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Key Performance Indicators in Field Hospital Appraisal: A Systematic Review

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Abstract

Background: Field hospitals are health care institutions with mobile or fixed structures. Although there have been numerous models and indicators for assessing the performance of public hospitals, there is no model to evaluate the performance of field hospitals.
Objectives: This study was aimed at determining key performance indicators in field hospital appraisal.
Methods: In this study, we conducted a systematic review of publications in English or Persian language indexed by PubMed, Scopus, Emerald, Elsevier, Ovid, Google Scholar, Springer, ProQuest, WHO and Word Bank databases. PICO strategy was used for searching databases. Quality assessment of the publications were carried out using CASP checklist. Similarly, the preferred reporting items for PRISMA checklist were used to assess systematic reviews. The PRISMA checklist was used to guide the reporting of the systematic review. A descriptive summary with data tables was produced to summarize the literature. Following the results of our search, 592 publications were retrieved and 352 citations were excluded because of irrelevance or duplication. After excluding the duplicate and irrelevant items we screened 240 titles and abstracts. Two independent reviewers evaluated 240 potentially relevant studies, and 15 records met the criteria to be included in this review.
Results: We found 13 criteria on the assessment of field hospital in the literature. We classified all the retrieved indicators according to the system approach. The results of this study showed that input indicators included 4 indicators, process indicators included 2 indicators, output indicators consisted of 4 indicators and outcome indicators involved 3 indicators.
Conclusions: This study highlights the most important performance measurement indicators in field hospitals with a system approach. There was no model to assess the field hospitals; however, a systematic approach in assessment can improve the quality of services.

Keywords: Mobile Health Units, Performance Appraisal, Hospital

1. Background

Field hospitals are health care institutions with mobile or fixed structures. These hospitals help inpatients and outpatients during the crisis by the use of highly qualified staff giving health care services (1). The main goals of establishment of field hospitals include: providing medical services at any time and any place in the country and abroad in abnormal and emergency situations, reducing the effects of delays in handling the victims, reducing the number of deaths and the victims of natural and man-made disasters (such as war, forced migration, etc.), reducing the disabilities that arise due to the delay in the delivery of emergency medical services, preventing the occurrence of epidemics due to delays in providing diagnostic and medical services when events arise, reducing costs and possibly personal injury (patient and caregivers) in transporting the wounded to the hospitals in towns near the crash site, and ultimately reducing psychological trauma caused by accidents (2, 3).

During the 8 year Iran-Iraq war, field hospitals were the third centers that were set up to handle the injured and the wounded in working areas. These centers were well equipped and most complete medical centers, with a station in the front and various parts of clinical and laboratory facilities and a support department (4). In the past, a shelter was built at the beginning of the field hospital and later it was replaced by concrete structures with niches of steel frame and sheet metal that were resistant to most of the enemy bombs.

The study showed that more than 50% of the victims either died or experienced severe complications before

reaching the treatment centers if there were no field hospitals (5). Field hospitals have other functions in the aftermath of the war. The hospitals are active as auxiliary arms of the health system to provide development services in deprived and remote areas (6).

Among the most important field hospitals are mobile and fixed hospitals. It can be noted that mobile field hospitals are needed in conditions of high numbers of victims and serious injury in remote areas (7). In battlefields, these hospitals are usually made based on three principles; availability, health, and conditions of launching facilities such as water, electricity and concealment (8).

In the past, there was no assessment of the field hospitals performance, but recently traditional local methods are used to evaluate the performance of them. Some studies suggest that field hospitals usually cannot respond to the patients' needs (9). In addition, there is no model to use in evaluating the performance of field hospitals at a level (10).

Today, all organizations are involved in performance evaluation to ensure their highest level of service (11). Field hospitals are no exception. Although in assessing the performance of public hospitals there have been many models and indicators, there is no model to evaluate the growth of quantitative and qualitative performance of field hospitals (12, 13). In recent years, Iran has managed to set up 50 field hospitals in the country. This study was aimed at determining the performance assessment criteria for field hospitals appraisal.

2. Methods

2.1. Data Sources and Searches

In this study, we conducted a systematic review of publications in English or Persian before March 2015 indexed by PubMed, Scopus, Emerald, Elsevier, Ovid, Google Scholar, Springer, ProQuest, WHO and word bank databases. Participants, interventions, comparisons and outcomes (PICO) strategy along with the following keywords obtained from PubMed (MeSH terms) were used in searching: field hospital, mobile hospital, performance assessment, performance appraisal, performance evaluation, military hospital

2.2. Exclusion and Inclusion Criteria

All publications such as reviews, systematic reviews and meta-analysis, qualitative, quantitative, books, reports and thesis were accepted if they had been published in English or Persian languages and their full text was accessible.

2.3. Study Selection

The titles of the retrieved citations were checked independently by two reviewers according to the above choice criteria. Full-text copies of potentially relevant studies were obtained and their appropriateness for inclusion was independently assessed by two reviewers. Literature that did not fulfill all the inclusion criteria was excluded.

2.4. Data extraction and Critical Appraisal

Using a standardized data extraction form, two reviewers (RZ and RGH) independently extracted study characteristics (details of participants, interventions, and outcomes), and a third author (ST) resolved any disagreement.

Quality assessments of the publications were independently carried out on each study by two reviewers using the relevant version of the critical appraisal skills programme (CASP) for qualitative research, quantitative research and literature reviews. Similarly, the preferred reporting items for systematic reviews and meta-analyses (PRISMA) checklist was used for assessing the systematic reviews.

3. Results

Following our search results, 592 publications were retrieved and 352 citations were excluded because of irrelevance or duplication, after excluding the duplicates and the irrelevant items we screened 240 titles and abstracts. Two independent reviewers evaluated 240 potentially relevant studies, and 15 records met the criteria to be included in this review.

We analyzed the 15 references, and the quality of these articles was evaluated using the CASP. If CASP score was over 14, the study quality was acceptable. To make sure the accuracy of the assessments, this work was performed by two standalone observers and the obtained scores were added together. After the consideration of the results we found the quality of researches based on CASP scores. The results of the quality are presented in Table 1.

Data extraction was performed using four themes: study type, methods, main focuses and finally key performance indicators that were used in the references. Table 2 summarizes the lesson learned or the proposed indicators for assessing mobile or field hospitals performance.

We found 13 criteria for the assessment of field hospitals in the literature. We classified all the retrieved indicators according to the system approach to understand them better and make a holistic approach in evaluating the performance of field hospitals. The results of this study showed that input indicators included 4 indicators, process indicators included 2 indicators, output indicators consisted of 4 indicators and outcome indicators involved

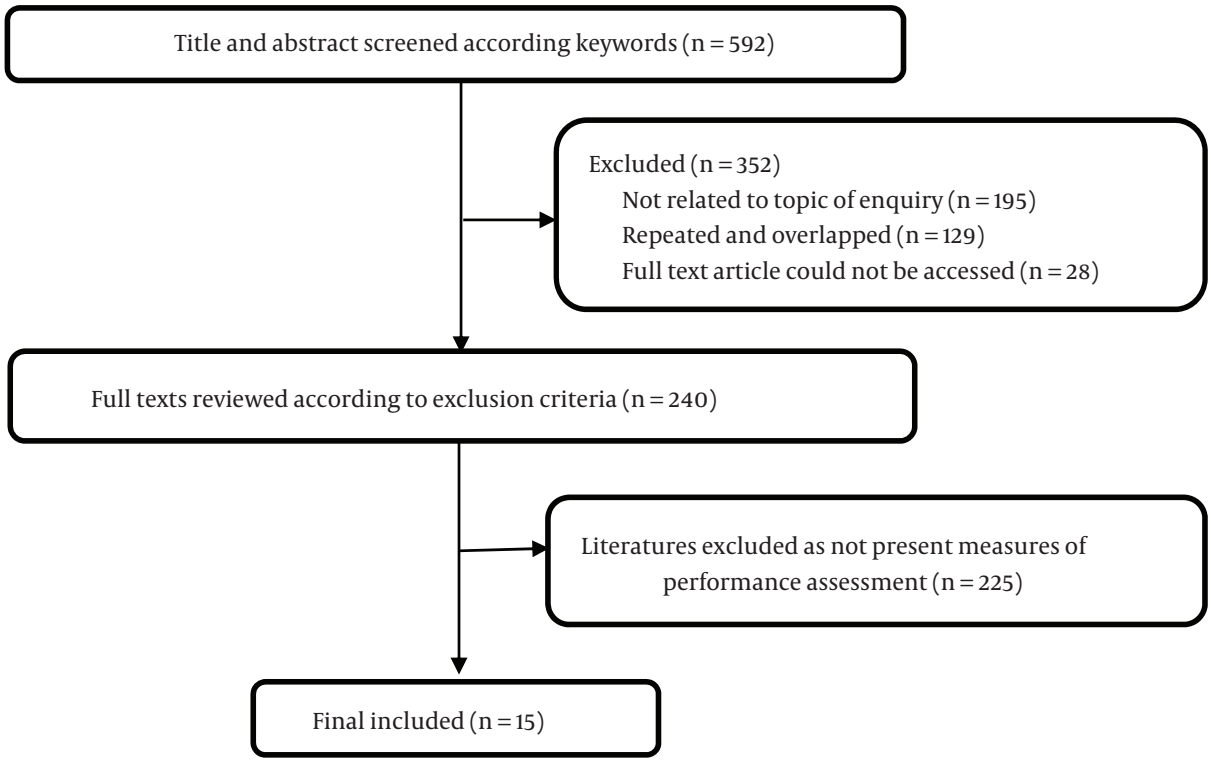

Figure 1. Literature Search Process

3 indicators. Figure 2 illustrates these indicators based on the system approach.

4. Discussion

This systematic review assessed the performance indicators in the assessment of field hospitals. We have presented a conceptual framework for evaluating the performance of field hospitals based on a system approach. Many studies have assessed the performance of public hospitals based on the health system performance assessment framework. The research study by Seitio-kgokgwe and his colleagues has determined the usefulness of the system approach in assessing the performance of hospital systems in a developing country (29). Hospital performance models based on system components were used to develop a benchmarking system to compare the performance of hospitals with similar characteristics in different countries (30, 31).

The results of this study showed that input indicators included: goal and clear policy, existence of the hospital coordination team, the number of staff per bed. Literature review showed that field hospitals must have input combinations in terms of the personnel and the coordination teams (32-34).

According to the results, the most important indicators in assessing the performance of the field hospitals were the process indicators. The referral system had the highest frequency. In the studies by Ghaedamini (2012), Ghanjal (2008), Tahmasbipour (2013), Dagan (2013), Johnston (2013), Levin (2012), Olszewski (2014), Oriol (2009), Voelker (2006), Stannard (2008), Ereso (2010) and Hodgetts (2009) the implementation of the referral system in the field hospitals was mentioned, thus we can conclude that it is the most important indicator in the evaluation.

Another index of the process indicators was scenario planning for disaster. Due to the nature of their activities, field hospitals must deal with scenarios of crises. Verderber noted that the process plays an important role in the field hospitals, which confirm the findings of our research (34).

This review showed 4 output indicators of field hospitals performance. Sebbah et al. have considered the humanitarian relief operations from a military logistics perspective and concluded that the output in these centers has several stages (35).

This study showed that outcome indicators involved 3

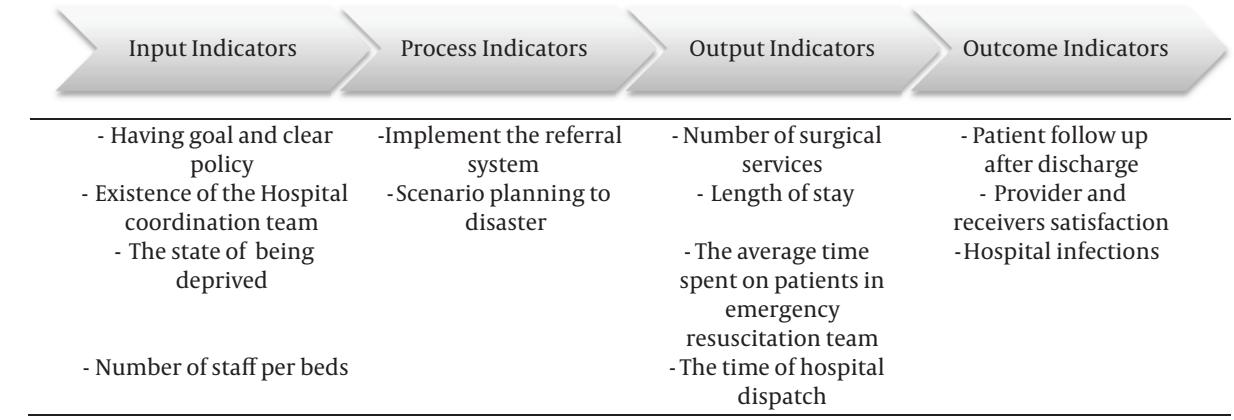

Figure 2. Classification of the Indicators Based on the System Approach

indicators. About half of the studies suggest that after the treatment in field hospitals, follow-up is necessary. Hospital infections in field hospitals according to the type of open surgery need to be systematically checked. Finally, patient satisfaction should be assessed as one of the most important issues in the establishment of a field hospital. Patient satisfaction has been extensively studied, however, it continues to be used as the perceived service quality of the patients (36). Other studies have emphasized the role and the importance of controlling hospital infection in mobile and field hospitals (37, 38).

5. Conclusions

This study highlights key performance indicators in the field hospitals appraisal with a system approach. There was no model to assess the field hospitals, so assessing the quality of the services in the field hospitals is unclear. The system approach to the assessment of the field hospitals provides solutions to this dilemma. Continued emphasis on system approach and indicators, presents an opportunity to improve the assessment of filed hospital services and scientific information to judge their performance.

Footnotes

Authors' Contribution: Rouhollah Zaboli, Rouhollah Ghaed Amini, and Shahram Toufighi were involved in the design of the study; Rouhollah Ghaed Amini started the study under the direction of Rouhollah Zaboli, Shahram Toufighi, and Mohammad|Raiess Zadeh; Rouhollah Ghaed Amini wrote the first draft of the article; Rouhollah Zaboli reviewed and commented on all drafts.

Competing Interests: The authors declare that they have no competing interests.

Ethical Issues: This study was approved by the ethics committee of Baqiyatallah University.

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Table 1. Summary of Manuscript CASP Scores

Author, Date	Title	CASP Score
Ajam, 2014 (14)	Assessing the quality of healthcare service by the SERVQUAL model: A case study of a field hospital	15
Ghaedamini, 2012 (15)	Review implementation of total quality management (TQM) in field hospitals	16
Ghanjal, 2008 (16)	Risk management and assessment of field emergency centers using FMEA method	15
Tahmasbipour, 2013 (17)	The evolution of field hospitals in war	15
Dagan, 2013 (18)	Extending a helping hand in disaster 6,000 miles away from home-the Israeli field hospital in the Philippines	15
Finestone, 2014 (19)	Telecommunications in Israeli field hospitals deployed in three crisis zones.	15
Johnston, 2013 (20)	Sepsis management in the deployed field hospitals	15
Levin, 2012 (21)	MHealth: promise and pitfalls	15
Olszewski, 2014 (22)	Selected epidemiological aspects of fresh whole blood application in Polish field hospital in Afghanistan	15
Oriol, 2009 (23)	Calculating the return on the investment of mobile healthcare	15
Voelker, 2006 (24)	Mobile hospitals raise questions about hospital surge capacity	15
Stannard, 2008 (25)	Key performance indicators in British military trauma	16
Berkenstadt, 2013 (26)	Training in trauma management: the role of simulation-based medical education	15
Ereso, 2010 (27)	Live transference of surgical subspecialty skills using telerobotic proctoring to remote general surgeons	17
Hodgetts, 2009 (28)	Military pre-hospital care: why is it different?	15
Total CASP score		15/47

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Table 2. Characteristics of the Studies Focusing on Processes, Focuses and Performance Indicators

Reference	Study Type	Methods	Main Focus	Key Performance Indicator
Ajam, 2014	Descriptive-cross sectional	SERVQUL questionnaire to investigators	The method showed a good quality and ability that makes it possible to satisfy the needs	Provider and receivers satisfaction Existence of the Hospital coordination team The state of being deprived Length of stay Patient follow-up after discharge Scenario planning for disaster The time of hospital dispatch Having goal and clear policy Implementing the referral system
Ghaedamini, 2012	Descriptive-cross sectional	Self-structure questionnaire	It is not feasible to evaluate the quality of services on field hospitals	Provider and receivers satisfaction Hospital infections Existence of the Hospital coordination team The state of being deprived Number of surgical services The average time spent on patients in the emergency resuscitation team Scenario planning for disaster The time of hospital dispatch Implementing the referral system
Ghanjal, 2008	Qualitative and cross sectional	Questionnaire to external experts, Checklist of performance	Review of the referral system of the injured, Estimate the facility to improve care, Lack of staff	The state of being deprived The average time spent on the patients in emergency resuscitation teams Implementing the referral system Having goal and clear policy Provider and receivers satisfaction Existence of the Hospital coordination team Number of staff per bed Number of surgical services Patient follow-up after discharge Scenario planning for disaster The time of hospital dispatch
Tahmasbipour, 2013	Review		Review of Iranian field hospitals during the war with Iraq, The evolution of hospitals in eight years	Implementing the referral system Provider and receivers satisfaction Hospital infections Number of surgical services Length of stay Patient follow-up after discharge Provider and receivers satisfaction The state of being deprived
Dagan, 2013	Descriptive	Purposeful sampling	Focusing on the communication and coordination between sectors and identifying the status of the injured	

Table 3. Extraction of Performance Indicators Based on the Studies

Mesures	Study															
	Ajam, 2014	Ghaedamini, 2012	Ghanjal, 2008	Tahmasbipour, 2013	Bagan, 2013	Finestone, 2014	Johnston, 2013	Levin, 2012	Olszewski, 2014	Oriol, 2009	Voelker, 2006	Stannard, 2008	Berkenstadt, 2013	Ereso, 2010	Hodgetts, 2009	n
Having goal and clear policy		*		*			*		*	*		*	*			7
Implemen the referral system		*	*	*	*		*	*	*	*	*	*		*	*	12
Provider and receivers satisfaction	*	*		*	*	*			*		*		*	*	*	10
Hospital infections		*			*		*	*			*					5
Existence of the Hospital coordination team	*	*		*										*		4
The state of being deprived	*	*	*			*			*	*		*			*	8
Number of staff per bed				*				*						*		
Number of surgical services		*		*	*				*		*	*	*			7
Length of stay	*				*		*				*				*	5
The average time spent on patients in the emergency resuscitation team		*	*					*								3
Patient follow-up after discharge	*			*	*		*		*							5
Scenario planning for disaster	*	*		*		*		*	*			*		*	*	9
The time of hospital dispatch	*	*		*		*		*		*			*		*	8