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ТЕКУЩИЙ УРОВЕНЬ ПРИМЕНЕНИЯ СОВРЕМЕННЫХ ИНФОРМАЦИОННЫХ ТЕХНОЛОГИЙ И ИХ РОЛЬ В СБОРЕ ДАННЫХ, ДИАГНОСТИКЕ И ЛЕЧЕНИИ В РАЗЛИЧНЫХ ОБЛАСТЯХ МЕДИЦИНЫ

Аннотация. *В статье рассматривается современный уровень применения информационных технологий в сфере здравоохранения и анализируется их роль в сборе медицинских данных, диагностике и лечении. Подчёркивается значение электронных систем здравоохранения, медицинских информационных систем, телемедицины и технологий искусственного интеллекта для повышения качества, эффективности и доступности медицинских услуг. Анализ текущей практики здравоохранения показывает, что системы электронных медицинских карт, поддержка принятия решений на основе искусственного интеллекта и телемедицина улучшают управление данными, точность диагностики и доступность медицинской помощи. Подчёркивается, что интеграция информационных технологий способствует точной диагностике, персонализированному лечению и эффективному управлению ресурсами здравоохранения.*

Ключевые слова: *информационные технологии, здравоохранение, медицинские данные, диагностика, лечение, телемедицина, искусственный интеллект.*

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THE CURRENT LEVEL OF APPLICATION OF MODERN INFORMATION TECHNOLOGIES AND THEIR ROLE IN DATA COLLECTION, DIAGNOSIS, AND TREATMENT IN VARIOUS MEDICAL FIELDS

Abstract. *This article examines the current level of application of modern information technologies in the healthcare sector and analyzes their role in medical data collection, diagnosis, and treatment processes. The study highlights the significance of electronic health systems, medical information systems, telemedicine, and artificial intelligence technologies in improving the quality, efficiency, and accessibility of healthcare services. The analysis of current healthcare practices shows that electronic health record systems, artificial intelligence-based decision support, and telemedicine improve data management, diagnostic accuracy, and access to medical services. The research emphasizes that the integration of information technologies contributes to accurate diagnostics, personalized treatment, and effective management of healthcare resources.*

Keywords: *information technologies, healthcare, medical data, diagnosis, treatment, telemedicine, artificial intelligence.*

Introduction

The rapid development of modern information technologies has led to profound transformations in various sectors, including healthcare. Today, healthcare systems increasingly depend on digital solutions to manage complex medical data, enhance diagnostic accuracy, and improve treatment outcomes [1]. The adoption of information technologies has become a strategic priority for healthcare systems worldwide, as it enables cost-effective service delivery and improved patient care [1].

In modern medicine, timely access to accurate medical information plays a critical role in decision-making processes. Therefore, the implementation of advanced information technologies is essential for ensuring the effectiveness and sustainability of healthcare systems. This study aims to analyze the current level of information technology usage in healthcare and evaluate its role in data collection, diagnosis, and treatment across different medical fields.

Materials and Methods

The study is based on an analysis of current healthcare practices and of the scientific literature on health information systems.

Results and Discussion

Current Level of Information Technology Usage in Healthcare

At present, healthcare institutions actively implement various information systems, including Electronic Medical Records (EMR), Hospital Information Systems (HIS), Laboratory Information Systems (LIS), and Picture Archiving and Communication Systems (PACS) [2]. These systems facilitate efficient management of patient information and enable healthcare professionals to access medical data in real time.

The widespread digitalization of healthcare processes has reduced administrative workload, minimized medical errors, and enhanced coordination among healthcare providers [3]. Additionally, cloud-based technologies allow secure storage and sharing of medical data, supporting collaborative decision-making and continuity of care [4].

Role of Information Technologies in Medical Data Collection and Management

Medical data collection is one of the most critical aspects of healthcare delivery. Modern information technologies provide automated tools for collecting, storing, and processing large volumes of patient data. Electronic health records ensure standardized documentation and improve data accuracy.

Advanced data analytics and big data technologies enable healthcare professionals to identify trends, predict disease risks, and develop preventive strategies [5]. As a result, information technologies significantly contribute to evidence-based medicine and public health management.

Application of Information Technologies in Diagnostic Processes

Information technologies play a vital role in modern diagnostic practices. Medical imaging technologies such as computed tomography (CT), magnetic resonance imaging (MRI), and digital radiography rely heavily on advanced software for image processing and analysis.

Artificial intelligence and machine learning algorithms have become increasingly important in diagnostics [6]. These technologies assist clinicians in detecting diseases at early stages, analyzing complex medical images, and reducing diagnostic errors. The integration of decision-support systems enhances diagnostic accuracy and supports clinical decision-making [7].

Healthcare organizations utilize a variety of digital tools, including electronic medical records (EMR), hospital information systems (HIS), laboratory information systems (LIS), and medical imaging platforms. These technologies

streamline patient data management, improve workflow efficiency, and reduce the likelihood of errors.

Practical examples (see also Table 1):

Cardiology: Digital monitoring devices track patient heart rates and blood pressure in real time, enabling early detection of arrhythmias.

Surgery: Robotic-assisted surgery platforms allow minimally invasive procedures with higher precision and reduced recovery times.

Table 1. Examples of IT applications across medical fields

Field	Technology Used	Purpose
Cardiology	Wearable monitors, ECG software	Heart rate tracking, arrhythmia detection
Surgery	Robotic surgery systems	Precision operations, reduced recovery
Pediatrics	EMR, digital growth charts	Monitor child health, vaccination schedules
Oncology	AI imaging tools	Tumor detection, treatment planning

Use of Information Technologies in Treatment and Patient Care

In treatment processes, information technologies enable the development of personalized and effective therapeutic strategies. Robotic-assisted surgery, computer-aided treatment planning, and digital monitoring systems improve treatment precision and patient safety.

Telemedicine platforms allow remote consultations, patient monitoring, and follow-up care, particularly in remote and underserved areas [8]. These technologies enhance access to healthcare services and reduce the burden on medical facilities. Furthermore, digital health applications support patient engagement and adherence to treatment plans.

Case examples:

Remote diabetes management: Continuous glucose monitoring with AI alerts for abnormal levels.

Tele-ICU: Remote critical care monitoring with real-time data sharing and expert consultation.

Challenges and Future Perspectives

Despite the advantages of information technologies in healthcare, several challenges remain, including data security, privacy concerns, and the need for skilled professionals. Ensuring cybersecurity and compliance with ethical standards is essential for sustainable digital healthcare development.

In the future, the continued advancement of artificial intelligence, wearable technologies, and integrated health information systems is expected to further transform medical practice. These innovations will enhance preventive care, personalized medicine, and overall healthcare efficiency.

Key Findings

The analysis of current healthcare practices demonstrates that the integration of modern information technologies significantly improves the efficiency of medical data management, diagnostic accuracy, and treatment processes. The use of electronic health record systems has resulted in more structured and accessible patient data, enabling healthcare professionals to retrieve information promptly and make informed clinical decisions.

The findings indicate that healthcare institutions implementing digital diagnostic tools, such as computer-assisted imaging systems and artificial intelligence-based decision support, show higher accuracy in disease detection and reduced diagnostic time. In particular, the application of machine learning algorithms contributes to the early identification of pathological conditions and supports clinicians in complex diagnostic cases.

Furthermore, the results reveal that the adoption of telemedicine technologies enhances access to medical services, especially for patients in remote and underserved regions. Remote consultations and digital patient monitoring systems improve continuity of care and patient adherence to treatment plans.

Overall, the findings confirm that modern information technologies positively impact the quality, reliability, and effectiveness of healthcare services.

Advantages: increased efficiency and accuracy, reduced human error, and better patient access and engagement.

Conclusion

In conclusion, modern information technologies have become an indispensable component of contemporary healthcare systems. Their application in data collection, diagnosis, and treatment significantly improves the quality, efficiency, and accessibility of medical services. The ongoing integration of advanced digital technologies is expected to play a crucial role in shaping the future of healthcare and improving patient outcomes.

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