Developing a scale for quality self assessment in pre-hospital emergency services

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ABSTRACT

   Establishing of total quality management in any organization including emergency medical services need to an appropriate tool to help developing, implementing and evaluating of quality programs. The objective of this study was to develop a valid and reliable tool for self assessing enabler criteria of Iran EMS centers according to European Foundation for Quality Management (EFQM) model.
The study was conducted using the Delphi method, and 43 participants as panelists were enrolled in 3 round modified Delphi technique. Initially, a rating scale was developed in response to main question of study; which items should be contained in self assessing tool of quality in Iran EMS area? This scale was judged by 5 experts primarily, and after some modification was entered in Delphi process. The comments of panelist were collected by E Mail and final scale was developed in the end of 3th rand.
Pre-hospital Emergency Self assessing Rating Scale (PHESARS), Was main result of this study that developed in 190 items in 5 enabler criteria according to EFQM model including; Leadership (52), Policy & Strategy (21), staff (41), Resources& partnership (36) and Processes (40).
Self assessing scale was developed by TQM and excellence perspective and because of experts' consensus in developing it, has content validity and can be used in self assessing of pre-hospital area and determining improvement opportunity and, can leads the Iran EMS centers to total quality management and organizational excellence.

Keywords: self assessing; pre-hospital emergency; EFQM; self assessing scale

INTRODUCTION

   Pre-hospital emergency care units have great responsibility in society health promotion so they have to improve their performance indicators in order to guarantee the quality of their services. Continuous improvement of these indicators requires establishment of a permanent patient-centered and quality-focused mechanism with regular monitoring and revision which may lead to continuous quality improvement under the supervision of senior management [1]. Studying the new management perspectives have shown that, the Total Quality Management (TQM) is one of the best choices which can be a basis for designing and establishing the quality system [2] . Quality management will be advantageous for health organizations if it is done accurately. Related studies reveal that TQM implementation will lead to key processes improvement, positive cultural alteration in team works and customer oriented sales promotion[3]. European Foundation for Quality Management (EFQM) as the best model of business excellence, contains 9 criteria in two categories, enabler and results, and demonstrates the constant benefits that any excellence organization has to achieve them [4].The internal structure of EFQM contains TQM basic assumptions and results of several studies show that EFQM is an appropriate framework for conducting systematic implementation of TQM in organizations [5-8]. Other research has shown that in the most of TQM studies, EFQM excellence model has been used [9]. Moreover, the results of these studies revealed that EFQM can be useful in the evaluation of the organization quality through its criteria, sub-criteria and guidelines [6, 10-12]. Evaluation of the organizations with no implemented TQM

experience will be done by self-evaluation of enabler criteria because the result production is done by these criteria [13]. Enabler criteria include leadership, policy and strategy, staffs, partnerships, resources and processes. In leadership field, the leaders develop organization vision and mission and facilitate access to these goals. They also create values and mechanism for organization success and implement it with proper policy. They have change management skills they can transform organization direction and persuade staff to follow it. In the field of policy and strategy, organizations develops their mission and vision by producing strategic regarding stakeholders interests and their field of activity. Policies, plans, goals and processes are being prepared to achieve goals. In the field of human resources, the organizations manage, improve and utilize the potential capacity of all staffs at individual, team work and organizational level. They promote justice and equity, and let their employees are to participate in ongoing tasks. Regarding partners and benefits, organizations manage their partners, suppliers and internal resources in order to have an effective support of their policy and strategy [13]. Although assessing enabler criteria of an organization in EFQM model has similar principles, the details of this assessment can be different according to the organization's mission and duties, organizational structure, and geographic characteristics. Organizations which offer emergency services consider as health organizations according to their services and should be evaluated due to their mission and duties. Till now various efforts have been carried out with quality improvement approach in emergency medical services in Iran, but little information concerning the design, structure, effectiveness and their services is available. However, the lack of coherent evaluation method makes the possibility of evaluation difficult in various steps. Therefore, having an effective tool for design, implementation and evaluation of quality programs, is necessary. Self evaluation is able to define the fields, in which, improvement and changes are needed. In Iran any measurement tools for self-assessment and TQM implementation in the Crisis Management centers

and Emergency Medicine department have not been produced yet. Since establishing and monitoring the total quality management and reaching the organization goals need primary self assessment, this study is designed with the purpose of developing appropriate tools for evaluation enabler criteria based on the EFQM model within Iran's emergency care system.

METHODS

This study is fulfilled by modified Delphi method using interview and e-mail between Feb. 1998 to Sep. 1999. Delphi is a systematic method in research in order to extract a group of experts' opinions about an issue or a question [14]. Delphi method belongs to the subjective-intuitive methods of foresight. This method was originally developed in the 50s by the RAND Corporation, Santa Monica, California, in operations research. Delphi is one of the knowledge creation methods [15], which has forecasting structure and aids decision making, information gathering and group consensus achievement during monitoring intervals [16-17].

The Delphi technique is designed as a group communication process that aims at conducting detailed examinations and discussion of a specific issue for the purpose of goal setting, policy investigation, or predicting the occurrence of future events. Common surveys try to identify "what is", whereas the Delphi technique attempts to address "what could/ should be" [18]. The Delphi technique is well studied as a means and method for consensus building by using a series of questionnaires to collect data from a panel of selected subjects. Delphi, in contrast to other data gathering and analysis techniques, employs multiple interactions designed to develop a consensus of opinion concerning a specific topic. More specially, the feedback process allows and encourages the selected Delphi participants to reassess their initial judgments about the information provided in previous iterations.

Thus, in a Delphi study, the results of previous iterations regarding specific statement and or items can change or be modified by individual panel members in later iterations based on their ability to review and assess the comments and feedback provided by the other Delphi panelists.

Other notable characteristics inherent with using the Delphi technique are the ability to provide anonymity to respondents, a controlled feedback process, and the suitability of a variety of statistical analysis techniques to interpret the data. These characteristics are designed to offset the shortcomings of conventional means of pooling opinions obtained from a group interaction i.e., influences of dominant individuals, noise, and group pressure for conformity. One of the primary characteristics and advantages of the Delphi process is subject anonymity which can reduce the effects of dominant individuals which often is a concern when using group based processes used to collect and synthesize information. Additionally, the issue of confidentiality is facilitated by geographic dispersion of the subjects as well as the use of electronic communication such as e-mail to solicit and exchange information.

As such, certain downsides associated with group dynamics such as manipulation or coercion to, conform or adopt a certain viewpoint can be minimized. Finally, the ability to use statistical analysis techniques is a practice which further reduces the potential of group pressure for conformity [15]. In this study, the Delphi technique was conducted within three phases. The main question in this research and after each phase of it was that "which criteria should be considered in the quality self assessment of pre-hospital emergency in Iran?" After determining the question, the primary scale (pre hospital emergency quality self assessment tool) was prepared using the criteria and sub-criteria enabler models of Europe Quality Management Business Foundation and quality standards principles and guidelines for pre-hospital emergency. After developing the scale was judged by 5 pre-hospital emergency experts. In this phase, some elimination, additions and modifications were performed and scale text was edited and prepared for the first round of the Delphi technique.

Consent criteria of 70 percent for experts were selected for presence of item in scale or its elimination. Therefore the item which cannot earns experts consent criteria of 70 percent wouldn't been included in the scale. It should be mentioned that 70 percent criterion in most researches were accepted or rejected [18-22]. At the end of the third phase only those items which earned the consent criteria were entered in the final list. In the fourth phase the experts whom supposed to participate in our research were selected. Selection criteria of expert contained scientific work experiences, academic experiences and practice in pre-hospital emergency setting. First of all a list of 56 experts was selected. In this list there were 22 PhD experts (11 management, quality management field, 5 Nursing PhD, 6 Emergency Medicine) 9 academic master experts (4 management, quality management, 3 nurses and 2 General Practitioner who were trainer for emergency care course) 25 non-academic experts, 8 GP working in emergency ward, 5 Senior Manager with experience in the health system and quality management, 6 pre-emergency nurses with M.A in Nursing education and 6 senior manager at pre emergency care unit. Then, a booklet was developed containing a summary of the Delphi method, as well as the Organization Excellence Model and its details and the goal of the study.

This booklet was sent to the experts with invitation letter. From 56 experts who were invited to participate in our study, 7 people didn't reply and 4 of them rejected the invitation. Therefore this study was performed with 45 experts (18 female and 27male). All of the participants were informed that this study would be done in 3 phase and they should fill the questionnaires of this 3 phases. The questionnaires were sent by email and all of participants were requested to give their judgments about each item of the scale using a 7 point Likert scale (from strongly agree to strongly disagree) and in cases they were asked to add their suggestion about each item. After each round, the percentage of the expert's agreements on each item and also all suggestions were evaluated. Based on the evaluation results a new scale was designed and was sent to the experts with additional information. These experts were asked to judge the new scale again. After finishing the third round, the list of approved items was prepared and final scale was designed.

RESULTS

From 45 experts agreed to participate in the study, 2 of them did not respond the questionnaire in the first round therefore 43 participants fulfilled the study. From these participants 27 were male and 16 were female. From 21 PhD experts there were 10 people in management science, 5people in Nursing and 6 people in Emergency Medicine specialty. From 6 academic master experts there was 1 in management, 3 in nursing and 2 General Practitioner who were trainers in emergency medical care courses. From 16 non-academic experts there were 3 GP working at emergency ward, 4 Senior Manager with experience in health system and quality management, 4 pre-emergency nurse with M.A in Nursing education and 5 senior manager of pre hospital emergency care unit. In the first round from 231 items, 138 items were approved by the experts and used in the final scale. From the other 42 items which experts suggested modification about them, the leadership and strategy criteria with 12 items were the most and resources and partnerships criteria with 4 items were the least. Suggestions contained grammatical editing of phrases in some items and changing the content of the other. In the leadership, strategy, and processes criteria there were 3, 1 and 1 new comments. In the second round, from 98 items which were judged by experts, 31 ones were approved for being in the final scale. One additional item was suggested to all criteria except those related to strategy and policy. There were suggestions for other 29 items which 4 of them were about content. In this round, 5 items which were related to the resource and partnership excluded from the study obtaining maximum rejection vote. In the third round from 66 items, 21 items were accepted and the other 45 were not agreed. Since the third round was the final phase of the study, the final self-assessment scale of pre-hospital emergency care unit was designed according EFQM excellence model, containing 190 phrases in five enabler criteria categories. Summary of results are shown in Tables 1 and 2.

Rating was done according to European Foundation for Quality Management Manual and Results-   Approach-Deployment-Assessment-Review (RADAR) logic. Radar Logic Elements in enabler criteria section include Approach, Deployment, Assessment and Review. Approach means what an organization plans to reach and the reason it implies. The deployment contains two parts of approach implementation and systematic implementation of approaches. Implementation refers to the cover amount of the approach and utilizing it and being systematic refers to planned implementation of the approach. Assessment and review imply the approach measurements, learning and improvement of their performance. Measurement includes regular assessment of the effectiveness of this approach and building it by focus on technique rather than on quantitative values. Training refers to the training activities for identifying and using the best practices within and outside the organization. Improvement is the expected outcome coming from measurement and training. So that, these two activities can be used in identifying, prioritizing, planning and implementing improvements [4]. Each of these elements based on the evidence, were voted between 0-100% and the average of these 3 points will be the overall rating of the approach. The average rate of the approach forms the rate of sub criteria and from total score the rate of enabler criteria is calculated. Based on the model guide, the amount of evidence is rated according to the following procedure: comprehensive evidence = 86-100%, clear evidence = 61-85%, good evidence= 36-60%, little evidence= 11-35% and lack of evidence = 0-10%.

Principles and guidelines for the degree of evidences are described in EFQM model. It is noteworthy that, enabler criteria have a total of 500 points which are distributed among sub-criteria. In this scale each of the sub-criteria with any number of approaches is allocated the same score as inserted in the model. Table 3 shows an example of scoring sub criteria.

Comparing different levels of different organizations along with TQM with scores of Radar Logic causes that the organizations, based on the level of quality they occupy, are placed in one of five categories and each organizational levels are conformed with part of Radar logic score[24].

Table1: Results of round 1 to 3 of Delphi process

Criteria		Leader ship	Policy & strategy	Staff	Resources & partnership	Process	Total
1st round	Agreed items	41	14	31	27	25	138
	Disagreed items	14	7	6	12	12	51
	Modified items	12	12	8	4	6	42
	Added items	3	1	0	0	1	5
	Total	67	33	45	43	43	231
2nd round	Agreed items	7	4	6	6	8	31
	Disagreed items	7	14	5	2	5	33
	Modified items	15	2	3	3	6	29
	Added items	1	0	1	1	1	4
	Rejected items	0	0	0	5	0	4
	total	29	20	14	16	19	98
3rd round	Agreed items	4	3	4	3	7	21
	Disagreed items	19	13	5	3	5	45
	total	23	16	9	6	12	66
Total modifications		27	14	11	7	12	71
Final scale(agreed phrase)		52	21	41	36	40	190

Table2: Agreement percentage in first and final round on suggested phrases of 5 item enabler criteria

Criteria	Leadership	Policy and Strategy	Staff	Resources & Partnership	Process
Agreement percentage in 1st round	62%	42/5%	69%	63%	58/14%
Agreement percentage in each round	77/61%	63/64%	91/11%	83/72%	91%

Table3: Scoring method of sub criteria

Scoring elements	Approach	Deployment	Assessment & Review	Mean
Criteria/sub criteria	0-100%	0-100%	0-100%	0-100%
First criteria: leader ship(100 score)				
Sub criteria 1(6items) leaders develop mission, goal, values and ethics of center and play model role in excellent model				
1-Dose this center hold quality improvement courses for manager?				
2-Dose this center hold organization assessment courses for managers?				
3-Dose this center has a sustained quality improvement program for manager?				
4-Dose this center has an approved strategic planning?				
5-Dose this center has charter of quality?				
6- Dose this center inform charter of quality to all staff and public?				
mean				
Final score				

Table4: Enabler criteria, sub criteria and its scores in EFQM model

Criteria	Sub criteria (number)	Sub criteria (score)	Total score
Leader ship	5	20	100
Policy and strategy	4	20	80
Staff	5	18	90
Resources & Partnership	5	18	90
Process	5	28	140
Total	24		500

DISCUSSION

The main purpose of this study was designing self-assessment tool based on TQM implementation in pre-hospital emergency organization in Iran. According to the existing information there was no evidence of any proceeding based on developing TQM self assessment scale in pre hospital emergency. Some of existing tools like European Foundation for Quality Management model is brief and can't be used in assessing pre hospital emergency because of its overall view.

Moreover, in spite of the presence of guidelines and recommendations for service improvement in emergency wards, there isn't any report on implementing measures for quality improvement in pre-hospital emergency in Iran. In this study we used the judgments of 43 academic and non-academic experts who were conversant to the purpose of the study and its aspects such as quality management and pre-hospital emergency and this is clear because of their judgments (71 cases of modification and 9 cases of additions). In the first round, high level of agreement (mean of 59%) was obtained .The most agreement was on the staff items (69%) the least was on the policy and strategy items. Considering the results of the all 3rounds of the study, most of the suggestions were on leadership criteria and the minimum was regarding resources and partnerships. It seems that 2 factor causes the leadership get the most modification suggestions; first, most of the participants were among organization managers in different levels and they were totally aware to the best methods of quality improvement in the field of leadership and human resource management. On the other hand, the experts were aware of the

key role of the organization leaders in TQM promotion. This result was also reported in Marcus et al study [23]. Most cases of disagreement in leadership items were referred to phrases which indicated that since pre hospital emergency is a state organization in Iran, participants believed that this fact will reduce the freedom of the managers so that they are not able to manage the organization according to quality management models. For example in the sub criteria of "Leaders collaboration with stakeholders, relevant organizations and the representatives of professional associations" the participants believed that pre hospital emergency is a centralized organization in Iran and must provide guaranteed and timely services. Therefore, the mangers do not have enough freedom to perform changes or have more collaboration with the other organizations. Disagreement, regarding external participation, has also been reported by Marcus et al [23]. In this case, probable collaborations and partnerships have been expressed more clearly especially in the field of crisis management.

Finally, most of the items of these sub criteria were approved. Since pre hospital emergency wards has several important tasks and missions, most participants suggested that quality in management scale supports dictatorial management rather than participative style. Since participation is one of the fundamental concepts of TQM implementation, in this in addition to documents and article abstracts on role of participative management in pre hospital emergency which were sent to participants, phrases were written more clearly and accurately and on the second round they all were agreed. In

the first leadership sub criteria (Leaders develop mission, goals, values and ethics of the organization and have the great role in culture excellence) most of the participants believed that the role of the leaders in the aforementioned items, should be expressed in the words in which their efforts and effective participation would be demonstrated. For example, instead of using terms on ethical and working specifications, some items about holding various training courses and strategic planning and developing guidelines and ... was used. According to these comments, some items were organized which gained the proper approval. High degree of agreement has also been reported in similar studies [22, 24]. However, designing and developing the organization mission, vision and ethical principles has been identified as the principal basis of TQM [22, 25-26].

In the second sub criteria (the leaders personally participate to ensure the creation, development and implementation of management systems and continuous improvement) most of the participants suggested that mangers partnership should evaluated through special measurement tools and program which has been developed before. By this view, 4 items were rejected and 5 others were added. These items were being approved on the next round. In the third sub criteria (the leaders will collaborate with stakeholders, relevant agencies and representatives of professional associations), the item related to communication and coordination with policy makers to improve services" wasn't approved. This result was reported in the Marcus and et al study. Some of the opinions indicated that, the general attitude towards policy makers is negative and it is better it is better not to consider it evaluation of the organization. Level of agreement on items related to the role of leaders in organizational change (fifth sub criteria) was high. The role of the leaders in changes implementation has been emphasized by the some of the participants [27].

In the staff criteria, the most cases of disagreement were about compensation of the staffs. The experts suggested that instead of general speaking about compensation written programs for compensation and dispensation,

monitoring and implementation of these programs should be taken in to consideration. Some items were rejected because of their too many details. It seems that the experience of the participants in human resource management and clearness of staffs sub criteria causes the high number of agreements on the terms of quality improvement of this item in the first round and in total. In the third sub criteria of staff item,(the staff involved in organization affairs and delegation of authority occurs) most of the participants suggested that the involvement of the staffs described in the item related to the quality group formation and composition as well as their role in decision-making and delegation of authority . In sub criteria 4 items were approved in total. In the policy and strategy sub criteria, the most of the disagreement related to the first sub criteria (planning policy and strategy based on the demands and expectations of stakeholders). Evaluating the answers of the participants shows that most of them believed that, pre hospital emergency system is state system in Iran , with minimal services and without any competitor so it does not need the demands and expectations of stakeholders because the government is the main financial supplier. It is obvious that all strategy would be planned according to government demands. According to the responsibilities of Disaster Management Center and Medical Emergency in disaster prevention and control, the experts suggested some items as well as modifications in the third sub criteria of policy and strategy scale (strategies are developed and reviewed) .These suggestions approved as a 5 items including risk assessment protocol, planning for unexpected events, their approval and   performance, explanation them to collaborating organizations.

Most of the disagreements in the resource and partnerships scale were referred to the financial management sub criteria. The phrases which refer to investment income and earnings management didn't accept the final approval. Participants believed that since this is a state organization and its free of charge services, it does not require investment and profit management like private sections. Moreover, 5 items refer to external

partnership management earned maximum disagreement and were eliminated. In this scale the highest agreement was reported on performance informing and financial report. Same results have been reported in similar studies[22, 24, 28-29]. The most agreement item, after these 3 phases of study, was on processes scale. Existing of clear instruction for pre hospital emergency services, participant's experience in the management and probably participants' awareness of positive impact of process management in quality improvement led to the high agreement in this scale.

CONCLUSION

This study is valuable because design a measurement tool in order to evaluate pre hospital emergency for the first time in Iran. The designed tool is a rating scale with 190 items and can estimate emergency departments with a quality approach and introduces strengths and opportunities for improvement to managers.

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Designing this tool is done by using Delphi method. This can guarantee its high validity and reliability in addition to application of experts' opinions in the field of emergency management. However it has been designed according to the main form of scoring of the European Foundation for Quality Management therefore the organization which are going to use it, can be sure that they use a validated tool for self assessment and, can participate in the National Quality Award Program. Moreover the results of the enabler criteria assessment in some Disaster Management center and Medical Emergencies in the country show that this scale can be used for identifying strengths and weaknesses of the organization.

ACKNOWLEDGEMENT

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