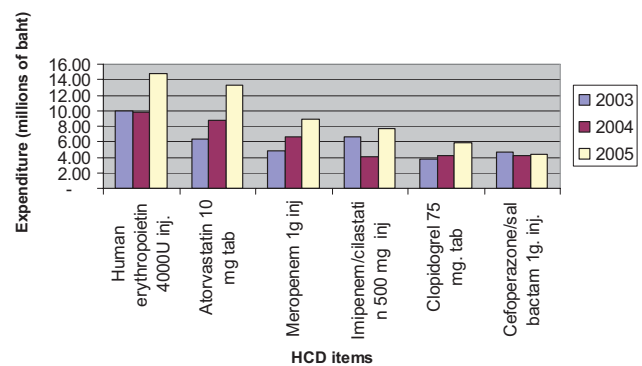


Fig. 2 The expenditure on six HCDs, mostly used in 2003, 2004, 2005

Table 2 Spending on top 10 HCDs among UC, CSMBS, and SSS schemes in 2005

HCD items	Expenditure (millions of baht)		
	UC	CSMBS	SSS
Human erythropoietin 4,000U inj.	0.11	13.65	0
Atorvastatin 10 mg tab	0.02	12.96	0.01
Meropenem 1g inj	7.99	2.79	0.19
Imipenem/cilastatin 500 mg inj	5.86	1.04	0.22
Cefoperazone/salbactam 1 g. inj.	4.49	0.99	0.17
Clopidogrel 75 mg	0.42	4.91	0.02
Erythropoietin beta 2,000 IU inj.	0.07	4.92	0
Enoxaparin sod. Inj.	2.10	1.65	0.05
Octeriotide	2.61	1.48	0.05
Mycophenolate 250 mg	0.01	2.43	0
Total of top 10 HCD spending	23.67	46.82	0.70
Percentage of top 10 HCD spending	32.27	63.84	0.95
Number of patients who received hospital services	298,683	130,660	44,282



tively) (Table 2).

The patients receiving hospital services under UC, CSMBS, and SSS schemes were classified by age group. The number of UC patients in each age group was more than the number of CSMBS patients

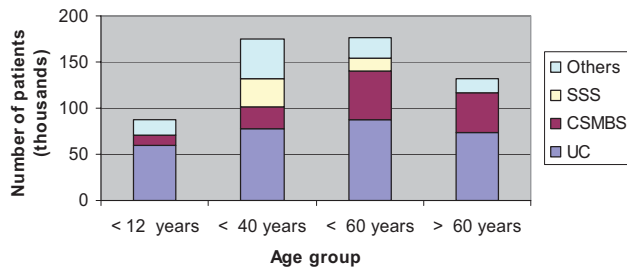


Fig. 3 Number of patients who received hospital services in 2005, classified by age group among various health insurance schemes

in each age group by 5.51, 3.34, 1.66, and 1.68 times in those ≤ 12 years of age, < 40 years, < 60 years, and ≥ 60 years respectively. Patients in the SSS scheme were mainly in the < 40 years and < 60 years age group. For those in CSMBS, most of the patients were also in the < 60 years and ≥ 60 years age group (Figure 3).

The number of patients using HCDs and the rate of use of HCD per 1,000 patients in each age group among the health insurance schemes was quite different depending on the type of disease. HCDs used for treating chronic diseases were atorvastatin (antilipemic drugs) and clopidogrel (antiplatelet drug), both of which were widely used among aging patients: 875 patients using atorvastatin, 282 patients

Table 3 The rate of HCD use per 1,000 patients in each age group under each health insurance scheme

HCD	Age group	Rate of HCD use in each age group per 1,000 patients in each age group (number of patients)		
		UC	CSMBS	SSS
Atorva statin 10 mg. tab	≤ 12 years	0 (0)	0 (0)	0(0)
	< 40 years	0 (0)	1.07 (25)	0.033 (1)
	< 60 years	0.017 (1)	10.324 (546)	0 (0)
	≥ 60 years	0.051 (4)	20.078 (875)	2.105 (1)
	Total number of patients	0.017 (5)	11.06 (1446)	0.045 (2)
Clopidogrel 75 mg. tab	≤ 12 years	0 (0)	0 (0)	0 (0)
	< 40 years	0.102 (8)	0.043 (1)	0.033 (1)
	< 60 years	0.535 (47)	1.267 (67)	0.439 (6)
	≥ 60 years	1.447 (106)	6.471 (282)	0 (0)
	Total number of patients	0.539 (161)	2.679 (350)	0.158 (7)
Meropenem 1g. inj.	≤ 12 years	2.298 (137)	0.183 (2)	0 (0)
	< 40 years	0.397 (31)	0.085 (2)	0.166 (5)
	< 60 years	0.855 (51)	0.378 (20)	0.293 (4)
	≥ 60 years	1.525 (119)	1.239 (54)	4.210 (2)
	Total number of patients	1.132 (338)	0.597 (78)	0.248 (11)
Enoxaparin sod. 40 mg/0.4 ml. inj.	≤ 12 years	0.134 (8)	0.092 (1)	0 (0)
	< 40 years	0.499 (39)	0.599 (14)	0.166 (5)
	< 60 years	2.461 (216)	1.494 (79)	1.107 (16)
	≥ 60 years	7.073 (518)	5.759 (251)	0 (0)
	Total number of patients	2.615 (781)	2.640 (345)	0.474 (21)

using clopidogrel in the CSMBS group; in the UC group 4 and 106 patients in the same age group were respectively treated with HCDs. The rate of use of atorvastatin and clopidogrel per 1,000 population in the aging group under CSMBS were 20.08 and 6.47 respectively, but the rates in the UC aging group were only 0.05 and 1.45 respectively. Regarding anti-infectious drugs, meropenem inj. was used to demonstrate the result, which showed that meropenem was used consistently in the patients in each scheme. The number of UC patients who were treated with this drug was the highest (338 patients); its use in CSMBS patients was next (78 patients). In addition, meropenem was widely used in patients ≤ 12 years old and ≥ 60 years in UC. For CSMBS patients, it was widely used in the ≥ 60 years age group. The rate of use of meropenem per 1,000 population in every age group in UC was greater than those in CSMBS. Concerning life-saving HCDs, enoxaparin (anti-thrombotic drug) was used to demonstrate the result. The number of patients who were treated with this drug in UC was the highest (781 patients); in CSMBS it was the next highest (345 patients). Enoxaparin was widely used in the < 60 years and ≥ 60 years age group in both UC and CSMBS patients. The rates of use of enoxaparin per 1,000 population in these two age groups in UC (2.46, 7.07 respectively) were greater than in CSMBS patients (1.29, 5.76 respectively) (Table 3).

Discussion

The result of the study indicated that the impact of HCD use on pharmaceutical expenditure is quite high; just the top 10 HCDs alone accounted for 18- 20 percent of the overall expenditures on pharmaceutical drug (~ 800 items). In addition, the trend of increasing overall drug expenditures was greatly affected by the increased spending on HCDs. Table 1 shows that 10 percent and 30 percent of the increases

in expenditure overall drug in 2004 and 2005 respectively was caused by the increasing use of HCDs. It should be noted that the increasing rate of overall expenditure was greater than the highest growth rate of pharmaceutical expenditure in the previous study (only 6.9 percent).⁽¹⁾ Most of the difference in this growth rate and the effect of HCDs on pharmaceutical expenditures at this hospital can be traced to more than the price of drugs. It might be possible that the increasing use of HCDs and the rise in overall expenditures may be a result of the increasing number of patients, rising from 509,292 to 549,465 and 572,078 in 2003, 2004, and 2005 respectively.

Most of top 10 HCD spending was on drugs for treatment of chronic diseases and on anti-infectious drugs (Table 1). Human erythropoietin 4,000 u. inj., atorvastatin 10 mg tab., meropenem 1g inj, imipenem/cilastatin 500 mg/vial IV, and cefoperazone/salbactam 1g inj and clopidogrel 75 mg tab were the top six HCD items most widely used in all three fiscal years. The other items showed little variation, including octeriotide inj, erythropoietin beta 2,000 u. inj., enoxaparin sod. 40 mg/0.4 ml inj., mycophenolate tab, goserelin inj., iopromide inj, paclitaxel inj., and cefoxitin inj. Most of these items were also the same as high-cost medicines in developed countries, such as Australia and the United States. Many of these drugs in developed countries need approval before use. For example, PBS needs approval when erythropoietin, enoxaparin, octeriotide inj, mycophenolate are used for individual patients.⁽³⁾ With regard to payment, the Maryland Aids Drug Assistance Program (MADAP) set up the criteria and evaluation form for epoetin alpha use and require information on the use of this drug from the prescriber for approval of payment for the drug.⁽⁷⁾ Another example is the criteria checklist for clopidogrel use in veteran patients, as mandated by the Pharmacy Benefit Management Strategic



Healthcare Group and the Medical Advisory Panel in April 2006 to promote cost-effectiveness.

Besides the above-mentioned drugs, the top six HCDs most widely used in three years, atorvastatin, human erythropoietin, and clopidogrel, drugs commonly used for chronic disease treatment in the aging group were increasing every year (Figure 2). These results seem consistent with the increase in the number of patients; the aging group showed the highest increase, at 21.49 percent when comparing the number of patients in 2005 (132,384) with the number of patients in 2003 (108,964) classified by age group. However, the use of some drugs, especially atorvastatin and clopidogrel, should trigger strong concern among policy and decision makers for reasons of cost effectiveness, because these two drugs are second line drugs and they can be substituted by first-line drugs in the same groups, simvastatin and aspirin, respectively, because Thailand now faces budget constraints. There was some evidence of the effect of other high-cost drug utilization on the expenditures, especially the irrational use of drugs which could affect excess drug expenditures. There was some evidence supporting this hypothesis. The first, misindication during admission, was one of the drug use problems with the rate ranging from 0.7 to 25.2 percent.⁽⁸⁾ The study on drug use evaluation (DUE) of Subclass 4 essential drug list (1999), reported by regional hospitals, general hospitals, and medical schools during from June 1 to December 31, 2000 also support this hypothesis. The rate was 21.6 for ceftazidime inj., 37.1 for ciprofloxacin tablet, and 62.4 for pentoxyphylline.⁽⁹⁾ Previous studies in eight hospitals from 1992 to 2000 reported economic loss from irrational drug use, such as the inappropriate use of cephalosporin inj. at Taksin⁽¹⁰⁾ and Ramathibordhi hospitals,⁽¹¹⁾ which caused excess drug expenses of 4,801 baht/visit and 432,109 baht/year/ hospital and

676 baht/patient and 171,632 baht/5 months/hospital respectively.

There were differences concerning HCD use among the health insurance schemes. Since the results showed that in comparing HCD spending together with the number of patients receiving hospital services in 2005, the spending was about two times greater in CSMBS patients than in UC patients, while the number of patients in UC was double those covered by CSMBS (Tables 2 and 3). According to these results, it could be hypothesized that CSMBS patients have more chances to use HCDs than the UC and SSS patients, especially for treatment of chronic diseases. Because of the CSMBS fee-for-service payment mechanism, the cost of drugs can be reimbursed but under UC and SSS, capped budget is used for the payment mechanism. Thus, the wide use of some HCDs in CSMBS is a result of the subsidy used. Great access to drugs is the advantage of CSMBS, but it may lead to economic loss because of overuse at the national level easily. The previously mentioned Manitoba study supports this explanation. Some users prescribed high-cost drugs were mainly in a fee-for-service payment scheme without clear clinical reasons.⁽⁴⁾ Cost containment and cost effective use of HCDs might be the advantage of the UC and SSS schemes, but the risk is less access to HCDs, especially for UC chronic patients who have to be treated with HCD continuously for a long period of time. This could affect their quality of life. For example, the results showed that human erythropoietin 4,000 u. inj. accounted for the highest hospital pharmaceutical expenditure and use in CSMBS patients, much more than in UC patients: the rates of use per 1,000 patients were 1.186 in CSMBS and 0.003 in UC. Since erythropoietin is used to treat anemia in end-state chronic renal failure (ESCRF) patients who need continuity and long-term treatment, the problem might

be accessibility for UC patients because its use will impact strongly the hospital's expenditures and a capped budget cannot solve this problem. This hypothesis is supported by the study about high-cost essential drug use in three hospitals. It was reported that the rate of outpatients with the same disease diagnosed in CSMBS and SSS were receiving erythropoietin at a much higher rate than the patients covered by the Low Income Card in all hospitals.⁽⁶⁾

In contrast, HCDs for life-saving and anti-infectious drugs were widely used in UC patients in terms of both expenditure and the rate of use per 1,000 patients in every age group when compare with CSMBS. For antibiotic use, this might affect the antibiotic drug use evaluation (DUE) program of this hospital. However, DUE of these kinds of drugs still continues in order to increase the rate of rational use; it was found that 82 percent of reported drug use in 2006 was rationale.

Conclusion

The impact of HCD use on pharmaceutical expenditure is quite high, since only 10 HCDs accounted for 18-20 percent of overall pharmaceutical expenditures. There is a difference in HCD use based on the insurance schemes and type of diseases concerned. Further studies should be focused on the evaluation of HCD use, effective measures to control HCD use, and the methods for balancing equity of HCD access among patients covered by various health insurance schemes.

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