

The Communication Systems Between the Rescue Teams in Case of Disaster. Evaluation of the Awareness of the Health Professionals and the General Public

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Introduction: The integration of communications and the unified coordination in interventions are essential to reduce the risk of the emergency medical personnel. The purpose of this study is to assess the level of awareness of the population and health professionals regarding the medical emergency and disaster response system as well as the importance of an integrated communication system and coordination of the involved teams.

Material and method: For the purpose of this study two questionnaires were used: initial evaluation and a review. The first questionnaire was applied on a sample of 138 persons, medical personnel from several medical centers in the country (Tîrgu Mureș, Timișoara, Cluj Napoca, București). The second questionnaire was applied on a sample of 120 persons from the general public. The data obtained were statistically analysed using several methods: Friedman test, Kendall tau test, Wilcoxon test, GraphPad Prism 5 and SPSS Statistics 17.0.

Results: The statistically significant difference ($p < 0.05$) among the mean scores obtained by analysing the answers to the first two questions contained in the first questionnaire, shows a poor knowledge related to the emergency response system as well as to the communication systems used in disasters, among doctors and nurses. The answers to the questions contained in the questionnaire applied to the general population revealed a dissatisfaction as well as a lack of knowledge about the existing emergency medical system. The presentation of the Mobile Command Centre led to a better understanding of the emergency response system as well as of the advantages of an integrated communication system in disasters, among the medical personnel and general public.

Conclusions: This study draws attention on the lack of information about the emergency medical system, disaster response and especially on the integration of the communication system between the teams involved in this kind of emergencies. The informative training performed during the second part of the study led to an improvement of the perception regarding the indispensability of an integrated communication system, among the medical personnel and the general public.

Keywords: emergency medicine, communication system, crisis situation

Introduction

Even for the personnel trained for emergency care, the communication during the interventions could be described a little bit more than a controlled chaos. The key of success consists of maintaining a strict discipline and respecting the implemented procedures, in order to preserve the existent communication structures.

The emergency situations and different catastrophic events, which we can see and hear every day, point out the importance of fast decisions. In many cases, the communication between the forces involved in solving the crisis events are not integrated as an unitary system. For example, before the collapse of the second tower of the "World Trade Center", a radio message was sent about the imminence of the event, which did not reach the firefighters because the radio communication systems used by these structures were different [1]. As a consequence, 121 firefighters lost their lives when the second tower collapsed [2].

The integration of the communications and the unitary coordination of the interventions should be mandatory in order to reduce the risks of the exposed emergency personnel and to optimize the response time in case of a imminent disaster. It also provides support in taking the decisions both, as an individual or as a team.

The aim of the study is to assess the level of knowledge among the general population and the medical personnel, regarding the emergency medical system and disaster responsiveness as well as the communication system and the unitary coordination of the acting teams.

Material and method

In order to collect data, two questionnaires were applied: the initial evaluation and a re-evaluation. These were different for the medical staff and for the general population.

The re-evaluation questionnaire was applied after the presentation of a Mobile Command Centre, a vehicle capable of integrating the communications and the activity of the intervention decision makers in disaster situations. The integrated management system gives to the coordinators of the intervention the possibility to be in the same location, in the same time, this way being able to take the best decisions together.

The Mobile Command Centre has the resources required for 72 hours of autonomous function, providing the communication channels among all the institutions involved in this type of interventions.

The method of collecting data was achieved using „cluster” type samples.

Questionnaire number one

1. Rank on a scale from 1 to 10 the efficiency of the existing intervention system in disasters
2. Rank on a scale from 1 to 10 the efficiency of the existing communication system in disasters
3. Rank on a scale from 1 to 10 the importance of the interdisciplinary coordination of the interventions in disasters
4. Rank on a scale from 1 to 10 the importance of the emergency medical care in disasters
5. Rank on a scale from 1 to 10 the importance of the Fire Department in the management of the disasters
6. Rank on a scale from 1 to 10 the importance of the integrated communication system and of the unitary coordination of interventions in disasters

The sample on which the first questionnaire was applied consisted of 138 doctors and nurses belonging to several medical centres (Târgu Mureş, Timișoara, Cluj Napoca, București). The second questionnaire was applied on 120 persons from the general population, others than doctors, nurses, policemen, firefighters, army or any other personnel belonging to different institutions or agencies involved in the rescue operations during a disaster situation.

The questionnaire was designed using the answer control techniques, applying successive questions to evaluate one single item [3].

Thus, by processing questionnaire number 1 we obtained answers to three problems:

- The level of knowledge concerning the importance of the emergency medical response in disasters;
- The level of knowledge concerning the importance of the communication systems in disasters;
- The level of knowledge concerning the importance of the integration and the unitary coordination of the interventions in disasters.

Questionnaire number 1 is presented in Table I and questionnaire number 2 in Table II.

Both questionnaires contain six questions evolving from simple to complex. Thus, we obtained data about the necessity of an integrated communication system and of a unitary coordination of interventions in disasters, from the perspective of the general public and the medical personnel.

We used data obtained from questionnaire number 1 as follows:

- The present level of knowledge concerning the efficiency of the communication system and the management of interventions in disasters was assessed using the first three questions. The validation of the questionnaires was based on the concordance of the answers to this questions.
- Questions 4 and 5 show the necessity of integration between the medical interventions and those of the firefighters and other intervening institutions.
- Question number 6 was used as a control item for the first questionnaire evaluating the validity of the previous answers.

Questionnaire number two

1. Are you satisfied with the existing emergency medical system?
 - a. Yes
 - b. No
2. Would improvements be necessary?
 - a. Yes
 - b. No
3. Are you aware about the disaster of the "Twin Towers"?
 - a. Yes
 - b. No
4. Do you think that human loss among the emergency teams could have been avoided?
 - a. Yes
 - b. No
5. If yes, in what way?
 - a. Unitary coordination of the emergency teams (doctors, firefighters, police, local authorities, experts, etc.)
 - b. Integrated communication system
 - c. No intervention because of the potential risks
 - d. The decrease of the time of response
6. Do you think that an integrated communication system could reduce the potential risks?
 - a. Yes
 - b. No

The data collected from the second questionnaire were used as follows:

- The first two questions show the level of satisfaction of the general population regarding the existing emergency system.
- Question number three shows the level of knowledge of the respondent regarding a real disaster situation ("Twin Towers"), the next questions being related to the way in which this situation was managed.
- Questions four and five refer to the way of optimizing the actions taken in order to diminish/avoid human lives losses during the interventions.
- Question six reveals the importance of an integrated communication system for a performant management, with minimum risks, of a disaster situation.

The lack of concordance between the answers to the first three questions of the first questionnaire was used as exclusion criteria. For the second questionnaire it was the lack of knowledge about the real given example.

The concordance of the answers to the questions used to evaluate the level of knowledge about the efficiency of the communication systems and of the coordination of the interventions in disasters was tested using the Friedman test.

The questions applied to determine the level of satisfaction of the general population regarding the existing emergency system were tested using the Kendall tau test, in order to calculate the "W" value.

The comparison of the mean scores from the questionnaire number one was performed using the Wilcoxon test for even data, and the difference between the proportions in questionnaire number two was obtained using the Chi square test. The chosen significance level was 0.05 [4]. GraphPad Prism 5 and SPSS Statistics 17.0. software were used for the statistical processing of data. The mean values are expressed as mean \pm standard deviation.

Table I. Mean scores questionnaire number one

Question	Mean score initial test	Mean score re-evaluation test	p value
1	6±2	9±1	p < 0.05
2	5±2	8±1	p < 0.05
3	7±2	8±2	p > 0.05
4	8±1	8±1	p > 0.05
5	8±2	8±2	p > 0.05
6	7±2	9±1	p < 0.05

Results

The concordance among the answers for the questionnaire number one was tested using the Friedman test, obtaining a p value <0.05, indicating the consistency of the answers given by each respondent individually. For questionnaire number two Kendall tau test was used, obtaining a p value <0.05.

Out of 138 questionnaires applied on doctor and nurses, ten questionnaires could not be processed because of the lack of concordance of the answers, the questionnaires being invalidated. None of the questionnaires applied on the general population were invalidated. The results obtained by applying questionnaire number one are shown in table I, while those obtained by applying questionnaire number two, in table II.

Discussions

The importance of the emergency medical care and the role of all the other institutions involved in the management of a disaster situation should be well-known by the medical personnel as well as the entire population.

For a long time most of the research work regarding the communication and the education of the medical staff emphasized the doctor – patient relation [5]. It was only recently that the crucial importance of the integrated communication among the various rescue teams involved in the emergency and disaster situations was recognized [6].

The present study shows that before the presentation of the Mobile Command Centre, the knowledge related to the emergency response system as well as to the communication systems used in disasters, among doctors and nurses (questionnaire number one) was poor, this fact being revealed by the statistically significant difference among the obtained mean scores.

The mean scores obtained by analyzing the answers to the questions related to the importance of the emergency medical care and firefighters interventions during a disaster revealed a good awareness on behalf of the respondents, the difference among the mean scores being statistically not significant.

The answers to the questions contained in the questionnaire applied to the general population revealed a dissatisfaction as well as a lack of knowledge about the existing emergency medical system. After the presentation of the Mobile Command Centre a statistically significant difference between the results of the two questionnaires was observed,

Table II. Frequences questionnaire number two

Question	Frequences initial test	Frequences re-evaluation test	p value
1	Yes – 63 (52.5% ± 8.93%) No – 57 (47.5% ± 8.93%)	Yes – 98 (81.67% ± 6.92%) No – 22 (18.33% ± 6.92%)	p < 0.05
2	Yes – 89 (52.5% ± 8.93%) No – 31 (25.83% ± 7.83%)	Yes – 24 (20% ± 7.16%) No – 96 (80% ± 7.16%)	p < 0.05
3	Yes – 120 (100%) No – 0	Yes – 120 (100%) No – 0	—
4	Yes – 33 (27.5% ± 7.99%) No – 87 (72.5% ± 7.99%)	Yes – 81 (67.5% ± 8.38%) No – 39 (32.5% ± 8.38%)	p < 0.05
5	a – 12 (36.36% ± 16.41%) b – 16 (48.48% ± 17.05%) c – 4 (12.12% ± 11.14%) d – 29 (87.88% ± 11.14%)	a – 64 (79.01% ± 8.87%) b – 78 (96.3% ± 4.11%) c – 48 (59.26% ± 10.7%) d – 46 (56.79% ± 10.79%)	p < 0.05
6	Yes – 49 (40.83% ± 8.79%) No – 71 (59.17% ± 8.79%)	Yes – 97 (80.83% ± 7.04%) No – 23 (19.17% ± 7.04%)	p < 0.05

showing an improvement of the perception of the general population regarding the emergency response system and the advantages of an integrated communication system in disasters.

Studies performed in other countries emphasises the crucial importance of a functional and efficient integrated communication system among the intervention teams [7,8].

Conclusions

The present study draws the attention upon the lack of information and knowledge regarding the emergency medical response system in disaster situations, especially related to the existence of an integrated communication system among the teams involved in the rescue activities.

However, after an appropriate informative training, an improvement of the perception regarding the indispensability of an integrated communication system, among the medical personnel and the general public, was noted.

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