ҚАЗАҚСТАН РЕСПУБЛИКАСЫ
ҰЛТТЫҚ ҒЫЛЫМ АКАДЕМИЯСЫНЫҢ
Өсімдіктердің биологиясы және биотехнологиясы институтының

ХАБАРЛАРЫ

ИЗВЕСТИЯ

НАЦИОНАЛЬНОЙ АКАДЕМИИ НАУК
РЕСПУБЛИКИ КАЗАХСТАН
Института биологии и биотехнологии растений

NEWS

OF THE NATIONAL ACADEMY OF SCIENCES
OF THE REPUBLIC OF KAZAKHSTAN
of the Institute of Plant Biology and Biotechnology

SERIES
OF BIOLOGICAL AND MEDICAL

2 (332)

MARCH – APRIL 2019

PUBLISHED SINCE JANUARY 1963

PUBLISHED 6 TIMES A YEAR

ALMATY, NAS RK

Типографияның мекенжайы: «Аруна» ЖК, Алматы қ., Муратбаева көш., 75.

Address of printing house: ST "Aruna", 75, Muratbayev str, Almaty

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POPULATION HEALTH AS A MAJOR FACTOR OF QUALITY OF LIFE

Abstract. The article examines the category of quality of life of the population from the public health point of view. The criteria for evaluation and characteristics of the analysis of quality of life associated with health at the individual and social levels are considered. Existing methods for measuring health indicators as a factor in quality of life are studied An integral indicator of health qualities was compiled based on the hierarchy of the system model for assessing the quality of public health. The model of assessment proposed by the authors takes into account all main factors influencing the quality of health and their interrelation and can be applied at regional or state levels, where institutional and external factors affecting public health play a large role. The indicators of the state of health of the Kazakhstan population in comparison with the countries of the same standards of living were analyzed. In this paper, special attention is paid to the influence of the environment on public health. The high level of environmental pollution in Almaty was noted compared with the world leaders in pollution. The development of health care in order to improve the quality of life of the population indicated the need to support educational and research institutions in the medical field.
Key words: quality of life of the population, health, healthcare, life expectancy.

Introduction. Improvement of the quality of life and public healthcare are one of the most topical tasks of the social and economic policy of the Republic of Kazakhstan. During the past ten years, Kazakhstan has made a lot of steps toward enhancing the effectiveness of the national healthcare system described in the National Program of healthcare system reforming and development "Salamatty Kazakhstan" for 2011 – 2015, and in the National Program of the Republic of Kazakhstan on the health care system development "Densayulyk" for 2016 – 2019 that were to bring the national healthcare system to the next qualitatively new level.

As a result of the taken steps implementation the expected lifetime in Kazakhstan increased, but the issues of the healthcare improvement remain open. The solution of the existing issues of the healthcare requires an integrated analysis of factors affecting the population health to form on this base a scientifically justified regional model of the healthcare system management model. The further development of the theory and methodology of population health state investigation is topical in view of the living standards improvement.

Methods and materials. During the investigation the methods of abstract and logical analysis, comparative method were applied. The information bases for the investigation were monograph researches of foreign authors, data by the Committee on Statistics of the MNE RK, ratings of the international organizations.

Results and discussion. The most of researchers investigating the quality of life topic agree that there is no unique definition for this notion, as well as there is no united methodology for its definition. Quality of life is a complex notion studied by sociology, economy, psychology, and medicine. In this regard, some western scientists in the field of psychology assume that the closest definition to "quality of life" is "happiness"; this kind of comparison can be found in works by M. Argyle (The Psychology of Happiness), I. Dzhidaryan (Imagination of happiness in Russian mentality), E. Diener and R. Emmons (On the independence of positive and negative affect). However, in scientific context the notion of happiness does not have a clear definition and, thus, does not facilitate the task of quality of life definition

search. At the same time, some scientists believe that the quality of life means a degree of human needs satisfaction. This can be found in the work by S. Bazhenov and N. Malikov: "the human needs are considered as inner reason of his life activity", and quality of life is determined as "a level and degree of satisfaction of the whole complex of needs and interests of people" [1].

Conditionally, the quality of life can be divided into several levels constituting the life activity [2]:

• Quality of life on the level of survival allows the population to satisfy the most necessary physiological needs only; the society and the State help in receiving the minimum social guarantees and services.

• Quality of life on the base level allows satisfying all physiological needs, and providing spiritual and intellectual demands of some groups of the population.

• Quality of life on the high level satisfies the whole diversity of needs, the high level of material welfare is observed, within the support of integrity of the city system there is enough leisure time for creative and spiritual growth, the conditions for enhancing the educational level of cultural growth are provided.

A lot of factors are engaged to cover the needs of each level, among them the state of health is one of the most important.

The first monograph in Russian that suggested the bases of the life quality investigation methodology for the medicine in view of the healthcare was published in 1999 [3]. One of the main ideas of this concept is that for the evaluation of the quality of life, an objective criterion that includes at least four constituents of a human health is needed: physical, psychological, social, and spiritual. The most popular definition of health in the context of the quality of life is the definition given by the World Health Organization (WHO): "Health is a state of complete physical, social and psychological welfare of a human, not absence of disease" [4].

The contemporary medicine and social sciences also apply a term ""the quality of life related to health" that was suggested for the first time in 1982. It is understood on two levels:

• On the individual level the term means apprehension of physical and mental health (mood, level of energy) by a person. This level also covers risks to health, life conditions, social support, and social and economic status of a person influencing on individual apprehension.

• On the social level the term means all public resources, institutes, and conditions of life influencing on public health.

The health as a factor of the life quality is closely connected with definition of disease and issues of its treatment [5]. The quality of life becomes the main purpose of disease treatment not limiting the life duration, and additional – if a disease limits the length of life, and the one – for incurables. The contemporary concept of the life quality in view of the healthcare includes three main constituents:

1. multidimensionality – the quality of life bears the information on all main fields of human life and activities, and this also includes the state of its health. In its turn, the state of health is also interconnected with all aspects of the life quality;

2. variability in time – data on the life quality change depending on a human state of health;

3. person contribution into estimation of his own state – i.e. the quality of life is estimated by a specialist, and a respondent. The same is for the health.

The importance of introducing and investigation of issues connected with a term "quality of life related to health" is determined by the necessity to fill the gaps in interdisciplinary researches of the life quality.

The medical interpretation of the notion "quality of life related to health" influenced on its interpretation on social sciences. The interconnection of satisfaction with life value (social) and health is explained by such theories as a theory of capital (social and human), a theory of social status (health as an indicator of social status, and estimation of life quality through it), a theory of inequality and social equity. According to the definition of health, the WHO determines the quality of life as person's individual estimation of his status in the society life, in the context of his culture, system of values, with his goals, plans, opportunities, and degree of disorder [6].

This diversity of explaining concepts leads to plenty of methodological approaches to study of life quality related to health. For instance, the Russian researcher I. Nazarova provides an example of researches by the Institute of Social and Economic Issues of Human Population of RAS. The qualitative state of population was "represented in terms of potentials of such important properties of a human as health

(physical, psychological, social), education and qualification (intellectual level), culture and morality (social activity). The special attention is paid to measurement of labor ability (labor potential)" [7]. It should be noted that in medicine the factors related to labor ability of a human are also the main in estimations of social, medical, and economic efficiency of the healthcare.

The Center for Disease Control and Prevention of the United States Department of Health and Human Services applies the questionnaire method for assessment of the life quality related to health. The standard questionnaire consists of 14 questions the answer to which the respondents have to give during some period. The questions are divided into three large modules: Healthy Days Core Module, Activity Limitations Module, Healthy Days Symptoms Module. The respondents have to keep a calendar where they mark healthy days, physical and emotional disturbance days, and symptoms days not followed by a disease. Basing on the observations during some time (one, three, six months) the statistics bulletin is made; it allows measuring the quality of population health, and determining main health problems and its influence on estimation of the life quality given by the respondents.

The Russian researchers B. Ilyasov, V. Martynov, I. Gerasimova, Ye. Makarova, Ye. Zakiyeva have developed a systematic hierarchy model of population health quality estimation. The main assumption of the model is that the health as an indicator of the life quality is structurally complex, hierarchically arranged indicator. For its measurement and estimation it is necessary to determine its components and relations between them (table 1).

Table 1 – The hierarchy of the system model of the population health quality estimation

Rank	Indicator name								
1	Quality of population health								
2	Quality of medical aid			Quality of human environment			Quality of health state		
3	Level of medical personnel qualification	Level of medical facility provision with equip-ment, techno-logies and medicines	Level of available in-patient department	Quality of ecology	Quality of social environ-ment	Quality of life environ-ment	Index of satis-faction with life	Index of psycho-logical health	Index of physical health
	Note. Reference [8].								

Basing on this hierarchical structure the authors have deduced an integral indicator of health qualities that can be calculated as weighted sum of its constituent components (system indicators):

$$J = \alpha_1 K_1 + \alpha_2 K_2 + \alpha_3 K_3, \tag{1}$$

where K_1 – quality of medical aid; K_2 – quality of human environment; K_3 – quality of health state; $\alpha_1, \alpha_2, \alpha_3$ – weighting coefficients characterizing the significance of K_i component and determined by expert way, considering that

$$\sum_{i=1}^{3} \alpha_1 = 1. \tag{2}$$

The model uses the following suppositions:
- The values of weighting coefficients characterizing mutual influence of indicators are set by experts and are not changed.
- The start values of special indicators are also set by experts as the issues of origin statistic data norming within the model are not considered.
- The estimation of integral indicator of health quality under the considered situations does not take into account the dynamics of special and system indicators change.

This method allows working with large massifs of data and considers all main factors influencing on the quality of health and its interrelation. Thus, this method is applicable at regional and national level where the big role belongs to institutional and outside factors influencing on public health.

In Kazakhstan, the index of population life quality is used for estimation of the life quality of popu-lation. The conceptual bases of index measuring methods stipulate the measurement of health state [9]. It describes the health state as an important constituent for estimation of life quality together with income level or good work. This indicator includes the following:

- Self-assessment of the health state.
- Length of life.

The indicator of self-assessment of the health state and its satisfaction is formed on the base of statistical observation data. The expected length of population life at birth does not characterize the length of life of one person, but the whole population.

Table 2 – Self-assessment of health state of Kazakhstan population

Year	Degree of satisfaction with health	Share of respondents (%)
2017	Satisfied	47,2
	Partially satisfied	46,8
	Not satisfied	5,8
2018	Satisfied	46,7
	Partially satisfied	48,6
	Not satisfied	4,6
Note. Compiled basing on data from references [10, 11].		

Table 2 shows that the satisfaction of RK population with its health in 2018 changed by several parameters: less of respondents are satisfied with their health completely, and more are satisfied partially. At the same time, the share of respondents unsatisfied with its health decreased.

Table 3 – The expected length of life in the world countries

Country	Expected length of life (years)	
	2010	2016
Armenia	73,3	74,6
Azerbaijan	70,9	72
Belgium	80,2	81
Belarus	70,4	73,8
Canada	81,2	82,3
China	75,2	76,3
Germany	79,9	80,6
Georgia	72,6	73,3
Kazakhstan	68,3	72,3
Kyrgyzstan	69,3	70,9
Russia	68,8	71,6
Turkey	74,1	75,8
Uzbekistan	70	71,3
Upper middle income countries	73,9	75,3
Note. Compiled basing on reference [12].		

Table 3 shows that the expected length of life in Kazakhstan, as of 2016, by data of the World Bank has not reached yet the average indicator for upper middle income countries to which it is related. In addition to these two indicators, the following indicators are not included into the index of life quality, but are used for statistics:

- Satisfaction with services in the field of the healthcare.
- Opinion on problems while visiting the healthcare facilities.

In addition to the indicator related directly to the health state in the method, the quality of environment is also measured. This component also includes two fields:

- Quality of water.
- Level of air pollution.

The quality of water is calculated via percent ratio of people informing on their satisfaction with local water quality. The indicator of air pollution is reflected as average indicator weighted by number of population, and showing the concentration of weighted small particles in air. For the comparison with the world indicators the data of Numbeo organization were taken. The index of air pollution is calculated for cities individually as the situation with air quality in different cities could vary a lot.

Table 4 – Index of environment pollution (air and water) for European and Asia cities in 2018

City, country	Index of air pollution
Chelyabinsk, Russia	89,19
Beijing, China	88,71
Naples, Italy	80,93
Shanghai, China	80,43
Baku, Azerbaijan	79,63
Tbilisi, Georgia	77,04
Almaty, Kazakhstan	76,69
Paris, France	67,71
Moscow, Russia	61,32
London, Great Britain	59,65
Tokyo, Japan	44,65
Note. Compiled basing on reference [13].	

Table 4 shows that the level of environment pollution by indicators affecting the living standards in Almaty is high even comparing to the world leaders on pollution. At the same time, large number of citizens does not lead to high pollution of environment – examples are Tokyo (10 million population), and London (more than 8 million population).

Numbeo also calculates the index of life quality throughout the world, and the constituent of this index is also the healthcare.

Table 5 – Healthcare index of Numbeo for the world countries in 2019

Position in rating by indicator	Country	Value of healthcare index
1	Taiwan	86,22
14	Germany	74,32
23	Canada	70,99
44	China	64,03
52	Latvia	59,71
55	Belarus	58,01
56	Russia	57,63
57	Greece	55,16
64	Georgia	51,29
65	Kazakhstan	51,27
66	Iran	51,18
67	Ukraine	50,95
71	Egypt	44,22
Note. Compiled by data of reference [14].		

Among 71 countries participated in the research, Kazakhstan is ranked 65 on the healthcare index that shows the low satisfaction of population with the health care system services, and arrangement of the health system in whole. At the same time, the highest values of healthcare index belong to the East Asia, after that with some gap are the countries of the Western and Northern Europe.

The goal of any national policy in the field of improving of population life quality is transition to the high level of life quality. For the transition to high standard of life quality in the field of the healthcare it is necessary to achieve several goals:

1. Provision of qualitative treatment. It implies that treatment of diseases will release from diseases at the shortest period and with minimum long-term consequences for patients.

2. Provision of medical and diagnostics services not only for treatment, but timely and maximum complete diagnostics of patients.

3. Provision of sanatorium-resort treatment. Sanatoriums and treatment resorts not only allow treating the diseases, but enhancing the life quality and subjective estimation of life conditions by people due to additional recreation functions.

4. Availability of sport and physical culture facilities, creation of conditions for outdoor activities. This goal is rather preventive aimed at improving of the common level of public health than on treatment of diseases.

To protect the population health it is necessary to conduct systematically the preventive activities, early diagnostics of diseases, treatment and health assessment of population, health-improving and reco-very work. The cumulative measures on keeping and strengthening physical and psychological health of society should include economic, social, legal, cultural, scientific, medical aspects as only in its integrity these can have positive influence on country's inhabitants apprehension of individual and public health.

An important aspect is support of city's health departments as s separate field of the State work on improving the quality of life related to health. The importance of the aspect is that cities usually have very dense population, and as consequence there are large risks of diseases appearance and distribution. The establishment of city healthcare must be of a special priority supposing the creation of developed network of medical facilities within a city, equal access of all citizens to these facilities, its material and technical, technological, staffing and medicine support.

The contemporary medicine cannot function in isolation from technical progress – for diseases treatment the advanced scientific and technical developments are used. Therefore, urban authorities shall render all possible support to research and educational establishments having medical departments, as namely these, in future, will be the suppliers of new technologies and methods of treatment, qualified staff, and medicines. Otherwise, the whole medical sphere of a city becomes dependent on presence of foreign medical companies. Even the subsidies into the medical sphere can be considered as investments into improvement of population life quality and, as consequence, enhancement of human capital within a city or a country [15].

In addition to provision of physical health of city or country inhabitants, it is necessary to take into account the quality of spiritual or mental health of population. The modern society unavoidably needs qualitative information society formed by social institutes and education, scientific, and culture estab-lishments. Development and accessibility of these institutes for the population determines the level of spiritual constituent of population life quality related to health.

As for the mental health, here the big role belongs to education system and integrity of psychological health establishments. The education system should teach of critical thinking and information sorting skills to avoid the overload of coming information, and the psychological health establishments should ensure the treatment in situations when the preventive measures did not help.

To facilitate the analysis and development of common policy on enhancing the life quality related to health, it is reasonable to introduce the concept of four human intelligences by Steven Covey [16]. Steven Covey has proposed this concept for more detailed understanding of human intellectual development features in the context of business, but the idea is also applicable for the health field. Each of the intelli-gence types is responsible for a definite aspect of life connected also to a definite type of health. These four types of intelligences are shown below:

Mental intelligence – is a combination of analytical , cognitive abilities allowing expressing thoughts and making plans. During its functioning the mental intelligence receives information the abundance of which can lead to disorder and overload.

Physical intelligence – ability of organism to self-regulation without conscious control, and ability of a human to understand changes in his body, and respond to disorders in time. This type is associated with physical health.

Emotional intelligence – is ability for safe-knowledge, empathy and ability to communicate with others, and understand the reasons and consequences of own emotional states.

Spiritual intelligence – is ability to create and apply meanings in daily life. Together with emotional intelligence it is responsible for spiritual health of a human; developed spiritual and emotional intelligence allows preventing the development of mental illness if its appearance is not due to physiological reasons.

Basing on this concept, while estimating a human health it is necessary to consider four types of intelligence for more complete analysis of life quality related to health.

Conclusion. Basing on the stated above the following conclusions were made:

• Quality of life is a complex notion studied by a lot of disciplines including medicine. Each discipline considers the quality of life from its point of view. For medicine such point of view is quality of life related to health.

• The quality of life notion related to health creates the interconnections between social sciences and medicine allowing for more complete analysis of health as a factor of population life quality. The term can be considered on individual and social level – each has its own assessment criteria and features of analysis.

• There are different methods of life quality analysis regarding the health; for instance, the American Centre for Disease Control and Prevention uses a special questionnaire and determines the health quality basing on it. A group of Russian scientists, in its turn, has proposed a mathematical model to measure health quality as a factor of life quality based on hierarchy of factors of health quality and its interaction.

• Kazakhstan also uses a lot of indicators to estimate the quality of life, among which there is state of health. By composite indicators Kazakhstan falls behind the countries that have the same living standards, but the lad is not critical. In the international rating of life quality calculated by Numbeo, in the section of healthcare index Kazakhstan is on one of the latest places among the analyzed countries.

• As for the ecological indicators as influencing on public health, Kazakhstan also experiences some difficulties; especially notable are problems of Almaty that is one of the first in the rating of environment pollution among the world largest cities.

• To improve the public health and the quality of life it is proposed to pay attention on urban health care as the most loaded field of the healthcare. Special attention should be paid to support of educational and research establishments in the field of medicine as namely these create a potential for the healthcare development. Otherwise, there will be dependence on foreign technologies and developments.

• It is also necessary to extend the comprehension of health as a factor of life quality in Kazakhstan practice – it should include not only physical and psychological constituents, but features of functioning of spiritual and emotional intelligences – creation of conditions for its development increases its motivation for self-perfection, and as result enhances the quality of human capital the importance of which increases every year.

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ХАЛЫҚТЫҢ ДЕНСАУЛЫҒЫ ӨМІР СҮРУ САПАСЫНЫҢ НЕГІЗГІ ФАКТОРЫ РЕТІНДЕ

Аннотация. Мақалада халық денсаулығы тұрғысынан халықтың өмір сүру сапасының санаты зерттелген. Денсаулыққа байланысты, жеке және әлеуметтік деңгейде өмір сүру сапасын талдау критерийлері мен сипаттамалары қарастырылған. Өмір сапасының факторы ретінде денсаулық көрсеткіштерін өлшеудің қолданыстағы әдістері зерттелген. Денсаулық сақтау сапасын бағалаудың жүйелік үлгісінің иерархиясына негізделген денсаулық қасиеттерінің интегралдық көрсеткіші әзірленген. Авторлар ұсынған бағалау үлгісі денсаулықтың сапасына және олардың өзара байланысына әсер ететін барлық негізгі факторларды ескереді және қоғамдық денсаулыққа әсер ететін институционалдық және сыртқы факторлар үлкен рөл атқаратын аймақтық немесе мемлекеттік деңгейлерде қолданылуы мүмкін. Қазақстан халқының денсаулығының жай-күйінің көрсеткіштері талданып, өмір сүру деңгейлері шамалас елдердің көрсеткішімен салыстырылған. Мақалада қоршаған ортаның денсаулыққа ықпал етуіне ерекше көңіл бөлінген. Алматыдағы қоршаған ортаның ластануының деңгейі ластану бойынша әлемдік көшбасшыларымен салыстырғанда жоғары екендігі анықталған. Халықтың өмір сүру сапасын жақсарту мақсатында денсаулық сақтауды дамыту үшін медицина саласындағы оқыту және зерттеу институттарын қолдау қажеттілігі көрсетілген.

Түйін сөздер: халықтың өмір сүру сапасы, денсаулық, денсаулық сақтау, өмір сүру ұзақтығы.

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ЗДОРОВЬЕ НАСЕЛЕНИЯ КАК ОСНОВНОЙ ФАКТОР КАЧЕСТВА ЖИЗНИ

Аннотация. В статье исследуется категория качества жизни населения с точки зрения здравохранения. Рассмотрены критерии оценки и особенности анализа качества жизни, связанные со здоровьем, на индивидуальном и социальном уровнях. Изучены существующие методы измерения показателей здоровья как фактора качества жизни. Составлен интегральный показатель качеств здоровья, исходя из иерархии системной модели оценки качества здоровья населения. Предложенная авторами модель оценки учитывает все основные факторы, влияющие на качество здоровья и их взаимосвязь и может применяться на региональном или государственном уровнях, где большую роль играют институциональные и внешние факторы, влияющие на общественное здоровье. Проведен анализ показателей состояния здоровья населения Казахстана в сравнении со странами одного с ним уровня жизни. В работе особое внимание уделено влиянию окружающей среды на здоровье населения. Отмечен высокий уровень загрязнения окружающей среды г. Алматы по сравнению с мировыми лидерами по загрязнению. Для развития здравоохранения в целях повышения качества жизни населения обозначена необходимость поддержки образовательных и исследовательских учреждений в медицинской сфере.

Ключевые слова: качество жизни населения, здоровье, здровоохранение, продолжительность жизни.

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