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DIGITIZING HEALTHCARE USING INFORMATION TECHNOLOGY

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Abstract

Currently, information technologies play a significant role in the development and improvement of the efficiency of the healthcare system. The process of digitalization in the field of medicine organizes the exchange of information, treatment, and diagnostic processes in healthcare institutions based on modern technologies. Digital databases, electronic medical records, telemedicine, diagnostic systems using artificial intelligence, and mobile health applications are the main directions of this process.

Digitalization of healthcare through information technologies enables storing all patient data in an electronic database. Such information technologies allow rapid information exchange among doctors, increase diagnostic accuracy, and reduce various errors. Information technologies automate management systems in medical institutions, promote rational use of medicines, and enable remote management of health improvement activities. Digital medicine is not only automation but also a new paradigm of healthcare. It serves to ease the work of healthcare professionals, create convenience for patients, and ensure transparency in the healthcare system. In Uzbekistan, pharmaceuticals and healthcare are developing through digitalization. In recent years, several reforms have been implemented in Uzbekistan toward the digitalization of healthcare, such as the introduction of "Telemedicine Centers," "Electronic Health Passport," and "E-Polyclinic."

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Digitalization of healthcare through information technologies is a program that protects public health, increases efficiency, improves the quality of medical services, and brings the healthcare sector to a new level.

Keywords: Information technologies, healthcare, medical card, telemedicine, medical database, medical services, digital medicine, artificial intelligence, digitalization, electronic health passport.

INTRODUCTION

In the 21st century, the rapid development of information technologies has profoundly affected all sectors, including healthcare. Digital technologies are expanding the possibilities for collecting, storing, transmitting, and processing data in the field of healthcare and are increasing the efficiency of medical services. In the Republic of Uzbekistan, digitalization of healthcare has been identified as a priority direction of state policy.

Today, digital technologies are widely used to improve the efficiency of the healthcare system, enhance the quality of medical services, create convenience for the population, and provide fast and quality medical assistance. The rapid development of information technologies has led to the introduction of digital transformation in medicine. Digitalization of healthcare is bringing the healthcare system to modern levels by converting medical processes into electronic form, automating medical services, and accelerating data exchange.

Currently, the subject “Information Technologies in Medicine” is taught in all higher medical educational institutions of our republic. One of the distinctive features of teaching this subject is the modular system, which takes into account the differences in students’ levels of knowledge.

MAIN PART

Fundamentals of Medical Informatics

The use of information technologies in medicine began in the 1940s. Initially, they were applied in radiotelephony, signaling devices, and statistical analysis of medical results using computational technologies. Today, information

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technologies, also known as medical informatics, have become an integral part of healthcare. This field is divided into four main directions:

- Biological informatics
- Imaging informatics
- Healthcare informatics
- Clinical informatics

In our country, the creation of electronic documents in medical institutions and the development of databases related to healthcare issues serve as the foundation of modern medical institutions.

Telemedicine is an information technology program used to provide remote medical treatment for patients. With this technology, distance is no longer an obstacle to receiving medical care. Through this system, patients can access medical services remotely. Telemedicine provides convenient opportunities to offer medical advice to people living in remote areas where access to doctors is difficult. Additionally, telemedicine allows saving the lives of critically ill patients in emergency situations through remote intervention.

Areas of telemedicine application today include:

- Studying new medical technologies and equipment
- Distance interactive training for doctors
- Conducting remote video consultations for critically ill patients

THE ESSENCE AND MEANING OF DIGITALIZATION IN HEALTHCARE

Digitalization involves storing and managing medical processes, documents, data, and services in electronic form. Currently, many countries around the world have implemented electronic healthcare systems under the “Digital Health” concept, including the “E-Health” program. Through this system, patient data is stored in an electronic database, and doctors can access this information in real time.

Main directions of digital medical technologies

The most important areas of information technologies in healthcare include:

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- **Telemedicine** — allows providing medical consultation, treatment, and diagnosis remotely, creating convenience for people living in remote areas.
- **Artificial Intelligence in Medicine** — AI helps analyze MRI, CT, and X-ray images, enabling early detection of cancer and other diseases, thereby increasing the efficiency of patient monitoring.
- **Electronic Medical Records (EMR)** — every person's health, diagnoses, laboratory results, and treatment information are stored in an electronic database. This system minimizes data loss and helps doctors make quick decisions.
- **Mobile Health (MHealth)** — mobile applications that help monitor a healthy lifestyle, remind patients to take medications, and track heart rate and other indicators.
- **Data Security** — ensures the protection of confidential information in healthcare systems through cryptography, authentication, and similar methods.
- **Digital Management Systems** — automate processes such as accounting and resource management.

Advantages of Digitalization in Healthcare

Implementing information technologies in healthcare provides numerous benefits:

- **Accelerates treatment processes:** patients spend less time receiving care.
- **Improves quality of medical services:** enables access to a complete history of each patient.
- **Reduces healthcare costs:** digital systems minimize paperwork and bureaucracy.
- **Simplifies statistical analysis:** enables accurate policy-making based on real data at the state level.
- **Reduces medical errors:** automatically detects human-related mistakes.

Main advantages of digitalization:

- Increases the quality and speed of medical services
- Reduces errors and bureaucratic delays
- Ensures the security of patient information
- Eases the work of healthcare professionals
- Creates convenience and transparency for the population

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DIGITALIZATION OF HEALTHCARE IN UZBEKISTAN

In recent years, Uzbekistan has been introducing digital technologies into the healthcare system to modernize it, ensure the provision of quality and accessible medical services to the population, and increase management efficiency. This process is carried out under the "Digital Uzbekistan – 2030" strategy. Pharmacies, hospitals, and polyclinics are gradually adopting systems such as electronic prescriptions, electronic medical cards, telemedicine platforms, and digital queues.

Examples include:

- The "E-Polyclinic" system allows patients to book online appointments with doctors, view test results, and receive prescriptions electronically.
- The state healthcare information systems digitally monitor disease statistics and vaccination processes nationwide.
- **"My-Med"** is a mobile application related to the healthcare system, designed to store, manage, and monitor medical data in one place.

INFORMATION TECHNOLOGIES IN THE AUTOMATION OF MEDICINE

Automation in medicine involves managing hospital processes, patient data, and pharmaceutical supplies through digital tools. Electronic medical records store patient prescriptions and drug histories. Electronic prescription systems digitally manage medication orders. Artificial intelligence-based analysis predicts and optimizes drug demand.

In Uzbekistan, the **DMED (Digital Medical Ecosystem)** system was launched in 2025, centralizing data of 33 million people.

The pharmaceutical market in Uzbekistan was 87% import-dependent in 2025, and digitalization is considered a crucial step to improve efficiency and reduce costs. DMED is the unified digital platform of Uzbekistan.

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CHALLENGES AND SOLUTIONS IN HEALTHCARE DIGITALIZATION

Some challenges in healthcare digitalization include:

- Ensuring data security
- Weak internet infrastructure in some areas
- Limited IT knowledge among healthcare professionals

Possible solutions:

- Organizing specialized training courses
- Learning from international experiences
- Developing cloud-based services and platforms

FUTURE PROSPECTS IN HEALTHCARE

In the future, one of the most important directions of information technologies will be **artificial intelligence (AI)**.

With AI, diseases can be detected earlier.

It is expected that artificial intelligence, 5G networks, and cloud technologies will be widely integrated into healthcare. These technologies will make medical data processing faster, safer, and more accurate.

Digital medical centers will enable remote patient monitoring. Cloud technologies will simplify the storage, processing, and transfer of data.

By 2030, the import dependency in the pharmaceutical sector is expected to decrease by 50%.

AI integration will help optimize drug production and reduce costs by up to 30%.

CONCLUSION

Digitalization of healthcare through information technologies is one of the main directions of modern medicine. This system enhances the effectiveness of public health protection, improves the quality of medical services, and elevates the healthcare sector to a new stage of development.

The digital healthcare system plays an important role in monitoring human health, preventing diseases, and improving the quality of medical services.

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Information technologies have become the main driving force of human progress. In the future, digital thinking, information culture, information ethics, and the application of artificial intelligence will become essential in every person's life. From today, acquiring knowledge in information technologies, learning new innovations, and adapting to them are the keys to success.

Digitalization of healthcare in Uzbekistan is an integral part of modern medicine. In the future, it will contribute to forming a high-quality, innovative, and fair healthcare system in our country.

Eventually, all medical services will completely transition to digital format. Uzbekistan is achieving significant progress in the digitalization of its healthcare system, improving the quality of life for its citizens.

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