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Hospital professional staff awareness of hospital plans for the provision of teams for medical support in case of disasters

Upućenost bolničkog profesionalnog osoblja u bolničke planove formiranja ekipa za medicinsko zbrinjavanje u slučaju katastrofa

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Abstract

Background/Aim. Resuscitation and surgical medical aid are the most important medical procedures in disaster relief operations. The limited time frame available for life-saving activities in such circumstances demands that resuscitation and surgical medical teams be established and trained for timely reaction and disaster medical support prior to disaster occurrence. The aim of the study was to analyze the awareness among the hospital medical staff in the Plovdiv Region of the hospital response plan in case of disaster, which concerns surgical and resuscitation team composition and tasks for disaster medical support. **Methods.** An anonymous survey, consisting of 55 questions about hospital staff awareness of the medical activities described in the hospital disaster medical support plan, was conducted between July and September 2019 among 295 hospital medical professionals in the Plovdiv Region, Bulgaria. Descriptive statistics and Pearson's χ^2 test were used in the statistical analysis of results. **Results.** The survey showed that the majority of medical staff demonstrated complete ignorance regarding the presence, number, and tasks of the specialized medical teams planned for hospital disaster response. Employees of multidisciplinary hospitals for active treatment were more familiar with the aforementioned plans than their colleagues from the university multidisciplinary hospitals. **Conclusion.** Insufficient awareness about human resources foreseen for disaster medical support negatively impacts the hospital surge capacity, leading to inadequate medical assistance in such cases. Hospital tactical disaster preparedness must be ameliorated by conducting a more rigorous training program among medical staff related to the planned hospital activities in case of disastrous events, especially for those working in emergency departments, intensive care units, and surgical departments.

Key words:
bulgaria; disaster medicine; disaster planning; medical staff, hospital; surveys and questionnaires.

Apstrakt

Uvod/Cilj. Reanimacija i hirurška medicinska pomoć su najvažnije medicinske aktivnosti u procedurama pomoći u katastrofama. Ograničeno vreme za spasavanje života u takvim okolnostima nameće potrebu da se timovi za reanimaciju i hiruršku medicinsku pomoć uspostave i obuče za pravovremeno reagovanje i medicinsku podršku u slučaju katastrofe pre nego što se katastrofa dogodi. Cilj rada bio je da se analizira upućenost bolničkog medicinskog osoblja, u regionu Plovdiva, u planove bolničkog reagovanja koji se tiču sastava hirurških i reanimacijskih timova i zadataka medicinske pomoći u slučaju katastrofe. **Metode.** Anonimna anketa, koja se sastojala od 55 pitanja i koja je trebalo da pruži informacije o tome koliko je bolničko osoblje upoznato sa medicinskim aktivnostima opisanim u bolničkim planovima medicinske podrške u slučaju katastrofe, sprovedena je od jula do septembra 2019. godine i obuhvatila je 295 medicinskih stručnjaka u bolnicama u regionu Plovdiva, u Bugarskoj. U statističkoj analizi rezultata korišćeni su deskriptivna statistika i Pearson-ov χ^2 test. **Rezultati.** Anketa je pokazala da većina medicinskog osoblja nije znala ništa u pogledu postojanja, broja i zadataka specijalizovanih medicinskih timova planiranih za bolničko reagovanje u slučaju katastrofe. Zaposleni u multidisciplinarnim bolnicama za aktivno lečenje bili su u većoj meri upoznati sa pomenutim planovima u odnosu na svoje kolege iz univerzitetskih multidisciplinarnih bolnica. **Zaključak.** Nedovoljno znanje o ljudskim resursima koji su predviđeni za pružanje medicinske pomoći u uslovima katastrofa negativno utiče na povećanje kapaciteta bolnica,

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što dovodi do neadekvatne medicinske pomoći u takvim situacijama. Taktička spremnost bolnica u slučaju katastrofa mora biti poboljšana sprovođenjem rigoroznijeg programa obuke medicinskog osoblja u vezi sa planiranim bolničkim aktivnostima u slučaju katastrofalnih događaja, posebno za one koji rade u odeljenjima hitne medicinske pomoći, jedinicama intenzivne nege i hirurškim odeljenjima.

Ključne reči:
bugarska; medicina katastrofa; katastrofe, planiranje; kadar bolnički; ankete i upitnici.

Introduction

Most disasters are characterized by severe consequences for the population due to diverse life-threatening injuries. Mechanical injuries include head and body traumas, such as closed head and brain injury, fractures of the limbs, fractures of the skull and the spine, chest fractures, and severe injuries of the chest, abdomen, and/or pelvis. Traumatized casualty management requires multidisciplinary resuscitation, intensive care, and surgical medical aid. Therefore, disaster medical response teams must be prepared to provide appropriate medical treatment for casualties, including a wide variety of resuscitative and surgical procedures [1–4].

In the occurrence of head injuries and severe injuries of the chest, abdomen, and/or pelvis, due to the urgency of required surgical procedures, disaster medical support has to provide urgent life-saving resuscitation along with surgical procedures under anesthesia. Therefore, surgeons and anesthesiologists are the main performers of medical support during the early medical response. The number of foreseen disaster surgical and resuscitation teams are key indicators for surge capacity [3, 5, 6].

In circumstances of limited time for adequate medical support in eventual disaster scenarios, effective, timely, and adequate medical assistance in such situations demands the formation of disaster support teams prior to a crisis or disaster occurrence. Proper team formation implies that the team members know each other and that they have undergone the same type and amount of theoretical and practical training [7].

The aim of the study was to analyze the awareness among hospital medical specialists in the Plovdiv Region, Bulgaria, of the concept of the hospital disaster response plan, surgical and resuscitation team composition, and tasks for disaster medical support.

Methods

An anonymous survey consisting of 55 questions was conducted in two multidisciplinary hospitals for active treatment and one university multidisciplinary hospital for active treatment between July and September 2019 among hospital medical professionals in the territory of the Plovdiv Region. For each medical specialist, the survey purpose was to self-determine the level of their awareness and medical readiness for responding in case of a disaster. The survey cards, along with brief introductions, were presented to the medical staff by an interviewer. Medical specialists who expressed willingness to participate in the study received the questionnaire and were kindly asked to fill it in a paper form.

Based on the different hospital types and their role during an eventual disaster medical support, multidisciplinary hospitals for active treatment were chosen to participate in the study. The reason for this choice was the fact that, in case of a disaster, the casualties are to be evacuated to the nearest hospital, which can provide life-saving therapeutic and surgical assistance to casualties with multiple traumas, and the chosen types of hospitals were in accordance with these prerequisites. The hospitals included in the study were: the University Multidisciplinary Hospital for Active Treatment "Plovdiv" – Plovdiv, Multidisciplinary Hospital for Active Treatment "Asenovgrad" – Asenovgrad, and Multidisciplinary Hospital for Active Treatment "Dr. Kiro Popov" – Karlovo. They were selected randomly from a list of existing hospitals in the Plovdiv Region.

Written permission to conduct the study has been sent from the hospital managers in response to application forms sent to them. Application forms with incoming numbers were sent to the directors of the following institutions: two application forms, No. B-1024, from August 6, 2019, and No. P-800, from July 6, 2019, were sent to the executive director of the University Multidisciplinary Hospital for Active Treatment "Plovdiv" – Plovdiv; request No. 1305, from July 10, 2019, was sent to the manager of the Multidisciplinary Hospital for Active Treatment "Asenovgrad" – Asenovgrad, and application form No. 748 from July 9, 2019, was sent to the manager of the Multidisciplinary Hospital for Active Treatment "Dr. Kiro Popov" – Karlovo.

A total of 310 medical specialists were surveyed, but due to incomplete and missing data on some of the survey cards, 15 participants dropped out. Therefore, the actual number of participants was ultimately 295. The number of medical professionals that participated in the study formed 8.6% of all medical personnel (general population) in the multidisciplinary hospitals for active treatment in the Plovdiv Region, and was representative in relation to the general population.

Data processing and quantitative analysis were conducted using the specialized software platform IBM® SPSS® 21.0 (IBM Corporation, Armonk, New York, USA). Descriptive statistics were used to calculate the relative percentages. Pearson's χ^2 test was applied in testing hypotheses for a statistically significant relationship between the studied factorial and performance traits. Graphic analysis was applied to illustrate processes and phenomena, certain regularities, or dependencies. Microsoft Office Excel 2013

was used for tabular and graphical analysis. The value of $p < 0.05$ was considered statistically significant for all analyses.

Results

Most of the surveyed hospital staff (n = 265, 89.8%) demonstrated complete ignorance regarding the presence of specialized medical teams in the hospital disaster response plans. Only a small part (n = 39, 15.3%) of the medical professionals knew about the planned resuscitation teams. Only 41 (13.9%) participants were informed of the number of surgical teams the hospital must provide in case of a disaster (Figure 1).

The most aware of disaster resuscitation teams were the medical personnel with medical practice between 1 and 10 years; 25 (21.7%) of them knew about their hospital plans for the required teams ($p = 0.041$, $\chi^2 = 8.24$) (Figure 2).

There was a significant statistical difference in awareness about resuscitation and surgical teams regarding the hospital type. Employees in multidisciplinary hospitals for active treatment were more knowledgeable; 29 (27.9%) of them were aware of their hospital resuscitation teams (Figure 3), while only 16 (8.4%) of their colleagues working in the university multidisciplinary hospitals for active treatment were informed about disaster plans ($p = 0.001$, $\chi^2 = 19.82$).

Similarly to their knowledge about the resuscitation teams, the medical staff was unfamiliar with the number of surgical teams planned in case of a disaster. Twenty-one (20.2%) specialists in multidisciplinary hospitals for active treatment were informed about the number of surgical teams, while 20 (10.5%) of their colleagues from the university multidisciplinary hospital for active treatment provided a positive answer (Figure 4). Although a small part of the medical staff was generally informed about the planned surgical capabilities, the difference between medical specialists working in multidisciplinary hospitals for active treatment and those working in the university multidisciplinary hospital was statistically significant ($p = 0.033$, $\chi^2 = 5.31$).

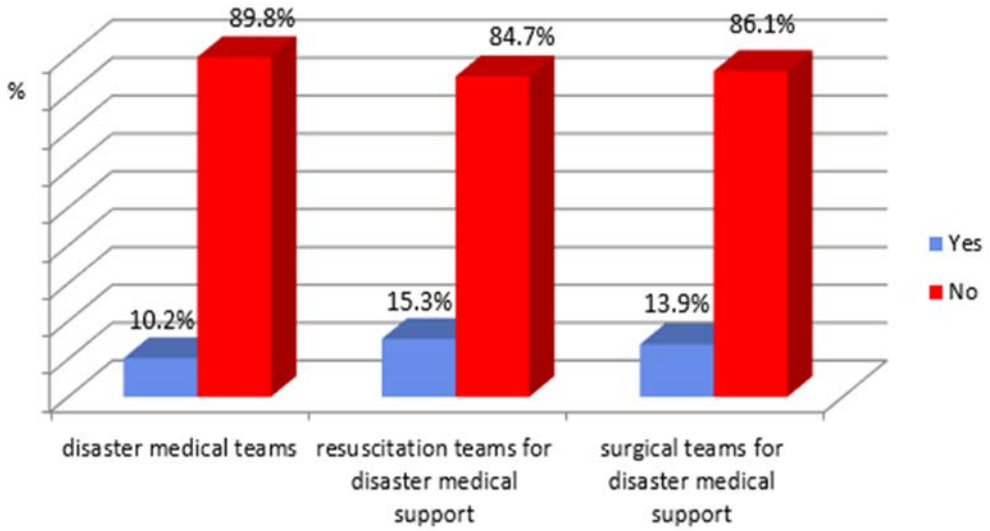

Fig. 1 – Hospital staff awareness of hospital disaster medical teams.

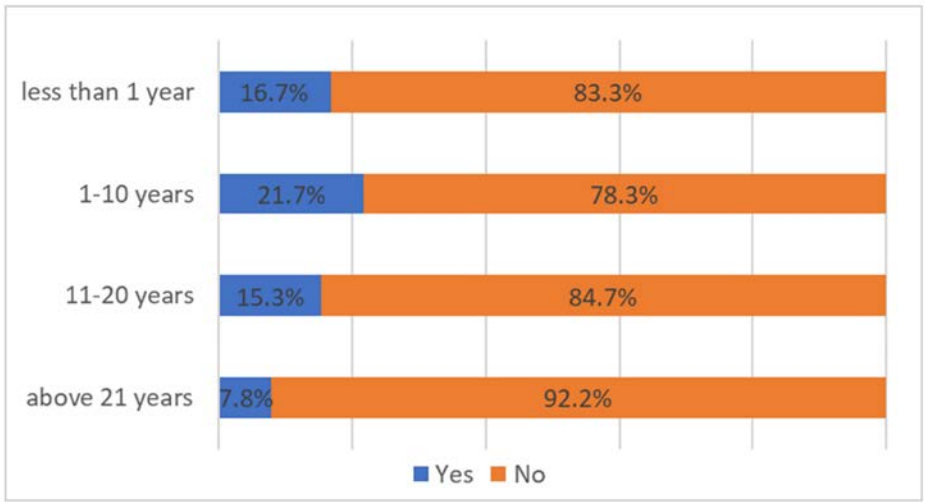

Fig. 2 – Hospital staff awareness of resuscitation teams for disaster medical support depending on duration of employment.

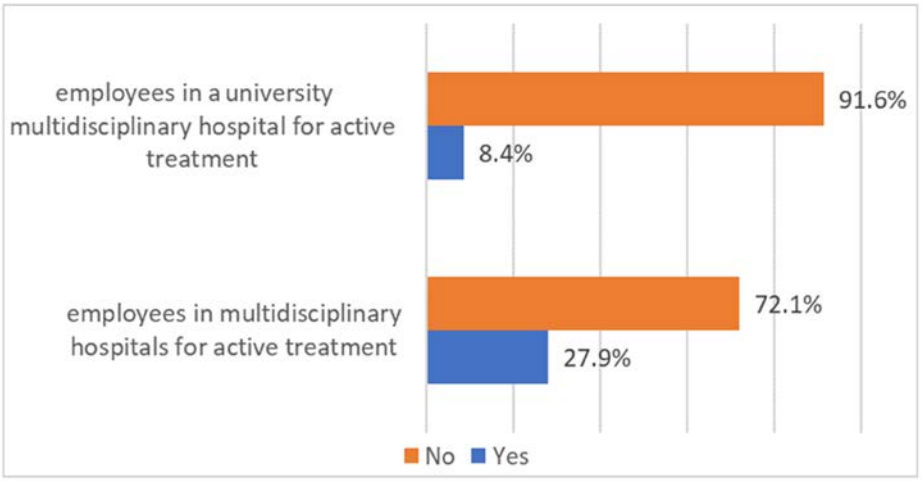

Fig. 3 – Hospital staff awareness of resuscitation teams for disaster medical support depending on the workplace.

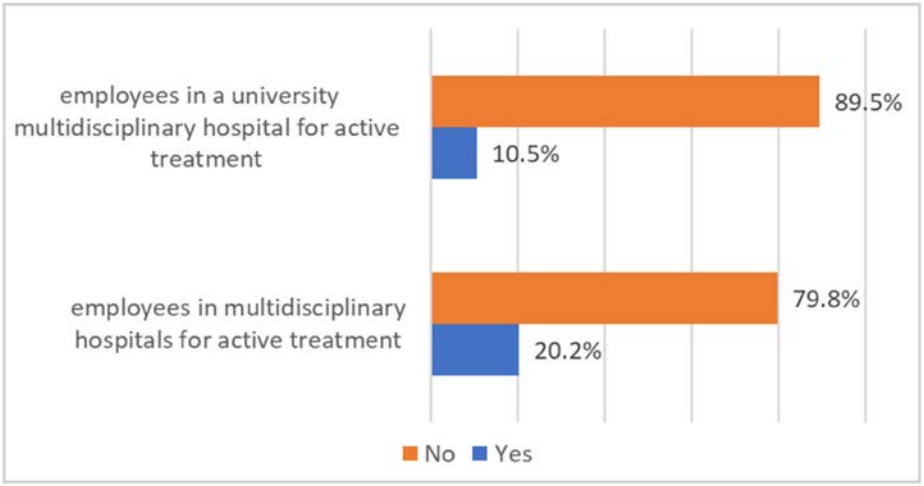

Fig. 4 – Hospital staff awareness of surgical teams for disaster medical support depending on the workplace.

Discussion

As the hospitals are the final stage of medical support in case of a disaster, it is necessary for them to be prepared to act adequately and promptly to save as many casualties as possible. Due to the nature of disasters and the limited time available to attend to the casualties, disaster planning of medical means and capabilities is required. Good preparedness presupposes preliminary organization of the number and the type of medical teams the hospital may provide in case of a disaster [8–11]. Most of the hospital personnel have shown complete ignorance regarding the presence of specialized medical teams, as well as the number of surgical and resuscitation teams planned in the hospital disaster medical plan, even though all of this was provided in the plan of the hospital they have worked in. Poor awareness of medical staff for disaster response negatively affects surge capacity. The main hospital medical teams required in case of a disaster caused by overpressure and/or a blast wave are surgical and resuscitation teams, as most casualties would require surgical intervention, necessitating the use of anesthesia [7, 12]. Most of the medical staff was not familiar with the number of surgical teams planned in case of a disaster, even though in two of the hospitals where the study was conducted, the disaster medical support plan indicated the formation of one main surgical team and one spare team. Although generally only a small part of the medical staff of the region was informed about the planned surgical capabilities, the medical specialists working in multidisciplinary hospitals for active treatment were more familiar than the ones in the university multidisciplinary hospitals. Similar results regarding awareness related to the preparedness of providing surgical teams in disaster circumstances were found in other studies [13]. Insufficient awareness suggests insufficient medical staff disaster preparedness.

Except for administering anesthesia, anesthesiologists would also perform other medical procedures necessary for disaster medical support, as they have more experience and skills than their colleagues from other medical specialties in the following fields: airway management, intravenous catheterization, resuscitation, trauma, and critically ill

patient management, analgesia, administration of antidotes/medications and performing transfusion protocols. In case of a disaster, anesthesiologists may be assigned to emergency departments where they could perform triage, assist their colleagues in airway management, obtain vascular access, perform cardiopulmonary resuscitation, and treat those affected by chemical or biological agents. If casualties with complications such as acute renal failure, shock, disseminated intravascular coagulopathy, or rhabdomyolysis were present, then anesthesiologists in coordination with anesthesiology nurses would treat these casualties in intensive care units. That is why it is necessary to plan both main and additional resuscitation teams in case of a disaster. An additional anesthesia team would provide additional help when/if needed, replace the main team, and provide breaks for anesthesiologists of the main team, working 24 to 48 hrs (two days approximately) [13–15].

The hospitals participating in the study have also planned the use of one main and one additional resuscitation team in case of a disaster scenario; the number of resuscitation teams was described in the plans of both hospitals, but the medical specialists did not know about them. The low awareness level about the planned disaster resuscitation teams is worrying. Inadequate knowledge about the human resources that would be recruited to treat casualties in an eventual disaster can lead to inadequate medical support.

The medical staff with working experience between 1 and 10 years was the most informed about resuscitation teams compared to the rest of the employees, but even their level of knowledge was disturbing. The low awareness of medical professionals with working experience of under one year can be explained by their recent appointment to the job. However, the other medical specialists have had long enough medical practice in the institutions they worked in to get familiar with the disaster medical support plans of the hospital and to have participated in the creation of the plans. Their lack of awareness is unacceptable because well-trained personnel are a prerequisite for efficient hospital disaster preparedness. The interviewed medical staff could not be classified as well-trained.

Conclusion

The low level of awareness about the planned medical teams for disaster medical support is disturbing. Insufficient awareness about human resources to be used in disaster medical support is a prerequisite for inadequate medical provision and negatively impacts surge capacity. Surge capacity can be improved by ensuring adequately trained medical specialists. Medical personnel should undergo a rigorous training program and tabletop exercise, especially the ones working in emergency departments, intensive care units, and surgical departments, at least twice a year to increase the hospital's tactical disaster preparedness.

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