International Journal of Economics, Finance and Management Sciences
2013; 1(2) : 108-114
Published online April 2, 2013 (http://www.sciencepublishinggroup.com/j/ijefm)
doi: 10.11648/j.ijefm.20130102.16

Systematic approach for improving medical service quality

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To cite this article:
Chang-Lin Yang, Rong-Hwa Huang. Systematic Approach for Improving Medical Service Quality, *International Journal of Economics, Finance and Management Sciences*. Vol. 1, No. 2, 2013, pp.108-114. doi: 10.11648/j.ijefm.20130102.16

Abstract: The purpose of this research is to discuss the characteristics of medical services quality in the hospital institutions. This study discusses the characteristics of medical services quality in the hospital institutions, combining the analysis of services quality deficiency and investigation then figuring out the method of improvements to focus on service deficiency. This research applied three kinds of technologies: The service quality questionnaire surveys, the gap model analysis and the quality function deployment (QFD). The result of investigating service quality shows three major key elements for im-provement: the hospital interior administration information efficiency and the personnel manner look after the service and the result and the hospital exterior communication. In the improvement plan, the customer opinion survey form provide and the recycling improvement, doctor specialty discussing, medical care personnel's soft training, the hospital bed specified number of personnel ratio are the most important item to be improved. In action plan, four most important departments are human resources room, laborer safety clinic, information room and quality control center.

Keywords: Medical Services Quality, Gap Model analysis, Quality Function Deployment

1. Introduction

The service industry plays an important role in economic activities and economic growth. Increased personal income has increased demands for living quality. Via the Internet, people now have access to vast amounts of medical knowledge. One result is that demand for quality medical treatment has increased. The quality of medical treatment includes medical processes and treatment. Following the development of customer-oriented quality, medical centers are seeking to improve treatment quality.

Quality medical treatment is defined as the use of advanced medical technology, medical treatment and sanitation. For hospitals, medical quality is one part of medical treatment quality. According the definition of The Joint Commission of Accreditation of Healthcare Organization (JCAHO), medical treatment provided to patients will increase the likelihood of a positive result for patients and minimize the likelihood of poor outcome. Donabedian (1988) considered medical treatment quality as structure, process and outcome. The structure is the measurement of the medical institution. Process is associated with treatment and outcome is the most proper healthy condition, which is balanced with patient behavior in a way of minimum complaints and costs. Parasuraman et al. (1985) argued that treatment quality is a judgment based on expectation and actual experience. PZB defined treatment quality as Empathy, Reaction, Reliability, Tangibles, and Security. Table 1 shows the relationship of each aspect. Bowers (1994) utilized SEVQUAL to investigate the service quality of hospital. Bowers indicated that SERVQUAL was unable to include all aspects of medical industry, and accommodate caring and outcomes. Dagger et al. (2007) developed and empirically validated a multidimensional hierarchical scale for measuring health service quality. The primary dimensions were interpersonal quality, technical quality, environment quality, and administrative quality. The subdimensions were interaction, relationship, outcome, expertise, atmosphere, tangibles, timeliness, operation, and support. Shieh et al. (2010) integrate SERVQUAL model and decision-making trial and evaluation laboratory (DEMATEL) method to evaluate the importance of 22 criteria of hospital service quality. The results show that trusted medical staff with professional competence of health care is the most important criterion and mutually affects service personnel with good communication skills, service personnel with immediate problem-solving abilities, detailed description of the patient's condition by the medical doctor, and medical staff with professional abilities.

This study examined the characteristics of medical treatment quality, and analyzed medical personnel, patients and the differences between expectations and experiences of patients to establish a future strategy for quality management. This study utilized quality function deployment (QFD) to integrate the opinions of medical personnel, patients and their families into the operational process of hospitals, investigated the characteristics of quality, and determined the priority for improving technology.

Table 1. *Service quality factors and definition.*

Factor	Definition
Tangibles	The medical treatment is in the same standard, it will not differ with people, place or time. The medical equipment and the looks of the medical personnel should co-operate with the provided treatment.
Reliability	In a presumption of complete medical equipment, the treatment can be enforced precisely.
Reaction	The medical servant should be willing to help the customers and adjust the treatment with different patients.
Empathy	A polite and graceful manner. The patient should be confident to the medical system.

The purpose of this research is to identify the most necessary service items to be improved to gain the highest profit and proposed the improving action in order to increase patient satisfaction and the quality of medical treatments. This study discusses the characteristics of medical services quality in the hospital institutions, combining the analysis of services quality deficiency and investigation then figuring out the method of improvements to focus on service deficiency. Finally, this re-search found out the most efficient methods and priorities to improve and enforce. This research sincerely hopes to bring the hospital better and higher quality after using the improvements, then the hospital will have the strength to increase the medical quality and make it better and higher in the whole medical system.

2. Research Framework

This study takes the medical service quality and uses a systematic approach for investigating and improving service quality. Given the objective of building medical service quality management system, this study applies the quality function dep-loyment to a two-stage deployment, including the improvement plan and action plan. Figure 1 shows the framework of this research. This research hopes to bring better and higher services quality while using suggested improvements.

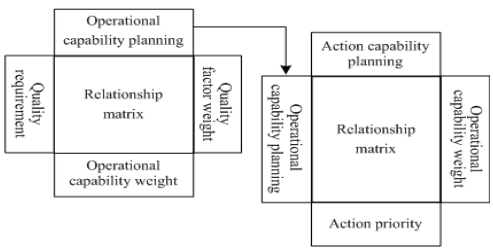

Figure 1. *Research framework.*

The term "quality function deployment" as presented in this study denotes a method of integrating and merging customer voices into the product development process. This concept was first initiated by Mitsubishi in 1972 at its Kobe shipyard. Quality function deployment is primarily intended to convert customer expectations into engineering substitute to establish product design quality criteria. In turn, they systematically apply a quality design system to the quality of the functional parts and components, and to the interrelationship of various elements in manufacturing engineering. Through these efforts they launched antecedent quality assurance activities to ensure complete satisfaction of customer demand (Atkinson, 1990; Theodore, 1993). The advantage of quality function deployment is that it can be applied to product and service development (Lockamy and Khurana, 1995; Hsu et al., 1997; Nattarajan et al., 1999; Yang and Fang, 2003), and helps in planning, assessing and improving managerial systems. (Philips et al., 1994; Jagdev et al., 1997; Chang et al., 1998; Yang et al., 2006). The above research programs clarify that sound utilization of quality function deployment can effectively stimulate and reflect real anticipation and demand, and can enhance the acceptability of the contents and the implementation results of any contents that are mapped out.

In the deployment process, this study divided the process into improvement plan deployment and action plan deployment according to hospital improvements to service requirements.

In improvement plan deployment, inputs on the left side of the QFD matrix are segmented by patient requirements. At the top of the QFD matrix is operational deployment ability. Patient requirements are weighted based on a patient's opinions. To prioritize operational abilities, the relevance was examined by completing the relationship matrix. The score for operational ability in each box is multiplied by the weight of each item. The priority of improvement is the total score for that column. The highest score is considered as the highest priority item for improvement.

In action plan deployment, operational ability planning is input at the end of the first stage. The improvement priority score from the previous QFD matrix is recorded on the right side of the operational ability weight. At the top of the output section of the QFD matrix, the main action plans for improvement are evaluated to generate an action scheme. The priority of each segment is deployed in action scheme planning. After completing the relationship matrix for operational ability and the action plan, scores on each square are multiplied by the corresponding weight of operational ability. The multiplication result is then entered into the lowest side of each column. This number represents the priority of an im-provement action scheme. The highest number, the most important, indicates that an action must be undertaken.

3. Service Requirements Plan

To identify the requirements of medical service quality,

this study examined medical service quality literature for Taiwan and abroad (Fisher 1971; Fletcher et al., 1983; O'Connor et al., 1991; Linn et al., 1984) and collected relevant information before classifying service quality requirements into five categories via expert knowledge. The five categories of service quality requirements are environment and equipment, hospital internal administrative efficiency and attitudes of personnel, hospital external communication, care service outcomes, and additional services.

Environment and equipment: The replacement and inspection of old hospital equipment is indispensable to quality care. The hospital staff has professional skills, safe and hygienic medical environments and medical equipment allowing patients to trust a hospital and have a sense of security and overall satisfaction with hospital services.

Hospital internal administrative efficiency and attitudes of personnel: Service processes are essential when measuring medical care quality. Increasing the efficiency of administrative information will help shorten processing time and enhance customer satisfaction. Additionally, patient mood is affected by the attitudes of hospital administrative staff. Thus, hospitals must provide places where patients can keep calm. This leads to patients feeling that a hospital is caring, and enhances the awareness of hospital service quality.

Care service outcomes: The ultimate goal of hospitals is to treat patient conditions to achieve maximum improvement and optimal health. Additionally, medical staff can provide timely care based on patient needs. A detailed assessment of a pa-tient's medical condition, medical procedures and drug effects are needed, such that patients can understand their illness. This will help patients throughout the medical process gain the most comprehensive care and best medical outcomes.

Hospital external communication: A hospitals must create a good public image. Hospitals must go through comprehensive analyses and wide vision in the process of public message and communication handling. Customers, the media, and society must be satisfied with the medical services provided by hospitals.

Additional services: Family members should be included in treatment considerations. If a hospital can increase the service scope, it will provide high-quality medical services and increase patient satisfaction.

Using the cause and effect (C&E) matrix (figure 2), this study scored hospital internal administrative efficiency and attitude of personnel (54.9), hospital external communication (39.6), and care service outcomes (33.9); these scores are clearly higher than those for the environment and equipment (14.4) and additional services (18.1). Therefore, an improvement plan will draw these three elements—hospital internal administrative efficiency and attitudes of personnel, hospital external communication, and care service outcomes—and their content for analysis.

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Item	Tangible	Reliable	Responsible	Assurance	Empathy	Total score
Weight	1.1	3.2	2.2	1.9	1.6	
Environment and equipment	5	1	1	1	1	14.4
Hospital nternal dministrative efficiency and attitudes of personnel	3	5	5	4	5	45.9
Care service results	1	5	3	5	4	39.6
Hospital external communication	2	2	5	5	3	33.9
Additional service	4	2	1	1	2	18.1

Figure 2. *C & E matrix.*

4. Operational Capability Planning

This study transformed customer demands into characteristics because of the requirement to improve service quality. According to demand of patients, their family, and medical staff, this study categorized operational capability planning into e-services, service-level improvements, education and training, facilities, human resources, and operational procedures.

E-services: E-services are used to increase service efficiency and decrease costs via electronic equipment for medical operations and procedures. The e-service includes (1) electronic bulletin boards that can be update rapidly, (2) equipment information interfaces, (3) electronic care history, (4) online registration, (5) subscriptions to e-papers, (6) and the exchange of health information.

Service-level Improvement: The most important task is to determine which services fall short standards. This study uses a questionnaire as costumer services, market surveys, and telephone surveys. Service-level improvement analysis includes (1) customer service surveys and analysis (2) the

correction and instantaneity of doctor looks examine.

Education and Training: Education and training are methods for enhancing the expertise of medical staff. Furthermore, education and training are important for medical staff learn how to release their working pressure. Education and training include (1) renewing medical knowledge, (2) increasing the number of training courses, (3) physician seminars (4) and training the attitudes and emotional control of medical staff.

Facilities management: There are three main emphases of facilities management the examination of medical equipment, protection of safety facilities, and renewing medical equipment. One must classify reuse and abandon equipment to avoid the chaos of equipment management. A good regular examination and record system can help manager to be aware of the status of equipment and examine and protect the safety of equipment. To facilitate renewal of medical equipment, equipment should be marked the service life and replacement time. New equipment should be purchased when the old one exceeds the deadline of use to ensure patient and staff safety. Facilities include (1) regular disinfection of medical service equipment, (2) regularly renewing safety equipment and (3) examining and renewing medical equipment.

Human resources: A suitable ratio of nurse to hospital beds and staff dispatching in each period can provide the best care quality for each patient, use hospital resources effectively, and decrease hospital cost. Human resources include (1) the ratio of nurses to hospital beds (2) the ratio of on time for on and off duty, (3) the ratio of staff dispatching in each period, and (4) reward and punishment policy establishment.

Operational procedures: An effective operational procedure can shorten operation time and decrease the number of patient complaints. Operations must be highly efficient, such that patients are pleased with hospital care quality, and willing go to a hospital for medical treatment. Operational procedures include (1) the operation procedure for urgent accident, and (2) recycling of medical equipment.

5. Improvement Plan Deployment

One can construct a relationship matrix that describes the relationship between quality requirements and operational ca-pability planning correctly. The relationship matrix uses signs to represent the relation between service quality requirements and operational capabilities. In this matrix, ◎ represents highly related items, and the numerical value is 9; ○ represents a secondary relationship between two items, and the numerical value is 3; and Δ represents weakly related items, and the numerical value is 1. If no relationship exists between service quality requirement and operational capability planning, this column is blank. The scores of the interrelationship elements among the deploying items are multiplied by the elements of service quality requirement and totaled to obtain the absolute weight below the quality house. Figure 3 illustrates the quality house for the deployment of operational capability planning.

symbol	weight	Relationship
◎	9	Strong
○	3	Medium
△	1	weak

		E- service						Service level Improvement		Education and Training				Hardware facilities			Human resource				Operation procedure								
		The immediate update of the E-tablet board	Establishing the information interface equipment	E-announce	On-line register reply	Subscription for e-news	Health consulting and interacting system	To provide and to retrieve the questionnaire of customer's opinion	To provide and to retrieve the questionnaire of customer's opinion	Renewing of medical knowledge	Increase in training courses	Physicians seminar	Attitude and emotion control of medical staff	Regularly disinfection of medical service equipment	The regular disinfection of medical service equipment	Regularly check and renew safety facilities and protection equipment	Regularly check and renew medical equipment	Set the nurses to hospital beds ratio of family	The staffs go to work and get off duty on time	The staff proportion in each period of time	Make the rules of rewards and punishments	The emergent operational way of medical staff	The recycling of medical equipment	4: Patient cognition	7: Health care personnel cognition	5: Patient expectation	m: P/N	D: A*B	w: D/the sum of D *100
Hospital external communication	Condition of food and sanitary						△							◎			○	△	△					2	2	5	2.5	5.0	4.8
	Residential food charge				◎	◎	◎	◎○◎		◎														3	1	3	3.0	9.0	8.7
	Whether the information of website is or not		△		◎	◎	◎	△	◎															3	2	3	1.5	4.5	4.3
	Whether the diagnosis schedule is convenient or not	○						◎												△				4	3	4	1.3	5.3	5.2
	Diversifications of registrations		△		○			△																3	4	3	0.8	2.3	2.2
	Medical charge							△																3	2	3	1.5	4.5	4.3
	Whether the charge list and items are with details or not							△																3	3	3	1.0	3.0	2.9
	The period of despondence from patients						○	◎			○		○					◎	○	◎	○	◎		3	3	3	1.0	3.0	2.9
	Whether the font desk can resolve and answer questions or not								△	○	◎		◎					△	○	○	○			4	3	4	1.3	5.3	5.2
Hospital internal administrative efficiency and attitudes of personnel	Offering outpatient schedule	◎	◎			◎	○	△	◎															4	5	4	0.8	3.2	3.1
	Attitude of administrative personnel							△			◎◎		◎◎						○	○	◎◎			4	4	4	1.0	4.0	3.9
	Attitude of medical personnel							△		○	◎◎	○	◎◎						○	○	◎◎			5	4	5	1.3	6.3	6.0
	Time length of operation	△	○	◎	◎	△		△	△		◎○		◎○				○	◎						4	3	4	1.3	5.3	5.2
	Efficiency to the outcomes of health evaluation		○	◎	◎			△																3	3	3	1.0	3.0	2.9
Care service results	Whether the doctors explain the patients' condition、medical procedure、medicine affect or not						○				○	◎	◎											5	2	5	2.5	12.5	12.1
	The patient's return diagnostic rate, infection rate during hospitalization and the degree of improvement condition					△						◎		◎			◎					△	◎	4	2	4	2.0	8.0	7.7
	Nurses to hospital beds ratio																◎	◎		◎	○			4	2	4	2.0	8.0	7.7
	The rate of checking wards of medical staff																◎	○		◎				3	3	3	1.0	3.0	2.9
	The response time when alarm ringing							△							○	○	○					◎		5	3	5	1.7	8.3	8.0
	Total score	48.4	38.3	72.9	92.1	39.5	91.3	92.6	89.4	72.3	196.2	193.3	264.2	112.5	24.0	123.3	212.1	67.5	218.4	122.1	128.9	111.0			Total score		1013	100
	Difficult and simple level improvement	4	5	5	5	5	4	5	3	5	3	4	5	5	5	3	5	4	2	4	2	5						
	Operational capability improvement weight	194	116	365	461	398	390	608	268	362	589	181	805	563	120	310	691	210	438	488	258	565						

Figure 3. *Operational capability planning deployment.*

According to improvement plan deployment, this study identified four items that must be improved—customer service survey and analysis, physicians seminars, attitudes and emotional control of medical staff, and the ratio of nurses to hospital beds.

Customer service survey and analysis: The customer ser-

vice questionnaire is provided and recycled by the social worker. Currently, the positions for putting the questioners are insufficient in hospital and do not clearly indicate where patients can fill out the questionnaire. Thus, this study suggests that a questionnaire can be attached with the numbered certificate for patients or families to fill out. Patients can fill out the questionnaire while waiting for a doctor. Patients can then drop the questionnaire into the box by the door of doctor examine room or give it to medical staff directly to increase the rate at which questionnaires are completed. After obtaining the questionnaires from patients, this study can organize the related sections and publish the problems identified by patients and their families to improve service quality.

Physician seminars: The purpose of physician seminars is to increase physician medical knowledge and thereby promote medical service quality. Thus, hospitals can hold seminars frequently to raise participation rates. Physician seminars can also enhance communication among doctors. The experience and knowledge gained by doctors can be communicated to other doctors to enhance the expertise of medical teams, strengthen the core professional capabilities in hospitals and enhance medical service quality.

Attitudes and emotional control of medical staff: Education and training classes for hospitals include professional training classes and education classes. Establishing education and research departments can enhance the attitudes and emotional control of hospital staff. For example, hospitals can increase the size of their health education centers and restrooms. Addi-tionally, hospitals can place increased importance in enhancing medical staff EQ. To increase professional knowledge, hospitals can provide information to patients, encouraging them to join concerts, reading groups, lectures, art classes, and social etiquette classes.

The ratio of nurses to hospital beds: Although the government legislated ratio of nurses to hospital beds is 1 to 1.28, most hospitals exceed this legislated ratio. Thus, hospitals should increase nursing staff to decrease this ratio to enhance patient care quality. To avoid mistakes in medical processes because of staff tiredness, decrease the ratio of nurses to hospital beds and build a good scheduling system are very important.

6. Action Plan Deployment

Action Capability Planning mainly focuses on the four items that need to be improved in Operational Capability Plan-ning—customer service surveys and analysis, physician seminars, attitudes and emotional control of medical staff, and the ratio of nurses to hospital beds. This study found the best resolutions and plans to enhance hospital quality through Improvement Plan Deployment. According to the four main executive departments—the Administration Department, Education and Research Department, Medical Team, and Medical-related Section—this study developed some im-provement plans. The details of each executive department are as follows.

Administration department: The Administration Department organizes the entire hospital operating system. This primary duty of administration department is to integrate inner department and outer organization in order to strengthen the whole medical ability of the hospital. The Administration Department includes a Superintendent office, Secretary office, Accounting office, Information Section, General Affairs office, Medical Service office, Quality Management Center, Social Work office, Human Resources Section, and Labor Safety and Health Section.

Education and research department: The expertise and skills of medical staff are utilized during patient care. Therefore, to update knowledge and to make progress toward to a successful future, the hospital established education and research de-partments to increase the exchange of knowledge about their operations. A Teaching and Research Section, website for continuing education about the hospital's emergency system, Clinical Trial Centers of Excellence, Institutional Review Board, Evidence-Based Medicine Center, and Patient Safety section are important for education and research to advance.

Medical team: The medical team is related to medical staff techniques and knowledge. The medical team includes the Internal Medicine Department, Surgery Department, Obstetrics and Pediatrics Department, other clinical departments, and medical centers.

Medical related section: In addition to medical staff skills and knowledge, other sections provide additional medical ser-vices. These sections include the Nutrition Department, Department of Pharmacy, Laboratory Medicine, Pathology section, Radiation Oncology Department, Anesthesiology Department, Nuclear Medicine, and Nursing Department.

In Action Plan Deployment, this study uses the four aspects of Operational Capability Planning as requirements, includ-ing customer service survey and analysis, physician seminars, attitudes and emotional control of medical staff, and the ratio of nurses to hospital beds. To weight each item, this study uses Absolute weights calculated in the Improvement Plan Deployment as the Operational Capability Planning in this deployment. Next, this study cross-compared the Operational Capability Planning and Action Capability Planning schemes, which included four executive departments—the Administration Department, Education and Research Department, Medical Team, and Medical-related Section. In the interrelationship matrix, the related symbols were filled in based on the interrelationship strengths and subsequently the interrelationship scores were given. Symbol ◎ suggests a strong interrelationship, with a weighting of 5; Symbol ○ suggests an indirect interrelationship, with a weighting of 3; Symbol △ suggests coordinative process, with a weighting of 1. A blank space suggests no interrelationship, and thus is assigned a score of 0. Figure 4 shows the quality house of Action Plan Deployment. For the operational capability weights, absolute weights are from the total scores of improvement plan dep-loyment. Percentage weights are the rates of total percentage weights. Each score for an item in the Action Ca-

pability Planning is recorded (Fig. 4).

The Action Plan Deployment result identified four sections that also had the highest scores that need to be improved. These sections are the human resources section, information section, labor safety and health section, and quality management center. Plans were made for each section.

Human resources section: According to the evaluation of medical staff in the customer service survey, this section can try to manage human resources more appropriately, and build a manpower pool. Increasing the frequency of professional seminars is an effective way of increasing interaction among staff and expertise. Additionally, medical staff needs a high EQ. Therefore, the hospital can provide clubs and activities to help employees relax.

Information section: An on-line survey can gather different perspectives from patients and their families. Moreover, In-ternet communities, such as Facebook Twitter and Plurk, can be established. These fast-response micro-blogs have the potential to communicate with staff and patients. Through the Internet, one can use e-learning to share knowledge and research with patients.

Labor safety and health section: With internal staff opinions as a reference, the survey was revised to increase their working morale and satisfaction. Additional expertise seminars for physicians and health examinations are effective ways to improve working satisfaction. The mission of labor safety and health section is take care all of all medical staff, such that they can work in a safe and healthy environment. Planning for healthy examination facilities and setting standard reaction methods for emergencies are very important to the rights of each employee.

Quality management center: The quality management center should place increased emphasis on customer relationship management and apply the quality tools to assist in research, experiments, diagnostic process.

symbol	weight	Relationship
◎	9	Strong
○	3	Medium
△	1	weak

		Medical team					Administration department											Education and research department						Medical related section							
		Internal Medicine department	Surgery department	Obstetrics and Pediatrics department	Other Clinical department	Medical center	Superintendent Office	Administrative Services	Accounting Office	Medical Affairs Office	Human Resource Department	Social Worker Office	General Affairs Office	Information Management Division	Work Safety Office	Quality Management Center	Medical Education and Research Department	The website of Hospital Incident Command System	Neurology and Neurosurgery	Center of Excellence for Clinical Trial and Research in Neurology and	Patient Safety section	Evidance Based Medicine Center	Institutional Review Board	Anesthesiology Dept	Radiation Oncology	Pathology section	Nursing department	Nuclear Medicine		D. Absoluteweight	Percentage weight
E- service	Tthe immediate update of the E-bulletin board									◎				◎																48.4	1.9
	Establishing the information interface equipment												○	◎				◎												58.7	2.2
	E-anamnesis									◎			△	◎																72.9	2.8
	On-line register reply									◎				◎																92.1	3.5
	Subscription for e-news													◎			△													79.5	3.0
	Health consulting and interacting system	○	○	○	○	○		○						◎			○	◎												97.5	3.7
Service level Improvement	To provide and to retrieve the questionnaire of customer's opinion	△	△	△	△	△					○	◎		○		◎								△	△	△	△	△		202.6	7.7
	To provide and to retrieve the questionnaire of customer's opinion							△		◎				◎		◎														89.4	3.4
Education training	Renewing of medical knowledge	○	○	○	○	○				△	◎					○	○		◎		◎			○	○	○	○	○		72.3	2.8
	Increase in training courses	△	△	△	△	△		◎	○		◎				◎	○	◎		◎	◎				△	△	△	△	△		196.2	7.5
	Physicians seminar	△	○	○	○	○	△				◎	○					◎		◎		◎		◎	○	○	○	○	○		195.3	7.5
	Attitude and emotion control of medical staff	△	○	○	○	○		○			◎	○	△	△	○	○	○						◎	◎	◎	◎	◎	◎		268.2	10.3
Hardware facilities	The regular disinfection of medical service equipment														◎	◎														112.5	4.3
	Regularly check and renew safety facilities and protection equipments													△	◎	◎														24.0	0.9
	Regularly check and renew medical equipments														◎	◎														123.3	4.7
Human resource	Set the nurses to hospital beds ratio firmly	△	△	△	△	△					◎				△	○	△							○	○		◎	○		232.3	8.9
	The staffs go to work and get off duty on time	○	○	○	○	○	△	◎	○	◎	◎			◎	◎	◎	△							△	△	△	△	△		67.5	2.6
	The staff proportion in each period of time	△	△	△	△	△		△			○	○		◎		◎	△							△	△	△	△	△		218.8	8.4
	Make the rules of rewards and punishments	△	△	△	△	△		△	◎		◎	○				△	△							△	△	△	△	△		122.1	4.7
Operation procedure	The emergent operational way of medical staff										○				◎	◎		◎			◎									128.9	4.9
	The recycling of medical equipment												△		◎	◎					△									113.0	4.3
Total score		823	1119	1119	1119	1119	101	1494	126	1306	4611	1395	240	3118	3026	5315	1821	912	1602		1159	921	1602	1812	1812	1545	2346	1812	Total score	2615.5	100

Figure 4. *Action plan deployment.*

7. Conclusions and Suggestions

The purpose of service quality management in hospital is to establish a system that understand and measure the requirements and expectations of patient care in order to provide continuous improvement action plan to optimize medical service for all patients. This study used Quality Function Deployment to identify the service quality items of patient requirements and expectations that need to be improved in the hospital. This study also provided recommendations and action plans to enhance customer satisfaction with medical services and improve service quality. The following conclusions are in two parts.

The first part of this conclusion addresses Improvement Plan Deployment. According to patients, their families, medical and administrative staff, this study categorized operational capability planning into six main parts depending on their de-mands. These parts are E-services, Service-level Improvements, Education and Training, Facilities, Human Resources, and Operational Procedures. In total, the operational capability plan has 21 items for these six parts. Moreover, this study found out there four areas need to be improved according to the Improvement Plan Deployment results. These four areas are customer service survey and analysis, physician seminars, attitudes and emotional control

of the medical staff, and the ratio of nurses to hospital beds.

The second part of this conclusion is associated with action capability planning. According to the four main executive departments—the Administration Department, Education and Research Department, Medical team, and Medical-related Section—some improvement plans for these sections were generated. Additionally, the four main executive departments have 20 sections. Finally, the Action Plan Deployment shows that four sections had the highest scores, indicating that they need to be improved. These sections are the human resources section, information section, labor safety and health section, and quality management section.

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