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RISK FACTORS FOR THE DEVELOPMENT OF EPILEPSY, TAKING INTO ACCOUNT REGIONAL CHARACTERISTICS OF THE FERGANA VALLEY

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Abstract: According to the World Health Organization, the prevalence of epilepsy in developing countries is 10.3 cases per 1000 population in urban areas and 15.4 cases per 1000 population in rural areas, which is significantly higher than similar indicators in developed countries (5.8 per 1000 population). Regional patterns of epilepsy prevalence and clinical course in various regions of the Republic of Uzbekistan are still insufficiently studied.

Key words: Fergana Valley, epilepsy, seizure, neurology.

Introduction. Epilepsy is one of the most common neurological pathologies, affecting approximately 50 million people worldwide. According to the World Health Organization, the prevalence of epilepsy in developing countries is 10.3 cases per 1,000 population in urban areas and 15.4 cases per 1,000 population in rural areas, which is significantly higher than in developed countries (5.8 per 1,000 population). The regional patterns of the prevalence and clinical course of epilepsy in various regions of the Republic of Uzbekistan remain understudied. Of particular interest is the densely populated Fergana Valley, which has unique geographical, climatic, and socioeconomic characteristics and is home to about 30% of the country's population.

In developed countries, this figure is 5.8 people per 1,000 population, in developing countries, it is 10.3 people per 1,000 population in cities, and 15.4 people per 1,000 population in rural areas. [1,2]. Among the European population, 20,000 out of 1,000,000 people have a history of one or more seizures. One-third of these people have fewer than one seizure per year, another third have fewer than 12 seizures per year, and the rest have more than one seizure per month (20 percent of this number have more than one seizure per week). Approximately 40 percent of people with epilepsy have no additional behavioral, neurological, or intellectual disabilities [3]. Currently, the total number of people suffering from epilepsy on our planet is 50 million.

Relevance: Epilepsy holds a significant place within the structure of neurological pathology and affects all aspects of a patient's life; therefore, it is important to analyze this problem from both medical and social perspectives [4,5]. In developed countries, this figure is 5.8 per 1,000 population, while in developing countries, it is 10.3 per 1,000 population in cities and 15.4 per 1,000 population in rural areas [6]. Among the European population, 20,000 out of every 1,000,000 people have a history of one or more seizures. One-third of these individuals experience fewer than one seizure per year, another third have fewer than 12 seizures per year, and the remainder have more than one seizure per month (with 20% of this group having more than one seizure per week). Approximately 40% of people with epilepsy have no additional behavioral, neurological, and/or intellectual disabilities [7,8,9]. Currently, the total number of people with epilepsy on our planet is 50 million. In CIS countries, 2.5 million people suffer from this disease. According to recent data, the prevalence of epilepsy in CIS countries ranges from 0.96 to 10 cases per 1,000 population [10].

More than 50 years ago, the term "late-onset epilepsy" appeared, but its age limit remains unknown. According to some sources, "late-onset" epilepsy begins after the age of 45-50, while others suggest it begins after the age of 30 or even 20. [11]. After excluding all known risk factors for epilepsy development (traumatic brain injury, dementia, stroke, hypertension, infectious nerve damage), age significantly influences the onset of the disease: after 30 years, the incidence of epilepsy increases 1.3 times every 10 years [12].

About 80% of people with epilepsy live in low- and middle-income countries. According to WHO data, the lack of sufficient information on the epidemiological characteristics of epilepsy in many countries leads to serious shortcomings in the organization of medical care. Thus, more than 75% of the 40 million people suffering from epilepsy worldwide do not receive adequate treatment, while 60-70% of people suffering from epilepsy can lead a normal life with adequate therapy [13].

The mortality rate of patients with epilepsy is consistently higher than that of the general population. In low- and middle-income countries, the standardized mortality rate for patients with epilepsy is more than 2.5 times higher than in the general population, while in high-income countries, it is 2-7 times higher [14]. The premature death of patients with epilepsy is associated, among other things, with frequent trauma and suicide, as well as a high degree of somatic and psychiatric comorbidity. In 1/3 of cases, the cause of death in patients with epilepsy is related to seizures.

Purpose of the study: To study the prevalence of epilepsy types among individuals aged 18 and older in the Fergana Valley and to determine the clinical and epidemiological characteristics of epilepsy syndrome to optimize the diagnosis and treatment of patients with epilepsy in the region.

Research materials and methods. The study involved 3,060 patients with epilepsy and seizures aged 18 and older living in three regions of the Fergana Valley of the Republic of Uzbekistan: Namangan (1254 patients, 41.0%), Fergana (275 patients, 9.0%), and Andijan (1531 patients, 50.0%). The study was conducted from 2020 to 2024 at the Andijan, Fergana, and Namangan branches of the Republican Scientific Center for Emergency Medical Care and in district neurology departments. The comprehensive examination of patients included: a questionnaire based on clinical and anamnestic methods containing detailed information about the disease and life history; neurological examination; electroencephalography (EEG) in accordance with standard protocol with functional tests; and neuroimaging (as indicated, brain computed tomography and magnetic resonance imaging). The classification of epileptic seizures was carried out in accordance with the criteria of the International League Against Epilepsy (ILAE, 2017). Statistical data processing was carried out using descriptive statistics using IBM SPSS Statistics 26.0, Pearson's $\chi 2$ test, Fisher's exact test, Pearson and Spirman correlation coefficients, and logistic regression.

Research results. The Namangan region, located in the northwestern part of the Fergana Valley, is a unique site for studying the epidemiological characteristics of epileptic diseases. The region covers an area of 7,400 square kilometers and has a population of more than 2.8 million people, which is approximately 8 percent of the population of the Republic of Uzbekistan. The geographical and climatic characteristics of the region, including the mountainous terrain in the north and the flat valley floor in the south, create diverse living conditions for the population, which can influence the spread and course of neurological diseases.

The prevalence of epilepsy in Central Asian countries varies from 3.8 to 8.5 per 1,000 population. Our study covered 1,254 patients with epilepsy living in various districts of the region and provided representative data on the prevalence, clinical features, and progression of the disease in this region. The study was conducted from 2020 to 2024 at the Namangan, Fergana, and Andijan branches of regional Republican Scientific Centers for Emergency Medical Care and district neurological clinics.

An analysis of the territorial distribution of patients with epilepsy in the Namangan region revealed significant disparities in the prevalence of the disease across administrative districts, which aligns with the research of E.I. Gusev et al. Regarding the regional characteristics of epilepsy epidemiology in Russia.

The highest number of patients was recorded in the city of Namangan - 353 people (28.1%), which may be due to several factors. First, approximately 30% of the region's population lives in the regional center, which naturally increases the absolute number of patients. Secondly, the main specialized medical institutions providing emergency medical care to patients with epilepsy are located in Namangan, which ensures better diagnosis and detection of the disease. These observations are consistent with the research of Hauser W.A. and others. [138], noted that the incidence of epilepsy is high in urbanized areas.

The highest prevalence of epilepsy among rural areas was observed in the Kasansay district, where 145 patients (11.5%) were registered. This may be due to the high population density of the district (over 250,000 people) and the presence of a district medical center with qualified neurologists. The Chust district, with 119 patients (9.4%), is also characterized by high population density and a well-developed network of medical institutions.

It should be noted that the lowest number of cases was recorded in the mountainous regions of the region (Nanai, Uchkurgan) - 8 (0.6%) and 30 (2.4%), respectively. This may be due to low population density in these regions and limited specialized medical care in mountainous areas. This uneven distribution corresponds to V.A. Karlov's data on the influence of socio-economic and geographical factors on the detection of epilepsy.

When calculating the prevalence rate per 1,000 people, it was established that in the city of Namangan, this figure was 4.7 per 1,000 people, in the Kasansay district 5.8 per 1,000 people, and in the Nanay district only 2.1 per 1,000 people. Such differences may reflect not only the actual prevalence of the disease but also the level of medical care organization in various districts of the region.

An analysis of the age distribution of patients with epilepsy shows a clear predominance of children and young adults among patients, which aligns with international epidemiological data.

This may be due to the immaturity of brain structures, increased readiness of the developing brain for seizures, and the influence of perinatal risk factors.

The group of 19-year-old adolescents consisted of 738 patients (58.8%). The incidence rate in this age group has relatively stabilized, but idiopathic generalized epilepsy, such as juvenile myoclonic epilepsy and juvenile absent epilepsy, often manifests during adolescence.

The 20-29 age group included 189 patients (15%). Symptomatic focal epilepsy associated with traumatic brain injury, neuroinfections, and other acquired factors often appears at this age. This age distribution confirms the data of Fisher RS et al. regarding the bimodal distribution of epilepsy cases, reaching its highest peaks during childhood and old age.

The gradual decrease in the number of patients with age (30-39 years - 11.4%, 40-49 years - 7.1%, 50-59 years - 4.4%) may reflect a real decrease and insufficient detection of epilepsy and atypical forms of seizures in adults.

The low representation of patients over 60 years of age (only 3.1%) deserves special attention. This differs from data from developed countries, where the second peak associated with cerebrovascular diseases is observed in old age. Possible explanations include a reduction in life expectancy in the region, the lack of a diagnosis of epilepsy in elderly people, and the misinterpretation of epileptic seizures as manifestations of other conditions.

A gender analysis of the age distribution revealed a slight predominance of men (54.3% and 45.7%), which is especially significant in the children's age group (57.2% boys). This aligns with international data indicating a slightly higher incidence of epilepsy among men.

The frequency of attacks at the onset of the disease is an important prognostic factor influencing the choice of therapeutic tactics and long-term prognosis.

Analysis of the seizure frequency at the onset of the disease showed that the majority of patients—407 people (32.2%) —had seizures 3-6 times a year, which can be considered a relatively favorable onset of the disease. In another 242 patients (19%), seizures were observed even less frequently—one or two times a year. Thus, more than half of the patients (51.2%) experienced rare seizures at the onset of the

disease, which is consistent with the research of Brodie M.J. and Kwan P. [100] about a positive prognosis with rare attacks at the beginning of the disease.

285 patients (22.5%) had moderate seizures (7-12 times per year) and 277 patients (21.7%) had frequent seizures (2-3 times per month). These groups require a more active therapeutic approach from the very beginning of treatment. The special group initially consisted of patients with very frequent seizures: weekly seizures were observed in 36 patients (2.8%) and daily seizures in 7 patients (0.5%). This severe onset of the disease is often associated with symptomatic forms of epilepsy, structural brain damage, or severe epileptic encephalopathy[15]. These patients require urgent intensive care, often using a combination of antiepileptic drugs. When analyzing the relationship between the frequency of attacks at the onset of the disease and the age at which the disease began, it was found that children in the first year of life had more frequent attacks (43% had more than 12 attacks per year), while rare attacks prevailed in adolescence (68% had less than 6 attacks per year).

Conclusion. The study demonstrated that epilepsy remains a significant neurological and social problem in the Fergana Valley. Analysis of 3,060 patients revealed notable regional differences in disease prevalence, with higher detection rates in densely populated districts and urban centers where specialized neurological services are more accessible. The majority of patients were children, adolescents, and young adults, confirming the important role of age-related and developmental factors in epilepsy onset. A slight predominance of male patients was observed. Most cases were characterized by relatively infrequent seizures at disease onset, suggesting favorable prospects for timely diagnosis and treatment. However, severe forms with frequent seizures were also identified and require intensive therapeutic management. The findings highlight the influence of demographic, geographic, and healthcare accessibility factors on epilepsy epidemiology in the region. These results can contribute to improving early diagnosis, optimizing treatment strategies, and strengthening specialized neurological care for patients with epilepsy in the Fergana Valley.

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