Investigating the relationship between crisis management and hospital performance indicators In selected hospitals of Kermanshah University of Medical Sciences

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Abstract

Crisis management is one of the Important subjects of management sciences

But despite its importance, especially in today's risky world, due to the hidden and surprising nature of crises and the involvement of managers in solving everyday problems, it is neglected by most managers and planners.

Preparing for unexpected events and disasters is one of the basic responsibilities of hospitals, especially educational and medical centers.

The current research was aimed at investigating the impact of crisis management on hospital performance indicators. The research hypotheses were formulated according to the research components.

The method used In this research Is a descriptive-cross-sectional method and a survey group, and the research population includes all the employees working in educational and therapeutic hospitals affiliated to Kermanshah University of Medical Sciences who worked in these hospitals in 2016

(Imam Reza, Imam Ali, Dr. Mohammad Kermanshahi, Farabi, Taleghani, Motazadi and Imam Khomeini (RA))

By using the available sampling method, the sample size was estimated through random sampling and the following statistical formulas at the confidence level of 95%, the power of the test was 80% and r = 0.17 equal to 300 people.

The research data was analyzed using SPSS and Amos software and descriptive and inferential statistics. The findings showed that the situation of crisis management in the selected medical sciences hospitals of Kermanshah was more than average and in a desirable level. Also, the situation of crisis management on hospital performance indicators has been more than average and at a desirable level.

Key words: crisis management, hospital performance index, medical education hospitals, Kermanshah

Introduction

During the last two decades, major natural disasters in the world have affected the lives of at least 800 million people and led to the death of thousands of people and economic damage of more than 50 billion dollars.

Iran is a landlocked country and is one of the most prone countries in the world for the occurrence of accidents and disasters, so that it is considered the fourth landlocked country in Asia and the tenth country in the world In this regard.

For example, over the past few decades, more than 180,000 people In Iran have lost their lives simply because of earthquakes, and many times more have been injured.

One of the main goals of healthcare systems during disasters is to provide medical care in the affected area.

Accidents and disasters have always had a significant impact on hospital readiness in providing health services to the affected population.

Crisis management provides a management framework for prevention and reduction of harmful effects, use of available facilities and equipment for preparation during natural events.

In unexpected accidents, the health sector, especially hospitals, play the most important role as the main unit of providing services in the Initial phase. The optimal performance of hospitals in critical incidents can reduce possible losses.

Therefore, preparing for unexpected events and disasters is one of the basic responsibilities of hospitals, especially educational and treatment centers, and this Is the fact that research has shown that these centers often do not have enough preparation to deal with the natural and Inherent problems of unexpected events. Ghasemzadeh, 2018

Considering the importance of hospital performance in risky situations, in this research we examine the Impact of crisis management on hospital performance indicators. Unfortunately, research has shown that medical centers often do not have enough preparation to deal with the natural and inherent problems of unexpected events and have poor performance.

The hospital's preparedness against these incidents is due to several factors, one of the most important of which is the existence of a hospital crisis management plan (Gasemzadeh, 2010)

On the other hand, hospital indicators are the most important factors that show the performance of the hospital, so It is necessary to pay full attention to these indicators along with the hospital's crisis management plan.

On the other hand, research shows the existence of hospital performance indicators as factors influencing crisis management programs (Vafaei et al., 2010; Arab et al., 2011)

And since by examining the internal and external backgrounds in relation to the subject, there has been no research conducted on the relationship between crisis management and hospital performance indicators.

Therefore, considering the importance of hospitals' performance in the face of crisis, the main problem of the current research is to investigate the relationship between crisis management and hospital performance indicators in selected medical sciences hospitals of Kermanshah.

The key to efficiency and product production in any organization is management. Planning, organizing, directing, coordinating and controlling are management functions

However, these functions are forgotten during the crisis and the system becomes more chaotic than before the accident.

Managers have responsibility in more than 5 areas such as human resources, financial, material, support and system resources. Management of each of these resources is critical before, during, and after an emergency.

Therefore, the need to pay attention to the management of accidents and natural disasters In our country is not hidden from anyone.

Undoubtedly, among the various components of disaster management in the health sector In unexpected incidents, the health and medical systems, especially hospitals, play the most important role as the main unit of providing services in the initial phase.

Health services are the main factor of human survival in natural disasters. Accidents and disasters always have a significant impact on health, public health and welfare of the affected population.

On the other hand, one of the criteria for measuring the success of the organization's

performance and determining the level of achievement of the desired goals is the statistics and indicators of that organization. As mentioned, among the centers that are In the center of attention and among the priorities of the development of the healthcare sector are hospitals.

Anticipation and prevention, preparation, confrontation and return to initial conditions are the four main phases of crisis management. Hospital indicators provide an overview of the ability of hospitals and medical centers to continue operating in emergency situations.

Therefore, investigating and studying the relationship between crisis management and hospital performance indicators is very important.

Unfortunately, few studies have investigated it. The present study was conducted with the aim of investigating the relationship between crisis management and hospital performance indicators in selected hospitals of Kermanshah Medical Sciences.

It is hoped that the present collection will be effective in improving the preparedness of health centers and will take a step towards reducing the sufferings of people affected by accidents and disasters and securing the rights of the noble people of Islamic Iran.

Background research

Mehrabi et al.(2014) In a research that was conducted under the title of evaluating the readiness indicators of military hospitals against unexpected natural disasters in Iran, showed that according to hospital managers, the main priority in dealing with critical situations in hospitals was short and long-term planning.

On the other hand, except for the area of maneuver implementation and accepting the injured, who were in medium readiness conditions; In other fields, an average level of appropriate preparation against crises was observed.

Of course, In some areas there was a significant difference between the hospital based in Tehran and other hospitals.

Mirzaei et al. (2013) In a research titled "Surveying the Safety and Preparedness of Ilam Hospitals against Disasters" showed that , despite differences in functional, structural and non-structural fields, the safety level of all hospitals is average.

However, a series of appropriate measures should be taken In each of the areas, and the safety level should be evaluated repeatedly on an annual basis in order to reach the global standard (A) level.

Eqbali Zarch (2012) In a research that was conducted under the title of examining the preparedness of hospitals against unexpected events and crisis management, the studies showed that the first step In the preparation plan of health and treatment centers Is to estimate the vulnerability of these centers to unexpected events.

In the meantime, hospitals, as fixed and specialized parts of providing medical services, with the availability of facilities and experienced personnel, are considered one of the important components in the process of responding to unexpected incidents In terms of planning, structural and non-structural dimensions, which are responsible for the mission of preserving the life and health of the injured.

Of course, all these cases are provided that they have the necessary preparation in crisis conditions to provide services.

Alexander (2007) concluded in his research that crisis management services should respond to 10 objectives, Including increasing people's participation to

maintain their security, prioritizing the needs of vulnerable groups, organizing at the local level but coordination and coordination by higher levels of the government, adapting to ecological sustainability and regional and urban planning that depends on the local area.

Kimberly et al. (2016) examined hospital emergency preparedness at a Virginia hospital center after 9/11, and they showed that a new preparedness plan should replace the previous plan so that health facilities and equipment have a stronger framework and operate without depending on extra-hospital resources during disasters.

In their research, Henstra and Bain (2015) found that Canadians face a wide range of natural hazards such as floods, storms, etc., in some cases, these hazards have interactions with vulnerability that will lead to major disasters.

Major disasters have the potential to impose important social and economic costs. Improving the management and performance of relief units during disasters can be effective in reducing imposed costs.

Research method

This research Is of applied type in terms of purpose and in terms of data collection and method, It is descriptive-cross-sectional and of the survey group. At first, in this research, an effort was made to determine the scope of the investigated structure.

In the second stage, a large set of measures was developed to check the improvement of the structure's performance according to the research literature and its background, and finally, based on that, the desired items were extracted according to the purpose of the research.

Statistical description of data

In this part, the personal and social characteristics of the sample, such as gender, age, and level of education, are examined and described in the form of tables and figures.

Gender

Table 1 is about gender of people

Total	Woman	Man	Gender
300	113	187	**Number**
100	37.67	62.33	**Percent**

Table 1 shows the gender of the respondents. 62.33% (187 people) are men and 37.67% (113 people) are women.

Total	Above 50	Between 40_50	Between 30_40	Less than 30	Age
300	75	80	99	46	**Number**
100	25	26.67	33	15.33	**Percent**

Table 2 shows the age of the respondents. 15.33 percent of the sample (46 people) are less than 30 years old.
And 33% of the sample (99 people) are 30 to 40 years old, 26.67% of the sample (80 people) are 40 to 50 years old, and 25% of the sample (75 people) are people over 50 years old.

Total	Master and higher	Bachelor	Diploma	Education
300	89	120	91	**Number**
100	29.67	40	30.33	**Percent**

Table 3 shows the percentage of respondents' education. 30.33% of the sample people (91 people) have a diploma, 40% of the sample people (120 people) have a bachelor's degree, and 29.67% of the sample people (89 people) have a master's degree and higher than.

Correlation matrix

The correlation matrix is based on the covariance of two variables and their standard deviation, and their estimates are used to calculate the correlation coefficient. Pearson's correlation coefficient was used to investigate the main and sub-hypotheses of the research, which is considered the most important part of statistical analysis. Pearson's correlation coefficient was used to investigate the relationship between criterion variable and predictor variables. Table 4 shows the correlation matrix between the variables.

Table (4-) correlation matrix

11	10	9	8	7	6	5	4	3	2	1	
										1	**Crisis Management**
									1	0.623^{*}	**Active to fixed bed ratio**
								1	0.594^{*}	0.715^{**}	**Bed occupancy**
							1	0.633^{*}	0.520^{*}	0.537^{*}	**Bed performance ratio**
						1	0.619^{*}	0.762^{**}	0.621^{*}	0.744^{**}	**Bed rotation distance**
					1	0.625^{*}	0.650^{*}	0.569^{*}	0.642^{*}	0.712^{*}	**Acceptance ratio for each bed**
				1	0.617^{*}	0.771^{*}	0.722^{*}	0.560^{**}	0.722^{*}	0.710^{*}	**Economic and social base**
			1	0.780^{**}	0.515^{*}	0.779^{*}	0.671^{*}	0.670^{*}	0.565^{*}	0.602^{**}	**The ratio of surgeries to the operating room**
		1	0.567^{*}	0.659^{**}	0.726^{*}	0.660^{*}	0.610^{*}	0.619^{**}	0.597^{*}	0.555^{*}	**ratio of deceased to hospitalized patient**
	1	0.655^{*}	0.515^{**}	0.750^{**}	0.733^{*}	0.525^{*}	0.614^{*}	0.520^{*}	0.640^{*}	0.614^{*}	**Number of active beds**

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1	0.718**	0.740**	0.670**	0.560**	0.695**	0.743**	0.549**	0.696**	0.700**	0.734*	**Social Security**

The above table shows the Pearson correlation coefficient between the variables. Both variables that have a star sign on their correlation coefficient are significant at the 0.05 level, and the variables that have a double star sign are also significant at the 0.01 level.

According to the results, confirmatory factor analysis steps can also be performed on the data. The KMO value of more than 0.70 confirms the adequacy of sampling and the significance level of 0.000 for Bartlett's test also indicates the appropriateness of the cited factor model.

The calculated KMO Is equal to 0.726 and because it is more than 0.70, the calculations show the adequacy of sampling. In this research, in order to check the appropriateness of the model, we use the indicators related to the fit of the model presented in Table 5.

Table (5) fit Indices of the crisis management variable measurement model

Index title	Number	Result	
$\dfrac{x^2}{\text{df}}$	**2.631**	**Model validation**	chi square
RMSEA	**0.025**	**Model validation**	The root mean square error of approximation
RMR	**0.621**	**Model validation**	Root mean square residual
GFI	**0.900**	**Model validation**	Goodness of fit
AGFI	**0.911**	**Model validation**	Modified goodness of fit Index
NFI	**0.902**	**Model validation**	Normalized fit index (Bentler-Bonet)
CFI	**0.924**	**Model validation**	Comparative fit index
IFI	**0.933**	**Model validation**	Incremental fit index

According to the obtained results, it can be acknowledged that all the fit indices of the above model are in the acceptable range, and therefore, the fit of the collected data with the model is favorable. Therefore, the suitability of the final model of crisis management is confirmed.

Variable measurement model of active to fixed bed ratio

According to the results, confirmatory factor analysis steps can also be performed on the data.

The value of KMO statistic more than 0.70 confirms the adequacy of sampling and the significance level of 0.001 for Bartlett's test also indicates the appropriateness of the cited factor model.

The amount of calculated KMO is equal to 0.756 (higher than 0.70), so the calculations

show the adequacy of sampling. The fit Indices of the variable measurement model of the ratio of active to fixed beds are given In Table 5.

Table (5-) fit indexes of the variable measurement model of active to fixed bed ratio

Index title	Number	Result	
$\dfrac{x^2}{\mathrm{df}}$	2.915	**Model validation**	Chi square
RMSEA	0.020	**Model validation**	The root mean square error of approximation
RMR	0.637	**Model validation**	Root mean square residual
GFI	0.915	**Model validation**	Goodness of fit
AGFI	0.934	**Model validation**	Modified goodness of fit Index
NFI	0.910	**Model validation**	Normalized fit Index (Bentler-Bonet)
CFI	0.900	**Model validation**	Comparative fit index
IFI	0.936	**Model validation**	Incremental fit index

According to the obtained results and comparing It with the acceptable range, It can be acknowledged that all the fit indices of the above model are in the acceptable range and therefore the fit of the collected data with the model is favorable. Therefore, the suitability of the final model of active to fixed bed ratio is confirmed.
Bed occupancy variable measurement model
According to the results, confirmatory factor analysis steps can also be performed on the data.

The value of KMO statistic over 0.70 confirms the adequacy of sampling and the significance level of 0.022 for Bartlett's test also Indicates the appropriateness of the cited factor model
The calculated KMO Is equal to 0.846 (higher than 0.70), so the calculations show the adequacy of sampling. The fit indices of the bed occupancy variable measurement model are given in Table 6.

Table (6) fit indices of the bed occupancy variable measurement model

Index title	Number	Result	
$\dfrac{x^2}{df}$	2.509	**Model validation**	Chi square
RMSEA	0.017	**Model validation**	The root mean square error of approximation
RMR	0.635	**Model validation**	Root mean square residual
GFI	0.900	**Model validation**	Goodness of fit
AGFI	0.815	**Model validation**	Modified goodness of fit Index
NFI	0.910	**Model validation**	Normalized fit Index (Bentler-Bonet)
CFI	0.904	**Model validation**	Comparative fit index
IFI	0.920	**Model validation**	Incremental fit index

According to the obtained results and comparing It with the acceptable range, It can be acknowledged that all the fit indices of the above model are in the acceptable range and therefore the fit of the collected data with the model is favorable. Therefore, the suitability of the final bed occupation model is confirmed.

Measurement model of average length of stay in hospital variable

According to the results, confirmatory factor analysis steps can also be performed on the data.

The value of KMO statistic more than 0.70 confirms the adequacy of sampling and the significance level of 0.002 for Bartlett's test also Indicates the appropriateness of the cited factor model.

The calculated KMO amount is equal to 0.795 (higher than 0.70), so the calculations show the adequacy of sampling. The fit Indices of the measurement model of the average length of stay in hospital variable are given In Table 7

Table (7) fit indices of the measurement model of the average variable of patient stay

Index title	Number	Result	
$\dfrac{x^2}{df}$	2.161	**Model validation**	Chi square
RMSEA	0.033	**Model validation**	The root mean square error of approximation
RMR	0.197	**Model validation**	Root mean square residual
GFI	0.941	**Model validation**	Goodness of fit
AGFI	0.930	**Model validation**	Modified goodness of fit Index
NFI	0.917	**Model validation**	Normalized fit Index (Bentler-Bonet)
CFI	0.926	**Model validation**	Comparative fit index
IFI	0.910	**Model**	Incremental fit index

validation

According to the obtained results and comparing It with the acceptable range, It can be acknowledged that all the fit indices of the above model are in the acceptable range and therefore the fit of the collected data with the model is favorable. Therefore, the suitability of the final model of average length of stay in hospital is confirmed.

Variable measurement model of the ratio of deceased to hospitalized patients

.According to the results, confirmatory factor analysis steps can also be performed on the data The value of KMO statistic more than 0.70 confirms the adequacy of sampling and the significance level of 0.001 for Bartlett's test also Indicates the appropriateness of the cited factor model

The calculated KMO Is equal to 0.719 (higher than 0.70), so the calculations show the adequacy of sampling. The fit indices of the variable measurement model of the ratio of deceased to hospitalized patients are given in Table 8.

Table (-8) fit indices of the variable measurement model of the ratio of deceased to hospitalized patients

Index title	Number	Result	
$\dfrac{x^2}{\text{df}}$	**2.496**	**Model validation**	Chi Square
RMSEA	**0.044**	**Model validation**	The root mean square error of approximation
RMR	**0.121**	**Model validation**	Root mean square residual
GFI	**0.922**	**Model validation**	Goodness of fit
AGFI	**0.900**	**Model validation**	Modified goodness of fit Index
NFI	**0.911**	**Model validation**	Normalized fit Index (Bentler-Bonet)
CFI	**0.903**	**Model validation**	Comparative fit index
IFI	**0.933**	**Model validation**	Incremental fit index

According to the obtained results and comparing It with the acceptable range, It can be acknowledged that all the fit indices of the above model are in the acceptable range and therefore the fit of the collected data with the model is favorable.

Therefore, the appropriateness of the final model of the ratio of deceased to hospitalized patients is confirmed.

In the following, the structural equation model will be discussed. Table 9 shows the effect coefficients of the variables.

According to the obtained results, it can be acknowledged that all the fit indices of the above model are in this range, and therefore, the fit of the collected data with the model is favorable. Therefore, the suitability of the structural equation model is confirmed.

Structural equation model analysis

Crisis Management

Active to fixed bed ratio	0.820
Bed occupancy	0.741
Bed performance ratio	0.790
Bed rotation distance	0.717
Acceptance ratio for each bed	0.750
Average length of stay in hospital	0.723
The ratio of surgeries to the operating room	0.737
Ratio of deceased to hospitalized patients	0.812
Number of active beds	0.800

The situation of crisis management in the selected medical sciences hospitals of Kermanshah is more than the average level and has been at the optimal level.

Table (9). Examining the situation of crisis management

Result	The significance level	One-sample t-statistics	Average	Crisis Management
Optimal	0.000	1.954	3.627	**Imam Reza. (pbuh)**
Optimal	0.001	1.492	3.526	**Imam Ali. (pbuh)**
Optimal	0.026	1.745	3.592	**Dr. Mohammad Kermanshahi**
Optimal	0.000	1.550	3.241	**Farabi**
Optimal	0.041	1.309	3.270	**Taleghani**
Optimal	0.009	1.634	3.748	**Motazadi**
Optimal	0.017	1.517	3.950	**Imam Khomeini (RA)**

In Table 9, the mean of each variable is tested using the one-sample T method. As we can see, the crisis management status of all hospitals is more than the average (their average is more than 3) and is at an optimal level.

The status of crisis management on hospital performance indicators has been more than average and at a desirable level.

Table (10) examining the status of hospital performance indicators

Result	The significance level	One-sample t-statistics	Average	Hospital performance indicators
Optimal	**0.000**	**1.748**	**3.360**	**Active to fixed bed ratio**
Optimal	**0.001**	**2.634**	**4.215**	**Bed occupancy**
Optimal	**0.023**	**2.590**	**3.627**	**Bed performance ratio**
Optimal	**0.015**	**1.889**	**3.190**	**Bed rotation distance**
Optimal	**0.000**	**2.629**	**3.927**	**Acceptance ratio for each bed**
Optimal	**0.006**	**2.594**	**3.691**	**Average length of stay in hospital**
Optimal	**0.000**	**1.864**	**4.318**	**The ratio of surgeries to the**

				operating room
Optimal	0.014	1.957	4.016	ratio of deceased to hospitalized patient
Optimal	0.033	2.641	3.672	**Number of active beds**

In Table 10, the average of each variable has been tested using the one-sample T method. As we can see, the status of hospital performance indicators of all hospitals is more than the average (their average is more than 3) and they are at a good level.

Conclusion

The results of research hypotheses show that the situation of crisis management in selected hospitals of Kermanshah medical sciences is more than average and favorable, as well as the situation of crisis management on hospital performance indicators.

According to the researcher's conclusion, these results indicate that with the presence and attention to hospital performance indicators in the organization, it is possible to witness the improvement and increase of the crisis management situation in selected hospitals of Kermanshah province.

In explaining the findings of this research, it can be concluded that in medical centers such as hospitals, any unexpected incident is considered as a crisis and must be properly managed and controlled to prevent it from turning into a disaster.

As one of the Important institutions providing healthcare services, the hospital plays an Important role in the return of the physical and mental health of the society. Therefore, applying efficient management at the time of crisis can have a great effect on the optimal performance of this institution.

So, it is necessary that each hospital has a crisis management structure or an emergency preparedness plan based on Its resources, facilities and special features. Based on this, the crisis management structure in Kermanshah hospitals was formed in accordance with the crisis management organization of the Ministry of Interior.

Which includes a commander such as the head of the hospital and several units and deputies, and these members, in addition to their daily work, are responsible for crisis management In incidents outside and inside the hospital.

The presence and work of these people in times of need has a significant Impact on the proper management of unexpected events. On the other hand, specialization and up-to-datedness in these medical education centers can be considered as a suitable factor for further preparation in these centers.

Through the Investigation, it was found that the ratio of active to fixed beds In these hospitals has increased compared to previous years, and it is in a favorable condition, and the percentage of bed occupancy is in a favorable condition.

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