Impact of Health Care Schemes on Hospital Care and Hospital Cost for Acute Decompensated Heart Failure in Ramathibodi Hospital

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Abstract

Objective: To identify the impact of different types of health care schemes on the hospital care and cost for acute decompensated heart failure in Ramathibodi Hospital.

Background: Heart failure has a significant burden to the health care systems and Health care schemes in Thailand which had been reformed since 2001 using universal coverage (UC) .Currently we are using many types of health care schemes but do not know what the impact of these different types of health care schemes have on hospital care and cost.

Methods: This study was a retrospective study using data from the ADHERE registry at Ramathibodi Hospital. We classified Health care systems into 2 groups. The first type of health care schemes had Full Reimbursement (FRB), while the second type of schemes was a group that had partial reimbursement (PRB). We collected baseline characteristics, medication and clinical outcomes from the different groups of health care schemes. Finally we calculated and compared the direct health care cost of these health care schemes

Results: Hospital care in both groups was not different. Mean direct health care cost per case of 200 events were 172,359 Baht/case. In the FRB group, the mean of the health care costs were 176,654 Baht per case, and in the PRB group it was 163,439 Baht /case. There were no statistical differences between both groups ($p = 0.573$)

Conclusion: The types of health care schemes have no impact on the hospital care and hospital cost for acute decompensated heart failure in Ramathibodi Hospital.

Key words: Health care, Heart failure, ADHERE

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Introduction

Heart failure (HF) is a disease of epidemic proportions in Thailand. In the United States, the incidence of heart failure approaches 10 per 1000 population after age 65 and 80% of men and 70% of woman under age 65 who have heart failure will die within 8 years (1). Moreover, the incidence of HF has not declined during the past 2 decades, but survival after onset has increased overall, with less improvement among women and elderly persons. This disease is still associated with a substantial morbidity and mortality (2).

Acute decompensated heart failure has emerged as a major public health problem over the past decade. There are an estimated 1 million hospitalizations with a primary discharge diagnosis of this syndrome annually, and this number is expected to increase substantially over the next 2 decades (3). Heart failure has become the leading cause of hospitalization in persons older than 65 years of age. Reported death rates appear excessive both during and after hospitalization and high readmission rates reveal the failure of admission to result in effective long-term care (4-7)

Acute Decompensated Heart Failure National Registry (ADHERE) is a national registry of patients hospitalized for acute decompensated heart failure. ADHERE collects data on each episode of hospitalization beginning with initial care in the emergency department or other hospital unit and ending with the patient's discharge to home or another facility or in-hospital death. The ADHERE was developed to provide a large national database describing the clinical characteristics, physician practice and treatment patterns, and outcomes of patients

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hospitalized with heart failure. The objective was to compile a clinical database on the medical management of patients hospitalized with acute HF, using information collected from acute care hospitals. Such information was to assist hospitals in evaluating and improving quality of care for patients with acute HF by tracking quality indicators and providing benchmark data reports; To describe the demographic and clinical characteristics of patients who are hospitalized with acute HF; To characterize the initial emergency department evaluation and subsequent inpatient management of patients hospitalized with acute HF; To identify patient characteristics and medical care practices associated with improved health outcomes in those hospitalized with acute HF; To characterize trends and changes over time in the management of acute HF; To offer surveillance of adherence to practice guidelines as these emerge for the inpatient management of acute HF.

Health care schemes in Thailand have been reformed after the implementation of the policy of universal coverage (UC) of health care in 2001. It has impacted health service, economic health care burden and the net government subsidies budget for hospital charges. In Thailand, we have three types Of Health care schemes, mainly the "Universal coverage care Scheme", "Social security care scheme" and "Civil servant medical service scheme" (Figure 1). They are the key achievement of recent health care reform in Thailand, and provide universal health care coverage for Thai citizens. Thailand achieved universal coverage (UC) in access to health care for the whole population by introducing a tax-financed health insurance scheme to 47 million people (~75% of total population). The UC scheme employs a capitation payment for ambulatory care and a global budget for diagnostic-related groups (DRG) for hospitalization. A nominal payment of 30 Baht (~USD 0.75) per ambulatory visit or hospital admission was levied. In rural areas, the district health system (DHS) is the main contractor whereby the UC members are required to register with their nearby DHS. In urban areas, public and private hospitals are the main UC contractors. The benefit package for the UC scheme covers outpatient care, hospital admissions, health promotion and disease prevention, as well as a wide range of high-cost care with an additional fee schedule outside the capitation and global budget .

The Social Security Scheme (SSS) is a compulsory social health insurance financed by tripartite contributions for 9 million private employees in the formal sector. Payment to health providers rely on a pure capitation basis.

The Civil Servant Medical Benefit Scheme (CSMBS) is a non-contributory, tax-funded scheme with free access to a comprehensive service package, but limited to public hospitals without co-payment. Healthcare providers are paid on a conventional fee for service. This results in rapid cost escalation. In 2006, the expenditure per CSMBS member of 5,300 Baht (USD143) was 3.2 times that of the 1,654 Baht (USD 48) UC member. Policy makers should be informed if cost containment from the capitation payment results in poor quality and welfare loss, and vice versa, that is if expensive CSMBS leads to a higher level of quality and survival.

There are the key achievement of recent health care reform in Thailand which provides universal health care coverage for Thai citizens. This policy has important ramifications for the management of practice for cardiovascular patients especially patients with acutely decompensated heart failure. Because there are a lot of patients and the limitations in the health care scheme and Social security care scheme may significantly restrict current practice and the ability to complete Heart failure guideline suggestions It is, therefore, important to understand the differences of Health care schemes on hospital costs and the management of heart failure; especially in patients with acute decompensated heart failure as in the ADHERE registry (8,9)

The purpose of this study was to answer the following two research questions: 1) What are the hospital costs of ADHF management as a result of the differences in the Health care scheme?, and 2) Are there any differences of ADHF management with the different types of Health care schemes?

Methods

ADHERE is a large, multicenter registry designed to compile a large clinical database on the clinical characteristics, management, and outcomes of patients hospitalized for heart failure. Data were collected on the episode of hospitalization beginning with the point of initial care and ending with the patient's discharge, transfer out of the hospital, or in hospital death.

Sample population

The age eligible for Study was 18 Years and above in Ramathibodi Hospital

Patients who had defined ADHF were enrolled in the ADHERE registry

Acute decompensated heart failure (ADHF) was defined as either new-onset heart failure or decompensation of chronic established heart failure with symptoms sufficient to warrant hospitalization. Patients were identified for inclusion in the registry from admissions given a discharge diagnosis of heart failure based on International Classification of Diseases, ICD-10 for Medical diagnosis of disease and ICD-9 for Medical procedure

Inclusion Criteria

- Age greater than or equal to 18 years at the time of admission to the hospital and received or were eligible to receive a principal hospital discharge diagnosis of HF
- Decompensated HF was present as determined clinically by the patient care team

Exclusion Criteria

- HF was present as a co-morbid condition, but was not a principal focus of diagnosis or treatment during the hospitalization episode

Study design

We reviewed 200 medical records from the Thai ADHERE registry of all consecutive patients admitted to Ramathibodi Hospital between April 2006 to March 2007 to calculate direct health care costs due to hospitalization from admission until discharge. After each retrospective records review, we calculated direct health care costs by cooperating with the policy and planning unit of Ramathibodi Hospital to estimate the cost using the cost accounting method. This study was approved by the Hospital Ethics Committee. All patients gave informed consent before participation of the ADHERE study.

Definitions

1. **Direct health care cost** was defined as the cost of goods and services that were directly provided by the health care system such as hospital days, drugs, home nursing etc.

2. **Universal coverage scheme (UC)** in access to health care for the whole population by introducing a tax-financed health insurance and employs a capitation payment for ambulatory care and a global budget with diagnostic-related groups (DRG) for hospitalization

3. **The Social Security Scheme (SSS)** is a compulsory social health insurance financed by private employees in the formal sector and payment to health providers rely on a pure capitation basis.

4. **The Civil Servant Medical Benefit Scheme (CSMBS)** is a non-contributory, tax-funded scheme with free access to a comprehensive service package, but limited to public hospitals without co-payment. Healthcare providers are paid on a conventional fee for service.

5. **Full Reimbursement (FRB)** group of health schemes where the Hospital received full payment from hospital charge including Cash,CSMBS1,2

6. **Partial Reimbursement (PRB)** group of health schemes where the Hospital received partial payment from hospital charge including UC-H,UC-R,SSS-H,SSS-R, Sod and Finance

Statistical analysis

1. Costs were analyzed using mean, median, percentiles and standard deviations

2. Descriptive data are presented as percent or ratio

3. Group data were compared using an independent T test and Chi square test

Results

The baseline characteristics of patients are shown in Table 1. The enrollment for ADHERE was started in April 2006 and lasted until March 2007. 146 patients and 200 events were enrolled at Ramathibodi Hospital. The mean age of patients was 69 years and 62.5% were women with 57.5% of patients having a prior history of heart failure. A history of hypertension was most common (77%) and the mean initial systolic blood pressure of registry patients was 144 mmHg and the mean initial diastolic blood pressure of registry patients was 80 mmHg. A history of coronary artery disease (55%), diabetes (66.5%) and dyslipidemia (66.5%) were commonly present as well. Other important conditions included a history of atrial fibrillation (22.5%) and chronic renal insufficiency in 48% of cases. The mean initial serum creatinine was 2.3 mg/dL and 13% were on chronic dialysis.

All patients (100%) presented with dyspnea and 34.5% had dyspnea at rest. Rales and peripheral edema

Table 1. Demographic characteristics and medical history of ADHERE enrollees in Ramathibodi Hospital

	N = 200,%	PRB :N = 65,%	FRB: N = 135,%	P value
Age –mean yrs	69	65.15	70.63	**0.01**
Gender				
Male	75 (37.5%)	20 (30.8%)	55 (40.7%)	0.172
Female	125 (62.5%)	45 (69.2%)	80 (59.3%)	0.166
Medical history				
Heart failure	115 (57.5%)	42 (64.6%)	73 (54.1%)	0.158
Coronary artery disease	110 (55%)	38 (58.5%)	72 (53.5%)	0.495
Myocardial infarction	88 (44%)	28 (43.1%)	60 (44.4%)	0.855
Chronic renal failure	96 (48%)	29 (44.6%)	67 (49.6%)	0.506
Atrial fibrillation	45 (22.5%)	20 (30.8%)	25 (18.5%)	0.052
Diabetic	133 (66.5%)	43 (66.2%)	90 (66.7%)	0.943
Hypertension	154 (77%)	46 (70.8%)	108 (80%)	0.146
Dyslipidemia	133 (66.5%)	41 (63.1%)	92 (68.1%)	0.477
Stroke	37(18.5%)	8(12.3%)	29 (21.5%)	0.118
Current smoking	3 (1.5%)	2 (3%)	1 (0.7%)	0.082
Physical and laboratory				
Initial mean systolic BP		143	144	0.845
Initial mean diastolic BP		80	80	0.895
Initial mean sodium		136.49	135.92	0.502
Initial mean cretinine		2.0	2.5	0.210
LVEF initial	38.66	39.13	38.19	0.720
Baseline medications				
Loop diuretic	101 (50.5%)	37 (56%)	64 (47.4%)	0.207
Aldosterone antagonist	21 (10.5%)	6 (9.2%)	15 (11.1%)	0.685
ACE inhibitor	55 (27.5%)	23 (35%)	32 (23.7%)	0.083
ARB	22 (11%)	4 (6.2%)	18 (13.3%)	0.129
Nitrates	63 (31.5%)	24 (36.9%)	39 (28.9%)	0.252
Beta-blocker	88 (44%)	20 (30.8%)	68 (50.4%)	**0.009**
Digoxin	30 (15%)	13 (20%)	17 (12.6%)	0.169
Death	26 (13%)	7 (10.7%)	15 (11.1%)	0.734
Principle diagnosis				
Heart failure	159 (79.5%)	48 (73.8%)	111 (82.2%)	0.169
Secondary diagnosis				
Heart failure	156 (78%)	46 (70.8%)	110 (81.5%)	0.154
Hospital stay (days)				
Mean ICU	3.63	3.48	3.70	0.779
Mean ward	9.13	8.78	9.35	0.775
Mean total stay	12.76	12.26	12.99	0.714
Adjust RW	3.58	3.659	3.55	0.827

PRB = partial reimbursement, FRB = full reimbursement, LVEF = left ventricular ejection fraction, ACE = angiotensin converting enzyme, ARB = angiotensin receptor blocker, ICU = intensive care unit, RW = relative weight

were present in 98% and 66.5% of the cases, respectively. The mean ejection fraction according to medical history was 43.1%. Assessment of left ventricular ejection fraction (LVEF), obtained during or before hospitalization, was available for 64.5% of ADHERE patients. The mean initial assessment of left ventricular ejection fraction (LVEF) was 38.7%. The median length of stay for all hospitalized patients was 12.8 days. The median length of stay for intensive care unit (ICU) patients was 3.6 days.

27.5% of patients were on an ACE inhibitor at discharge. Most of the Patients received diuretics and Beta blockers in 50.5% and 44% respectively. Some (10.5%) of the patients got Aldosterone Receptor antagonist and digoxin was given in about 15% of the cases

The in hospital mortality for all patients in the ADHERE was 26 patients from 200 events (13%). Aggressive treatment was usually required during their hospitalization; especially those cared for in ICUs. Mechanical ventilation was required in 41% and dialysis in 13% of patients whose stay included intensive care

As mentioned above, health care schemes in Thailand had been reformed after implementation of the policy on universal coverage (UC) of health care in 2001. It impacted on health service, health care economic burden and the net government subsidies budget for hospital charge.

In our study, we classified Health care systems into 2 groups, the first included CASH = patients paid hospital charge by themselves, Civil = Civil servant medical service scheme: hospital payment for patients was all supported by the government. We grouped these types of health care schemes as Full Reimbursement (FRB). The second group included UC-H = Universal coverage care Scheme from other Hospitals, UC-R = Universal coverage care Scheme from Ramathibodi Hospital, SSS-H = Social security care schemes from other hospitals, SSS-R = Social security care schemes from Ramathibodi Hospital,

Figure 1. Health care finance and service provisions of the Thai health care system after implementation of the universal coverage policy

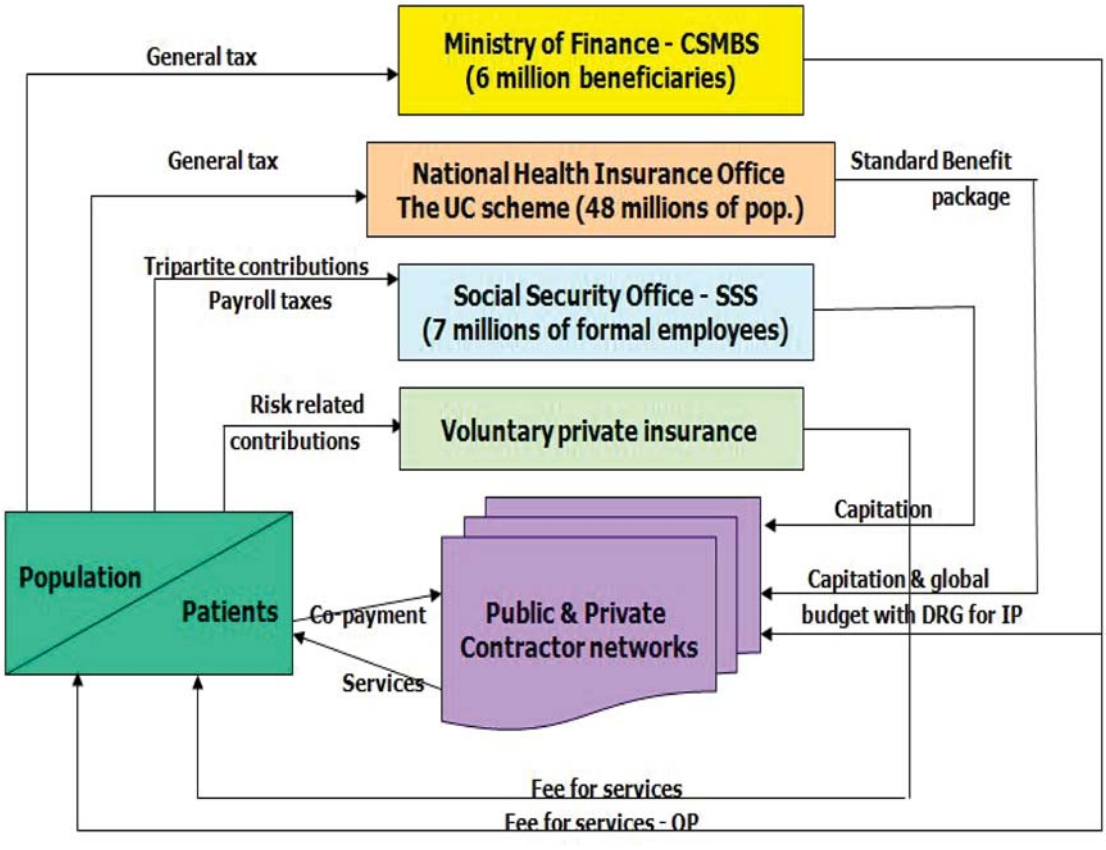


Table 2. Hospital economic status: Total and subgroup of ADHF patients

Hospital economic	Total N = 200	Mean /case	PRB N = 65	FRB N = 135	P valve
Hospital charge	26,725,182	133,625	8,376,092	18,349,090	0.829
Hospital DRG payment	22,214,413	111,072	3,244,949	18,349,090	<0.001
Hospital Cost	34,471,859	172,359	10,623,515	23,848,344	0.674

PRB = partial reimbursement, FRB = full reimbursement, DRG = diagnosis related group

Figure 2. Type of Health schemes and percentage

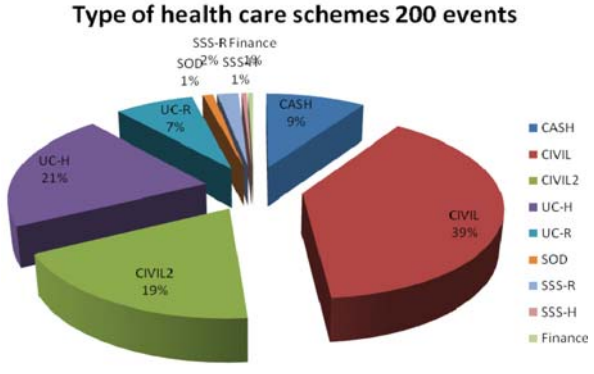


Figure 3. Mean direct hospital care cost comparison between FRB and PRB

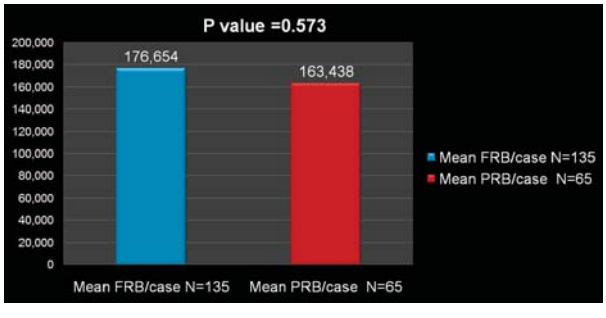


Figure 4. Mean type of hospital cost :in subgroups of FRB, PRB

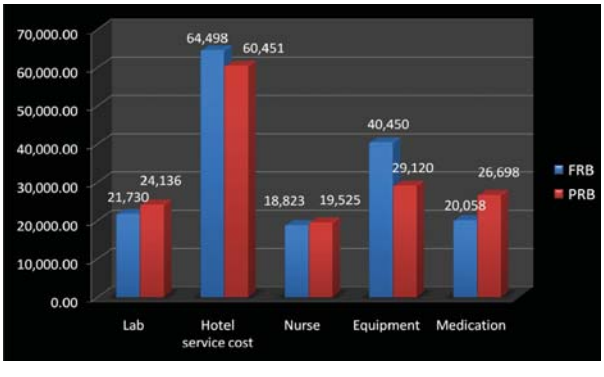
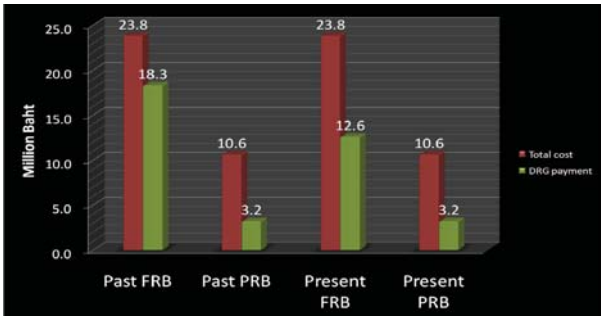


Figure 5. Difference between Hospital cost and DRG payment in the past and present day



Sod = Soldier security welfare, Finance = Patients paid with refinance systems. In this group, the hospital can not collect the money directly from the hospital charge so we grouped this type as Partial Reimbursement (PRB).The percentage of both groups is shown in Figure 2.

As we classified Health care systems into 2 groups of FRB and PRB the data showed no difference in baseline characteristics, baseline medical history, and medical treatment such as ACEI, ARB, Diuretic, or baseline treatments for both groups. There also was no difference of LOS and ICU duration, in the subgroups of FRB. Moreover, the median length of stay for FRB patients was 13 days and median length of stay for ICU patients was 3.7 days whereas in the PRB group the median length of stay was 12.3 days and median length of stay for ICU patients was 3.5 days with no statistical difference in either group (p = 0.714 and p = 0.779 respectively. Most of the data are shown in Table 1.

The total direct health care hospital costs of the 200 event admission of ADHF patients between April 2006-

April 2007 was 34,471,860 Baht while the total direct health care hospital charge was 26,725,182 Baht, and the total direct health care hospital DRG payment was 22,214,414 Baht. In the subgroup of health care schemes for FRB, the total health care cost was 23,848,344.20 Baht whereas the PRB group was 10,623,516 Baht. There was no statistical difference between both groups ($p = 0.674$) as shown in Table 2.

The mean direct health care cost per case of the 200 event admission for ADHF patients between April 2006 and April 2007 was 172,359 Baht. As shown in figure 3, in the subgroup of health care schemes for FRB, the mean of the health care cost was 176,654 Baht whereas in the PRB group it was 163,439 Baht. There was no statistical difference between both groups ($p = 0.573$).

The total direct health care cost was 34,471,860 Baht. This was mainly due to hospital hotel service care, non-pharmacological material, Nursing and doctor treatment intervention and pharmacological costs. Hotel service care was about 36% of the total cost for ADHF patients. Equipment was about 21%, medication was about 13% as was laboratory investigation which was approximately 13% as well. Nursing care was 11%. The hospital cost mean was 172,359 Baht/case. The hotel service care mean cost was 63,139 Baht and the equipment mean cost was 36,768 Baht while the medication mean cost was 22,217 Baht which was similar to the Lab investigation mean cost of 22,512 Baht. Mean nursing care costs was 19,052 Baht. In the subgroups of FRB and PRB the data showed no statistical differences in the mean type of hospital costs between the groups. This data is shown in Figure 4.

In our study, 26 of 200 events were death and and the cost for this was 5,112,925 Baht (21.8% of the total direct health care cost). In the subgroup of health care schemes for FRB the, mean of the death health care cost was 2,991,352 Baht whereas in the PRB group it was 2,121,573 Baht. There was no statistical difference between both groups.

In this study, the median length of stay for all hospitalized patients was 12.8 days. The median length of stay for ICU patients was 3.6 days. In the subgroup of health care schemes for FRB, the median length of stay for patients was 13 days and median length of stay for ICU patients was 3.7 days. In the PRB group the median length of stay was 12.3 days and median length of stay for ICU patients was 3.5 days. Again there was no statistical difference between both groups ($p = 0.714$ and $p = 0.779$ respectively). The cost per day in all groups was 13,508 Baht/day. In the subgroup of health care schemes for FRB the cost per day was 13,599 Baht/day and In subgroup of health care schemes for PRB the cost per day was 13,331 Baht.

The total amount the hospital collected was 22,214,414 Baht. In the subgroup of health care schemes for FRB the total amount the hospital collected was 18,349,090 Baht whereas it collected from the PRB group 23,244,949 Baht. There was no statistical difference between groups. The mean total amount the hospital collected for the 200 event admissions of ADHF patients between April 2006 and April 2007 was 111,072 Baht. In the subgroup of health care schemes for FRB the mean collected by the hospital was 135,919 Baht and it collected from the PRB group 49,922 Baht. This big difference in hospital collection between the groups was statistically different (Figure 4).

Discussion

We first found that there was no difference in treatment between different types of health care schemes because there were no differences in baseline characteristics for both the PRB and FRB group and no difference of LOS and ICU duration. Moreover there were no differences in procedures during hospital admission and death, diagnosis and hospital stay were not statistically different as shown by the data. So it appears that different types of health care schemes have no impact on the hospital outcome in the Treatment of ADHF in Ramathibodi Hospital. We treat patients without prejudice to their Heath care scheme.

Second, when we focus on the Total hospital cost and mean hospital cost .there were no statistical significant difference between the FRB and PRB group. The big differences were Hospital DRG payments between these two groups. We calculated the total hospital cost in both groups of the health care schemes. In 146 patients we spent 23.8 million Baht on treatment for FRB group but received back from the DRG system about 18 million. In the PRB group we spent approximately 10 million Baht

but only 3.2 million Baht had been actually paid. This meant we lost about 5.5 million Baht in the FRB and about 7.4 million Baht in the PRB group. Thus our total loss was about 13 million baht in 1 year.

From now on, Ramathibodi Hospital has been reformed to a new strategy because of the Privatization Law, The Civil Servant Medical Benefit Scheme (CSMBS) formerly, and tax-funded scheme with free access to a comprehensive service package, but limited to public hospitals without co-payment. Healthcare providers are paid on a conventional fee for service and full support from the government. However, from now on this Law has changed how payments will be made. The CSMBS will charge from government payment to DRG systems diagnostic-related group (DRG) for hospitalization the same as the UC and SSS. This will make a difference in profit and income from the hospital's perspective.

As we mentioned before, we calculated the direct health care cost to be 33.8 million Baht but the hospital collected only 21.2 million baht and thus lost approximately 13 million Baht in the past year. Presently Thailand has reformed the payment in Privatization Law, CSMBS will charge from Government payment to DRG systems the same as UC and SSS systems and Ramathibodi Hospital's estimated collected cost will be only 16.2 million Baht .This is because in the FRB subgroup we can collect 12.6 million Baht instead of 18.3 million Baht and in the PRB subgroup we can collect 3.2 million Baht which is the same as now. So with this Privatization Law Ramathibodi Hospital will increase its loss of hospital collection from 13 million Baht to 18 million Baht. This estimated total lost of Hospital DRG payment for treatment of ADHF patients in 200 events in 1 year after the Privatization law is shown in the data in figure 5.

From our study, we suggest that we can save more direct health care hospital costs from unnecessary investigation, unnecessary treatment, shortening LOS from discharge planning, and we can improve our registry to get an accurate DRG. This may be the solution to survive in the near future.

Limitations

There are some limitations of this study. First, our estimated direct heath care costs were based on data collected from the Ramathibodi Hospital data center. Therefore some of the labs may have been done but their was no registry in the computer as well as lack of data for evaluation such as bed side ECHO, urine analysis, plenty of blood sample kits, etc. Second, some of the data that have been registered in the systems may be miscoded because many Doctors, Residents, Externs, Nurses -RN,-PN and clerks can have a human error in processing codes and do not update them.

Conclusion

From our study we demonstrated that there were no differences in treatment as well as no differences of hospital cost between different types of health care schemes in ADHF patients at Ramathibodi Hospital. The total direct health care hospital cost of the 200 event admission of ADHF patients between April 2006 and April 2007 was 23,369,441 Baht mainly due to non-pharmacological material, inpatient care, treatment intervention and pharmacological costs. The mean direct health care cost of the 200 event admission of ADHF patients from April 2006 to April 2007 was 116,847 Baht. In the subgroup of health care schemes for FRB, the mean of health care costs was 120,809 Baht and in the PRB group it was 108,618 Baht , again with no statistical differences between both groups ($p = 0.573$).

There was no impact due to the different types of health care schemes on Hospital outcome or Hospital cost of ADHF patients in Ramathibodi Hospital .We treated all patients equally. However, from this study the Hospital cost and DRGs actual payment had very huge differences; thus, we have to keep our standard of care while using our budget wisely.

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