

Laws of Thermodynamics and Public Health

Apanasenko GL*

Department of physical and rehabilitation medicine of the National medical academy of postgraduate education the name of P.L. Shupik, Kyiv, Ukraine

***Corresponding Author:** Prof. Apanasenko GL. Department of physical and rehabilitation medicine of the National medical academy of postgraduate education the name of P.L. Shupik, Kyiv, Ukraine.

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Abstract

A human organism is examined as an open thermodynamics system. Her stability at influence of unfavorable factors of environment is determined by potential of her energy. The index of this energy is maximal aerobic power (maximal consumption of oxygen). It is an index in the ml/of min/mass of body can be considered quantitative description of somatic health. Having a quantitative index, it is possible to manage a health. The phenomenon of «safe» health level is first described, endogenous risk and disease factors do not register oneself higher than that. Him quantitative description is given to. On leaving of individual from the «safe zone» of health the phenomenon of «selfdevelopment» of pathological прооцеcca is formed. It is necessary in addition to «industry of illness» (establishments of ministry of health) forming of «industry of health», in basis of that maintenance and increase of aerobic power potential of the biosystem at population level. Industry of health must be important part of public health.

Keywords: *Thermodynamics conception of health; Health level; «industry of health»; Thermodynamics strategy of health protection; Public health*

Introduction

The system of public health is basis of prophylactic medicine. She is sent to maintenance of health of population and reduction of volume of charges on medical service. In the field of attention of the system of public health there are practically healthy people. They must be engaged in the measures of primary prophylaxis, including chronic nonfectious diseases - cardiovascular, malignant, endocrine, respiratory system. In case of manifestation of disease or finding out endogenous risk factors practically healthy people pass to the digit of patients. Is it possible to prevent this process? It is possible, if we will be able to control a health of man level. But how to do it?

The greatest problem of modern health protection is chronic noninfectious diseases (CND). In the developed countries they come forward as reason more than in 80% of all cases of death. The stake of deaths is especially high from the diseases of the cardiovascular system, here is a permanent height of this index. The government and international programs (for example, CINDI) did not change a situation. Appeared, that a hope to improve the health of population due to conception of risk factors is illusive, because a fight against them does not diminish the amount of diseased. This conception answers a question “how” does not answer a question “why”. All anymore appears works in that a reasonable doubt speaks out concerning ability of traditional prophylactic approaches to influence on a general death rate [8, 9 and other]. Classic endogenous risk factors in a

number of situations can come forward risk indicators, predicting the origin of illness, but their correction improves a prognosis not necessarily. In addition, there is the phenomenon "of pumping over of death rate" [8], when the decline of death rate from one diseases is accompanied by the increase of death rate from other, not giving a result from the point of view of increase of life-span [13].

In an order to estimate evidentialness of statement, in accordance with that the multivariable prophylaxis of ischemic heart disease (IHD), sent to the correction of traditional risk factors, provides the decline of general death rate, I. Gundarov a.o. [8] undertook a fundamental study, that an analysis of efficiency of the known prophylactic programs is the basis of from the point of view of evidential medicine.

As material the results of the large multivariable programs making "the gold" fund of epidemiology of uninfected diseases and medical prophylaxis are used. The conducted analysis showed that from 23 programs only in one a general death rate diminished, in three increased, in other the distinction appeared unreliable. The same a null-hypothesis about ability of traditional multivariable prophylaxis of IHD to influence on a general death rate was not confirmed.

It is necessary to underline that a death rate did not diminish even at the expressed decline of endogenous risk factors. It suggests an idea, that they really are risk indicators helping to forecast an unfavorable situation, however their minimization (removal) improves a prognosis. The participants of the prophylactic programs establish: «Researches of multivariable primary prophylaxis on the decline of cardiovascular diseases generated disappointing results ... distinctions of general and coronal death rate between the groups of interference and control appeared reduce ». [15]. Drawn conclusion about prematurity of distribution of this approach on a practical health protection [14]. To the analogical conclusion researchers came at the analysis of the later multivariable prophylactic programs, published in «bible» of evidential medicine - Cochrane review [12]. Validity of fear is confirmed by the height of death rate shown in a number of the considered projects on the start of prophylaxis, that means an increase in the groups of interference of number of the lost years of life.

Absence of convincing proofs of efficiency of the programs of multivariable prophylaxis of IHD in regard to the decline of cardiovascular and general death rate puts on an order-paper the question

of changing of existent paradigm of medical prophylaxis and development of the new going near forming of healthy way of life and strengthening of health of population. Development of innovative organizationally-functional model of warning of surplus death rate is required from noninfectious diseases, strategy of individual mass prophylaxis, being based on principles of measuring of backlogs of health of man, can be fixed in basis of that [3, 4].

Theoretical bases

Nothing in the world takes place without the expenses of energy. It touches and life as process [6,19 a. o.]. And than more energy-potential of the biosystem, the she steadier to external and internal influences [3, 6]. Formation of energy in the living system is a process of transformation of sunny energy in other types of energy. An eventual link of formation of energy in the living system and her accumulator are mitochondries. Efficiency of their activity at organism level shows up in maximal possibilities of aerobic energy (maximal consumption of oxygen - MCO, ml/min/kg). Thus, viability of the biosystem is characterized by her energypotential that can be identified with a somatic health level measured [2]. And it means that it is possible to manage (to control, save, restore, strengthen) viability by a health.

In the process of evolution there is perfection of efficiency of the intracellular breathing [10], i.e. exists for form's sake Homo Sapiens the evolutional conditioned threshold that we named a «safe» health level (SHL) and gave quantitative description to him [1, 2]. Higher SHL (12 MET for men and 10 MET for women) register oneself neither endogenous risk of chronic uninfected diseases (cardiovascular, malignant, endocrine and other) factors nor diseases.

At influence of negative factors of environment, unhealthy way of life, aging, etc. there is a decline of efficiency of intracellular form energy. In accordance with thermodynamics conception of health and prophylaxis [1] the exit of efficiency of intracellular form energy outside SHL is accompanied by the phenomenon of «selfdevelopment» of pathological process and is primary cause of epidemic of CND (a decline of energypotential is a height of entropy - chaos of functions - pathology). At distribution of similar changes in the scale of population, except development of epidemic of CND, an aging rate is accelerated, a reproductive function suffers, the physical and i psychophysical internalss of and other go down, i.e. the phenomenon of biological degradation of Homo Sapiens is formed [5].

First reaction of organism on a defect ATP in cages is an increase of arteriotony [7]. Thus, fight against endogenous risk of development of CND factors without the increase of energypotential of the biosystem to the level conditioned by an evolution (SHL), - ineffective. Researches of Myers J. [16] confirmed our the data that subzero indexes of aerobic capacity are more powerful predictor of cardiovascular morbidity and general death rate, what other cardiovascular risk factors, such as a hyperpispies, smoking, lipidemia and diabetes mellitus. An Aspenes S. a.o. [11] in researches of the healthy Norwegian population confirmed our the data about the presence of SHL, showing that every decline of MCO on 5 mls/mines/kg below SHL increases the risk of development of cardiovascular pathology on 56%. To the present tense metaanalysis of publications appeared on this issue, that confirms the indicated conformities to law [18]. We will bring also the most complete and evidential research over of the American scientists from Medical Center of veterans in Washington. They from 1986 to 2008 watched 5314 veterans of war of the USA (P. Kokkinos, J. Mayers a.o.). Appeared, that every increase of maximal aerobic ability on 1 MET reduced the risk of death on 13%. F. Booth a.o. (20) generalized these data and presented them as a chart. Pays attention on itself catastrophic height of death rate, since maximal aerobic power in 10-12 MET (35-42 mls/of kg/of min).

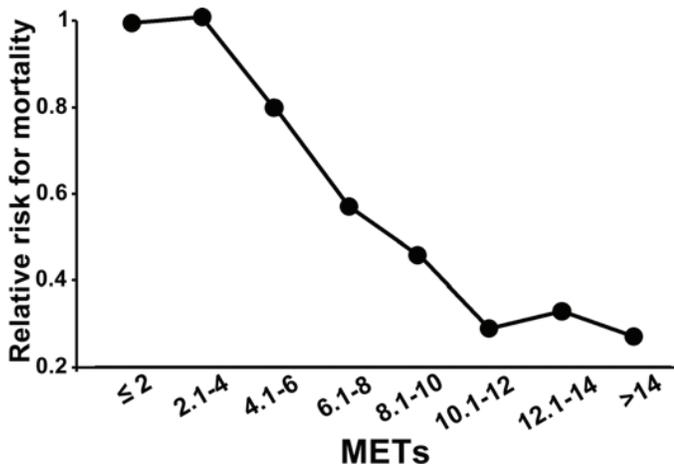


Figure 1: Risk of death for the veterans of war of the USA depending on MCO (20).

Using the materials of population researches of maximal aerobic ability, got in different years, it is possible to mark important conformity to law, touching biological nature of modern man : for the last 60-70 years the population level of maximal aerobic ability

substantially went down and on the average goes out outside the «safe zone» of somatic health (figure 2). Coming from foregoing, there are all grounds to suppose that herein and direct reason of epidemic of chronic noninfectious diseases, staggering the industrially developed countries from the second half of the XX century, consists.

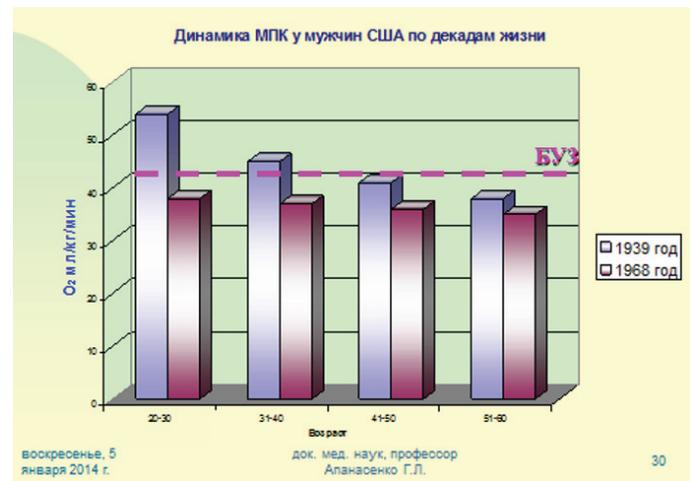


Figure 2: Dynamics of indexes of MCO on the ten-years periods of life in the population of men of the USA from 1939 to 1968 (Andersen K.L., a.o., 1978). «БУЗ» - is a «safe health level»

Thus, morbidity and death rate of modern population are conditioned, mainly, by the decline of energypotential of the biosystem (health level), and CND - only investigation of this process.

Actually, nobody of drivers will search direct reason of failures in-process car, if an accumulator is discharged. And doctors search the hidden reasons of illness until now. Although here they - lie on a surface: mitochondries, i.e. intracellular accumulators, is discharged.

In spite of all complication of organization living there are three major components of the living system (cages), providing life: accumulator of energy, delivery of high quality substrat and oxidant system for his incineration, and also system of selection of exhaust foods to the vital functions. And all this is managed by a complex regulative center being, in turn, from the nervous system, system of the endocrine adjusting and immunity. If function of these all of the tools living will be accordingly provided, the system will exist infinitely long. Sanocentric strategy of health protection consists herein.

Pathocentric strategy of health protection is realized in practice of health protection, in the spotlight of that pathological process. To expect the substantial strengthening of health of population at financing mainly of sphere of curatively-diagnostic help senselessly. (To hope on it - however, that to expect the decline of criminality at a fight against her in prisons). Pathocentric strategy is fraught the crisis of health protection, because new technologies of diagnostics and treatment with every year become all more expensive and already inaccessible to the ordinary patient.

In respect of the sanitary-hygenic providing, then it shows by itself, in fact, passive way of warning of pathology, and does not relate to strengthening of the open thermodynamics system, which an organism of man is.

Ways of decision of problem

Substitution of concepts a «health» and «illness» at the level of state and territorial administration result in the acceptance of wrong administrative decisions: we talk about a health - we imply illnesses.

An innovation allowing during the nearest years to provide reproduction and forming of new high quality of human capital is creation of the «industry of health» (in addition to existent «industry of illness» - establishments of Ministry of health), built on sanogenetic conception. At the investment of facilities in a health practically healthy man the necessity of financing of problems of sick people will diminish appropriately.

Presently independently without participation of the state industry of health is formed as centers of fitness, shaping, health centers of and other. But they are created without a due scientifically-technological ground, approach of the systems, professional and application of management technologies by a health.

We are give definition of category «individual health» with the use of operational criteria (id est such that can be reproduced identified) and a case frame is created by the health of man [2]. Health it is ephemeral not «well-being», as WHO asserts, but ability of individual to carry out the biological (survival and reproduction) and social functions.

Only at joint determination of indexes of health and illness and their comparison it is possible to talk about the prognosis of the state of health of concrete man and present for him diseases, and also determine correct strategy and tactics of making healthy and

treatment. Making healthy must come true constantly, and treatment - if necessary.

In connection with the stated, management by vital functions and health of man must come true by a management by energypotential of the biosystem - physical activity (perfection of function of mitochondries), feed (i.e. by the consumption of energy, information and substance), optimization of internal environment of organism (leadingout of foods of exchange); by a recreation, preparation to realization of reproductive function of and other.

Orientation on treatment of patients, but not on maintenance and strengthening of health resulted in that now there are hundreds of specialities and specializations on illnesses, and there is not a single scientifically-confessed medical speciality, investigating the phenomenon of health. Hygienical science studies influence of factors of environment on morbidity and death rate, and essence and phenomena of health do not investigate.

Everybody must save, strengthen and responsible for an own health, health native and near. But for this purpose he must be well-informed about essence of problem.

Conclusions

Existent conception of prophylaxis of chronic noninfectious diseases as a fight against risk factors can not be confessed by successful. On changing thermodynamics conception of prophylaxis must come her. A human organism looks like any other mechanism: for his functioning energy is needed. It is well-proven by us, that a level of intracellular formation of energy is, neither endogenous risk factors nor diseases register oneself higher than that. Him quantitative description (12 MET for men and 10 MET for women is a «safe health level») is given to. On leaving the phenomenon of «selfdevelopment» of pathological process shows up from the «safe zone» of health. It is necessity in addition to «industry of illness» (curative establishments) forming of «industry of health», in basis of that maintenance and increase of aerobic power potential of the biosystem at population level. Thus, «Industry of health» must be important part of public health.

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