



## CHAPTER 5

### DISCUSSION, CONCLUSIONS, AND IMPLICATION

In this chapter, the result of this study will be discussed and compared with other studies. The policy implications will be described and recommended in future.

#### 5.1 Discussions

There are many differences in the studies of cost for open-heart surgery, which are due to a variety of reasons, for example, the rate of cost of personnel and materials, cost of the building and equipment, the costing methods, the cost assumption, scope of the study and even the exchange rate. According to the comparison of this study with other studies in developed countries such as the study in Amrital Institute of Medical Sciences and Research Center (AIMS) (1994), we found that the total charge for Atrial Septal Defects (ASD) device including with procedure charge is required three day hospital stay and spends 75,000 bahts, which is higher than charge in this study (60,542 Bahts.), calculated by exchange rate equals \$1 to 40 bahts. Even though the charge of open-heart surgery in this study is much lower than other studies in developed countries, but the amount of charge mentioned above seems to be high in Thailand due to limited health care budget.

In Thailand, Jaiyoudsrind, S. et al (2001) studied about costs of open-heart surgery at Institute heart disease, and found that the average total cost in Ordinary open heart is 82,579.19 bahts, for Coronary Artery Bypass Graft, 95,389.82 bahts, and 169,592.83 bahts for Complex Congenital Operation which are higher than this study's result because the total cost of hospital charge prices in this study are only calculated by economic allocation criteria, laboratory tests, and anesthetic in operation room but excluding with the administrative cost.

Research questions are formulated in chapter one what factors that determine inpatient charge of open-heart surgery are, and what guidelines of the reimbursement for open-heart surgery are. From this study, we found that there were many differences in hospital charges among public hospital and university hospital due to the National Standardizing Price of the Ministry of Public Health 1994. In reality the hospital pricing mechanism is influenced by many factors especially administrative decision-making. The charges may be adjusted from the rate of National Standardizing Price due to changes in the economic aspect. The national standard price was not update since 1994, some hospital charges may reflect to the change in price of input especially after the economic crisis in year 1997 while some may still follow the National Standardizing Price.

In fiscal year 2001, Thailand has many health schemes such as voluntary health card, low-income health card, social security schemes and civil servant medical benefit scheme. The charge to the patient should be the same regarding to difference in each scheme, but in reality the hospital sometimes cross-subsidized charge between different schemes due to low reimbursement rate in some scheme. Also in some scheme such as civil servant medical benefit scheme hospital charges are per item charge and are totally collect from the patient. In some other schemes, some charge data are just record data, which refers to the charge that get reimbursement from the Ministry of Public Health. There is no incentive for the hospital to record the complete total charge they require for treating that inpatient case because the reimbursement rate are limited on National Standardizing Price.

#### **The Characteristic of Factor Determines Inpatient Charge**

The evidence characteristics of the patient from model testing which affects to the inpatient charges are: age, length of stay, patient type of payment, intensity of operative procedure and type of hospital. The other characteristics are not explicit affected on the probability of the inpatient charge.

## Evidence Characteristics of Determinants of Inpatient Charge

### Age

Age is determinant of inpatient charge of open-heart surgery. The age of patient operated on open-heart surgery directly affects to inpatient charge.

### Length of Stay

The average length of stay in this study equals to 19 days ranging from 8 to 46 days. Number of length of stay depends on severity and complications, and directly varies on inpatient charge of open-heart surgery. Regarding to Statistic Department of Ratchawithi hospital, the average length of stay in hospital is only 7 days in general which open-heart surgery hospitalization time is much longer than the hospital's average. In order to reduce the charge of open-heart surgery, fewer complications are the best way to under take the open-heart surgery.

In this study, we examine only the charge from the day of admission to the day of discharge. Therefore, the charge of screening, which occurs before admission, is excluded. After the patients receive screening for heart disease, they have to wait for a queue for operation from the hospital, which this process may take time at least two years normally. And moreover, some patients receiving screening tests cannot take open-heart surgery because they become to die before a long queue operation. As a result, the hospital may lose resources without any outcomes. Some criteria for screening in open-heart surgery service and criteria for selecting the suitable patients should be performed in order to take open-heart surgery service so that the resources would be used more efficiently.

### Patient Type of Payment

Health benefits and criteria are differences in determination of reimbursement rate in each health insurance scheme. For example, the Social security scheme and the

subsidization of the Ministry of Public Health are limited by the maximum payment of 100,000 bahts. In contrast, the Civil servant medical scheme is not limited in the amount of money but limited to some categories such as drug items.

According to inpatient charge of open-heart surgery in this study, average charge of ordinary open-heart is 57,372 bahts, Coronary Atery Bypass Graft is 72,695.68 bahts, and complex congenital operation is 140,036.6 bahts, are lower than cost for open-heart surgery in Institute heart disease because financial data is not based on cost, different and variable in each hospital price positioning as well as lower claim that some hospitals issue to Insurance Office due to Ministry's regulation and determination of Health Insurance Office which some details can not be claimed and covered actual charge. In contrast, charge is classified with surgery varied by cost trend. At the same time, inpatient charges would be varied based on complexity of surgery. We can summarize that inpatient charge affects to cost of surgery.

#### Type of Hospital

The hospital charges in this study depend mainly on the level of organization. Higher charges are resulted from some factors due to the characteristic of level of hospital, which is input price or management efficiency. However, the charge are somewhat may be related to the behavior of the organization, which is different in each level. Some possible explanations about why small hospitals charge patients at lower prices than large hospitals may be as follow; Firstly, higher level hospitals should have higher cost, which leads to higher charges. University hospitals that have resident training program may have some more cost from extra laboratory diagnosis cost for teaching purpose, more complicated cases. Secondly, university hospital operates complicated disease. In this study, we found that 306 cases (89%) are operated in university hospital. As a result, inpatient charge would be higher than other hospitals.

### Type of Operation

Type of open-heart surgery directly affects to cost. This research found that inpatient charge of Ordinary open heart is 57,372 bahts, 72,695.68 bahts for coronary artery bypass graft, and 140,036.6 bahts, for complex congenital operation, which tends to be higher consequently. Table 4.9 shows that average cost is higher than average charge in this study because the charge item of reimbursement is limited by national standardizing price in 1994. Some hospitals claim only items of service charge according to determining charge items of Health Insurance Office.

According to current information, inpatient charge rate that reflects to cost per unit per each patient is approximately lower than actual cost due to inpatient rate is determined long time ago. As a result, the cost of study of open-heart surgery in Ratchawithi hospital is higher than inpatient charge in this study. As mentioned above, inpatient charge should be adjusted to correspond with current situation.

End open-heart surgery period leads to be higher operation cost while the result of operation decline. Normally, inpatients of open-heart surgery have a queue at least 2 years approximately which approaches to end period. Any patients are operated at early stage immediately as soon as indicator occurs, cost of operation will be lower as well.

### Intensity of Operative Procedure

Intensity of operative procedure is one determinant of inpatient charge. This variable has negative and significantly related to average charge. The percentage of number of operation into 4 groups, one procedure about 77.1%, two procedure about 19.1%, three procedure about 1.5%, and four procedure about 2.3%. Percentage of number of operation is expected to represent the management efficiency of the physician relative output of the hospital. Hospital with high percentage of number of operation should have lower productivity. In this study refers to one operation. Patients

have higher number of operation than other patients; if the hospital has many patient they may incur higher used resource, which reflects the input price also.

In conclusion of regression analysis result and the discussion above, internal input factors of the hospital such as length of stay, and age from the hypothesis are significantly related to inpatient charge, which in theory should have relation.

## 5.2 Conclusion

The objectives of this study are determined inpatient charge and what factors are related to inpatient charge. The scope of the study is limited to hospital sent the information to the Health Insurance Office in fiscal year 2001. Data were collected from the hospital report of inpatient records and hospital annual statistics. This study use inpatient charge as a dependent variable. The explanatory variables are eight output measurement variables, four patients' clinical characteristic, three-physician practice characteristic and one hospital characteristic. Finding from the general linear regression are that the inpatient charge is total inpatient charge of open-heart surgery from the day of admission to the day of discharge averaged 94,889.63 bahts per patient, Ordinary open heart averaged 82,384.51 bahts, coronary artery bypass graft averaged 72,468.96 bahts, and complex congenital operation averaged 115,189.61 bahts There are two patients clinical characteristic, two-physician practice characteristic, and one hospital characteristic that have significantly positive relationship with inpatient charge. Ministry of Public Health subsidized patient, length of stay, type of hospital and age are all significantly related at 99% confidence level. The higher age has higher coefficient of the regression model. The R-square of the regression was .627, which indicates that 62% inpatient charge can explain by the explanatory variables in the regression.

This study tries to develop a methodology of charge analysis of open-heart surgery in Thailand. It is the retrospective determination of inpatient charge from individual medical records. The costs were collected from many relevant departments in hospital.

Regarding to major factors affected to inpatient charge in the determination of hypotheses, findings from statistical analysis disclosed that there are eight major factors significantly affected to inpatient charge. Those factors consist of inpatient age, length of stay, intensity of operative procedure, types of hospital, and MOPH insured patient.

Integrating both findings, the revised model of inpatient charge is comprised of eight factors including with types of hospital, patient of age, length of stay, intensity of operative procedure, and MOPH subsidized. It can measure inpatient charge.

The important implication of this study is how the hospital copes with the high cost of catastrophic illness among heart diseases. This study provides basis for Ministry of Public Health to consider the rate of appropriate reimbursement in open-heart surgery.

### 5.3 Policy Implications

In present, Ministry of Health concentrates on reimbursement of open-heart surgery according to types of operation. In this study was found that factors, which reflect to reimbursement of open-heart surgery, are age, length of stay, number of operation procedure, Ministry of Public Health subsidized, and type of hospital. At the same time, we found that charges reflect to cost directly. Table 4.16 is shown that average cost and average charge of open-heart surgery are varied by complexity of surgery in trend. The reason is average cost is higher than average charge, because charge is reimbursed by hospitals by determining charge item that can only reimburse determination of items and prices.

Reimbursement of open-heart surgery will be paid according to free for service, but not exceeding than 100,000 bahts per capita. Each item will be reimbursed according to National Standardizing Price in 1994. Generally, hospitals reimburse for any charge in difference.

#### 5.3.1 Guidelines of the reimbursement for open-heart surgery:

Reimbursement of open-heart surgery should not be paid as flat rate (100,000 bahts per capita). Other factors should be considered in common. This study found that factors that affect to charges are Length of stay, age, patient type of payment, intensity of operative procedure, and types of hospital. Charges of open-heart surgery in same level of hospitals would be similar by comparison between average charge in Chest Center Hospital and average cost in Ratchawithi hospital.

Length of stay is determinant of patients with open-heart surgery reimbursement and determined by diagnosis related groups (DRGs). Ministry of Public Health subsidization is explicit increasing of inpatient charge of open-heart surgery because normally their healthcare financing is determined by the hospital. This evidence means that the hospital is strict to the Ministry of Public Health subsidization to make the reimbursement. Therefore the hospital must continue their function and be a model for other groups of privilege for healthcare.

5.3.2 Compensation of open-heart surgery. The Central Fund Office (Health Insurance Office, MOPH) is responsible for medical service fees in case of high-cost care. This method has lessen the burden of other fund offices to a certain extend, However, the overall expenditure is greater than the amount of funds available, and thus, the method is not a solution to the losses.

5.3.3 It should have systematic medical record reviews within patient wards by internal audit teams. The team should comprise of at least four positions. They are a physician head, a senior nurse, a medical recorder and an accountant. After the team has sent medical abstracts to the hospital medical record division, the division has to



recheck the validity of patient and financial information by randomly select extremely high and low costs of admission cases as well as the open-heart surgery patients.

5.3.4 Should separate High Cost Care budget allocation with capitation budget and institute High Cost Care Fund by donation provider's source to research and study cost per unit as well as improving claim charge to be equity for provider and, finally, patient should involve with exceed charge. High cost care foundation and professional association should determine pattern of disease and efficiently cure method.

#### 5.4 Recommendations for Future Study

5.4.1 Because this study is a retrospective design and has many limitations, Hence it is better to take charge analysis in prospective design while the researcher can design more carefully about data collection of charge for more accurate results.

5.4.2 This study examines only provider charge since the day of admission to the day of discharge. Actually, charges are incurred not only in hospitals. Patients and their families have to be near a big burden, for example, long stay in hospital, quit work, and even unable to work after discharge from the hospital. Consequently, it is important to study the charge incurred by the patients and families.

5.4.3 Many patients cannot afford the high expenditure because open-heart surgery is a highly technical procedure that requires extensive hospitalization and very expensive. Therefore, it is necessary to study about the options for relieving the financial burden associated with open-heart surgery. For example, the Social security scheme, the Civil servant medical benefit scheme, the Ministry of Public Health subsidized, and private insurance can be valuable resources in planning for these financial needs. In the United States of America, there are Government programs like Medicaid, for people of low income and Social Security for insured persons, which can provide financial assistance for health expenses and disability. It is very interesting to promote all Thai

people to have at least one health benefit scheme especially for the catastrophic illness like severe heart diseases as its treatment, open-heart surgery, is very expensive.

5.4.4 Study of individual cost of open-heart surgery should be activated to get benefit from standard evaluation in open-heart surgery claim and consider database to determine ceiling price of open-heart surgery. Consequently, charge that reflects to cost should not be determined by charge item according to national standardizing price and charge will be reimbursed by actual cost.