Unit Cost of Diabetes Care: A Case Study of a General Hospital in Thailand

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บทคัดย่อ: ต้นทุนการดูแลรักษาโรคเบาหวาน: กรณีศึกษาโรงพยาบาลทั่วไปในประเทศไทย

อุทุมพร วงษ์ศิลป์ บช.ม*, อาณัติ วรรณศรี วท.ม**
*สำนักวิจัยเพื่อการพัฒนาหลักประกันสุขภาพไทย สถาบันวิจัยระบบสาธารณสุข อาคารสุขภาพแห่งชาติ 88/39 อำเภอเมือง จังหวัดนนทบุรี 11000
**โรงพยาบาลนพรัตนราชธานี แขวงคันนายาว เขตคันนายาว กรุงเทพมหานคร 10230

การศึกษาครั้งนี้มีวัตถุประสงค์เพื่อศึกษาต้นทุนการจัดบริการเบาหวาน กรณีศึกษา โรงพยาบาลประเภททั่วไป ใช้วิธีการเก็บรวบรวมข้อมูลบริการและข้อมูลต้นทุนของโรงพยาบาลทั่วไป สำหรับปีงบประมาณ 2557 และวิเคราะห์ต้นทุนการจัดบริการตามแนวทางการศึกษาต้นทุนของกระทรวงสาธารณสุข โดยจำแนกเป็นต้นทุนการให้บริการผู้ป่วยนอกและต้นทุนผู้ป่วยในที่เป็นเบาหวาน ผลการศึกษา คือ การให้บริการรักษาผู้ป่วยในโรคเบาหวานมีต้นทุนรวม 1,921,560 บาท ขณะที่การให้บริการรักษาผู้ป่วยนอกโรคเบาหวานมีต้นทุนรวม 2,723,623 บาท นอกจากนี้ พบว่า โรงพยาบาลดังกล่าวมีต้นทุนเฉลี่ยการให้บริการผู้ป่วยในโรคเบาหวาน เท่ากับ 15,622.44 บาท และ ต้นทุนเฉลี่ยการให้บริการผู้ป่วยนอก เท่ากับ 971 บาท ทั้งนี้ ต้นทุนการให้บริการผู้ป่วยเบาหวานในโรงพยาบาลทั่วไปแห่งนี้สูงกว่าเมื่อเทียบกับโรงพยาบาลชุมชน 4 เท่า เนื่องมาจากภาพรวมของค่าใช้จ่ายที่แตกต่างกัน โดยเฉพาะอย่างยิ่งค่าใช้จ่ายบุคลากรและค่าวัสดุ อย่างไรก็ตาม ในการศึกษาครั้งนี้ ใช้โรงพยาบาลประเภททั่วไปเป็นตัวอย่างเพียงแห่งเดียวในการศึกษา ดังนั้น ผลที่ได้อาจยังไม่สามารถเป็นตัวแทนของโรงพยาบาลทั่วไปได้ และควรเพิ่มจำนวนโรงพยาบาลทั่วไปในการศึกษาครั้งต่อไป
คำสำคัญ: ต้นทุน โรคเบาหวาน ต้นทุนผู้ป่วยนอก ต้นทุนผู้ป่วยใน

Abstract

The objective of this study was to estimate the unit cost of diabetes mellitus in both inpatient and outpatient care of a general hospital in Thailand, which used a traditional costing method establishing by the Ministry of Public Health (MOPH). The cost data and service data of the fiscal year 2014 were collected. Then, the unit cost was analysed by patient types including inpatient and outpatient. The results indicated that the total cost of inpatient care was THB 1,921,560 and the total cost of outpatient was THB 2,723,623. In addition, the average unit cost per admission of inpatient was approximately THB 15,622, whereas the average unit cost per admission of outpatient was approximately THB 971 or sixteen times lower than that of inpatient care. Moreover, unit cost of diabetic patient in general hospital was higher than in community hospital, just 4 times. This is because there was a significant difference between those two types of hospital in case of expenditure especially labour cost and material cost. However, further studies are needed to confirm the results of this study because this study just purposively selected one general hospital as a sample. Thus, the results may not be possible to represent other general hospitals in Thailand.
Keywords: Unit cost, Diabetes care, Inpatient cost, Outpatient

Introduction

Diabetes mellitus (DM) is a complex chronic disease and has emerged as one of the major health problems. DM is considered one of four non-communicable diseases (NCDs) that the global concerns. In 1980, the prevalence of diabetes was just only 108 million people. In 2014, it was estimated that the number of people with diabetes was approximately 422 million people[1]. This figure indicates that the number of people with diabetes is dramatically increasing. Diabetes is thus considered one of the greatest challenges for many countries, including Thailand.

Thailand is an upper-middle income country in South-East Asia which has currently higher number of NCDs and ageing population than the South-East Asia region's average[2]. Diabetes is one of the significant NCDs in Thailand. Data from the fifth National Health Exam Survey (NHES) indicate that diabetes prevalence in individuals aged between 15 years and over has increased over the time from approximately 6.9% in 2009 to approximately 8.9 in 2014. Furthermore, the highest increase in the prevalence of diabetes occurred in the age category 60-69 years[3].

It is evident that the increase in health care expenditure associated with the increase in the size of diabetes prevalence[4]. Previous research on diabetes in Australia found that the average health expenditure on diabetes care in 2000 - 2001 was $1,469 per known (self-reported) case of diabetes, or $42 per Australian. ·In addition, $204 million was spent by the Australian Government and people with diabetes on antidiabetic drugs and diabetes testing reagents. Given that Type 2 diabetes is largely preventable, there is potential for substantial savings for governments, public and private companies and services, and individuals[5]. Further, research in Germany showed that people with Type 2 diabetes had 1.7 fold higher health expenses than people without diabetes and one in 10 Euros of healthcare expense is spent on people with Type 2 diabetes[6]. In America, America diabetes association statements showed that the burden

of diabetes was imposed on all sectors of society - higher insurance premiums paid by employees and employers reduced earning through productivity loss, and reduced quality of life for people with diabetes and their families[7].

In Thailand, a study investigating the factors affecting health-care costs and hospitalizations among diabetic patients in Thai public hospitals found that demographic factors of patients (i.e., age and sex), payment methods (i.e., capitation, fee-for-service, and out-of-pocket) were significantly associated with higher health-care costs and probability of hospitalization[8]. In terms of unit cost research, there was a few research conducted unit cost of diabetic patients[9-11]. It was found that the average unit cost per visit of outpatient at a district hospital was THB 206.47, and the average unit cost per visit of outpatient at healthcare sector was THB 233. Another research showed that the unit cost of diabetic patients were THB 2,398 per visit at a reginal hospital, THB 808 per visit at district hospital and THB 355 per visit at health sector[9]. However, those research conducted since year 2003 and there was no statistics of unit cost of diabetic patients at general hospital which is important to estimate future expenditure. The objective of this research was to estimate unit cost of diabetes mellitus both inpatient and outpatient of a general hospital in Thailand.

Materials and Method

This study is quantitative research, and it was conducted in a general 300-bed hospital by purposive sampling. The selection criteria were service and cost data of hospital are adequate to estimate unit cost. This study was designed to estimate unit cost of Diabetes Mellitus from a provider perspective, which used a traditional costing method of Ministry of public health[12]. Financial report, cost data and service data for fiscal year 2014 were collected from a general hospital.

In terms of costing method, it can be divided into four steps. The first steps is cost centers of hospital were determined into 2 groups, namely supporting cost center and service cost center. Next, total direct cost was calculated including labour cost, material cost and capital cost. After that, total cost from supporting cost centers allocation factors were allocated to service cost center by allocation factors. The last step is unit cost was calculated by patient types: inpatient and outpatient.

Formula:

$$\text{Unit cost per visit of outpatient} = \frac{\text{Total cost of outpatient}}{\text{Total visits}}$$

$$\text{Unit cost per admission of inpatient} = \frac{\text{Total cost of inpatient}}{\text{Total admissions}}$$

Service data collection

Service data for the fiscal year 2014 including inpatient and outpatient data were collected from a purposive selected general hospital. Descriptive statistic was performed to count the total number of inpatient and outpatient. This was done separately due to the objectives of this study.

The 10th revision of the International Classification of Diseases (ICD-10) was used to identify diagnosis code of diabetes, which included E10-E14. The outputs obtaining from the analysing of service data were used further as denominators in order to calculate the unit costs of inpatient and outpatient care for people with diabetes.

Results

Table 1 Financial Report of hospital in fiscal year 2014

Unit: THB

Revenues:	
Healthcare services	553,127,355
Others	129,189
Total revenue	553,256,543
Expenditures:	
Salary	186,051,953
Compensation	68,839,396
Drug	61,060,730
Material supply	43,455,105
Utility	88,813,082
Bad debt	457,020
Depreciation	39,392,056
Total expenditure	488,069,341

Table 1 provides information concerning financial statement of general hospital in fiscal year 2014. It can be divided into 2 groups which include revenues and expenditures. Overall, it can be seen that this hospital had more total revenues than total expenditures. Total revenue was THB 553 million and total expenditure was THB 448 million. The highest expenditure was labour cost including salary and compensation, followed by material cost which includes drug, material supply and utility, accounting for THB 254 million and THB 193 million, accordingly.

Table 2 Cost centers of the hospital

Supporting Cost Center		Service Cost Center	
Code	Department	Code	Department
A01	General administration	C0101	Clinical Pathology
A02	Supply	C0201	Blood Bank
A05	Financial &Accounting	C0301	X-Ray
A07	Human Resource	C0701	Pharmacy
A08	Vehicles	C0901	Rehabilitation
A10	Maintenances	C1101	Operation rooms
A13	Information Technology	C1201	Anesthesiology
A17	Audio Visual Technology	C1301	Delivery services
A20	Library	C1401	Nutrition
A25	Planning	C1501	Physician organization
A26	Quality Development	C5001	OPD services
A27	Medical Record and Statistics	C5002	Health Check-up
A28	Health Insurance Group	C5101	Eyes clinic
A29	Laundry	C5102	Ear and Hearing Center
A30	Dressmaking/ Sewing	C5103	Family planning
A31	Central Supply	C5104	Psychiatry
A32	Patient Service Center	C6001	Emergency Room
A33	Nursing Organization	C6101	Dental services
		C6201	Thai traditional medicine
		D0001	Orthopaedic Ward
		D0002	Surgical Ward
		D0003	Medical Ward 1
		D2001	Medical Ward 2
		D2002	Medical Ward 3
		D4001	Gynaecological Ward
		D4002	Paediatrics
		D4003	ENT ward
		D5001	ICU
		D5002	ICU ward for children
		E0101	Refer services
		E0201	Salary of staff, who works for other facilities
		E0401	Social Medicine
		E1801	Public Relationship

Table 2 shows information concerning cost center of hospital. It can be divided into 2 groups, namely supporting cost center and service cost center. There were 19 supporting cost centers and 33 service cost centers.

Table 3 The cost to charge ratio

Charge ID	Charge Items	Total Cost (THB)	Total Charge (THB)	Cost to Charge Ratio
01	Room and Board	23,455,360	32,435,150	0.72
02	Instrument	4,370,890	15,482,792	0.28
06	Blood Bank	10,346,248	7,563,989	1.37
07	Laboratory	23,901,463	29,848,860	0.80
08	X-Ray	20,788,678	15,325,425	1.36
09	Special Investigations	1,765,897	5,474,506	0.32
10	Medical Equipment	19,528,244	24,498,359	0.80
11	Operative and anesthetic	47,090,943	34,635,634	1.36
12	Doctors and Nurses Fees	205,716,335	70,770,977	2.91
13	Dental Services	15,221,292	7,887,082	1.93
14	Physical therapy and rehabilitation	4,546,985	2,392,800	1.90
15	Acupuncture & alternative medicine)	7,573,046	6,552,920	1.16
Drug	Drug	84,276,643	115,781,873	0.73

Table 3 provides information about the cost to charge ratio by charge items using guideline from Comptroller General's department manual. It found that the cost to charge ratio of doctors and nurses fees was highest, followed by dental service and physical therapy and rehabilitation, whereas the cost to charge ratio of special investigations was lowest, amounting to 2.91, 1.93, 1.90 and 0.30, respectively.

Table 4 Unit cost of inpatient and outpatient for diabetes care

Unit: THB

	IPD	OPD
Total Cost	1,921,560	2,723,623
Total admission (visit)	123	2,804
Unit cost (per admission /visit)	15,622.44	971

Table 4 provides information concerning the average unit cost of diabetes both inpatient and outpatient. This data can be divided into two groups, namely unit cost of inpatient and outpatient. It showed that there were THB 1,921,560 in total cost of inpatient and total cost of outpatient was THB 2,723,623. In addition, the average unit cost per admission of inpatient was approximately THB 15,622 and the average unit cost per admission of outpatient was THB 971.

Discussions

This study indicated the average unit cost per admission of inpatient with diabetes was approximately THB 15,622 and the average unit cost per admission of outpatient with diabetes was THB 971. It can be seen that the average unit cost per admission of outpatient in this general hospital is higher than unit cost of district hospital from previous study (9), by THB 163. Moreover, it is higher than unit cost of diabetic patient in community hospital about 4 times. (10, 11), This is due to the fact that cost of hospital resources including human resources, materials and capital use in general hospital are more expensive than community hospital especially labour cost and material cost. There are a number of stuff in general hospital which includes specialists more than stuff in community hospital. As a result, labour cost is higher in general hospital when compared to community hospital. Furthermore, this study showed remarkable findings that the unit costs of services for diabetes patient were high and it is likely to increase overtime due to increasing resources use for providing care to patients with diabetes. Therefore, health prevention, health promotion and health literacy are needed to promote better health in diabetes patients. It is not only can prevent people from diabetes but in the long term it also can lead to decreasing in financial burden of government agencies.

Conclusions

Diabetes mellitus (DM) considered one of four non-communicable diseases (NCDs) has emerged as one of the major health problems in many countries including Thailand. This has not only resulted in increasing a number of diabetes patients dramatically, but also unit costs of services for providing cares were significantly high. Health prevention, Health promotion and health literacy should, therefore, be promoted in order to decrease the number of people living with diabetes.

Limitations

It should be noted that secondary data which used in this research obtained from just only one general hospital. The results of this present study cannot properly represent general hospitals in Thailand because there are more than 80 general hospitals in Thailand. Therefore, further research should include more samples. Furthermore, to investigate and provide adequate and comprehensive information about unit cost of diabetes care the samples should include different hospital types, including district hospital, general hospital and regional hospital.

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