Effects of Different Payment Schemes on Actual Inpatient Expenditures with Schizophrenia

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Abstract This study analyzes actual inpatient expenditures by different health insurances for schizophrenic patients in Thailand. A total of 3,896 schizophrenia admissions at Khonkaen Rajanagarindra Psychiatric Hospital between January 2010 and December 2012 were included. Multivariate analysis of covariance analyses was conducted on schizophrenic patients among three health insurance schemes. Multiple-regression model was used to analyze the influence of variables on total inpatient expenditure. Ninety three percent of patients were paid by the Universal Coverage Scheme. After controlling for the length of stay, total expenditures were found to be 27,861.47, 15,199.23 and 15,063.05 Baht for the Civil Service Medical Benefit Scheme (CSMBS), Universal Coverage Scheme (UCS) and Social Security Scheme (SSS), respectively. The statistically significant difference for the CSMBS patients was found in the expenditures for hospital bed and board, medication, physical therapy, laboratory test as well as total expenditures. Longer hospital stay, higher education, number of admission, age and occupation were positively correlated to total expenditure.

Keywords: *expenditures of inpatient care, payment scheme, schizophrenia*

บทคัดย่อ **อิทธิพลของรูปแบบสิทธิการเบิกจ่ายต่อค่าใช้จ่ายที่เกิดขึ้นจริงในการรักษาพยาบาลผู้ป่วยจิตเภท**

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การศึกษานี้เป็นการวิเคราะห์ค่าใช้จ่ายที่เกิดขึ้นจริงของผู้ป่วยจิตเภทตามรูปแบบสิทธิการเบิกจ่ายในประเทศไทย กลุ่มตัวอย่างได้แก่ผู้ป่วยจิตเภทที่เข้ารับการรักษาในโรงพยาบาลจิตเวชขอนแก่นราชนครินทร์ระหว่างเดือน มกราคม พ.ศ. 2443 ถึงเดือน ธันวาคม พ.ศ. 2555 จำนวน 3,896 คน วิเคราะห์ข้อมูลโดยใช้การวิเคราะห์ความแปรปรวนร่วมและการวิเคราะห์การถดถอยพหุ ผลการวิเคราะห์พบว่าผู้ป่วยจิตเภทร้อยละ 93 ใช้สิทธิหลักประกันสุขภาพถ้วนหน้า สำหรับค่าใช้จ่ายในการรักษาพยาบาลที่เกิดขึ้นจริงทั้งในส่วนที่เบิกได้และเบิกไม่ได้ในการรักษาแต่ละครั้ง เมื่อควบคุมตัวแปรจำนวนวันนอนโรงพยาบาล พบว่ากลุ่มเบิกต้นสังกัดของข้าราชการมีค่ารักษารวมสูงสุดเฉลี่ย 27,861.47 บาท กลุ่มใช้สิทธิหลักประกันสุขภาพถ้วนหน้ามีค่ารักษารวมเฉลี่ย 15,199.23 บาท และกลุ่มใช้สิทธิประกันสังคมมีค่าใช้จ่ายรวมน้อยที่สุดเฉลี่ย 15,063.05 บาท ความแตกต่างอย่างมีนัยสำคัญทางสถิติของค่าใช้จ่ายแยกตามประเภทพบว่า ค่าใช้จ่ายที่แตกต่างสูงสุดเป็นค่าเตียงและอาหาร ค่ายา ค่ากายภาพบำบัด ค่าผลการทดสอบทางห้องปฏิบัติการและค่ารักษารวม ขณะที่จำนวนวันนอนโรงพยาบาล ระดับการศึกษา จำนวนครั้งของการเข้ารับการรักษา อายุและอาชีพมีความสัมพันธ์เชิงบวกกับค่าใช้จ่ายรวมอย่างมีนัยสำคัญทางสถิติ

คำสำคัญ: *ค่าใช้จ่ายในการรักษาพยาบาลของผู้ป่วยใน,สิทธิการเบิกจ่าย, จิตเภท*

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Background

Schizophrenia is a psychiatric disorder with a global incidence of 8 to 40 individuals per thousand per year[1] or around 24 million people worldwide, mostly in the 15-35 age group[2]. Ranked among the top 10 causes of years lived with disability (YLD) worldwide in 2001[3,4], the impact of schizophrenia on health care budgets is substantial. The World Health Organization estimates the direct cost of schizophrenia in Western countries to be between 1.6% and 2.6% of the total health expenditure[5]. In the United States, Knapp et al.(6)reported the estimated cost of schizophrenia to be 2.8% (US$65 billion) of all attributable National Health Service (NHS) and social services expenditures, whereas Whiteford et al.[7] indicated the cost of schizophrenia to be between 1.5% and 3% of the total national health expenditure in developed countries. Most of the direct cost (79%) was due to hospitalization[8].

In Thailand, the estimated budget had reached 3.9% of gross domestic product in 2002[9] before falling to 3.5-3.6% during 2003 to 2007[10]. In 2011 the government spent up to 200 billion Baht per annum for total health expenditure, or a 3.9% increase from that observed in 2010[11]. In 2012 and 2013, health spending wa sat 4.2% and 3.8%, respectively[12]. In spite of this, the government allocated only 3% of the total health budget on mental health[9]. There is no study on the direct cost for the entire population with schizophrenia in Thailand. The main reason was lack of population-based epidemiological data. As Phanthunane et al.[13] reported, the largest component of direct cost for schizophrenia was hospitalization (50%).[14] Apparently, a significant growth of healthcare cost is a major challenge to healthcare expenditure policies.

Thailand's healthcare system has undergone several reforms with regard to financing, service delivery, and consumer rights. Since the reform in October 2001, there are now three public health insurance schemes: the Civil Servant Medical Benefit Scheme (CSMBS), the health branch of Social Security Scheme (SSS), and the Universal Coverage Scheme (UCS)[15]. The first scheme, the CSMBS, was established in 1978 and administered by the Comptroller General's Department (CGD) which is under the Ministry of Finance (MOF). The scheme covers about 6 million persons, or 7%of the Thai population, including current and retired civil servants and their dependents (spouse; three dependent children under 18 years old, and parents)[12,15].

The second scheme is the SSS. It was launched in 1990 and financed by a compulsory tripartite (employees, employers and government) with contributions of 2.75% from government, 5% each from employer and employee[12,16]. The SSS is managed by the Social Security Office (SSO), a unit in the Ministry of Labor and Social Welfare. It covers workers, but not their families, except for maternity benefits. This scheme covers about 9.8 million people, or 15.8% of the total population[16].

The third scheme, the UCS, covers Thai citizens not eligible for the SSS and CSMBS. This scheme is administered by the National Health Security Office (NHSO); an autonomous organization established in accordance with the National Health Insurance Act in 2002. The UCS covers about 47 million persons, or about 80% of the total population[11,12]. The UCS is

financed by the general tax revenue (1,202 Baht per person per annum in 2002, and 2,755.60 Baht in 2012, paid directly to hospitals and health centers to provide services for people in their catchment area) with a fixed co-payment of 30 Baht per visit or per hospitalization at the point of service, except for the low-income households[12,15].

These schemes use different financial arrangements and provide different benefit packages, thus contributing to the varied levels of service in the healthcare system. As the government has been spending up to 200 billion Baht per annum, about 100 billion Baht is allocated to the UCS beneficiaries (2,755.60 Baht per capitaexpense), with 70 billion Baht spent on providing medical benefits for the CSMBS beneficiaries(15,000 Baht per capita expense), and about 30 billion Baht for the SSS beneficiaries (2,500 Baht per capita expense)[17]. The CSMBS provides comprehensive health benefits comprising both outpatient (OP) and inpatient (IP) care in public facilities through fee-for-service reimbursement[12,15]. Also, the CSMBS beneficiaries are allowed the liberty of choosing their providers in public hospitals. However, this scheme experienced an annual cost inflation of 20% in nominal terms, despite almost zero growth in civil servant numbers. The same sort of health-spending increase from fee-for-service payment was found in Taiwan and Korea(18). Healthcare cost for the CSMBS has soared from 26 billion Baht in 2004 to 70 billion Baht in 2012[11]. Most of the budget was used for expensive medicines and outpatient services[12].

The SSS provides health benefits that comprise outpatient and inpatient care at a registered public or private health facilities through a capitation payment arrangement. A single annual capitation amount per person was calculated to cover all healthcare services, with the exception of a few high-cost procedures (e.g. hemodialysis, brain surgery and bone marrow transplantation). Additionally, the social security benefitscheme does not include psychoses and drug addiction, except acute psychosis (lasting 15 days or less). Also, under the SSS, most hospitals are reimbursed for more complex procedures[16]. For example, the capitation payment set at 700 Baht per day or less for room and food while other facilities pay the actual cost on the condition that the length of stay should be between 90-180 days per year.

The benefit package of UCS is based on the SSS package with slight modifications[11]. The payment method designed for UCS is different: capitation for OP and global budget plus Diagnostic Related Groups (DRG) for IP. UCS policy requires scheme members to register at a primary healthcare facility in their catchment area with a referral system from registered primary health care unit (PCU) to higher level facility, if required, except in an emergency situation. Bypassing one's level of registration to the higher level in non-emergency situations incurs liability for the full cost of treatment.

The incidence of schizophrenia in Thailand was 0.3 per 1,000, peaking at age 15-24 in both male and female[19]. Schizophrenia also accounted for the highest number of patients admitted to mental health hospitals (59%)[20] and 75% of patients with schizophrenia are under the UCS[21]. Since the implementation of the UCS, numerous studies reported significant inequalities between the three schemes[15,22-25]. However, the studies have the following limitations;

only one type of public health insurance was included; only descriptive analyses was conducted; and only medication expenditure or total cost was analyzed.

For example, a recent study was undertaken at Ramathibodi Hospital's Faculty of Medicine. It was estimated that unit cost per admission for schizophrenia was about 56,388.44 Baht[26] whereas Phuaphanprasert and Pannarunothai[27] reported that unit cost per admission at SuanPrung psychiatric hospitals was around 20,766 Baht. Another study comparing data from the department of mental health at the Ministry of Public Health with Ramathibodi studies indicated that the direct cost for schizophrenia treatment for a Thai social security employee was about 34,321.23 Baht per admission, and 31,207.73 Bath[24]. Since the unit cost for one schizophrenic patient per admission regarding the DRG was about 15,027.67 Baht[25], the difference in cost of service for schizophrenia ranged from 5,738.33 to 41,360.77 Baht per admission.

Specifically, it has been reported that per-capita patients receive cheaper drugs or shorter courses of the same drugs than fee-for-service patients[22]. It was also found that mental health patients under the CSMBS and SSS who stay in the hospital had higher cost of treatment and shorter length of stay than those from the UCS[23]. In spite of this, Sripa et al.[28] found that the CSMBS had the highest total drug cost per patient, whereas the equivalent cost for the SSS, UCS and CSMBS beneficiaries are likely to be prescribed with new and more expensive drugs, and hospitals tend to prescribe unnecessary drugs and investigations[29]. For the SSS, there is a tendency of dumping IP into OP and limited admission to the general margin[24]. Also, psychiatric hospitals tried to adjust their systems to the 30-Baht policy through tight debt-following policy and reducing length of stay for in-patients[25]. The present study, therefore, aims to explore the variations in the total direct and category-specific expenditures incurred by schizophrenic patients across the three different schemes (the CSMBS, SSS and UCS) at a tertiary psychiatric hospital. The results from this study should be useful in the planning, preparing, budgeting and decision making in healthcare services for schizophrenic patients.

Methods

Data Source

The data analyzed in this study was taken from the Khonkaen Rajanagarindra Psychiatric Hospital's internal database. This is a large database of psychiatric patients from all regions between January 1, 2010 and December 31, 2012.

The study proposal was reviewed and approved by the ethics committee of Mahasarakham University and the hospital's review board. The identity of the patients has been de-identified by the removal of all Protected Health Information. The data also underwent several stages of quality checks to delete duplicated records and correct errant variable coding. Inpatient records of all admissions and discharges of inpatients with a primary diagnosis of schizophrenic disorder (ICD-10 diagnosis code F20) diagnosed by an experienced psychiatrist were identified and retrieved from the IT department.

The Hospital

The Khonkaen Rajanagarindra Psychiatric Hos-

pital is a 372-bed tertiary health institution located in the northeast of Thailand. It is one of seventeen mental hospitals belonging to the Thai Department of Mental Health under the Public Health Ministry.

Sample

The original dataset contained 3,925 schizophrenic cases. The authors excluded 13 cases with no information on expenditure and 16 cases that had a length of hospital stay less than one day. The remaining sample of 3,896 schizophrenic cases (99.26% of the original sample) was used. Information on the sociodemographic (age, gender, marital status, education and occupation), clinical characteristics (diagnoses, number of admission, comorbidity illnesses, length of stay and types of payment scheme) was extracted from the case files. Missing data for education (13.8%) and occupation (0.0002%) was included in analyses using a missing indicator variable.

Length of stay (LOS) was the number of days from the date of admission to the date of discharge, and at least 1 day separating the discharge date from an admission date. Psychiatric comorbidities were divided into three categories: sole schizophrenia, with one psychiatric comorbidity, and with more than one psychiatric comorbidities. Types of payment were classified according to three different schemes: Civil Servant Medical Benefit Scheme, Universal Coverage Scheme, and Social Security Scheme.

Expenditure Estimates

Actual expenditure incurred from each hospitalization was extracted from the financial database for the list of patients extracted using ICD 10 codes. Expenditure was chosen as the measurement of cost, instead of charges, because charges are often discounted and include uncollected liability, bad debt and charitable care.

Direct expenditure includes expenditure of resources utilized and services received. The total direct expenditure was calculated as the sum of the following components: medication, hospital bed and board, occupational therapy, physical therapy, behavioral therapy, nursing services, electroconvulsive therapy (ECT), laboratory test fee, and inpatient general services. All expenditures were calculated in the Thai currency (Baht) on the basis of fees, rates and prices. The average annual exchange rate was one US dollar to 30 Thai Baht.

Data Analysis

Data-mining and processing was conducted using the Microsoft SQL Server. Baseline characteristics were compared across insurance schemes using Peason χ^2 test or Fisher's exact test for categorical variables and the Kruskal-Wallis test for continuous variables. Categorical data were presented in frequency and percentage. Continuous data were presented as the median (interquartile range [IQR]).

The influence of payment scheme on inpatient expenditure components was analyzed with multivariate analysis of covariance. Dependent variables included inpatient expenditure and total expenditure. Independent variable was the different payment schemes. When the overall scheme was significant, we conducted post-hoc tests to examine statistical significance of the differences between each scheme. Since the distribution of LOS and the inpatient ex-

penditures were skewed to the right, the values of these variables were log-transformed. The estimation of parameters was converted to Baht by exponentiatiion (geometric means) to predict the expected expenditures associated with schizophrenic patients among the three different health schemes. Multiple linear regression model was used to analyze the influence of variables on total inpatient expenditure. The significant levels for the model were set to 0.05. Analyses were conducted using Statistical Package for Social Sciences SPSS (SPSS INc., Chicago, IL, USA).

Results

Table 1 presents the characteristics in the overall population and payment schemes. In total, 3,896 schizophrenic patients 93.43% were paid by the UCS and 3.82% by the CSMBS. Only 107 patients (2.75%) were paid by the SSS. Significant differences were found in age, gender, marital status, education level and length of stay among the three health schemes. No statistically significant differences emerged in term of number of psychiatric comorbidities and number of admission of the patients across the three schemes. There were equal proportions of male and female patients in the CSMBS, with a relatively high proportion of male patients in the UCS (77.80%) and SSS (78.5%). Most patients were unmarried in the UCS (71.81%) and SSS (60.75) while there were nearly equal proportions of the unmarried and married in the CSMBS. CSMBS members had the highest level of education, whereas UCS and SSS members were mostly primary and secondary school educated. The majority of admissions were single episode (72%) and sole schizophrenia (75%). The median age of the patients was 37 (IQR: 32 to 43 years), with the oldest population seen in the CSMBS (median 48 years; IQR: 40.5 to 56 years) and the youngest patients in the SSS (median 34 years; IQR: 30-39 years). The median LOS of the overall patients was 22 days (IQR: 14-36 days), with the longest stay seen in the UCS (median 23 days; IQR: 14-37 days) while an equal median stay was found in the CSMBS and SSS (median 15 days; IQR: 14-24 days).

Table 2 displays total expenditure and expenditures by category according to insurance schemes. The coefficient of total mean expenditures for the CSMBS (exp9.915=20,231 Baht) was significantly greater than for the UCS (exp9.650=15,521.79 Baht) and SSS (exp9.381=11,849.01 Baht) by 30% and 70%, respectively. The significant difference according to the payment schemes was for the expenditures of medication, hospital bed and board, occupational therapy, physical therapy and inpatient services, while the expenditures for behavior group therapy, nursing services, examination, electroconvulsive therapy and laboratory test showed no significant difference.

Table 3 depicts the results of the multivariate analysis of covariance. Adjustment was made for LOS because expenditure was correlated with LOS, and the UCS had a much longer hospital stay. After the adjustment, the difference according to the payment schemes for medication, hospital bed and board, physical therapy, laboratory test as well as total direct expenditure remained significant. A marginally significant difference (p=0.055) existed in the inpatient general services. The statistical significance of the difference was lost in the expenditure for occupational therapy. Coefficients adjusted for LOS indicated that

Table 1 Characteristics of the overall population and payment schemes at the Khonkaen Rajanagarindra Psychiatric hospital in Thailand from 2010-2012 (N=3,896)

Characteristics	CSMBS patients (N=149)		UCS patients (N=3,640)		SSS patients (N=107)		P value
	number	%	number	%	number	%	
Gender							
Male	76	51.00	2,832	77.80	84	78.50	<0.0001
Female	73	49.00	808	22.20	23	21.50	
Marital status							
Unmarried	56	37.58	2,614	71.81	65	60.75	<0.0001
Married	71	47.65	572	15.71	26	24.29	
Divorced/separated	16	10.73	386	10.60	14	13.08	
Widowed	6	4.03	34	0.93	-	-	
Missing data	-	-	34	0.93	2	1.86	
Education level							
Primary level	20	13.42	1,710	46.98	33	30.84	<0.0001
Secondary level	32	21.48	1,097	30.14	39	36.45	
Occupational level	28	18.79	223	6.13	14	13.08	
Higher level	41	27.52	118	3.24	6	5.61	
Missing data	28	18.79	492	13.52	15	14.02	
Number of comorbidities							
0	116	77.85	2,669	73.34	77	71.96	0.725
1+	25	18.79	754	20.71	22	20.56	
2+	8	5.37	217	5.96	8	7.48	
Number of admission							
1	105	70.46	2,633	72.33	78	72.90	0.883
2	28	18.79	642	17.64	21	19.63	
3+	16	10.74	365	10.03	8	7.48	
Age (years)	48	(40.5-56)	37	(32-43)	34	(30-39)	<0.0001
Length of stay (days)	15	(14-23)	23	(14-37)	15	(14-24)	<0.0001

total mean expenditures range fromexp(10.235) or 27,861.47 Baht for the CSMBS to exp(9.620) or15,063.05 Baht for the SSS. Post-hoc comparisons indicated that total mean expenditure for the CSMBS was significantly different from the other two schemes whereas thetotal mean expenditures for the UCS and SSS were not significant different.

All values show expenditures per admission in Thai Baht. The average annual exchange rate of one US dollar to Thai Baht was 30.00 Baht in the year 2010-2012.

Also, medication, hospital bed and board, physical therapy, and laboratory test expenditures for the CSMBS patients were significantly different from the other two schemes. For CSMBS, the mean expenditure of hospital bed and board was 12,531.49 Bath,

Table 2 Total and category specific inpatient expenditures according to the payment schemes in Thailand from 2010-2012 (N=3,896)

Category of the expenditures*	CSMBS patients (N=149)		UCS patients (N=3,640)		SSS patients (N=107)		F	P value*
	B	95% CI	B	95% CI	B	95% CI		
Drug	7.872	7.728-8.017	6.718	6.689-6.747	6.442	6.272-6.613	124.374	0.000
Hospital bed and board	9.057	8.925-9.189	8.710	8.683-8.737	8.414	8.258-8.570	20.163	0.000
Occupational therapy	3.935	3.473-4.397	4.787	4.693-4.881	4.749	4.204-5.293	6.286	0.002
Physical therapy	.591	.481-.700	0.065	0.043-0.087	0.164	0.034-0.293	43.115	0.000
Behavior group therapy	3.208	2.658-3.758	3.648	3.537-3.760	3.756	3.108-4.405	1.254	0.285
Nursing services	3.960	3.583-4.338	3.808	3.731-3.885	4.039	3.594-4.485	0.778	0.460
Examination fee	1.645	1.238-2.053	1.314	1.231-1.396	1.185	0.705-1.666	1.388	0.250
ECT	1.256	0.889-1.624	1.009	0.935-1.084	1.165	0.731-1.598	1.046	0.351
Laboratory test	4.510	4.029-4.992	4.049	3.951-4.147	4.165	3.598-4.733	1.753	0.173
Inpatient services	8.407	8.281-8.534	8.742	8.717-8.768	8.421	8.272-8.570	20.949	0.000
Total	9.915	9.802-10.028	9.650	9.627-9.673	9.381	9.247-9.514	18.298	0.000

*All values show expenditures per admission in Thai Baht. The average annual exchange rate of one US dollar to Thai Baht was 30.00 Baht in the year 2010-2012.

Table 3 Total and category specific expenditures adjusted for length of stay according to the payment schemes in Thailand from 2010-2012(N=3,896)

Category of the expenditures*	CSMBS patients (N=149)		UCS patients (N=3,640)		SSS patients (N=107)		F	P value*
	B	95% CI	B	95% CI	B	95% CI		
Drug	8.079	7.950-8.207	6.705	6.679-6.731	6.596	6.445-6.748	211.988	0.000
Hospital bed and board	9.436	9.385-9.486	8.686	8.676-8.696	8.696	8.637-8.755	410.865	0.000
Occupational therapy	4.523	4.100-4.946	4.750	4.664-4.835	5.187	4.690-5.685	2.046	0.129
Physical therapy	0.607	0.497-0.717	0.064	.042-.086	0.176	0.046-0.305	45.716	0.000
Behavior group therapy	3.677	3.146-4.208	3.619	3.511-3.726	4.106	3.481-4.730	1.145	0.318
Nursing services	3.894	3.515-4.273	3.812	3.736-3.889	3.990	3.544-4.436	0.371	0.690
Examination fee	1.742	1.334-2.150	1.308	1.225-1.390	1.257	0.777-1.738	2.135	0.118
ECT	1.259	0.891-1.628	1.009	.935-1.084	1.167	0.733-1.601	1.061	0.346
Laboratory test fee	4.682	4.202-5.163	4.038	3.941-4.135	4.294	3.729-4.859	3.616	0.027
Inpatient services	8.772	8.726-8.818	8.719	8.710-8.729	8.693	8.639-8.747	2.904	0.055
Total	10.235	10.189-10.281	9.629	9.620-9.639	9.620	9.565-9.674	319.149	0.000

*All values show expenditures per admission in Thai Baht. The average annual exchange rate of one US dollar to Thai Baht was 30.00 Baht in the year 2010-2012.

Table 4 Regression analysis on variables associated with total inpatient expenditures (natural logarithm) in schizophrenic patients in Thailand from 2010-2012 (N=3,896)

Variables	Unit	Coefficients	S.E.	p	95%CI	Partial R^2
Constant		8.081	0.075	0.000	7.934-8.228	
LOS	Number of days	0.744	0.006	0.000	0.732-0.755	0.819
Insurance schemes	CSMBS/UCS/SSS	-0.297	0.020	0.000	-0.337-(-0.257)	0.059
Education	Levels	0.034	0.006	0.000	0.021-0.046	0.008
Admission	Number of admission	0.015	0.004	0.000	0.008-0.022	0.005
Age	Years	0.002	0.001	0.006	0.000-0.003	0.002
Occupation	Types	0.007	0.003	0.006	0.002-0.013	0.002

followed by inpatient services at 6,438.17 Baht and drug at 3,226.01 Baht. For UCS, the mean expenditure of inpatient services was 6,118.06 Bath, followed by hospital bed and board at 5,919.46 Baht and drug at 816.48 Baht. For SSS, the mean expenditure of hospital bed and board was 5,978.95 Bath, followed by inpatient services at 5,961.04 Baht and drug at 732.16 Baht. The largest expenditure difference was found to be hospital bed and board 6,612.03 Baht (exp9.436-exp8.686), followed by drug expenditure at 2,493.94 Baht.

Table 4 reveals the selected variables for total inpatient expenditure prediction. The longer hospital stay, higher education, number of admission, age and occupation were significantly positively correlated to total expenditure whereas the CSMBS paid significantly greater than UCS and SSS patients. These variables account for 83% of the total variation in the total expenditure. Length of stay accounts for the largest contribution (82%) to the variation in the total expenditure, and the insurance schemes came in second (6%). Although gender and marital status differed significantly according to the insurance schemes (Table 1), these variables did not independently correlate with total expenditure.

Discussion

Recently, expenditure considerations have assumed an increasingly important role in the cost-benefit analysis of psychiatric patients, especially for schizophrenia. The expenditure analysis of 3,896 patients at Khonkaen Rajanagarindra Psychiatric Hospital between January 2010 and December 2012 was performed. The results indicated that age, gender, marital status, education level and length of stay were significantly different whereas the number of comorbidities and number of admission were not significantly different across three different health insurance schemes. The median LOS was 23 days with the longest stay seen in the UCS patients. This is consistent with reports from previous descriptive analysis[23]. The findings also indicated that 93.43% of patients were UCS beneficiaries. Similar results have been reported that over 70% of patients with schizophrenia used the UCS or Public insurance[21,23,30]. In addition, our results presented that SSS and UCS

patients tend to be younger than CSMBS patients. This finding is consistent with Kasemsuk[23] study. Also, SSS and UCS patients were more likely to be male (76%) and unmarried (70%).

Our study showed that there was a strong linear relationship between total expenditure and LOS, type of health insurance schemes, education level, number of admission, age and education. In detail, LOS was the highest value for total expenditure, followed by type of health insurance schemes. This is consistent with findings from other countries[31-33].

In the present study, we found that total mean expenditures for CSMBS schizophrenic beneficiaries (27,861.47 Baht) exceeded those for UCS and SSS beneficiaries (15,199.23 and 15,063.05 Baht). This study found that the UCS and SSS reimbursements (15,027.67 and 15,000 Baht) are slightly below the actual expenditures for schizophrenia. The results from this study are consistent to some extent with the study by Kasemsuk[23]. This may be explained by the fact that CSMBS patients were treated under fee-for-service arrangements which may account for the higher costs relative to UCS and SSS patients. In addition, because psychiatric disorders with SSS benefits are two ceiling prices of reimbursement: 700 Baht per day for room and board lasting 15 days or less, or 15,000 Baht per admission. Fora longer stay, patients had to pay for the full cost of treatment at that out-of-pocket level, whereas UCS benefits are controlled by DRG payment. The findings may reflect pressures to control expensive inpatient utilization by hospitals.

With respect to the three schemes, approximately 20% of the total expenditure comprised the hospital bed and board, inpatient services (19%), and drug (15-17%). Besides, all expenditures for fee-for-service patients were also significantly higher than those for per-capita patients. The largest difference of category specific expenditures was found for hospital bed and board, followed by drug expenditure. This is consistent with previous reports that prescription costs for fee-for-service patients are significantly higher than those for capitated patients[22]. This may be due to the fact that the CSMBS beneficiaries can stay in a private room while UCS beneficiaries can stay only in a common room. Furthermore, the SSS and UCS are characterized by restrictions surrounding original drug use and mandate the use of drugs featured on the National List of Essential Medicines (NLEM), while the CSMBS scheme has not traditionally been burdened with prescription restrictions. Conversely, Kasemsuk[23] found that the largest difference between CSMBS and UCS expenditure was found for drug expenditure. Some differences of these studies may relate to differences in patient demographics, or methods used to calculate total expenditures.

The advantage of this study is that it fully allocates expenditures for every service and procedure associated with the care of patients. It combines information from a variety of financial and medical record sources in an automated fashion. Thirteen patients were excluded as a result of errors in expenditure. These errors would affect the expenditure data estimated by cost-to-charge ratios. It is therefore imperative that hospital pay more attention to the integrity of their financial and medical record information.

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