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New approaches towards organization and implementation of antiepidemic measures in emergency

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Numerous ecological, socioeconomic and medical problems occur in result of natural disasters; hygienic and epidemiological problems, which are fraught with "explosive charge", take an important part by the scales and significance. Such a situation is a consequence of various factors, in particular, the total character of emergency, disorganization of social structures, intense migration processes, disorder of ecosystem, etc. All these factors create favorable conditions for occurrence and spread of infectious diseases and food poisonings [2,4,5,8].

At the same time, in Armenia the situation after the disastrous Spitak earthquake of 1988 significantly differed from other earthquakes by its numerous manifestations, as compared with other earthquakes and natural calamities. The cause for such a situation was the following circumstance: in Armenia (like nowhere else) the disastrous situation resulting from the earthquake was interrelated with other powerful factors such as war-time, communicational, energetic and economic blockade of the country, which undoubtedly worsened and complicated the situation [6-8, 11].

The history and experience of mankind show that no country in the world has managed to do its best to minimize the consequences of major catastrophes. In order to prevent serious after-effects or, at least, to limit their scales in case of possible disasters in future, there is a definite urgent necessity to study thoroughly and comprehensively analyze the experience obtained in the zone of Armenia earthquake, taking into account the above mentioned peculiarities, which brought forth worsening of the situation in the country after the earthquake [3, 10, 12].

After the December 1988 Spitak earthquake in the zone of calamity there was created a complex situation, the complexity of which was determined by sanitary hygienic parameters: abrupt worsening of usual life-conditions of thousands of people, their accumulation in unadjusted temporary dwellings without elementary hygienic means, when the water supply, sewerage system, catering and consumer services, trade units were out of order. There were observed piles heaped all over, numerous human and animal corpses, total antisanitary state, high atmospheric dust level and intense environmental pollution. This is the list of the characteristic conditions and factors which altogether defined the sanitary hygienic situation [9-15].

As it was demonstrated by our experience in arranging the activity of State bodies and entities of sanitary epidemiological service in the zone of disaster, chief officials and experts constantly faced to complex, earlier unknown situations, which frequently required reconsideration of known norms, standards and approaches [6, 13].

Liquidation of the earthquake consequences in order to prevent the emergence of epidemic outbursts and food poisonings has multilateral aspects (prevention of intestinal, managable, especially dangerous infections, influenza, etc.) [8, 10]. Obviously, it is impossible to include the data on all results of overall activity in one paper, therefore we should emphasize certain aspects dealing with prevention of some leading infections' emergence and their epidemic complications.

The implementation of this task was hindered by a number of circumstances, in particular, by the fact that in order to provide appropriate food supplies and nutrition, including hot meal for the general population, there were functioning numerous temporary entities, at which the services were frequently rendered by non-professionals, i.e. by those who had no experience in this sphere. These individuals were neither examined by the medical board, nor obtained any permission issued by the State bodies of sanitary epidemiological service [11, 12]. In Leninakan (Gyumri) there were functioning 143 such entities, including 70 units of catering, 64 units of trade, 9 units of food industry. In emergency conditions the bodies of sanitary epidemiological service carried out endeavors on arranging activity of these objects, their pasportization, and issuing recommendations to ensure hygienic order and safety. First-order recommendation was made and implemented: to deliver hot meal using exceptionaly single-purpose utensils. The requirements included also a guarantee for

the supplies of cold and hot water, as well as refrigerating facilities at functioning entities.

Under hard conditions of the extreme situation the State Sanitary Supervision reported daily about the progress obtained and got new tasks to act in accordance with stricter requirements, despite the opinion of numerous party leaders, representatives of local authorities, who considered such severe approach inappropriate. In particular, during the first months after the earthquake 65 entities were closed and 41 people were dismissed [10, 12]. In Leninakan (Gyumri) 39 persons were fined for unsatisfactory state of the entities; 39 such entities/facilities were sealed and 12 persons dismissed. To ensure legal basis Temporarily Sanitary Rules were extraordinarily developed and implemented for proper exploitation of entities of catering, trade and food industry. The requirement was implemented to perform medical examinations of individuals engaged in this sphere at least once a month. The laboratory bacteriological control was strengthened as well, as the control for Escherichia coli [11].

During the period of activity, 9050 samples were taken from these entities; the number of positive ones made 1805 (20%). In Spitak the analyses revealed that positive cases of wash-off liquid from dishes made 10,6%; wash-offs from tables 44%, while those from the hands of the personnel were positive in 5% of cases, thus confirming once again that the strict position of the bodies of State Sanitary Supervision was appropriate [12].

To prevent the danger of water-borne (intestinal) infections as an emergency measure, the destroyed and damaged water-supply systems were firstly switched off. Sanitary epidemiological teams (brigades) visited the inhabited areas, the camps of emergency workers, etc. General population was informed about the existing threat of transmission of infections through water. The practice to render information by means of megaphones proved to be efficient; later on when the radio broadcasting system worked anew the information campaign continued via the local radio. A great number of precautionary leaflets were spread among the population and emergency workers, warning not to use unboiled drinking water. Recommendations were given to prevent spreading of diseases. In particular, general population and emergency workers were insistently recommended to use even the examined water only after boiling [8, 12].

The decision was made to use bottled mineral water for general water use, as it was entirely substantiated from the hygienic and epidemiological point of view. Mineral water was brought to the zone of disaster from other towns and regions and distributed immediately in the streets, at temporary dwellings, etc. For the first days this action was appropriate and even life-saving, though it was impossible to solve the problem only by means of mineral water, especially for a long time. Therefore, new additional measures were taken, in particular, to use earlier abandoned low-efficacy water-supply sources, for which there had been no necessity before the disaster due to the presence of powerful centralized water-supply system. From these small wells water was taken for use only after a thorough laboratory examination and appropriate permission from the State sanitary inspection bodies [7-8].

Good-quality drinking water deficiency was overcome by water brought from outside the earthquake zone in tanks. For entire guarantee laboratory checks were done and chlorination of water at special control sites was guarded by military troops. Cisterns with water were allowed to enter the zone of disaster only after these measures. Examination and chlorination were performed by the personnel of the State Sanitary Epidemiological Supervision. For chlorination 5g dry substance was taken per $1m^3$ of water; exposure time was 30 minutes. All tankers involved in drinking water supply were passportized and the drivers underwent obligatory medical examination and got appropriate instructions [10, 11].

Taking into account the high risk level of intestinal infections, other preventive measures were also taken. In particular, phage-mediated prevention (phage-prophylaxis) was exercised by means of typhus, disinteria, and salmonella phages [8-9]. Large-scale application of this specific prevention was applied by us for the first time in the zone of the earthquake. It was known before the disaster that the above-mentioned phages were officially recommended for limited use only within the range of the focus of infection in individuals having contact with sick people. In the earthquake zone an extraordinary decision was taken to implement mass application of the mentioned phages. As a result 400 000 individuals were exposed to phage-prophylaxis. This cohort involved general population, emergency workers, and military troops. The decision to simultaneously apply all the above-mentioned complex measures for fight against and prevention of intestinal infections turned to be substantiated, and the actions taken proved to be efficient.

Due to the targeted implementation of the entire complex of sanitary hygienic and anti-epidemiological measures neither outbursts of water-borne infectious diseases nor food poisonings were registered in the zone of disaster. Moreover, in both urban and rural regions of the earthquake zone the disease prevalence in concern of such infections as typhus, paratyphoid, salmonellosis, hepatitis, etc. was registered at lower levels as compared with the previous years (before the earthquake).

The epidemiological analysis demonstrated that before the earthquake Sanitary and Epidemiological Service of the Ministry of Health of Armenia had performed an activity in order to create protection required in population concerning a number of "manageable" infections. However, the analysis of the scientific publications available showed, that the situation of emergency and serious negative factors can affect unfavourably the immunity, bringing forth its weekness and "break-through" [1,6]. The a.m. negative factors include mass cumulation and migration of

population, especially the refugees from Azerbaijan, causing an unfavourable background for the epidemic complications.

In the zone of disaster and some regions of Armenia the mass vaccinal prevention was carried out in two stages against diphtheria, tetanus, pertussis, to increase the protection of the population, as well as to avoid the epidemiologic complications. The coverage was 91,8% (first stage) and 95% (second one). The repeated vaccinal prophilaxis was performed in concern of poliomyelitis as well.

After the second stage serologic analyses revealed high tension of the immunity in respect of the a.m. infections in the population of cities and regions of the disaster zone. The efffectiveness of measures performed was demonstrated by the absence of morbidity in vaccinated communities [7-9].

It is well-known that the disasters, including the earthquakes, are fraught with ecologic and epidemiologic complications, the infectious diseases amongst them frequently having a character of epidemic outbursts.Among the infectious diseases the most "vulnerable" ones are grippe and acute respiratory viral infections, which are counted as classic "unmanageable" infections, as the means of specific prophylaxis against these infections never bring to the desired effect. In the zone of the earthquake there existed all conditions for the emergence of the a.m. infections: overcrowded temporary adjusted shelters, garages, basements, tents, etc. without the elementary hygienic facilities on the background of unfavourable winter conditions [2-4, 7, 15].

In order to obtain an expressed and reliable effect (without the purpose of mass prophylaxis) we used Remantadine and Interferon, the medications applied before only as means of treatment and personal prophylaxis of grippe. More than 250.000 individuals were subject to mass prophylaxis (183.000 with Remantadine and 70.000 with Interferon, given to children and elderly people). Polyvitamines were distributed concomittantly to 200.000 people.

The efficiency of the measures performed were above doubt. No epidemic outbursts of grippe and acute respiratory viral infections were registered in the disaster zone [7-8, 10]. The morbidity with these infections in different areas (cities of Leninakan and Kirovakan) decreased from 2 to 6 fold, as compared to previous 3 years.

As a conclusion it is necessary to mention that the experience gained in organization of the sanitary epidemiological service in the earthquake zone and the results obtained are summarized and would serve as a background for the system, which we are currently developing in order to ensure sanitary hygienic and antiepidemiological safety of general population in case of natural disasters and mass catastrophes.

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Արտակարգ իրավիճակներում կանխարգելիչ եւ հակահամաճարակային միջոցառումների կազմակերպման եւ անցկացման նոր մոտեցումների մասին

Ա.Խ. Մայրապետյան

Տարերային աղետների և մասնավորապես երկրաշարժերի ժամանակ առաջացող բաղմաթիվ էկոլոգիական, սոցիալ-տնտեսական և առողջապահական խնդիրների շարքում առաջատար տեղ են գրավում հիգիենիկ և համաճարակաբանական պրոբլեմները, որոնք բարենպաստ պայմաններ են ստեղծում ինֆեկցիոն հիվանդությունների համաճարակային բռնկումների համար:

1988 թվականի Հայաստանյան երկրաշարժի ժամանակ նման համաճարակային բարդություններ չարձանագրվեցին, քանի որ շատ հեղինակավոր մասնագետների վկայությամբ՝ աղետի գոտում ճիշտ և նպատակասլաց կազմակերպվեցին և անցկացվեցին կանխարգելիչ և հակահամաճարակային աշխատանքները:

Իրականացված միջոցառումների բարձր արդյունավետության մասին է վկայում այն, որ երկրաշարժի գոտում և հանրապետությունում աղետից հետո և հետագա տարիներին չարձանագրվեցին ինֆեկցիոն հիվանդությունների բռնկումներ, ավելին՝ մի շարք առաջատար ինֆեկցիաների գծով գրանցվեց ավելի ցածր հիվանդացություն՝ երկրաշարժին նախորդող տարիների համեմատությամբ:

Նոր մոտեցումների կիրառման փորձը և արդյունքները թույլ են տալիս առաջարկել դրանց ներդրումն ու օգտագործումը հետագայում արտակարգ իրավիճակների դեպքում ինչպես Հայաստանում, այնպես էլ այլ տարածաշրջաններում, հաշվի առնելով, որ մինչև այժմ հակահամաճարակային պրակտիկայում նման համակարգ մշակված և ներդրված չէ:

О новых подходах организации и проведения профилактических и противоэпидемических мероприятий в экстремальных условиях

А.Х. Майрапетян

Вследствие стихийных бедствий, в частности землетрясений, возникает множество экологических, социально-экономических и медицинских проблем, среди которых по значимости ведущее место занимают гигиенические и эпидемиологические проблемы, т.к. в результате одновременного влияния многочисленных мощных отрицательных факторов создаются благоприятные условия для возникновения эпидемических вспышек, распространения инфекционных заболеваний.

Во время землетрясения 1988 года в Армении таких эпидемических последствий не было отмечено, по мнению ведущих специалистов, благодаря правильной и целенаправленной работе органов здравоохранения и других служб.

Подтверждением эффективности новых принципов работы явилось то, что в зоне бедствия и в республике в целом в последующие годы не регистрировались вспышки вышеуказанных инфекций, более того заболеваемость по сравнению с периодом, предшествовавшим землетрясению, была ниже.

Полученные нами результаты новых тактических и организационных форм позволяют внедрить и использовать их в дальнейшем при возникновении чрезвычайных ситуаций не только в Армении, но и в других регионах с учетом того факта, что до сих пор в противоэпидемической практике подобной разработанной и внедренной системы нет.

References

1. *Азнаурян А.В., Хачатрян С.А., Зильфян А.В. и др.* Мед. аспекты последствий землетрясения в Армении. Ереван, 1990, с. 185.
2. *Келлер А.А.* Геоэкологические проблемы и медицинская география. Гео-экология: глобальные проблемы. Л., 1990, с. 30.
3. *Келлер А.А., Корольков В.Ф., Фургал С.М.* Мед. аспекты последствий землетрясения в Армении. Ереван, 1990, с. 19.
4. *Ковалева Е.П., Тулупова А.А.* Медицина катастроф. Матер. междун. конф. М., 1990, с. 97.
5. *Кондрусев А.И., Наркевич М.И., Онищенко Г.Г.* Там же, с. 177.
6. *Кондрусев А.И., Шестопалов Н.В.* Организация санитарно-эпидемиологической службы и планирование профилактической и противоэпидемической работы. Руководство по эпидемиологии инфекционных болезней. М., 1993.
7. *Корольков В.Ф., Келлер А.А., Фургал С.М.* Мед. аспекты последствий землетрясения в Армении, Ереван, 1990, с.176.
8. *Майрапетян А.Х.* Организация и тактика противоэпидемических мероприятий в условиях стихийных бедствий (из нашего опыта организации работы в зоне землетрясения Армении 1988 года). Журнал микробиологии, эпидемиологии, иммунологии, М.,1998, 6, с. 87.
9. *Майрапетян А.Х.* Тактика обеспечения эпидемиологического благополучия по управляемым инфекциям в экстремальных условиях. Актуальные вопросы эпидемиологии инфекционных болезней. Сб. науч. трудов, вып.3, М., 1999, с. 254.
10. *Майрапетян А.Х.* Тактика организации и проведения комплексных санитарно-гигиенических мероприятий в экстремальных условиях (из нашего опыта работы в зоне землетрясения Армении 1988 года). Ж. Гигиена и санитария. М., 1999, 2, с. 65.
11. *Майрапетян А.Х.* Решение экологических и санитарно- гигиенических проблем в экстремальных условиях (из нашего опыта работы в зоне землетрясения в Армении 1988 г.). Актуальные вопросы эпидемиологии инфекционных болезней. Сб. научн. трудов, М., 2002, с. 327.
12. *Онищенко Г.Г., Федоров Ю.М., Майрапетян А.Х.* Решая сложные задачи: из опыта работы санитарно-эпидемической службы при ликвидации последствий землетрясения в Армении. Ж. Гражданская оборона СССР, 1990, 2, с. 62.
13. *Erie S.* Pollution et sante publique: L'automobile en accusation., Transp. publ., 1995, 936, p. 22-24, 26.
14. *Koshland D.E.J., Hanson B.* Earthquake and collective action, Science, 1994, 263, p. 451. Editorial.
15. *Noji E., Armenian A., Oganesjan A.* Earthquake injury epidemiology. Materials of International Conference "Disaster Medicine", Moscow, 1990, p. 467.