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Povch Z. V.[1], Osaulenko S. V.[2], Medvedovska N. V.[3]

Accessibility of ophthalmological care in the context of the growing prevalence of diseases of the visual analyzer

[1] State Institution "Eye Institute of the Ministry of Health of Ukraine", Kyiv, Ukraine
[2] Bogomolets National Medical University, Kyiv, Ukraine
[3] National Academy of Medical Sciences of Ukraine, Kyiv, Ukraine

Повч З. В.[1], Осауленко С. В.[2], Медведовська Н. В.[3]

Доступність офтальмологічної допомоги в контексті зростання поширеності хвороб зорового аналізатора

[1] Державна установа «Інститут ока Міністерства охорони здоров'я України», м. Київ, Україна
[2] Національний медичний університет імені О. О. Богомольця, м. Київ, Україна
[3] Національна академія медичних наук України, м. Київ, Україна

medvedovsky@ukr.net

Introduction

The vast majority of ophthalmic nosologies are classified as diseases whose prevalence increases with age. However, the functioning of the visual analyzer is crucial for active socialization and work capacity in modern conditions of widespread remote forms of education, work, and communication [1].

Research continues into the conditions and factors that cause the development of ophthalmic pathology in different age groups of patients. Thus, recent scientific literature presents scattered studies that prove the existence of the combined influence of factors such as age, socio-economic conditions, cultural and harmful habits, gender, type of employment, employment, hobbies, and the presence of decompensated chronic non-infectious diseases, especially diabetes mellitus [2–6]. The current possibilities for effective treatment of the vast majority of ophthalmic diseases, provided that there are no symptoms or signs of the disease in its early stages, open up a field for scientific discussion on the introduction of modern medical and preventive technologies and screening programs in specific risk groups, especially among the elderly population and populations exposed to proven risk factors [7; 8].

The peculiarities of modern civilizational development create conditions for excessive visual stress on the visual analyzer due to the rapid spread of digitalization, digitization, and related remote forms of education, employment, communication, etc. [9; 10]. Therefore, some scientists in different countries around the world strongly advocate the advisability of screening for visual impairments, arguing for its widespread introduction, starting from early childhood [11; 12]. At the same time, different approaches to the organization of medical and preventive ophthalmological examinations, including in the conditions and with the involvement of medical professionals and equipment from the network of primary health care facilities, are the subject of ongoing debate. For example, scientists from Australia, the United States, the United Kingdom, and the Netherlands are discussing the low economic efficiency of introducing multi-component vision screening in primary health care facilities for older age groups [12].

The objective of our study was to identify and analyze effective preventive, medical, diagnostic, and screening strategies published in scientific literature to ensure equal access to specialized ophthalmological care for different segments of the population, especially those diagnosed with ophthalmological pathologies.

Object, materials and research methods

The materials for the study were the results of scientific research published in scientific literature on the problems of studying the accessibility of specialized ophthalmological care for different segments of the population, as well as the results of the implementation of improved approaches in different countries around the world to improve it, including for patients with diagnosed ophthalmological pathology.

The practical implementation of tasks to achieve the research goal required the use of the following general scientific and special research methods: the systematic approach method; bibliosemantic; content analysis; structural-logical analysis. The systematic approach method was used to analyze the improved approaches applied to improve the accessibility of ophthalmic care for different segments of the population. The bibliosemantic method was used to study the domestic and international experience published in scientific sources, as well as improved scientific approaches to solving the problem under study.

Content analysis and structural-logical analysis methods were used to study the content of literary sources regarding the analysis of the results of research on the availability of specialized ophthalmological care, in particular in terms of the implementation of modern medical and preventive strategies for preserving the ophthalmological health of the population. Data processing included the processing of primary material, referenced literary sources obtained from open information resources, in particular PubMed, Google Scholar, as well as from official websites, as provided for by Ukrainian legislation, which were collected, systematized, and analyzed using the above-mentioned research methods.

Research results

According to the results of the analysis of the effectiveness of the international program "VISION 2020: The Right to Sight: Analysis for Research on the Global Burden of Disease," it was found that in 204 countries around the world, between 1990 and 2021, the number of ophthalmological complications of diabetes mellitus and age-related changes in the central region of the retina (age-related macular degeneration or AMD) increased at one of the highest rates among all nosologies in the class of diseases of the eye and its adnexa. The latter has become one of the main modern causes of visual impairment and blindness over the years, with age being a risk factor [13]. During the specified period, the number of people diagnosed with macular degeneration more than doubled from 3.64 million in 1990 to 8.06 million in 2021. With the growing trend toward an "aging" population, the prevalence of age-related macular degeneration is projected to increase, especially among women. Recent scientific studies predict that by 2050, the number of people with AMD will increase among both women (from 4.66 million in 2021 to 12.32 million in 2050) and among men (from 3.40 million in 2021 to 9.02 million in 2050) [14].

German researchers have found that almost half of all cases of blindness and severe visual impairment are caused by the development of AMD, which is completely asymptomatic in its early stages. Between 2017 and 2022, the number of people diagnosed with AMD in Germany rose from 5.7 million to 7.0 million. The situation is complicated by the fact that there is no guaranteed treatment for the so-called "dry" form of AMD, while "wet" AMD requires injections of VEGF inhibitors, which are quite expensive [15].

The prevalence of AMD increases with the patient's age. Thus, in the group of patients over 75 years of age, every third person is at risk of developing early AMD (25.0 %) or late AMD (8.0 %). Therefore, early diagnosis with a thorough examination of the fundus and central retina by a specialist can help prevent the progression of the disease [16].

Diabetes mellitus, a complex endocrine disorder, continues to spread rapidly in most countries around the world, and the problem of insulin resistance is growing similarly. The development of micro- and macrovascular complications of diabetes mellitus (such as ischemic heart disease, nephropathy, diabetic foot syndrome, peripheral polyneuropathy, diabetic retinopathy, etc.) leads to loss of working capacity, disability, and even premature death. Studies show a high probability of several of these complications occurring simultaneously in one patient. For example, half of patients diagnosed with diabetic retinopathy are also highly likely to be diagnosed with peripheral polyneuropathy. The vast majority (90.0 %) of patients with diabetic foot are also diagnosed with diabetic retinopathy. Conversely, patients under the supervision of an ophthalmologist with diabetic retinopathy are often simultaneously diagnosed with ischemic heart disease (88.1 %), nephropathy (85.0 %), and polyneuropathy (65.6 %) [8].

As blood sugar levels rise, the frequency of micro- and macrovascular complications increases [17]. Against the background of chronic hyperglycemia, diabetic retinopathy develops, which, as neurovascular degeneration progresses, leads to a proliferative form of diabetic retinopathy with the risk of complete (peripheral or central) vision loss. A sign of proliferative diabetic retinopathy is the appearance and development of growths on the optic disc, which occupy an area of more than 1/3 or 1/4 of the disc, the appearance of hemorrhages in the vitreous body or preretinal hemorrhages. In the advanced stage of diabetic retinopathy, the growth of fibrovascular membranes creates a risk of traction retinal detachment. Proven risk factors for the progression of diabetic retinopathy are: high blood sugar levels; high levels of glycated hemoglobin; renal failure in type I and II diabetes mellitus; young age at diagnosis of diabetes mellitus; elevated blood triglyceride levels; increased retinal vein diameter in patients with type I diabetes mellitus [3; 4].

It has been proven that the more complex diabetic retinopathy is at the time of initial diagnosis, the worse the prognosis for its further development and progression [18].

Research on the evidence of signs for predicting complications of diabetes mellitus formed the basis for the development of the PRISMA software, which assesses the combination of individual characteristics of each patient, taking into account their age, gender, nationality, body mass index, weight, harmful habits, in particular smoking with a history of its duration, the presence of arterial hypertension, diastolic blood pressure, fasting blood glucose level, glycated hemoglobin, high and low density lipoproteins, total cholesterol, triglycerides, insulin use, duration of diabetes mellitus, family and genetic history of the presence and course of cardiovascular diseases and diabetes. The use of modern software allows predicting the onset of diabetic retinopathy, nephropathy, and neuropathy in patients with diabetes mellitus. Microangiopathies, as complications of diabetes mellitus, including damage to the mitochondria of the retinal neuroepithelium with the development of chronic inflammation, neovascularization, and narrowing

of the visual field, cause diabetic retinopathy to progress to its proliferative form [19]. It is diabetic retinopathy, occurring in patients with diabetes mellitus, that is an early indicator of visual signaling disorders, the development of microvascular deficiency, and chronic inflammation with excessive tissue remodeling [4; 19].

Proliferative diabetic retinopathy is the main cause of irreversible vision loss in working-age people with diabetes. Proliferative diabetic retinopathy is an independent predictor of other serious complications of diabetes, such as ischemic stroke [4]. In turn, the negative prognosis for the progression of diabetic retinopathy depends on the number of strokes and hospitalizations [20].

Due to the need for regular examinations and supervision by an ophthalmologist in the United States, all patients without insurance face barriers to accessing medical and preventive care, which becomes critical in the case of late diagnosis of ophthalmic complications of diabetes mellitus [19]. The increase in the cost and frequency of use of additional medical services, such as specialized ophthalmological care, contributes to the progression of diabetes and its complications, which encourages increasing their availability to patients at risk of developing complications of diabetes [9; 19].

Early prevention programs, risk factor correction, and early treatment of diabetic retinopathy are economically justified, without which the prevalence of proliferative diabetic retinopathy increases, proving the paramount importance of focusing on prevention rather than treatment [21].

The use of artificial intelligence for diabetic retinal examinations increases adherence to treatment, monitoring, and regularity of examinations in patients with diabetes mellitus [9].

Discussion of research results

Research on the impact of the availability of medical and preventive services on the health status of the population in modern conditions remains relevant. The problems of accessibility of specialized ophthalmological services for older people, lonely elderly people, and low-income groups remain particularly acute. Given the asymptomatic onset of most ophthalmic diseases, the increase in the proportion of ophthalmic complications of chronic somatic diseases, in particular such as ophthalmic complications of diabetes mellitus, and the increasing prevalence of age-related macular degeneration, it is reasonable to conduct consultative examinations by an ophthalmologist, the frequency of which is disrupted for various reasons, including the low availability of specialized ophthalmological care. In such conditions, it is important to study the feasibility of introducing screening medical and preventive examinations by an ophthalmologist or screening tests of visual functions in a family clinic or primary health care center at the patient's place of residence, which will help overcome the barrier of territorial accessibility of these services.

Prospects for further research

The implementation of the above requires the necessary ophthalmic equipment, skills, and abilities of family clinic staff and family doctors to assess visual function or justify the appointment of a comprehensive ophthalmological examination in individuals with chronic non-infectious pathology for early detection of visual impairment. and family doctors to assess visual function or make an informed decision to refer individuals with chronic non-infectious pathologies for a comprehensive ophthalmological examination for the early detection of possible ophthalmological complications, such as those associated with diabetes mellitus, the early stages of which are completely asymptomatic. On the other hand, the high cost of ophthalmic equipment and the shortage of ophthalmologists create conditions for reduced access to ophthalmic services, particularly among older and low-income populations. Therefore, further research may focus on finding ways and methods to overcome barriers to the availability of specialized ophthalmological care for low-income groups suffering from difficult socio-economic conditions. The need for organizational support for a systematic approach to the implementation of modern medical and preventive strategies may require the planning and implementation of appropriate regional programs with the combined efforts of local communities.

Conclusions

1. Given the extreme importance of developing and maintaining healthy visual functions in different age groups of the population, which are important for education, employment, and socialization in the context of digitalization and digitization, the availability of specialized medical and preventive ophthalmological services is an important component of medical care.

2. In modern conditions, the risk of asymptomatic onset and development of ophthalmic complications of most chronic non-infectious diseases, as well as the development of visual analyzer pathology, the prevalence of which has been proven to increase with age, has been proven.

3. A review of the current scientific literature demonstrates the growing relevance of research on the development and testing of systemic organizational approaches to the introduction of modern medical and preventive technologies and methods for improving the accessibility of ophthalmological care, especially for patients with age-related macular degeneration and diabetes mellitus, whose ophthalmic complications have been shown to negatively affect the working capacity, disability, and quality of life of such patients.

Bibliography

1. Varma R, Tarczy-Hornoch K, Jiang X. Visual Impairment in Preschool Children in the United States: Demographic and Geographic Variations From 2015 to 2060. JAMA Ophthalmol. 2017;135(6):610–616. DOI: 10.1001/jamaophthalmol.2017.1021. PMID: 28472231; PMCID: PMC5710267

2. Lin Y, Chu C, Chen Q, Xiao J, Wan C. Factors influencing primary health care utilization among elderly internal migrants in China: the role of social contacts. BMC Public Health. 2020;20(1):1054. DOI: 10.1186/s12889-020-09178-3

3. Lu VI, Patnaik JL, Scott RA, Lynch AM, Smith JM, Mandava N, Manoharan N. Risk Factors and Outcomes of Delayed Presentation of Diabetic Retinopathy Patients to a County Hospital. Transl Vis Sci Technol. 2023;12(9):8. DOI: 10.1167/tvst.12.9.8. PMID: 37676677; PMCID: PMC10494984

4. Perais J, Agarwal R, Evans JR, Loveman E, Colquitt JL, Owens D, Hogg RE, Lawrenson JG, Takwoingi Y, Lois N. Prognostic factors for the development and progression of proliferative diabetic retinopathy in people with diabetic retinopathy. Cochrane Database Syst Rev. 2023;2(2):CD013775. DOI: 10.1002/14651858.CD013775.pub2

5. Qian CX, Zhao Y, Anindya K, Tenneti N, Desloge A, Atun R, Qin VM, Mulcahy P, Lee JT. Non-communicable disease risk factors and management among internal migrant in China: systematic review and meta-analysis. BMJ Glob Health. 2021:e003324. DOI: 10.1136/bmjgh-2020-003324

6. Tatsuta W, Inayama T, Yamanaka E, Ohkawara K. Assessment of Physical Activity and Related Factors among Adults with Visual Impairments in Japan. Int. J. Environ. Res. Public Health. 2022;19(4):2244. DOI: 10.3390/ijerph19042244. PMID: 35206430; PMCID: PMC8871727

7. GBD 2019 (2021) Blindness and Vision Impairment Collaborators; Vision Loss Expert Group of the Global Burden of Disease Study. Causes of blindness and vision impairment in 2020 and trends over 30 years, and prevalence of avoidable blindness in relation to VISION 2020: the Right to Sight: an analysis for the Global Burden of Disease Study. Lancet Glob Health. 2021 Feb;9(2):e144–e160. DOI: 10.1016/S2214-109X(20)30489-7. Epub 2020 Dec

8. Kozek E, Górska A, Fross K, Marcinowska A, Citkowska A, Sieradzki J. Przewlekłe powikłania i czynniki ryzyka u chorych na cukrzyce 1 typu--analiza retrospektywna [Chronic complications and risk factors in patients with type 1 diabetes mellitus--retrospective analysis]. Przegl Lek. 2003;60(12):773–7. Polish. PMID: 15058014

9. Channa R, Wolf RM, Abràmoff MD, Lehmann HP. Effectiveness of artificial intelligence screening in preventing vision loss from diabetes: a policy model. NPJ Digit Med. 2023;6(1):53. DOI: 10.1038/s41746-023-00785-z

10. Weinreich KJ, Frankova I, Maksymets N, Barbui C, Klymchuk V, Mooren T, Olechno E, Purgato M, Sijbrandij M, Witteveen AB, van der Ven E. Implementing scalable face-to-face and digital interventions among forcibly displaced persons from Ukraine in Europe: protocol of The U-RISE Project. Eur. J. Psychotraumatol. 2025;16(1):2468117. DOI: 10.1080/20008066.2025.2468117. Epub 2025 Feb 27. PMID: 40012519; PMCID: PMC11869340

11. Allison K, Virk A, Alamri A, Patel D. Analysis of the Awareness and Access of Eye Healthcare in Underserved Populations. Vision (Basel). 2025;9(3):55. DOI: 10.3390/vision9030055

12. Clarke EL, Evans JR, Smeeth L. Community screening for visual impairment in older people. Cochrane Database Syst Rev. 2018;2(2):CD001054. DOI: 10.1002/14651858.CD001054.pub3

13. GBD 2021 Global AMD Collaborators. Global burden of vision impairment due to age-related macular degeneration, 1990-2021, with forecasts to 2050: a systematic analysis for the Global Burden of Disease Study 2021. Lancet Glob Health. 2025 Jul;13(7):e1175–e1190. doi: 10.1016/S2214-109X(25)00143–3

14. Huang L, Hu P, Chen J, Liu J, Grzybowski A. Smoking-Attributable Age-Related Macular Degeneration Vision Loss in China: 1990-2021 Trends and 2040 Projections. Transl Vis Sci Technol. 2025;14(10):21. DOI: 10.1167/tvst.14.10.21. PMID: 41099595; PMCID: PMC12534889

15. Stahl A. The Diagnosis and Treatment of Age-Related Macular Degeneration. Dtsch Arztebl Int. 2020;117(29-30):513–520. DOI: 10.3238/arztebl.2020.0513. PMID: 33087239; PMCID: PMC7588619

16. Thomas CJ, Mirza RG, Gill MK. Age-Related Macular Degeneration. Med Clin North Am. 2021;105(3):473–491. DOI: 10.1016/j.mcna.2021.01.003. Epub 2021 Apr 2. PMID: 33926642

17. De Meulemeester J, Charleer S, Visser MM, De Block C, Mathieu C, Gillard P. The association of chronic complications with time in tight range and time in range in people with type 1 diabetes: a retrospective cross-sectional real-world study. Diabetologia. 2024;67(8):1527–1535. DOI: 10.1007/s00125-024-06171-y. Epub 2024 May 24

18. Wykoff CC, Khurana RN, Nguyen QD, Kelly SP, Lum F, Hall R, Abbass IM, Abolian AM, Stoilov I, To TM, Garmo V. Risk of Blindness Among Patients With Diabetes and Newly Diagnosed Diabetic Retinopathy. Diabetes Care. 2021;44(3):748–756. DOI: 10.2337/dc20-0413. Epub 2021 Jan 20

19. Rajeswaren V, Lu V, Chen H, Patnaik JL, Manoharan N. Healthcare Resource Utilization and Costs in an At-Risk Population With Diabetic Retinopathy. Transl Vis Sci Technol. 2024;13(2):12. DOI: 10.1167/tvst.13.2.12. PMID: 38359018; PMCID: PMC10876016

20. Guo Y, Yonamine S, Jian Ma C, Stewart JM, Acharya N, Arnold BF, McCulloch C, Sun CQ. Developing and Validating Models to Predict Progression to Proliferative Diabetic Retinopathy. Ophthalmol Sci. 2023;3(2):100276. DOI: 10.1016/j.xops.2023.100276. PMID: 36950087; PMCID: PMC10025270

21. Kropp M, Golubnitschaja O, Mazurakova A, Koklesova L, Sargheini N, Vo TKS, de Clerck E, Polivka J Jr, Potuznik P, Polivka J, Stetkarova I, Kubatka P, Thumann G. Diabetic retinopathy as the leading cause of blindness and early predictor of cascading complications-risks and mitigation. EPMA J. 2023;14(1):21–42. DOI: 10.1007/s13167-023-00314-8

References

1. Varma R, Tarczy-Hornoch K, Jiang X. Visual Impairment in Preschool Children in the United States: Demographic and Geographic Variations From 2015 to 2060. JAMA Ophthalmol. 2017;135(6):610–616. https://doi.org/10.1001/jamaophthalmol.2017.1021

2. Lin Y, Chu C, Chen Q, Xiao J, Wan C. Factors influencing primary health care utilization among elderly internal migrants in China: the role of social contacts. BMC Public Health. 2020;20(1):1054. https://doi.org/10.1186/s12889-020-09178-3

3. Lu VI, Patnaik JL, Scott RA, Lynch AM, Smith JM, Mandava N, Manoharan N. Risk Factors and Outcomes of Delayed Presentation of Diabetic Retinopathy Patients to a County Hospital. Transl Vis Sci Technol. 2023;12(9):8. https://doi.org/10.1167/tvst.12.9.8

4. Perais J, Agarwal R, Evans JR, Loveman E, Colquitt JL, Owens D, Hogg RE, Lawrenson JG, Takwoingi Y, Lois N. Prognostic factors for the development and progression of proliferative diabetic retinopathy in people with diabetic retinopathy. Cochrane Database Syst Rev. 2023;2(2):CD013775. https://doi.org/10.1002/14651858.CD013775.pub2

5. Qian CX, Zhao Y, Anindya K, Tenneti N, Desloge A, Atun R, Qin VM, Mulcahy P, Lee JT. Non-communicable disease risk factors and management among internal migrant in China: systematic review and meta-analysis. BMJ Glob Health. 2021;6(9):e003324. https://doi.org/10.1136/bmjgh-2020-003324

6. Tatsuta W, Inayama T, Yamanaka E, Ohkawara K. Assessment of Physical Activity and Related Factors among Adults with Visual Impairments in Japan. Int. J. Environ. Res. Public Health. 2022;19(4):2244. https://doi.org/10.3390/ijerph19042244. PMID: 35206430; PMCID: PMC8871727

7. GBD 2019 Blindness and Vision Impairment Collaborators; Vision Loss Expert Group of the Global Burden of Disease Study. Causes of blindness and vision impairment in 2020 and trends over 30 years, and prevalence of avoidable blindness in relation to VISION 2020: the Right to Sight: an analysis for the Global Burden of Disease Study. Lancet Glob Health. 2021;9(2):e144–e160. https://doi.org/10.1016/S2214-109X(20)30489-7

8. Kozek E, Górska A, Fross K, Marcinowska A, Citkowska A, Sieradzki J. Przewlekłe powikłania i czynniki ryzyka u chorych na cukrzyce 1 typu--analiza retrospektywna Przegl Lek. 2003;60(12):773–7. Polish. PMID: 15058014

9. Channa R, Wolf RM, Abràmoff MD, Lehmann HP. Effectiveness of artificial intelligence screening in preventing vision loss from diabetes: a policy model. NPJ Digit Med. 2023;6(1):53. https://doi.org/10.1038/s41746-023-00785-z

10. Weinreich KJ, Frankova I, Maksymets N, Barbui C, Klymchuk V, Mooren T, Olechno E, Purgato M, Sijbrandij M, Witteveen AB, van der Ven E. Implementing scalable face-to-face and digital interventions among forcibly displaced persons from Ukraine in Europe: protocol of The U-RISE Project. Eur. J. Psychotraumatol. 2025;16(1):2468117. https://doi.org/10.1080/20008066.2025.2468117

11. Allison K, Virk A, Alamri A, Patel D. Analysis of the Awareness and Access of Eye Healthcare in Underserved Populations. Vision. 2025; 9(3):55. https://doi.org/10.3390/vision9030055

12. Clarke EL, Evans JR, Smeeth L. Community screening for visual impairment in older people. Cochrane Database Syst Rev. 2018;2(2):CD001054. https://doi.org/10.1002/14651858.CD001054.pub3

13. GBD 2021 Global AMD Collaborators. Global burden of vision impairment due to age-related macular degeneration, 1990-2021, with forecasts to 2050: a systematic analysis for the Global Burden of Disease Study 2021. Lancet Glob Health. 2025;13(7):e1175–e1190. https://doi.org/10.1016/S2214-109X(25)00143–3

14. Huang L, Hu P, Chen J, Liu J, Grzybowski A. Smoking-Attributable Age-Related Macular Degeneration Vision Loss in China: 1990-2021 Trends and 2040 Projections. Transl Vis Sci Technol. 2025;14(10):21. https://doi.org/10.1167/tvst.14.10.21

15. Stahl A. The Diagnosis and Treatment of Age-Related Macular Degeneration. Dtsch Arztebl Int. 2020;117(29-30):513–520. https://doi.org/10.3238/arztebl.2020.0513

16. Thomas CJ, Mirza RG, Gill MK. Age-Related Macular Degeneration. Med Clin North Am. 2021;105(3):473–491. https://doi.org/10.1016/j.mcna.2021.01.003

17. De Meulemeester J, Charleer S, Visser MM, De Block C, Mathieu C, Gillard P. The association of chronic complications with time in tight range and time in range in people with type 1 diabetes: a retrospective cross-sectional real-world study. Diabetologia. 2024;67(8):1527–1535. https://doi.org/10.1007/s00125-024-06171-y

18. Wykoff CC, Khurana RN, Nguyen QD, Kelly SP, Lum F, Hall R, Abbass IM, Abolian AM, Stoilov I, To TM, Garmo V. Risk of Blindness Among Patients With Diabetes and Newly Diagnosed Diabetic Retinopathy. Diabetes Care. 2021;44(3):748–756. https://doi.org/10.2337/dc20-0413

19. Rajeswaren V, Lu V, Chen H, Patnaik JL, Manoharan N. Healthcare Resource Utilization and Costs in an At-Risk Population With Diabetic Retinopathy. Transl Vis Sci Technol. 2024;13(2):12. https://doi.org/10.1167/tvst.13.2.12

20. Guo Y, Yonamine S, Jian Ma C, Stewart JM, Acharya N, Arnold BF, McCulloch C, Sun CQ. Developing and Validating Models to Predict Progression to Proliferative Diabetic Retinopathy. Ophthalmol Sci. 2023;3(2):100276. https://doi.org/10.1016/j.xops.2023.100276

21. Kropp M, Golubnitschaja O, Mazurakova A, Koklesova L, Sargheini N, Vo TKS, de Clerck E, Polivka J Jr, Potuznik P, Polivka J, Stetkarova I, Kubatka P, Thumann G. Diabetic retinopathy as the leading cause of blindness and early predictor of cascading complications-risks and mitigation. EPMA J. 2023;14(1):21–42. https://doi.org/10.1007/s13167-023-00314-8

Purpose. The aim of our study was to search for and analyze effective preventive, medical, diagnostic, and screening strategies published in scientific literature to ensure equal access to specialized ophthalmological care for different segments of the population, especially those diagnosed with ophthalmological pathologies.

Materials and methods. The materials and methods of the study were the results of scientific research published in scientific literature on the problems of studying the accessibility of specialized ophthalmological care for different segments of the population. Achieving the research goal required the use of general scientific and special research methods, including: the systematic approach; bibliosemantic; content analysis; and structural-logical analysis.

Results. The experience of various countries around the world published in scientific literature demonstrates evidence of an increase in the prevalence of ophthalmic diseases with age, with ophthalmic complications of diabetes mellitus and age-related macular degeneration increasing at an especially rapid rate. Early diagnosis can help prevent the progression of the disease. The use of modern software for predicting complications of diabetes mellitus allows predicting the onset of diabetic retinopathy, nephropathy, and neuropathy in patients with diabetes mellitus. In patients with diabetes mellitus against the background of chronic hyperglycemia, diabetic retinopathy occurs and develops, the progression of which into a proliferative form increases the risk of complete loss of vision. Real-life examples of the implementation of regional medical and preventive strategies to prevent the development of blindness and low vision in different countries around the world are given, their positive results are described, and issues that continue to be actively debated are discussed.

Conclusions. A review of current scientific literature demonstrates the growing relevance of research on the development and testing of systematic organizational approaches to the implementation of modern medical and preventive technologies and methods for improving the accessibility of ophthalmic care, especially for patients with age-related macular degeneration and diabetes mellitus, whose ophthalmic complications have been shown to negatively affect the working capacity, disability, and quality of life of such patients.

Key words: accessibility of ophthalmic care, ophthalmic pathology, medical and preventive technologies, regional programs.

Мета. Зростання поширеності офтальмологічної патології з віком є визнаною проблемою в більшості країн світу. Метою нашого дослідження став пошук та аналіз оприлюднених у науковій літературі ефективних профілактичних, медико-діагностичних, у тому числі скринінгових, стратегій забезпечення рівного доступу спеціалізованої офтальмологічної допомоги для різних верств населення, особливо тих, які мають діагностовану офтальмологічну патологію.

Матеріали та методи. Матеріалами та методами дослідження стали оприлюднені в науковій літературі результати наукових досліджень із проблем вивчення доступності спеціалізованої офтальмологічної допомоги для різних верств населення, а також результатів розробки та реалізації регіональних ініціатив у різних країнах світу для її покращення. Досягнення мети дослідження вимагало використання загальнонаукових та спеціальних методів дослідження, серед яких – метод системного підходу, бібліосемантичний, контент-аналізу, структурно-логічного аналізу.

Результати. Оприлюднений у науковій літературі досвід різних країн світу демонструє докази зростання поширеності офтальмологічних хвороб із віком, особливо підвищеними темпами зросли офтальмологічні ускладнення цукрового діабету та вікових змін центральної області сітківки (вікова макулодистрофія або ВМД). Практично половина випадків сліпоти і складних порушень зору зумовлені розвитком ВМД, яка на початкових стадіях є повністю безсимптомною. Рання діагностика з ретельним оглядом спеціалістом очного дна, центральної частини сітківки може сприяти попередженню прогресування захворювання. У пацієнтів із цукровим діабетом на тлі хронічної гіперглікемії виникає та розвивається діабетична ретинопатія, прогресування якої в проліферативну форму підвищує ризик повної втрати зору. Застосування сучасного програмного забезпечення прогнозування ускладнень цукрового діабету дає змогу спрогнозувати появу діабетичних ретинопатії, нефропатії, нейропатії у пацієнтів із цукровим діабетом. Економічно обґрунтованими стають програми ранньої профілактики, корекції факторів ризику й раннього лікування діабетичної ретинопатії, без запровадження яких зростає поширеність проліферативної діабетичної ретинопатії, що доводить надважливість акценту на профілактиці, а не на лікуванні. Використання штучного інтелекту для проведення діабетичних ретинальних оглядів підвищує прихильність до лікування, нагляду та регулярності обстеження у пацієнтів із цукровим діабетом. Різні підходи до організації надання офтальмологічної допомоги особам старших вікових категорій, одиноким особам, малозабезпеченим верствам населення в різних країнах світу дають можливість досягати позитивних результатів через запровадження скринінгових стратегій, застосування сучасних медико-профілактичних стратегій серед населення визначених груп ризику. Враховуючи безсимптомність початку більшості офтальмологічних захворювань, зростання питомої ваги офтальмологічних ускладнень хронічних соматичних захворювань, як-от офтальмологічні ускладнення цукрового діабету, зростання поширеності вікової макулодистрофії, обґрунтованими стають консультативні обстеження офтальмолога, дотримання періодичності яких порушується з різних причин, у тому числі через низьку доступність спеціалізованої офтальмологічної допомоги. Наведено реальні приклади запровадження регіональних медико-профілактичних стратегій попередження розвитку сліпоти та слабобачення в різних країнах світу, описано їх позитивні результати та питання, навколо яких продовжують точитися активні дискусії, зокрема щодо участі закладів і персоналу первинної медичної допомоги у профілактичних програмах попередження офтальмологічних ускладнень цукрового діабету, прогресування вікової макулодистрофії.

Висновки. Враховуючи надзвичайну важливість формування та збереження здорових зорових функцій в різних вікових групах населення, які в умовах розвитку диджиталізації та цифровізації є важливими для освіти, працевлаштування і соціалізації, доступність медико-профілактичних спеціалізованих офтальмологічних послуг є важливим компонентом організації медичного нагляду. В сучасних умовах доведеним є ризик безсимптомного початку і розвитку офтальмологічних ускладнень більшості хронічних неінфекційних захворювань, а також розвитку патології зорового аналізатора, поширеність якої доведено зростає з віком. Огляд сучасної наукової літератури доводить зростання актуальності досліджень з розробки та апробації системних організаційних підходів із впровадження сучасних медико-профілактичних технологій та методів підвищення доступності офтальмологічної допомоги, особливо для пацієнтів із віковою макулодистрофією та цукровим діабетом, офтальмологічні ускладнення якого доведено негативно впливають на працездатність, інвалідність та якість життя таких пацієнтів.

Ключові слова: доступність офтальмологічної допомоги, офтальмологічна патологія, медико-профілактичні технології, регіональні програми.

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Information about the authors

Povch Zoreslava Vasylivna – Candidate of Medical Sciences, ophthalmologist, State Institution "Eye Institute of the Ministry of Health of Ukraine"; Komarova Ave., 3, Kyiv, Ukraine, 03065.
zoriana1971@ukr.net, ORCID ID: 0009-0003-6358-850x [A, C, D]

Osaulenko Sofia Vitaliivna – Student of Bogomolets National Medical University National Medical University, Second Faculty of Medicine; Beresteyskiy Ave., 34, Kyiv, Ukraine, 02000.
osaulenko@ukr.net, ORCID ID: 0009-0003-5786-6526 [B, C]

Medvedovska Natalia Volodymyrivna – Doctor of Medical Sciences, Professor, Honored Worker of Science and Technology of Ukraine, National Academy of Medical Sciences of Ukraine, Acting Chief Scientific Secretary; Herzen Ave., 12, Kyiv, Ukraine, 04050.
medvedovsky@ukr.net, ORCID ID: 0000-0003-3061-6079 [A, E, F]

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