Development of Performance Indicators for Thai Autonomous University Hospitals

Wipada Kunaviktikul[1*], Wichit Srisuphan[2], Wanchai Moongtui[1], Susanha Yimyam[1] and Nuttamon Vuttanon[1]

[1]Faculty of Nursing, Chiang Mai University, Chiang Mai 50200, Thailand

[2]Professor Emeritus, Faculty of Nursing, Chiang Mai University, Chiang Mai 50200, Thailand

**Corresponding author: E-mail: nsadi001@chiangmai.ac.th*

ABSTRACT

The purpose of this study was to develop performance indicators for a Thai autonomous university hospital. The study was comprised of two stages; Stage 1: Content validity and prioritization of performance indicator items and Stage 2: Probability of use of the performance indicators. The instruments used for data collection were a set of questionnaires. The sample included experts in autonomous organization administration, public organization administration and hospital administration. The results showed that the majority of experts agreed with the proposed performance indicator items and most of them rated those items with high priority. Thus, performance indicators can be applied directly to measure the performance of a Thai autonomous university hospital. As for those items which were rated by some experts with "moderate" or "low" priority, they can be included as indicators later as necessary. Based on the findings of this study, implications for university administration, university hospital administration, nursing administration and nursing education are suggested.

Key words: Performance indicators; Autonomous university hospital; Nursing administration

BACKGROUND AND SIGNIFICANCE

A university hospital in Thailand is governed by the government with the main functions of providing teaching and training for health science university students and for providing research facilities for health science professionals as well as serving communities in terms of providing health care services. Currently, government universities have been preparing themselves to become more efficient by reducing the percentage of government control and planning to increase their administrative freedom, especially in aspects pertaining to finance, human resource, and academic affair management. Some universities in Thailand have become autonomous already, for example, Suranaree University of Technology and Walailak University (Walailak University, 1992). In preparation for reforming the government university administration, the government urged the universities to take concrete action by 2002 as the Thai government had applied for financial assistance from the Asia Development Bank (ADB). One of the recommendations made by ADB was to let government universities govern

themselves in order to reduce government expenses and solve the higher education institutions' problems with the bureaucratic structure (Nitikraipot, 1999). Most government universities responded and became autonomous bodies, for example, Khon Kaen University planned to be an autonomous university by 2003 (Khon Kaen University, 2000) and Chulalongkorn and Chiang Mai Universities are now in the process (Chiang Mai University, 1997; Chulalongkorn University, 2000.

An autonomous university hospital will allow complete flexibility in inputs purchased as well as personnel management (Punthasen et al., 1999), with flexibility including, but not limited to, the financial and administrative management of an organization. In exchange for financial and management flexibility, the autonomous hospitals must show evidence of improvement of performance. Therefore, the feasibility of developing meaningful performance indicators for autonomous hospitals, such as university hospitals, is crucial.

Performance is composed of multi-dimensional tasks and is derived from multiple sources. Performance indicators (PIs) are financial and non-financial measures which explain what has happened and assist administrators in identifying an organization's strengths and weaknesses (Hennel, 2001). They also provide a starting point for the performance improvement process by demonstrating whether management is in line with its strategic objectives. Therefore, key performance indicators are those "keys" which are used to measure and track progress in an organization. They reveal what is important to the success of that organization, and they provide information on whether the organization is succeeding in achieving the intended outcome. Therefore, indicators in performance management provide a critical route to the desired outcome as well as a way to monitor process and progress.

Types of events measured by indicators may be categorized as structure, process or outcome (Bernstein and Hilborne, 1993; Egdahl and Coertman, cited in Sitti-amorn et al., 2000). Structure refers to the roles that govern how the service is provided. A structural indicator is derived from written structure standards. Examples of standards include the mission, philosophy, goals, policies, job descriptions of the organization, numbers of specialists and numbers of beds. The structural aspect of an indicator provides quantitative measures of the performance of an organization, which may not reflect the quality of the service. The process indicators measure specific aspects of the service that is critical to outcome. Examples of process indicators include routine and emergency care and treatments, or management of health-related complications. As a process indicator, a PI is derived from written process standards such as procedures, practice guidelines, plans and documentation that outline how service in each department is to be delivered and recorded. Outcome indicators measure what does or does not happen to the customer, staff or system after something is or is not done. These indicators are based on the written outcome standards of service, practice or governance. Examples of outcome indicators include patient satisfaction, knowledge gained by patients or mortality rates.

Hofer et at., (1997) proposed that sound and appropriate PIs are those indicators that cover identified problems concurrently and retrospectively, reflect the organization's philosophy and mission, utilize low resources and costs, identify problems caused by substandard care and identify problems which repeatedly occur. Bernstein and Hilborne (1993) suggested that the main issues for the development of performance indicators are how reliable and valid the indicators are for use in the target organization.

Therefore, sound indicators for a Thai autonomous university hospital should have the

following characteristics: 1) Reflect the philosophy or mission of the university hospital; 2) Reflect the needs of the clients such as patients and their customers such as students who practise in the hospital; 3) Reflect the support of governmental policies related to the services provided; 4) Be valid, reliable and yet responsive, to the changes both within and outside the organization; 5) Data for each indicator should be simple and easy to collect; and 6) Cover areas of structure, process and outcomes of the performance of the university hospital.

Based on reviewed literature, performance means different things to different people. Consequently, researchers use different terms to indicate the performance of health care settings. Conceptually, investigators utilize either single-dimension or multi-dimension PIs for health care settings. Examples of a single dimension PI for health care settings might be multi-stay rates (Wray et al., 1999), risk-adjusted mortality rates (Thomas and Hofer, 1999), length of stay (Thomas et al., 1997), hospital re-admission rates (Cooper et al., 1999; Rosencheck et al., 1999) and cesarean section rates (Kritchevsky et al., 1999).

Many investigators and organizations also proposed multi-dimensional PIs. The Joint Commission on Accreditation of Health Care Organization (JCAHO, 1993; cited in Chang, 1997) identified eight PIs of care and health care services: appropriateness, availability, continuity, effectiveness, efficiency, respect and caring, safety and timeliness. Performance indicators were also developed for the performance of nursing care. For example, Ware and colleagues (cited in Popovich, 1998) identified 8 aspects of PIs related to nursing care. Those 8 aspects include: art of care, technical quality of care, accessibility/convenience, finances, physical environment, availability, continuity of care and efficacy/outcomes.

In the United States, the JCAHO has made PIs available for health care agencies and distributed them to health sector agencies for use (cited in Sriratanabul et al., 2000). The PIs proposed by JCAHO are comprised of four main aspects: clinical performance, health status, satisfaction and administrator/finance that cover structure, process and outcome of organizational performance. Also, clinical performance PIs were developed and consisted of as many as 31 PIs. The advantage of these PIs was that they had already been tested for validity and reliability and they were also clear numerators and denominators of the indicator, so that they were easy to calculate and retrieve.

Maryland's Quality Indicator Project, proposed by seven hospitals in Maryland, has been developed to establish clinical quality indicators in order to evaluate and improve the care of the patient. The quality indicators covered five clinical areas: acute care in-patient indicators, acute care ambulatory indicators, psychiatric care indicators, long-term care indicators and home-care indicators (MHA, 1998, cited in Sriratanabul et al., 2000). However, the Maryland Quality Indicators focused only on the clinical aspects, not covering other aspects of the hospital's performance.

The Canadian Council on Health Services Accreditation (CCHSA) categorized quality of health care into eight dimensions: safety, competency, acceptability, effectiveness, appropriateness, efficiency, accessibility and continuity. Currently, the CCHSA is in the process of implementing a national PI pilot project in 13 hospitals in Canada to develop and test for reliability and benefits of 6 generic acute care indicators such as percentage of unplanned re-admissions to the same hospital with the same or related diagnosis within seven days.

The National Health Service (NHS) of the United Kingdom (National Health Service, 2001) has published information on High Level Performance and Clinical Indicators. The purpose of this information is to provide information to individual NHS hospitals, trusts and

health authorities about a set of performance indicators, covering key government priorities such as cancer services and primary care. According to the NHS, the performance assessment framework is comprised of six inter-dependent areas; health improvement, fair access, effective delivery, efficiency, user/career experiences and health outcome of the care. Hong Kong also has dimensions of PIs similar to those of the NHS's PIs. However, Hong Kong has fewer PIs than the NHS.

Australia has also made progress in terms of the use of PIs in health care organizations. The Auditor General of Western Australia (1999) examined the PIs proposed by health care agencies in Western Australia and found that PIs reported by health sector agencies compared favorably with those reported locally and internationally. According to the Auditor General, agencies reported almost 1000 indicators, with the vast majority being measures of quality, access and efficiency, in particular for acute care.

In Thailand, Sriratanabul et al., (2000) are studying performance indicators for autonomous community hospitals, using a case study method to develop PIs for a community hospital. The study is in progress. At present, there have been no PIs developed specifically for Thai autonomous university hospitals. Kunaviktikul et al., (2000) proposed nursing care quality indicators that were categorized as structure, process and outcome. These categories were then divided into subcategories such as management, personnel, nursing practice and incidents and complications. Based on the findings, nurses proposed that quality of nursing care should include all physical, psychological, emotional, spiritual dimensions and patient satisfaction whereas the hospital administrators proposed subcategories of standards, efficiency of work and the satisfaction of the patient.

In summary, performance indicators are valid and reliable quantitative structure, process and outcome measures related to one or more dimensions of performance that provide indicators of the condition or direction over time of an organization's performance. Reviewed literature shows that there have been considerable differences between the PIs that were studied across the region concerning health care organizations. As for the elements of the PIs, many agencies have made dramatic progress in the United States, Europe and Australia by identifying, testing and utilizing them to measure health care agencies. Even though PIs have been an important issue in Thailand during the transformation period of the health care organizations, there has been no study to identify and test Pis, developed specifically for Thai autonomous university hospitals. Therefore, it is crucial to identify and test PIs designed specifically for the context of the Thai tertiary health care system.

OBJECTIVES

The specific objective of the study was to develop performance indicators for a Thai autonomous university hospital.

MATERIALS AND METHODS

The study was comprised of two stages; Stage 1: Content validity and PI item prioritization and Stage 2: Potential for the use of the performance indicators.

Setting and Sample

The sample in Stage 1 included 35 experts in autonomous organization administration, public organization administration or hospital administration. They had positions of policy makers, administrators, educators and community leaders who had experiences in the administration of autonomous organizations. In Stage 2, the sample included 9 university hospital directors.

Instruments

In Stage 1, the instruments were questionnaires developed by the investigators. The first questionnaire measured agreement with the proposed performance indicators. The performance indicators were proposed by the investigators based on the reviewed literature, indicator items used for hospital accreditation, the results from a study on quality of nursing care (Kunaviktikul et al., 2000) and from a previous study (Vuttanon, 2001). The questionnaire contained 42 indicators. Respondents were requested to rate whether they agreed or disagreed that each item should be one of the performance indicators.

In Stage 2, a questionnaire with the same content and same number of items as the first one concerned the probability of use of the items. The nine university hospital directors were asked to rate whether the items could be "possible", "probable" or "not possible" for use as performance indicators.

Data Collection Procedures

Data were collected as follow:

Stage 1: Content validity and PI items prioritization

1.1 The investigators selected appropriate performance indicators based on the results from Phase I and reviewed literature.

1.2 The experts were requested to rate whether they agreed or disagreed with the proposed items with a space provided for the reasons they agreed or did not agree. If they agreed with the item, they were also requested to rate the priority of the item ranging from 1 to 3, which indicated highly-prioritized, moderately-prioritized and normally-prioritized, respectively.

1.3 The questionnaire and a guideline and postage-paid envelope were sent to the subjects with a letter informing them of the purpose of the study and requesting them to return the questionnaire to the investigators.

Stage 2: Possibility of the use of the Performance Indicators

2.1 Based on responses to the PI questionnaire received from experts in Stage 1, the investigators analyzed the items of the PIs questionnaire and classified items based on the agreement from responses and comments made by experts.

2.2 The investigators revised the PIs questionnaire based on the comments and recommendations from experts. A rating scale was assigned for each item of the revised PIs questionnaire, ranging from the greatest probability for use (the data are already available), moderate probability for use (data could probably be retrieved) to no probability for use (no data available nor no need to use the proposed PIs item).

2.3 The revised questionnaire, the handbook of item explanation and a letter informing the subjects about the purpose of the study, together with a postage-paid envelope, were sent to nine university hospital directors and they were requested to return the question-

naire within one month to the investigators.

Data Analysis

In Stage 1, the PIs questionnaire was analyzed by calculating the percentage of the agreements on items as rated by experts and the content validity index (CVI) was calculated. The PIs questionnaire was analyzed by categorizing items into the area of the performance indicators (teaching/learning, clinical practices and research). The revised PIs questionnaire in Stage 2 was analyzed by categorizing items into the probability of the use of the item as rated by the directors of the university hospitals, using a data categorization method, frequency and percentage.

RESULTS

The PIs consisted of three dimensions: teaching (7 items), research (4 items) and services (31 items). Twenty-four questionnaires were returned out of 35 sent (response rate = 68.6%) and were analyzed for the content validity index and priority of PI items. The investigators modified and revised the questionnaire and sent it with a questionnaire guidebook to nine university hospital directors to rate the possibility of the use of the PIs. Eight questionnaires (response rate = 88.9%) were completed and returned to the investigators. The details of findings are as follow:

1. Content Validity Index and PI item agreement and prioritization

Based on the analysis, the CVI was 0.88. The majority of experts agreed with all items. They prioritized those items as high, moderate and low. The detailed explanation of highly- and moderately-prioritized items are as follow: (Table 1)

1.1 The teaching dimension of the PIs

Table 1. Number and percentage of experts who agreed with and prioritized the Performance Indicators of the teaching dimension.

Item	Agreement and Priority			Disagree n(%)	No response n(%)
	High n(%)	Moderate n(%)	Low n(%)		
Ratio of numbers of patients in selected areas to numbers of students in those areas	10 (41.7)	11 (45.8)	3 (12.5)	-	-
Readiness and adequacy of setting for practice	15 (62.5)	6 (25.0)	3 (12.5)	-	-
Readiness and adequacy of material to support learning skills	15 (62.5)	8 (33.3)	1 (4.2)	-	-
Readiness and sufficiency of preceptors	18 (75.0)	5 (20.8)	1 (4.2)	-	-
Preceptor/mentor satisfaction rate	8 (33.3)	10 (41.7)	5 (20.8)	1 (4.2)	-
Student satisfaction rate	9 (37.5)	8 (33.3)	6 (25.0)	1 (4.2)	-
Institute satisfaction rate	11 (45.8)	5 (20.8)	5 (20.8)	2 (8.3)	1(4.2)

As shown in *Table 1*, all key informants (100%) agreed with the 4 PI items in the teaching dimension, however, at a different level of agreement. In addition, almost all experts (90-99%) agreed with the 3 PI items of the teaching dimension.

1.2 The research dimension of the PIs

Table 2. Number and percentage of experts who agreed with and prioritized the Performance Indicators of the research dimension.

Item	Agreement and Priority			Disagree n(%)	No response n(%)
	High n(%)	Moderate n(%)	Low n(%)		
Policy to support research conducted by related institute/organizations	15 (62.5)	5 (20.8)	2 (8.3)	2 (8.3)	
Policy to support research conducted by personnel	15 (62.5)	5 (20.8)	4(16.7)		
Number of research projects carried out in hospital	5 (20.8)	15 (62.5)	1 (4.2)	1 (4.2)	2 (8.3)
Number of research funds and technical support	8 (33.3)	12 (50.0)	2 (8.3)		2 (8.3)

As shown in *Table 2*, only one of four PI items of the research dimension was agreed on by all key informants (100%) and most of them rated it as a high priority item; i.e., policy to support research conducted by personnel, however, at a different level of agreement. In addition, almost all experts (90-99%) agreed with the remaining 3 the remaining PI items of the research dimension.

1.3 The service dimension of the PIs

Table 3. Number and percentage of experts who agreed with and prioritized the Performance Indicators of the service dimension.

Item	Agreement and Priority			Disagree n(%)	No response n(%)
	High n(%)	Moderate n(%)	Low n(%)		
Overall in-hospital mortality rate	3 (12.5)	10 (41.7)	6 (25.0)	5 (20.8)	
Peri-operative mortality rate	17 (70.8)	5 (20.8)	1 (4.2)	1 (4.2)	
Neonatal mortality rate	17 (70.8)	5 (20.8)	1 (4.2)	1 (4.2)	
Overall hospital-acquired infection rate	19 (79.2)	2 (8.3)	2 (8.3)	1 (4.2)	
Post-operative infection rate	20 (83.3)	2 (8.3)	1 (4.2)	1 (4.2)	
Drug allergy rate	11 (45.8)	10 (14.7)	2 (8.3)	1 (4.2)	
Blood transfusion reaction rate	14 (58.3)	6 (25.0)	3(12.5)	1 (4.2)	
Rate of unplanned readmission within 28 days	15 (62.5)	5 (20.8)	2 (8.3)	2 (8.3)	

Item	Agreement and Priority			Disagree n(%)	No response n(%)
	High n(%)	Moderate n(%)	Low n(%)		
Rate of low-birth-weight babies of mothers attending the ANC clinic at the hospital	12 (50.0)	7 (29.2)	3(12.5)	2 (8.3)	
Medical record completeness	20 (83.3)	3 (12.5)	-	1 (4.2)	
Out-patient satisfaction rate	13 (54.2)	9 (37.5)	-	2 (8.3)	
In-patient satisfaction rate	13 (54.2)	9 (37.5)	-	2 (8.3)	
Average emergency-patient waiting time	17 (70.8)	4 (16.7)	2 (8.3)	1 (4.2)	
Average length of stay of top 10 DRGs	13 (54.2)	6 (25.0)	3(12.5)	2 (8.3)	
DRG relative weight in-patient	10 (41.7)	7 (29.2)	5(20.8)	1 (4.2)	1 (4.2)
Cesarean section rate	10 (41.7)	7 (29.2)	6(25.0)	1 (4.2)	
Rate of abnormal CT scan findings in patients with head injury	8 (33.3)	7 (29.2)	3(12.5)	5 (20.8)	1 (4.2)
Rate of attendance of the hospital director at the quality steering committee	11 (45.8)	8 (33.3)	4(16.7)	1 (4.2)	
Rate of medical personnel retention	6 (25.0)	14 (58.3)	3(12.5)	1 (4.2)	
Bed occupancy rate	8 (33.3)	11 (45.8)	3(12.5)	1 (4.2)	1 (4.2)
Quick ratio	10 (41.7)	9 (37.5)	4(16.7)	1 (4.2)	
Rate of patient satisfaction with educational information	3 (12.5)	15 (62.5)	4(16.7)	2 (8.3)	
Number of falls associated with injuries	14 (58.3)	7 (29.2)	2 (8.3)	1 (4.2)	
Skin integrity problem rate	14 (58.3)	7 (29.2)	2 (8.3)	1 (4.2)	
Rate of patient satisfaction with pain management	12 (50.0)	9 (37.5)	2 (8.3)	1 (4.2)	
Rate of patient satisfaction with care	14 (58.3)	5 (20.8)	2 (8.3)	3 (12.5)	
Job satisfaction rate	13 (54.2)	7 (29.2)	1 (4.2)	2 (8.3)	1 (4.2)
Average surgical waiting time	12 (50.0)	7 (29.2)	3(12.5)	1 (4.2)	1 (4.2)
Rate of cancellation or postponement of operations	12 (50.0)	8 (33.3)	1 (4.2)	3 (12.5)	
Personnel development rate	16 (66.7)	4 (16.7)	2 (8.3)	2 (8.3)	

As shown in *Table 3,* of the thirty-one PI items of the service dimension, 27 items were agreed on by almost all key informants (90-99%), 2 items were agreed on by most of key informants (80-89%) and 2 items were agreed on by many of the key informants (70-79%), however, at a different level of agreement.

Based on priority, most informants rated 24 items as highly-prioritized PIs. The three PI items of service dimension, rated as moderately-prioritized PIs, *were rate of medical personnel retention, bed occupancy rate and rate of patient satisfaction with educational information.*

2. Probability of Use of the Performance Indicators

At this stage, eight questionnaires (response rate = 88.9%) were completed and returned to the investigators. The results of this stage are described as follow:

2.1 The teaching dimension of the PIs

Table 4. Number and percentage for probability of use of the teaching dimension of the PIs according to the hospital directors.

Item	Probability of Use			
	Possible n(%)	**Impossible & No data n(%)**	**Not necessary n(%)**	**No Response n(%)**
Ratio of numbers of patients in selected areas to numbers of students in those areas	8 (100%)	-	-	-
Readiness and adequacy of setting for practice	8 (100%)	-	-	-
Readiness and adequacy of material to support learning skills	8 (100%)	-	-	-
Readiness and sufficiency of preceptors	7 (87.5%)	1 (12.5%)	-	-
Preceptor/mentor satisfaction rate	3 (37.5%)	3 (37.5%)	1(12.5%)	1(12.5%)
Student satisfaction rate	6 (75.0%)	1 (12.5%)	-	1(12.5%)
Institute satisfaction rate	3 (37.5%)	3 (37.5%)	1(12.5%)	1(12.5%)

As shown in *Table 4*, all eight hospital directors (n= 8, 100%) agreed that 3 of 7 PI items were possible to be used as the performance indicators of the teaching dimension. One item, *readiness and sufficiency of preceptors,* was agreed for use as an indicator by seven hospital directors while one hospital director stated that it could not be used as an indicator due to unavailability of the data. As for the two PI items of the teaching dimension: *preceptor/ mentor satisfaction rate and institute satisfaction rate*, three of seven hospital directors agreed that the item could be used as an indicator with the data available, while three other hospital directors stated that it could not be used as an indicator due to unavailability of the data. The item on *student satisfaction rate* was agreed for use as an indicator by six hospital directors, while only one director who indicated that no data were available for that time.

2.2 The research dimension of the PIs

Table 5. Number and percentage for probability of use of the research dimension of the PIs according to the hospital directors.

Item	Probability of Use		
	Possible n(%)	**Impossible & No data n(%)**	**Not necessary n(%)**
Policy to support research conducted by related institute/ organizations	8 (100%)	-	-
Policy to support research conducted by personnel	8 (100%)	-	-
Number of research projects carried out in hospital	8 (100%)	-	-
Number of research funds and technical support	8 (100%)	-	-

As shown in *Table 5*, all of the hospital directors agreed that all 4 items could be used as PIs.

2.3 The service dimension of the PIs

Table 6. Number and percentage for probability of use of the service dimension of the PIs according to the hospital directors.

Item	Probability of Use		
	Possible n(%)	**Impossible & No data n(%)**	**Not necessary n(%)**
Overall in-hospital mortality rate	8 (100%)	-	-
Peri-operative mortality rate	8 (100%)	-	-
Neonatal mortality rate	8 (100%)	-	-
Overall hospital-acquired infection rate	7 (87.5%)	-	1 (12.5%)
Post-operative infection rate	8 (100%)	-	-
Drug allergy rate	6 (75.0%)	2 (25.0%)	-
Blood transfusion reaction rate	7 (87.5%)	1 (12.5%)	-
Rate of unplanned readmissions within 28 days	7 (87.5%)	1 (12.5%)	-
Rate of re-operation during the same hospital stay	8 (100%)	-	-
Rate of low-birth-weight babies of mothers attending the ANC clinic at the hospital	8 (100%)	-	-
Medical record completeness	8 (100%)	-	-
Out-patient satisfaction rate	8 (100%)	-	-
In-patient satisfaction rate	7 (87.5%)	1 (12.5%)	-
Average emergency-patient waiting time	8 (100%)	-	-
Average length of stay of top 10 DRGs	8 (100%)	-	-
DRG relative weight in-patient	8 (100%)	-	-

Item	Probability of Use		
	Possible n(%)	Impossible & No data n(%)	Not necessary n(%)
Cesarean section rate	8 (100%)	-	-
Rate of attendance of the hospital director at the quality steering committee	8 (100%)	-	-
Rate of medical personnel retention	8 (100%)	-	-
Bed occupancy rate	8 (100%)	-	-
Quick ratio	7 (87.5%)	1(12.5%)	-
Rate of patient satisfaction with educational information	5 (62.5%)	2(25.0%	1 (12.5%)
Number of falls associated with injuries	8 (100%)	-	-
Skin integrity problem rate	8 (100%)	-	-
Rate of patient satisfaction with pain management	6 (75.0%)	2(25.0%)	-
Rate of patient satisfaction with care	8 (100%)	-	-
Job satisfaction rate	7 (87.5%)	1(12.5%)	-
Average surgical waiting time	7 (87.5%)	1(12.5%)	-
Rate of cancellation or postponement of operations	6 (75.0%)	2(25.0%)	-
Personnel development rate	7 (87.5%)	-	1 (12.5%)

All hospital directors agreed that 18 items could be used as PIs with available data or that data could be found (*Table 6*). There were some items which hospital directors showed their concerns. As for some items of the service dimension, most hospital directors (n = 7, 87.5%) agreed that the items could possibly be used as PIs. Only one hospital director (n = 1) stated that some items were not possible for use as PIs with varying reasons, most often that there were no data available. For the following items, i.e., *overall hospital-acquired infection rate, rate of patient satisfaction with educational information and personnel development rate,* one director stated that they were not necessary to be used.

DISCUSSION

The performance indicators (PIs) were tested for content validity, using a content validity index rating from experts (n = 24) which was 0.88, showing a high degree of agreement among the experts. The experts also rated whether they agreed or disagreed with PI items. If the experts agreed, they also rated these items with "high", "moderate" or "low" priority. Finally, the items were tested for the probability of use among current university hospital directors (n = 8).

1. Agreement on and prioritization of performance indicators among experts

Based on the findings, the majority of experts agreed with the PI items of the teaching and research dimensions. As for the service dimension, 5 out of 24 experts did not agree with two items. Three experts (12.5%) did not agree with 2 items, and only one or two experts did not agree with other items.

Among those experts who agreed with the items, the majority of them rated most items

as high priority and only some of them rated those items as moderate priority. There were only one or two experts who rated items with low priority with varying comments. The high agreement among experts may be that the proposed indicators are all important, and during this time, the quality-assurance system for the university is being emphasized and implemented. All individuals working for the university, including the experts, were informed and realized that these indicators were important for the quality of education and services and therefore, should be included as PI items. In addition, the hospital accreditation system may also play a part because experts realize that quality is also emphasized in that system.

Based on the results, all items could be used as performance indicators of a Thai autonomous university hospital due to the high agreement among experts. However, some items of the service dimension were rated by 3-5 experts as "disagree." These items might reflect the sensitivity aspect of the items when used for a university hospital which focuses on tertiary care. For example, five experts did not agree with *the overall in-hospital mortality rate*. Most items were rated as high priority by experts. Thus, it is important and crucial to include these items to measure the performance of a hospital. As for those items which were rated with moderate or low priority, they might reflect the performance of the hospital, but were not in urgent need of being included in the beginning.

2. The possibility of the use of the Performance Indicators

The PI items were tested for the possibility of use among current hospital directors (n=8). The results showed that all hospital directors agreed that all items in the research dimension were possible for use with available data. As for the teaching dimension, all items were rated by hospital directors as "possible". However, three hospital directors (37.5%) rated the following items as either "impossible" or "no data available"; *the preceptor/mentor satisfaction rate and institute satisfaction rate*. This finding indicated the need to develop a database or methods to acquire the data related to these items. In addition, adjustment or measurement of these items might be necessary. As for the service dimension, the majority of the hospital directors rated the items as "possible" to be used as indicators with data readily available. As one hospital director explained, there is no systematic approach to the data collection of some of these items, and therefore the development of an innovative and systematic approach to data collection is needed. This approach also applies to other items for which there are currently no data available.

3. The agreement and discrepancy of perspectives between experts and hospital directors.

When the data were analyzed for agreements with items and for the possibility of use of the items between experts and hospital directors, there were some agreements and discrepancies in the responses as follow:

3.1 The teaching dimension:

Both experts and hospital directors agreed with most items except for the *preceptor/mentor satisfaction rate and the institute satisfaction rate.* This may be explained as they all realize that the primary function of a university hospital is the teaching function to serve the mission of an autonomous university hospital. Also, the quality assurance system is being implemented in most Thai universities. Quality of teaching is part of quality assurance. Therefore, the teaching dimension of the proposed PIs was supported.

3.2 The research dimension:

Both experts and hospital directors agreed with most of the items proposed. This can be explained since all of the experts and hospital directors might have been informed regarding the implementation of the quality assurance system. To achieve high-quality tasks, research-based activities must be implemented. Clinicians may use research-based information to provide services for clients. As for researchers, they may conduct research to find out the best ways to conduct services. For example, health care workers such as physicians or nurses may use evidence-based practice to conduct services for patients to reduce nosocomial infections (infections that occur during hospitalization). Researchers may use research as a tool to find the best way to prevent and control the spread of infection.

3.3 The service dimension:

The majority of experts and hospital directors agreed with most of the proposed service items. A hospital accreditation system is being implemented in most hospitals in Thailand. The experts and directors are all concerned and realize the importance of conducting activities to meet the requirements of the accreditation. Also, some of the proposed items were developed based on the indicators that are used for hospital accreditation. Using the same or a similar set of indicators could be an advantage for the hospital to meet the two requirements with the same task: one is for the hospital accreditation and the other is for autonomous hospitals. Thus, the PI items for service are supported.

CONCLUSION

The performance indicators for Thai autonomous university hospitals should consist of three dimensions: teaching (7 items), research (4 items) and service (31 items). Most of them were rated by the majority of experts as high priority. Thus, items can be applied directly and immediately to measure the performance of Thai autonomous university hospitals.

In terms of probability of use, the majority of hospital directors rated most of these performance indicators as possible to be used as indicators with data readily available, while some of them rated some items as either not possible or with no data readily available. For these items, the development of a systematic approach to acquire the data is suggested. Some hospital directors rated some items as "not necessary to do". This perspective needs critical analysis as to whether it is really "not necessary to do" or there are alternative ways to measure the performance of the hospital.

IMPLICATIONS

Most of the performance indicators in this study could be used to measure the performance of the Thai autonomous university hospitals with a guidebook included. As for those items with no data currently available, the development of a systematic approach to data collection is necessary.

LIMITATIONS OF THE STUDY

As of January 2004, there is no university hospital that is officially autonomous. The performance indicators should be implemented in the current actual situation of the university hospitals to test for the applicability of the performance indicators and adjust the items as necessary. In this way, when the university hospitals do acquire autonomous status, the PIs will have to be field-tested and revised and should be ready for implementation.

RECOMMENDATIONS

Hospital administrators should bring the performance indicators to trial in their hospitals in order to prepare a database. This might start from indicators with data readily available. For those with no data readily available, they should develop data collection, using a systematic approach.

For further research, performance indicators of this study may serve as a guideline. Therefore, it is necessary to test the use of performance indicators in practice. Based on the results, some items were disagreed with by some experts. Some items were rated by hospital directors as not possible for use or with no data available. There were discrepancies of perspectives on some items between experts and hospital directors. Further studies about the adjustment of items or other aspects are needed.

ACKNOWLEDGEMENTS

The authors would like to thank the World Health Organization (Thailand) for granting the project and thank to all experts and subjects in this study for making it possible.

REFERENCES

Bernstein, S.J., and L.H. Hilborne. 1993. Clinical indicators: The road to quality care. Joint Commission Journal on Quality Improvement 19(11): 501-509.

Chaita, O. 1996. Nosocomial infections among orthopedics patients at university hospital. Unpublished Master's Thesis. Chiang Mai University, Chiang Mai, Thailand.

Chang, K. 1997. Dimensions and indicators of patient's perceived nursing care quality in the hospital setting. Journal of Nursing Care Quality 11(6): 26-37.

Chiang Mai University. 1997. Annual Report. Chiang Mai: Chiang Mai University.

Chulalongkorn University. 2000. To be autonomous university [On Line] Available WWW: http://www.chula.ac.th

Cooper, G.S., C.A. Sirio, A.J Rotondi, L.B. Sherpardson, and G.E. Rosenthal. 1999. Are re-admission to intensive care unit a useful measure of hospital performance? Medical Care 37(4): 399-408.

Hennel, M. 2001. Key performance indicators: The integral first step of the performance management process. DM review. Available via WWW http://www.dmreview.com/editorial/dmreview

Hofer, T.P., S.J. Berstein, and R.A. Haywars. 1997. Validating quality indicators for hospital care. Joint Commission Journal on Quality Improvement. 23(9): 455-467.

Khon Kaen University. (2000). About us [On Line] Available WWW: http://www.kku.ac.th

Kritchevsky, S.B., B.I.. Braun, P.A. Gross, C.S. Newcomb, C.A. Kelleher, and B.P. Simmons. 1999. Definition and adjustment of cesarean section rates and assessments of hospital performance. International Journal of Quality Health Care 11(4): 283-291.

Kunaviktikul, W., W. Srisuphan, R. Chontawan, R. Nantasupawat, O. Pumarporn, and R. Anders. 2000. Development of nursing care quality. Journal of Advance Nursing 36(6): 776-784.

Nitikraiphot, S. 1999. Public organization. Paper presented at the meeting of Preparing to Autonomous Forum, Lampang.

Nitikraiphot, S. 2000. Possibility and method to enact a public organization law. Bangkok: Graphic format.

Popovich M.L. 1998. The Joint Commissions performance measurement initiative. Home Care Provider 3(4): 226-228.

Punthasen, A., S. Suksisereekul, O. Kowinta, C. Pethpichetchian, S. Ratanalert, B. Varachit, V. Sae-ung, K. Utthawethchakul, and L. Wajeesukseet. 1999. Performance indicators and budgeting for state hospitals as public organizations. Nonthaburi: Health Reform Organization.

Rosencheck, R., A. Fontana, and M. Stolar. 1999. Assessing quality of care: administrative indicators and clinical outcomes in posttraumatic stress disorder. Medical Care 37(2): 180-188.

Sithi-amorn, C., A. Supachotikul, S. Ratanalert, K. Rachaboreeruk. 2000. Clinical practice guidelines: development and application. Bangkok: Development and Hospital Accreditation Organization.

Sriratanabul, J., S. Pothisat, Y. Ungsurote, J. Thadadeth, and S. Tomolsak. 2000. Hospital quality indicators. Bangkok: Development and Hospital Accreditation Organization.

The Auditor General Western Australia. 1999. Getting better all the time: Health sector performance indicators. West Perth: Office of the Auditor General.

The National Health Service (NHS) 2001. High level performance and clinical indicators. Available via WWW: http:\\www.nhs.gov.uk

Thomas, J.W., K.E. Guire, and G.G. Horvat. 1997. Is patient length of stay related to quality of care? Hospital Health Service Administration 42(4): 489-507.

Thomas, J.W., and T.P. Hofer. 1999. Accuracy of risk-adjusted mortality rate as a measure of hospital quality of care. Medical Care 37(1): 83-92.

Vuttanon, N. 2001. Administrative structure of Thai autonomous university hospital. Unpublished Ph.D. Thesis. Chiang Mai University, Thailand.

Walailak University. 1992. Human resources regulation of Walailak university. Nakornsritummarat: Walailak University.

Wray, N.P., N.J. Petersen, J. Souchek, C.M. Ashton, J.C. Hollingsworth, and J.M. Geraci, 1999. The hospital multi-stay rate as an indicator of quality of care. Health Service Research 34(3): 777-790.

none 422