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ON THE SUBJECT OF OPHTHALMIC SURGERY STAFFING IN UKRAINIAN HOSPITALS

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Most cases of blindness are reversible according to WHO. The wide distribution of visual impairments, in particular those related to eye injuries and retinal detachments (RD) in the world and in Ukraine, indicates the need to study the issues of organizing medical care for ophthalmic surgical patients in order to find out why all the possibilities of preserving the sight of the population are not used and to suggest ways improvement of the situation. The study was conducted with the aim of studying the staffing of ophthalmology departments for the implementation of urgent vitreoretinal surgical interventions for the population of Ukraine. Analyzed data from ResearchGate, Google Scholar, and PubMed scientific publications on vitreoretinal surgery, regulatory and legal acts of Ukraine, statistical data of the Ministry of Health of Ukraine, WHO publications and guidelines, data from analytical reports of international organizations (in particular, the USAID project "Support for health care reform", 2019). It was established that the number of medical personnel (including ophthalmologists) per 10,000 population is gradually decreasing, which does not correspond to the growth trend of ophthalmosurgical pathology. The obtained results indicate insufficient monitoring of the situation by the Ministry of Health of Ukraine. Based on indirect evidence, we established the absence of vitreoretinal surgeons even in large regional hospitals of Ukraine. It was concluded that the correction of this situation can have a positive effect on the quantity and quality of the provided ophthalmic surgical care for eye injuries and RD.

Keywords: *eye injuries, blindness, retinal detachment, vitreoretinal surgery, ophthalmic care management.*

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Introduction

In the world, approximately 1 billion people have visual impairments, 285 million have significant visual impairments, and 39 million are completely blind [1]. But the vast majority of them can be helped.

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The main causes of vision loss and impairment are cataracts, infections and eye injuries, glaucoma, retinopathy, cortical blindness, refractive errors (myopia, farsightedness, astigmatism, presbyopia). It is known that the global burden of blindness and visual impairment can be reduced by wearing glasses and contact lenses, protecting the eyes from injuries at dangerous jobs, from ultraviolet light, reducing domestic, criminal and military injuries, timely and correct treatment of myopia, diabetes, hypertension, obesity, chronic kidney diseases, autoimmune diseases, retinal detachments, prevention of methyl alcohol poisoning, normalization of nutrition according to the vitamin and mineral composition (vitamins A, E, C, zinc, Omega-3 fatty acids, etc.), work with normal lighting and rest for the eyes [2–7]. But a significant part of visual disturbances cannot be corrected without ophthalmosurgical intervention. The prognosis of treatment and the number of complications depend significantly on the quality of this care.

Some of the diseases listed above in themselves carry a significant threat of vision loss worldwide, and this threat is growing. According to the WHO [8; 9], the number of blind people due to cataracts in the world may increase to 40 million in 2025. Today, more than 70% of the world's population over the age of 72 and about 20% 40–60 ages suffer from cataracts [10; 11].

Trachoma, caused by the bacterium Chlamydia trachomatis, is a significant medical and social problem for 42 countries worldwide, causing irreversible blindness in approximately 1.9 million people. Approximately 125 million people live in endemic areas. But only 44% of patients receive the necessary antibiotics [12].

Since the beginning of the Anti-Terrorist Operation in Ukraine, in connection with the occupation of Ukrainian territories, eye injuries have been of particular importance [13]. Ocular and orbital injuries, isolated or as part of traumatic brain injury, are the leading cause of irreversible blindness in working-age people worldwide. They are divided by severity (severe, medium, light), damage factor (caused by mechanical action, chemicals, electricity, or temperature factor), sometimes evaluated in points according to models such as the Ocular Trauma Score (OTS), which simplifies statistical calculations based on the integral damage, but often do not take into account accompanying pathologies. After emergency care, the patient must be transported to a specialized ophthalmology department, but the success of further treatment often depends on how the first aid was provided, how much time was lost in the delivery to the clinic where the patient finally received high-quality medical care, and how transportation took place [14; 15].

In modern military conflicts, highly destructive types of weapons are used, which often leads to damage to the head and eyes. (The head is usually less protected than the thoracic and abdominal organs.) Traumatic damage to the structures of the eye is possible both as a result of penetrating wounds and as a result of the action of an explosive wave [16]. According to statistics, traumatic eye injuries account for 13–16% of all combat injuries. It is the fourth most common cause among similar injuries. The exponential growth of this frequency is also recorded. In this context the military ophthalmology was even separated from the specialty of military surgery.

The total number of retinal detachments (RD) is 0.1 per 1,000 [17–19]. The majority of such cases are associated with diabetic retinopathy [20; 21], and only 10–20% are traumatic. There is a high risk of traumatic RD during such sports as boxing, bungee jumping, tennis, diving, from being hit in the face by airbags during traffic

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accidents. Thinning of the vitreous body after blunt eye trauma also increases the RD risk, especially if the shock wave that caused the injury acted at a speed of more than 50 m/s.

For diagnosis and rapid surgical intervention in injuries that caused RD, qualified personnel trained in modern methods of restoring the anatomical integrity of the retina, sophisticated equipment and tools are necessary. The speed of providing highly qualified ophthalmic surgical care can significantly improve the result of surgery (in terms of acuity recovery and visual fields) and the number of complications. However, according to the researchers of the project "Supporting health care reform" (2019) [22], provision of qualified personnel in some hospitals of Ukraine is insufficient. It is only necessary to clarify in which regions there is a lack of vitreoretinal surgeons capable of providing timely assistance in the case of RD and eye injuries.

The **purpose** of the study is to determine the ophthalmology departments staffing for urgent vitreoretinal surgical interventions for the population of Ukraine.

Materials and methods

Bibliosemantic, comparative and systematic analysis methods are used in study. The research materials were scientific publications of ResearchGate, Google Scholar and PubMed, normative legal acts of Ukraine, publications and guidelines of the WHO, statistical data of the Ministry of Health of Ukraine.

Results and their discussion

An important stage of planning the necessary volumes of medical care is the study of medical statistics data on diseases coded according to the International Classification of Diseases (ICD). According to ICD-10, diseases of the eye and adnexa (H00–H59) include disorders of eyelid, lacrimal system and orbit (H00–H06), conjunctiva (H10–H13), sclera, cornea, iris and ciliary body (H15–H22), lens (H25–H28), choroid and retina (H30–H36), glaucoma (H40–H42), diseases of the vitreous body and globe (H43–H45), optic nerve and optic pathways (H46–H48), ocular muscles, binocular movement, accommodation and refraction (H49–H52), vision disturbances and blindness (H53–H54), other disorders of eye and adnexa (H55–H59). Together with detachments of the choroid (H31.4) and retina (H35.7), Retinal detachment with retinal break (H33.0), Retinal breaks without detachment (H33.3), serous (H33.2), traction (H33.4) and other retinal detachments (H33.5) are usually studied conditions closely related to RD. For example, proliferative diabetic retinopathy (E10.3, E11.3, E12.3, E13.3, E14.3 – in different types of diabetes).

In accordance with ICD-10 codes and the corresponding ICD-11 codes, medical statistics data, clinical protocols and guidelines are studied, which determine the procedure for examination, treatment and rehabilitation of patients with RD. So, for example, general ophthalmological examinations are recommended at the outpatient and inpatient stages of treatment of eye disease (codes ICD-10 – H33, ICD-11 – 9B73); binocular reverse ophthalmoscopy of the periphery of both eyes; biomicroscopy with a Goldmann lens of the retina and vitreous body; surgical treatment with and without vitrectomy [23]. It should be noted that in recent years, unified protocols have been replaced by clinical protocols and clinical guidelines in Ukraine [24; 25]. The latter use the recommendations of the world's leading medical associations and more developed health care systems, and are also based on the principles of evidence-based medicine. Such actions improve the results of treatment and rehabilitation, the accuracy of diagnosis, but only if they are adapted to Ukrainian realities. It is known that the restoration of the functional state of the detached retina allows to improve visual parameters by 2–11 times compared to the

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deterioration immediately after the crisis (moment of detachment) [26–28]. The range of possible improvement is determined by the time since the crisis event, the degree of damage, the qualifications of the personnel and the method of operative intervention. The ability to perform the necessary operation on time directly depends on a number of factors of the organization of medical care at the regional level, and necessarily on the presence of a vitreoretinal surgeon in the hospital to which the patient was taken.

The quality of providing all types of medical assistance to the population is affected by the number of medical personnel. In particular, the number of doctors, intermediate-level medical personnel (nurses, paramedics and midwives), as well as their ratio [29]. Analysis of the number of medical personnel as of 2016 indicated a ratio of nurses to doctors of 1:1.96, which is lower than the European average (2.4:1). During 1993–2018, the ratio of the number of doctors to nurses in Ukraine decreased from 1:2.7 to 1:1.86 according to international accounting (the trend of the last 5 years of the specified period is shown in *Table 1*) and from 1:2.7 to 1:2.2 – according to national accounting [22]. The number of ophthalmologists on the period 1993–2013 gradually increased (from 0.74 to 0.84 per 10,000 population), and in 2018 it decreased to 0.69 per 10,000 population) (*Table 2*), which occurred against the background an increase in the need for vitreoretinal ophthalmosurgical interventions, which is evidenced by a gradual increase in the corresponding morbidity both among adults and among children [30; 31].

The discrepancy between the number of qualified ophthalmologists and the needs of the population, which indirectly indicates the increase in the incidence of ophthalmosurgical diseases, indicates an insufficient level of monitoring of the needs of the population in various types of medical care. This leads to a lack of suitable personnel. We were not able to collect relevant statistics, but our opinion is confirmed by the fact that patients with eye and eye injuries are often transported from one regional center of Ukraine to another for urgent vitreoretinal surgery. That is, even the largest clinical centers of some regions of Ukraine do not have a vitreoretinal surgeon on staff.

The analysis of regulatory legal acts of Ukraine proves the need to organize the necessary conditions for providing care to

Table 1. The number of doctors MD and intermediate-level medical personnel (IMP) in the budgetary and private sectors of Ukraine on 2014–2018 per 10,000 population according to the calculation [22, p. 130].

Years	2014	2015	2016	2017	2018
MD	185,945	186,234	186,776	186,178	185,675
IMP	378,880	371,736	366,756	360 416	345,364
MD : IMP	1 : 2.04	1 : 2.00	1 : 1.96	1 : 1.94	1 : 1.86

Table 2. The number of ophthalmologists (N) in budget medical institutions of Ukraine on 1993–2013, 2017 and 2018 per 10,000 population according to the calculation [22, p. 131, 132].

Year	N		Year	N		Year	N		Year	N		Year	N		Year	N
1993	0.74		1997	0.77		2001	0.79		2005	0.81		2009	0.82		2013	0.84
1994	0.72		1998	0.78		2002	0.79		2006	0.81		2010	0.83		–	–
1995	0.73		1999	0.79		2003	0.80		2007	0.80		2011	0.84		2017	0.71
1996	0.74		2000	0.79		2004	0.80		2008	0.81		2012	0.84		2018	0.69

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patients with eye injuries. Thus, the Order of the Ministry of Health of Ukraine No.372 on May 14, 2013 "On the system of ophthalmological care for the population of Ukraine" states the need to provide 24-hour emergency care for eye injuries (clause 2.2.12). Treatment of retinal breaks and detachments is recommended to be carried out both in laser rooms and in laser centers of specialized ophthalmic care (Appendix 3) [23].

Conclusions

The conducted analysis shows the great medical and social importance of vitreoretinal pathology, which requires urgent ophthalmosurgical care. In particular, eye injuries and retinal detachments. We believe that every central regional hospital of Ukraine should have a vitreoretinal surgeon on staff. Also, for the work of these specialists, conditions should be created for performing unexplained vitreoretinal surgical interventions, which can improve the recovery statistics of patients with eye injuries and retinal detachments, reduce the number of complications and the risks of complete vision loss for patients of this profile.

The authors declare **no conflict of interest.**

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ДО ПИТАННЯ КАДРОВОГО ОФТАЛЬМОХІРУРГІЧНОГО ЗАБЕЗПЕЧЕННЯ УКРАЇНСЬКИХ ЛІКАРЕНЬ

Більшість випадків сліпоти є відворотними за даними ВООЗ. Широке розповсюдження вад зору, зокрема пов'язаних із травмами очей та відшаруваннями сітківки (ВС) у світі та в Україні свідчить про необхідність вивчення питань організації медичної допомоги офтальмохірургічним хворим, щоб з'ясувати, чому не використані всі можливості збереження зору населення та запропоновати шляхи покращення ситуації. Дослідження проведено з метою вивчення кадрового забезпечення офтальмологічних відділень задля проведення ургентних вітреоретинальних оперативних втручань населенню України. Проаналізовані дані наукових публікації ResearchGate, Google Scholar та PubMed з питань вітреоретинальної хірургії, нормативно-правові акти України, статистичні дані Міністерства охорони здоров'я України, публікації та настанови ВООЗ, дані аналітичних звітів міжнародних організацій (зокрема проекту USAID «Підтримка реформи охорони здоров'я», 2019). Встановлено, що кількості медичного персоналу (у тому числі лікарів-офтальмологів) на 10 000 населення поступово знижується, що не відповідає тенденції росту офтальмохірургічної патології. Отримані результати свідчать про недостатній моніторинг ситуації з боку Міністерства охорони здоров'я України. За непрямими ознаками нами встановлена відсутність вітреоретинальних хірургів навіть у великих регіональних госпіталях України. Зроблено висновок, що виправлення цієї ситуації може позитивно вплинути на кількість та якість наданої офтальмохірургічної допомоги про травмах ока та ВС.

Ключові слова: *травми ока, сліпота, відшарування сітківки, вітреоретинальна хірургія, організація офтальмологічної допомоги.*

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К ВОПРОСУ КАДРОВОГО ОФТАЛЬМОХИРУРГИЧЕСКОГО ОБЕСПЕЧЕНИЯ УКРАИНСКИХ БОЛЬНИЦ

Большинство случаев слепоты являются обратимыми по данным ВОЗ. Широкое распространение проблем со зрением, в частности связанных с травмами глаз и отслойкой сетчатки (ОС) в мире и в Украине говорит о необходимости изучения вопросов организации медицинской помощи офтальмохирургическим больным, а также обязывает выяснить, почему не использованы все возможности сохранения зрения населения и предложить пути улучшения ситуации. Исследование проведено для изучения кадрового обеспечения офтальмологических отделений, которые выполняют ургентные витреоретинальные оперативные вмешательства населению Украины. Проанализированы данные научных публикаций ResearchGate, Google Scholar и PubMed по вопросам ветреоретинальной хирургии, нормативно-правовые акты Украины, статистические данные Министерства здравоохранения Украины, публикации и руководство ВОЗ, данные аналитических отчетов международных организаций (в частности проекта USAID «Поддержка реформы здравоохранения», 2019). Установлено, что количество медицинского персонала (в том числе врачей-офтальмологов) на 10 000 населения постепенно снижается, что не соответствует тенденции роста офтальмохирургической патологии. Полученные результаты свидетельствуют о недостаточном мониторинге ситуации со стороны Министерства здравоохранения Украины. По косвенным признакам установлено отсутствие витреоретинальных хирургов даже в крупных региональных госпиталях Украины. Мы пришли к выводу, что исправление этой ситуации может положительно повлиять на количество и качество оказанной офтальмохирургической помощи при травмах глаза и ОС.

***Ключевые слова**: травмы глаза, слепота, отслойка сетчатки, витреоретинальная хирургия, организация офтальмологической помощи*.

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