

Importance-performance analysis for improving patient services in a cardiology department in a Thai government hospital

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Abstract

The number of patients looking for high-quality medical care is significantly increased in Thailand. Then, a hospital needs to realize the importance and satisfaction of the patients. We are focusing on the study at the Department of Cardiology in a public hospital located in Bangkok. We found that the average time spent by patients was about 1-2 hours. In the worst case, it can reach 3-4 hours. The objective of this research were to determine which quality factors were needed to be improved and what are the current satisfaction level in each factors. We designed questions and used questionnaire at a five-point scale for the satisfaction and importance scores. We explored eleven factors in terms of reliability, responsiveness, quality for facilities, staff and service system. Then, we analyzed whether there were differences in satisfaction level among the types of patients, the difference between the importance and satisfaction level in these factors. Then, we performed various methods to analyze the performance of the hospital service such as the descriptive analysis, the paired T-Test, gap value and importance-performance analysis. We found that different methods led to an altered conclusion. Hence, the decision maker should determine the proper method based on the hospital policy and resources. The result indicated that the overall level of satisfaction is 3.884 and some factors needed to be improved especially the nurse service quality. Furthermore, the method of payment, e.g. a government support program, social insurance or self-support, did not affect the satisfaction level of patients. In addition, patient suggested that the service at the getting queue card and making an appointment stations should be redesigned to shorten the waiting time. We suggested that the study of simulation with the lean concept can help reduce the waiting time in the Cardiology Department. In future, other departments in the hospital can implement this method to analyze the patient satisfaction to enhance the service level of the hospital.

Keywords: Patient satisfaction levels, importance-performance analysis, hospital service improvement

Introduction

Modern medical equipment, highly specialized physicians and healthcare professionals are results of today's highly advanced medical technology. That has also brought about a rise in patient numbers seeking medical services in hospitals. A widespread problem is that the patient headcount for each department is too great, resulting in long waiting times. In order to ease this problem, there have been studies and analyses of each procedure by departments. The ultimate goal is to enhance the system flow, making it more rapid, thus reducing waiting time in the system. The survey taken from patients of the department of cardiology of the case study hospital revealed the number of patients on Wednesdays to be as many as 150 to 200 patients. Out of this, 85% were existing patients and 15% were newcomers. Patients were found to visit the heart disease clinic on Wednesdays more than any other day. Each patient experienced one to two hours waiting time. For the case of patients in need of further diagnosis in the department, three to four hours waiting time was necessary. Some patients had to wait to see the doctor in the afternoon. This overly long waiting time was a result of a diagnostic room and staff shortage. In order to offer solutions to this problem, we proposed the use of questionnaires to collect the data and analyze the data using various methods. The research objectives were to study the level of service expectation and satisfaction of sampling patients, to identify the pros and cons of selected analytical methods, and to determine the quality factors needed to be improved.

The related works were as follows. Hurst and Williams (2012) studied the determinants of productive efficiency in hospitals whereas Eccles et al. (1993) developed questionnaire and scale measurements which can quantify aspects of the outcome of care. Haran et al. (1993) stated that the level of satisfaction to quality indicators can be routinely measured on those health facilities in cases of Out Patient Departments (OPDs) of hospitals. He identified the main factors that people felt to be important in the provision of health care which was doctors, drugs, diagnosis, duration, distance, affordability, and prompt service. The quality factors were then compared with other hospitals. Comparisons indicated that a hospital with higher efficiency has more satisfied patients. Bowden (1993) reported that quality service should not be based on statistical returns alone but must involve a quality audit. The audit tool was made up of proformas whose questions aim to examine the standards of nursing service against contract specifications and each question was given a weighted score. The proformas were then analyzed to establish whether standards were being met. The Importance-Satisfaction (IS) model is an assessment tool to classify the importance of attributes. It aids to analyze which strategy should be implemented in the form of four quadrants including continued emphasis, exceeding expectation, less importance, and opportunities for improvement (Chen & Lin, 2013).

The IS model is also known as Importance-Performance Analysis (IPA), introduced by Martilla and James (1977). The IS model or IPA has been widely used in various industries such as tourism management (Rivera et al. 2009; Tonge & Moore, 2007), food service industry (Bunchalileo et al. 2018; Aldian et al. 2015; Waiter, 2015; Tzeng & Chang, 2011), hospital (Cohen et al. 2016; Ho et al. 2014; Chen & Lin, 2013; Whynes & Reed, 1995), airline industry (Chang & Yang, 2008) and job satisfaction (Pan, 2015). In this study, we will use the IS model to evaluate which factors of the service of the hospital meet customer satisfaction and to suggest the hospital manager to pay attention to those factors.

In our study, we focus on the government hospital in the cardiology department. The current process is as follows. A patient picks the queue card at the counter. Then, the patient measures weight and height at the weight measure counter. After that, a patient waits to see a doctor. Next, the doctor performs a preliminary diagnosis to check whether the patient is in need of special investigation. If further examination is needed, the patient is examined in accordance with the doctor's instruction. The patient then comes back to see the same doctor without having to wait in the line. Finally, the patient makes an appointment with the nurse and obtain a prescription receipt and an invoice. In some cases, diagnosis lasts long so that a patient's examination from the morning session has to be continued in the afternoon session, e.g. Echocardiography. Exceptions are emergency cases where the immediate diagnosis is required. In the afternoon session, further diagnosis takes place in the examination room where the doctor observes the patient's condition. The last process is then repeated as occurred in the morning session.

Materials and methods

Survey method

First, we identified eleven quality factors as in **Table 1** based on service quality in a hospital (Hasin et al. 2001). Then, we constructed a questionnaire and tested the reliability from thirty patients by face to face interview. Questions in the questionnaire asked about demography information, the payment method, the reasons for choosing this hospital, the opinion of importance and satisfaction of eleven quality factors from services in the cardiology department and which process was needed to be improved the most. The five-point Likert scale rating was used. The scale ranges from 5 = very important/very satisfied, 4 = important/ somewhat satisfied, 3 = moderately important/neutral, 2 = slightly important/somewhat dissatisfied and 1 = not important/very dissatisfied. Hence, we can measure the importance and customer satisfaction of quality factors and be able to identify weak points in the service process.

Next, the sample size was derived statistically (Hasin et al. 2001). The number of customers was based on a confidence level, a sampling error, and a preliminary estimator of the importance and satisfaction levels. A preliminary estimate showed that one customer out of 30 was neutral and 29 patients were satisfied with the hospital service. Then, the minimum number of sample size for 95% confidence was 59. In this survey, 141 patients answered the questionnaire by random sampling. The patients returned the questionnaires before they left the hospital. Later, the overall service opinion of each patient was analyzed by considering every factor that had an impact on customer satisfaction (Hasin et al. 2001).

Table 1 Summary of important factors from the questionnaires.

Type of Quality Factor	#	Description
Quality of People	1	Officers and nursing staff provide a complete service in a courteous, friendly and enthusiastic manner
	2	Officers explain, suggest, and answer any inquiry clearly and pertinently
	3	Nursing staff explain, suggest, and answer any inquiry clearly and pertinently
	4	Doctors explain, suggest, and answer any inquiry clearly and pertinently
Reliability of System	5	Every patient obtains fair service: First come, first served and no double standard
Responsiveness of System	6	Quick cooperation between different service units
Reliability of System	7	Reliability of diagnosis and treatment services
Quality of System	8	Convenient, not-so-complex service processes
Quality of Facilities	9	Availability and cleanliness of treatment equipment and supplies
	10	The tidiness of service stations
	11	Clarity of signs (e.g. bulletin, service station guide posts)

Data analysis

First, the descriptive analysis in the demography information was performed. Next, we calculated the average, standard deviation and coefficient of variation for the importance and satisfaction scores for each quality factor. We interpreted the score in five ranges: 1) [1,1.8) implies not important/dissatisfied 2) [1.8,2.6) implies slightly important/dissatisfied 3) [2.6,3.4) implies moderately important/neutral 4) [3.4, 4.2) implies important/satisfied 5) [4.2,5] implies very important/very satisfied.

Then, we calculated the gap analysis from the gap value of satisfaction score minus the importance score. Hence, gap value measures the difference between the importance score and the satisfaction score. A negative value implies that the importance score is larger than the satisfaction score. Hence, the management action is required. Otherwise, there is no extra management required (Tonge and Moore, 2007)

After that, we performed a paired T-test to check whether there were differences in satisfaction scores among four types of payment i.e. self-support, social health insurance, government support, universal health coverage (30 baht card). The hypothesis was set as follows.

$$H_0 : u_{1j} = u_{2j} = u_{3j} = u_{4j}$$

$$H_1 : \text{At least a pair of } u_{ij} \text{ are unequal,}$$

where u_{ij} = a satisfaction score for payment type i and quality factor j

Similarly, we perform a paired T-test to check whether there were differences between importance and satisfaction scores for each quality factor.

$$H_0 : i_j = s_j \text{ for all } j$$

$$H_1 : i_j \neq s_j, \text{ for all } j,$$

where i_j = importance score for quality factor j and s_j = satisfaction score for quality factor j

Finally, we performed the importance-performance analysis where the coordination of importance and satisfaction scores were plotted into a matrix of important score and satisfaction scores. Then, four quadrants will be classified using the averages of both scores. There are four categories i.e. Concentrate Here, Keep up the Good Work, Low Priority, and Possible Overkill. If the quality factor is in Concentrate Here quadrant, it implies that there is a need to act something to improve the customer perceptions. If the quality factor is in Keep up the Good Work quadrant, then it should keep current strategies. If the quality factor is in Low Priority quadrant, it implies that the little effort should be done unless there is a great resource. Otherwise, the efforts toward this quality factor can be reduced in Possible Overkill quadrant. The SPSS version 14 for WINDOWS were used for the statistical analysis.

Results and discussions

According to the general information gathered, the frequency of coming to the hospital: one time, 2-3 times, more than three times were 25.5, 5 and 69.5%, respectively. There were 51.06% of male patients. 50.4% of the patients were 31-40 years old and 35.5% were younger than 20 years old. For the payment, 44.7% of patients paid by themselves and 41.1% paid by 30 bath card, 12.1% paid by the government and only 2.1% paid by social insurance. Three main reasons for choosing this hospital were 31.2% recommended by a friend, 28.4% were being the current patient, and 21.7% due to the reputation of having high professionals. 50.4% of samples agreed that the queueing process was needed to be improved whereas 14.2% agreed that the appointment process was needed to be improved. On the other hand, 27.7% said that there was nothing needed to be improved. The overall service satisfaction level of the system was 3.91 ± 0.043 which implied there was a good service satisfaction level.

The average satisfaction levels of all factors based on payment option was represented in **Table 2**. There was no significant difference among four type of payment patient.

Table 2 The satisfaction score for each type of payment patient.

Payment option	N	Mean*
Personal payment	63	3.944a
Social insurance	3	3.687a
Government Officer	17	3.965a
30 bath card	58	3.893a
Total	141	3.920

*the same letter means there is no significant difference among values

Table 3 The average, standard deviation, and coefficient of variation of importance and satisfaction scores, Gap Value and P-Value of Paired T-Test.

Quality factor	Satisfaction scores			Importance scores			Gap value	P-value of paired T-test
	Mean	SD	CV	Mean	SD	CV		
1	3.851	0.765	0.199	4.099	0.636	0.155	-0.248	.183
2	3.972	0.878	0.221	4.064	0.709	0.174	-0.092	.023*
3	4.000	0.793	0.198	4.121	0.692	0.168	-0.121	.107
4	4.333	0.683	0.158	4.170	0.696	0.167	0.163	.000*
5	3.922	0.879	0.224	4.050	0.720	0.178	-0.128	.111
6	3.014	0.993	0.329	3.716	0.881	0.237	-0.702	.132
7	4.277	0.698	0.163	4.128	0.706	0.171	0.149	.148
8	3.589	0.949	0.264	3.851	0.774	0.201	-0.262	.008*
9	4.241	0.696	0.164	4.220	0.677	0.160	0.021	.247
10	3.929	0.859	0.219	4.028	0.686	0.170	-0.099	.000*
11	3.596	0.926	0.258	4.021	0.751	0.187	-0.425	.000*

*there is a significant difference between importance and satisfaction scores

From the descriptive analysis, the most important quality factors identified were factors 9, 4, 7 and 3, respectively. The patients put greater weight on the quality of treatment equipment and supplies, the doctor and nurse service quality. These factors should, in turn, be major concerns for the hospital. The average of satisfaction and importance scores in all factors were 3.884 and 4.043, respectively. Regarding to the average of the satisfaction scores, most quality factors had higher satisfaction score than 3.4, which implies that they were satisfied. However, the satisfaction score in quick cooperation between different service units is neutral, hence, the coordination between departments should be improved. Considering the gap values as shown in **Table 3** and **Figure 1**, most factors except for Factor 4, 7, 9 were needed to be improved. On the other hand, the paired T-Test showed that the factor 2, 4, 8, 10, 11 had significant differences between the importance and satisfaction scores. The paired T-Test indicated that there was the difference within 141 patients' opinion but it did not indicate what direction. On the other hand, the gap value only calculated the difference from those averages but it identified the direction so the decision maker knows the direction for the improvement. From gap values, they implied that the quality of the doctor, reliability of diagnosis and treatment system and availability and cleanliness of equipment were higher than the patient's expectation. The remaining factors were needed to be improved. However, if we considered the importance-performance analysis as shown in **Figure 2**, the result might be different. The quality factor 2-5, 7 and 9 were already good. The improvement should be done in factor 1 which was the quality of the nurse. Then, factor 6, 8 and 11 were fallen in the lower priority to improvement, which implied that the hospital can consider to improve the responsiveness of the system, convenience of the service system and clarity of signs, but no need to do them right away. From our analysis, the different methods result in a different conclusion. However, it also depends on the policy of the hospital and the availability of resource such as investment and staff to process the improvement.

In summary, we suggested that the top management should realize the current situation of the service from the survey and make an action in the urgent issues such as the nurse quality and queuing system. The training for the nurse to have a better service including friendly and enthusiastic manners. The meeting among nurses, staff and doctors in the hospital should be established to enhance the responsiveness between the departments. The hospital service can be redesigned to be simple and convenient for patients and their relatives. If the hospital needs to improve the overall service, they should consider improving the weight and height taking station and the ticket queue station first. In the next step, a simulation was used to study and improve the system. In addition, the bulletin and service station guideposts in the building should be clarified and relocated to the proper locations.

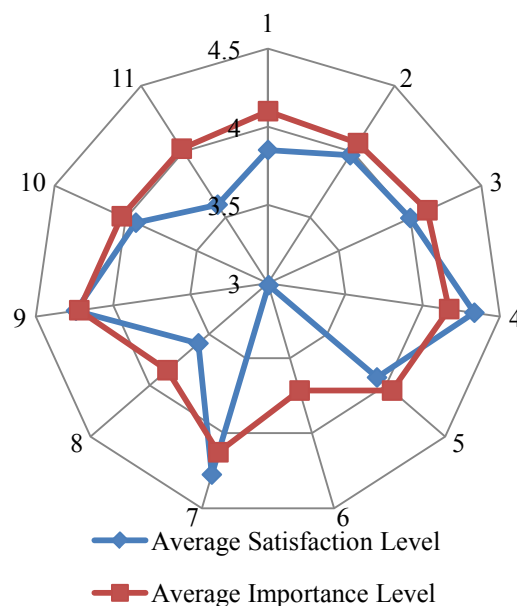


Figure 1 Radar chart of the gap analysis of eleven quality factors

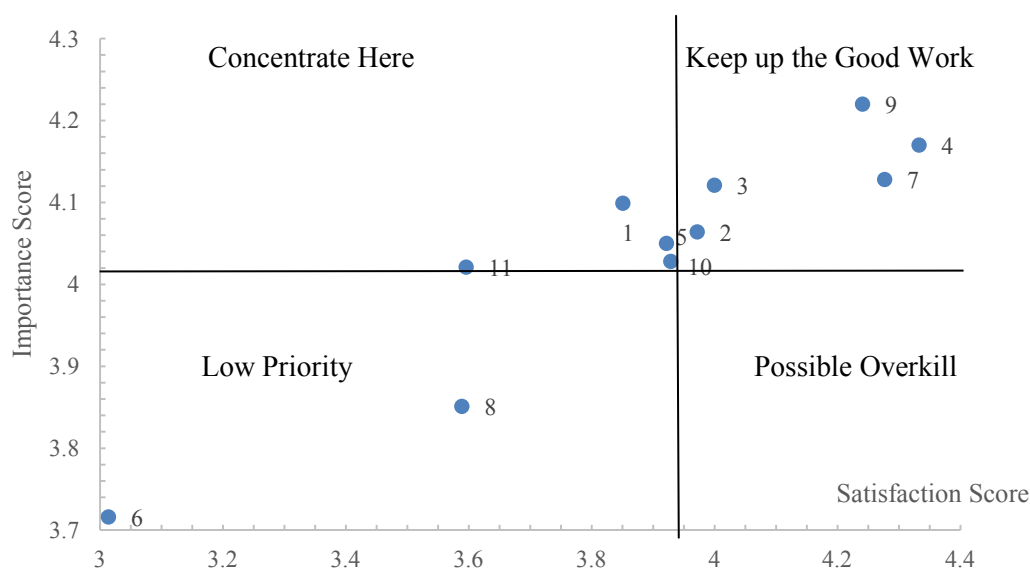


Figure 2 Importance-performance analysis of eleven quality factors.

Conclusions

This research was to analyze which quality factors in a case study hospital need to be improved using the questionnaire with at a five-point scale to survey the importance and satisfaction levels in specified quality factors. There were eleven factors in terms of reliability, responsiveness and quality of facilities, staff and service system. We used several methods to analyze the performance of the hospital service such as the descriptive analysis, the paired T-Test, gap value and importance-performance analysis. We found that different methods lead to an altered conclusion. Hence, the decision maker should consider which method should be used for proper improvement. The analysis showed that some factors needed to be improved, especially the nurse service quality. On the other hand, patients satisfied with the qualification of doctors, reliability of diagnosis and treatment system and availability and cleanliness of equipment. There was no significant difference in satisfaction of different type of patient base on payment method. In addition, patient suggested that the hospital should redesigned the service at the ticket queue station and making an appointment station to reduce the waiting time. We suggested that the study of simulation with the lean concept can help reduce the waiting time in the Cardiology Department. In the future, other departments in the hospital can implement this method to analyze patient satisfaction.

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