

Identification of the Predictor of Individual Health

Olga Ivanovna Ustinova, Yuri Sergeevich Pimenov and Yuri Vladimirovich Ustinov

Medical Institute "REAVIZ", Chapaevskaya str. 227, 443001, Samara, Russian Federation

Abstract: Due to the demographic ageing of the population and increase of the share of senior people, the main line of the healthcare system activity is the maintenance of employability, social importance of a human and improvement of the level of his individual health. High quality performance of practical medicine in this regard requires detection of the factors, first of all, which determine the individual health of a human, the predictor of individual health (among the existing definitions of health), for the purposes of further practical research. We tried to evaluate the mentioned problems within this theoretical work. In the result of this research, we detected the predictor, without which human health cannot exist at any conditions-it is the availability of the adaptive ability of an organism. A sick person does not have these reserves. Therefore, a concern was raised regarding the necessity to search for adequate indicators of the "health quantity".

Key words: Health • Predictor of individual health • Adaptive reserves • Health quantity

INTRODUCTION

The contemporary world faces the phenomenon of demographic ageing of the population. According to many researchers, the demographic situation in the contemporary Russia is critical and can be described as a demographic crisis [1-4]. Taking into account the increase of the share of senior people, solution of the problem of maintaining physical and psychological ability of a person to self-fulfillment and his real social importance and health seems to be important. The Academician Y.P. Lisitsyn reasonably noted: "Healthcare is the state-related activity sphere, the purpose of which is the organizing and the ensuring of affordable medical service for the population and preservation and improvement of the level of its health" [5]. N.N. Shcherbakova draws our attention to the fact that currently, the clinical medicine does not have information, which would allow it to describe the health state of an individual correctly. She said the search for proper definition of the *Health* term had failed to achieve any qualitative result due to the lack of methodological basis, generally acknowledged criteria and methods of examination of the health state. [6, 7]. In order to achieve any results in this direction and for the purposes of *further practical research*, it is necessary to identify the leading factors of health among the presently existing ones, i.e. to identify the predictor of individual health.

It is important for practical healthcare, as treatment is necessary for sick people only. As for healthy people, they need to be approached by the preventive medicine, in order to avoid their status change from healthy to sick [8]. We tried to evaluate the mentioned problems within this work.

Body of the work. It is important to emphasize that such efforts have already been undertaken by renowned practical scientists. The Academician I.V. Davydovsky [9] as far back as in 1959 noticed: *the concept of health consists of the idea of the normally flowing physiological processes in an organism*. There cannot be any absolute opposition between physiological and pathological processes. Health is not the evidence of absence of any pathogenic factors in the environment, in which a human is. The extent of its impact transforms the *normological* process in an organism into the *pathological* one. If there are pathogenic factors, but the organism adapts to them and thus balances their effect, this is what does not let a disease develop. The completeness of adaption to changing environmental factors is the completeness of health [10]. The Academician N.M. Amosov [11] introduced the following concepts: "the level of health" in its function as the intensity of life manifests in normal environmental conditions, which is determined by the condition of the organism structures and the "quantity of health" in its

function as the margins of external conditions, at which the life still continues and it manifests itself in the *reserve power*. The reserve powers need to be improved by training. An intensive external stimulus for a detrained organism brings it into a pathological mode, i.e. into a disease, where for a trained organism it is "routine intensive work". Healing a sick organism to the healthy state is ensured by energetic, construction materials and regular exercises. N.M. Amosov determined health as the ability to live a fulfilled life and work at full rate [12]. More than a millennium ago, the famous doctor and philosopher of the Middle East Avicenna suggested the following classification of organism states: 1. The body is as healthy as possible; 2. The body is healthy, but not as much as possible; 3. The body is neither healthy, nor sick; 4. The body is in a good condition and can receive health quickly; 5. The body is slightly sick; 6. The body is as sick as possible [13]. The definition "The body is in a good condition and can receive health quickly" reflects the fact that already at that times, Avicenna emphasized that there was a certain key moment, to which the body reacts. A certain reason, a certain opportunity, a certain motive force, which fills the body making it healthy. Without this certain *something*, the body becomes "slightly sick" or "as sick as possible". As we can see, the Avicenna's classification of organism states associated only two of six classes with disease and four classes described various levels of health. However, as medicine developed, its focus shifted from the position of health to the position of disease. Professor O.S. Glazachev noticed in 2008: "for a long time, the health concept was determined by opposing to disease: absence of diseases was treated as "non-disease" [14]. Health was treated as the "non-disease". We agree to a number of authors [6, 14-17] who admitted the method of health evaluation by detecting and eliminating diseases to be baseless. M. Goldberg, W. Dab (1987) identified several human health levels by standards: The first one is the minimal level (for the majority of people), the second one is the ideal level (for ideally healthy people), the third one is the special level (for specially prepared and trained groups-sportsmen, pilots, etc.). Traditionally, the concepts of *health* and *standard* are equalized. N.N. Shcherbakova (2007) noticed: "Clinical medicine keeps on being oriented to the statistical indexes of population "standards", rather than to the individual standard" [6]. Thus, we have the following concepts: normal state, disease, health. The Academician I.V. Davydovsky noticed that the concept of normal and sick states is clearly differentiated by the sick person

himself, while the science cannot provide a clear definition. The main objective of preventive medicine is the health preservation and strengthening. Currently, the main methods of preventive medicine are: timely check-ups, laboratory and other medical examinations targeting people with deviations from standards, assignment of medicines, etc. But, deviation of any indicator from the standard value is a stimulus to return to it-this is the "golden rule" of self-regulation discovered by the famous Russian physiologist, the Nobel Prize winner for medicine, I. P. Pavlov. Unfortunately, the contemporary medicine virtually does not use the deviation from the standard as a stimulus for returning to it. Regulation is achieved by the artificial medicated way only. Thus, the abilities of self-reconditioning, self-regulation of an integral organism are not taken into account and actuated. Currently, for evaluation of the health status, the control of a large number of medical parameters is required. Their indicators have not been sufficiently considered in terms of methodology and standards for various age and gender categories of people [18, 19]. Besides, these standards must be permanently changed in time, as the human is "integrated" into the environment and he changes it actively by himself. It means that according to the law of self-adjusting (all objects, which are placed in a single environment, self-adjust), the human with all of his parameters while changing the environment will change himself permanently. This brings us to the conclusion that it is a hardly achievable and hardly beneficial objective to try permanently to search and enact even more standards. The health of a human will not become better due to that, but huge intellectual efforts will be wasted in vain. Therefore, we need to choose another way to achieve health. In 1950s-60s, the Academician I.V. Davydovsky worked out theoretical basic concepts of the medicine of the future, using the image of health as the adaptive ability of an organism and determined "disease as the result of reduction of reserves, exhaustion of the protective power" [10]. He revealed the factor, which, according to Avicenna, allows a body to "remain in good condition and become healthy quickly"-this is the reserve of the adaptive abilities of an organism. The Academician N.M. Amosov (1963), while considering the six levels of regulating systems in the self-regulating human organism, came to a conclusion that it is the factor of reserves that ensures flexibility and reliability of performance of the programs of all body stages for achievement of health [20]. The learning of the Canadian pathophysiological H. Selye (1976) about stress created

important prerequisites for identification of a "non-specific element in the organism's reactions, which was determined by mobilization of functional reserves for various impacts... For example, the exhaustion of functional reserves leads to the malfunction of adaptive mechanisms and further development of the disease" [21]. N.N. Malyarchuk (2008) stated the following principal approaches to the definition of health: a) health as absence of disease; b) health as a standard; c) health as a successful adaptation, which includes physical, psychological and social aspects [22]. The "non-disease" and "standard" cannot be the cause, the motion force, i.e. the factors of health of an individual. Successful adaptation of an organism can be its health factor. The most comprehensible work, which systematized the states of human health, was carried out by P.I. Kalyu (1998). He considered 79 definitions of health suggested by scientists from different countries. He revealed that health was considered as a certain functional optimum, which ensured balance of all parts of an organism, including psychological and social aspects of its existence [23]. Kalyu pointed out four models of health characteristics: the medicine model-health as absence of diseases and their symptoms; the biomedicine model-absence of personalized feeling of malaise and organic disorders; the biosocial model-it considers the medicine and social characteristics of health; and the value-related and social model-it considers health as a human value (it also includes the definition of health provided by the WHO: "Health is a state of total physical, mental and social welfare and not just absence of disease and physical handicaps" [24]). The considered four models do not consider the factors of health achievement. P.I. Kalyu also systematizes the four groups of health indicators suggested by the contemporary medicine: anthropometric parameters, such as stature, weight, chest volume, geometric shape of organs and tissues, etc.; physical parameters-pulse rate, arterial pressure, body temperature, etc.; biochemical parameters-the content of chemical elements, erythrocytes, leukocytes, hormones, etc.; biological parameters-presence of viruses, bacteria, contagious diseases, the content of the intestinal flora, etc. Kalyu in this case determined standard values as the indicators of "non-disease". Further, he considered the four factors of health as the evaluation criteria of possible human working capacity: the physical development; the physical aptitude; the functional readiness for exertions and the aptitudes for mobilization of the adaptive reserves of an organism, which ensure adaptation to various conditions

of the environment. The first three factors cannot exist without the fourth one-the reserve of adaptive aptitudes, which ensures high quality level of vital activity. We can agree with the definition of health suggested by the Medicine Encyclopedia [16]: "Health is the quality of human vital activity, described by its perfect adaptation to impact... of the factors of the natural environment,... which is ensured by normal functioning of all organs and... systems of an organism..., which manifests itself in... welfare of an individual at various types of its active... activity". The attention is drawn to the possibility of qualitative fulfillment by a human of his labor function. A healthy human has reserves of adaptive capacity of the organism for fulfillment of "various types of active and labor activity" and a sick person does not have these reserves. Summarizing the opinions of a series of authors [6, 10, 16, 20, 21, 22, 25, 26], we come to the conclusion that it is the reserve of adaptive capacity of an organism that is the most important indicator, the predictive parameter, the means of forecasting, i.e. the predictor of health. Without this reserve, the human health cannot take place at any other conditions. Improvement of the health potential is, first of all, the increase of reserves of the adaptive capacity of an organism.

CONCLUSION

In 2009, a decree of the Government of the Russian Federation initiated nationwide development of diagnostic packages of evaluation of physical health and functional reserves of an organism. In Russia, the following scientists study the problem of functional reserves of an organism: V.P. Kaznacheev, N.A. Agajanyan, S.M. Razinkin, A.O. Tolokonkin, S.L. Panasenko, V.I. Dontsov, V.N. Krutko, I.P. Bobrovitsky, O.D. Lebedeva and many other scientists [15, 13, 26, 27, 28, 29, 30, 31]. The importance of this factor of personal health is acknowledged by the opinions of both Russian scientists and the Government of the Russian Federation (including the Ministry of Health of Russia). Many scientists abroad also work on this problem [4, 7, 32-46].

Summary: To summarize the above:

- Human health is a state of an organism, which ensures high quality of vital activity.
- High quality of vital activity is ensured by the existing ability to adapt to the impact of environmental factors.

- Further search for a methodological basis, generally acknowledged criteria and methods of studying the adequate indicators of the health quantity, including the age-related ones, is required.
- To set the direction of further practical research, we bring out the hypothesis that the reserve of adaptive (compensatory adaptive) capacity is the predictor of individual health of a human.

The authors enclose gratitude to N.B. Kalugina for highly intelligent technical support.

REFERENCES

1. Andreev, E.M., 2002. Possible Causes of Longevity in Russia during 1990s. *The Issues of Statistics*, 11: 3-15.
2. Vishnevsky, A.G., 2003. The Great Underpopulated Power. *Russia in the Global Policy*, 1(3): 54-72.
3. Lazebnik, L.B. and Y.V. Konev, 2008. Demographic Aspects of the Population Ageing in Moscow, Russia and CIS Countries. *Clinical Gerontology*, 12: 3-6.
4. Gu, D., J. Sautter, C. Huang and Y. Zeng, 2011. Health Inputs and Cumulative Health Deficits among the Older Chinese. *Social Science & Medicine*, 72(5): 806-814.
5. Lisitsyn, Y.P., 1987. *Guidance in Social Hygiene and Healthcare Arrangement*, Vol. 1. Moscow: Medicine, pp: 10.
6. Shcherbakova, N., 2013. Health and Non-health. Where is the Boundary? *Medportal*. Date views: 04.04.2013 http://www.psj.ru/saver_magazines/detail.php?ID=7090
7. Ahnquist, J., S.P. Wamala and M. Lindstrom, 2012. Social Determinants of Health-A Question of Social or Economic Capital? Interaction Effects Of Socioeconomic Factors On Health Outcomes. *Social Science & Medicine*, 74(6): 930-939.
8. Chimarov, V.M. and N.N. Malyarchuk, 2011. The Culture of Health of a Teacher in its Function as the Basis of Formation of a Healthy Personality in the Cultural and Informational Education Space. *Valeology*, 2: 80-85.
9. Davydovsky, I.V., 1956. *Pathological Anatomy and Pathogenesis of Human Diseases* (Edition 3, revised and supplemented), Vol. 1. Contagious Diseases. Moscow: Medgis, pp: 662.
10. Davydovsky, I.V., 1962. *The Problem of Causation in Medicine (Etiology)*. Moscow: Medicine, pp: 237.
11. Amosov, N.M., 1978. *Health Considerations*. Moscow: Molodaya Gvardiya, pp: 191.
12. Amosov, N.M., 1981. *Health Considerations* (Edition 3, revised and supplemented). Kemerovo: Kemerovo Publishing House, pp: 176.
13. Kaznacheev, V.P. *et al*, 2002. *Survival of the Population of Russia. The Problems of the Sphynx XXI* (Edition 2, revised and supplemented). Novosibirsk: The Novosibirsk University Publishing House, pp: 463.
14. Glazachev, O.S., 2013. Modern Approaches to the Analysis of the Health Concept from the Perspective of Formation of Environmental Culture. *Ecology. Date Views* 19.05.2013 <http://www.ecogeo.info/publications/7>
15. Bobrovitsky, I.P., 2012. Evaluation of Functional Reserves of an Organism and Detection of Persons who are in the Risk Group for Common Diseases. *The Problems of Balneology, Physiotherapy and Remedial Gymnastics*, 6: 40-43.
16. *Dictionaries and Encyclopedia at Academic*. Date views: 17.05.2013 http://dic.academic.ru/dic.nsf/enc_medicine/12104
17. Canter, D. and L. Nanke, 1995. Can Health be a Quantitative Criterion? A Multi-Facet Approach to Health Assessment. *Towards a New Science of Health*. London, pp: 183-200.
18. Makovetskaya, A.K., V.N. Fedoseeva and O.V. Mislavsky, 2010. Development of an Extended System of Immunological Indicators for Evaluation of the Impact of Environmental Factors on the State of Population Health. *Hygiene and Sanitary*, 1: 11-12.
19. Maximova, T.M. and N.P. Lushkina, 2011. The Peculiarities of the State of Health of Various Types of Population. *Problems of Social Hygiene, Healthcare and Medicine History*, 1: 3-7.
20. Amosov, N.M., 1964. *Regulation of Vital Functions and Cybernetics*. Kiev: Naukova Dumka, pp: 115.
21. Selye, H., 1979. *Stress without Distress*. Moscow: Progress, pp: 108-111.
22. Malyarchuk, N.N., 2008. *Valeology. Study Guide*. Tyumen: The Tyumen State University Publishing House, pp: 270.

23. Kalyu, P.I., 1988. The Entity Characteristic of the Health Concept and Certain Issues of the Healthcare Modernization: Survey Information. Moscow: VNIIMI, pp: 69.
24. How WHO Determines Health? Date views 22.05.2013 <http://www.who.int/suggestions/faq/ru/>
25. Kaznacheyev, V.P., 1983. Essay of the Theory and Practice of the Human Ecology. Moscow: Nauka, pp: 260.
26. Konovalov, V.V., 2006. Totally Different Medicine. Moscow: Russkaya Kniga, pp: 416.
27. Agajanyan, N.A., 1983. Adaptation and Reserves of an Organism. Moscow: Fizkultura I Sport, pp: 176.
28. Agajanyan, N.A., 1989. Biorhythms, Sport, Health. Moscow: Fizkultura i Sport, pp: 208.
29. Agajanyan, N.A., 1986. Functions of an Organism in the Circumstances of Hypoxia and Hypercapnia. Moscow: Medicine, pp: 272.
30. Krupko, V.N. and V.I. Dontsov, 2011. Methodological Approach to the Qualitative Assessment of the Human Ageing Diagnostics. Herald of Recreational Medicine, 6: 55-59.
31. Razinkin, S.M., A.O. Tolokonkin and S.L. Panasenko, 2012. Methodological Aspects of Assessment of Health Level in Medicine. Literature Review. Physioterapist, 3: 33-42.
32. Zhang, W., Q. Chen, H. Mccubbin, L. Mccubbin And S. Foley, 2011. Predictors Of Mental And Physical Health: Individual And Neighborhood Levels Of Education, Social Well-being and Ethnicity. Health & Place, 17(1): 238-247.
33. Graven, L.J. and J.S. Grant, 2013. Coping And Health-Related Quality Of Life In Individuals With Heart Failure: An Integrative Review. Heart & Lung: The Journal of Acute and Critical Care, 42(3): 183-194.
34. Ross, A., E. Friedmann, M. Bevans and S. Thomas, 2013. National Survey Of Yoga Practitioners: Mental And Physical Health Benefits. Complementary Therapies in Medicine, 21(4): 313-323.
35. Norman, P. and L. Fraser, 2013. Self-Reported General Health and Body Mass Index: a U-Shaped Relationship? Public Health, 127(10): 938-945.
36. Galán, I., C.M. Meseguer, R. Herruzo and F. Rodríguez-Artalejo, 2010. Self-Rated Health According To Amount, Intensity And Duration Of Leisure Time Physical Activity. Preventive Medicine, 51(5): 378-383.
37. Attema, A.E., W.B. Brouwer and O. l'Haridon, 2013. Prospect Theory in the Health Domain: A Quantitative Assessment. Journal of Health Economics, 32(6): 1057-1065.
38. Crytzer, Th.M., B.E. Dicianno and R. Kapoor, 2013. Physical Activity, Exercise and Health-related Measures of Fitness in Adults with Spina Bifida: A Review of the Literature. PM&R, 5(12): 1051-1062.
39. Eriksen, L., T. Curtis, M. Grønbaek, J.W. Helge and J.S. Tolstrup, 2013. The Association between Physical Activity, Cardiorespiratory Fitness And Self-Rated Health. Preventive Medicine, 57(6): 900-902.
40. Adams, B.J., J.G. Carr, A. Ozonoff, M.S. Lauer and G.J. Balady, 2008. Effect of Exercise Training in Supervised Cardiac Rehabilitation Programs on Prognostic Variables from the Exercise Tolerance Test. The American Journal of Cardiology, 101(10): 1403-1407.
41. May, A.M., E. van Weert, I. Korstjens, J.E. Hoekstra-Weebers, C.P. van der Schans, M.L. Zonderland, I. Mesters, B. van den Borne and W.J. Ros, 2010. Monitoring Training Progress during Exercise Training in Cancer Survivors: A Submaximal Exercise Test as an Alternative for a Maximal Exercise Test? Archives of Physical Medicine and Rehabilitation, 91(3): 351-357.
42. Downing, J. and G.J. Balady, 2011. The Role of Exercise Training in Heart Failure. Journal of the American College of Cardiology, 58(6): 561-569.
43. Beniamini, Y., J.J. Rubenstein, L.D. Zaichkowsky and M.C. Crim, 1997. Effects of High-Intensity Strength Training on Quality-of-Life Parameters in Cardiac Rehabilitation Patients. The American Journal of Cardiology, 80(7): 841-846.
44. Roberts, E., F.K.W. Li and K. Sykes, 2006. Validity Of The 6-Minute Walk Test For Assessing Heart Rate Recovery After An Exercise-Based Cardiac Rehabilitation Programme. Physiotherapy, 92(2): 116-121.
45. Murphy, M.H. and E.M. Murtagh, 2013. Physical Activity: Beneficial Effects. Encyclopedia of Human Nutrition (Third Edition), pp: 33-38.
46. Murton, A.J. and P.L. Greenhaff, 2013. Resistance Exercise and the Mechanisms of Muscle Mass Regulation in Humans: Acute Effects on Muscle Protein Turnover and the Gaps in our Understanding of Chronic Resistance Exercise Training Adaptation. The International Journal of Biochemistry & Cell Biology, 45(10): 2209-2214.