Literature review

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The state of health as a factor affecting the work activity of working elderly people

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Currently, there is an increase in the number of elderly residents in the world community. The researchers note the progressive aging of the working population long with the existing unfavorable demographic trends and a number of socio-economic changes. Thus, many countries have made a push to increase the level of employment among people of the "third age". In addition, many states have raised the official retirement age for both men and women. However, economic measures, primarily raising the official retirement age, will be successful only if employees are able to perform labor functions productively and maintain their physical and mental health at the stage before retirement. The analytical review presents an analysis of modern foreign and domestic literature, where scientists publish works devoted to the study of the degree of influence of health indicators on the labor activity of working elderly people. Scientists have identified the main factors affecting the performance of an elderly person with the help of studies conducted in different countries. At the same time, the elderly have an increase in acute and(or) chronic diseases, which adversely affects their level of performance. Whereas physical and social activity significantly contributes to reducing the incidence of persons of the "third age".

Keywords: *health; elderly persons; "third age"; labor productivity; working capacity; occupational morbidity; occupational hygiene; overview*

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The aging of the population depends on a combination of historical and evolutionary factors, and we observe this in conditions of sufficiently high economic, social, scientific, technical and cultural development of society. At the same time, population aging is a global phenomenon, which mainly associated with a decrease in mortality and fertility rates. Demographic forecasts show that the number of elderly people over the age of sixty will exceed the number of children for the first time in 2047, increasing from 841 million elderly people in 2013 to more than two billion in 2050 [1].

Demographic aging of the population began in the late 60s of the twentieth century and according to the forecasts of scientists around the world will occur until 2300. In this regard, a new socio-demographic layer has formed — "young old people", who are referred to the so-called third age [1, 2].

In various theories and practices of the pension system in most countries of the world, the lower limit of reaching the "third age" experts believe the age of 60–65 years.

In accordance with the directives published by the United Nations (UN) [3] and the International Labour Organization (ILO) [4], the elderly are persons who have reached sixty years of age and older. As noted in the UN report, the number of people over the age of sixty will increase by 2030 from 10% to 38%, and over the age of eighty — from 1% to 17% [5].

The World Health Organization (WHO) offers its own definition of the age limits of old age. According to this classification, the generation of older people (sixty plus) belongs to the elderly: 60–74 years — elderly; 75–89 years — old; 90 years and older — long-livers.

According to forecasts, by 2030, one in six will belong to this age group, and by 2050 — one in five. Older people in 2025 will make up approximately 30% of the population in Europe and North America, 21% in Asia and 17% in Latin America [6]. The increase in life expectancy and the lack of social resources have prompted most European governments to raise the retirement age. In addition, the increase in the number of older employees in the workforce is mainly due to the fact that employees postpone retirement, undergo training for an alternative career and prolong their lives thanks to achievements in the field of healthcare.

According to statistics from the OECD (Organization for Economic Cooperation and Development), Japan ranks seventh out of 35 OECD countries with a high level of employment of senior citizens. After retirement age, most elderly people want to continue working to support themselves and their families. However, 67.3% of employees over the age of 60 can only find temporary or part-time employment, which does not guarantee a stable income. Most of the professions performed by older people there is a physical labor [7].

According to the scientific literature in Russia, 20% of the number of employees are elderly people [8]. Experts attribute the increase in the number of working people of retirement age both to improving the health of the population (in most subjects of the Russian Federation, life expectancy ranges from 70 to 75 years [9]) and to the need to obtain additional income.

The aging of workers requires attention to two main issues that which experts consider together from the point of view of balance: the first concerns the health of workers, the second concerns labor productivity. An increase in the number of older workers means, for example, an increase in the number of working people with minor or serious health

problems that occur more often after the age of 55. From this point of view, over the next few years, organizations will face the level of prevalence of chronic diseases (for example, disorders of the musculoskeletal system, diabetes mellitus, cardiovascular diseases, oncology, etc.), which will significantly affect the ability to work. The significant socio-economic impact of chronic diseases and risk factors contributing to their development and growth negatively affect the Millennium Development Goals. This covers such indicators of social well-being as health, education and poverty reduction in many countries. The influence of demographic and epidemiological factors, increased changes in age structures and the growth of chronic diseases also have a direct impact on the quality of life of people [10].

It is necessary to pay attention to the increase in the age of persons employed in harmful working conditions and in heavy work, which, of course, affects the state of occupational and general chronic morbidity. Analysis of the dynamics of employment growth of workers by age groups conducted by the Izmerov Research Institute of Occupational Health showed that in the coal industry the share of workers aged 50–59 years increased by 1.25 times, over 60 years — by 1.75 times. Among the miners, there is also an annual increase in the number of employees of retirement age, the authors note that 26% of pensioners currently work in the mines [11].

It is important to remember that the demographic transition has led to the need to create programs to help the elderly to ensure active aging and maintain the quality of life of this segment of the population. There is a successful international example of initiatives aimed at improving the quality of life in the elderly in Canada, Spain, Italy, Portugal and Germany.

The latter include such programs as "Active Lifestyle" (Alberta, Canada), "In Porto, life is long" (Porto, Portugal) and "Wellness Project" (Terranuova, Italy), which demonstrate the possibility of promoting a healthy lifestyle and active aging [12, 13].

In 1980, the International Labor Organization formed Recommendations "On Older Workers" aimed at eliminating restrictions on their rights, age discrimination, improving working conditions, strengthening health, increasing the duration, level and quality of life, prolonging active longevity. In accordance with these Recommendations, the Russian Federation has formed a regulatory framework regulating the social and labor relations of older workers. In addition, experts have developed and implemented a Strategy of actions in the interests of older citizens in the Russian Federation until 2025. The main directions of the Strategy are: ensuring the guarantee of income, health, accessibility of education, information, leisure, social services [14, 15].

The assessment of the quality of life of the elderly consists primarily of self-assessment of health and prediction of morbidity, as well as the general condition of this category of citizens and psychosocial factors.

The results show that the quality of life is directly related to self-assessment of health status and correlates with both psychological and social status.

Older women and men have different needs for physical and mental health. According to WHO [1], mental health is more important for women, while men are more dependent on their physical health [12].

The ability of elderly people to carry out their work activities, of course, directly depends on their state of health: in the course of a scientific study, E.V. Shchanina found that among those respondents who rated their state of health as "good" — 88% receive a pension and are constantly working; among those who rated their state of health "rather as bad" — 43% are constantly working; and among those who rated their state of health as "bad" — only 3% of the surveyed pensioners continue to work [16].

The work of older people over the age of 65 is largely associated with high rates of self-assessment of health, mental health and functional ability. Older part-time workers received almost the same grades as full-time workers. The authors found a causal relationship, according to which retirement has a bad effect on both mental health and functional ability but does not have a significant impact on self-esteem of health. On the other hand, people who changed jobs from full-time to part-time were not affected, as were people who continued to work full-time. Perceived health status was negatively correlated with occupational stress. Occupational stress refers to physical and psychological reactions when occupational conditions do not coincide with the capabilities, resources and needs of older workers. The fact that retirement leads to a deterioration in health after age adjustment means that work has a good effect on maintaining health. Consequently, this study supports the theory of the activity of workers over 65 years of age [17].

Many older workers are vulnerable to professional problems due to heavy physical exertion and the psychological impact of their work. The authors note that working senior citizens have such traits as high discipline, a developed sense of duty, conscientiousness, responsibility against the background of high self-esteem, concern for their reputation, ambition, self-confidence, which is supported by their own experience and knowledge. The aging process is affected by changes in physiological functions and systems, psychological makeup, which entails a decrease in performance, memory and attention.

Against the background of the accompanying negative reaction of the surrounding people, the employee has a clear discrepancy between the self-assessment of working capacity and the results of work. All of the above, while maintaining the same unchanged requirements for the employee, is often a trigger factor for the formation of emotional instability, irritability, increased excitability of a person, inability to quickly navigate in a difficult work environment and forces him to leave the workplace, or switch to other activities with a decrease in qualifications and wages, as well as make up the majority in decadent professions, industries and sectors of the economy [17, 19].

Considering the main reasons for the impact of health changes on the ability to work of people of the "third age", we highlight the following features: changes in auditory and visual sensations when considering the influence of age on performance. Although these changes are usually gradual, and the disorders are usually mild or moderate, and despite significant individual differences, the problem of hearing loss with age undoubtedly affects the ability to work.

According to age-related changes in auditory sensitivity, older workers may become disabled due to the influence of the working environment, which is formed taking into account younger age categories of workers [12].

Age-related changes occurring in the visual system have negative consequences for older workers, especially as the technology of work and its organization continue to evolve (for example, the use of computers, the wider use of open workplace plans, etc.). An increase in the size of visual details

and more intense lighting are often necessary for work elderly people, while excess light can cause discomfort to other workers [18].

While there are large individual differences in the nature, speed and severity of age-related decline in human motor functions, the effect of aging on the motor activity of elderly people tends to be gradual and moderate. It is known that a decrease in motor activity occurs to a greater extent during leisure activities than in the workplace. Nevertheless, there is a decrease in physical strength (due to loss of muscle mass) and an age-related decrease in muscle endurance. It is necessary to implement compensatory strategies (for example, stimulation of activity), which to some extent compensate for the consequences of loss of muscle mass. At the same time, researchers believe that the lack of productivity with age will not manifest itself until the work requirements exceed physical capabilities. However, we emphasize the great heterogeneity of older age groups in this aspect. Therefore, the ratio of "average" factors of labor behavior becomes less accurate as the age of the group of working people increases [19, 20].

When considering the importance of individual health in the problem of preserving and prolonging labor activity, it seems important to characterize both objective and subjective health indicators among working and non-working citizens of retirement age. Thus, as a result of a survey conducted by A.V. Korolenko and V.N. Barsukov among pensioners of the Vologda Region, scientists noted that the cumulative share of positive responses concerning their own health assessments was 89% versus 78% for non-workers.

Non-working pensioners were 2 times more likely than citizens working on pensions to give negative assessments of their health (22% and 11%, respectively). About 5% of working respondents seek help monthly due to illness leading to full or partial temporary disability, which indicates the priority of this factor in the formation of their work behavior strategy. The most common type of chronic non-infectious pathology among the representatives of both groups are diseases of the circulatory system [21, 22].

The WHO report [1] on aging and work describes significant cardiovascular changes that occur with age, including a decrease in the internal contractile function of the myocardium, a 50% decrease in ventricular filling at the age of 20 to 80 years and an increase in the time between the closure of the aortic valve and the mitral valve. This leads to a decrease in the maximum heart rate. The consequence of these age-related cardiovascular changes is a decrease in the maximum physical performance of working elderly people; although cardiac output at rest tends not to change with age, a decrease in cardiac function in response to aerobic activity begins to manifest itself by the age of 40. But usually, they do not create significant problems with labor productivity. The result of the observed pattern of age-related decline in general pulmonary function is a decrease in the ability to long periods of physical labor and the appearance of shortness of breath during physical activity. While age-related changes in the respiratory system can become a problem of work activity with the onset of respiratory diseases, these changes usually do not pose a problem for older workers. At the same time, experts note that the decrease in working capacity largely depends on the physical condition, therefore, older workers who strive to remain physically healthy may surpass on productivity of young workers with physical inactivity [23, 24].

The authors have carried out studies on the age and intellectual functioning of working elderly people. Nevertheless, there is a departure from the simple study of the nature and degree of age differences and changes in intelligence towards greater attention to individual patterns of change and identification of factors affecting the rate of intellectual aging of a person throughout life. Only after the age of 70, according to research data [25], we constantly observed a hidden decrease in productivity, although there is age stability and even an increase in intellectual or cognitive abilities up to the 7th and 8th decades of life.

Cognitive losses occur mainly among those who suffer from cardiovascular diseases or experience a decline in the socio-cultural environment without taking into account their age.

Age-related changes in intellectual functioning are usually minimal for healthy workers who receive a high level of education, professional training. There is a stimulation from their environment. In addition, there is accumulating evidence that self-assessment of health status has a significant impact on the cognitive performance of elderly people [23].

Studies [26] show that the age-related decline in the ability to process information in older workers depends both on the complexity of tasks and on stressful conditions. Elderly workers show the greatest decrease in labor productivity in a complex of tasks that require rapid decision-making and are solved in a noisy working environment. N. Schulz et al. [26] highlighted the conclusions: the climate of collective health has become especially important for older employees, because the social context can support those compensation strategies that older employees can use when work requirements exceed their physical or mental capabilities.

According to R. Warr [27], four main types of work arise from the interaction between age/experience and job demand:

- the first one includes jobs where the required skills do not decrease with age, and experience is an additional value of work;
- in the second case, the required skills do not decrease with age, but experience does not add value to the work;
- the third type includes employees whose qualifications decrease with age, but experience can partially compensate for them;
- fourth, the required skills decrease with age, and experience cannot adequately compensate for them.

In this direction, the literature shows that the relationship between age and working capacity is more critical when workers are engaged in work with high physical exertion [28].

Often, there is early retirement for these professions or the opportunity to switch to less physically demanding work tasks within the same organization.

Currently, there is a significant amount of research indicating the preservation of the ability of working elderly people to learn. So, despite the fact that older workers need more time and effort to assimilate and memorize new information, but when they assimilate it, retrieval efforts under information will be equally successful for both older and younger workers. So experts have proved that once older employees become relaxed and confident in a new environment, they usually learn as well and as quickly as younger employees. For a long time, scientists believed that long-term memory is more age-dependent than short-term memory [29].

Older people may not extract specific information from long-term memory because they never assimilated it. In general, the changes in learning and memory usually experienced by older workers tend to be small, and they are most likely more closely related to the level of motivation, attention, perception, health status and the learning context itself than to some age-related inability to master new skills.

Modern research shows that the problem is not to determine whether it is possible to train working elderly people, but rather to identify the best approach (approaches) to training in order to optimize the training potential of working elderly people [30]. There are many types of work in which age is a definite advantage or has a negligible impact on productivity.

Researchers interested in age-related changes in labor productivity usually distinguish two dimensions, namely attitude to work and labor behavior.

Scientists widely study the accidents among older workers, as well as aspects of age-labor relations. The ILO estimates that about 2.3 million men and women die annually as a result of workplace accidents or work-related illnesses — an average of 6,000 people daily. Worldwide, experts have registered annually approximately 340 million industrial accidents and 160 million victims of occupational diseases. Human aging, of course, is an individual process, but it can accelerate under the conditions of exposure to the worker of production factors of the working environment and the labor process that form harmful working conditions [1, 30].

Studies of age and occupational accidents show that the relationship between age and accidents has two patterns of conclusions.

Firstly, the frequency of accidents at work is negatively correlated with the age of workers — older workers tend to be less likely to have accidents than their younger colleagues.

Secondly, the severity of accidents at work positively correlates with the age of employees — accidents at work involving older workers, as a rule, lead to more serious injuries. The level of injury also varies depending on the industry and profession and on the level of experience in the workplace [30, 31].

Common to the factors of labor content is the presence of physical requirements that are too high and, therefore, negatively affect performance. Several specific risks explain the significant decrease in this ability; they include static muscle work, the use of muscle strength, lifting and carrying, sudden peak loads, repetitive movements and simultaneously bent and twisted working poses. Specific risk factors include dirty and wet workplaces, the risk of accidents, hot or cold workplaces, and temperature fluctuations during the working day. Conflicts, unsatisfactory control and work planning, fear of failure and mistakes, lack of freedom of choice, influence on one's own work, professional development, lack of recognition and evaluation — each of the factors, independently of others, contributes significantly to the deterioration of the working capacity of older workers [32].

Although health problems of a working person do not always impose direct restrictions on work in the profession, however, they often lead to a decrease in the pace of his work, a decrease in working capacity, and an increase in anxiety. There is a fear of complications of chronic diseases and even premature death, which contributes to the withdrawal from the labor market of different categories of workers [33]. And, although the overall structure of the analyzed risk factors in the workplace does not differ significantly depending on gender, there are minor variations depending on the health status of individual employees, and these minor variations related with age. For example, the most favorable combination of risk factors for workers suffering from cardiovascular diseases differs from that for workers with diseases of the musculoskeletal system or mental disorders. At the same time, the degree to which the ability to work meets labor requirements affects labor productivity, and the difficulties that older workers face in meeting these requirements can lead to stress and work-related illnesses and disabilities [34].

The combination of competencies in the company is based on the strengths of employees of several generations. Elderly workers are an important integral part of modern society. According to the forecasts of experts around the world, the number of such will increase in the coming decades. Employees of pre-retirement and retirement age have greater skills and competencies compared to other categories of employees. Without their participation in working life, there will be a shortage of human and professional resources. It is important to transfer their knowledge and experience to the younger generation.

The authors note that, in general, the production potential of the majority of older workers remains high, and age-related changes in health have minimal impact. As a rule, researchers consider the attitude and behavior of an elderly employee to be highly congruent with effective organizational functioning.

In addition, active participation in working life is an important positive factor of active aging. In turn, the correct organization of working conditions and workplaces of elderly workers, taking into account their ergonomics, psychophysiological changes, lifestyle correction, favor the maintenance of mental and physical health of workers, maintaining a high level of their labor abilities and labor productivity throughout the entire work cycle. Better working conditions can affect cognitive development, reducing the risk of dementia and improving cognitive abilities later in life, as well as generally strengthen physical and psychological health during work and daily life, which is of great importance for health and functioning in old age. As concerns about the aging of the population in general and the aging of the workforce in particular increase, the issues raised about the impact of health on the ability to work of people of the "third age" become even more relevant.

Thus, scientists pay sufficient attention to the problem of health status as a factor affecting the labor activity of working elderly people in the scientific research of Russian and foreign authors. At the same time, it is necessary to clarify and develop several related issues. It seems significant to study in more detail the socio-hygienic aspects of the formation of the health of working elderly people, including the definition of the features of the formation of production-related pathology. A comprehensive analysis and assessment of the impact of a combination of industrial, socio-economic, psychophysiological factors on the state of health, labor intensity, and working capacity of elderly people seems relevant. The scientific substantiation and development of the concept of preserving the health of elderly workers is of the utmost importance, which should include a set of legal, socio-economic, organizational, and technical, sanitary and hygienic, therapeutic and preventive, rehabilitation measures aimed at reducing the risks of developing health disorders, preventing the progression of diseases, preserving and prolonging the professional longevity of elderly people age.

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