

**ABOUT THE INFLUENCE OF HEALTH CARE FINANCING,
MEDICAL PERSONNEL'S QUALIFICATION AND STAFFING
TO PROVIDE MEDICAL CARE
FOR A PATIENTS WITH A CEREBRAL STROKE IN UKRAINE**

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According to the World Health Organization, 17 million people die from cardiovascular diseases every year in the world, which makes up 30% of all causes of premature death [1]. In Ukraine, cardiovascular diseases cause 2/3 of all premature deaths [1; 2]. The leading causes of death are myocardial infarction (due to coronary heart disease) and cerebral stroke. However, the efforts of the neurological service are focused only on cerebral stroke, the frequency of which is 280-290 cases per 100 thousand people, but on other vascular diseases of the brain. About 2.5 million Ukrainians receive treatment for cerebrovascular pathology (7-9 thousand cases per 100 thousand population). Among them, the majority regarding chronic cerebrovascular accident "discirculatory encephalopathy". Transient ischemic attacks (hereinafter – TIA) and cerebral strokes (hereinafter – CS) are recorded 20 times less often. However, for one stroke patient (all inpatient treatment), the neurological service spends about 25 thousand hryvnias (hereinafter – UAH), including the remuneration of medical workers, medications, hospital days, examination (the patient spends the same amount out of pocket). Whereas about 400 UAH is spent on the treatment of one case of discirculatory encephalopathy. Thus, expenses for CS

and TIA (UAH 2.5 billion) exceed the costs of treating chronic cerebrovascular diseases (UAH 800 million) by more than 3 times.

The relevance of the CS's topic has been growing for the past two decades. About 17 million CS happen per year occur in the world. In 1990, they were 2/3 less [3]. WHO's forecast for the next decade is also alarming: in 2030, 23 million CS are expected, 7.8 million deaths from CS, and 77 million people who have suffered CS [4]. This prognosis is associated with an increase in life expectancy in many countries (CS occurs more often in older people), as well as with a wide spread of behavioral risk factors (tobacco smoking, alcohol, sugar, fat and salt abuse, a sedentary lifestyle) and “diseases of civilization” (arterial hypertension, diabetes mellitus, diseases of the cardiovascular system, obesity, atherosclerosis, etc.) [5].

Ukraine belongs to the category of countries with high mortality from CS. About 100 thousand CS occur annually in Ukraine (268 per 100 thousand of the population, over the past 10 years – 290 per 100 thousand of the population). The ratio of hemorrhagic to ischemic strokes is 1:5. Not only neuropathologists, but also neurosurgeons are involved in the treatment of hemorrhagic stroke. All in Ukraine, 500 neurological departments carry out medical admission of patients with CS, however, 300 of them do not have the proper neuroimaging tools – computed tomography and magnetic resonance tomography, without which it is impossible to make a timely diagnosis and start proper treatment, in particular, thrombolysis [6; 9]. To diagnose a patient with a stroke, they are transferred to another clinic, which has the necessary diagnostic equipment. When moving the patient, valuable for emergency care time is lost. Such organization of medical care significantly reduces the chances of survival of patients with CS in the acute period, and also increases the chances of subsequent disability. To prevent such situations, it is necessary to provide tomographers into more neurological departments, as well as create more specialized stroke departments.

The neurological departments should be better provided with medicines, including expensive drugs for thrombolysis. Over the past 8 years, 3,000 thrombolysis cases have been performed in Ukraine, with a need of approximately

15,000 per year. For comparison, approximately 25,000 such procedures are carried out in Poland annually [6]. The reasons for the inadequate treatment are inadequate funding, inadequate staffing and insufficient qualifications of medical personnel.

Ukrainian medicine is not adequately funded all the years after the collapse of the USSR. In the case of CS, this means high mortality. For the current year, 912 million UAH are provided in the state budget of Ukraine for free treatment of CS [7; 8], which corresponds to payment for the treatment of one CS case in the amount of UAH 9 thousand, including all health care expenses. Due to the dangerously low costs of CS treatment, from April 2020, state funding for one CS case will increase to UAH 19.5 thousand. [9]. At least the same amount each patient will be forced to spend “out of pocket”. According to the World Bank, Ukrainians' health care expenditures “out of their own pockets” account for about 54% of all health care spending [10; 11].

Table 1

**The number of medical rates and the number of working neurologists
in Ukraine at December 31, 2019***

Region	Staffing rate	MD working	Region	Staffing rate	MD working
Vinnitsa	211	190	Mykolaiv	137	119
Volyn	146	139	Odessa	282	248
Dnepropetrovsk	449	395	Poltava	201	180
Donetsk	241	204	Rivne	174	165
Zhytomyr	184	170	Sumy	170	153
Transcarpathian	126	119	Ternopil	162	154
Zaporizhzhya	255	235	Kharkov	397	369
Ivano-Frankivsk	189	178	Kherson	133	113
Kyiv	233	200	Khmelnyskyi	162	155
Kyiv city	521	483	Cherkasy	178	168
Kirovohrad	130	118	Chernivtsi	130	125
Lugansk	94	83	Chernihiv	155	144
Lviv	368	357	Ukraine	5 425	4 960

Note: * rounded to whole digits.

Provision of medical personnel and their qualifications also plays an important role in organizing medical care for patients with CS. In Ukraine, there is always a shortage of medical personnel [12] of about 42 thousand doctors and 100 thousand nurses. According to the State Medical Statistics Service of Ukraine [13], a deficit also exists in the neurological service (see table 1 — data are not included in the temporarily occupied territories of Donetsk, Lugansk regions and Crimea): neurologists were not recruited at 465 medical rates (8.5%).

The deficit is facilitated by migration processes. For 2014-2016, about 7 thousand medical workers left Ukraine annually, for the period 2014-2020 – more than 50 thousand medical workers. In addition, the supply of Ukrainians with doctors is much lower than in Europe: 24.9 doctors per 10 thousand people (data for 2016) with an average European indicator of 32.2 doctors. For example, in Norway – 41.6 per 10 thousand people, in Germany – 36.0; in France – 34.5; in the UK – 27.4; in Bulgaria – 37.3; in the Czech Republic – 36.7 [12]. The share of doctors of retirement age is 24%, in certain regions (for example, in Kiev) – up to 35%. At the primary care – twice as much. One in four retirement doctors who continue to work is over 75 years old. That is, the real staff shortage is even greater. The low pay for medical workers, the lack of regular practice of examinations and treatment according to modern protocols for patients with CS adversely affects qualifications.

Thus, in order to reduce the mortality of patients with CS, it is necessary to act in several directions at once: reduce the shortage of neurological medical personnel and the average it's age, improve staff skills through accumulating experience using modern diagnostic and treatment methods, create more specialized stroke centers, and optimize patient delivery routes with a stroke to the place of direct provision of qualified medical care, install into neurological departments additional tomography equipment, to provide them with modern medicines to treat patients with CS for the state budget.

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