

## EXPERT ASSESSMENT OF SIGNIFICANCE OF ON-SITE FORM OF MEDICAL REHABILITATION OF RESCUERS IN EMERGENCY ZONE

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**Abstract.** The purpose of the study is to analyze and summarize the results of an expert assessment of the goals, needs, ways and methods of medical rehabilitation of rescuers in the emergency zone to preserve and maintain their professional health and high performance during emergency rescue operations.

*Materials and methods of research.* The study was conducted by interviewing of 248 specialists of the All-Russian service for disaster medicine (VSMC) using three questionnaires developed by the author. The questionnaires included questions on the possibility of using and expediency of the field form of medical rehabilitation of rescuers in the emergency zone, the need for additional preparation and professional training of specialists of field teams, as well as the expected effectiveness of this form of work.

The results of the research were analyzed using the STATISTICA V.8.0 application software package.

*Research results and their analysis.* The provisions are formulated as based on the results of processing expert opinions on the possibility, significance and expediency of using modern technologies of medical rehabilitation in the emergency zone, the need to change the professional training of specialists in the field of medical rehabilitation and additional training of specialists of field teams working in the emergency zone.

**Key words:** emergency rescue formations, emergency situation, emergency zone, expert assessment, medical rehabilitation, mobile teams of medical rehabilitation, predictive modeling, questionnaires, rescuers

**Conflict of interest.** The authors declare no conflict of interest

**For citation:** Budnikova L.N. Expert Assessment of Significance of On-Site Form of Medical Rehabilitation of Rescuers in Emergency Zone. *Meditsina Katastrof = Disaster Medicine.* 2020; 4: 33–37 (In Russ.).  
<https://doi.org/10.33266/2070-1004-2020-4-33-37>

## ЭКСПЕРТНАЯ ОЦЕНКА ЗНАЧИМОСТИ ВЫЕЗДНОЙ ФОРМЫ ПРОВЕДЕНИЯ МЕДИЦИНСКОЙ РЕАБИЛИТАЦИИ СПАСАТЕЛЕЙ В ЗОНЕ ЧРЕЗВЫЧАЙНОЙ СИТУАЦИИ

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**Резюме.** Цель исследования – проанализировать и обобщить результаты экспертной оценки целей, потребности, путей и методов медицинской реабилитации спасателей в зоне чрезвычайной ситуации (ЧС) для сохранения и поддержания их профессионального здоровья и высокой работоспособности в ходе проведения аварийно-спасательных работ.

*Материалы и методы исследования.* Исследование проводилось путем анкетирования 248 специалистов Всероссийской службы медицины катастроф (ВСМК) с использованием трех анкет, разработанных автором. Анкеты содержали вопросы о возможности применения и целесообразности выездной формы проведения медицинской реабилитации спасателей в зоне ЧС, необходимости дополнительной профессиональной подготовки и обучения специалистов выездных бригад, а также об ожидаемой эффективности такой формы работы. Кроме того, выяснялось мнение экспертов о факторах, существенно влияющих на эффективность медицинской реабилитации в условиях ЧС.

Результаты проведенного исследования анализировались с использованием пакета прикладных программ СТАТИСТИКА v.8.0.

*Результаты исследования и их анализ.* По результатам обработки экспертных заключений сформулированы положения о возможности, значимости и целесообразности применения современных технологий медицинской реабилитации в зоне ЧС, необходимости изменения профессиональной подготовки специалистов в области медицинской реабилитации и дополнительного обучения специалистов выездных бригад, работающих в зоне ЧС.

**Ключевые слова:** аварийно-спасательные формирования, анкеты, выездные бригады медицинской реабилитации, зона чрезвычайной ситуации, медицинская реабилитация, прогностическое моделирование, спасатели, чрезвычайные ситуации, экспертная оценка

**Конфликт интересов.** Авторы статьи подтверждают отсутствие конфликта интересов

**Для цитирования:** Будникова Л.Н. Экспертная оценка значимости выездной формы проведения медицинской реабилитации спасателей в зоне чрезвычайной ситуации // Медицина катастроф. 2020. №4. С. 33–37. <https://doi.org/10.33266/2070-1004-2020-4-33-37>

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Currently, in Russia and worldwide, there is an increase in the number of natural and man-made emergencies (ChS) as well as in the severity of their medical and sanitary consequences [1]. The possibilities of countering potential threats, especially in the technogenic sphere, where anthropogenic risks are higher, turned out to be limited. The human factor is the main reason for that [2]. Elimination of the emergencies' consequences is the task for emergency rescue units (ASF), who carry out rescue operations in emergency zones (foci) [3–6].

ASF include rescue, medical, fire-fighting, engineering, technical, automobile formations, as well as intelligence, radiation and chemical monitoring, radiation and chemical protection, communications, mechanization of work, public order and other formations.

Elimination of emergencies' consequences is associated with physical and psycho-emotional distress among participating specialists [3–6].

Rescuers who get a temporary or a persistent health disorder or a disorder of psycho-emotional state, a decrease or a loss of professional working capacity in accordance with the Decree of the Government of the Russian Federation "On the procedure for free medical rehabilitation of rescuers in the Russian Federation" dated October 31, 1996 No. 1312 are sent for medical rehabilitation. Specialists of the All-Russian Center for Disaster Medicine "Zashchita" (VTsMK "Zashchita") of the FMBA of Russia have accumulated a great deal of practical material on the use of medical rehabilitation programs for participants in the elimination of the consequences of emergencies, rescuers and full-time specialists of mobile medical units [5, 7-9].

Development of the activities of the All-Russian Service for Disaster Medicine (VSMC) is closely related to the development and implementation of effective methods, forms, means of prevention, diagnostics and medical rehabilitation of the ASF personnel. Analysis of the literature on the organization of medical rehabilitation of participants in the elimination of the consequences of emergencies shows that there are no specialized recovery and rehabilitation programs for rescuers in ChS. [8-13]. In scientific works the issue of organizing medical rehabilitation of rescuers in the emergency zone has not been sufficiently developed. There are no regulatory and no methodological documents on the procedure for carrying out rehabilitation and recovery measures in an emergency zone using an individual differentiated approach to choosing of medical technology. There, the strategy and tactics of using therapeutic physical factors in the complex of rehabilitation measures has a number of

specific features and is based on taking into account the character of activities of this contingent, adverse external physical, chemical and environmental impacts in the emergency zone as well as emotional and physical overstrain [3, 8, 9, 14, 15].

An important role in solving existing problems can be played by the VSMC experts, who are engaged in scientific and practical aspects of rehabilitation and recovery maintaining the professional health of rescuers. The method of expert assessments is actively used in the analysis of the most significant aspects of various problems, especially in situations where their interpretations are controversial or there is a lack of certainty in their understanding [16].

**The purpose of the study** is to analyze and to summarize the results of an expert assessment of the need, feasibility and possibility of carrying out medical rehabilitation of rescuers in the emergency zone, as well as to explore the opinion of experts on the expected results of this work and on the need for additional professional training and education of specialists of mobile medical rehabilitation teams (VBMR).

**Materials and research methods.** The study was carried out by questioning VSMC specialists using questionnaires and instructions, developed by the author. The first questionnaire contained questions concerning various aspects of the expediency of the on-site medical rehabilitation of rescuers in the emergency zone, as well as of the expediency of training and education of on-site teams specialists, as well as of the expected effectiveness of this form of work. The questionnaire included 10 questions. The experts were asked to choose one of three answers: "yes", "no", "I find it difficult to answer." The second questionnaire was aimed at obtaining expert opinion on the factors that significantly affect the effectiveness of medical rehabilitation in emergencies. The experts were asked to select 10 out of 18 statements, which, in their opinion, are the most important. The third questionnaire was focused on the possibility of using 10 modern technologies of medical rehabilitation in the emergency zone – the experts were asked to evaluate each of the proposed technologies on a five-point scale – from 1 to 5. Most of experts (60%) personally took part in eliminating the consequences of emergencies. The following categories took part in the research: heads of the territorial centers of disaster medicine (TCMC) – 7%; healthcare organizers – 24; employees of VTsMK "Zashchita" – 19; chief doctors of leading medical institutions – 8; heads of departments and doctors – specialists of city clinical hospitals (GKB) – 25; psychologists of the Center for Emergency Psychological Aid (CEPP) of EMERCOM of Russia – 17%.

The set of requirements (professional competencies), on the basis of which the selection of experts in the studied area was carried out, included work in the structures of the Ministry of Emergency Situations of Russia and of the Disaster Medicine Service (VsMC), it took into account the primary processing of their personal data, work experience, academic degree and academic title, as well as their ability to clearly formulate the essence of a particular problem. The share of experts with 10 to 25 years of experience was 43%, with a doctorate or a candidate of sciences degree – 5 and 7%, respectively. The survey included 248 specialists working in the structures of the Ministry of Emergency Situations of Russia and of the Disaster Medicine Service, which was of great importance for the development of a scientifically grounded methodological approach to determining the need of rescuers for medical rehabilitation in an emergency. The consistency of the experts' judgments was assessed using the chi-square test.

The results of the studies were analyzed using the STATISTIKA v.8.0 application package.

**Research results and their analysis.** A Questionnaire No. 1, concerning various aspects of the expediency of the on-site medical rehabilitation of rescuers in the emergency zone, the professional training and education of specialists of the on-site teams, as well as the expected effectiveness of this form of medical rehabilitation, included the following questions:

1. Do you read the Disaster Medicine magazine and the articles on the medical rehabilitation of rescuers?

2. Do you agree that medical rehabilitation of rescuers in an emergency is aimed at the earliest possible restoration of impaired body functions and at an early return to professional activity?

3. Do you think that within the framework of the provision of primary health care, medical rehabilitation of rescuers in an emergency situation can be carried out in an on-site form?

4. What do you think, is the mobile medical rehabilitation team the most promising form for the implementation of a systematic approach to medical rehabilitation of rescuers in (during) an emergency?

5. Do you think that an organizational and staff structure of the mobile medical rehabilitation team should be determined taking into account the predictive model of the development of an emergency?

6. Do you think that specialists of the field medical rehabilitation team need to undergo advanced training on the organization and methods of rehabilitation of the appropriate profile?

7. Do you consider it necessary to develop individual programs for medical rehabilitation of rescuers based on methods of restorative treatment in an emergency?

8. In your opinion, can timely recovery measures maintain high efficiency and proper professional reliability of rescuers during the liquidation of the consequences of an emergency?

9. Do you think that the implementation of a well-grounded and well-developed system of medical rehabilitation of rescuers in an emergency will help them to take important decisions to eliminate the consequences of an emergency?

10. What prospects do you see in a further development of medical and professional rehabilitation of rescuers in an emergency situation? (The question is optional)

The first and the tenth questions of the questionnaire were of informational nature and were asked in conformity with the

methodological rules of social research. The answer to the first question showed that the survey participants were aware of the existing problems of the VSMC, and the final one allowed them to express their opinion on a further development of medical and professional rehabilitation of rescuers in an emergency.

Таблица/Table

**Частота встречаемости ответов «да», «нет», «затрудняюсь ответить» на вопросы Анкеты №1, %**  
Frequency of responses "Yes", "No", "I wouldn't know" to questions of Questionnaire #1

Вопрос Question	Ответ/Answer		
	да/yes	нет/no	затрудняюсь ответить I wouldn't know
1	44,4	55,6	0,0
2	96,9	3,1	0,0
3	87,6	12,4	0,0
4	75,9	24,0	0,0
5	77,8	22,2	0,0
6	96,3	3,7	0,0
7	88,5	11,5	0,0
8	94,5	5,5	0,0
9	83,64	16,4	0,0
В среднем On average	82,8	17,2	0,0

As follows from the data in the table, the answer to most of the questions in the questionnaire was "Yes" (82.8%). On the whole, the experts were unanimous in assessing prospects and importance of the on-site medical rehabilitation of rescuers in the emergency zone, of mandatory additional professional training of field teams and of formation of their organizational and staff structure, taking into account the prognostic model of emergencies development. Major part of them agreed that this would contribute to an early restoration of impaired body functions and to a quick return to professional activity, that this would support high efficiency and proper professional reliability of rescuers during rescue operations and elimination of emergency consequences.

In Questionnaire No. 2, the experts were asked to select 10 provisions that correspond to the condition "The effectiveness of medical rehabilitation of rescuers in an emergency depends on ...": As can be seen in Fig. 1, 85.2% of experts ranked 1st the qualification and work experience of medical specialists working in field medical rehabilitation teams (answer 7); 2nd – 83.7% – the timeliness of recovery measures taken (answer 2); third – 71.4% – personalization of rehabilitation measures (answer 9). The remaining 7 ranks were distributed as follows: 4th – individual approach to rehabilitation measures (answer 1 – 71.4% of experts). 5th – tactics and strategy of using physical and psychological methods of rehabilitation (answer 8 – 67.9%). 6th – availability of all known (in Russia and abroad) means and methods of restorative treatment (answer 18 – 67.3%). 7th – the algorithm for organizing rehabilitation measures (answer 5 – 62.8%). 8th – adaptive abilities of the rescuers' body (answer 15 – 62.8%). 9th – responsiveness of the medical rehabilitation field team (answer 3 – 61.7%). 10th – field rehabilitation team's cohesion, unity in understanding of the goals, objectives, motives and ways of performing joint activities (answer 12 – 57.1% of experts).

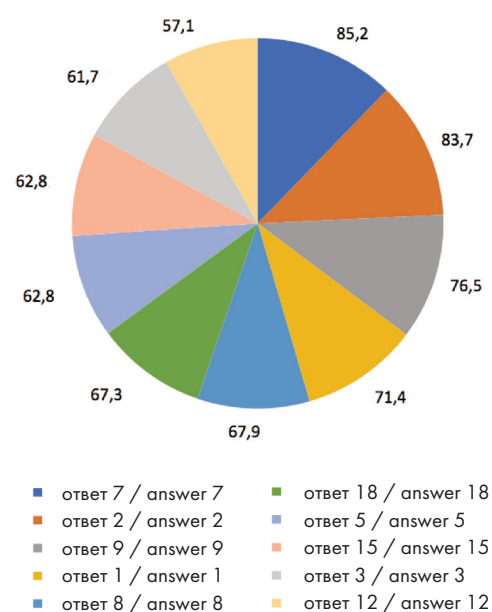
Thus, the expert assessment of the factors affecting the effectiveness of medical rehabilitation of rescuers in emergencies confirmed the general requirements for the methodological approaches previously described in the scientific literature: consistency, timeliness, continuity, efficiency, differentiated approach and a prognostic model of emergencies development.

The purpose of questionnaire # 3 was to identify the most promising medical rehabilitation technologies for possible use in emergencies. The respondents were asked to rate the following 10 technologies using points from 1 to 5 (5 is the maximum score): 1) Conscious behavior of an individual to overcome stress – coping behavior. 2) Self-regulation by controlling breathing and muscle tone. 3) Pharmacological correction with phytopreparations, biologically active additives and vitamins. 4) Natural healing factors – climatotherapy, hydrotherapy, mud therapy, etc. 5) Therapeutic physical training – general strengthening and special exercises for tension and relaxation of body muscles, physiotherapy. 6) Therapeutic massage – Su-Jok, by acupuncture points, by zones. 7) Physiotherapy using modern portable equipment. 8) Art therapy – fine art, musical art, musical color exposure, etc. 9) Preventive health-improving measures – increasing non-specific immunobiological resistance. 10) Relaxation for stress relief – audio meditation, body-oriented therapy, prayer, yoga, etc.

Fig. 2 presents medical technologies of rehabilitation, ranked in order of decreasing their preference for use in emergency situations. When ranking, the assessments were combined into groups of high (4–5 points), medium (3 points), and low (1–2 points) importance.

### Conclusion

As follows from the above data, the experts gave the greatest preference to technologies related to coping behavior –



**Рис. 1.** Ведущие факторы, влияющие на эффективность медицинской реабилитации спасателей в условиях ЧС, %  
**Fig. 1.** Leading factors affecting the effectiveness of medical rehabilitation of rescuers in emergency environment, %

77% of high rankings; general strengthening and special exercises for tension and relaxation of body muscles – 71 and pharmacological correction with phytopreparations, dietary supplements and vitamins – 68% of high rankings. Therapeutic massage, physiotherapy using modern portable equipment and preventive health-improving measures are of equal importance – 65, 64 and 63% of the highest rankings, respectively. Art therapy received the highest number of low rankings (44%).

All methods of medical rehabilitation assessed by the experts can be used in practice if there is a supportive regulatory and methodological framework available.

The results of the study suppose the following directions for further improvement of the system of medical rehabilitation of rescuers:

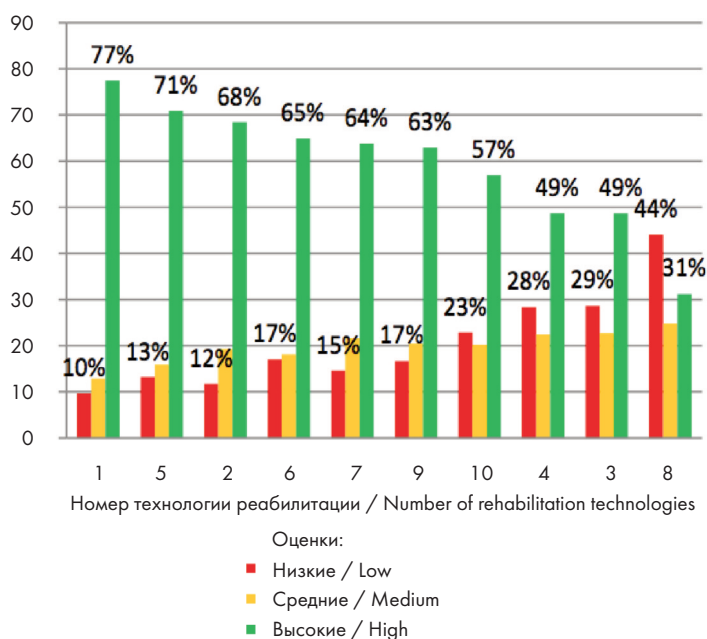
1. Development of organizational and staff structure and regulatory and methodological framework to support the work of field medical rehabilitation teams, taking into account the prognostic model of emergencies development.

2. Inclusion of mobile medical rehabilitation teams of rescuers in the mobile medical units of the All-Russian Service for Disaster Medicine.

3. Carrying out additional professional training / re-training of specialists.

4. Development and introduction of new rehabilitative medical technologies into activities of institutions and units of the VSMC. The technologies should be usable by all the AMF participants when working in the emergency zone.

5. Development and introduction of methodological recommendations on the use of modern non-contact methods of operational assessment of psychophysiological status and health status with monitoring of the effectiveness of the applied methods of medical rehabilitation into activities of institutions and formations of the VSMC.



**Рис. 2.** Медицинские технологии реабилитации, ранжированные в порядке снижения их предпочтительности при использовании в условиях ЧС, %  
**Fig. 2.** Medical rehabilitation technologies ranked in order of expediency of their use in emergency environment, %



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Материал поступил в редакцию 19.08.20; статья поступила после рецензирования 23.11.20; принята к публикации 30.11.20

The material was received 19.08.20; the article after peer review procedure 23.11.20; the Editorial Board accepts the article for publication 30.11.20