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STUDY OF THE CURRENT STATE OF CATASTROPHE MEDICINE SERVICE IN THE REPUBLIC OF KAZAKHSTAN

V.G. Slesarev

“Catastrophe medicine centre” Public Institution, Emergency Control Ministry of the Republic of Kazakhstan, Astana

The relevance of providing population with health care after man-caused and natural disasters or armed conflicts is high nowadays [1-2]. To meet the demands of the time a new branch of science, catastrophe medicine, and a new branch of health, catastrophe medicine service, were founded in Kazakhstan [3].

It is widely assumed, that catastrophe medicine is a system of knowledge and a sphere of practice aimed at:

- rescuing life and saving health of population in the emergency situations;
- preventing and curing lesions (diseases) caused by emergency situation;
- preserving and restoring health of rescuers and other emergency specialists.

There are basic difference between catastrophe medicine and usual health care including emergency health care.

A gap between the need in health care and the means to providing it is increasing. These circumstances require transition from the principle of the routine health care, which is “optimal care for each”, to the principle of catastrophe medicine, which is “optimal care for all” and which means providing maximum number of casualties with health care.

The purpose of our study is to analyze the functioning of catastrophe medicine service for the years of its existence.

Until 1994 Kazakhstan health system had capability to ensure health response in emergency situations. But the country didn't have organizational system to make health forces and means of urgent response always ready for situations of emergency.

Under the Ministry decree number 1068 from 27 September 1994 Health Care Service for Emergency Situations was established in Kazakhstan in order to prevent and eliminate catastrophes. This Service comprised almost all public health organizations. In case of large-scale catastrophes it was decided by Governmental Committee that health care organizations of other Ministries and departments could be employed.

Kazakhstan Health Ministry was to direct this Service.

One of the first and basic measures towards development of the Service was the foundation of Catastrophe Medicine Republic Centre. The Charter of the Centre stated the following basic areas of action:

Ø delivering health care to Kazakhstan population in emergency situations with simultaneous coordination of health care resources employed in elimination of a catastrophe;

Ø urgent and advisory health care to population on the basis of day-to-day activity (air medical service);

Ø control of the objects of Service for Emergency situations;

Ø carrying out scientific and technical work on problems of catastrophe medicine;

Ø organization of first aid training for survival teams.

The analysis of the Service found problems with its legal regulation, institutional state and logistical support, which made health system unready to face a range of problems which occur in emergency situations.

It was found that the existing organization structure of Catastrophe medicine service, which is responsible for uniting national health system and its regular and supernumerary units, is unable to provide urgent response to an emergency situation. In case of emergency the system can only deliver health care with ambulances, and this approach can lead to unwarrantable number of casualties.

Catastrophe Medicine Service has several basic drawbacks:

- 1) It has no legal basis;
- 2) Material and technical basis does not meet the requirements of the Service;
- 3) It lacks the united, centralized control service integrated into automatized management-information system under Kazakhstan Health Ministry;
- 4) As a result of numerous reorganizations health authority lost the agency to govern health system under emergency situations;
- 5) It lacks academic footing;
- 6) The republic does not have a catastrophe medicine hospital;
- 7) Training and retraining of health care staff in Catastrophe medicine is not properly organized;
- 8) There is no psychological and psychotherapeutic service for casualties and rescuers;
- 9) There is no common methodic guide for first aid training of rescuers, population and some persons who are duty-bound to come to a scene first (policemen, firemen, etc.).

Thus the Catastrophe medicine service is now being formed in the Republic of Kazakhstan with consideration of the world and national experience. Overcoming the aforesaid drawbacks will allow health system to unite its resources and provide adequate management of these resources to be able to respond to different kinds of emergencies.

MORBIDITY AMONG WORKERS IN POWER COMPANIES ACCORDING TO PREVENTIVE EXAMINATIONS

A.K. Temirgaliyeva

Sanitary epidemiologic inspectorate committee of the Ministry of Health of
the Republic of Kazakhstan

Trends in incidence of respiratory diseases among employees in power companies according to preventive examinations were studied. 21 workers of

power companies with respiratory diseases diagnosed for the first time were found in Pavlodar region. Incidence was 9.5 per 100 employees. Incidence of respiratory diseases was 8.3 per 100 workers Among workers of Heat Power Plant 1; it was 10.3 per 100 workers among workers of Heat Power Plant 2 and 3.

14 cases of initial respiratory diseases were registered among power workers in Kapshagay. The incidence was 9.2 per 100 workers.

Total number of cases of respiratory diseases was 35, so the incidence was 9.3 per 100 workers.

We studied the incidence of cardiovascular diseases among workers in power companies according to data of preventive examinations. In Pavlodar region incidence of cardiovascular diseases was 4.5 per 100 workers (10 cases were registered). In Kapshagay 4 cases of cardiovascular diseases were found as a result of preventive examinations, which make up 2.6 cases per 100 workers.

Total number of initial cardiovascular diseases was 14, so the incidence was 3.7 per 100 workers.

Incidence of digestive diseases was 3.2 per 100 workers in power companies of Pavlodar region and Kapshagay.

13 cases of urinogenital diseases were registered among power workers in Pavlodar region and Kapshagay. Incidence of urinogenital diseases was 3.5 per 100 workers

Study of incidence of nervous diseases found 23 cases in Pavlodar region and 17 cases in Kapshagay. The morbidity was 10.7 per 100 workers.

Incidence of other diseases was 8.8 per 100 workers.

Study of trends in temporary disability due to diseases in Pavlodar region found 416 cases in Heat Power Plant 1, or 56.5 per 100 workers and 4311 days of disability, or 585.7 days per 100 workers. In Heat Power Plant 2 and 3 there were 2896 cases of temporary disability as a result of diseases or 140.3 per 100 workers and 26489 days of temporary disability which is 1379.3 days per 100 workers.

Similar study in Kapshagay found 658 cases of temporary disability in Heat Power Plant 2; 394 cases in Heat Power Plant 3 and 190 cases in Hydroelectric Power Station or 98.5; 105.9 and 125.8 cases of temporary disability per 100 workers correspondingly.

Thus, the incidence of nervous diseases was the highest among workers of power companies in Pavlodar region. The second place was occupied by respiratory diseases. Other diseases occupied the third position, cardiovascular diseases were the fourth, digestive diseases were on the fifth place, urinogenital diseases were on the sixth.

In Kapshagay the trends were a little different: the incidence of nervous diseases was the highest, the incidence of other diseases was the second, respiratory diseases were on the third place, urinogenital diseases were on the fourth place and incidence of digestive diseases was the lowest.

This comparative estimation of morbidity among power workers reflects influence of social and industrial factors. We can assume that rate of electromagnetic radiation is one of these factors.

Correlation analysis of incidence, temporary disability and the rate of electromagnetic radiation in power plants in Pavlodar region and Kapshagay supports this assumption. Correlation score and authenticity between target effects were ascertained via correlation coefficient. The higher the incidence of a particular disease was the stronger correlation became. Thus authentic correlation was found between the incidence, temporary disability and rate of electromagnetic radiation in companies.

The results of our study urge health workers to take preventive, treatment and rehabilitation measures for workers of power plants and fulfill contemporary social and economic policy at workplaces.

ATTITUDE OF POPULATION TOWARD HAZARD OF ELECTROMAGNETIC RADIATION

A. K. Temirgaliyeva

Sanitary epidemiologic inspectorate committee of the Ministry of Health of
the Republic of Kazakhstan

Sociological study was carried out among 462 people on their attitude toward electromagnetic radiation. 341 of them were townsmen and 121 were countrymen. The study of connection between professional occupation and working with electromagnetic radiation sources showed that 262 (76, 8%) townsmen and 108 (89, 3 %) respondents from rural areas do not work directly with electromagnetic radiation sources. At the same time working process of 79 townsmen (23,2 %) and 13 countrymen (10,7 %) was directly connected with electromagnetic radiation.

The greatest part of respondents (73.3%), when asked about level of exposure to electromagnetic fields at home, said that they don't know about the existence of such. Only 26.7% of urban respondents and 14.9% of countrymen could give an appropriate answer.

64.3% of respondents did not consider electromagnetic radiation to be hazardous and 35.7% of respondents did.

51.1% of respondents said that they often had health problems, 29.9% said they seldom felt sick and 19.7% considered themselves to be healthy.

33 (35.9%) respondents had worked near EM transmitters for a year, 20 respondents (21.7%) – from 1 to 3 years, 13 people (14.1%) – from 3 to 5 years, 16 people (17.4%) – from 5 to 10 years and 10 people (10.9%) – for more that 10 years.

67 respondents (72.8%) were aware of safety measures when working with EM transmitters and 25 respondents (27.2%) were not.

When asked if they followed safety rules, 73 respondents (79.3%) said they did, and 19 respondents (20.7%) said they did not.

Regular sanitary inspections of electromagnetic safety was held every week at workplaces of 26 respondents (28.3%), every month – at workplaces of 17 people (18.5%), every quarter or every six months – at workplaces of 12 respondents (13.0%), once a year – at work of five respondents (5.4%) and no inspections were held at all at workplaces of 3 respondents (3.3%).

65.5% of respondents knew that a television set was a source of electromagnetic radiation and 37.0% appeared to think it did not produce EM radiation. At the same time the greatest part of respondents (43.1%) watched television from 2 to 4 hours a day, 35.5% watched TV for less than 2 hours a day and 21.4% spent more than 4 hours in front of a TV set.

75.1% of city-dwellers used PCs or cellular phones; this value was much lower among rural population (18.2%). The greatest part of respondents from urban areas (39.8%) used computers for 3-5 hours a day and the greatest part of country respondents used computer only 3 hours a day or less. And only 15.1% of respondents used protective shields when working at the PC.

45.7% of respondents complained of poor efficiency, 43.5% - fatiguability, 31.1% - irritability, 12.6% - high blood pressure and 10.4% had problems with eyesight.

Most respondents from urban areas knew safety rules of working with PC (71.1%), however 54.5% of respondents living in countryside did not know safety rules and 45.4% of them did. 168 respondents (60.4%) said they followed safety rules and 110 respondents (39.6%) said they did not.

Most respondents expressed opinion that individual safety rules are necessary to follow (88.1%); labour conditions need improving (69.3%); sanitary and technical inspections at workplaces must be qualitative (55.4%); environment at the place of living needs improving (49.6%).

This public opinion poll allowed us to study attitude of population to health risks of electromagnetic radiation. These results can help set objectives when organizing preventive measures and be useful in deep study of this factor and its influence on health.

JOB DESCRIPTION OF A GENERAL PRACTITIONER

A.N.Chen, S.S.Gavrilov, M.K. Kulzhanov

Kazakhstan School of Public Health

Efficiency of health system in many respects depends on primary health specialists. General practitioners or so called family doctors have recently occurred

in our health system. The new post requires differentiation of functions between primary and secondary health care, prevention, treatment and rehabilitation. Job description of general practitioner is designed to fulfill this task. Kazakhstan school of public health developed a project of “Job descriptions of health specialists” by request of Health Ministry in the frameworks of scientific and technical program of “Organizational, technological, educational, social and psychological aspects in the development of personnel policy in health system of the Republic of Kazakhstan”.

Job descriptions consist of three parts: general knowledge, functions and qualifying requirements.

A general practitioner must know basic health legislation, structure and principles of public health, his or her rights, duties and responsibility; demographic, health and social features of the attached population; principles of cooperation with other specialists and services; principles of deontology.

A general practitioner’s functions include prevention, diagnostics, treatment for the most prevalent diseases and rehabilitation of patients irrespective of their gender and age; delivering urgent health care, medical manipulation and organizational work.

In this respect a general practitioner must be able to conduct examinations and evaluate data in accordance with treatment and diagnostic protocols; design laboratory and instrumental examinations; interpret results of blood tests, urine, sputum, gastric analyses, coprograms, cerebrospinal fluid, electrophysiological and duodenal examinations, radioexamination, and other kinds of examinations. He or she must be able to diagnose an illness and deliver urgent health care; advocate health literacy, healthy life style, rational nutrition, work with different population groups on their health education together with health centers; advise on the issues of maternity and childhood, family planning, different aspects of family life and contraception; in cooperation with sanitary inspectors organize antiepidemic measures in nidi of infection; conduct activities aimed at detecting early or latent forms of diseases and risk factors; attract managers of social and business organizations and patients to health promotion process; organize the whole complex of diagnostic, treatment and rehabilitation measures; monitor pregnancy and delivery; participate together with social authorities and charity services in organization of aid for the aged, disabled, chronic invalids; make an examination on temporary disability of patients, provide patients with psychological care; carry out study of health of population attached; keep medical records.

Qualifying requirements include higher medical education, general practice internship.

JOB DESCRIPTION FOR MANAGERS OF HEALTH ORGANIZATIONS IN THE REPUBLIC OF KAZAKHSTAN

The basic and nearest goal of health personnel policy is development of health human resources management, which implies efficient personnel planning, training and job placement, use of modern educational technologies and motivation techniques.

Personnel policy improvement is determined by staff evaluation criteria and scientific approaches to development of specialties and posts of health workers. System of certification, based on professional standards (job description) is aimed at raising professional level of health specialists.

Job descriptions promote formulation of new approaches to health care standards and efficient health human resources allocation. In this regard within the Scientific and Technical Program of “Organizational, technological, educational, social and psychological aspects in the development of personnel policy in health system of the Republic of Kazakhstan” Kazakhstan School of Public Health designed a project of job descriptions. The designed job descriptions are based on social hygienic research.

A manager of health care organization must know basic structure of market-oriented state, basic legal and ethic regulations in social relations; social problems; fundamentals of medical, social and economic sciences and humanities and be able to analyze and evaluate social factors affecting health, use this knowledge in study of public health problems. A manager also must know health legislation, including statutory acts which determine responsibility of health organization and bodies; fundamentals of social medicine; basic concepts of population health protection and priorities of the development of Kazakhstan health; basis of state policy and program-oriented development of Kazakhstan health; structure of world leading health systems and activity of WHO; budget policy and health financing techniques in market economy; hierarchy of health authorities in the Republic of Kazakhstan; basic principles of contemporary management and must be able to set a goal, work out objectives and set priorities. A manager should know basic concepts, criteria and indicators of health; fundamentals of current planning and forecasting; methods and principles of gradual restructuring of health sector; approaches to information and analytical support of health system; human resources management techniques; qualifying requirements to doctors of basic specialties and modern statistic methods.

Functions of a health manager include setting goals and objectives of the organization activity and clear understanding of significance of the health care organization in the region; setting basic priorities of the health care organization. A manager must be able to carry out current and long-term planning; organize his or her administrative and managerial activity and work and training of health staff; evaluate availability and quality of health care for population; make use of laws and directive acts to improve resources supply in his or her organization; ensure efficient use of resources in organization departments; analyze and evaluate results of the organization activity with modern methods of expert evaluation; introduce new methods of

information support of health organization; ensure adequate management of preventive, diagnostic and treatment processes, implementing of republic and local health programs, organize and control fulfillment of sanitary requirements and sanitary epidemiologic procedure within an organization; control health education work among population; promote raising professional skills of health care staff; ensure cooperation with other health care organizations and social units.

Qualifying requirements of a health manager include higher education (medical, economic, liberal), first or top category in the specialty of “health management” or “health organizer” and record of service of a health manager must include at least 5 years of executive position or work in governmental health authorities.

DEVELOPMENT OF NATIONAL HEALTH FUNDS IN THE REPUBLIC OF KAZAKHSTAN

M.K. Kulzhanov, A.N. Chen, S. Tanibergenov, Y.K. Bekbotayev, A. Gabdulin, Zh. Isayeva, E. Sabitova

Kazakhstan School of Public Health

Rapid evolution of health economics and financing determined by diversity of financial sources and new financing and planned-economic techniques, requires development of new information-analytical and financial-economic models. Those models are not aimed directly at organization of health care financing but act as a logical tool to assess and compare data. In public health they are aimed at situation analysis, forecasting and system performance evaluation.

Model of national health funds is one of the most adequate and objective approaches for Kazakhstan. Correlation between resources (first of all finance resources) and health care provided (or planned) should be analyzed when developing national health funds in order to support adequate health policy.

The objectives of this study are as follows: study volume and structure of health care financial resources in Kazakhstan; analyze volume and structure of public and private health care services, evaluate techniques of the development of national health funds commonly used in Kazakhstan and elaborate methods of improving those techniques.

In Kazakhstan in 2007 according to Technical and economic indicators (TEI) database there were 2012 independent public organizations and according to national health funds (NHF) there were 2044 ones i.e. by 1.6% more. The greatest part of them was located in Almaty (16.4%) and East-Kazakhstan (15.7%) regions, the least part was situated in Astana city (2.0%), Aktubinsk (2.9%), Mangystau (3.5%) and Atyrau (3.8%) regions. In other regions of the country the proportion of

independent public health organizations varied from 4.0% in Kostanay region to 8.4% in Pavlodar region.

The comparative study of independent public health organizations, registered in 1111 database found the greatest difference in number of them in Almaty (-17.0%), Pavlodar (+30.6%), South-Kazakhstan (+13.7%), West-Kazakhstan (-11.8%) and Kyzylorda (+9.7) regions. In other regions of the country difference in number of independent health organizations registered in both databases was statistically inauthentic.

These data prove three facts: first, status of public health organizations is interpreted in different ways, second, there are republic organizations in the country and third, the essence and relevance of national health funds are not properly understood.

Similar study among independent private health organization in these databases found that according to TEI the proportion of private health organizations in Karaganda (39.9%) and East-Kazakhstan (30.2%) regions was the greatest and no such organizations was registered in Almaty city, Almaty and Kostanay regions.

Comparison of two databases showed that the number of registered private health organizations in NHF was 4 times higher than those in TEI: 1426 versus 358.

The greatest difference in number of registered private health organizations was found in North-Kazakhstan (+208), Mangystau (+177), West-Kazakhstan (+170), Karaganda (+141), Kostanay (+109) and Aktubinsk (+103) regions.

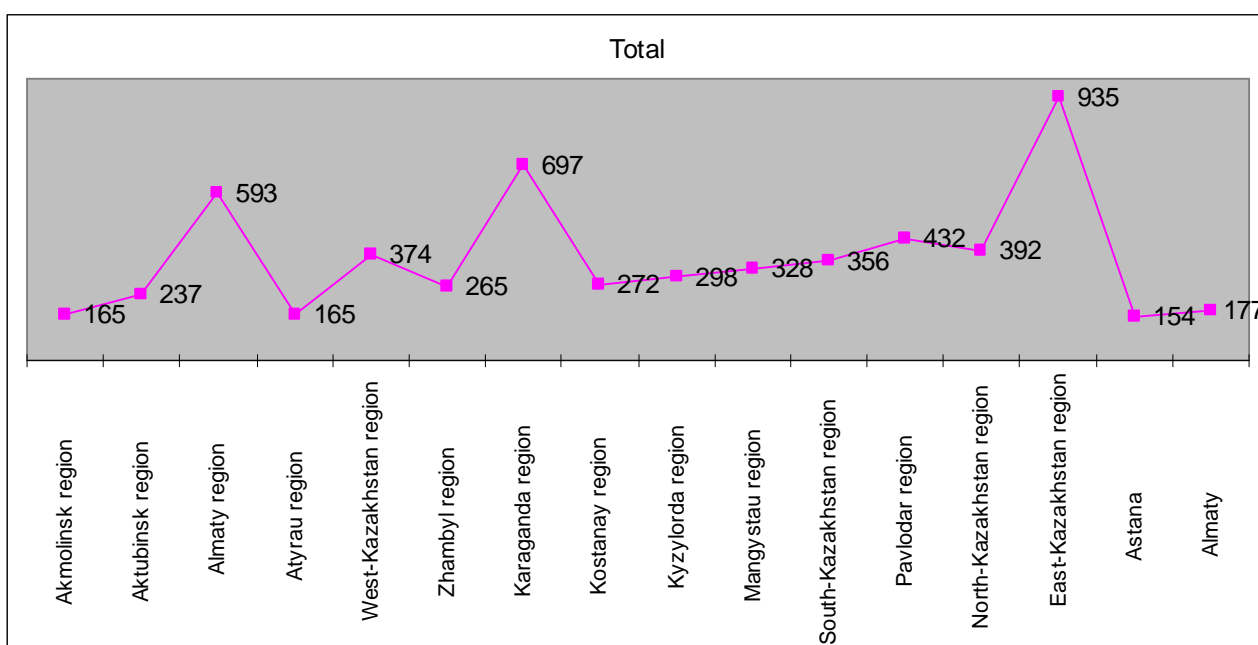


Figure – Comparative analysis of TEI and NHF databases, 2007

These results prove that the aforesaid regions place higher emphasis on development of national health accounts. It is notable that no registered independent private health organizations were found in Almaty city and Almaty region.

Registration of main subjects of national health funds is not uniform in different regions. Although it is clear that incorrect registration of private health organizations was determined by objective reasons, registration of public health organizations needs improving, since the number of them play an important role in development of national health funds.

ASSESSMENT OF VOLUME AND STRUCTURE OF INVESTMENT IN HEALTH CARE SERVICES IN THE REPUBLIC OF KAZAKHSTAN

M.K. Kulzhanov, A.N. Chen, S. Tanibergenov, Y.K. Bekbotayev, A. Gabdulin, Zh. Isayeva, E. Sabitova, N. Arslanovna

Kazakhstan School of Public Health

The study of investment in health care in the Republic of Kazakhstan showed that in 2007 the amount of public health care services was 162700826.37 tenge worth, which makes up 88.4% of general health fund. In private health sector expenditures for health care services were 21282966.66 tenge i.e. 11.6% of general health fund (figure). In public health sector 65,5% of all funds was spent for in-patient care, 33.6% - for out-patient care, 0.6% - for daily in-patient care and 0.3% - for home visiting service.

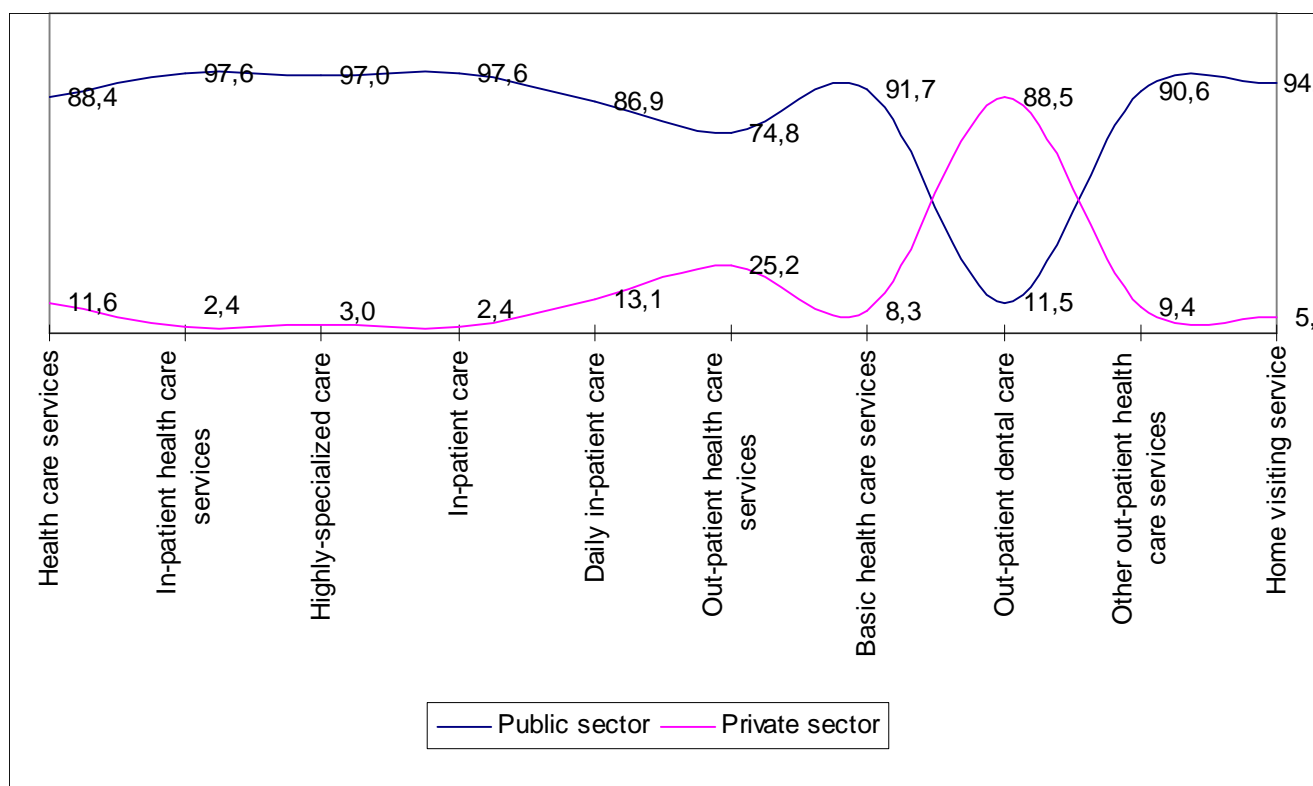


Figure - Volume and structure of investment in health care

In private health sector 86.8% of funds was spent by population for out-patient care; 12.4% was spent for in-patient care; 0.7% was spent for daily in-patient care and 0.1% was spent for home visiting service.

In public health sector 96.3% of all health funds was spent for qualified in-patient health care and 3.7% of public health funds was spent for highly qualified health care. In private sector the correlation between specialized and highly specialized care was almost the same (95.4% and 4.6%).

The structure of public health expenditures was the following: local health authorities account for 81.0% of general expenditures; central administration account for 7.2%, including 6.6% of funds expended by the Health Ministry, 0.2% - by the Ministry of Internal Affairs, 0.2% - semi-governmental companies, 0.2% - national companies and 0.1% - The Ministry of Energy and Mineral resources. Other Ministries and services spent little, if at all, for health services.

The similar study of expenditures in private sector showed that the greatest part of expenditures was spent by population (89.8%), 8.2% was spent by private organizations, 1.8% - by health insurance companies and 0.2% - by nongovernmental organizations.

Further analysis found that general expenditures by central authorities included 50.9% spent for in-patient care; 46.9% spent for out-patient care; 2.0% spent for daily in-patient care and 0.3% spent for home visiting service. Expenditures for in-patient care included 87.4% of costs of specialized care and 12.6% of costs of highly specialized care. Expenditures for out-patient care

included 69.1% spent for primary health care and 39.1% spent for consultative and diagnostic services and other health services.

General costs of the Ministry of Health (republic budget) included 49.0% of costs spent for organization of in-patient treatment; 2.1% of costs spent for daily in-patient treatment and 0.3% of costs spent for home visiting service. Greatest proportion of expenditures for in-patient treatment (65.5%) fell at highly specialized health care and 35.5% fell at specialized health care. Thus Health Ministry should reduce the volume of specialized health care and focus on tertiary health care services. 96.8% of costs spent for out-patient care fell at consultative and diagnostic and other services which is quite normal.

General costs spent by The Ministry of Justice for health care included 40.3% of costs of in-patient care, 59.7% of costs of out-patient care (35.5% - primary health care and 67.2% - consultative and diagnostic and other services). The Ministry of Science and Education, Ministry of Transport and Communication and Ministry of Energy and Mineral Resources were covering health care services in 2007, but their expenditures didn't exceed 0.1% of all country's health costs and were spent for out-patient health care services for departmental workers.

In 2007 expenditures by local health authorities included 66.9% of costs spent for in-patient care, 32.3% - for out-patient care; 0.5% - for daily in-patient care and 0.3% - for home-visiting service. Expenditures for in-patient care included 96.9% of cost spent for secondary health care and only 3.1% - for tertiary. Costs spent for out-patient treatment consisted of 75.1% of primary health care, 21.4% of consultative and diagnostic services and only 3.5% of dental health service. Expenditures for local administration of sanitary epidemiologic inspectorate made up 0.05% of general costs by local authorities.

Health expenditures of public and national companies need special attention. Total costs made by these companies made up 0.29% of general costs by local health authorities in 2007. 98.3% of these costs fell at out-patient care for departmental workers and only 1.2% of them fell at in-patient care services.

Health costs of local education and social authorities were negligibly little in 2007.

Analyses of health expenditures made in private health sector found that private payments made up 89.9% including 12.2% of costs for in-patient services, 87.0% of costs for primary health care, 0.7% of costs for daily in-patient care and 0.2% of costs for home visiting health service. Costs for in-patient care consisted of 95.9% of costs for specialized in-patient care and 4.9% - highly specialized care. 12.7% of expenditures for out-patient care fell at primary health care, and 80.5% - consultative and diagnostic and other health services.

Similar study of expenditures by private health care organizations in 2007 showed that 9.7% of these costs fell at in-patient care, 89.8% - out-patient care and only 0.5% of costs was spent for daily in-patient services.

Expenditures by health insurance companies in 2007 made up 0.9% of all health costs in the country. It is notable that 66.8% of costs by insurance companies was spent for in-patient services and 33.2% - for out-patient ones. 79.2% of patients covered by insurance companies used specialized in-patient

services and 2.2% - highly specialized health care services. Expenditures for out-patient care included 83.3% of costs spent for primary health care, 14.6% - dental health care, 2.1% - consultative and diagnostic care and 0.1% - home visiting health service.

These data show that state budget still covers health costs in the country; expensive health services prevail over other services; investments in out-patient care increase progressively; substitutes of in-patient services are developing slowly.

On the other hand it is obvious that in private sector out-patient services are developing. We can assume that this trend is determined by insufficient investment in health by private sector low quality of public out-patient services.

These results prove that republic and local health budgets are the main financial resources in public sector and the Ministry of Health and its local authorities are the main payers. Rapid centralization of health financing is now taking place, investments in health care are growing in Kazakhstan Health Ministry and decreasing in other ministries and departments. In private health sector most health services are covered by population. Investments in private health infrastructure by private enterprises are increasing very slowly. Apparently such situation hardly promotes competition in health sector and curbs improvement of health care services.

INFLUENCE OF TASK-ORIENTED INSTRUCTION ON REHABILITATION OF PATIENTS WITH CICATRICIAL ESOPHAGEAL AND GASTRIC STRICTURES

T.A. Bulegenov

Department of hospital surgery Semipalatinsk State Medical Academy

The instruction was carried out among 82 patients with burn cicatricial esophageal and gastric stricture (BCEGS). Task-oriented instruction (TOI) promotes quality of life of patients, efficiency of complex treatment, reduces length of in-patient treatment and improves rehabilitation prognosis.

Key words: gullet, stomach, cicatricial stricture, rehabilitation, task-oriented instruction

Introduction

At the present stage of the development of public health in our country it is essential to find new cheaper treatment and rehabilitation methods. Task-oriented instruction meets those requirements. Task-oriented instruction is a method of teaching patients with certain diseases how to cope with specific problems, which implies participation of a patient and his or her surroundings in this process. World experience proves efficiency of task-oriented training [1]. The purpose of this

study is to prove the importance of task-oriented instruction for patients with burn cicatricial esophageal and gastric stricture in complex treatment and rehabilitation.

Methods

82 in-patients with BCEGS of hospital surgery clinic under Semipalatinsk State Medical Academy were the object of the study. They were 57 men (69.5 percent) and 25 women (30.5 percent). Average age of patients was 36.6 ± 4.2 . Average duration of the disease was 3 ± 1.2 years. 35 patients (42.7%) were with extensive burn cicatricial esophageal strictures and 40 patients (48.8%) were after combined chemical injuries of gullet and stomach, 2 patients (2.4%) were after combined chemical injuries of throat, larynx and gullet. The results of task-oriented instructions for patients and relevant information from medical documents were recorded into special cards and then analyzed. The purpose of this training was to give people knowledge about their disease and thus help them recognize the necessity of changing lifestyle, raise their psychological adaptation and motivation to self control and disease management, and help them acquire skills of gullet bougienage. Quality of life was estimated with SF-36.

Results

The results of the study are presented in reference to average indices of quality of life (QL) in general population (table 1).

Table 1 – Influence of TOI on QL of patients with BCEGS

Groups	PF	RP	BP	GH	VT	SF	RE	MH
QL of patients with BCEGS before TOI	64.1± 12.4	56.9± 14.3	62.6± 15.1	46.4± 15.5	45.5± 15.8	44.6± 16.5	44.9± 14.5	48.5± 12.4
QL of patients with BCEGS after TOI	74.4± 7.3	72.4± 11.3	75.3± 5.4	62.6± 8.4	55.3± 5.7	65.3± 11.4	58.6± 5.3	57.6± 4.5
General population	96.00± 1.86	90.00+ 1.74	89.70± 1.67	73.20+ 1.55	62.20± 1.25	85.0 + 1.65	65.0+ 1.32	63.3+ 1.27
	P<0.01	p<0.01	p<0.01	p<0.01	P<0.01	p<0.01	p<0.01	p<0.01

Note: PF – physical functioning, RP – role limitation due to physical health (role-physical), BP – bodily pain, GH – general health, VT - vitality, SF – social functioning, RE – role limitations due to emotional problems (role-emotional), MH – mental health.

Table's data prove improvement of life quality of patients with BCEGS in all scales as a result of task-oriented instruction. The most visible results can be seen in scales with subjective estimation of general health (GH), vitality (VT), social functioning (SF), role emotion (RE), and mental health (MH).

During task-oriented instruction patients with BCEGS acquire skills of gullet bougienage. Supporting bougienage is an important stage of treatment; it requires persistence from a doctor and strong will from a patient. Without bougienage relapse of esophageal stricture can occur. Bougienage must be done three times a week during the first month after discharge, once a week during the second month, once every two weeks during the third month and once every three weeks during the fourth and fifth months. After that bougienage must be done according to dynamics of dysphagy.

In case of health worsening patients must be hospitalized for intensive bougienage under anaesthetic with further supporting bougienage. Patients must undergo regular medical check-ups for two years, and then consult a doctor when necessary [3].

As a result of task-oriented instruction, frequency of hospitalizations and length of in-patient treatment decreased, which proves clinical and economic effectiveness of this method (table 2).

Table 2 – Correlations between task-oriented instruction and frequency of hospitalization and length of in-patient treatment of patients with BCEGS

Groups	Frequency of hospitalization per year	Length of in-patient treatment
Before TOI	3.3 ±0.3	13.4±2.2
After TOI	2.2±0.4	7.4±1.3
	p<0.05	p<0.05

Conclusions

Task-oriented instruction for patients with BCEGS improves their quality of life, effectiveness of complex treatment, reduces frequency of hospitalization and length of in-patient treatment and improves rehabilitation prognosis.

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THE ROLE OF PREMATURITY AND ASPHYXIA IN INFANT MORTALITY RATE

D.K. Smailova, T.S. Builashev

Department of Health Management and Economics
Kyrgyz State Medical Institute of the Refresher Training
National center of maternity and childhood protection under the Ministry of Health
of the Republic of Kyrgyzstan

Key words: infant mortality, prematurity, hypotrophic children, asphyxia.

Summary: In order to study causes and determinants in infant mortality (birth weight, low Apgar score, intrauterine hypoxia and resuscitation measures taken, qualification of health care staff) we examined children who died during the first year of life from four regions of Osh oblast.

Relevance of the problem.

Hypotrophy of children (weight at birth under 2500 g.) is a serious problem all over the world. About 90% of hypotrophic children are born in developing countries. The reason for low weight at birth can be both various growth disorders of a fetus as well as health of a mother [4].

Prematurity can be considered as the leading risk factor for neonatal mortality. Thus, general mortality among premature neonates is 15 times higher than that among full-term infants, and the earlier a child is born the less chances he has to survive [3].

In most cases premature infants die of cerebral haemorrhage or pulmonary insufficiency [1].

Pre-natal hypoxia and birth asphyxia are the leading illnesses in the morbidity among neonates [2].

Methods

The causes of death of infants during the first year of life were analyzed.

The complex study of medical documentation and data collection in houses with the method of Verbal autopsy in Alai, Chonalai, Karakuljin and Nookat regions of Osh oblast were carried out.

Results:

319 infants in 4 regions with low weight at birth died, which is 94.6 % of general number of infants. The greatest number of hypotrophic infants was registered in Nookat region (58%). 32 and 30 percent of hypotrophic infants was born in Alai and Karakuljin regions correspondingly. Only 10.3 percent of similar cases was registered in Chonalai region.

135 infants, out of general number of infants who died, had diagnosis of asphyxia, which made up 64.6 percent. 108 of them were born with grave asphyxia (80 percent). Only 35.4 percent of infants did not have asphyxia (table 7). The largest number of neonates with grave asphyxia was registered in Chonalai and Nookat regions and made up 53.3 and 53.8 percent correspondingly.

Conclusions:

1. Predominance of infants with low birth weight.
2. Predominance of infants with pre-natal hypoxia and birth asphyxia with Apgar score less than six-seven in different degrees of severity.
3. High incidence among neonates of mainly stroke and prenatal infection.

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PROGNOSTIC CRITERION FOR PREVENTION OF CHRONIC SOMATIC DISEASES COMPLICATIONS

М.А. Baimuratova

Almaty institute for advanced health care training

Reforms of health care education in the Republic of Kazakhstan are carried out in the framework of Government Program on reforming and developing health for 2005-2010. These reforms are aimed at strengthening all branches of health with introduction best foreign experience in training and retraining of doctors. Laboratory service is an integral part of health system. Results of bacteriological examinations make it possible to solve diagnostic problems as well as problems of organizing preventive measures.

The purpose of this study is to analyze the nature of change in intestinal flora of people with somatic pathology in order to design preventive measures for reducing period of their disability. Conclusions based on microflora examination among 60 patients with chronic obstructive bronchitis in Almaty were studied. The study was carried out in accordance with the normative document number

10.05.044.03 ratified by Kazakhstan Health Ministry. Microbiological criteria included decrease in the number of Bifidobacteria and Lactobacilli, appearance of strains with changed features, increase in the number of cocci by 25 percent, detection of opportunistic pathogenic enterobacteria as well as fungi and clostridia.

We divided all data into 7 groups according to intestinal microflora contents. We found that disbiotic deviations were in 75 percent of cases. In particular, decrease in number of Bifidobacteria by 2-3 lg, when in 37.8 percent of cases this change was not followed by activation of facultative microflora. A bacteriologist can interpret such change as individual. However we still do not know which disbiotic deviations in microflora can be called adaptive and which of them are considered to be abnormal. Difference in anaerobic constituent within 1-2 lg and variation in aerobic constituent within 2-4 lg are considered to be physiological fluctuation. It is known that when intestinal colonial resistance is decreased microecological disorders arise with opportunistic pathogenic bacterium prevailing in microbiocenose. Many dynamic and inflammatory diseases of large intestine are accompanied by dysbacteriosis, which can complicate fundamental illness. In regards to Lactobacilli it was found that in 51.7 percent of cases there was decrease in critical indicator by 2-3 lg. At the same time simultaneous decrease in the number of Bifidobacteria was in all cases, which altogether predetermined activation of facultative microflora.

However in 27 cases out of 45 with decompensated change activation of facultative microflora was not found. The study found that species in microflora are not as diverse as many researchers say, since our study found only six species of bacteria: E.aerogenes, C.freundi, two types of E.coli, C.albicans and Clostridium. These data probably are the result of treatment for chronic obstructive bronchitis with antibacterial medication, which inhibits colonization of intestine with transitory germs. In some cases damages in mucous membrane of intestine can promote translocation of opportunistic pathogenic bacteria into another ecologic niche like respiratory tract. Our study found that the percent of cases with decompensated change in intestinal flora against the background of chronic obstructive bronchitis was rather high – 75%. Therefore it is advisable to make dysbacteriosis analysis obligatory for patients with somatic diseases, since disorder in intestinal microflora can be prognostic criterion for prevention of chronic diseases complications. Change in intestinal flora in patients with somatic diseases requires complex estimation of their health (gastroenterologist + pulmonologist + microbiologist), which will promote health service improvement and reduce period of disablement of population

METHODOLOGICAL APPROACHES TO COSTS ESTIMATION IN TERRITORIAL HEALTH SYSTEM

In present days studies of out-patient care in health care organizations consider mainly the number of services provided by doctors and nurses, which describes quality of health care services indirectly.

Trends in the most important indicators of financial support to primary health care organizations were analyzed in order to ground new approaches to development of differential payment to primary health care workers.

Study of trends in expenditures for health services in Almaty in 2005-2007 (figure) found that in 2005 the greatest part of health expenditures fell at in-patient health care (36.5%); costs for primary health care and maternity and childhood protection were almost similar, 26.8% and 24.2% correspondingly, and the least part of total expenditures fell at specialized health care (12.5%)

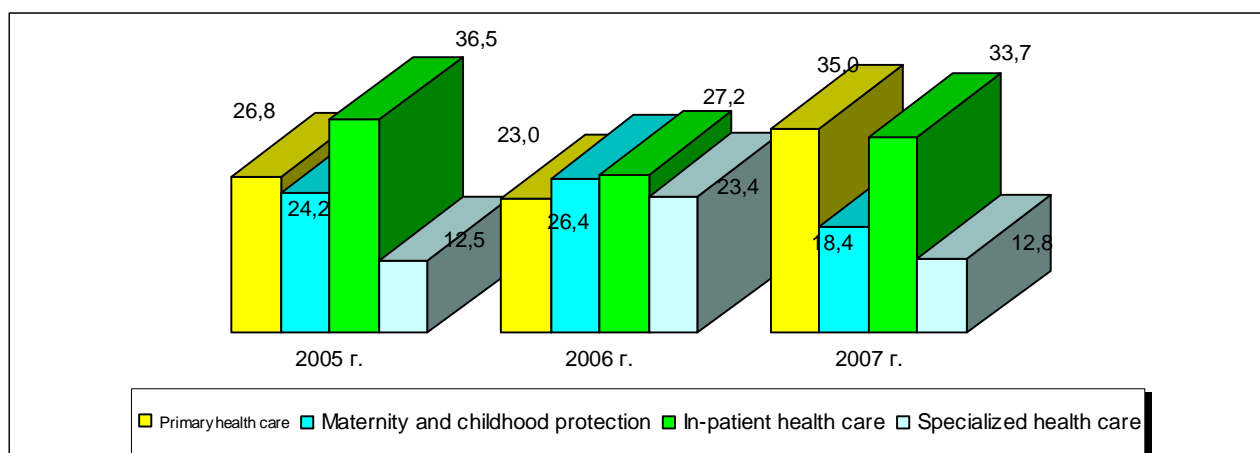


Figure – Trends in expenditures for health services in Almaty in 2005-2007 (million tenges)

In 2006 in Almaty expenditures were almost equal for different health services. 27.2% of expenditures fell at in-patient care, 26.4% was spent for maternity and childhood protection, 23.4% - for specialized health care and 23.0% - for primary health care.

In 2006 in comparison with 2005 only expenditures for in-patient care were reduced by 3.5%. Other health expenses increased: primary health care expenses increased by 11.3%, maternity and childhood expenses increased 1.5 times and specialized health expenses increased 2.5 times. Overall health expenditures in Almaty increased by 3126.5 million tenges, or by 29.4%.

In 2007 primary health care accounted for 35.0%, in-patient health care – 33.7%, maternity and childhood care – 18.4% and specialized care accounted for 12.8% of health expenditures. In 2007 in comparison with 2006 expenditures for maternity and childhood protection and specialized care decreased by 11.2% and

30.2% correspondingly. At the same time costs for primary health care doubled and costs for in-patient care increased 1.5 times. Overall health expenditures rose by 3731.4 million tenges, or by 27.2 %.

These data illustrate important change in the structure of health expenditures in Almaty for the three years. With increasing of Almaty health budget, investments in primary health care organizations increased more rapidly than those in in-patient and specialized health organizations.

These trends create new opportunities for differentiation of payment to health workers by results. It is obvious that it can be done only under economical independence of heads of primary health care organizations. It requires study of trends in average wage of Almaty health workers (table).

The table says that in 2005 average wage in Almaty was 46199 tenges. Average wage of health workers was 18374 tenges, which was 2.5 times less.

Average wage of doctors was 23449 tenges, i.e. 2 times lower than average value in the city. Average wage of nurses was 2.5 times less than average wage in Almaty. Average wage of other paramedic personnel was 3.1 times lower than Almaty average wage.

In 2006 average wage in Almaty was 56112 tenges, and average wage of health workers was 21670 tenges, which is 2.6 times lower than average city indicator. Average wage of doctors was 2.1 times higher than in previous year, but lower than average wage in the city.

Average wage of nurses was 2.6 times less then that in Almaty. It is notable that the lowest wage was paid to junior and other paramedic personnel.

In 2006 in comparison with the previous year average wage of health workers increased by 17.9%.

In 2007 average wage in Almaty was 78981 tenges, and average wage among health workers was 2.2 times lower. Average wage of doctors was 1.7 times lower, than that in the city. Average wage of nurses was 2.2 times lower than average city indicator. The lowest wage was paid again to junior paramedical and other paramedical staff and was 3.2 and 3.0 times lower than in Almaty.

Table – Trends in average wage of Almaty health workers in 2005-2007, in tenges

Type of payment	2005	2006	% to 2005	2007	% to 2006
1. Average wage in Almaty	46199	56112	121.5	78981	140.8
2. Average wage of health workers	18374	21670	117.9	36003	166.1
3. <i>Ratio of average wage of health workers to average wage in Almaty</i>	2.5	2.6	-	2.2	-
4. Average doctors' wage	23449	27288	116.4	45913	168.3
5. <i>Ratio of average doctors' wage to average wage in Almaty</i>	2.0	2.1	-	1.7	-

6. Average wage of nurses	18464	21810	118.1	38005	174.3
<i>7 Ratio of average wage of nurses to average wage in Almaty</i>	2.5	2.6	-	2.1	-
8. Average wage of junior paramedical personnel	14959	17729	118.5	24961	140.8
<i>9 Ratio of average wage of junior paramedical personnel to average wage in Almaty</i>	3.1	3.2	-	3.2	-
10. Average wage of other paramedical personnel	14973	18020	120.3	25942	144
<i>11. Ratio of average wage of other personnel to average wage in Almaty</i>	3.1	3.1	-	3.0	-

In 2007 average wage of health workers increased by 66.1% in comparison with the previous year.

Thus there is a trend toward raise in wage of different health workers in Almaty. However its level is still lower than that of average wage in the city. The method of studying ratio and structure of wages makes it possible to monitor change and trends in wages in contemporary conditions in Almaty.

PROBLEMS OF HEALTH RESOURCES ALLOCATION IN ALMATY REGION

B.N. Sadykov

Department of Health of Almaty region

In the conditions of unprecedented growth of health financing in the Republic of Kazakhstan the efficient resources allocation is a priority. Therefore the study of resources administration is extremely relevant.

The number of patients increased only slightly from 1998 to 2006, i.e. by 3%. Increase in the number of patients of specialized health care organizations is more noticeable: their number increased by 132.7% in comparison with 1998.

In 2006 only 160984 patients received treatment in city health care organizations, which is 111.8% relative to 1998. Hospital and specialized care covered 204165 and 18475 people correspondingly, i.e. 109.9% and 129.4%.

In rural health care organizations 90.5% of patient underwent treatment in comparison with 1998. Hospital care was delivered to 89.6% and specialized care covered 129.0% of patients relative to 1998.

In urban health care organizations in 2006 111.8% of patients was treated and in rural hospitals 90.5% of patients received treatment relative to 1998.

In 2006 increase in size of hospital services to urban population was 109.9%, and increase in specialized care was 129.4% in comparison with 1998.

The results of the following study (figure 1) showed that cost per one patient was very low in 2000 and made up 89.2% in comparison with 1998. In 2002 it began to grow (to 119.0% relative to 2000). In 2004 the cost doubled (227.2%), and in 2006 it made up 139.4% relative to 2004.

Expenditure per one patient in rural health organizations in 2000 dropped to 73.1% relative to 1998 and in spite of growth in 2002 (119.6% in comparison with previous period) it was lower than in 1998. Significant growth of expenditure began in 2004 and further in 2006 and made up 227.2% and 139.4% correspondingly in comparison with previous years.

Unlike hospital treatment, cost per one patient for specialized health care was increasing for the whole period and made up in 2000-2006 124.4%; 143.3%; 208.2% and 129.6% correspondingly.

Regarding cost per one patient treatment in urban and rural health care organizations comparative study showed that expenditure was increasing in both, although in rural area growth rate was higher than in urban .

At the same time in organizations providing hospital and specialized care as well as urban and rural health care organizations cost per one patient treatment was progressively increasing. It was especially noticeable in urban hospitals, where per patient cost in 2006 increased 24.5 times relative to 1998 and that cost in rural hospitals increased 6.8 times.

Expenditure of specialized health care organizations rose, although difference between urban and rural health care was not as evident and per patient cost in 2006 increased 4.9 times in urban hospitals and 3.2 times in rural ones.

We also studied the most important indicator of financing, which is health expenditure per capita in Almaty region in 1998-2006. Expenditure per capita decreased in 2000 to 84.8% relative to 1998, from 2002 to 2006 it increased to 156.5%; 211.7%; 157.6% relative to previous years correspondingly.

Comparative study of expenditure per capita in urban and rural areas found that in 2006 health expenditure per capita in urban areas increased 5 times and in rural areas it increased 6 times relative to 1998. Although volume of funds spent for one urban patient was greater than that spent for a rural patient.

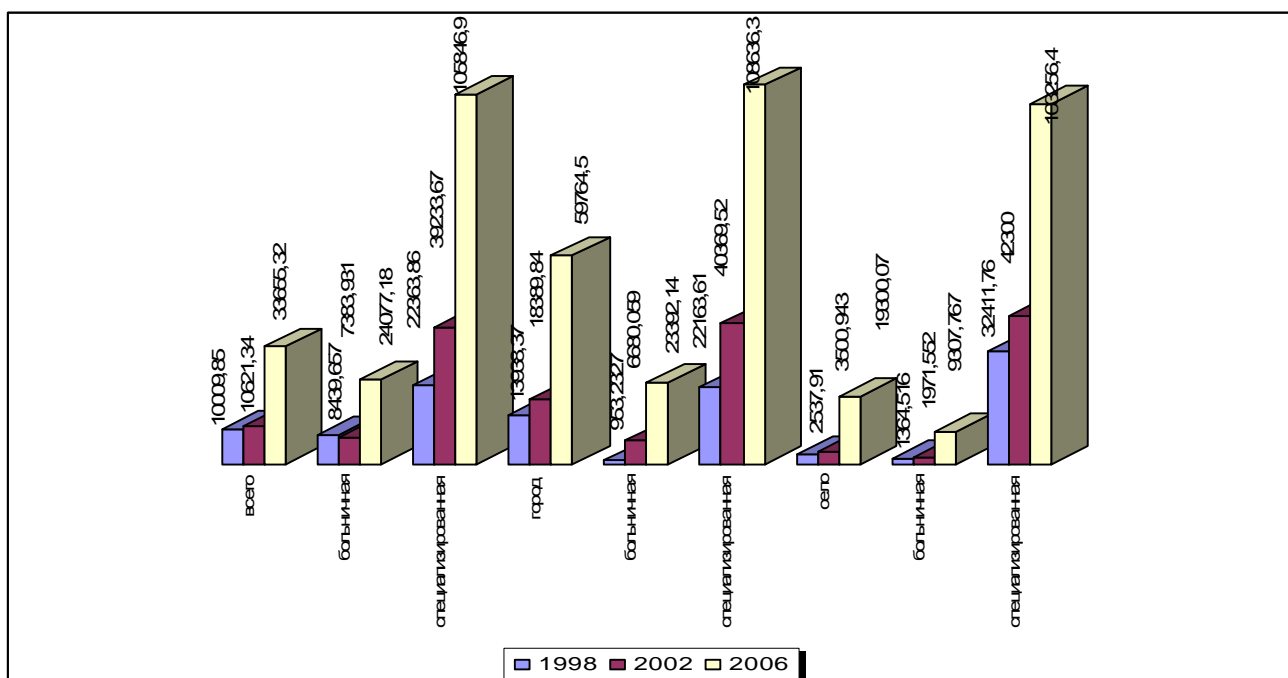


Figure 1 – Dynamics of cost per one patient treatment in Almaty region, 1998-2006

In the city per capita expenditure for primary health care had been growing continuously since 1998. The same growth in rural areas began only in 2004.

Per capita cost of hospital treatment increased significantly both in the city and in the country. However average per capita expenditure in urban population was 18 time higher than that in rural population in 2006.

Expenditure per capita for specialized care increased in urban and rural districts. In the city per capita expenditure rose 6.9 times in comparison with 1998 and in the country it increased 4 times. However gap between the city and the country widened, since in 1998 per capita expenditure for specialized care in the country was 72.4 times lower.

Main funds were limited in 1998-2000 and then in 2002 they began to grow. Expenditures for primary health care increased significantly since 2000. The least expenditure was spent for preventive activities.

These results were determined by restructurization of financing of different health care services and urban and rural health infrastructure. However slow growth of number of treated patients indicates low rates of rehabilitation and restructurization of health care network and proves the necessity of resolute consistent measures to be taken to strengthen the financial and medical-technological base of health care in Almaty region.

DYNAMICS OF INVESTMENTS IN LOCAL HEALTH CARE IN ALMATY REGION

B.N. Sadykov

Department of health of Almaty region

For the last years investments in local health programs have increased. In this regard monitoring of money allocation gains great importance. Study of trends in financing health from local budget in Almaty region in 1998-2006 is of great interest.

Official statistic data of health department of Almay region were analyzed.

Many changes happened to health budget in the region for the period from 1998 to 2006. In 2000 in comparison with 1998 it was reduced and made up 81.7%. Since then health expenditure was increasing and in 2002 in comparison with 2000 it increased to 156.6% and in 2004-2006 it rose to 214.9% and 159.2% in relation to previous years correspondingly. Costs for in-patient treatment in 2000 and 2002 were much lower than in 1998. In 2004 investments in this health service increased more than two times in comparison with 2002 and in 2006 these investments rose by 46.3% in comparison with 2004.

Financing of primary health care was increasing from year to year beginning from 1998. Costs for primary health care increased in 2000-2006 to 105.9%; 143.2%; 200.1% and 222.8% correspondingly.

We carried out a separate study of programs of financing health care to people with socially important diseases and diseases hazardous for surrounding people.

In 2002 in comparison with 1998 investments in psychoneurological hospitals and tuberculosis health care organizations increased for the first 1.5 times and for the latter 1.6 times. Obviously this was a slight increase. This was true for oncological, narcological and dermatovenerologic centers as well.

Expenditure for isolation hospitals in 2000 was higher than in 1998 by 134.6% and in 2002 it increased to 123.9%.

In 2006 investments in specialized hospitals increased 88.3 times in comparison with 1998.

Financing of AIDS Center was limited and varied from 10 million tenges in 1998 to 11 million 888 thousand tenges in 2002. In following years the financing of this centre comes from republic budget.

Expenditure for orphanages grew from 53821 thousand tenges in 2000 to 138259 thousand tenges in 2006.

Budget planned for emergency care decreased in 2002 in comparison to 1998 and began to slowly increase in 2004, in 2006 this growth was noticeable and made up 172.9%.

Financing of major repairs of health facilities underwent positive changes.

Medicine provision among certain categories of people was limited and varied in 2002-2004 from 20000 thousand to 21080 thousand tenges, but in 2006 increased to 2292.5% (483249 thousand tenges).

Expenditure for sanitary epidemiological inspectorate service gradually increased as well.

Administration of the budget for 1998-2006 was studied on the next stage of our research.

Per one patient cost of hospital treatment in 1998 made up 28562 tenges. Meanwhile cost per one patient in multifield hospitals made up 21.7% of general in-patient expenses and treatment of one patient in specialized hospitals cost 78.3% of general in-patient expenses. The cost per one treated city-dweller was 26217 tenges the cost per one countryman was only 2538 tenges. In 2000 expenditure per one patient was reduced by 7.1%.

From 2000 to 2002 expenses of treatment of one patient grew significantly both in urban and rural areas. Cost per unit of hospital treatment increased 1.5 times and cost of specialized care increased by 14.9.

During the next two years cost per one patient treatment increased by 23.8%. At the same time financing of multifield hospital treatment was higher then that of specialized hospital treatment.

In 2004-2006 expenditure for in-patient treatment grew by 7.0% in the region. Expenditure for specialized care didn't change and only multifield hospital care went up by 18.0%.

Conclusions:

The study found positive trends in financing of health services in 2002-2006. Two periods had quite different trends in health financing:

1. During the first period (1998-2000) investments in all types of health care were progressively decreasing, while the main part of health budget was spent for expensive hospital and specialized care.

2. In 2000-2002 restructurization of financing of different health care services was taking place. Overall health expenditures were increasing. Primary health care attracted more funds than hospital and specialized care with the financial advantage of rural health organizations. This shift determined increase in investments in preventive, health promotion programs and improvement in medical-demographic situation.

THE INFLUENCE OF ELECTROMAGNETIC RADIATION ON HEALTH

A.K. Temirgaliyeva

Sanitary epidemiologic inspectorate committee of the Ministry of Health of the Republic of Kazakhstan

For the last two decades activity of artificial electromagnetic fields at varying frequencies increased dramatically. As a result this factor gained significant hygienic importance. The number of EM transmitters increases every year.

Experimental data gained by both Kazakhstan and foreign researchers prove that electromagnetic fields have high biological activity at all frequencies. Effects of electromagnetic fields on human beings can be continuous and discontinuous, general and local, combined of several sources or with other negative environmental factors. There is certain correlation between the level of activity of an electromagnetic field and health. EM radiation causes low immune responsiveness, increase in general morbidity, spreading of respiratory, skin and nervous diseases, visual impairment and growth of oncological diseases.

The accumulated effect of long-term e-field radiation can result in degenerate process in central nervous system, leucoses, endocrine diseases. Electromagnetic radiation is especially hazardous for children, expectant mothers, patients with nervous, endocrine and cardiovascular diseases, highly allergic individuals and people with poor immunity. Nervous, immune, endocrine and genital systems of human organism are the most sensitive to electromagnetic radiation. Congenital malformations are believed to be caused by electromagnetic radiation at an early stage of pregnancy.

People living in the area of electromagnetic activity complain of irritability and impatience. After one-three years some of them begin to suffer from anxiety, uneasiness, memory impairment, concentration problems, sleep disturbance and fatigability.

Electric equipment in buildings (cable busses, switchboards and transformers) are the most active sources of electromagnetic radiation of commercial frequency of 50 Hz. In adjacent facilities magnetic radiation is also high. All domestic electric appliances are the sources of electromagnetic radiation. The most powerful sources include microwave ovens, air grills, frost-free refrigerators, cooker hoods, electric cookers and television sets. Human organism is normally responsive to electromagnetic radiation, but this respond will grow into pathology under the combination of several factors including intensity of an electromagnetic field and continuance of radiation. Therefore electromagnetic fields produced by domestic electric appliances do not harm most people.

Personal computers are among the most wide-spread sources of electromagnetic radiation nowadays. Many computer users destroy their health sitting by terminals more than it is needed or playing computer games during breaks. Even at home people have rest by a computer display.

The study carried out by the Centre for Electromagnetic Safety in 1996 showed that even after 45 minutes of exposure to radiation produced by a computer display, significant endocrine changes and changes in brain biocurrents are taking place. Those effects are especially strong among women. Examination of 1583 women in Auckland (California, USA) carried out by Keiser Medical Centre showed that the risk of miscarriage among women who use computer terminals for more than 20 hours a week is by 80 percent higher than for those, who do the same work without using terminals.

Microwave ovens normally produce radiation of 2,45 GHz. This very radiation level scares people. However modern microwave ovens are equipped with quite perfect protection, but it does not mean that the electromagnetic field does not spread out of microwave ovens at all.

There is still no unanimous opinions about how harmful are cellular phones for human organism. However all researchers unanimously say that electromagnetic radiation produced by cellular phones affect brain and cause degenerate changes in it.

A mobile radio-telephone (MRT) is a compact transceiver. Depending on a telephone model, frequency of transmission varies from 453 to 1785 MHz. Radiation power is variable and depends on communication channel "MRT – base station". Maximum output is between 0.125-1 W, however in real settings it exceeds 0,05-0,2 W.

It is still a question, how MRT radiation affects human body. Numerous studies carried out by researchers of different countries including Russia produced ambiguous conflicting results. The only incontestable fact is that human body responds to mobile phone radiation. Therefore the owners of cellular phones are recommended to follow some preventive rules: not to use cellular phones needlessly; talk over cell phone no more than 3-4 minutes at a time; children are not allowed to use MRT; chose cellular phones with the least maximum radiation power, use speakerphone in the car. MRT electromagnetic field is not hazardous people surrounding the one who speaks over the cell phone.

Nowadays education of children and adolescents is associated with computers. All schools in Almaty region are computerized. There are a lot of computer game clubs, where children spend much of their time.

Working at the computer causes exertion of visual analyzer, musculoskeletal system and as a result overfatigue.

Continuous exposure to electric field, electromagnetic field of commercial frequency (50 Hz), ultraviolet and infrared radiation causes dynamic abnormalities in central nervous and cardiovascular systems in children; they may cause metabolic derangements as well. Children, who are exposed to electromagnetic radiation for a long period of time, complain of weakness, irritability, sleep disturbance, fatiguability and memory weakening.

Electromagnetic and electrostatic radiation does not always exceed norms. However when technology is not observed, health risks occur.

For example in Almaty region in early 2008 metering of electromagnetic and electrostatic fields intensity in 205 units found that in 51 units maximum allowable limits were exceeded.

In order to decrease negative effect of the PC on children and adolescents, all requirements to installation and exploitation of computers must be observed. Moreover physical factors, such as microclimate, light, noise and vibration level must be considered. A facility equipped with computers must have a separate grounding mat.