The Study of Service Quality and Costs of Hospitals in Social Security System in Thailand

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The Asian Conference on the Social Sciences 2015
Official Conference Proceedings

Abstract
This research aims to study factors influence the medical service quality of hospitals in the Social Security System. Also, it considers the problems and obstacles of the services. Additionally, cost-efficiency analysis is included by using the quantitative and qualitative analysis. The study found that hospitals in the Social Security System have high service quality and can achieve the high satisfaction level from insurers. The study found that the satisfactions on the existing medical and healthcare services are less than the expected level, but more than the minimum acceptable level. These revealed that the hospitals in the Social Security System still have to develop their service quality to meet the insurers' needs.

Cost-efficiency analysis of the hospitals revealed the opposite relationship between service quality and costs of healthcare. As a result, hospitals can reduce costs of management while providing better quality of healthcare services to the insurers and increasing insurers' satisfactions by obtaining proper medical services. Hospital can provide better services and the insurer can gain higher satisfactions when there are an availability and adequacy of medical services, effectively managing their costs, and properly allocating all their resources. However, some hospitals have problems to provide good medical services. The major limitation of the large-sized hospitals is budget limitations while the medium-sized hospitals face the unavailability of the facility. The small-sized hospitals have drawback in terms of unavailability of equipment and medical technology limitations. Considering on type of hospital, the major limitations of public hospital

Keywords: health economics, service quality index, hospital's cost efficiency analysis

Introduction

Social Security Office (SSO) of Thailand provides several insurance services to assure a minimum security to the people. However, some services such as providing medical and health care services cannot be performed by the SSO itself. Therefore, the coordination with hospitals is necessary. The SSO has contracts with several major hospitals devoted to providing medical services to more than 10 million insurers. In order to accommodate the increasing in the number of insurers, it currently has a total of 243 hospitals in the social security system nationwide. Initially, these hospitals must pass the inspection requirements such as the service quality standards in order to guarantee the service quality of the hospitals to the insurers.

Therefore, the main objective of this research is to study the quality of service as well as cause of problems and obstacles of improving the service quality are included. The analysis of factors affecting the quality of medical services is also examined. Moreover, the study expands the analysis on the incentive to improve the service quality of the hospital. Certainly, profit is the major incentive, so raising income and minimum cost management are the main purposes of the hospitals' operations. Analyzing the cost-effectiveness of health care facilities is integrated in order to provide guidelines for the hospital management plan as well as to continuously encourage the development of medical and health care services quality while gain benefit from better resource allocation.

Methodology

The study separates the analysis into 2 parts. First, the service quality and insurers' satisfactions are examined. Second part is the estimation of the cost efficiency of hospitals in the Social Security System.

SERVQUAL

To determine service quality and satisfaction, the study use SERVQUAL. It is a multiple item scale for measuring consumer perceptions of service quality. It is an effective approach has been studied and its role in the analysis of the difference between customer expectations and perceptions. The essence of this tool is to find the quality of products and services in order to satisfy customers. The SERVQUAL instrument has been the predominant method used to measure consumers' perceptions of medical service quality in this study. It has five generic dimensions or factors, which are stated as follows.

(1) Tangibles: Physical facilities, equipment and appearance of personnel.
(2) Reliability: Ability to perform the promised service dependably and accurately.
(3) Responsiveness: Willingness to help patients and provide prompt service.
(4) Assurance (including competence, courtesy, credibility and security):
Knowledge and courtesy of employees and their ability to inspire trust and confidence.
(5) Empathy (including access, communication, understanding the customer):
Caring and individualized attention that the hospital provides to its patients.

The SERVQIAL concept is to use gap analysis. The study determines the gap between three variables, which the lowest service quality, which patients can accept

(the minimum acceptable service: Minimum), the desired service quality (the service is expected to receive: Expectation) and the perceived service quality (the service has actually been: Perception). The service ratio scale is also applied.

Service Quality of Expectation (SQE) = Perception (P) / Expectation (E).
Service Quality of Minimum (SQM) = Perception (P) / Minimum (M).
Service Quality Index (SQI) = SQE * SQM

Table 1: Service quality analysis

	SQM<1	SQM=1	SQM>1
SQE<1	1) The perception is less than the expectation and the minimum of acceptable level. The insurers are very dissatisfied.	2) The perception is less than the expectation but equal the minimum of acceptable level. The insurers are dissatisfied, but acceptable.	3) The perception is less than the expectation but more than the minimum of acceptable level. The insurers are dissatisfied, but acceptable. Insurers ask for improvement.
SQE=1	4) The perception equals the expectation, but less than the minimum of acceptable level. The insurers are dissatisfied, but accept the limitation of the hospitals.	5) The perception equals the expectation and the minimum of acceptable level. The insurers feel neutral.	6) The perception equal the expectation, but more than the minimum of acceptable level. The insurers are satisfied and do not expect on the service quality.
SQE>1	7) The perception more than the expectation, but less than the minimum of acceptable level. The insurers may be dissatisfied, and do not expect on the service quality.	8) The perception more than the expectation, but equals the minimum of acceptable level. The insurers are satisfied	9) The perception more than the expectation and the minimum of acceptable level. The insurers are very satisfied since the service quality is more than the expectation.

Source: Authors

There are 9 criteria to analyze the service quality. If the results are in 1, 2, 3, 4 and 7 criteria, it means the insurers are not satisfied since the SQI will be less than 1. Thus, the hospitals must improve the services in order to increase the satisfactions.

Cost Efficiency

To estimate the cost efficiency, the Stochastic Frontier Analysis (SFA), introduced by Aigner, Lovell and Schmidt and Meeusen and van den Broeck, is applied. There are two terms involved in the equation. First part is traditional random error (V_{it}) and another is shows inefficiency effects (U_{it}). Thus the hospitals' costs also will be away from the boundary as long as they continue operating inefficiency. In order to determine the cost efficiency function by using stochastic frontier, this paper modifies the error term as $(V_{it} + U_{it})$ follows Schmidt, Schmidt and Lovell and Battese and Coelli. They defined the cost efficiency function as follows:

$$C_{it} = \beta_i a_{it} + (V_{it} + U_{it})$$

The cost inefficiency effect, U_{it} in the stochastic frontier equation could be defined as

$$U_{it} = \xi_i b_{it} + W_{it}$$

Where

C_{it} = Total cost of hospital i at time t

a_{it} = Input price and other explanatory variables at time t

β_i = Unknown parameters

V_{it} = Random variables (Independent with the normal distribution which assumed to be iid N(0, σ^2) random errors, and independently distributed of the U_{it}'s)

U_{it} = Non negative random variables (Inefficiency effects which are assumed to be independently distributed as truncations at zero of the normal distribution)

b_{it} = Specific cost inefficiency variables

ξ_i = Coefficients of specific cost inefficiency variables

W_{it} =The random variable follows truncated normal distribution with mean zero and variance σ^2

U_i is the cost inefficiency, which consists of positive departures from the cost frontier. It presents the distance above the cost frontier. If hospitals effectively managed their costs, the costs will be lower and close to the boundary line. However, the costs of hospitals with inefficient management are higher and further from the cost frontier.

Results

The study divided hospital into three types which are 1) small-sized hospitals with less than 100 beds, 2) medium-sized hospital with 101-250 beds and 3) large-sized hospitals with 250 beds or more. The population is 238 hospitals. The study uses quota sampling. The sampling of the large-sized hospitals is 67 places, 44 medium-sized hospitals and 39 small-sized hospitals.

SERVEQUAL analysis

Table 2: Service quality index of hospitals in Social Security System

List	Service Quality		SERVQUAL		
	Mean	Quality	SQE	SQM	SQI
Overall Service Quality	75.64	High	0.9304	1.1645	1.0834
Tangibles	74.92	High	0.9239	1.1571	1.0690
Reliability	76.37	High	0.9335	1.1754	1.0972
Responsiveness	75.20	High	0.9268	1.1590	1.0742
Assurance	75.97	High	0.9361	1.1600	1.0862
Empathy	75.74	High	0.9316	1.1711	1.0910

Source: Authors

The service quality index of hospitals in the Social Security System is presented in table 2. The results show that the overall medical services quality index (SQI) is averagely 1.0834. The value is greater than 1 indicates that the insurers access to high medical service quality. As well as the mean score of likert scale is 75.64 which are higher than the minimum acceptable quality level (69.50), but below the expected service quality level (83.19). Thus, the mean score is considerably high. Considering on each element of SQI, they are found that the index remains at a high level. The reliability is the highest at 1.0972. Compared with other elements, the study reveals that the insurers have the most confidence in the consistence of hospital (Reliability), followed by staff compassion (Empathy), doctors and nurses' knowledge (Assurance), staff's willingness to serve (Responsiveness), and physical attributes (Tangible), respectively.

The study of hospitals' service quality evaluation found that there are 9.82 percent of hospitals (16 hospitals), which their insurers feel that the quality of health care facilities is good. The insurers have high satisfactions. The hospitals' medical and health care services are above the expectation. The insurers of 49.69 percent or 81 hospitals have medium level of satisfaction since the perceived service quality is below their expectation even they agree that the service quality is good. A 26.99 percent of hospitals (44 hospitals), where insurers still do not feel satisfied, since the service quality is too difference from their expectations. However, they agree that the quality is still acceptable. There is 13.50 percent (22 hospitals), where receives dissatisfied because the level of quality is lower than the minimum acceptable level. Thus, the hospitals in this group should urgently improve their service quality.

The characters of insurers are also influent the satisfaction level. The study states female feels that the medical and health care service quality, which one received, are not difference to the expectation more than male; especially, the empathy element. One reason supports this evidence is most of the staffs in the hospital are female. Indeed, a gender issue has impact on the coordination and understanding between the service providers and the recipients. Additionally, the research indicates that the attitudes on service quality are better in the elderly group. The elderly has more

patients and understands the limitations and obstacles of providing health care services more than the young.

Insurers who are under social security system less than 1 year have high expectations due to less experience. The longer they stay in the system, the less expectation on service quality. However, the one, who is in the system for a long time, has more understanding on the hospitals' management and always has more reliability on the hospitals.

The insurers, who have chronic disease, agree that the hospitals provide high service quality; in particularly, they well perceive on empathy element. The study found that the score of perceived service quality almost reaches the expectation level. The frequency and number of visits also impact the difference between perceived and expected quality. Insurers, who visit once in a while, trend to have higher expectation and slightly less perceived of the quality while the one, who often visits, has higher perceived service quality.

Total Cost and cost efficiency estimation

The study uses panel data of hospitals in the social security system from year 2009 to year 2011. The independent variables are 1) Service Quality Index (SQI) which is the results from the first part, 2) wage per staff of the hospitals, 3) investment expenses per insurer which compute from depreciation per year of the hospitals. This variable reflects the investment in capital goods such as infrastructure, buildings, facilities, technical equipment, and other medical equipment. 4) Service expenses per insurer. The total cost (C_i) and the cost efficiency function (SFC_i) are presented as follows:

$$Ci = f(SQI_i, PL_i, EK_i, ES_i)$$
$$SFCi = f(SQI_i, PL_i, EK_i, ES_i)$$

where
C_i = Cost of hospital i
SFC_i = Stochastic frontier of hospitals' cost
SQI_i = Service Quality Index of hospital i
PL_i = wage per staff of hospital i
EK_i = investment expenses per insurer of hospital i
ES_i = service expenses per insurer of hospital i

The equations of cost function and stochastic frontier function are presented as follows.

Cost function:
$$\ln C_i = \alpha_0 + \alpha_1 \ln SQI_i + \alpha_2 \ln PL_i + \alpha_3 \ln EK_i + \alpha_4 \ln ES_i + e_i$$

Stochastic frontier function (Cost efficiency):
$$\ln SFC_i = \alpha_0 + \alpha_1 \ln SQI_i + \alpha_2 \ln PL_i + \alpha_3 \ln EK_i + \alpha_4 \ln ES_i + (V_{it} + U_{it})$$

Table 3: The estimation of cost function and stochastic frontier of the hospitals in Social Security System

	Ordinary Least Square		Stochastic Frontier Analysis	
Variable	Coefficient	SD.	Coefficient	SD.
(Constant)	5.921 ***	0.5912	9.0558 ***	0.4484
lnSQI	-0.1778	0.2340	-2.5799 ***	0.2036
lnPL	0.2408 ***	0.0378	0.1342 ***	0.0223
lnEK	-0.2671 ***	0.0495	0.1049 ***	0.0172
lnES	0.5677 ***	0.0708	0.6281 ***	0.0288
R-Square	0.358			
Adjusted R-Square	0.346			
Log likelihood function			242.9388	
LR test of the one-sided error			612.8397	

Source: Estimated by Authors

Table 3 shows the health care's cost estimation of hospitals in the social security system by using Ordinary Least Square (OLS). The results reveal that most of the main variables are statistically significant. The cost estimation states that the R-squared is 0.358. The service costs per insurer such as security provision, cleanliness expenses, meals and drinks expenses have the positive impacts on the cost of hospitals. Also, it has the most effects on the total cost with the coefficient of 0.5677. Wage has positive effects on the total cost as well. If service costs and wages increase, the total cost will increase. However, the costs of capital per insurer are related in the opposite direction with the total cost. The capital costs reflect the investment of the hospital. The increase of investment results in a decrease in total costs. Like capital costs, the SQI has negative influence to the cost, but not significant.

This study uses Stochastic Frontier Analysis (SFA) to estimates the cost efficiency of health care provision of hospitals in the social security system. The results indicate that all variables are statistically significant as expected, with the log likelihood of 242.939, which is considerably high. All expenses such as wages, investment, and service expenses have positive impacts to the cost efficiency. The SQI has the opposite direction to the cost frontier. This is in line with the estimation of the OLS estimation.

When wages increase, costs will rise. When investing in medical care and health care capital rise, it will result increasing in cost efficiency as well as the service costs. The target variable is SQI. SQI has a coefficient of -2.5799. When the insurers are satisfied, SQI increases, but it will reduce the total cost of healthcare. This reveals that when hospitals can provide better services to the insurer while decreasing the total cost of medical services. If the insurer can be satisfied, it can reduce costs by about 2.5 times. Thus, the spending in other categories drives to the higher costs. However, spending on improving service quality and satisfaction generates awareness of the insurer and it reduces the overall costs. In other words, managing to the cost efficiency will be able to satisfy the patient and it can lead to medical service provision at the lowest cost and better resource allocation.

Conclusion

The hospitals in Social Security System must pass the service quality inspection in order to guarantee the service quality of the hospitals to the insurers. Therefore, the main objective of this research is to study the quality of service. The analysis of factors affecting the quality of medical services is also examined. Analyzing the cost-effectiveness of health care facilities is integrated in order to provide guidelines for the hospital management plan as well as to continuously encourage the development of medical and health care services quality while gain benefit from better resource allocation.

The study divided hospital into three types which are 1) small-sized hospitals with less than 100 beds, 2) medium-sized hospital with 101-250 beds and 3) large-sized hospitals with 250 beds or more. The population is 238 hospitals. The study uses quota sampling. The sampling of the large-sized hospitals is 67 places, 44 medium-sized hospitals and 39 small-sized hospitals.

The results of service quality reveal that the insurers access to high medical service quality. The study found that the index remains at a high level. The reliability is the highest followed by empathy, assurance, responsiveness, and tangible, respectively. Moreover, the results state that most of the insurers satisfy and think that the service quality of the hospitals is acceptable. Only 13.50 percent receives dissatisfied because the level of quality is lower than the minimum acceptable level. Additionally, the characters of insurers such as gender, age, the frequency of visits, and the length of staying in the system are also influent the satisfaction level.
The cost efficiency analysis uses panel data of hospitals in the social security system from year 2009 to year 2011. The estimation shows the wage and service costs per insurer such as security provision, cleanliness expenses, meals and drinks expenses have the positive impacts on the cost of hospitals. However, the costs of capital per insurer are related in the opposite direction with the total cost. The Stochastic Frontier Analysis of the cost efficiency of health care provision indicates that all variables are statistically significant as expected, with the log likelihood of 242.939. All expenses such as wages, investment, and service expenses have positive impacts to the cost efficiency. The SQI has the opposite direction to the cost frontier. This reveals that when hospitals can provide better services to the insurer while decreasing the total cost of medical services. If the insurer can be satisfied, it can reduce costs by about 2.5 times. Thus, managing to the cost efficiency will be able to satisfy the patient and it can lead to medical service provision at the lowest cost and better resource allocation.

References

Aigner, D.J. and Chu, S.F. (1968). On estimating the industry production function. American Economic Review 58: 826 – 839.

Aigner, D.J, Lovell, C.A.K. and Schmidt, P.J. (1977). Formulation and estimation of stochastic frontier production function models. Journal Econometrics 6: 21 – 37.

Afriat, S.N. (1972). Efficiency estimation of production function. International Economic Review. 13: 568 – 598.

Battese G.E. and Coelli T.J. (1993) A Stochastic Frontier Production Function Incorporating a Model for Technical inefficiency effects, Department of Econometrics, University of New England, Armidale, NSW, September.

Bell, L. (2004). Developing service quality in mental health services. International Journal of Health Care Quality Assurance. 17(7): 401-406.

Boyer, L., Franc¸ois, P., Doutre, E., Weil, G. and Labarere, J. (2006). Perception and use of the results of patient satisfaction surveys by care providers in a French teaching hospital. International Journal for Quality in Health Care. 18(5): 359-364.

Clemes, M.D., Ozanne, L.K. and Laurensen, W.L. (2001). Patients' perceptions of service quality dimensions: an empirical examination of health care in New Zealand. Health Marketing Quarterly. 19(1): 3-22.

Cronin, J.J.J., Brady, M.K. and Hult, G.T.M. (2000). Assessing the effects of quality, value, andcustomer satisfaction on consumer behavioral intentions in service environments. Journal of Retailing. 76(2): 193-216.

Crowe, R., Gage, H., Hampson, S., Hart, J., Kimber, A., Storey, L. and Thomas, H. (2002). The measurement of satisfaction with healthcare: implications for practice from a systematic review of the literature. Health Technology Assessment. 6(32): 1-244.

Donabedian, A. (1980). The definition of quality and approaches to its assessment. Explorations in Quality Assessment and Monitoring. NO.1, Health Administration Press, Ann Arbor, MI.

Farrel, M.J. (1957). The measurement of a productive efficiency. Journal of the Royal Statistical Society, Series A. General 120. No. 3: 253 – 281.

Gilbert, G.R. and Veloutsou, C. (2006). A cross-industry comparison of customer satisfaction. The Journal of Services Marketing. 20(5): 298-307.

Gonzalez, N., Quintana, J.M., Bilbao, A., Escobar, A., Aizpuru, F., Thompson, A., Esteban, C., Sebastian, J.A.S. and de la Sierra, E. (2005). Development and validation of an in-patient satisfaction questionnaire. International Journal for Quality in Health Care. 17(6): 465-472.

Hawthorne, G. (2006). Review of Patient Satisfaction Measures. Australian Government Department of Health and Ageing. Canberra.

Heidegger, T., Saal, D. and Nuebling, M. (2006). Patient satisfaction with anaesthesia care: what is patient satisfaction, how should it be measured, and what is the evidence for assuring high patient satisfaction. Best Practice and Research Clinical Anaesthesiology. 20(2): 331-346.

Hill, N. and Alexander, J. (1997). Handbook of Customer Satiseaction and Loyalty Measurement. 2nd ed. Hampshine:Gower Publishing Limited.

Hood, C. (1995). The new public management in the 1980s: variations on a theme. Journal of Accounting, Organizations and Society. 20(2/3): 93-109.

Kenagy, J.W., Berwick, D.M. and Shore, M.F. (1999). Service quality in health care. Journal of the American Medical Association. 281(7): 661-665.

Kotler, P. (1998). Marketing Management. 11th ed. Upper Saddle River, NL:Pactice Hall.

Linder-Pelz, S. (1982). Toward a theory of patient satisfaction. Social Science & Medicine. 16(5): 577-82.

Matzler, K. and Hiterhuber, H. (1998). How to make Product Development Projects More Sucessful by integrsting Kano's Model of Customer Satisfaction into Quality Function Development. Technovation. 18, 1: 25-38..

Meeusen, W. and Broeck, J. (1977). Efficiency estimation from Cobb-Douglas production functions with composed error. International Economic Review. 18(2): 435 – 444.

O'Connor, S.J. and Shewchuk, R. (2003). Commentary – patient satisfaction: what is the point? Health Care Management Review. 28(1): 21-24.

Pascoe, G.C. (1983). Patient satisfaction in primary health care: a literature review and analysis. Evaluation and Program Planning. 6(3-4): 185-210.

Schmidt, P. (1976). Econometrics. New York: Marccll Dekker.

Schmidt P. and Lovell C.A.K. (1979). Estimating technical and allocative inefficiency relative to stochastic production and cost frontiers. Journal of Econometrics 9: 343 – 366.

Strasser, S., Aharony, L. and Greenberger, D. (1993). The patient satisfaction process: moving toward a comprehensive model. Medical Care Review. 50(2): 219-245.

Urden, K.D. 2002. Patient satisfaction measurement: current issues and implications. Outcomes Management. 6(6): 125-131.

Ware, J.E., Snyder, M.K., Wright, W.R. and Davies, A.R. (1983). Defining and measuring patientsatisfaction with medical care. Evaluation and Program Planning. 6(3-4): 247-263.

Williams, B. (1994). Patient satisfaction: a valid concept? Social Science & Medicine. 38(4): 509-16.

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