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<https://doi.org/10.52269/SRDG2611261>**PROBLEMS AND PROSPECTS OF USING MEDICAL INFORMATION SYSTEMS AND THEIR ECONOMIC CONSEQUENCES: QUALITATIVE ANALYSIS OF USER EXPERIENCE**

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The digitization of healthcare is considered one of the key factors in improving the quality of medical services, management efficiency, and accessibility of medical care. Despite the active implementation of medical information systems, their practical use is accompanied by a number of organizational and user difficulties. The purpose of this study is to identify the key problems and expectations of users of medical information systems based on a qualitative analysis of user experience.

The study was conducted using a qualitative exploratory design. Data was collected through semi-structured interviews with 21 participants, including healthcare professionals, patients, and IT specialists. Data analysis was performed using inductive thematic analysis.

In addition to organizational and technological effects, the digitization of healthcare has a significant economic dimension. The introduction of medical information systems involves significant investments in infrastructure, software, staff training, and support for digital solutions. At the same time, the expected economic effects include a reduction in transaction costs, optimization of management processes, increased productivity of medical personnel, and more efficient use of resources by medical organizations.

The study identified five key themes: fragmentation of medical information systems and data duplication, usability issues with interfaces, limited analytical capabilities of systems, trust and security issues with medical data, and expectations for a unified, integrated digital platform. The results show that the effectiveness of healthcare information systems is determined not only by their technological characteristics, but also by the extent to which they meet user needs.

The practical significance of the study lies in the possibility of using the conclusions obtained in the development and improvement of medical information systems, the introduction of user-oriented design, and

the formation of integrated digital healthcare ecosystems. The results of the study emphasize the importance of taking the user perspective into account in the digital transformation of the healthcare system.

Key words: *medical information systems, healthcare digitization, user experience, thematic analysis, digital healthcare.*

МЕДИЦИНАЛЫҚ АҚПАРАТТЫҚ ЖҮЙЕЛЕРДІ ПАЙДАЛАНУДЫҢ МӘСЕЛЕЛЕРІ МЕН ПЕРСПЕКТИВАЛАРЫ ЖӘНЕ ОЛАРДЫҢ ЭКОНОМИКАЛЫҚ САЛДАРЫ: ПАЙДАЛАНУШЫ ТӘЖІРИБЕСІН САПАЛЫ ТАЛДАУ

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Денсаулық сақтауды цифрландыру медициналық қызметтердің сапасын, басқару тиімділігін және медициналық көмектің қолжетімділігін арттырудың негізгі факторларының бірі ретінде қарастырылады. Медициналық ақпараттық жүйелерді белсенді енгізуге қарамастан, оларды практикалық қолдану бірқатар ұйымдастырушылық және пайдаланушылық қиындықтармен ұласуда. Бұл зерттеудің мақсаты – пайдаланушы тәжірибесін сапалы талдау негізінде медициналық ақпараттық жүйелерді пайдаланушылардың негізгі мәселелері мен күтілетін нәтижелерін анықтау.

Зерттеу сапалы барлау дизайны аясында орындалды. Мәліметтерді жинау медицина қызметкерлерін, пациенттерді және ИТ-мамандарды қоса алғанда, 21 қатысушымен жартылай құрылымдалған сұхбат әдісі арқылы жүзеге асырылды. Мәліметтерді талдау индуктивті тақырыптық талдауды қолдану арқылы жүргізілді.

Ұйымдастырушылық және технологиялық әсерлерден бөлек, денсаулық сақтауды цифрландырудың айқын экономикалық өлшемі бар. Медициналық ақпараттық жүйелерді енгізу инфрақұрылымға, бағдарламалық қамтамасыз етуге, персоналды оқытуға және цифрлық шешімдерді сүйемелдеуге бағытталған айтарлықтай инвестициялармен байланысты. Сонымен қатар, күтілетін экономикалық тиімділік транзакциялық шығындарды азайтуды, басқару процестерін оңтайландыруды, медициналық персоналдың еңбек өнімділігін арттыруды және медициналық ұйымдардың ресурстарын тиімдірек пайдалануды қамтиды.

Зерттеу нәтижесінде бес негізгі тақырып анықталды: медициналық ақпараттық жүйелердің фрагментациясы және деректердің қайталануы, интерфейстердің ыңғайлылық мәселелері, жүйелердің шектеулі аналитикалық мүмкіндіктері, медициналық деректердің сенімділігі мен қауіпсіздігі мәселелері, сондай-ақ бірыңғай интеграцияланған цифрлық платформаны құруды күту. Алынған нәтижелер медициналық ақпараттық жүйелердің тиімділігі тек технологиялық сипаттамалармен ғана емес, сонымен қатар олардың пайдаланушылардың қажеттіліктеріне сәйкестік деңгейімен де анықталатынын көрсетеді.

Зерттеудің практикалық маңыздылығы алынған тұжырымдарды медициналық ақпараттық жүйелерді өзірлеу және жетілдіру, пайдаланушыға бағытталған дизайнды енгізу және денсаулық сақтаудың интеграцияланған цифрлық экосистемелерін қалыптастыру кезінде пайдалану мүмкіндігінде жатыр. Зерттеу нәтижелері денсаулық сақтау жүйесін цифрлық трансформациялау кезінде пайдаланушы перспективасын ескерудің маңыздылығын көрсетеді.

Түйінді сөздер: *Медициналық ақпараттық жүйелер, денсаулық сақтауды цифрландыру, пайдаланушы тәжірибесі, тақырыптық талдау, цифрлық денсаулық сақтау.*

ПРОБЛЕМЫ И ПЕРСПЕКТИВЫ ИСПОЛЬЗОВАНИЯ МЕДИЦИНСКИХ ИНФОРМАЦИОННЫХ СИСТЕМ И ИХ ЭКОНОМИЧЕСКИЕ ПОСЛЕДСТВИЯ: КАЧЕСТВЕННЫЙ АНАЛИЗ ПОЛЬЗОВАТЕЛЬСКОГО ОПЫТА

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Цифровизация здравоохранения рассматривается как один из ключевых факторов повышения качества медицинских услуг, эффективности управления и доступности медицинской помощи. Несмотря на активное внедрение медицинских информационных систем, их практическое использование сопровождается рядом организационных и пользовательских трудностей. Цель настоящего исследования заключается в выявлении ключевых проблем и ожиданий пользователей медицинских информационных систем на основе качественного анализа пользовательского опыта.

Исследование выполнено в рамках качественного разведочного дизайна. Сбор данных осуществлялся методом полу структурированных интервью с 21 участником, включая медицинских работников, пациентов и ИТ-специалистов. Анализ данных проводился с использованием индуктивного тематического анализа.

Помимо организационных и технологических эффектов, цифровизация здравоохранения имеет выраженное экономическое измерение. Внедрение медицинских информационных систем связано с существенными инвестициями в инфраструктуру, программное обеспечение, обучение персонала и сопровождение цифровых решений. При этом ожидаемые экономические эффекты включают снижение транзакционных издержек, оптимизацию управленческих процессов, повышение производительности труда медицинского персонала и более эффективное использование ресурсов медицинских организаций.

В результате исследования были выявлены пять ключевых тем: фрагментация медицинских информационных систем и дублирование данных, проблемы удобства использования интерфейсов, ограниченные аналитические возможности систем, вопросы доверия и безопасности медицинских данных, а также ожидание создания единой интегрированной цифровой платформы. Полученные результаты показывают, что эффективность медицинских информационных систем определяется не только технологическими характеристиками, но и степенью их соответствия потребностям пользователей.

Практическая значимость исследования заключается в возможности использования полученных выводов при разработке и совершенствовании медицинских информационных систем, внедрении пользовательско-ориентированного дизайна и формировании интегрированных цифровых экосистем здравоохранения. Результаты исследования подчеркивают важность учета пользовательской перспективы при цифровой трансформации системы здравоохранения.

Ключевые слова: медицинские информационные системы, цифровизация здравоохранения, пользовательский опыт, тематический анализ, цифровое здравоохранение.

Introduction

In recent years, the digitalization of healthcare has been regarded as one of the key factors in improving the quality of medical services, management efficiency, and the accessibility of medical care. The implementation of medical information systems (MIS), electronic health records (EHR), and digital services for patients has become a central element in the modernization of healthcare systems in many countries. According to the World Health Organization's Global Strategy on Digital Health, digital technologies are seen as a tool to enhance the resilience of health systems, improve medical data management, and expand public access to health services [1].

Despite the active implementation of digital technologies, the practical use of medical information systems is accompanied by several difficulties. Research indicates that the presence of digital infrastructure alone does not guarantee its effective application. Users often encounter problems with inconvenient interfaces, data fragmentation, and insufficient integration of information systems, which can increase workload and reduce the productivity of medical personnel [2]; [3]. Furthermore, the lack of interoperability among digital solutions can limit access to comprehensive medical information and decrease the quality of healthcare coordination.

Significant attention in scientific literature is devoted to the user experience (UX) of interacting with medical information systems. Studies show that low usability and complex interfaces are among the primary barriers to the adoption of digital technologies in healthcare. Clunky interfaces can reduce the efficiency of medical specialists and increase the likelihood of errors during medical data processing [4]; [5]. This underscores the necessity of developing medical information systems based on user-centered design principles and the active involvement of end-users in the design process of digital solutions.

In economic literature, digital medical systems are viewed as tools for increasing the efficiency of resource allocation in healthcare, reducing redundant diagnostic procedures, and decreasing administrative costs. However, achieving these effects depends on the level of system integration, functionality, and the actual degree of utilization by medical staff and patients. In conditions of insufficient compatibility between digital solutions, the economic return on investment can significantly decrease, making the analysis of user experience a vital factor in evaluating the effectiveness of healthcare digitalization.

Another pressing issue in healthcare digitalization is the limited use of the analytical potential of medical data. Despite the vast amounts of accumulated information, many medical information systems function primarily as data repositories and do not provide full support for clinical and managerial decision-making. Modern research emphasizes the importance of implementing analytical tools, decision support systems, and

data visualization to enhance the management efficiency of medical organizations and the quality of care [6]; [7]. In the context of healthcare digitalization, issues of user trust and medical data protection acquire particular importance. Research shows that patients' level of trust in digital medical services directly affects their willingness to use electronic medical systems and share personal health information [8]; [9]. Meanwhile, healthcare workers also face the necessity of complying with information security requirements, necessitating a balance between data protection and information accessibility.

Despite the growing interest in healthcare digitalization, a significant portion of existing research focuses on the technical characteristics of medical information systems and quantitative assessments of their effectiveness. At the same time, qualitative studies aimed at a deep understanding of user experience and the perception of medical information systems remains limited, especially in countries with developing digital healthcare infrastructure.

In the context of Kazakhstan, the implementation of medical information systems is carried out in both public and private medical organizations. However, questions regarding the practical experience of users, emerging difficulties, and expectations from digital solutions remain insufficiently studied. The lack of systematized data on user perception of medical information systems limits the possibilities for their further improvement and adaptation to the real-world conditions of the healthcare system.

In this regard, the use of a qualitative research approach appears justified. Qualitative methods, specifically semi-structured interviews, allow for the identification of hidden barriers to using medical information systems, the study of the context of user interaction with digital platforms, and the formation of a holistic understanding of the user experience.

Objective. The objective of this study is to identify key issues and expectations of medical information system users and their economic implications based on a qualitative analysis of semi-structured interviews with healthcare professionals, patients, and IT specialists. The study is exploratory in nature and aims to generate empirically grounded findings that can be used in the development and improvement of medical information systems, taking into account the actual needs of users.

To achieve this objective, the following tasks were formulated: to examine the practical experience of different groups of users of medical information systems (MIS) through interviews; to identify and classify critical issues in system performance; and to determine key user expectations in order to develop recommendations for the advancement of digital ecosystems. At the same time, the study is oriented toward assessing the economic implications of MIS functioning, including the impact of system failures and organizational constraints on the cost structure of healthcare institutions, staff productivity, and the efficiency of resource utilization. Particular attention is given to identifying directions for improving digital solutions that can ensure not only enhanced quality of healthcare services but also increased economic performance of management processes within the healthcare system.

Materials and Methods

This study was conducted within a qualitative exploratory design and is aimed at studying the user experience and perception of medical information systems. The use of a qualitative approach is due to the need to obtain a deep understanding of the context of user interaction with digital healthcare platforms, rather than a quantitative assessment of the prevalence of identified problems. Semi-structured interviews were used as the main data collection method, allowing the combination of comparability of answers with the flexibility of studying the individual experience of participants [10]

The selection of participants was carried out using a purposive sampling strategy corresponding to the methodology of qualitative research [11]. 21 informants who have experience in using medical information systems or digital healthcare services took part in the study. The sample included medical workers ($n = 11$), patients of medical organizations ($n = 6$), and IT specialists involved in the development or support of medical information systems ($n = 4$). The inclusion criterion was the presence of practical experience in interacting with digital medical solutions.

Data collection was carried out through individual interviews conducted in person or remotely. The interviews included open-ended questions aimed at identifying the experience of using the systems, interface usability, information accessibility, data integration, security issues, and user expectations. All data were recorded in text form and analyzed in an anonymized form.

Data analysis was carried out by the method of inductive thematic analysis in accordance with the approach [12], including coding statements, grouping codes into themes, and their consistent refinement. The study was conducted in compliance with the ethical principles of voluntary participation and data confidentiality.

Based on the results obtained, a model for assessing the economic efficiency of the implementation of medical information systems will be built, with input parameters including: capital investments, operating expenses, organizational changes, and the level of digital maturity.

Formal efficiency model:

$$EE_{mis} = \frac{B_{direct} + B_{indirect}}{C_{total}}$$

EE_{mis} – Economic efficiency of MIS

B_{direct} – Direct economic benefits

$B_{indirect}$ – Indirect benefits

C_{total} – Total cost of implementation and operation

Process effects of the model: reduction in operation time, reduction in errors, increase in productivity, data integration. Economic results of the model: cost savings, increased resource efficiency, improved quality of care, enhanced system controllability.

Results

As a result of inductive thematic analysis of the semi-structured interview data, five key themes were identified, reflecting the experience of using medical information systems, the main problems of their functioning, and user expectations regarding the development of digital solutions in healthcare. Despite the differences in the professional roles of the study participants, the identified themes were characteristic of all groups of informants, although they differed in the degree of significance and interpretation. Medical workers primarily focused on the operational and organizational aspects of using the systems, patients focused on the availability of information and transparency of processes, while IT specialists viewed the identified problems from the perspective of digital solution architecture and the specifics of their development.

Fragmentation of medical information systems and data duplication

One of the most pronounced and systemic problems identified in the course of the study was the fragmentation of medical information systems. Most participants noted the need for simultaneous use of several digital platforms that function in isolation and do not provide a full exchange of data. This situation leads to duplication of information, increased time costs, and reduced user performance efficiency.

The identified fragmentation of medical information systems has not only organizational but also economic consequences. Data duplication, re-entry of information, and the need to use several platforms increase the time costs of medical personnel, which effectively increases the operating costs of medical organizations. Furthermore, the lack of integration of information systems reduces the effectiveness of management control and limits the possibilities for economic analysis of the activities of medical institutions. Collectively, this leads to a lower return on investment in digital health infrastructure and generates additional indirect costs for the healthcare system.

Medical workers emphasized that the lack of integration between systems requires re-entering information about patients, examination results, and prescriptions. In their opinion, this problem is particularly acute in conditions of high workload when time resources are limited.

«Often, the same data has to be filled into different systems. This takes time and creates a sense of chaos in the work»

(Healthcare professional)

Patients also face the consequences of system fragmentation. They noted the need to repeatedly provide personal and medical data when visiting various medical organizations, which reduces the convenience of receiving medical care and forms a negative perception of digital services.

«Information about appointments and tests is stored in different places, and there is no single space where everything is collected»

(Patient)

IT specialists linked this problem to the historical practice of implementing separate digital solutions without forming a unified architecture for the medical information environment. Thus, the fragmentation of systems is considered by the study participants as a key barrier to the digital transformation of healthcare.

Usability and Interface Issues

The second significant theme relates to the usability of medical information systems. Study participants noted that many digital solutions are characterized by complex interfaces, overloaded menu structures, and a lack of intuitive navigation. This complicates the performance of even standard operations and increases the likelihood of errors when working with the system.

Healthcare professionals pointed out the need to perform a large number of actions to complete medical documentation, search for information, or prescribe treatment. In their opinion, system interfaces often fail to account for real-world work scenarios in medical practice.

«To find the necessary information, you have to take too many steps, and this slows down the work»

(Healthcare professional)

IT specialists confirmed this problem and linked it to the insufficient involvement of end users in the design process of digital solutions. In their opinion, interface development is often carried out with a focus on technical requirements rather than the practical needs of users.

«Interfaces are often created without considering real-world processes, which causes users to get lost in the system»

(IT specialist)

Patients also noted difficulties when using mobile applications and online healthcare services, including the complexity of booking appointments, finding test results, and navigating personal accounts. Thus, the issue of usability in medical information systems manifests at all levels of user interaction with digital platforms.

Limited Analytics and Lack of Decision Support Tools

The third identified theme relates to the limited analytical capabilities of medical information systems. According to the study participants, most existing solutions primarily serve a data storage function but provide almost no tools for its analysis and interpretation.

Healthcare professionals noted the absence of automated reports, data visualization, and tools for monitoring clinical and organizational indicators. As a result, data analysis is often performed manually, which increases the workload on staff and reduces the speed of decision-making.

«The system stores data but does not help analyze it. Everything has to be done manually»
(Healthcare professional)

IT specialists emphasized that the development of analytical modules and the implementation of decision support systems could significantly increase the efficiency of medical organizations and improve the quality of medical care.

«If there were convenient reports and analytics, it would greatly simplify management»
(IT-specialist)

This topic was also linked to the need for integrating medical information systems with business intelligence and forecasting tools, which is viewed by participants as a promising direction for the development of digital healthcare.

Medical Data Access and Trust Issues

A significant aspect of the user experience was the theme of medical data security and trust in digital systems. Patients expressed concerns regarding the transparency of processes for storing and using personal medical information. Participants noted a lack of awareness about who has access to their data and how it is being protected.

«It's not always clear who can see my medical information and how it is being used»
(Patient)

Healthcare professionals, in turn, emphasized the need for a balance between ensuring data security and maintaining usability. In their view, excessive access restrictions can hinder the provision of medical care and slow down workflows.

«It is important that access is secure, but at the same time, it should not create additional barriers to work»
(Healthcare professional)

IT specialists also noted the difficulty of implementing effective data protection mechanisms while maintaining high information availability. Thus, the issue of trust in medical information systems is viewed by study participants as a complex matter that encompasses technological, organizational, and social aspects.

Expectation of a Unified and Integrated Medical Platform

Almost all study participants expressed the expectation that a unified medical information platform would be created to ensure the integration of various digital services and systems. Informants viewed such a platform as a means of increasing the efficiency of medical care, improving data accessibility, and simplifying interaction between all participants in the medical process.

Healthcare workers emphasized the need for a single interface that would consolidate medical documentation, test results, patient communication, and analytical tools.

«It would be much more convenient if everything worked in a single system, without the constant switching between different programs»
(Healthcare professional)

Patients emphasized the possibility of creating a single personal account that would allow them to access all medical information, book appointments, and track treatment results.

«I want to have a single personal account where I can see all appointments and results»
(Patient)

IT specialists viewed the creation of an integrated platform as a complex but strategically important task, requiring data standardization and consistency across digital solution architectures.

The analysis of the data obtained shows that the identified themes are closely interconnected and reflect the systemic features of how medical information systems function. The fragmentation of digital solutions exacerbates usability issues, limits analytical capabilities, and reduces user trust. At the same time, the expectation of an integrated platform reflects users' desire for a more convenient, transparent, and functional digital healthcare environment.

Discussion

The results of this study revealed key features of the user experience in interacting with medical information systems and confirmed that the main barriers to their effective use are complex, including technological, organizational, and behavioral aspects. The findings are consistent with modern research on the digitalization of healthcare, which emphasizes that the success of implementing digital solutions is determined not only by the level of technological development but also by the degree of their alignment with user needs [13];[14].

The digitalization of healthcare represents not only a technological transformation of medical processes but also a large-scale economic transformation of the healthcare resource management system. The implementation of medical information systems requires significant capital and operating costs, including investments in software, infrastructure, staff training, and technical support. In health economics, medical information systems are viewed as a tool for increasing the efficiency of resource allocation, reducing transaction costs, and optimizing management processes. The main sources of the economic effect of digitalization include: reduction in medical information processing time; reduction in administrative costs; decrease in the duplication of diagnostic procedures; increased labor productivity of medical personnel; improved quality of management decisions through data analytics; reduction in medical errors and associated costs.

The economic efficiency of MIS implementation is determined by the ratio of investment costs to the effects achieved, expressed both in direct financial savings and in indirect results – increasing the accessibility of medical care, improving the quality of treatment, and optimizing the use of resources.

The structure of the Cost–Benefit analysis for the implementation of medical information systems includes, primarily, Costs: of these – capital (software licenses, server infrastructure, system integration, implementation, and configuration); operating (technical support, updates, staff training, administration); and indirect (temporary reduction in productivity during implementation, organizational restructuring of processes).

Benefits: Direct – reduction in administrative costs, reduction in documentation costs, reduction in patient encounter time. Indirect – reduction in the number of medical errors, improved quality of treatment, increased data accessibility, and growth in patient satisfaction.

$$\text{Net economic effect: } \textit{Net Benefit} = \sum \textit{Benefits} - \sum \textit{Cost}$$

Accordingly, one of the central problems identified during the study was the fragmentation of medical information systems. Participants noted the need to work with multiple digital platforms and perform repetitive data entry, which increases time costs and reduces the efficiency of medical processes. These results are supported by international studies emphasizing that the lack of interoperability in medical information systems is one of the key obstacles to the digital transformation of healthcare [15]. Research also shows that data integration between medical organizations contributes to higher quality medical care, a reduction in errors, and improved coordination of patient treatment [16]. In the context of Kazakhstan, the identified problem demonstrates the need to form a unified digital healthcare architecture that ensures the standardization and compatibility of information systems.

The second important theme of the study relates to the usability of medical information systems. Informants pointed to overloaded interfaces and complex navigation, which hinder the performance of daily tasks. These results align with research on user experience in healthcare, which highlights that low usability levels directly affect the adoption of digital technologies by medical staff and patients [17]. According to studies [18], inconvenient interfaces in medical information systems can not only reduce the productivity of healthcare workers but also increase the risk of clinical errors. This confirms the necessity of applying user-centered design in the development of medical information systems and actively involving end-users in the design process.

The identified deficit of analytical tools also reflects one of the current problems in digital healthcare. Study participants noted that existing systems primarily perform a data storage function but do not provide decision support. This conclusion is consistent with research findings demonstrating that the potential of medical data is often underutilized due to the absence of built-in analytical tools and clinical or management decision support systems [19]. The development of analytical modules, including data visualization tools and intelligent decision support systems, is viewed as one of the key directions for increasing the efficiency of digital medical platforms.

Issues of trust and medical data security gained particular significance in the study. Patients expressed concern over the transparency of how their personal information is used, while healthcare workers emphasized the need to ensure rapid access to data while maintaining a high level of information protection. These results are confirmed by modern digital healthcare research, which stresses that user trust is a critical factor in the adoption of medical information systems [20]. Studies show that insufficient transparency in data management mechanisms can reduce patients' willingness to use digital medical services, whereas effective access control and user information systems increase the level of trust in digital solutions.

The expectation for the creation of a unified integrated medical information platform, identified during the study, reflects global trends in digital healthcare development. International research points to a transition from isolated digital solutions to the formation of ecosystem platforms that ensure the integration of medical data, communication between medical process participants, and the use of analytical tools [1]. Such an

approach contributes to increasing the continuity of medical care and improving interaction between medical organizations. In the conditions of Kazakhstan, the creation of an integrated digital platform could become an important factor in increasing the efficiency of the healthcare system and the quality of medical services.

The results obtained are of great importance from the perspective of health economics. The effectiveness of medical information systems should be considered not only in terms of functionality and usability but also in the context of return on investment in digital infrastructure. High capital and operating costs for implementing digital solutions are justified only if they are actively used, integrated, and capable of reducing the costs of providing medical care.

Low usability, system fragmentation, and limited analytical capabilities reduce the economic efficiency of digitalization, as they increase hidden costs – staff time losses, inefficient use of data, and duplication of processes. Thus, user experience serves not only as a socio-organizational factor but also as an economic one affecting the performance of investments in digital healthcare.

The results of this study also confirm the significance of using qualitative methods when studying healthcare digitalization. A qualitative approach allowed for the identification of hidden aspects of the user experience, including the emotional perception of digital systems, organizational barriers, and user expectations, which often remain outside the scope of quantitative research. Modern works emphasize that including the user perspective is a key condition for the successful implementation of digital medical technologies [21].

Despite the significant results obtained, the study has several limitations. Firstly, the participant sample was relatively small and included representatives of specific professional and user groups, which limits the possibility of generalizing the results. Secondly, the study was qualitative in nature and aimed at identifying deep aspects of user experience rather than providing a quantitative assessment of the prevalence of the identified problems. In the future, it is advisable to conduct mixed-methods research combining qualitative and quantitative methods, which will allow for the confirmation of the identified patterns on a broader sample.

Overall, the study results confirm that the development of medical information systems requires a comprehensive approach, including technological innovations, user-centered design, and the improvement of organizational processes. Taking user experience into account can contribute to increasing the effectiveness of digital solutions and accelerating the digital transformation of healthcare.

Conclusion

This qualitative study has identified key features of the user experience in interacting with medical information systems through the analysis of semi-structured interviews with healthcare workers, patients, and IT specialists. The findings demonstrate that the effectiveness of using digital medical solutions is determined not only by the level of technological development but also by the degree to which they align with user needs and the organizational context of the healthcare system's functioning.

The study revealed several systemic problems within medical information systems, including the fragmentation of digital solutions, insufficient data integration, user interface complexities, limited analytical capabilities, and issues regarding trust in medical information management. Regardless of their professional roles, study participants expressed the expectation for the creation of a unified, integrated digital platform capable of consolidating the core functions of medical information systems, ensuring information accessibility, and increasing the efficiency of interaction between participants in the medical process.

The practical significance of the study results lies in the possibility of their application in the development and improvement of medical information systems. The conclusions indicate the need for a transition toward integrated digital healthcare ecosystems, the implementation of user-centered design, the expansion of analytical functions in digital platforms, and the development of transparent mechanisms for managing access to medical data. Incorporating user experience can contribute to increasing the efficiency of digital solutions, improving the quality of medical services, and accelerating the digital transformation processes in healthcare.

The study results also lead to a conclusion regarding the significance of the economic dimension of healthcare digitalization. The effectiveness of medical information systems is determined not only by their technological characteristics but also by their ability to provide resource savings, reduce operating costs, and increase the effectiveness of managing medical organizations. Considering user experience, integrating digital solutions, and developing analytical tools are necessary conditions for increasing the economic return on investment in the digital transformation of the healthcare system.

Despite the significance of the results obtained, the study has several limitations. First, it is based on a relatively small purposeful sample, which is characteristic of qualitative research and limits the possibility of statistical generalization of the results. Second, the data are based on participants' subjective assessments, reflecting individual user experiences. However, it is precisely the subjective perception of digital technologies that serves as an important source of information when studying the processes of their implementation and use. Third, the study was conducted within a single national context, which limits the possibilities for cross-country comparison of the results.

A promising direction for further research is the conduct of mixed-methods studies combining qualitative and quantitative analysis techniques, as well as expanding the geographical scope of the research. This will allow for a more comprehensive assessment of the impact of medical information systems on the performance of medical organizations and the quality of medical care.

Overall, the study results confirm that successful healthcare digitalization requires a comprehensive approach, including technological innovations, organizational changes, and the systematic consideration of the user perspective.

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