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Original Article

Hospital Managers' Decision-Making Puzzle

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Abstract

Background: Decision-making is choosing one option from among different options. Most decision-making models were developed in the general industry. Specific decision-making models are needed due to the special nature of the hospital and its services. We aimed to propose and validate a decision-making model for hospital managers.

Methods: This research used the modified Delphi technique to develop and validate a decision-making model for hospital managers. A data collection form was used to collect data. The search of English databases covered the period from 1990 to 2020. The first draft of the model was introduced through a scoping review and semi-structured interviews. Two rounds of Delphi were conducted with 33 experts to verify the proposed model.

Results: Many factors affect the quality and outcome of a hospital manager's decision. The decision- making model developed in this study has 10 constructs grouped into three components (i.e., inputs, processes, and outputs). These constructs include decision maker, decision implementer, organization, client, subject, analysis, identification, evaluation & selection, implementation and control. This model provides a guide for each decision stage and determines the conditions necessary for a good decision.

Conclusion: Using the decision-making puzzle and considering the set of inputs, processes, and outcomes of the decision making together alongside with specifying the details of each decision-making stage make it easy for hospital managers to decide. Such a scientific, objective and systematic approach in decision-making will result in desired results for staff, patients, managers and the hospital. This puzzle is also a good tool for pathology of hospital managers' decisions.

Keywords: Decision-making; Managers; Hospital; Model

Introduction

Decision-making is choosing one option from among different options. Decision-making is one of the most important functions of a manager that has positive or negative effects for other stakeholders. As a result, some scholars define organization as a "decision network" and management as "decision making" (1). Decision-making can be considered as a choice between two or more actions, behaviors, opportunities, solutions and possibilities (2-5). Decision-making is the process of reducing the gap between the current and the desired situation by solving problems (6).

Managers face problems in planning, organizing, leading and controlling. Thus, they have to make timely and optimal decisions (7). The necessity of making a balance between quality and efficiency, changes in laws and policies, development of expensive medical technologies, and increasing knowledge of patients and staff increase these problems (8, 9). On the other hand, decisions are influenced by key people such as doctors, managers and nurses. Therefore, it is more difficult and challenging for hospital managers to make decisions compared to their counterparts in other institutions (10).

Different decision-making models were proposed in general industries of Western countries. However, considering the differences between general industries and the health system, which has significant consequences on people well-being and health, a context- specific Decision-making model should be developed for hospital managers. The knowledge of hospital managers in decision-making is limited to basic elements and principles such as the decision-making process, decision-making methods (rational/intuitive, systemic/non-systemic and situational/contingent) and decision-making approaches (optimization-satisfaction). Practically, solutions such as hospital committees, hospital trustee boards and independent hospitals have been introduced in Iran to facilitate and improve decision-making in hospitals. However, their success has not been proven. Therefore, it is necessary to develop a decision-making model as a practical guide for hospital managers' organizational decisions.

The aim of this research was to develop a decision-making model for hospital managers. Such a decision-making model creates a common language between administrative experts and clinical specialists in the decision-making process in the hospital and leads to the improvement of the efficiency of the resulting decisions.

Methods

To develop the initial model of managers' decision-making, a scoping review was conducted. Relevant articles were also extracted from valid databases and reviewed. A data collection form was used to collect data. The search of English databases covered the period from 1990 to 2020.

Through interviews with 37 managers and officials of the medical, diagnostic, support and administrative departments of the hospital, the initial model was completed. The pluralistic evaluation approach was used and the interviewees were selected using purposive and snowball sampling techniques. Finally, grounded theory was used to develop the initial decision model in Iranian hospitals.

This research used the modified Delphi technique to develop and verify a decision-making model for Iranian hospital managers. The modified Delphi method allows for expert interaction in the final round. This allowed members of the panel to provide further clarification on some matters and present arguments in order to justify their viewpoints. The modified Delphi method can be superior to the original Delphi method and perceived as highly cooperative and effective (11).

The members of the Delphi panel must have in-depth knowledge of and differing perspectives on the issue under study and be highly credible in relevant scientific communities. Overall, 33 individuals agreed to participate in the present research. The inclusion criteria for the expert panel invited to take part in the study were: hospital managers with at least 5 years of work experience, authors with at least three original research papers on decision-making, keynote speakers in conferences on decision-making. The expert panel was selected after reviewing their CVs. Authors of this article were excluded from this stage. The Delphi panelists' key demographic characteristics are presented in Table 1.

Table 1: Demographic Characteristics of Delphi Panel Expert

Demographic variables	*Frequency*	*Percentage*
Gender		
Male	24	73
Female	9	27
Age		
35 to 45 yr	11	33
45 to 55 yr	15	46
55 to 65 yr	7	21
Years of related management		
1 to 10 yr	15	46
11 to 20 yr	10	30
21 to 30 yr	8	24
Graduation degree		
Master of science	11	33
Doctor of medicine	6	19
Doctor of philosophy	16	48
Occupation		
Faculty member	22	67
Hospitals and medical centers	11	33

Initial model was presented to the expert panel using a questionnaire. This instrument had been reviewed by five health policy and management professors and its face and content validity had been established. The total average CVI was 0.96, which is acceptable. This questionnaire included the main-constructs and sub-constructs of the model. Each section contained items for obtaining the opinions of expert panel on the strengths and weaknesses of the proposed model, potential challenges to its implementations, and their recommended solutions. The opinions of the expert panel were analyzed using thematic analysis. Quotations taken from the interview transcripts were labelled with the letter 'Q'. Finally, the proposed model was modified based on the opinions of the expert panel.

In the second stage, the modified model was again presented to the expert panel using a questionnaire to reach consensus. This approach is useful for converging expert panel opinions. First, a set of closed questions was used to ask expert panel about their agreement or disagreement with the key constructs of the proposed model. These questions were rated on a 10-point Likert scale from 1 for 'strongly disagree' to 10 for 'strongly agree'. Moreover, using an open question, experts who rated an item less than 7 were asked to explain their reasoning. The information obtained from the questionnaires was analyzed in SPSS 24 (IBM Corp., Armonk, NY, USA).

Measures of central tendency and dispersion, including mean and standard deviation, were used to analyses the data obtained from the second rounds of the Delphi method. For all questionnaire items, the mean above 7 and the standard deviation less than 2, are the acceptable values for the model to be accepted by the expert panel.

Ethical approval was obtained from the Research Ethics Committee. Respondents were given full information on the purpose and design of the study through a letter. Participation was voluntary and Participants could stop participating in

the study at any point. All methods were carried out in accordance with relevant guidelines and regulations.

Results

In round one, the initial decision-making model which consists of three categories with 10 main constructs and 63 sub-constructs was reviewed and criticized by a panel of experts. Then experts' suggestions about required changes were applied to the model and the modified model was developed with3 parts, 10 main constructs and 49sub-constructs.

In round two, modified model was again presented to the expert panel. The results of statistical analysis indicated that experts approved the modified model. The results of the statistical analysis are provided in Table 2.

Table 2: The Main and sub- constructs of the modified model of decision-making

Constructs	*Mean SD*	*Constructs*	*Mean*	*SD*
Decision maker		Is the decision-maker appropriate in the model?	8.03	0.44
		Are sub-constructs complete and comprehensive in the inputs and outputs?	8.43	0.48
		Is the relationship between sub-constructs logical in the inputs and out-	8.51	0.23
Decision implementer		Is the decision implementer appropriate in the model?	8.45	1.09
		Are sub-constructs complete and comprehensive in the inputs and outputs?	8.24	0.52
		Is the relationship between sub-constructs logical in the inputs and out-	8.12	0.41
Organization		Is the organization appropriate in the model?	8.34	1.44
		Are sub-constructs complete and comprehensive in the inputs and outputs?	8.78	0.35
		Is the relationship between sub-constructs logical in the inputs and out-	7.91	0.51
Client		Is the Client appropriate in the model?	8.58	0.85
		Are sub-constructs complete and comprehensive?	8	0.69
		Is the relationship between sub-constructs logical?	8.31	1.32
Subject		Is the Subject of the decision appropriate in the model?	7.21	0.69
		Are sub-constructs complete and comprehensive?	8.27	0.77
		Is relationship between sub-constructs logical?	8	0.29
Analysis		Is the Analysis appropriate in the model?	8.03	1.02
		Are sub-constructs complete and comprehensive?	7.57	0.76
		Is the relationship between sub-constructs logical?	8.22	1.05
Identification		Is the Identification appropriate in the model?	8.03	1.16
		Are sub-constructs complete and comprehensive?	7.09	0.63
		Is the relationship between sub-constructs logical?	7.18	0.71
& Evaluation Selection		Is the Evaluation & Selection of solutions appropriate in the model?	9	1.13
		Are sub-constructs complete and comprehensive?	9.04	1.07
		Is the relationship between sub-constructs logical?	9.01	0.76
Implementation		Is the Implementation appropriate in the model?	7.88	0.91
		Are sub-constructs complete and comprehensive?	7.44	0.62
		Is the relationship between sub-constructs logical?	8.03	1.41
Control		Is the Control appropriate in the model?	8.45	1.22
		Are sub-constructs complete and comprehensive?	8.11	1.18
		Is the relationship between sub-constructs logical?	8	0.51

Final model

The second round of Delphi showed that the proposed model is comprehensive and applicable to hospitals. This final model is called "Hospital Managers' Decision-Making Puzzle" in Fig. 1.

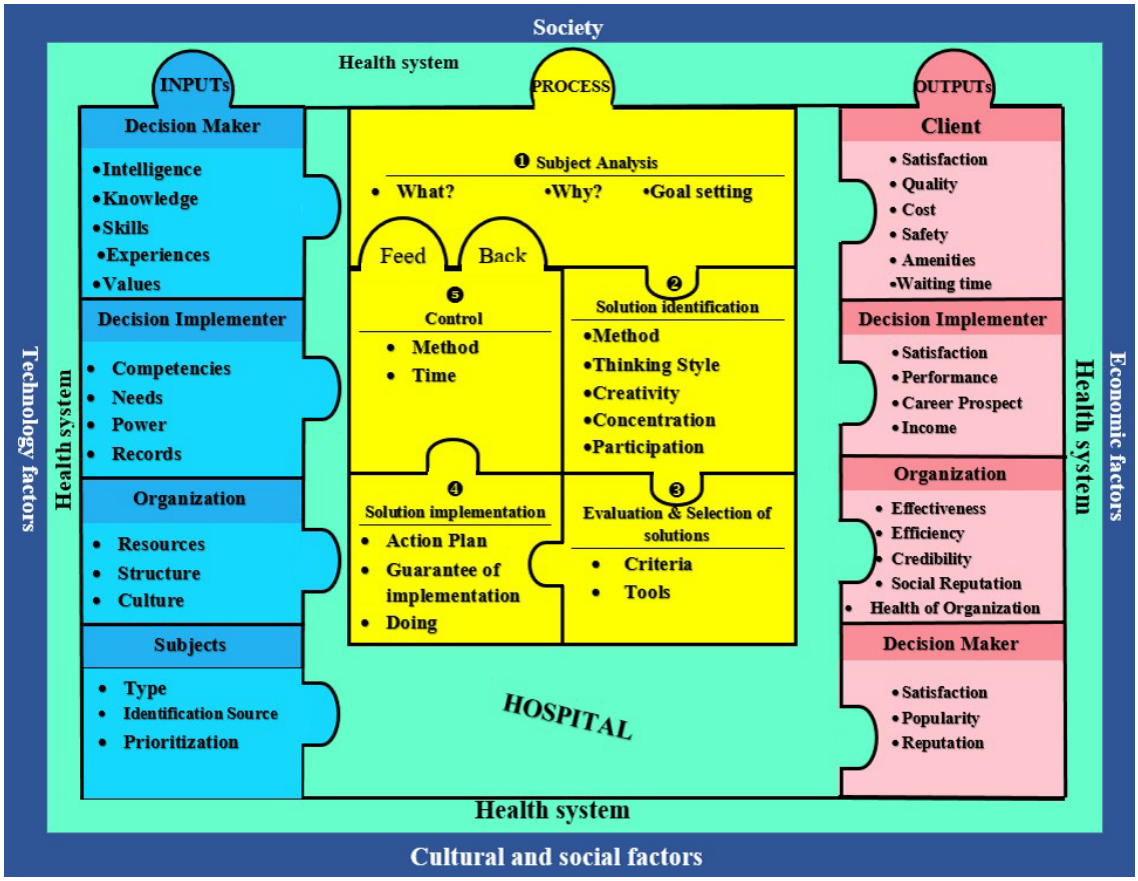

Fig. 1: The Hospital Managers' Decision- Making Puzzle

Discussion

In this study, a comprehensive model for hospital managers' decision-making was introduced and verified. According to this model, decision-making is a system that consisting of inputs, processes and outputs/outcomes. This model is called a decision puzzle. A decision-making system similar to solving a puzzle, can only function properly when all its components are considered and fit together correctly. The dominant logic of the model is the development of inputs that lead to desired outputs/ outcomes through specific processes.

Inputs of the puzzle of decision making

It is necessary for the decision maker to be one of the best human resources in terms of intelligence (intellectual-emotional-political), knowledge, experiences and management skills; however, these capabilities are greatly influenced by the beliefs and values of the decision-maker If people are placed in this position regardless of these characteristics, without a doubt, the process of making progressive and creative decisions will fail (12-17).

Hospital managers complement each other in terms of competencies such as intelligence,

knowledge, experience and management skills, but since most of the time decision makers have different values, it is better to pay attention to the homogeneity of decision makers' values (18).
The competence, needs, power and records of decision implementer are important and should be considered in the inputs of the decision-making. Competencies are a combination of knowledge, experience, skills, intelligence and creativity that provide the potential to perform tasks effectively. Competencies have complementary potential, can be trained, and developed (19).
Managers must also pay attention to the records of decision implementer in their selection (20). Understanding and meeting the needs of decision implementers increase their motivation to implement the decision better (21, 22). Understanding the power of decision implementer is essential if this power is a threat to the implementation of the decision, action must be taken to neutralize it, and if this power is an opportunity, it must be used to the maximum; Power is the potential ability of an individual or a group to exert influence over others or groups (23).
The hospital is an organization. This organization, including organizational structure, organizational culture, and resources, influences managers' decisions. Organizational resources include human, information, financial and physical resources. The information needed to make a decision must come from a variety of sources, such as field observations, documents, and interviews (24, 25). Adequate resources affect the satisfaction and motivation of the decision implementer and increase the chances of its successful implementation (26, 27); therefore, managers must provide the necessary resources when making decisions and distribute them properly.
A standard organizational structure, including well-defined job descriptions, fair division of labor, and proportionality of authorities, facilitates the decision-making process (28).
Managers should create and promote an appropriate organizational culture, including teamwork, collaboration, customer centered, and rule of law, so that decisions are implemented correctly. Education, positive reinforcement and transparency contribute to the development of such a culture (29).
Organizational problems and goals are the subjects of decision-making. These subjects are identified through observations, complaints of individuals, reports and performance indicators. Then, these subjects should be prioritized according to their importance. The decision-making process begins with choosing the subject of the decision.

Process of the puzzle of decision-making

The "what" and "why" of the decision subject is explained in the analysis phase. The goal and objectives of the decision is determined by these questions. In addition, the root causes of the problem must be identified and analyzed in order to provide appropriate solutions. This step is similar to "Define" and "Problem definition" in DECIDE and CPD (Complex Decisional Process) models, respectively (30, 6). Using accurate information is important at this stage and personal judgments should be avoided.
The solution identification stage is influenced by identification method (individual or group), decision makers' thinking style (rational and intuitive), creativity, concentration and participation of working process stakeholders. Benchmarking and operations research are used as individual methods and brainstorming is used as the group method in solutions' identification (31, 32).
Hospital managers use rational or intuitive thinking styles or both while making a decision. They should promote a creative culture to increase the quality of decisions, too. Creativity is enhanced by techniques such as Brainstorming, Bionics, and Lateral Thinking (33). Interesting subject of decision making, decision makers' knowledge and experience about the subject affect their concentration on the decision making process (34). Participation of working process stakeholders reduces their resistance in implementing the decision and enhances their commitment. Their voluntary and active participation as a team leads to the success of this stage (35).
The identified solutions should be evaluated using some criteria such as their benefits and costs

for stakeholders, required resources and time, and moral/cultural considerations as a result, a practical and cost-effective solution should be selected. This step is similar to "Establish the criteria" and "Evidence" in DECIDE and Evidence Based Decision Making models, respectively (30, 36). Managers should consider the collective interests of the hospital instead of their own individual or professional interests. A solution should not be chosen due to conflict of interests (individual or professional), while it has not many collective interests.

Information and personal judgment are used in the evaluation and selection stage. Valid, reliable and update evidence and information are keys to successful organizational decision making. Personal judgment will inevitably be substituted in the absence or lack of information. As a result, the decision would be more subjective rather than objective. Thus, it is better to use personal judgment when two or more solutions got the same score in the evaluation stage (37, 38).

An action plan should be formulated to list all activities required for implementing the selected solution. The action plan specifies by whom, how, where and when each activity will be performed. Regular and continuous meetings of key decision makers enhance commitment and organizational discipline (39). Selecting motivated people to implement the decision, managers' support, education, training, and promoting teamwork increase the chance of successful implementation (40, 41).

Control helps to determine the efficacy of the decision in solving the problem and to identify factors prohibiting achieving the best result. Control techniques include monitoring, assessment and evaluation. Control is an ongoing process considering factors before, during and after the implementation of the decision (42). This step is similar to "Evaluation" in DECIDE model (30). Managers may control their decisions actively or passively. Hospital managers should get involved personally in the control process. Using unnoticed controls are recommended to understand better the process and outcomes of implementing a decision. Good control identifies the need for applying corrective actions or highlights continuing the current actions. These experiences should be reflected in the decision-making cycle to enhance organizational learning and improve performance.

Outputs of the Puzzle of Decision Making

The patient and the patient's relative are the most important customers of a hospital. Hence, their satisfaction is the ultimate goal of any organizational decision. Patient satisfaction is his or her perception about the received service. Measuring patient satisfaction is difficult as they are suffering from the pain of diseases, are vulnerable, and have to follow up the treatment process. Patients' expectations are increased nowadays owing to an increase in their knowledge and as a result, they are more demanding and it is challenging hospital managers to keep them satisfied. Factors such as hospital amenities, waiting time, health and safety, costs and quality of services are affecting patients' satisfaction. Patients' satisfaction leads to their loyalty and introducing the hospital to others to get services (43). Therefore, it is a good decision if it can improve the satisfaction of patients and their relatives by providing quality, safe and effective services.

A good decision should lead to improved performance, career advancement, increased revenue, and improved employee job satisfaction. Employees' job satisfaction refers to the desired feelings of employees while performing organizational tasks. Organizational decisions affect employee job satisfaction; they expect hospital managers to link their performance improvement due to implementing the decision to their career advancement and increased income. A decision that leads to improved employee job satisfaction will also lead to improved job performance (44).

If the manager pursues his/her personal benefits or interests in decision-making, s/he may achieve satisfaction, but s/he will not have the support of employees and will not be popular among them. On the other hand, if a manager considers organizational interests when making decisions, he or she will have more credibility among senior man-

agers, peers, and employees. Conflict of interest is a set of conditions in which decisions and actions are affected by a secondary interest. Besides, these interests can incorrectly affect their duties. Conflict of interest is a major form of corruption (45).

Organizational decisions also have consequences for the hospital itself. Managers' decisions should have a positive effect on hospital performance indicators. The most important of these indicators include effectiveness, efficiency, organizational health, social reputation and hospital reputation. Managers must make decisions that increase efficiency (achieving hospital goals) and efficiency (appropriate use of limited resources). A good decision should increase hospital productivity. In addition, organizational decisions should enhance the organizational health of the hospital. As a result, the hospital balances with its external environment and adapts better. The hospital's good reputation attracts competent staff to work in the hospital and attracts patients to receive services (46, 47).

Conclusion

The different nature of hospitals from other industrial organizations requires a different approach to decision making. The existing models of decision-making show the decision-making process including steps to be followed to make the right decision. We consider decision-making as a system including inputs, processes and outputs/ outcomes. Some specific requirements should be provided to achieve the desired result through decision–making steps. This study somehow develops existing models in decision making.

The decision-making puzzle helps hospital managers to correctly put together all the components of this system with an objective approach. This decision-making puzzle can be also used as a tool for the pathology of managers' decisions to find the strengths and weaknesses of decisions and their effects and to strengthen the decision-making system.

Journalism Ethics considerations

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

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Conflict of interest

The authors declare that there is no conflict of interests.

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