Incidence of diabetic retinopathy in the Russian Federation according to Federal statistics

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Despite a comprehensive approach to the problem of diabetes mellitus (DM) and diabetic retinopathy (DR) in the Russian Federation, a number of problems persist in medical care for patients with DM. The analysis of statistical data makes it possible to assess the availability and the quality of medical care for diabetic patients in each region of the Russian Federation and to plan the distribution of resources - medicinal and technical support. This paper presents the geographical distribution analysis of DR general incidence, visibility impairment due to DR, the proportion of timely detected DR in the course of primary preventive healthcare, and the medical examination coverage. We propose that certain regional defects exist in the organization of medical care for patients with DR.

Keywords: Diabetic retinopathy, statistical indicators, epidemiology, general incidence, visual impairment, medical examination.

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Diabetes mellitus (DM) is recognized as one of the most important medical and social problems of today. Currently, 415 million people suffer from diabetes in the world, and over the last 10 years, the number of DM patients has more than doubled, reaching up to 6 % of the adult population [1, 2]. Special epidemiological studies have shown that among the adult population of Europe 9.1 % are sick with diabetes, and in some countries, such as Portugal, this figure reaches 14 % [3]. According to the WHO, DM will be ranked 7th among the causes of death in the world by 2030. In recognizing the global DM epidemic, the United Nations adopted resolution No. 61/225 of December 20, 2006 with recommendations to all states "to develop national strategies for the prevention and treatment of diabetes" [4].

In Russia, there are also highly increasing rates in incidence of diabetes. According to federal statistics, at the beginning of 2017, there were 4.6 million of patients with diabetes in the Russian Federation. Additionally, epidemiological studies from the Endocrinology Research Center showed that the true number of patients with diabetes in the country reaches 9-10 million people, which is at least 7 % of the population [2].

The main cause of disability in patients with diabetes is DM's micro- and macrovascular complications. Diabetic retinopathy (DR) is a severe microvascular complication of diabetes and one of the leading causes of blindness and vision impairment in the world among persons of working age. In the absence of timely and adequate treatment, DR progresses steadily to the terminal stage with the development of complications and the inevitable loss of vision. In addition, the frequent cause of significant visual impairment is diabetic macular edema [5].

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According to WHO, DR remains the 5th leading cause among the causes of vision impairment and the 4th — among the causes of blindness. 4.8 million people in the world are blind due to DR [6, 7]. At the same time, the combination of timely preventive and therapeutic measures allows for vision impairment and vision loss prevention in patients [5].

In the Russian Federation, the issue of DM and DR is considered to be a priority in health care [2, 5]. From 2007 to 2012 in Russia, a subprogram "Diabetes mellitus" was implemented in the federal program "Prevention and control of socially significant diseases". During the execution of this subprogram, the State Register of Diabetics was successfully created. In 2016, 4,094 million patients with diabetes were registered in this system.

In order to attract public attention to the problem of diabetes and improve the effectiveness of early diagnosis of the disease, a Russian program "Diabetes. Find out in time" was implemented in 2012–2014. A significant contribution to the timely detection of DM and DR started in 2013 with a Russian annual checkup of the population. DR became one of the priorities of the national plan for the prevention of blindness in the framework of the national project "Health" (2011–2013). In addition, DR is an important part of one of the eight target programs of the Russian National Committee on the Prevention of Blindness under the WHO program "Vision 2020. Right to See".

The prolonged asymptomatic nature of DR and the steady progression of the disease emphasizes the importance of regular ophthalmological monitoring of patients with DM in order to timely identify changes in the eyes, to adequately manage the patient care, and to evaluate any needed visual correction in the future.

Principles and frequency of patient monitoring and therapeutic strategies depending on stages and manifestations of DR are clearly regulated in the clinical guidelines (therapeutic protocols) "Diabetes mellitus: diabetic retinopathy, diabetic macular edema (KR115)" [5]. This document was developed by the Russian Public Organization "Association of Ophthalmologists" among the first of the list of similar documents in the sphere of ophthalmology. It describes the organization of medical actions, procedures, and manipulations in their order and the way they connect or relate to one another, as an important part of standardization in health care.

Despite the comprehensive approach to the problem of DM and DR in the country, a number of problems remain in patient care. This leads to the diagnosis of changes in the eyes at the stage of complication in proliferative DR, to the inadequate extent of medical manipulations due to lack of patient monitoring in medical institutions, and eventually, to the patient's vision loss. Imperfections in the system responsible for assisting patients with these severe diseases are noted in many other countries around the world [7].

In 2015, the Russian National Committee for the Prevention of Blindness initiated the launch of the international WHO program "Tool for the Assessment of Diabetic Retinopathy and Diabetes Management System" (TADDS) for the quality assessment of organization in care for patients with these diseases in Russia. The first stage of the program was implemented, including the collection of information on the organization of medical care for patients with DR, analysis of the data obtained, and the identification of priority areas for improving its quality [8]. The results of this work showed significant differences between regions of the country in quality and availability of medical care for patients with DR. Full implementation of the principles established from clinical recommendations is still impossible in several regions due to a number of reasons. The main obstacles include the deficiency of trained personnel, remoteness of medical institutions, transport problems, communication difficulties of ophthalmological institutions of different levels, as well as, interdisciplinary interactions. There are also problems at the screening level and during the patient's clinical examination. There are significant differences in the material-technical support of various regional ophthalmology services [7].

Solving existing problems is impossible without a detailed analysis of incidence statistics. Statistical data allow us to estimate the dynamics of epidemiological indicators and to analyze accessibility and quality of medical care to patients in each region of the Russian Federation, identify the weakest points, and plan the allocation of resources — medicinal and technical support - , accordingly. Until now, large-scale epidemiological studies of DR had not been conducted in Russia. The only available source of information on the epidemiology of this disease is the data form N 12 Federal statistical study "Information on the number of diseases registered with patients living within the service area of the medical organization". The analysis of these records is extremely important in the framework of a complex assessment of the effectiveness of medical care for patients with DR.

According to the federal statistical reporting, the number of patients with DR in the Russian Federation consists of 356,587 (355,737 adults, 850 children) in 2016. DR has been diagnosed in 7.8 % of people with DM.

In the nosological category of eye diseases, DR makes up 2.2 %, occupying the fifth place after refractive disorders, cataracts, conjunctivitis, and glaucoma. In the nosological category of visual impairment, DR reaches 8 %.

The general incidence of DR in the country's 100,000 adult population is 303.5. Analysis of a general incidence indicator reveals significant differences among the regions of the country. Out of the 100,000-adult population, the greatest number of patients with DR is observed in North Ossetia — Alanya (3,060.7 — 10 times higher than the national average), the Voronezh region (1,530.8 — 5 times higher), Tula region (805.3), Ivanovo region (777.1), Khabarovsk (769.7), the Astrakhan Region (742.2), the Kamchatka Territory (700.7), the Stavropol Territory (700.0), and the Vladimir region (680.4). At the same time, this indicator does not correlate with the

indicator of the overall incidence of DM, which is lower than the average for the whole of Russia in several regions (Voronezh Region, Stavropol, Kamchatka, Khabarovsk Territory) and slightly higher in the rest. The exception is the Republic of Northern Ossetia — Alania, where both indicators are significantly higher than the national average — the total incidence of diabetes by 2.5 times higher and more than 10 times higher for the incidence of DR.

When analyzing the reasons for the increase in the incidence rate of DR, it should be taken into account that in addition to diagnosis and registration of patients, it is possible that the increase in the number of patients with DR is actually due to shortcomings in management of the underlying disease. For optimizing the management of DR, the interaction between ophthalmology and endocrinology services is required.

In some regions of Russia, the overall incidence of DR is 6–10 times lower than the average Russian indicator. For 100,000 adults, this indicator is 2.7 for the Novosibirsk Region, the Chukotka AO — 21.5, the Tomsk Oblast — 28.5, Samara region — 38.3, the Republic of Chuvashia — 63.4, the Republic of Dagestan — 65.2, the Leningrad Region — 66.2, and the Kurgan Region — 93.8.

The reasons for underestimation of frequency of DR patients are linked not only to irregularities in collection of statistical data, but also low effectiveness of early detection, recording, monitoring, and treatment of DR. This conclusion is supported by the high incidence of disability due to this disease in a number of subjects with a low general incidence of DR. In particular, in the Orel region where an overall incidence rate is 205.2 per 100,000 adults (Russian Federation — 303.5), the prevalence of DR amongst visual impairment is 24 % (Russian Federation — 8 %). A similar situation developed in the Lipetsk region (the overall incidence was 172.8; 13 % of the disability category), in the Belgorod region (total incidence — 114.8; 13 % of the disability category), and in the Novosibirsk region (total incidence — 2.7; 11 % of the disability category). This ratio indicates insufficient effectiveness of all stages of organization in DR patient care, which leads to an increase in the number of worsened cases and complete vision loss. It is impossible to ignore the endocrinologists' lack of vigilance regarding the risk of DR development and the inspection of timely examinations performed by ophthalmologists on diabetes patients.

In a number of regions, the detection of DR during the course of annual check-ups and clinical examination of certain adult groups occurs somewhat more often than in the nation on average. Thus, when the incidence rate of people diagnosed with DR during annual check-ups and clinical examination is 0.3 % on average in Russia, it is 5 % in Mordovia, in Khabarovsk Territory — 1.8 %, in Kaliningrad region — 1.3 %, and in Saratov region — 1.2 %. At the same time, in the listed regions, the incidence of DM is at a comparable level or below the national average. Such statistics are indicative of the generally well organized primary prevention care. However, it is important to remember that the optimal organization of screening for DR implies the early diagnosis of fundus changes during regularly scheduled ophthalmological examinations of patients with DM.

At the same time, 50 % of patients in the Russian Federation participating in scheduled examinations (annual check-ups and clinical examination of certain adult groups) were not diagnosed with DR at all. This fact does not exclude a poor-quality examination by ophthalmologists who did not perform an examination of the fundus.

In general, 91 % of patients with DR are medically observed. In 37 subjects this indicator reaches 99–100 %. A slightly smaller group (from 70 to 90 %) of DR patients are medically observed in Yaroslavl, Rostov, Orenburg, Kemerovo, Tomsk, Sakhalin, Republics Kabardino-Balkaria, North Ossetia — Alania, Tatarstan, Udmurtia, Tyva, Altai, and Altai and Krasnoyarsk regions. An extremely low percentage of DR patients are supervised in Leningrad Region (15 %), Saratov Region (20 %), and Ivanovo Region (49 %). It should be noted that the lack of proper control over the management of patients leads to disability. Thus, in the Ivanovo region, where less than 50% of DR patients are observed under medical care, the prevalence of DR amongst visual impairment is high relative to the rest of the country — 33 % (Russian Federation — 8 %).

CONCLUSION

Thus, the analysis of federal statistics generated on the basis of the Russian patient data and provided by the Russian Federation Ministry of Health reveals certain regional shortcomings in the organization of medical assistance to patients with DR. Deviations in statistical indicators of individual patients, shortcomings in DR diagnosis during the course of regularly scheduled ophthalmological examinations of DM patients, problems in monitoring DR, the incomplete regional medical patient care coverage, and the lack of interdisciplinary interactions indicate to the necessity of developing a better approach. In most cases, the main focus is on improving the organization of medical care in outpatient settings.

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