Psychological State of a Person as A Factor Assessment of The Prenosological Level of Public Health

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Abstract
The article shows the development of a continuous functioning technology for remote automated monitoring of the socio-psychological state of the population to determine the prenosological level of individual health, which allows to optimize medical non-invasive mass screening of the population. The technologies and their implementation are shown to ensure functioning with the use of information and communication technologies, mobile communications, methods of automated remote exchange, accumulation, storage of information, as well as with the involvement of medical knowledge, mathematical models and algorithms for their data mining socio-psychological state population, development and implementation of preventive measures, which are effective mechanisms to ensure health of the healthy people's.

The healthy general condition of the body depends not on the sense of the physical condition, but also on the socio-psychological state of the person. This means that many practically healthy people are meteorological, poorly protected from social and psychological stress, and over time this will turn a healthy person into a patient [19]. Thus, one of the main tasks of health care is to know the level of the socio-psychological state of a person in order to maintain the healthy state the population. This puts its prognostic aspect at the head of the health problem: the need to predict the individual trajectory of movement from health to illness. The medicine of the future must focus on maintaining the healthy state of human. Nowadays, the term "health" is often interpreted as the absence of disease. The World Health Organization has defined health as a complex of physical, mental and social well-being. The science of health is an integral one, which is formed at the junction of many sciences, it should be based on the science of human health, who lives in a real complex world, saturated with stressful influences arising from changes in many factors of the surrounding biosocial environment, which takes away part of his state of health and leads to the so-called "third state". The concept of the third state in assessing human health is actually based on the laws of ancient medicine, set forth more than a thousand years ago by the famous physician and philosopher Abu Ali Ibn Sina - Avicenna, who identified six states of human health: the body is healthy to the limit; the body is healthy, but not to the limit; the body is not healthy, but not sick; a body that easily perceives health; the body is sick, but not to the limit; the body is sick to the limit

[1]. Of these conditions, only the last two are related to disease. Between the two extreme levels of health (according to Avicenna) - we distinguish five transition states with varying degrees of stress in regulatory systems: with normal, moderate, pronounced, pronounced and overstrain [2]. Consequently, the transition from health to illness occurs through overstrain and disruption of adaptation mechanisms. And the sooner it is possible to foresee such an outcome, the more likely it is to maintain health. Health is viewed as a process of continuous adaptation of the body to environmental conditions, and the measure of health is the adaptive capacity of the body. At the same time, a number of noted transitional states, called prenosological, arise between health and disease. The listed moments, together with the unsolved problems of rational organization and management of the lifestyle of the majority of the population, are the basis for the massive occurrence of prenosological disorders and their inevitable transformation into certain forms of pathology, as well as part of the global problem of maintaining health. For example, the results of mass preventive examinations showed that from 50 to 80% of the population is at different stages of prenosological conditions [3]. Thus, most people do not need medical diagnostics (diagnostics of diseases), but prenosological diagnostics, i.e., in determining the degree of decrease in the adaptive capabilities of the organism.

Recognition of these functional states, reflecting the outcomes of adaptive behavior, is called prenosological diagnostics (PD), since this determines the conditions preceding the development of noso-

logical forms of diseases. This is precisely the prognostic aspect of PD, which recognizes the current functional state of the body.

The purpose and objectives of the study. Today, the prevention of diseases is the most important priority task of public health, aimed at developing motivation among the population for a healthy lifestyle (healthy lifestyle), strengthening the physical and mental health of a person and maintaining the well-being of the population. This task is undoubtedly paramount among others in health care reform, taking into account the most significant economic effect associated with preserving people's health, labor potential, as well as a significant decrease in the population's need for medical care. The priority of prevention and healthy lifestyle is postulated in the decree of the government of the Republic of Uzbekistan for the implementation of measures for the prevention of diseases, promotion of healthy lifestyle and the formation of a sanitary and hygienic culture among the population, is defined as the main direction of preventive medicine. At the same time, it is envisaged to ensure early detection of diseases by organizing high-quality preventive examinations, ensuring that preventive measures are carried out in full and introducing their systemic monitoring as the primary tasks of the republic's health care system. In connection with the above, the urgent task of the health care system at the present stage, along with an increase in the efficiency of nosological treatment and diagnostic processes, i.e. treatment of those already ill, is the organization of mass prenosological examinations to assess the level of the functional state of the body of the population and the introduction of their systemic monitoring, early detection of risk factors (RF) and, if necessary, the implementation of preventive measures to correct them, ensuring the preservation of the health of healthy people. An important task of preventive medicine is to search for direct tools of prenosological diagnostics and their publication as innovations in the provision of services in the social sphere and is aimed at examining practically healthy individuals in order to identify RF, latent and unrecognized cases of diseases. Thus, it allows early identification of developing diseases before the onset of clinical symptoms; select the system or organ that requires priority action. Ultimately, it allows an increase in the level of health of the population, which is one of the priority areas of modern medicine. In this aspect, the development and implementation of new approaches and methods that could improve the quality, reliability, mass character and targeting of prenosological diagnostics are especially relevant.

Methods and methodologies. In the prenosological examination of a person, the main attention is paid to determining the level of vital functional capabilities of the cardiorespiratory, muscular, central and autonomic nervous systems, coordination-motor and morphological characteristics and regulatory mechanisms, as well as the socio-psychological state of a person [5-8]. These indicators are significant for determining predictors of the development of pathological conditions, identifying risk factors, and also for assessing the effectiveness of individual rehabilitation programs. Thus, in contrast to sick people - patients of clinical and polyclinic institutions, the objects of prenosological diagnostics are, as a rule,

practically healthy people. In this type of examination is determined, on the one hand, by the form and content of the conclusions they receive, on the other, their interest depends on the comfort of the diagnostic and correction technologies used.

A comprehensive assessment of the level of prenosological functional states of the body and indicators of its health and the use of modern information technologies allows: to create a data bank on the state of health and to conduct long-term automated monitoring of changes in the functional state of the body of the population, to carry out their correction aimed at an optimal and broad physiological and socio-psychological adaptation of the individual; to assess the impact of exogenous and endogenous influences on health and the effectiveness of health-improving and corrective measures. Speaking about measures for correcting health and preventing diseases, it should be borne in mind that this entire complex is used at the preclinical stage and is designed for the mass consumer who does not have medical knowledge. Accordingly, we can only talk about means of non-drug correction of health (healthy lifestyle, rational nutrition, physical activity, personal hygiene, psychocorrection of communication, etc.). PD helps to develop systems for dynamic monitoring of the health of the adult population, even at home, without going to a medical institution.

PD is distinguished: prenosological screening is the selection of people with certain functional states for the subsequent solution of issues of their health improvement; prenosological control - dynamic monitoring of the functional state of practically healthy people.

Monitoring the general state health of healthy people, that is, prenosological control, is a practical step towards dynamically assessing the socio-psychological state, the state of regulatory systems, identifying the most initial manifestations of their over-voltage, both in the whole organism and in individual organs and systems, and their timely correct. The volume of this work, if it covers the entire contingent of the population, will be tens of times more than now in the health care system, where work is carried out only with already sick parts of the population. Therefore, the implementation of monitoring the socio-psychological and physical condition of healthy people using traditional methods, using the capabilities available in the system, is difficult, and sometimes even impossible. The process of prenosological research in all cases is a process of recognition using both simple logical rules and complex mathematical techniques. But it is always distinguished by non-invasiveness, comfort and short diagnosis time. One more important methodological principle of prenosological diagnostics should be mentioned, which consists in the use of information-intensive research methods. This means that with the minimum examination time and its methodological simplicity, extensive and valuable information should be obtained, allowing to draw important conclusions about the state of vital systems and the psycho-emotional state of the population [16-17]. This principle is fundamental in the development of specific technologies, the algorithm for its implementation and the rules and knowledge used in

this case. In this regard, it is relevant to attract for the solution of these problems, the modern possibilities of information and communication technologies, mobile communications, methods of automated remote exchange, accumulation, storage of information, as well as mathematical methods and algorithms for their intellectual analysis. As a result of their introduction into the practice of mass surveys of the population, it becomes possible to develop and implement preventive measures, which are effective mechanisms to ensure the preservation of healthy people.

To date, a number of systems and mobile applications have been developed for monitoring and tracking health [11-13]. The issues of the need to create and implement remote monitoring of human health indicators as a means of improving the quality of medical care for patients and the main features of creating a specialized automated system for these purposes are considered in [14]. New opportunities in early and individualized prenosological diagnosis are opened by information technologies [11], which are a useful tool for accurate and standardized assessment of the result of external factors on the health and general physical condition of a person, which are methods of early prenosological diagnosis.

Research results. The technology, algorithms and software and mathematical software developed by us for remote automated monitoring of the socio-psychological state for determining the prenosological level of individual health will allow us to optimize dispensary examinations of the population, ensure their necessary coverage, they are low-cost, operate continuously and, when using modern algorithms for recognizing given signs, are intelligent ...

A prerequisite for the implementation of the project is the assignment of the role of a correspondent for receiving, transmitting and receiving personal electronic medical data to the population itself. At the same time, in order to minimize financial costs for the purchase of foreign medical gadgets, it is necessary to train the population to receive data on the morpho-functional parameters of the body using non-invasive and publicly available methods and send them to the appropriate health center serving its territorial

unit - the module using a personal mobile phone. The hardware and software of each such module requires a mobile communication device with the necessary parameters and an Internet connection. All such means of mobile communication will be equipped with software tools developed by us and interfaces for exchanging information with the server of our health center. This will make it possible to put into practice the principle - a mobile patient - a virtual doctor. By creating this principle individual monitoring of the prenosological level of health, and organizing its modular functioning for a specific contingent of the population [17].

The described modular principle and mechanisms of remote monitoring of the socio-psychological state to determine the prenosological level of individual health, as a pilot project, we are implementing among the student contingent of the Fergana Medical Institute of Public Health. In this technology, using the effective non-invasive methods for assessing the level of health described in the literatures [5-10], we provide the implementation, based on individual indicators of students and medical knowledge bases (formed from literature data on quantitative and qualitative criteria for assessing certain indicators of health organism), remote individual assessment: the method "Mental Equilibrium" developed by S. Stepanov, the method of Heck and Hess "Express diagnostics of the likelihood of neurosis", the method "Determination of the level of personality conflict" allowing to assess their somatic health ... The study involved students, boys and girls from the ages of 20 to 27.

The following assessment of the socio-psychological state was obtained according to the general method of somatometry: the method of "Mental Equilibrium" developed by S. Stepanov, the subject is asked to determine the degree of his poise, calmness and spiritual harmony, by answering the questions according to the instructions, the interpretation of the results is calculated by the number of points collected and according to a certain "key" divided into three groups, balanced, preserve mental balance and the verge of mental explosion.
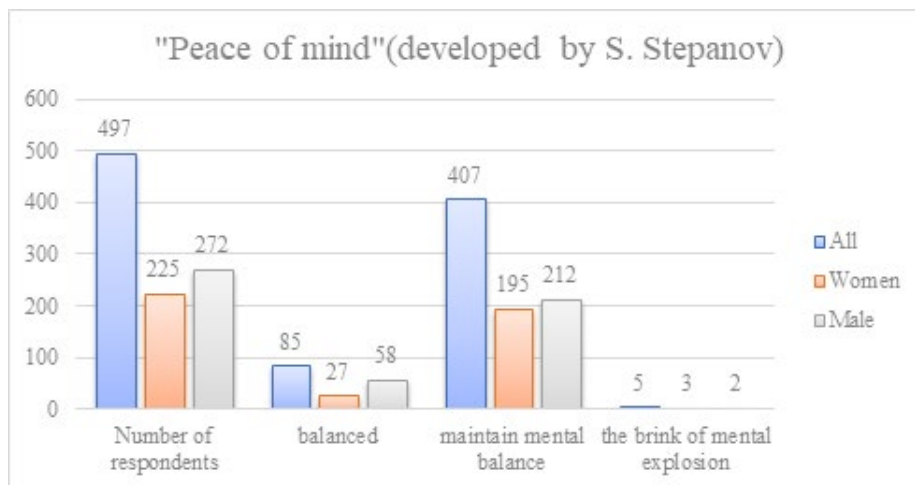
The simplified algorithm for prenosological diagnostics describes well the functional states, where a stable relationship between the main physiological parameters remains. According to the task of studying the functional status, the value of the indicators of the physiological reserves of the respiratory system of the Shtange and Gench tests was obtained. The data obtained reflects the power levels and efficiency of aerobic energy production. To determine the resistance to hypoxia, the index was calculated - the ratio of the heart rate at rest to the duration of inspiratory apnea.
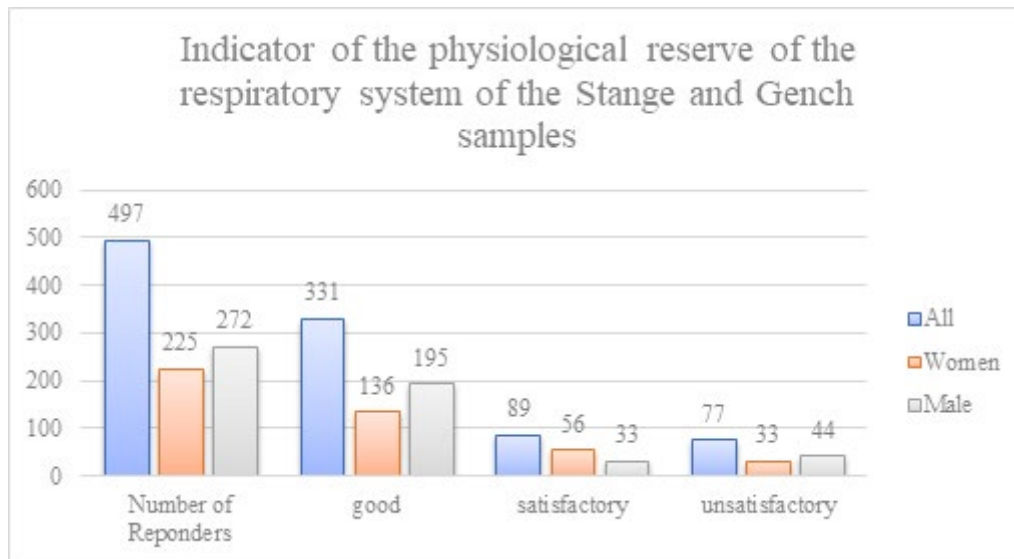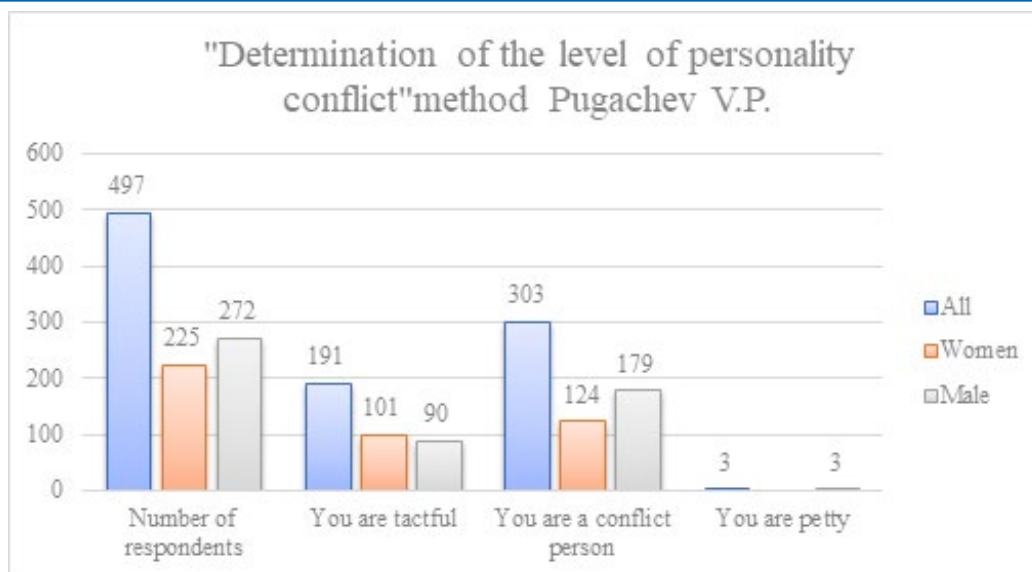

One of the informative socio-psychological state for prenosological integral indicators reflecting the likelihood of neurosis is the method of express diagnostics of the probability of Heck's and Hess's neurosis, which allows us to identify the degree of likelihood of neurosis. To determine it, it is necessary to count the number of affirmative answers in the questionnaire, which shows two degrees of neurosis probability: low neurotization and indicates emotional stability; the likelihood of neurosis (neurotization) which indicates a pronounced emotional excitability.
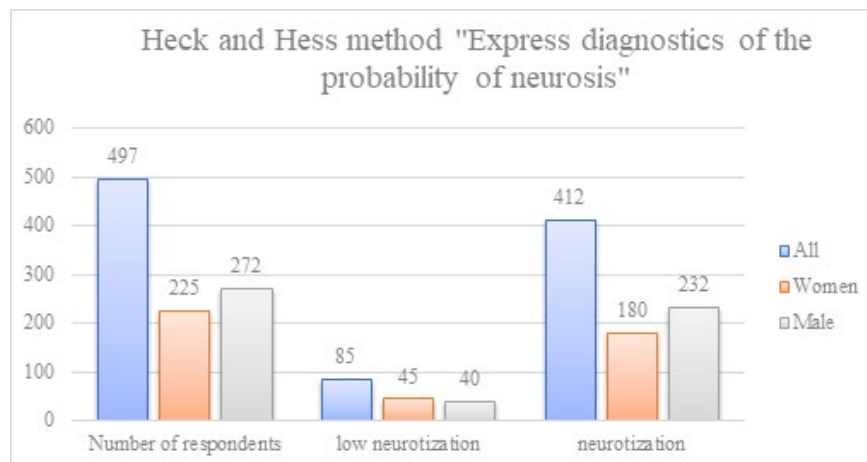
To determine the level of personality conflict, depending on the goals of this work, certain models can be used. The choice of the model depends on the purpose of the study. At this point, different methods are used, for example, the questionnaire of A. Bass - A. Darki - to determine the individual level of personality aggressiveness (proposed in 1957), diagnostics of MLO is a method for studying relationships in a small group, created by T. Leary, T. Leforge and R. Sazek (1954), the personality questionnaire of G. Eysenck, the 16-factor personality questionnaire of Cattell, the scale of reactive and personal anxiety developed by the American psychologist C. Spielberger, the method "Q-sorting" proposed by H. Zalen and D. Stock, questionnaire K. Thomas designed to determine the strategies of behavior in conflict situations, the test "Conflict personality" developed by V.P. Pugachev (2003), which we have chosen in this work. The test consists of 11 questions, the investigated object must choose one answer out of three possible for each question. The answers received are scored according to the key.

"Determination of the level of personality conflict" method Pugachev V.P.

It should be noted that the perspective of the transition of a prenosological state into a disease is determined by the adaptive capabilities of the organism and, in particular, the regulation of the psychological state. Therefore, information technologies aimed at assessing the social and psychological state of a person should take an important place in promising systems of medical control, since, as already indicated, it is the overstrain of the nervous systems, as well as the associated decrease in functional reserves, which is one of the main risk factors for the development of diseases. [6].

The level of functional reserves, which we monitored according to the Kournikova method, is an independent prenosological indicator of health that adequately reflects the state of the body's adaptation systems to the adverse effects of the environment [7]. Moreover, it is the most sensitive and dynamic criterion for identifying priority risk factors. Note that the survey scenario depends on the purpose of the prenosological examinations and may vary depending on the tasks and volume of the studies being carried out.

Software for evaluating the results of information analysis and the formation of conclusions is the most important and main part in the technology of prenosological studies [18]. The issues of constructing recognition algorithms for various classes of prenosological conditions are the main ones in solving the problems of automating mass prenosological diagnostics associated with the examination of large contingents of the population. Here it is necessary to select the most informative indicators, to minimize them with the development of optimal decision rules. An algorithm, as an exact prescription about the order of performing a certain system of actions or operations leading to the solution of the task, should be based on scientifically grounded criteria. In this case, speaking about algorithms for prenosological diagnostics, we mean the psychological criteria that we have accumulated in the knowledge base of the analytical block of our system. At the same time, we took into account that various physiological indicators used in assessing the functional state have different information content and, accordingly, make a different contribution to obtaining the final result in the

formulation of a prenosological diagnosis. Assessment of the level of human health by individual, even if informative, indicators does not provide a holistic view. It is necessary to integrate individual parameters in order to obtain a total quantitative indicator (index) of health. This gave rise to the introduction of the concept of the prenosological syndrome as an indicator of a complex of certain deviations of individual indicators. To assess the integral level of health, we used the Apanasenko method, where a similar approach was implemented using 5 body indicators [15].

The listed indicators, which adequately characterize the level of the prenosological state of the body, are calculated on the basis of data determined by non-invasive and comfortable methods, which is important for prenosological monitoring of general physical state of healthy people. Algorithms for analyzing the registered indicators, including morphological and functional development, functional reserves and the state of the leading organs and systems, using factor analysis, provides for an analysis of the relationship between indicators of morphological and functional development and health status and determination of the internal structure of an individual's health. This function is performed with the help of an algorithm developed by us and software for their automated computer implementation, which makes it possible to classify each object of the survey in one of the following categories and form the corresponding population databases:

1. category-contingent with a high level of health, not requiring the implementation of any preventive measures - contingent of the base of the green folder;
2. category - persons with health risk factors - the contingent of the base of the yellow folder;
3. category - persons with one or more chronic diseases - the contingent of the base of the red folder.

Thus, according to the stated goal, a comprehensive monitoring of the physical, functional and clinical and somatic status of the population's health indicators is carried out. It provides for the imple-

mentation of the functions of prenosological diagnostics, screening and control, a comprehensive prenosological examination of citizens, including the socio-psychological state, anthropometric and other morphological and functional indicators, screening assessment of the level of somatic health, functional and adaptive reserves of the body, rapid assessment of the cardiovascular and vegetative system, assessment of complex indicators of the respiratory system function. Based on the results of the surveys, the degree of risk for the development of certain diseases is assessed and assistance is provided in the implementation of measures to form a healthy lifestyle and reduce the spread of RF of non-infectious diseases in the environment of the attached population, carried out by the territorial center for medical prevention and other organizations. Dynamic monitoring of the contingent of people at increased risk of developing non-infectious diseases and referring them to local doctors.

The practical use of this technology contributes to the conduct of mass prenosological examinations of the population and the improvement of the quality of targeted, personalized prevention of risk factors and improvement of their health.

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