



## Developing a Hospital Managerial Performance Assessment Tool in Iran

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### ARTICLE INFO

#### Article History:

Received: 10 Jul 2017

Revised: 5 Sep 2017

Accepted: 7 Dec 2017

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### ABSTRACT

**Background:** Performance assessment tries to find the best, valid and cost-effective way of measuring performance and work satisfaction. There are several indicators for health systems performance evaluation which ignore the managerial aspect. We aimed at evaluating the validity and reliability of managerial performance assessment tool for Iranian hospitals.

**Methods:** The current study is a part of larger study which aims at developing a reliable and valid tool for managerial performance assessment tool. The intended tool has seven dimensions of planning, organizing, leadership, information management, resource management, clinical governance, and performance indicators. We conducted a 2-round Delphi study with 18 experts whom were selected purposefully to evaluate the validity of the tool. Reliability was assessed through implementing the tool in three randomly chosen hospitals of Tabriz. Content Validity Index (CVI) and Content Validity Ratio (CVR) along with internal consistency and Cronbach's alpha were calculated for this reason.

**Results:** A checklist with 117 indicators was prepared. After determining the validity and reliability of checklist, scores for these indicators were calculated given the importance scores. The whole tool has the score of 1000. Cronbach's alpha coefficient was 0.76 for the whole checklist.

**Conclusion:** The validated tool in the current research can be used in performance assessment, evidence-based dismissal, installation, and upgrading of hospital managers in order to avoid non proper selection of these managers. Further researches are needed to apply this tool in managerial performance assessment of hospitals in order to measure probable bugs of this model.

**Keywords:** Management, Performance Assessment, Checklist

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### Citation

This paper should be cited as: Jannati S, Dadgar E, Tabrizi JS, Gholizadeh M, Kabiri N. **Developing a Hospital Managerial Performance Assessment Tool in Iran.** Evidence Based Health Policy, Management & Economics. 2017; 1(4): 198-204.



## Introduction

Human resources are the most valuable capital of health care organizations (1), in which among them, good manager is the important leader of organizations toward reaching productivity (2). Complex structure of hospitals, increased medical costs, and importance of productivity in such organizations, have persuaded hospitals seek an effective and efficient performance appraisal system (3). Performance assessment, in an effort to find the best, as a valid and cost-effective way of measuring performance and work satisfaction (4), is defined as supervision, and evaluation of the performance to assess the extent to which goals are obtained (5). Furthermore, performance evaluation organizes the efforts in order to achieve the objectives and encourages managers and policy makers to improve their performance (6).

Nowadays planning, decision making and resource allocation in healthcare system strongly depend on performance assessing of these systems (7). Also competency of hospital managers should be measured in order to discover that if they can coordinate such complex organization as well as performing their tasks of planning, organizing, leading and controlling (8, 9). Increased demand for transparency of health care systems has forced different stakeholders such as policy makers, health care purchasers, and providers pay more attention to assessing performance of hospitals now more than ever (10). In the past, performances were measured only based on financial characteristics, which could not examine the failure and success of an organization (11).

There are several indicators for evaluation of health systems performance such as Malcolm Baldrige quality model, ISO 9001:2000 quality audit, total quality management, etc. It has been shown that the Malcolm Baldrige model is a useful tool to assess hospital quality performance. Also it can be used as a self assessment tool for hospitals to measure and improve their hospitals (12).

Samadi and co-authors (13) designed a performance assessment tool for army hospitals in Iran, combining two models of “excellence

model” and “balanced scorecard model”, in which managerial dimensions were ignored. Also Asaadi and co-workers (14) in their research assessed performance of hospitals using three models of Data envelopment analysis, Balanced scorecard, and SERVQUAL. Included hospitals were assessed in some important indicators such as financial and customer, except that for managerial performance. Although organizational excellence models are designed and used for assessing performance of hospitals in Iran since 1990s (15), lack of appropriate indicators for hospital managerial performance assessment in Iran has led to a non-meritocracy installation and dismissal of these managers (16-18). Considering the fact that there is not a reliable and valid tool for assessing hospital managers’ performance, in our previous research (19) we developed a tool for this purpose including seven dimensions of planning, organizing, leadership, information management, resource management, clinical governance, and performance indicators.

Objectives: Given that a tool should be validated to be usable, in the current study we validated the tool for performance assessment of hospital management.

## Materials and Methods

This study is part of a larger study which develops a performance assessment tool for hospital managers in Iran. In the first phase of this large project that the reports have been published by the authors (19) before, seven categories and 175 indicators were created to form the performance appraisal tool for hospital managers that were excluded through a systematic review and expert panel. The second phase of this project which is addressed in the current paper, assigns to checking the validity and reliability of the checklist.

## Validation of the hospital managerial performance assessment tool:

After the initial construction of the tool, final indicators of the tool should be selected by determining that, which of these 175 indicators



include the main ones of manager's performance. To accomplish this, a 2- round Delphi study was performed. In the first round, the tool was sent to 18 experts that were selected with purposeful sampling, in order to grade each of the indicators from 1 (least important) to 9 (most important) and comment on necessity, transparency, relevance, simplicity, and measurability based on multiple choice answers. Sixteen of 18 checklists were returned to the researchers. Content Validity Index (CVI) and Content Validity Ratio (CVR) were calculated for necessity, transparency, relevance, simplicity, and measurability. Indicators with  $0.3 < CVR < 0.7$  were entered to second round of Delphi.

### **Reliability of the hospital managerial performance assessment tool**

For evaluating reliability of tool, it was implemented in three hospitals of Tabriz. These hospitals were selected randomly among general, specialized and non-training hospitals. Cronbach's alpha for whole tool and each of the seven dimensions were applied to determine the reliability of tool.

### **Inclusion criteria**

Experts with PhD degree in health services management with at least two years experience of executive management were recruited in Delphi process. Experts were included if they had BSc or MSc degree in health services management with at least three years experience of hospital manager or hospital expert. Also hospitals managers with at least three years of experience as hospital manager or health network manager and experts in hospital performance evaluation were included in this study.

### **Statistical analysis**

Descriptive statistics and Microsoft office Excel 2007 were used to describe data.

### **Ethical considerations**

Informed consent of the participants was obtained before their entrance to the study. Also participation in this project was voluntary. In the current research we avoided to generalize the results to other studies or groups. Participant's

voices were recorded with their consent and their comments were reflected covertly.

### **Results**

The current study was conducted to evaluate validity and reliability of hospital managerial performance assessment tool in Iran which was reported by our previous work. Basic characteristics of participants are indicated in table 1.

### **Validity**

At the end of the first round of Delphi, 94 out of 175 indicators which their CVR were further to 0.7 formed final indicators of the tool. Fifty-nine of 175 indicators with had CVR between 0.3 and 0.7 were entered to second round of Delphi. Also 22 out of 175 indicators with CVR less than 0.3 were eliminated. After second round of Delphi which evaluated 59 indicators by experts, 16 indicators were eliminated. So the final tool was consisted of 137 indicators. Wherever there was a comment in any dimensions of planning, organizing, leadership, information management, resource management, and clinical governance, they were transferred to the last dimension that was performance indicators.

### **Reliability**

The Cronbach's alpha, and number of questions in each seven aspects of checklist is indicated in table 2. Cronbach's alpha coefficient was 0.76 for the whole checklist.

It should be mentioned that 20 indicators were eliminated in this stage and our tool was finalized with 117 indicators. After determining the validity and reliability of checklist, scores for 117 final indicators were calculated given the importance score of them which were obtained in both rounds of Delphi. The tool has 1000 scores which are dedicated to each seven dimensions in this way: 200 for each of planning and resource management, 150 for each of organizing and leading, and 100 for each of information management, clinical governance, and performance indicators. Final tool for evaluation of hospital managerial performance in 7 dimensions along with scores of each indicator is shown in appendix 1.

**Table 1.** Basic characteristics of participants

Specialty	Degree of education	Number of participants	Age (Mean year)	Gender		Work experience (Mean year)
				Male	Female	
Physician	MD	5	45	4	1	17
Health services management	PhD	5	49	3	2	21
Health services management	MSc	5	40	3	2	18
Health services management	BSc	3	36	4	1	10

**Table 2.** The Cronbach's alpha coefficient and number of questions in each aspect of checklist

Evaluation area	Number of questions	Cronbach's alpha coefficient
Planning	17	0.717
Organizing and staff performance management	21	0.778
Leadership	16	0.790
Information management	16	0.737
Resource management	21	0.850
Clinical governance	14	0.769
Performance indicators	12	0.698

## Discussion

This study was conducted to evaluate validity and reliability of the appraisal tool for hospital managerial performance. Findings from this research had reached to a tool with seven performance areas of planning, organizing, leadership, information management, resource management, clinical governance, and performance indicators with final grade of 1000.

This research was consistent with Shafiei et al. (20), who developed a five dimensional managerial performance assessment tool including operational, professional, organizational, individual and human. Indicators in this tool were weighting with Fuzzy model. Operational indicators including planning, organizing, leadership and control had the highest rate and individual indicators had the lowest rate. One similar study developed a tool for measurement of process-based performance of multispecialty tertiary care hospitals using analytic hierarchy process. The model identified specific areas where neither hospitals performed very well and suggested recommendations to improve those areas (21). The World Health Organization in 2003 modeled a hospital performance appraisal tool in which indicators were defined more minor than current study including clinical effectiveness,

safety, patient-oriented, production efficiency, staff-oriented, and responsiveness. This tool was piloted in 8 countries (22). Findings of the piloted studies showed some challenges in design and methodology of this tool. Main factors influencing success of implementation of these tools include national and international coordination, timeliness feedback to hospitals, project management resources and data collection (23). A review identified 11 hospital performance assessment tools which clinical effectiveness was a common indicator in most of these tools. Other indicators include efficiency, patient and staff oriented responsiveness and safety. The number of indicators varies from 36 to 300 in different models (24). Another research (25) designed a conceptual framework for clinical performance appraisal of hospital in Taiwan. This matrix had two dimensions of quality (safety, clinical effectiveness, patient and staff oriented and efficiency) and function (whole hospital, surgical and non surgical). The results of appraisal were used in accreditation in this study. A systematic review in Japan (26) identified managerial indicators of health statistics, readmission, organizational efficiency, staffing and managerial processes using 3 prospective of managers, staff and



patients. Another systematic review proposed a model named Input Process Output (IPO) which measures management's performances in 3 dimensions of input, process and output. According to this model input indicators include motivation, training and expertise, appropriate communication with physicians; process indicators include strategy, organization culture, goal setting, feedback to right functions; and output indicators include degree to reach goal, positive outputs of care, involving others in service quality (27). Another study in Japan developed performance assessment of hospital manager's tool using a researcher developed questionnaire. Indicators including safety, functional efficiency, staff and patient satisfaction, financial effectiveness were extracted from this questionnaire and were presented as hospital managerial assessment criteria (28).

#### Limitations of the study

There were some practical limitations in collecting questionnaires due to bulky volume of questionnaires and lack of time of managers and specialists in Delphi process. Also some of the managers didn't cooperate seriously with researchers in the implementation phase of study.

#### Conclusion

Different models present variable indicators for performance appraisal of hospital managers. Professional and core functions of managers are surveyed in the limited number of these models.

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The designed tool in the current research can be used in performance assessment, evidence-based dismissal, installation and upgrading of hospital managers in order to avoid non proper selection of them. On the other hand with completing this checklist for hospital can show the position of hospital during the term of management which in addition to evaluating the results of previous management performance can be considered as the basis for future management and reveal changes in hospital performance. Further researches are needed to use this tool in managerial performance assessment of hospitals in order to measure probable bugs of this model.

#### Acknowledgements

We wish to thank to deputy of research in Tabriz University of medical sciences because of financial support.

#### Conflicts of interest

Authors have no conflicts of interest to declare.

#### Authors' contributions

Ali Jannati and Jafar Sadegh Tabrizi designed research; Elham Dadgar conducted research and analyzed data or performed statistical analysis; Neda Kabiri and Masoumeh Gholizadeh wrote the paper; Ali Jannati had primary responsibility for final content. All authors read and approved the final manuscript.





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## Appendix 1. Hospitals performance assessment checklist

Subject of assessment: planning

Number	Assessment items	Score of each question	Exists	Does not exist	Somewhat	Assessment Tool	Evaluation Guidelines	Comments of evaluators
1	Existence of Strategic plan	16				Strategic plan booklet	Full score- relative- zero	
2	An active committee for planning	16				Communication of team	Full score- relative- zero	
3	Attending in a planning training course	10				Valid certification of training course	Full score- relative- zero	
4	Situation analysis by data before planning	12				Documentations of SWOT analysis	Full score- relative- zero	
5	Considering priorities of ministry and university for strategic planning	12				Find recent ministerial programs such as clinical governance	Full score- relative- zero	
6	Setting appropriate long term goals	10				Strategic plan booklet	Full score- relative- zero	
7	Setting appropriate short term goals	10				Strategic plan booklet	Full score- relative- zero	
8	Existence of operational plan	16				Documents	Full score- relative- zero	
9	Revising the program in specified time periods	12				Revision minutes	Full score- relative- zero	
10	Doing activities based on operational planning	10				Operational planning assessment	Full score- relative- zero	
11	Regular assessment of progress of the program	10				Assessment feedbacks	Full score- relative- zero	
12	Installing statement of vision, mission and values of the organization exposed for all to see	12				Find vision mission and values statement	Full score- relative- zero	
13	Hospital staff awareness of the vision, mission and values statement	10				10 random questions from people	Full score- relative- zero	
14	Doing all stages of development, implementation and assessment of the program in planning Committee	8				Minutes	Full score- relative- zero	
15	Participation of all stakeholders in development of program (staff, patients, students, managers, etc.)	12				Documents of stakeholders comments in SWOT	Full score- relative- zero	
16	Strategy development based on SWOT	10				Find TOWS matrix	Full score- relative- zero	
17	Hospital top management commitment towards the implementation of the program	14				Documents of follow-up, feedback and reports	Full score- relative- zero	
<b>Total</b>		<b>200</b>						





Subject of assessment: organizing and staff management

Number	Assessment items	Score of each question	Exists	Does not exist	Somewhat	Assessment Tool	Evaluation Guidelines	Comments of evaluators
1	Written job description in the workplace	8				Documents in work place	Full score- relative- zero	
2	Introducing new personnel with hospital activities based on specific instructions	6				Documents	Full score- relative- zero	
3	Educational needs assessment of staff	8				Documents	Full score- relative- zero	
4	Devolution in hospital	8				Documents	Full score- relative- zero	
5	Existence of programs for staff empowerment	8				Documents	Full score- relative- zero	
6	Stability in the management of the organization	6				Assess the provisions of directors (the average managerial age of managers)	Full score- relative- zero	
7	Proportion of organizational positions with the posts given (lack of organizational dislocation)	6				Assessment of personnel files	Full score- relative- zero	
8	Human resource planning for the next few years (based on the number of retirees, transfers, etc.)	8				Documents	Full score- relative- zero	
9	Written system of pay for performance	8				Documents	Full score- relative- zero	
10	Specific instructions for measuring skills and knowledge in the field of specialized work	8				Documents	Full score- relative- zero	
11	Written system for performance assessment of units	8				Documents	Full score- relative- zero	
12	Nomination and selection for managerial positions based on documented indicators	8				Documents	Full score- relative- zero	
13	Performance evaluation of staff based on a written system	8				Documents	Full score- relative- zero	
14	Transparent and clear career path for employees	8				Documents	Full score- relative- zero	
15	Bed Manager with total devolution in hospital	8				Prophecy	Full score- relative- zero	
16	Equitable distribution of educational opportunities between staff	6				Compare the per capita assessment-based training + random questions from people	Full score- relative- zero	
17	Staff training manuals for needs and held courses	6				Documents	Full score- relative- zero	



Number	Assessment items	Score of each question	Exists	Does not exist	Somewhat	Assessment Tool	Evaluation Guidelines	Comments of evaluators
18	Fitness of trainings with staff needs	8				10 random questions from people	Full score- relative- zero	
19	Presence of staff in continuous training programs	6				Documents	Full score- relative- zero	
20	Annual examinations of employees based on written guideline	6				Documents	Full score- relative- zero	
21	Identifying transferable units	4				Documents	Full score- relative- zero	
<b>Total</b>		<b>150</b>						



Subject of assessment: Leadership

Number	Assessment items	Score of each question	Exists	Does not exist	Somewhat	Assessment Tool	Evaluation Guidelines	Comments of evaluators
1	Transparency of decision making hierarchy in management levels	10				decision making hierarchy flowchart– separation of duties	Full score- relative- zero	
2	Performing participatory management	10				Suggestion system	Full score- relative- zero	
3	Recognizing processes of units	10				List of processes	Full score- relative- zero	
4	Standard flow-chart for all processes	10				Documents- flowcharts	Full score- relative- zero	
5	Checklist for continuous assessment of units	10				Documents	Full score- relative- zero	
6	Provide assessment feedbacks and comments to sectors	10				Documents	Full score- relative- zero	
7	Regular meetings of decision-makers (committees based on the timing)	10				Committees documents	Full score- relative- zero	
8	Arranged participation of manager in meetings (turnout)	10				Committees documents	Full score- relative- zero	
9	Implementation of decisions taken at the hospital committees	8				Committees documents	Full score- relative- zero	
10	Lack of contrasts and contradictions in decisions of committees	8				Committees documents	Full score- relative- zero	
11	Participation of manager in management improvement meetings (passing management improvement courses)	8				Documents	Full score- relative- zero	
12	Having eligible criteria for appointment to the post of manager (management and nursing management)	10				Documents	Full score- relative- zero	
13	Friendly meetings with the employees	8				Documents- minutes	Full score- relative- zero	
14	Staff participation in core decision makings	10				Documents- minutes random questions from 10 people	Full score- relative- zero	
15	Developing team work in hospitals	8				Documents- team work minutes-Held meetings	Full score- relative- zero	
16	Evidence based staff rewarding system	10				Documents- minutes	Full score- relative- zero	
<b>Total</b>		<b>150</b>						



Subject of assessment: information management

Number	Assessment items	Score of each question	Exists	Does not exist	Somewhat	Assessment Tool	Evaluation Guidelines	Comments of evaluators
1	Appropriate feedback for units reports	8				Documents	Full score- relative- zero	
2	Analysis of reports in reporting committees	6				Documents	Full score- relative- zero	
3	An ongoing survey system for patients and their relatives	6				Documents	Full score- relative- zero	
4	Reporting system for applied projects	6				Documents	Full score- relative- zero	
5	Planning interventions based on the reported results	8				Documents	Full score- relative- zero	
6	Recording and reporting system for medical errors	8				Documents	Full score- relative- zero	
7	Planning and action to reduce medical errors	6				Documents	Full score- relative- zero	
8	Recording and reporting system for hospital infections	8				Documents	Full score- relative- zero	
9	Planning and action to reduce hospital infections	6				Documents	Full score- relative- zero	
10	The possibility of getting financial reporting from a hospital HIS system	4				Documents	Full score- relative- zero	
11	Monitoring system for ward management at managers room	4				Finding system	Full score- relative- zero	
12	Electronic hospital record system for patients	4				Documents	Full score- relative- zero	
13	managerial researches done on the system	4				Documents	Full score- relative- zero	
14	Giving feedback about researches done in hospitals	8				Documents	Full score- relative- zero	
15	Using the results of studies in hospitals	6				Documents	Full score- relative- zero	
16	Ease of findings patient's folders when needed	6				Finding 10 folders randomly	Full score- relative- zero	
<b>Total</b>		<b>100</b>						



Subject of assessment: resource management (medical equipments, working space, financials and budget)

Topic	Number	Assessment items	Score of each question	Exists	Does not exist	Somewhat	Assessment Tool	Evaluation Guidelines	Comments of evaluators
medical equipments	1	Keeping and developing equipments with a written plan	10				Checklist 1	Full score- relative-zero	
	2	A written organizing for medical equipment	10				Checklist 2	Full score- relative-zero	
	3	Coordination in buying medical equipment	10				Checklist 3	Full score- relative-zero	
	4	Supervision and control system in medical equipment	10				Checklist 4	Full score- relative-zero	
<b>Total</b>			<b>40</b>						
working space	1	Appropriateness of orders in working space	8				Observation and judgment	Full score- relative-zero	
	2	Appropriateness of working space (environment health, light, voice)	6				Observation and judgment	Full score- relative-zero	
	3	Keeping working space (a written plan)	8				Observation and judgment	Full score- relative-zero	
	4	Appropriateness of working space with standards (space to bed and patient ratio)	8				Checklist 5	Full score- relative-zero	
<b>Total</b>			<b>30</b>						
Financials and budget	1	A written plan for enhancing revenue	10				Documents	Full score- relative-zero	
	2	Extraction and analyses of monthly deductions	10				Documents	Full score- relative-zero	
	3	Appropriateness of revenue and charges with operational plan	10				Documents	Full score- relative-zero	
	4	Awareness of manager about monthly exclusive revenue	10				Question from manager	Full score- relative-zero	
	5	Analyzing charges and hospital income	10				Documents	Full score- relative-zero	
	6	Analyzing charges and income for costing centers monthly	10				Documents	Full score- relative-zero	
	7	Budget allocation according to a written plan	10				Documents	Full score- relative-zero	



Topic	Number	Assessment items	Score of each question	Exists	Does not exist	Somewhat	Assessment Tool	Evaluation Guidelines
8		Giving feedback of cost and income for centers	10			Documents	Full score- relative-zero	
9		Having plan and action for reducing unnecessary costs	10			Documents	Full score- relative-zero	
10		Clear process of cost (buying based on a plan)	10			Documents	Full score- relative-zero	
11		Yearly cost management of hospital according to a plan	10			Documents	Full score- relative-zero	
12		Recognizing ways of cost reduction in hospital	10			Documents	Full score- relative-zero	
13		Having priority for hospital costs	10			Documents	Full score- relative-zero	
<b>Total</b>			<b>130</b>					





Subject of assessment: clinical governance

Number	Assessment items	Score of each question	Exists	Does not exist	Somewhat	Assessment Tool	Evaluation Guidelines	Comments of evaluators
1	Interventions to reduce cases of insecurity in hospital	10				Documents	Full score- relative- zero	
2	Risk checklist for evaluating sections	8				Documents	Full score- relative- zero	
3	The fire alarm system in hospitals and warehouses	6				Finding and checking system	Full score- relative- zero	
4	Proper waste management systems	8				Checklist 6	Full score- relative- zero	
5	Educating employees about workplace hazards	6				Training certifications	Full score- relative- zero	
6	WHO guidelines and strategies for patient safety	8				Checklist 7	Full score- relative- zero	
7	Appropriate instructions for the safety of visitors	6				Documents	Full score- relative- zero	
8	Instructions to meet the environmental crisis	8				Documents	Full score- relative- zero	
9	Registration system for readmissions	8				Documents	Full score- relative- zero	
10	Registration system for complaints	8				Checklist 8	Full score- relative- zero	
11	Patients' rights in the right place	6				Documents	Full score- relative- zero	
12	Symptoms and signs for guiding patients and their relatives in hospital	6				Documents	Full score- relative- zero	
13	Specific guidelines for working with providers and organizations (including 115 emergency, hospitals, insurance companies, clinics, nursing homes, etc.)	6				Documents	Full score- relative- zero	
14	Clear guidelines for referring patients	6				Documents	Full score- relative- zero	
<b>Total</b>		<b>100</b>						



## Subject of assessment: hospital performance indicators

Number	Assessment items	Score of each question	Exists	Does not exist	Somewhat	Assessment Tool	Evaluation Guidelines	Comments of evaluators
1	Ratio of active bed to constructive bed	8				Documents	Improved: full score- no change: half score-worsened: zero	
2	Bed occupancy rate	10				Documents	Improved: full score- no change: half score-worsened: zero	
3	The average waiting time for outpatient services after admission	10				Timing randomly form 5 case	Improved: full score- no change: half score-worsened: zero	
4	The number of medical personnel to active bed	8				Documents	Improved: full score- no change: half score-worsened: zero	
5	Increase rate in hospital income	8				Documents	Improved: full score- no change: half score-worsened: zero	
6	Net infection rate in hospital	10				Documents	Improved: full score- no change: half score-worsened: zero	
7	Proportion of canceled surgeries to total surgeries	8				Documents	Improved: full score- no change: half score-worsened: zero	
8	Proportion of emergency surgeries to elective surgeries	8				Documents	Improved: full score- no change: half score-worsened: zero	
9	Proportion of laboratory personnel to existing standards	8				Documents	Improved: full score- no change: half score-worsened: zero	
10	Efficiency of assigned units	8				Documents	Improved: full score- no change: half score-worsened: zero	
11	Specific income ratio to total hospital costs	8				Documents	Improved: full score- no change: half score-worsened: zero	
12	Proportion of staff payment to hospital costs	6				Documents	Improved: full score- no change: half score-worsened: zero	
<b>Total</b>		<b>100</b>						



## Checklist 1

**Maintenance and development of medical equipments**

Number	Items	Item score	Exists	Don't exist
1	Annual program for the purchase and development of medical equipment in hospital	2		
2	Schedule for the equipment and maintenance services in medical equipment unit	2		
3	Schedule for the equipment and maintenance services in agencies	2		
4	Regular calibration programs in hospital	2		
5	Official surveys to determine the budget for maintenance of medical equipment	2		
<b>Total</b>		<b>10</b>		

## Checklist 2

**Organizing medical equipment**

Number	Items	Item score	Exists	Don't exist
1	Medical equipment committee in hospital	2		
2	Medical equipment unit in hospital	2		
3	Delegation of responsibilities for medical equipment maintenance from top manager to the unit	2		
4	Annual maintenance service contracts for advanced and expensive equipment	2		
<b>Total</b>		<b>8</b>		



## Checklist 3

**Guidance and coordination in purchase and development of medical equipment**

Number	Items	Item score	Exists	Don't exist
1	Regular reporting of annual performance about medical equipment (purchase, maintenance and repair) to hospital manager	1		
2	Training courses for users of medical equipment by medical equipment unit	1		
3	Installation of guide label for complicated equipment on the device	1		
4	Address the deficiencies and failures of equipment by medical equipment unit on time	1		
5	Specialized committee for the purchase of medical equipment	1		
6	Prioritizing for medical equipment purchases	1		
7	Specified annual budget for purchasing medical equipment	1		
8	Warranties and documentation for medical equipment purchases	1		
<b>Total</b>		<b>8</b>		

## Checklist 4

**Monitoring and controlling medical equipment**

Number	Items	Item score	Exists	Don't exist
1	Warning signs on disabled medical equipment or equipment that should not be used	2		
2	Documentation of medical equipment unit's monitoring on primary function of newly purchased equipments	2		
3	Documentation of medical equipment unit's monitoring on how do technicians do with equipment's repair	2		
4	Documentation of medical equipment unit's monitoring on how do users do with equipments	2		
5	Documentation of monitoring the installation of medical equipment's identification labels on the equipment	2		
6	Documentation of medical equipment unit's monitoring on equipment's certification	2		
7	Documentation of medical equipment unit's monitoring on software about equipment management	2		
<b>Total</b>		<b>14</b>		



Checklist 5

**Appropriateness of space with standards**

Number	Items	Item score	Exists	Don't exist
1	Assessment tool for physical space of hospital	2		
2	Regular assessment of physical space of hospital	1		
3	Analyzing physical space and recognizing main problems	1		
4	Annual schedule for maintenance of physical space according to hospital's priorities	2		
5	Extraction of developmental needs of hospital	1		
6	Doing changes in physical space in order to improvement (according to standards)	1		
7	Improvement in physical space's health standards according to standards at the beginning of the year	1		
<b>Total</b>		<b>8</b>		

Checklist 6

**Hospital waste management system status**

Number	Items	Item score	Exists	Don't exist
1	Using color coding of waste	2		
2	Waste separation of origin in accordance with environmental and workplace health guidelines number 81	3		
3	Optimized use of safety box	3		
<b>Total</b>		<b>8</b>		



## Checklist 7

Number	Items	Item score	Exists	Don't exist
1	Pay attention to drugs with the same name and pronunciation	1		
2	Patient identification (a specific pathway and procedure)	1		
3	Effective relationship in patient transfer (a specific pathway and procedure)	1		
4	Doing the right procedure in the right place	1		
5	Controlling the concentration of electrolyte solutions	1		
6	Ensuring the accuracy of medication in transitional stages of delivery (drug combination)	1		
7	Avoiding connection of incorrect catheter and tubes	0.75		
8	Use of disposable syringes	0.5		
9	Improvement of hand hygiene	0.75		
<b>Total</b>		<b>7.75</b>		

## Checklist 8

## Complaint's attendance system in hospital

Number	Items	Item score	Exists	Don't exist
1	A place for complaints attendance	0.5		
2	Assigning a person in charge of attending complaints and existence of information boards to guide the complainant	1.5		
3	A specific process for complaints attendance including:			
	Different ways of giving complaint	1		
	Devoting a code for each complaint for tracking and giving the code to complainant	0.5		
	Attending complaints due to their priority, intensity and repeat	0.5		
	Analyzing and recording complaints	0.5		
	Doing corrective actions due to the results of analyze	0.5		
	Giving feedback to the complainant in the specified time	0.5		
	Declaring the experiences to whole hospital	0.5		
<b>Total</b>		<b>6</b>		