The data on exploratory factor analysis of factors influencing employees effectiveness for responding to crisis in Iran military hospitals

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ABSTRACT

The article presents the data on the exploratory analysis of factors involved in employees' effectiveness for responding to crisis in Iran’s military hospitals. This research was a descriptive exploratory study. The statistical population included the 561 medical and nonmedical staff of three military hospitals. Two researcher-made questionnaires were used to collect data, and reliability and validity of the questionnaires were confirmed. The exploratory factor analysis (EFA) method was used to classify, clarify, and explain study factors and the infrastructural structure. At the end, 473 questionnaires were found appropriate for the final analysis. Based on results of the exploratory factor analysis (EFA), 8 criteria were identified as the main factors involved in employees' effectiveness for responding to crisis. According to Friedman test results, organizational factors were the most important factors influencing employees' effectiveness with a mean score of 3.76 of 5. Responding to crisis was the most important variable factor involved response to crisis with a mean score of 3.74 of 5.

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### Specifications Table

| Subject area | Health |
|--------------|--------|
| More specific subject area | Health management |
| Type of data | Tables and Figures |
| How data was acquired | Two researcher-made questionnaires were used to collect data from the medical and nonmedical staff of three military hospitals. The reliability and validity of the questionnaires were confirmed. |
| Data format | Analyzed |
| Experimental factors | The questionnaire was prepared by fusing several standard questionnaires and notions, questions, and statements raised by crisis professors and experts. |
| Experimental features | The exploratory factor analysis (EFA) method was used to classify, clarify, and explain study factors and the infrastructural structure. |
| Data source location | Tehran, Tehran province, Iran. |
| Data accessibility | Data are included in this article |

### Value of the data

- For success and effectiveness of medical and nonmedical measures in hospitals in response to crisis, many factors such as facilities and expert human force is necessary to be prepared. Employees' performance is assessed based on following two substantial concepts: effectiveness and efficiency [1–6].
- This data include the exploratory analysis on factors involved in employees' effectiveness for responding to crisis in Iran's military hospitals.
- The data in this article indicates that there are 8 criteria as the main factors involved in employees' effectiveness for responding to crisis.
- The analyzed data in this article shows that organizational factors are the most important factors for effectiveness of employees during crisis.
- The data included in this research are expected to be utilized more effectively in future studies to collect data on factors influencing effectiveness of employees for responding to crisis in other organizations.

1. **Data**

   Analysis of demographic properties of the study population indicated that 263 (55.6%) participants in this study had taken crisis management courses, 330 (69.8%) had attended crisis management programs, and 91 (19.2%) had responsibilities in crisis programs. Therefore, the minimum inclusion criterion was met. The factor analysis of employees' effectiveness with 38 statements, which was carried out by obtaining the main components in accord with Table 1 based on the eigenvalue column, factors with eigenvalues higher than one led to identification of four factors. Each factor's share of variance of the 38 statements is shown in the variance percent column. The first factor had the largest share (46.670 with an eigenvalue of 17.735) of variance, whereas the fourth factor had the smallest share (2.925 with an eigenvalue of 1.112) of variance of 38 statements. In sum, all of the four factors with eigenvalues larger than one explained 57.577% of variance of 38 statements. Since the eigenvalues of these factors were larger than one and factor loading of each statement was close to one, the factorial validity of statements related to employees' effectiveness is satisfactory by accepting the related hypotheses.

   As the crisis response data in Table 1 indicate the first factor had the largest share (3.735 with an eigenvalue of 28.730) of variance of 13 statements, whereas the fourth factor had the smallest share (1.075 with an eigenvalue of 8.272). In summary, all 4 factors with eigenvalues higher than one
explained 68.509 of variance of 13 statements. Therefore, it is concluded that factorial validity of statements related to crisis response variable is satisfactory by accepting the hypotheses.

The screen plots presented for both variables in the following visually illustrate results of the table of variance explained by factors of both variables based on suitable number of factors. That is to say, similar to eigenvalue, this plot helps determine the number of factors. According to Figs. 1 and 2 in the case of both variables, eigenvalues of 4 factors are higher than one. In other words, the 13 crisis response statements and 38 employees' effectiveness statements can be reduced to four factors separately.

Results of analysis of correlations between factors of the employees' effectiveness and crisis response variables indicated that correlation coefficient of all factors was close to zero, which reflect their lack of correlation. Hence, since all factors of the employees' effectiveness and crisis response variables were uncorrelated, orthogonal varimax rotation methods were used to rotate factors.

According to Table 1, factors influencing effectiveness of employees for responding to crisis were summarized into eight factors using the Principle Component Analysis (PCA) and varimax rotation methods. Finally, the eight factors were named with the aid of the research steering committee. The factors and components of each factor are introduced in the following. Research findings showed that the following eight factors were identified and prioritized as factors influencing employees' effectiveness in responding to crisis: responding to crisis, resource supply, responding capacity and ability, expert workgroup, personal factors, group factors, organizational factors, and administrative factors.

Results of the Kaiser-Meyer-Olkin (KMO = 0.973) and Bartlett's test at significance level of < 0.01 (sig = 0.001 is rejected) for employees' effectiveness are show in Table 2. These results suggest that factor analysis was suitable for these statements. In all statements except for questions q4 and q8 the factor loading is higher than 0.5 which indicates that these statements can optimally explain corresponding variances and the questions are significance. Hence, by omitting questions q4 and q8 these statements become suitable for determining effectiveness factors in this research.

In addition, results of the KMO (=0.956) and Bartlett's tests at significance level of < 0.01 (sig = 0.001 is rejected) for crisis response in Table 3 indicate that factor analysis is suitable for these statements. In all statements, the factor larger than 0.05 suggests that the statements can optimally explain variances of their related factors, and thus the questions are significant.

Results in Table 4 indicate that according to respondents, among the factors influencing employees' effectiveness, organizational factors are the most important with a mean score of 3.76 of 5, whereas administrative factors are the least important with a mean score of 1.09 of 5. Among the crisis response criteria, the responding process has the highest level of importance with a mean score of 3.47 of 5, while mobilization and supply of resources has the lowest importance with a mean score of

| No. | Questionnaire dimensions | Factor                                      | Rotation sums of squared loadings |
|-----|--------------------------|---------------------------------------------|----------------------------------|
|     |                          |                                             | Eigenvalue | Variance (%) | Cumulative variance (%) |
| 1   | Employees effectiveness factors | Personal factors                            | 17.735     | 46.670        | 46.670                 |
| 2   |                          | Organizational factors                      | 1.680      | 4.422         | 51.092                 |
| 3   |                          | Group factors                               | 1.353      | 3.560         | 54.651                 |
| 4   |                          | Administrative factors                      | 1.112      | 2.925         | 57.577                 |
| 5   | Response to crisis       | Responding to crisis                         | 3.735      | 28.730        | 28.730                 |
| 6   |                          | Resource supply                             | 2.550      | 19.614        | 48.345                 |
| 7   |                          | Capacity and potential for responding to crisis | 1.546   | 11.893        | 60.237                 |
| 8   |                          | Crisis response expert workgroup             | 1.075      | 8.272         | 68.510                 |
Fig. 1. Cattell’s screen plot of 4 components of employees’ effectiveness.

Fig. 2. Cattell’s screen plot of 4 components of crisis response.
| Factor titles         | Questions                                                                 | Statements                                                                 | Factor loading | KMO  | BT     | DF  | p-Value |
|----------------------|---------------------------------------------------------------------------|-----------------------------------------------------------------------------|----------------|------|--------|-----|---------|
| Administrative factors | q1                                                                         | Training resources management and organization based on standards and employees needs assessments | 0.77           | 0.910| 1816.92| 21  | 0.001   |
|                      | q2                                                                         | Time management in changing use of employees and workplace from normal to critical mode | 0.80           |      |        |     |         |
|                      | q3                                                                         | Senior managers' knowledge of employees' substantial capabilities and duties | 0.72           |      |        |     |         |
|                      | q4                                                                         | Suitability of managers' management method with employees status and competencies | 0.70           |      |        |     |         |
|                      | q5                                                                         | Employing staff in proportion to different situations in different types of crisis | 0.76           |      |        |     |         |
|                      | q6                                                                         | Speed of operational plans based on urgent action scenario                   | 0.37           |      |        |     |         |
|                      | q7                                                                         | Selection of employees based on professional characteristics and qualification | 0.72           |      |        |     |         |
|                      | q8                                                                         | Organizing a transportation system for transferring victims from the crisis scene to hospital | 0.32           |      |        |     |         |
| Personal factors     | q9                                                                         | Employees' personal ability to cooperate with other medical teams during crisis | 0.70           | 0.949| 3016.12| 55  | 0.001   |
|                      | q10                                                                        | Personal mobility and movement of employees during crisis                     | 0.78           |      |        |     |         |
|                      | q11                                                                        | Quality and type of equipment used for time of crisis                         | 0.78           |      |        |     |         |
|                      | q12                                                                        | Employees' knowledge of nature and types of crises                            | 0.81           |      |        |     |         |
|                      | q13                                                                        | Employees' knowledge of available facilities and resources during crisis     | 0.74           |      |        |     |         |
|                      | q14                                                                        | Employee's skills for accomplishing tasks properly during crisis             | 0.72           |      |        |     |         |
|                      | q15                                                                        | Proportionality of the assigned task or mental/stressful condition of workplace to employees | 0.73           |      |        |     |         |
|                      | q16                                                                        | Employees' motivation and interest in cooperating with training programs     | 0.69           |      |        |     |         |
|                      | q17                                                                        | Employees independence in accomplishing tasks during crisis                   | 0.72           |      |        |     |         |
|                      | q18                                                                        | Paying attention to opinions, suggestions, and complaints of employees for improving activities effectiveness | 0.74           |      |        |     |         |
|                      | q19                                                                        | Elimination of negative feeling of inequality and injustice in workplace to prevent under-activity | 0.76           |      |        |     |         |
| Group factors        | q20                                                                        | Coordination, sharing of efforts, and teamwork                               | 0.78           | 0.884| 1518.71| 28  | 0.001   |
|                      | q21                                                                        | Defining group activities for employees                                       | 0.75           |      |        |     |         |
of 1.06 of 5. In addition, other factors are shown in the aforementioned table in the order of significance.

2. Experimental design, materials and methods

This research is an exploratory study that was conducted using the field research method. The study population included all of the medical and nonmedical staff of three military hospitals in Tehran City. Samples were collected using the stratified random sampling method from all of the in-patient, out-patient, administrative, engineering, and other wards of three military
hospitals. Data was collected using the employees effectiveness and crisis response researcher-made questionnaires, which were prepared by fusing several standard questionnaires and notions, questions, and statements raised by crisis professors and experts. With a sample loss of 10% a total of 561 samples were included in the research. Questionnaires validities were calculated for all questions to be higher than 0.89 and 0.92 based on opinions of 8 experts using

| Factor titles | Questions | Statements | Factor loading | KMO  | BT   | DF  | P-Value |
|---------------|-----------|------------|----------------|------|------|-----|---------|
| Responding to crisis | q39 | Availability of a predetermined standard response procedure | 0.82 | 0.804 | 586.2 | 6 | 0.001 |
| | q40 | Availability of a response program based on clear specific descriptions of duties | 0.84 | | | | |
| | q41 | Availability of a response plan supervised by a single commander and specified members | 0.79 | | | | |
| | q42 | Emphasizing responsibility with supervision and control of consumables and constructional expenses | 0.78 | | | | |
| Resource supply | q43 | Support of relief and service organizations in response to disasters | 0.73 | 0.500 | 62.49 | 1 | 0.001 |
| | q44 | Ease of access to emergency teams for all employees | 0.81 | | | | |
| Responding capacity | q45 | A changeable response program structure based on type of accident | 0.77 | 0.754 | 451.01 | 6 | 0.001 |
| | q46 | Coverage of response program in hospital by hospital staff | 0.76 | | | | |
| | q47 | Existence of flexible and diverse procedures on different crisis response levels in hospitals | 0.85 | | | | |
| | q48 | Existence of stress management programs for employees working under critical conditions | .810 | | | | |
| Expert workgroups | q49 | Existence of expert work groups for crisis response | 0.72 | 0.655 | 167.82 | 3 | 0.001 |
| | q50 | Taking professional adequate training courses on crisis response | 0.80 | | | | |
| | q51 | Training hours in hospital crisis management programs | 0.84 | | | | |
| Sum of KMO and Bartlett questions | | | | 0.956 | 4033.148 | 78 | 0.001 |

| Questionnaire dimensions | No. | Components | Priority | Mean of 5 |
|--------------------------|-----|------------|----------|-----------|
| Employees effectiveness factors | 1 | Personal factors | Second | 3.18 |
| | 2 | Organizational factors | First | 3.76 |
| | 3 | Group factors | Fourth | 1.09 |
| | 4 | Administrative factors | Third | 1.96 |
| Response to crisis | 5 | Responding to crisis | First | 3.47 |
| | 6 | Resource supply | Fourth | 1.06 |
| | 7 | Capacity and potential for responding to crisis | Second | 3.45 |
| | 8 | Expert work groups | Third | 2.02 |
the Lawshe (1986) CVI and CVR forms, and reliability of the questionnaires was higher than 0.7 using the Cronbach’s alpha of both questionnaires. The inclusion criterion was reference to presence in one course or program or responsibilities in the past or present crisis management records. The finalized questionnaire was distributed among the samples, and finally 473 appropriate were analyzed after the pre-processing especially omission of indifferent samples. Afterwards, through exploratory factor analysis the factors were categorized and descriptive statistical methods (including mean and standard deviation) were used to analyze the findings. Friedman test was also used to rank the indices, and examinations of skewness and kurtosis were used to determine normality of variables. Calculations were carried out in SPSS version 20 at a significance level of \( P < 0.05 \).

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**Transparency document. Supporting information**

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