

DIGITALIZATION OF THE HEALTHCARE SYSTEM IN RUSSIA: UPCOMING TRENDS AND RISKS

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Digital technologies are currently entering a human life and changing it drastically. Education, economy and healthcare go hand in hand with digitalization. The author of the article stresses that digital technologies spawn fear and mistrust in many people. This applies especially to digitalization of the healthcare system. To overcome the mixed feelings arising in people, we need to understand what digitalization is and review its perspectives and threats. Thus, the purpose of this paper is to consider perspective trends of digitalization of the Russian healthcare system and reveal the existing risks. The author of the article analyzes the normative legal base devoted to the development of healthcare system in Russia, examines the available articles of scientists on the subject, and analyzes the interviews undertaken by IT company representatives, which assess the use of digital technologies in medicine. Based on the performed analysis, the author underlines the following upcoming trends in healthcare digitalization: rapid data generation and processing, remote medical aid, remote enrollment in a medical institution, and easy access to an electronic medical record. The author mentions the following risks: a set of personal data, which could be stolen from digital media, mistakes existing when telehealth technologies are used, and impossibility to get access to a high-speed Internet connection in some Russian regions. According to the author, coordinated work of all actors of healthcare digitalization will allow to keep to a minimum or completely avoid the mentioned risks.

Key words: digitalization, medicine, healthcare, digital medicine, risks, perspectives

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ЦИФРОВИЗАЦИЯ РОССИЙСКОЙ СИСТЕМЫ ЗДРАВООХРАНЕНИЯ: ПЕРСПЕКТИВНЫЕ НАПРАВЛЕНИЯ И РИСКИ

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В настоящее время цифровые технологии входят в жизнь человека и меняют ее кардинальным образом. Наверно, уже нельзя представить образование, экономику и сферу здравоохранения без использования цифры. Автор статьи обращает внимание на то, что цифровые технологии вызывают у многих людей страх и недоверие. Особенно это касается цифровизации системы здравоохранения. Чтобы побороть смешанные чувства у людей, необходимо разобраться в том, что из себя представляет цифровизация, какие перспективы несет и какие угрозы таит. В связи с этим цель данной работы — рассмотреть перспективные направления цифровизации российской системы здравоохранения и выявить существующие риски. Автор статьи анализирует нормативно-правовую базу, посвященную развитию системы здравоохранения в России, рассматривает уже существующие работы ученых по данной тематике, а также анализирует интервью представителей IT-компаний, посвященных оценке использования цифровых технологий в медицине. На основе проведенного анализа автор работы выделяет следующие перспективы цифровизации в сфере здравоохранения: быстрое получение и обработка данных о пациенте, дистанционное получение медицинской помощи, удаленная запись в медицинское учреждение, удобный доступ к электронной медицинской карте. Среди рисков автор отмечает: существование массива личных данных, который может быть похищен с цифровых носителей, ошибки, существующие при использовании телемедицинских технологий, невозможность доступа к высокоскоростному Интернету в некоторых регионах России. По мнению автора, при слаженной работе всех акторов процесса цифровизации здравоохранения можно минимизировать или полностью избежать указанные риски.

Ключевые слова: цифровизация, медицина, здравоохранение, цифровая медицина, риски, перспективы

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We are currently facing the fourth industrial revolution, which produces a fundamental impact on a human life by putting new technologies into practice. We are witnessing large-scale projects of innovative companies. They include 3D printing, robot-cars, artificial intelligence, automated cars, biotechnologies, etc., which became part of everyday life.

‘The fourth industrial revolution is unique because of growing harmonization and integration of many various academic disciplines and discoveries, apart from rates of development and a wide coverage’ [1]. Digital technologies are used in education, economy and healthcare. It should be noted that many cardiovascular and oncological diseases have a genetic component allowing doctors to decide on the methods of treatment. Use of information technologies

to examine the genetic composition will make the healthcare system more personalized and effective. For instance, the IBM Watson system has been widely used at the present day. The system is capable of analyzing medical records, scanning and analyzing genetic data within several minutes and forming a customized program of treating oncological diseases [2]. When a person comes across something new and comprehended like digital technologies, he develops fear, mistrust and misunderstanding. To overcome the emotions arising during healthcare digitalization, we need to know what digitalization is, and what perspectives and threats it has. Thus, in this article, we aim to consider perspective trends of digitalization of the Russian healthcare system and detect the existing risks.

MATERIALS AND METHODS

Many modern researchers display their scientific interest to healthcare issues. The issues of health administration in the Russian Federation are considered in articles by K. A. Bogma, who mentions that 'in Russia, the effectiveness of healthcare system modernization control is based on the combination of assessments on the part of the society (social assessment) and on the part of healthcare system management entities (administrative self-assessment)' [3]. Some articles examine the quality of public health service. A. N. Zubets and A. V. Novikov mention that the quality of health service depends on the budgetary financing of the Russian healthcare system [4]. A. N. Zubets and A. V. Novikov state that the lack of unified approaches to the structure of medical aid quality currently influences the healthcare system marker [4]. When examining the Russian healthcare system, the researchers discuss the system development trends [5], one of which is represented by digitalization of this sphere [6]. In the researchers' articles devoted to medicine digitalization it is mentioned that the model of healthcare control is altered due to digital transformation [7]. Besides, certain digital technologies in medicine are analyzed. For instance, electronic medical records are viewed [8]. Scientists also examine the models of the unified medical information and analytical system [9]. Apart from the perspectives of healthcare digitalization, its issues are considered as well [10]. Though the examined issue is being actively discussed by scientists, we believe that the last events of coronavirus pandemics made implementation of digital technologies into healthcare more active. This enabled to look at the issue of perspectives and risks of healthcare digitalization.

In this article, perspectives and risks of healthcare system digitalization are found while analyzing the regulatory basis devoted to development of the Russian healthcare system, review of the current works on this topic, analysis of the interviews by company representatives aimed at assessment of digital technologies in medicine.

RESEARCH RESULTS

To understand the perspectives of Russian healthcare digitalization and the risks covered by it, we need to refer to such basic notions as 'digitalization' and 'healthcare'.

What is digitalization? It is defined in different ways. From a more general point of view, digitalization is a specified approach creating the digital environmental picture, though in the format suitable for computer treatment. Digitalization is a process of using the newest information technologies to improve or accelerate certain operations/actions [11]. If this or that activity wasn't possible, digitalization enables to perform any activity using innovative technologies. Digital technologies help exchange various data, in spite of temporal and spatial boundaries.

Based on the Decree signed by President of the Russian Federation in 2020 'On the National Purposes of Development of the Russian Federation up to 2030', we can see that one of national purposes of our country is digital transformation associated with achievement of 'digital maturity' of the key branches of economy and social sphere, including healthcare [12]. Healthcare is a state branch organizing and ensuring protection of public health. Healthcare is a set of political, economic, sanitary, ant epidemic and cultural measures aimed at the preservation and strengthening of physical and mental health of every human, support of healthy life and provision of medical aid in case of health worsening. The abovementioned Decree poses a goal to increase a share of electronically

available essential services to 95%. The indices can be achieved through a high-speed Internet connection at medical institutions, and use of digital technologies during treatment and prevention of diseases in patients.

The Federal Project 'Creation of the Unified Digital Contour in Healthcare based on the Single State Health Information System' [13] is currently acting in the Russian Federation [13]. The project has come into effect in 2019. It is aimed to increase the effectiveness of health system functioning. Buildup of interaction mechanisms of medical organizations based on the unified state health system and implementation of digital technologies and platform decisions up to 2024 are allowed withing the project. They form a unified digital health contour. It is suggested that the system of electronic recipes and automatic management of preferential provision of medicines will be available in Russia by 2024. Medical appointment and periodic health examination booking, filing an application to the policy and medical documents can be done using My Health account at State Services Portal irrespective of the patient's region.

On the official website of the Ministry of Health of the Russian Federation we can see that the Order of the Ministry of Health of the Russian Federation 'On Approval of the Records System Arrangement Procedure in the Sphere of Health Concerning Maintenance of Medical Electronic Documentation' has come into action since January 2021 [14]. According to the Order, health workers will not make paper copies of source medical records any longer. Thus, they will pay more attention to patients. People will obtain data on the services provided in their electronic medical records at the State Services Portal.

Apart from making a unified digital contour in health, it is important to pay attention to the existing and currently used digital technologies to treat and prevent diseases. We won't use all the utilized technologies to treat diseases in this article, as it is impossible. We'll try to give examples of the technologies used during the pandemics. For instance, an electronic health care application Zdorovye.ru has been developed and remains in effect. The application is available on a mobile phone as well. The application can be used to make an appointment with the doctor, determine a number of a medical insurance policy, insurance company and medical institutions, have free tests for disease risk factors and get recommendations on doctor's appointment and delivery of medical tests.

The message stating that 'a human being is a coauthor of his/her medical experience' is relevant as never before. Medical companies must be partners of patients and use the experience of cooperation, whereas manufacturers of IT technologies need to find ways how to provide people with more freedom of cooperation and make everyone a coauthor of its digital experience.

The current unfavorable epidemiological situation in the world explores certain trends in the medical system market development. Maxim Kuznetsov, head of Philips in Russia, countries of the Central and Eastern Europe and CIS, said in his interview that the company was trying to respond to the situation and helped healthcare struggle with the disease. For instance, Philips equips CT scanners with software that makes the working process more effective (reducing the number of actions produced by the technician, decreasing the acquisition time, reducing the exposure dose). The company also makes ultrasound decisions with telehealth care functionality: Lumify, ultraportable ultrasound, enables to perform an ultrasound examination using compact sensors plugged into smartphones. The videos can be sent to *colleagues* in a real-time mode. The decision is useful when used in red zones of medical institutions.

Philips also creates decisions that improve the quality of medical aid provided to patients in hospitals: digital resuscitation is a system of taking clinical decisions (ICCA), which collects medical data of patients from bedside equipment of different manufacturers in a resuscitation ward and operation theater, and correlates them with prescriptions, laboratory findings, and keeps automatic recording.

In the interview by Oleg Abdiev, head of PM&HM, it is stated that many IT companies started to develop robot devices, which can perform certain work instead of people. For instance, Youibot robot can disinfect the surface with ultraviolet, measure temperature in those who visit hospitals and find out other primary signs of diseases. In the end of 2020, Sberbank launched a disinfection robot to struggle with viruses both in the air, and on the surfaces of the European Medical Center.

In the annual report of 2021 provided by the Government at the State Duma, Chairman of the Government of the Russian Federation Mikhail Mishustin stated that COVID-19 pandemics accelerated the launch of digital technologies in healthcare. For instance, remotely recorded electronic sick notes have been actively implemented, it became possible to register for vaccination through the Internet, and experience of using artificial technologies to get insights into medical scans was available.

DISCUSSION OF RESULTS

As it is seen from regulatory instruments and Internet sources analyzed by us, digitalization of health system in Russia has been on the rise (this was especially evident during the last year in the view of an unfavorable epidemiological situation in the world and in Russia). Digital technologies in health make medicine more affordable and qualitative for the Russian people. The technologies mentioned above enable fast information gaining and processing, saving doctor's time and giving more attention to patients.

Digital medical aid allows to provide 'medical aid to patients using digital medical services, including the ones at a distance, with application of telehealth technologies and distance exchange of clinical data between a patient and a medical specialist' [15].

IT technologies in the form of various applications make every person a coauthor of his/her digital medical experience. Everyone can use the devices for independent control of own health indicators. The device data can automatically transfer the results into users' accounts to ensure further working with data [15].

Digital technologies in health enable provision of distant medical aid and registration for a medical institution not

waiting in line. Health digitalization is a convenient access to an electronic medical record, which can be shown to a necessary specialist for the purpose of consultation.

Apart from the denoted positive perspectives for health system digitalization in Russia, certain risks are available. The risks include slow Internet speed or its lack in the remote areas of the Russian Federation. Thus, digital health services can't be provided to the fullest extent to those living in the remote regions of the Russian Federation. Another problem is that a village lacks the necessary infrastructure to provide digital medical aid and competent personnel to deal with digital technologies. The digital health network has a large amount of patient's personal data, which can be stolen by malicious users. That's why cybersecurity must be strengthened. Moreover, a number of errors associated with the use of telehealth technologies while rendering medical aid can be increased. Telehealth development includes new requirements to provision of medical aid quality assessment by patients and even insurers.

CONCLUSIONS

The analyzed material has shown that use of digital technologies in the health system is the most important element for future successful development of the Russian healthcare. The use of digital technologies when struggling with a new coronavirus infection is currently confirmed. Digital instruments make medicine more comfortable, affordable and qualitative. When diagnosing diseases, digital technologies promote fast gaining and processing of patient data. The applied technologies make it possible to improve the procedures of monitoring and control of activity of medical organizations, expand the possibilities of remote patient management, and help create new support services of taking medical decisions.

Apart from positive effects of digitalization, the health system has certain threats. According to them, the existing body of digital data about patients can be stolen by malicious users. Errors associated with the use of telehealth technologies while rendering medical aid cannot be excluded. Those living in the remote regions of the Russian Federation can't be provided with digital health services to the full extent due to the lack of high-speed Internet. This violates rights of the citizens based on the principles of guaranteed health protection of all service recipients.

Thus, digitalization of health system in Russia is a huge step forward. However, actors implementing digitalization (state, medical institutions, IT companies and patients) must act as partners. This is how wise solutions will be found to avoid the risk for digitalization of the health system.

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