

# Benefits, barriers, and limitations on the use of Hospital Incident Command System

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Hospital Incident Command System (HICS) has been established with the mission of prevention, response, and recovery in hazards. Regarding the key role of hospitals in medical management of events, the present study is aimed at investigating benefits, barriers, and limitations of applying HICS in hospital. Employing a review study, articles related to the aforementioned subject published from 1995 to 2016 were extracted from accredited websites and databases such as PubMed, Google Scholar, Elsevier, and SID by searching keywords such as HICS, benefits, barriers, and limitations. Then, those articles were summarized and reported. Using of HICS can cause creating preparedness in facing disasters, constructive management in strategies of controlling events, and disasters. Therefore, experiences indicate that there are some limitations in the system such as failure to assess the strength and severity of vulnerabilities of hospital, no observation of standards for disaster management in the design, constructing and equipping hospitals, and the absence of a model for evaluating the system. Accordingly, the conducted studies were investigated for probing the performance HICS. With regard to the role of health in disaster management, it requires advanced international methods in facing disasters. Using accurate models for assessing, the investigation of preparedness of hospitals in precrisis conditions based on components such as command, communications, security, safety, development of action plans, changes in staff's attitudes through effective operational training and exercises and creation of required maneuvers seems necessary.

**Key words:** Barriers, benefits, Hospital Incident Command System, hospital management, limitations

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## INTRODUCTION

Unexpected events have always threatened human communities. During the recent decade, the necessity of preparedness for facing crises and emergencies as important cases received many attentions from public minds.<sup>[1,2]</sup>

According to global statistics in 2014, natural disasters have had devastating effects and consequences for the human community in such a way that 324 natural disasters occurred and caused the death of more than 7823 and 99.2 billion dollars financial loss. Asia has the highest number of disasters (44.4%) and victims (69.5%).<sup>[3]</sup> What occurs after the occurrence

of these disasters is unpredictable chaos. Moreover, hospitals immediately are involved in admission of the injured and victims.<sup>[4]</sup> One of the investigable issues is the effects which disasters put on the shoulder of hospitals and causes the devastation of abundant health-care institutes and centers of in the world.<sup>[5]</sup> A diverse range of experiences all over the world indicates that confusion and chaos, lack of proper planning on the organization of human forces, and failure to use new technologies are among issues which hospitals face in case of encountering crises.<sup>[6,7]</sup> Therefore, ensuring the maintenance, the structural and functional security of hospitals in critical conditions is a necessary issue.<sup>[8]</sup> Regarding the key role of hospitals in medical management of deadly accidents and disasters, effective responses to these disasters require precrisis appropriate preparedness. In fact, nowadays, the

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international slogan of preparedness against unexpected events, especially hospital preparedness, is at the top of disaster management at national and international levels particularly in disaster-prone countries.<sup>[9,10]</sup> Appropriate reactions against unexpected events require proper preparedness, facilities, and planning. In each hospital, abilities and restrictions should be identified in order that with reinforcing weaknesses, more preparedness against unexpected events can be obtained.<sup>[11]</sup> The necessity of quality in emergencies requires developed planning and event management. Event management at all executive levels causes organizing strategy processes and makes possible the creation of necessary inter- and intra-organizational coordination through continuous assessment and application of new technologies with appropriate leadership. This system contributes to reducing socioeconomic vulnerability and has a profound range.<sup>[12]</sup> Health management in disasters plays the most important role in health-care systems including hospitals as the main unit of presenting services at primary levels.<sup>[13]</sup> One of the invaluable management instruments which has an effective role in empowering services of health-care centers according to global experiences is the Incident Command System (ICS). ICS is a management system designed for controlling, commanding, and coordinating activities of independent groups for accessing the common aim of controlling incidents and reducing mortalities, financial losses, and severe injuries and includes a set of staff, policies, processes, facilities, equipment, and communications collected in a shared organized structure for managing events and guiding processes in planning. It is used for improving reactions to emergency operations.<sup>[14,15]</sup>

The Hospital Incident Command System (HICS) is widely used by hospitals, yet there is a paucity of research and a lack of developed models to examine HICS implementation. Regarding the fact that the lack of full deployment of this system would have irreparable consequences for the society and according to research done in this area, hospitals have failed to establish hospital emergency incident command system completely and successfully.

The aim of doing the present research is to investigate advantages, barriers, and restrictions of applying HICS in hospitals based on the conducted studies. In fact, findings of the present research would try to contribute to enhancing knowledge of decision-makers of health-care sectors for eliminating potential deficiencies regarding more preparedness and planning against disasters in hospitals.

A study of HICS implementation may benefit hospitals, provide insight for future revisions, and add to the body of knowledge about it.

## MATERIALS AND METHODS

In this section, researchers tried to investigate the state of current knowledge of applying HICS in hospitals by reviewing studies related to the subject. The present study was conducted using the review method in 2016.

### Search strategy

In this study, the first extensive review of the literature was conducted. The literature review has been conducted to identify the present trends in research on HICS and suggests areas for future research work. The next step was identification of journals related to hospital management system. To do the research, studies and reports conducted on HICS qualitatively and quantitatively during 1995–2016 were investigated. Journals are considered as one of the most reliable sources of knowledge, and they have a very big impact in any field of study. The third step was the study selection. Exclusion criteria were as follows: a number of 110 articles and reports were selected, and finally, among these, only 35 articles that had been done qualitatively and quantitatively about HICS and hospital safety index were selected and those articles about ICS were removed. Then, in the final step, data were extracted, summarized, and categorized. To do so, using key words and expressions such as Hospital Incident Command System, barriers, advantages, and Incident Command System were searched in different electronic databases such as Pub med, Iranmedex, Magiran, Elsevier, Google Scholar, Scientific Information Database, and Web of Science.

## RESULTS

HICS was designed in 1991 as one of the strategies of hospitals for contrast with disasters with the mission of prevention, mitigation, response, and recovery in hazards.<sup>[16]</sup> In 2014, the fifth edition of a book with experiences obtained from learned lessons from real events and direct experiences all over the world for users.<sup>[17]</sup> One of the most important revisions is addition of the field of helping patients' families and their needs during events and reactions to a crisis, providing supportive services for the health-care staff and their families, emphasizing mostly planning conducted during disasters by introducing operational and newer instruments, and using a new chapter for investigation of performing HICS in small hospitals and those in rural regions.<sup>[18]</sup> The success of this system requires the existence of elements such as objective-based management in facing problems such as assessment and development of programs for eliminating identified problems, performing and allocating resources, common language and structure used for communications among agencies and personnel, a predictable chain of leadership with suggested control range, and periodization of tasks

using sheets of describing responsibilities.<sup>[17]</sup> Moreover, this system can be effective on identifying all possible hazards and crises in the organization, preparing a set of standards of concepts and expressions for making connections among elements, effectively and coordinately reacting emergencies, explaining official lines and scopes and systematic hierarchies of determining lines, preparing the government and financial aids in case of occurrence of disasters, matching with national incident management systems, and matching them with validation standards.<sup>[19]</sup> Using HICS can result in appropriate and constructive management in controlling events and disasters because of prevention from confusion, undecidedness, also shortening the response time to the event of accidents, and minimizing their side effects on health centers; in fact, using this system, planning and responses to all hazards in hospitals,<sup>[13]</sup> the increase in the safety of patients, leadership of the organization in case of disasters, and prevention from arbitrary actions with creating operational programs can be possible.<sup>[20]</sup> This system should prepare hospitals for incident management and facilitate inter- and intra-sectional cooperation in hospitals with other institutions such as fire, police, and other related organizations.<sup>[19]</sup> Accordingly, experiences indicate that regarding the significance of creating HICS for emergencies has caused that some aspects of quality be ignored. Moreover, this system guides activities in case of occurrence of disasters. This issue has caused that hospitals mostly have weaknesses in assessing power and severity of vulnerability in real precrisis management systems.<sup>[21]</sup>

Not observing standards of incident management in the stage of designing, constructing, and equipping hospitals, the lack of repeatability of big unexpected events, the lack of accepted international standards for doing related measures, the lack of standards of the qualification of responsibilities, allocation of insufficient resources, failure in the culture of teamwork and accountability, and the lack of accepted methodology for assessing this system are among other cases which cause weaknesses in the performance of assessing results of presented services in case of disasters.<sup>[22,23]</sup> Therefore, studies conducted on HICS were investigated.

## DISCUSSION

The present study was conducted for enhancing the level of existing knowledge in the domain of the ICS in the world. The aim of the ICS is ensuring the use of the best management mechanism for guaranteeing cases such as timely responses to incidents, security of individuals responsible for emergency and other individuals (general safety), access to operational objectives, incident management, and ensuring efficient and optimal use of resources.<sup>[24]</sup> Accordingly, a lot of studies have been conducted on performing HICS. Each

of these studies is related to investigating the performance of this system as well as its advantages, barriers, and limitations in operationalization and action.

To answer this question that which advantages HICS have, results of different studies were investigated. According to some of these studies, advantages of applying HICS were preparedness of health-care centers as a facilitator, communicator, and the role of sharing resources among organizations and health-care institutes, the existence of teamwork, communications with social shareholders, the existence of effective communicative programs in increasing information management both inside and outside the organization,<sup>[25,26]</sup> the increase in the degree of preparedness of human forces in facing with disasters,<sup>[27]</sup> facilitation of the effectiveness and flexibility of the system, successful responses and leadership,<sup>[28]</sup> and the most proper model for planning a comprehensive and complete action plan for coping with incidents<sup>[6]</sup> which have flexibility, relevance, and an acceptable system for all hospitals without attention to the size, location, specialty, the type of patients, or their threatening hazards in hospitals.<sup>[16]</sup> In investigation of preparedness of establishing HICS in hospitals, Jagminas and Bubly consider planning about facing big events, construction of leadership chain, flexibility in responding emergency conditions, and the use of common language as other advantages of establishing the ICS.<sup>[29]</sup>

In spite of advantages existing in HICS, incompatibility of this system with the management structure of hospitals causes the emergence of barriers on the path of applying the system such as high costs of implementations, lack of motivation in the hospital staff, the lack of a common language, the noncompetitive environment for progress and excellence, the lack of qualified managers, lack of legal requirements, the multiplicity of resources of decision-making, the lack of administrative culture of crisis management, the lack of differences, and different needs of hospital users at international levels with various economic and social aspects.<sup>[30]</sup> In his research titled as “a case study in the identification of critical factors leading to successful implementation of HICS in naval postgraduate school,” Schoenthal considers the lack of reviewing tests for investigating the ICS and probing documents related to the past as barriers.<sup>[25]</sup>

The results of the following studies refer to other deficits and barriers of applying HICS. Failure to understand objectives and the spirit dominating them, failure to match the existing organization with the target organization and high costs of changes in the organization,<sup>[6]</sup> inflexibility, difficulty of activation, and low compatibility in case of rapid and uncertain changes with the work place,<sup>[31]</sup> the lack of doing investigations of the results in hospitals in different regions,

failure to generalize the results obtained from hypothetical maneuvers in real life conditions,<sup>[32]</sup> and the lack of attention to new challenges in HICS<sup>[33]</sup> indicate that this system has not been able to operationalize all practical measures and necessary planning about doing relief work for victims in the response stage.<sup>[34]</sup>

The results of other studies conducted on HICS are as follows:

In the study of Schoenthal indicated that leadership commitment, potency and qualification, and the staff's knowledge for reinforcing workforces including training courses, maneuvers, and practice for doing the process of planning such as criteria are for implementation of this model as properly as possible.<sup>[25]</sup>

A research study titled as "HICS as a model modified for Iran" which uses the 4<sup>th</sup> version of HICS indicated that with advised changes in the organizational chart existing in the system including the addition of the office of controlling quality, establishment of the security unit, transference of the branch of survival of business from the operation unit to the logistic unit, and merging the planning unit into administrative-financial unit can make possible the operationalization of this system into hospitals and cause the increase in the performance of hospitals in case of disaster management whether in stimulation or in case of the occurrence of real disasters.<sup>[35]</sup>

A research was conducted with the aim of developing the crisis management program with the use of HICS to investigate crisis management programs in America and Europe. It indicated that preparing treatment protocols, doing agreed action plans in critical conditions and their implementation in normal conditions, determining and making tasks understandable for members of the executive group, the definition of critical conditions in hospitals, development of assessment analysis plans for hospitals' vulnerability, and development of programs to provide clinical efficiency and service continuity are effective on presenting a localized model.<sup>[36]</sup> The results of the aforementioned studies emphasize the need of creating a new model in HICS.

In his research, Zane and Prestipino consider planning, training, and commitment to rules, the existence of knowledge and appropriate understanding this system, interactions with other organizations, and intersector coordination as necessities of HICS.<sup>[37]</sup>

In a research conducted by O'Neil, familiarity with the organizational structure of hospitals incidents and proper understanding of them was considered as necessities for

accessing successful responses to disasters. The results of the research indicated that HICS deals with creating intraorganizational preparedness through maneuvers, drill, and training course before the occurrence of incidents as well as with creating inter- and intra-organizational communications during disasters. All these cases require reinforcement of facilities in the health-care sector and the increase in the preparedness levels of the personnel in optimizing of the results. Therefore, training the staff in this regard seems necessary.<sup>[26]</sup>

Autrey and Moss consider implementation of HICS as the necessity of increasing preparedness against disasters in hospitals. He believes that successful implementation of this model needs knowledge and teamwork with the high reliability with proper understanding of the status quo through training, retraining, and improvement in communication systems.<sup>[38]</sup> Autrey and Moss study on the need to planning and training in hospital incidents is consistent with those of O'Neil, Schoenthal, and Zane.

In 2005, a review research titled as "Recommended Modifications and Applications of the Hospital Emergency ICS for Hospital Emergency Management," investigated the elements existing in the organizational chart of HICS. The aim of the research was to present general plans for suggested reformation in HICS. The conclusion of the research indicated that paying attention to new challenges in the management of the ICS, counselors, and elites is necessary in emergency conditions. Therefore, the changes in the chart were suggested.<sup>[33]</sup> Editing the organizational chart is consistent with the studies of Djalali (2015), Vafaei, and Arnold.

## CONCLUSION

The ICS has been founded on some principles which on the one hand results in ensuring the effective application of resources and on the other hand causes the reduction of disorders in policymaking and operations of responsible organizations. These principles should be applied for each kind of crisis and at each level.<sup>[18]</sup> Various dimensions of damages and losses caused by natural disasters and incidents in the world have caused that a lot of applied and practical researches be conducted on crisis management and applied models and immunization against different types of incidents be presented. Regarding the issue that the health-care field as the first and the most important status among all elements involved in incident management has important roles, it requires internationally accepted methods for coping disasters and incidents. Crisis management should prioritize its own policies and activities and then design and implement a system relevant to each of the jobs involved in crisis management. For the time being, HICS is the most necessary

system in crisis management. The aforementioned issues indicate the significance of the existence of HICS. Identifying the role of the system and how it can be identified in scenes of incidents is among other necessities of applying the ICS. In case of the absence of this system can result in the personnel's confusion, the lack of vital capacities in hospitals such as emergency, the lack of equipment, the lack of classification of patients, psychological reactions, rapid completion of the treatment capacity of near centers, and the result of the increase in mortality in critical conditions. With regard to the existing challenges for implementation of this system, the use of accurate models for assessing the ICS, investigation of the degree of preparedness of hospitals in precritical conditions for effective responses to incidents and medical emergencies based on key components such as command, control, communications, security, assessment of security in hospitals, development of systematic operational programs for crisis management, selection of competent managers and with the qualification of their responsibilities, changes in managers and the staff's attitudes through effective and operational training, establishment of maneuvers and required trainings, and finally elimination of internal and external barriers in operationalizing this system seem necessary. The necessity of using quality instruments for compensating gaps existing in HICS is also emphasized. Quality models, with emphases on standards of the process, structure, and consequences, leadership elements, customer orientation, the staff's participation, and reforming measures regarding organizational incompatibilities facilitate the possibility of filling gaps existing in HICS. Therefore, reviewing the conducted studies tries to identify limitations as well as advantages of applying HICS.

### Research limitations

The lack of doing extensive studies on HICS in the world is the most important limitation for the present study.

### Suggestions for further research

Presenting a model for assessing HICS with the use of the results obtained from the implementation of HICS with restriction of related problems as well as doing investigations for stating knowledge and deeper attitudes toward the system in the future research is valuable.

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### Conflicts of interest

The authors have no conflicts of interest.

## AUTHORS' CONTRIBUTION

- ShA contributed in the conception of the work, conducting the study, revising the draft, approval of

the final version of the manuscript, and agreed for all aspects of the work PM contributed in the conception of the work, drafting and revising the draft, approval of the final version of the manuscript, and agreed for all aspects of the work

- ShSh contributed in the conception of the work, conducting the study, revising the draft, approval of the final version of the manuscript, and agreed for all aspects of the work
- ShT contributed in the conception of the work, revising the draft, approval of the final version of the manuscript, and agreed for all aspects of the work.

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