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RESEARCH ARTICLE

Medical and social risk factors for cardiovascular disease among elderly and old people

Nurdilla Tuzelbayev[1], Gulsum Abdurahmanovna Duchshanova[2], Gulnara Abdymazhitovna Mustapayeva[3], Zhanar Akbarovna Yermakhanova[4]

[1]Doctor of Medicine, Department of General Practice, Hoja Akhmet Yassawi International Kazakh-Turkish University, Shymkent, Kazakhstan, [2]Doctor of Medicine, Department of Neurology, Psychiatry and Psychology, South Kazakhstan State Pharmaceutical Academy, Shymkent, Kazakhstan, [3]Candidate of Medical Sciences, Department of Neurology, Psychiatry and Psychology, South Kazakhstan State Pharmaceutical Academy, Shymkent, Kazakhstan, [4]Doctoral, Medical Faculty, Department of General Practice, Hoja Akhmet Yassawi International Kazakh-Turkish University, Shymkent, Kazakhstan

Correspondence to: Nurdilla Tuzelbayev, E-mail: ntuzelbayev@mail.ru

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ABSTRACT

Background: Ageing is a natural biological process, manifested in a gradual decrease in the adaptive capacity of the organism. The causes of social alienation among elderly people have a multifactorial nature. Stroke is a very dangerous disease since it disrupts the work of the most important organ - the brain. The problem of stroke prevention has been particularly relevant in the past decade. **Aims and Objectives:** The research was conducted to study the state of medical and social risk factors for the development of cardiovascular disease among elderly and old individuals. **Materials and Methods:** This study was conducted among 2481 individuals over employable age. Of this number, in 84 patients with ischemic stroke individual risk factors were studied. Their health was characterized by a high incidence of cardiovascular diseases (CVD) and severe disability. The main types of pathology among elderly and old people are CVD. **Results:** The main factor leading to the development of stroke, especially recurrent, is arterial hypertension in combination with ischemic heart disease, heart failure, cardiosclerosis, and paroxysmal atrial fibrillation. **Conclusions:** Recurrent stroke is characterized by increasing cognitive dysfunction against the background of worsening mental and motor disorders of the heterogeneous nature, which defines a high degree of disability due to stroke.

KEY WORDS: Risk Factors; Cardiovascular Disease; Elderly and Old People; Medical and Social Indicators; Ischemic Stroke

INTRODUCTION

Ageing is a natural biological process, manifested in a gradual decrease in the adaptive capacity of the organism as well as an increase in the likelihood of death. According to the WHO criteria (1982), the age of 60 years is considered the crossing line to the elderly group, 65 years - an "indicator" of elderly age. Individuals aged 60-74 are classified as elderly, aged 75 or older - old, and those aged over 90 - very old.[1] According to statistics, the results of epidemiological studies as of the year 2000 showed that about 590-685 million people aged over 65 lived in the world.[2] According to current projections, by 2050 the number of elderly people in the world will increase from 600 million to 2 billion.[3] On the one hand, longevity is one of the achievements of the 21st century, on the other - the ageing of the population and a decline in the birth rate in developed countries is an acute social problem leading to social alienation.

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The causes of social alienation among elderly people have a multifactorial nature - a combination of medical, psychological, and social factors on the background of organic brain dysfunction (involution).[4] It also includes the loss of social status due to retirement, changes in material status, dependence on working family members, changes in family status and loneliness in family and among friends. During this period, there is a reassessment of values. Along with involutional changes (awkwardness, uncertainty in one's own actions, and cognitive decline) and increased stress availability (anxiety and depression), the feelings of helplessness, uselessness and the lack of demand are compounded, which inevitably leads to the aggravation of chronic diseases and frequent readmissions.

The incidence rate in the elderly age group is 2 times higher, and in the old age group - up to 6 times higher, than among other age groups. Almost all of them are in need of medical social and rehabilitation measures.[5] Diseases acquire a chronic mutually aggravating nature and often lead to disability. The main types of pathology among people of older age groups are diseases of the circulatory system, nervous system, as well as cancers. At present, due to the distinct trend toward the ageing of the population in many countries of the world of particular importance become the geriatric aspects of angioneurology.[6,7]

Every year in the world, 17.5 million people die from cardiovascular diseases (CVD).[8] Among CVD, the leading position is occupied by ischemic heart disease (IHD) (49.3%) and cerebrovascular disease (35.3%), mainly cerebral strokes (CS), which account for 84.6% of all deaths and 23.9% of all losses due to the disability of population.[9,10]

In recent years, the incidence of endocrine diseases and mental disorders has increased significantly.[11] Among people, both men and women, of employable age, deaths from IHD and CS account for about 80% of all deaths from CVD. The INTERHEART international study, which covered various centers from 52 countries and involved 15,152 adults, showed that smoking, raised ApoB/ApoA1 ratio, history of hypertension, diabetes, abdominal obesity, psychosocial factors, daily consumption of fruits and vegetables, regular alcohol consumption, and regular physical activity, were "all significantly related to acute myocardial infarction (MI). " These nine risk factors accounted for 90% of the population attributable risk of MI.[12]

Stroke is a very dangerous disease since it disrupts the work of the most important organ - the brain, and the effects of stroke among elderly people are exacerbated by age-related changes in the central nervous system, so can be extremely serious. At present, every 10th death in the world is associated with stroke - a total of about 6 million cases annually. The load due to stroke (a range of medical, social, and financial problems) significantly affects the budgets of developed countries and comes on the health systems of low-income countries as an excessive burden. The treatment of patients suffering from stroke costs about 10 times more expensive than the treatment of patients suffering from MI.[13] The prevention of stroke (both primary and secondary) requires considerable organizational efforts, new methods of diagnosis, and expensive drugs. This affects the access to health care and the effectiveness of preventive measures. As a result, the incidence of stroke in the low - and middle-income countries is about 2 times higher than in developed countries.[14]

About 80% of strokes occur among people aged over 65 years. At the same time, the age of a person has a large impact on stroke outcomes. An increase in the probability of stroke in the elderly is determined by age and vascular changes in the brain. Risk factors for stroke, ischemic brain injury mechanisms are different among young and elderly people. Elderly patients may have more severe strokes. However, they often receive insufficiently effective therapy due to a number of reasons, resulting in poor outcomes. Age is one of the main non-modifiable risk factors regardless of the type of stroke. After 55 years of age, the probability of stroke doubles every 10 years, regardless of sex.[15] It has been shown that 75-89% of cases of stroke develop after 65 years, 50% of them - in patients older than 70 years, and about 25% - after 85 years of age.[16] By 2025, the number of people in the world aged over 60 is projected to increase to 1.2 billion people. By 2050, the total number of population aged over 65 will exceed for the first time the number of young people, and therefore, high economic costs of stroke treatment among the elderly are expected.[17] By 2030, the total number of stroke patients will be 23 million people. At the same time, the rate of mortality from stroke will amount to 7.8 million per year by 2030.[18]

In Kazakhstan, morbidity from CVD has increased 1.7 times over the past 10 years. The incidence of stroke in the structure of overall incidence of nerve diseases is 52%, including 29% of employable age. The incidence of stroke in different regions of the country is from 2.5 to 3.7 cases per 1000 people. The rate of mortality of the adult population from CVD is 29.7%, of which 21.5% from CS. The rate of mortality from stroke in different regions of Kazakhstan is 1.08 cases per 1000 people per year. Among the dead, the share of cerebrovascular diseases was 26%, including 47.3% of employable age.[19] The standardized measure of mortality of the Kazakh population from CVD is 2 times higher than that in European countries - 867.9 against 448.6 per 100,000 population.

In addition, stroke is the leading cause of disability causing enormous damage with regard to the cost of treatment and medical rehabilitation in the field of production. The frequency of disability due to diseases of the circulatory system in the Republic of Kazakhstan amounted to

104.6 cases per 100,000 population.[20] Statistical data are available that 46% of stroke patients die in the 1st month, of those who survived only 10% return to work, 53% of stroke patients are in need of assistance for personal care, 20% are unable to walk independently, and 30% have a developing psychoorganic syndrome.[21]

The problem of stroke prevention has been particularly relevant in the past decade when the upward trend in the incidence rate and mortality from acute cerebrovascular accidents has become apparent. There were some earlier studies that researched stroke and different heart diseases among elderly people.[22-26]

However, in spite of the aging processes of population in the southern region of Kazakhstan, characterized by high population density and specific climatic and geographical conditions, no scientific studies have been carried out that would systematically and comprehensively study the state of medical and social indicators as well as risk factor assessment of CVD among elderly and old people.

The research was conducted to study the state of medical and social risk factors for the development of cardiovascular disease among elderly and old individuals.

MATERIALS AND METHODS

The study was conducted by the method of a questionnaire of 2481 elderly and old people in the age interval of 60-90 years, including 1037 men and 1444 women, living in urban and rural areas of South Kazakhstan region of the Republic of Kazakhstan. Non-random, available and directional selections were used for sampling since only elderly and senile people who had the necessary information were selected.

There were used three types of questionnaires: Group, selective, and face to face. Cross-sectional (one-stage) and observational types of research were used.

Data on the gender and age group are shown in Figures 1 and 2.

As can be seen from Figure 2, there is the predominance of males, accounting for 58% of the total number of the respondents surveyed.

For an integrated assessment, all the parameters that characterize the state of health were given in the following groups: The ability to self-care, social activity, and morbidity data.

The parameters characterizing the ability of the respondents to self-care included such indicators as house cleaning, working in the garden, cottage, water and fuel collecting, laundry, sewing, cooking, minor flat renovation, and delivery of food and medical supplies. Social activity

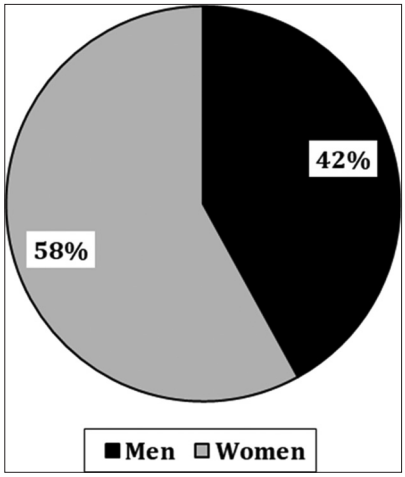

Figure 1: Gender of the respondents surveyed

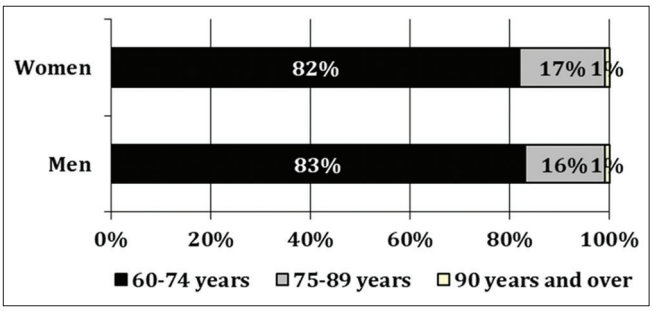

Figure 2: Age categories of the respondents surveyed

was characterized by the following data: Continuation of labor activity, participation in public life, active contacts with relatives, reading newspapers, magazines, watching television, and various hobbies. Health assessment indicators consist of the following characteristics: The respondents did not seek medical treatment because they were feeling good, the respondents sought medical treatment only due to acute diseases, the respondents sought medical treatment due to one or more chronic diseases, and the respondents have chronic diseases for which they do not need medical treatment, there are some cases of complicated forms of chronic diseases concerning which the respondents did not appeal to medical professionals; there are a large number of complicated forms of chronic diseases concerning which the respondents appealed to medical institutions, the respondents frequently had an exacerbation of chronic diseases because they did not appeal to medical professionals.

On the basis of the results obtained, these characteristics were assessed with regard to gender, age, and social features of the respondents.

The selection of patients suffering from ischemic stroke was conducted among 2481 respondents surveyed. Inclusion criteria were as follows: Men and women aged over 65 years with a diagnosis of ischemic stroke, the presence of which could be confirmed when studying complaints, medical history, physical examination results, instrumental studies

(computed tomography [CT] and magnetic resonance imaging [MRI]), regardless of the pathogenetic mechanism of development, and the clinical severity of the disease.

Exclusion criteria were as follows: Confirmation of the hemorrhagic nature of stroke, the presence of oncological, inflammatory and focal neurodegenerative brain affection. The study also excluded those patients who had a change of neurological deficit due to decompensation of somatic diseases such as hypoxia, hypotension, hyperglycemia, and infection. The statistical analysis did not include patients suffering from alcoholism and drug and drug addiction.

The primary ischemic stroke was defined as an acute cerebrovascular accident, characterized by a sudden onset of focal neurological symptoms (motor, speech, sensory, coordination, and other disorders) and/or brain disorders, which persist longer than 24 h, or result in death of the patient in a shorter period of time due to causes of cerebrovascular origin. It was mandatory to confirm stroke by CT/MRI study.

Recurrent ischemic stroke was diagnosed as a cerebrovascular event that meets one of the following criteria: In medical history, documented ischemic stroke; stroke with focal neurological symptoms different from neurological deficit obtained at the first stroke; neuroimaging studies reveal ischemic brain damage in another vascular pool, different from the first stroke; change of the nature of motor neurological deficit (e.g., an increase in the degree of paresis by two points on the NIHSS scale)[27] in conjunction with new neurological symptoms.

Pathogenic subtype of stroke was determined on the basis of diagnostic criteria for ischemic stroke, proposed by the Institute of Neurology of the Russian Academy of Medical Sciences. According to these criteria, the following pathogenic subtypes can be determined: Atherothrombotic, cardioembolic (CIS), hemodynamic, lacunar stroke, and stroke by type of hemorheological micro-occlusion.[28] The study distinguished the category of patients with an unidentified leading pathogenetic mechanism, which included patients with competitive pathology, each of which independently may lead to stroke.

RESULTS

The prevalence of chronic diseases among the elderly was analyzed. It was established that among the contingent surveyed CVD was observed with the highest frequency (Figure 3). The second and third places were taken by diseases of the digestive system and diseases of the respiratory system, respectively. Diseases of the endocrine system rank 4th and diseases of the musculoskeletal system - 5th. It was also noted that there was a frequent combination of several chronic diseases, which increased with the age of patients. It should also be noted that it is women who predominantly have combined chronic diseases.[29]

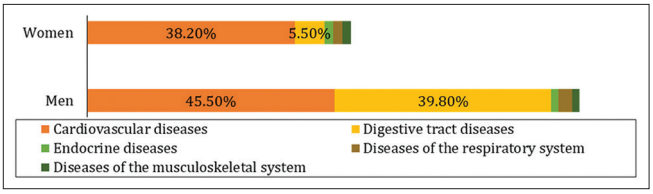

Figure 3: Prevalence of chronic diseases among the respondents

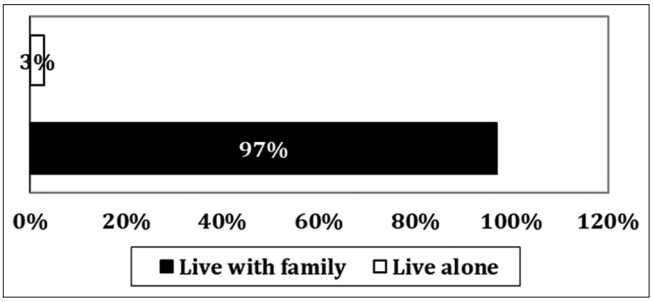

Figure 4: Relationship status of the respondents

During the consideration of social factors, it was established (Figure 4) that the marital status of elderly and old individuals did not undergo significant changes.

The respondents' assessment of the ability to self-care, obtained in the course of the study can be seen in Figure 5.

The respondents' assessment of their health can be seen in Figure 6. The proportion of people who rated their health as poor is significantly increased, and the share of positive assessments of the health status is reduced.

The percentage of men and women, as well as elderly men and elderly women that are recognized as disabled due to diseases, can be seen in Figure 7.

With an increase in age of the respondents, the proportion of people calling an ambulance is significantly increased (Figure 8).

Thus, the study revealed an increase in the proportion of people older than employable age, whose health condition is characterized by a high incidence of CVD and severe disability that results in a higher demand for medical care. These results suggest the formation of long-term regional programs aimed at preserving and improving the health of the population of older age groups with regard to the leading pathology.

DISCUSSION

The next stage of our work was to assess and analyze risk factors for the development of primary and recurrent stroke among elderly and old individuals, which is the most severe manifestation of CVD, with the aim of studying the characteristics of individual factors. After a thorough analysis of all 2481 respondents, the study included 84 surviving patients with primary and recurrent ischemic stroke,

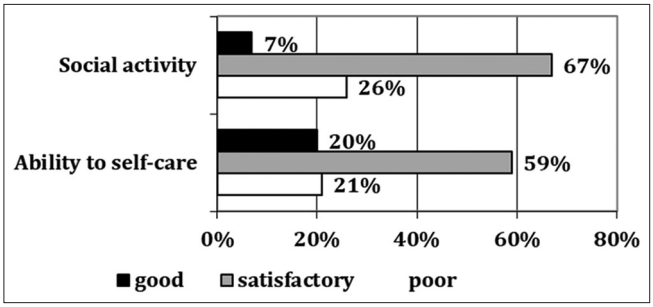

Figure 5: The respondents' social activity and ability to self-care

Figure 6: Health assessment of the respondents

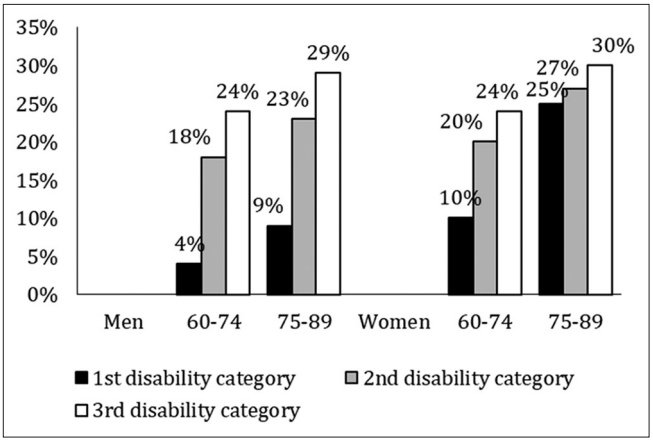

Figure 7: The structure of the respondents' disability category

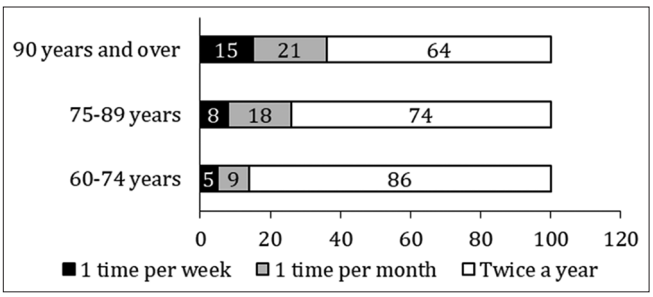

Figure 8: Frequency of emergency calls among the elderly depending on age (in %)

corresponding to the above criteria, including 31 (37%) men and 53 (63%) women. More than 80% of patients were older than 70 years. The average age of patients was 76.9 ± 0.7 years from 60 to 86 years.

The main criterion for the distribution of patients into groups was the presence of new-onset and recurrent stroke, confirmed by examination during hospitalization in a specialized neurovascular hospital.

The main group consisted of 44 surviving patients with recurrent ischemic stroke (55.3%). The comparison group included 40 patients with new-onset ischemic stroke comparable by groups, depending on gender and age. The comparison of the two groups showed no significant differences in the basic characteristics that determine the possibility of subsequent statistical analysis. The basis for the study was formed by elderly and old patients, according to the WHO classification.[1] There are significant differences in the distribution of patients according to the severity of angina. Figures 9 and 10 present the basic risk factors for ischemic stroke in the studied groups.

Most patients in both groups had effort angina, second functional class. In the control group, there were fewer patients with this diagnosis, of which a quarter had no clinical manifestations of angina or had initial symptoms and, on the other hand, there were patients with severe symptoms of angina. The basic risk factor for CIS stroke is a disturbance of the heart's rhythm atrial fibrillation (AF). Among patients with AF (paroxysmal and permanent form), significant differences were revealed (P = 0.006), in particular, in the predominance of AF paroxysmal form among patients of the comparison group. Conduction abnormalities were more frequent among patients with recurrent stroke. Twice as many patients suffered from rheumatism with the formation of acquired heart valvular disease among patients with recurrent stroke. The basic analyzed risk factor for recurrent stroke is arterial hypertension (AH), circulatory deficiency, and diabetes mellitus.

Patients suffering from diabetes of type 1 constituted the same number. At the same time, the number of patients with diabetes was greater than in the group with recurrent stroke.

Almost twice as often patients with recurrent stroke were diagnosed with obliterating atherosclerosis. A larger number of patients with a secondary stroke suffered from lower extremity varicose vein.

The basic factors for ischemic stroke related to lifestyle factors are obesity and smoking. In the groups studied, these differences reached significance. Obesity was predominantly diagnosed in patients with recurrent stroke, mostly smokers.

The social significance of stroke is primarily determined by the effects of stroke, the main ones of which are high

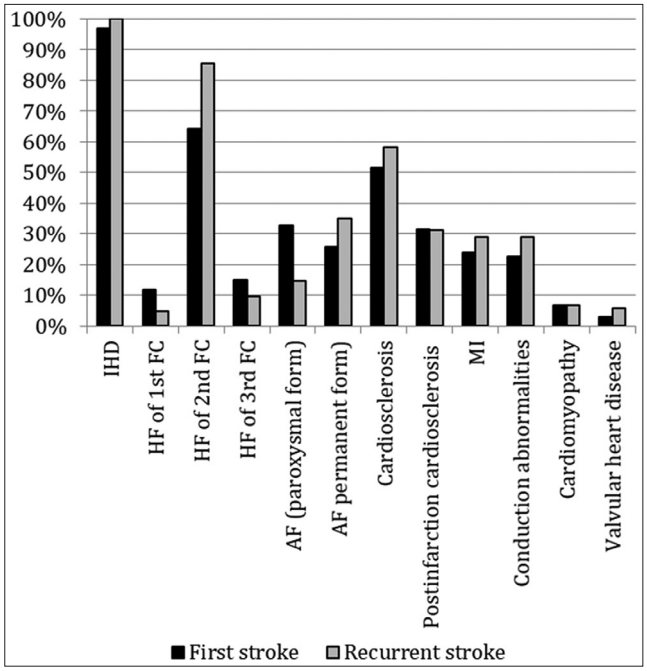

Figure 9: Basic cardiac risk factors in hospitalized patients suffering from ischemic stroke

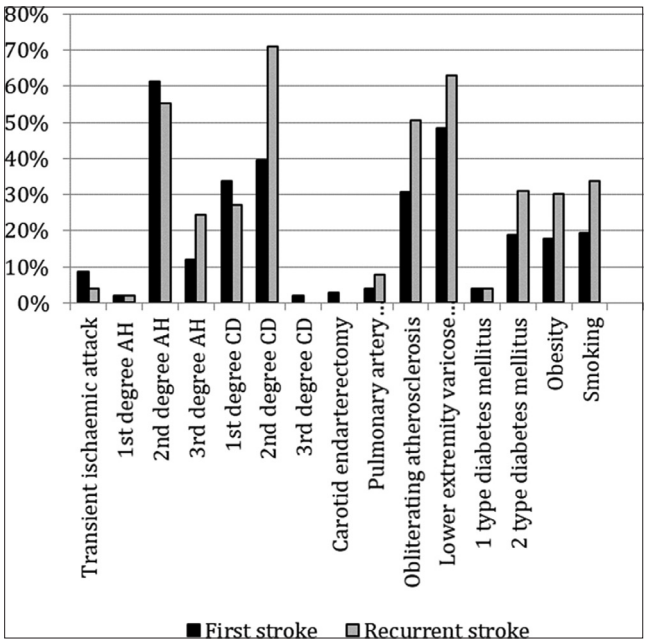

Figure 10: Basic risk factors in patients with ischemic stroke. The probability (P) for qualitative characteristics was evaluated with the use of a Pearson χ^2 significance test and Fisher's Exact tests

mortality and disability. The degree of disability in the surveyed patients was determined by a symptom complex of mostly cognitive and motor disorders, presented in Figure 11.

There is a growing cognitive dysfunction on the background of worsening of mental and motor disorders of the heterogeneous character (a combination of pyramidal, coordination, and subcortical disorders).

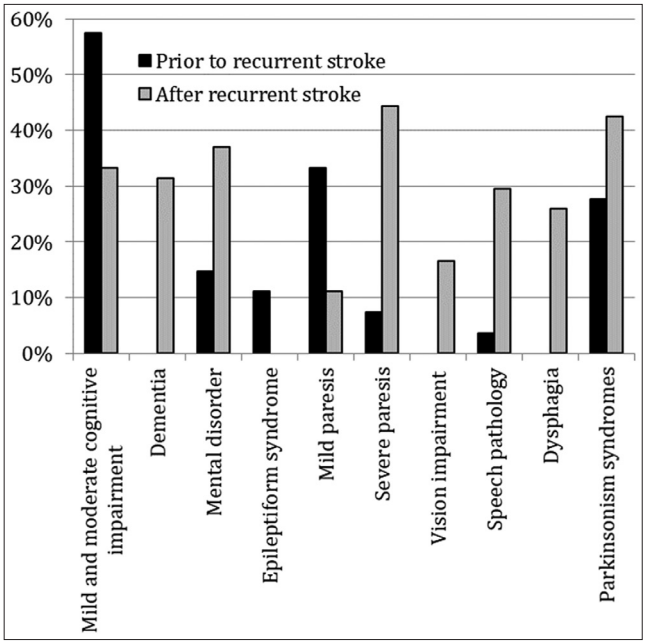

Figure 11: The neurological consequences of recurrent stroke

A comparative analysis of risk factors in patients with first and recurrent stroke showed a high prevalence of CVD. At the same time, attention is drawn to the lower frequency of IHD extreme severity, circulatory failure and rhythm disturbance among patients in the group with recurrent stroke. At the same time, patients in this group are characterized by the pathology of peripheral arterial and venous vessels, diabetes of type 2, obesity and smoking. It should be noted that patients with recurrent stroke are significantly more likely to suffer from osteoarthritis and subcortical impairment of Parkinson-like type that can be attributed to the effects of the previous stroke when the disorder of the morphological brain structure leads to the formation of a Parkinson-like symptom complex.

There were conducted some earlier studies in this area that discuss epidemiological aspects of cardiovascular disease as well as heart disease mortality among elderly and old people.[30-32] In these studies, some predictions concerning global epidemic of cardiovascular disease were made.[33-34]

CONCLUSIONS

This study revealed an increase in the proportion of people over employable age, whose health condition is characterized by a high incidence of CVD and severe disability that results in a higher demand for medical care and to a large extent determines the reduction of social adaptation of elderly and old people. The main types of pathology in people of older age groups are diseases of the circulatory system.

The health features of elderly and old individuals include a frequent incidence of CVD in combination with chronic diseases and pathological conditions, which determines an

increased demand for outpatient, inpatient, and specialized emergency medical care.

The system of measures to provide medical and social assistance to elderly and old people should take into account the socio-hygienic characteristics of the different categories of elderly and old people, including the disabled and lonely people.

The main factor leading to the development of the most severe manifestation of cardiovascular disease – acute stroke, especially recurrent - is AH, which determines the actual need to improve the secondary prevention of stroke as a result of dynamic observation and treatment of patients with AH, who suffered from a stroke or transient ischemic attack.

Recurrent ischemic stroke significantly exacerbates the disability of patients of elderly and old age, mainly due to the development of motor disorders of the heterogeneous nature (both pyramidal and subcortical) and cognitive impairment, reaching the degree of dementia, as well as leads to longer hospitalization. Patients suffering from a recurrent ischemic stroke are characterized by a frequent combination of cerebrovascular pathology with other disorders of the cardiovascular system.

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