

Received: 15.11.2024 Accepted: 17.12.2024 Published online: 30.12.2024

DOI: [10.26212/2227-1937.2025.47.12.027](https://doi.org/10.26212/2227-1937.2025.47.12.027)

УДК: 614.253

THE IMPACT OF ARTIFICIAL INTELLIGENCE ON THE STANDARDIZATION AND IMPROVEMENT OF NURSING CARE

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Resume:

Background. The rapid advancement of artificial intelligence technologies and their implementation in medical practice create new opportunities for enhancing the quality of patient care. In the context of growing healthcare service demands and a shortage of qualified personnel, artificial intelligence plays a crucial role in optimizing nursing processes, improving diagnostic accuracy and forecasting, as well as increasing the efficiency of healthcare staff.

Research objective. To examine nurses' perceptions of artificial intelligence technologies and their readiness to integrate artificial intelligence into nursing practice in order to enhance the efficiency of patient care and optimize work processes.

Materials and methods. An analysis of publications on the research topic was conducted using sources such as PubMed, Google Scholar, Web of Science, and Scopus. The results of a literature review are presented, focused on studying the use and understanding of artificial intelligence among nurses.

Research results. A literature review has demonstrated that artificial intelligence holds significant potential to transform healthcare by enhancing diagnostic accuracy, personalizing treatment, improving administrative efficiency, and optimizing healthcare staff coordination. Artificial intelligence contributes to the automation of routine tasks, supports clinical decision-making, predicts outcomes, improves patient monitoring, and reduces workload and burnout risk among nurses. However, the implementation of artificial intelligence in medical practice requires enhanced education and training for healthcare personnel to overcome acceptance barriers, address ethical considerations, and ensure data security.

Conclusion. Artificial intelligence has a significant impact on healthcare by improving the quality of care and optimizing workflows. Nurses play a crucial role in its integration, which requires enhancing their knowledge and training. Studies indicate the need for developing educational programs to improve nurses' competencies in using artificial intelligence, ensuring more effective and safer implementation of technologies into practice.

Keywords: Artificial Intelligence, Nursing Care, Patient Care Management, Data Sharing, Automation

ЖАСАНДЫ ИНТЕЛЛЕКТТИҢ МЕЙІРГЕРЛІК ІСТЕ КҮТІМ САПАСЫН СТАНДАРТТАУ МЕН ЖАҚСARTУҒА ӘСЕРІ

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Түйін:

Кіріспе. Жасанды интеллект технологияларының қарқынды дамуы және медициналық практикаға енгізілуі пациенттерге күтім көрсету сапасын арттыруға жаңа мүмкіндіктер ашады. Медициналық қызмет көлемінің артуы және білікті кадрлардың жетіспеушілігі жағдайында жасанды интеллект мейіргерлік процесті оңтайландыруға, диагностика мен болжау дәлдігін жақсартуға, сондай-ақ медициналық қызметкерлердің жұмыс тиімділігін арттыруға ықпал етеді.

Зерттеу мақсаты: Мейіргерлердің жасанды интеллект технологияларын қабылдауын және оларды пациенттерге күтім көрсетудің тиімділігін арттыру және жұмыс процестерін оңтайландыру мақсатында мейіргерлік тәжірибеге енгізуге дайындық деңгейін зерттеу.

Зерттеу материалдары мен әдістері: Зерттеу тақырыбы бойынша PubMed, Google Академия, Web of Science және Scopus дереккөздері арқылы жарияланымдарға талдау жасалды. Мейіргерлер арасында жасанды интеллектті қолдану және түсіну бойынша әдеби шолу нәтижелері ұсынылған.

Зерттеу нәтижелері. Әдеби шолу нәтижелері бойынша жасанды интеллекттің денсаулық сақтау саласын трансформациялауда елеулі әлеуеті бар екені анықталды: бұл диагностикалық дәлдікті арттыруға, емдеуді дараландыруға, әкімшілік міндеттерді тиімдірек орындауға және медициналық персоналдың үйлесімді жұмысын жақсартуға ықпал етеді. Жасанды интеллект күнделікті операцияларды автоматтандыруды, клиникалық шешімдерді қолдауды, нәтижелерді болжауды, пациенттерді бақылауды жетілдіруді, сондай-ақ медбикелер арасында жұмыс жүктемесін төмендетіп, күйзеліске ұшырау қаупін азайтуды қамтамасыз етеді. Алайда жасанды

интеллекті медициналық тәжірибеге енгізу оны қабылдаудағы кедергілерді, этикалық мәселелерді және деректер қауіпсіздігін еңсеру үшін медициналық персоналдың білімін күшейтуді және дайындықты талап етеді.

Қорытынды. Жасанды интеллект денсаулық сақтауға айтарлықтай әсер етеді, күтім сапасын жақсартып, жұмыс үдерістерін оңтайландырады. Мейіргерлер оны интеграциялауда маңызды рөл атқарады, бұл олардың білімін арттыруды және дайындықты қажет етеді. Зерттеулер мейіргерлердің жасанды интеллектті қолдану бойынша құзыреттіліктерін арттыруға арналған білім беру бағдарламаларын әзірлеудің қажеттілігін көрсетеді, бұл технологияларды тәжірибеге неғұрлым тиімді және қауіпсіз енгізуді қамтамасыз етеді.

Кілттік сөздер. Жасанды интеллект, Мейіргер ісі, Науқастарды күту басқармасы, Деректермен алмасу, Автоматтандыру.

ВЛИЯНИЕ ИСКУССТВЕННОГО ИНТЕЛЛЕКТА НА СТАНДАРТИЗАЦИЮ И УЛУЧШЕНИЕ УХОДА В СЕСТРИНСКОМ ДЕЛЕ

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Резюме:

Введение. Стремительное развитие технологий искусственного интеллекта и их внедрение в медицинскую практику, открывает новые возможности для повышения качества ухода за пациентами. В условиях увеличивающихся объемов медицинских услуг и нехватки квалифицированных кадров, искусственный интеллект способствует оптимизации сестринского процесса, улучшению точности диагностики и прогнозирования, а также повышению эффективности работы медицинского персонала.

Цель исследования. Изучить восприятие медсестрами технологий искусственного интеллекта и их готовность к внедрению искусственного интеллекта в сестринскую практику для повышения эффективности ухода за пациентами и оптимизации рабочих процессов.

Материалы и методы. Был проведен анализ публикаций по теме исследования с использованием источников PubMed, Google Академия, Web of Science и Scopus. Представлены результаты литературного обзора, направленного на изучение использования и понимания искусственного интеллекта среди медицинских сестер.

Результаты исследования. Литературный обзор показал, что искусственный интеллект имеет значительный потенциал для трансформации здравоохранения, повышая точность диагностики, персонализацию лечения, эффективность административных задач и координацию медперсонала. Искусственный интеллект способствует автоматизации рутинных операций, поддержке клинических решений, прогнозированию исходов, улучшению мониторинга пациентов, а также снижению рабочей нагрузки и риска выгорания среди медсестер. Однако внедрение искусственного интеллекта в медицинскую практику требует усиленного образования и подготовки медперсонала для преодоления барьеров в его восприятии, этических вопросов и безопасности данных.

Выводы. Искусственный интеллект показывает значительное влияние на здравоохранение, улучшая качество ухода и оптимизируя рабочие процессы. Медсестры играют важную роль в его интеграции, что требует повышения их знаний и подготовки. Исследования показывают необходимость разработки образовательных программ для повышения компетенций медсестер в использовании искусственного интеллекта, что обеспечит более эффективное и безопасное внедрение технологий в практику.

Ключевые слова. искусственный интеллект, сестринское дело, управление уходом за пациентами, обмен данными, автоматизация

Background. Healthcare systems around the world are focused on improving patient outcomes, optimizing cost management, and expanding access to services. Artificial intelligence (AI) is an integral part of solving these problems by increasing diagnostic accuracy, personalizing treatment protocols and more effectively managing patient care [1]. These opportunities are of decisive importance, as providers of medical services strive to balance the provision of quality medical care with economy and availability in increasingly complex medical conditions [2]. AI is defined as the theory and development of computer systems capable of performing tasks that normally require human intelligence, such as visual perception, speech recognition, decision making, and language translation. In other words, it is the ability of machines to emulate human intellectual behavior and is a general term covering such areas as machine learning, computer vision, and natural language processing.

The purpose of the review. To study nurses' perception of artificial intelligence technologies and their readiness to implement artificial intelligence in nursing practice to increase the efficiency of patient care and optimization of work processes.

Materials and methods. The search strategy included the analysis of full-text publications devoted to the use and perception of artificial intelligence among nurses. The following scientific databases were used for literature search: PubMed, Google Scholar, Web of Science and Scopus.

Results and discussion. Artificial intelligence technologies are developed, tested, evaluated and applied in health care in many countries, but the participation of nurses in their implementation remains limited, despite the wide spread of these technologies in various institutions and specialized areas around the world [3]. As AI technology develops, it becomes more advanced, accurate, practical, effective and economical for nursing care. This is another level of possibilities, as well as for the application of artificial intelligence technology in nursing care [4]. Artificial intelligence has significant potential for revolutionizing healthcare, improving efficiency, quality of patient care, and contributing to the development of various aspects of medical practice. Among the key advantages are remote monitoring using telemedicine, as well as virtual medical assistants, which contribute to more active attraction and involvement of patients in the treatment process [5], early

detection of diseases using advanced analysis of medical images, personalized treatment plans based on genetic data and lifestyle data [6], predictive analytics for disease outbreaks and patient hospitalizations, early warning systems for identifying patient deterioration [7] and the use of artificial intelligence-based robots intelligence in surgery to reduce the risk of human error [8]. As practice shows, the use of AI has achieved significant success in the healthcare system and improved patient treatment outcomes [9], saving time, energy and money in the healthcare sector. It avoids unnecessary hospital visits for minor diseases, reduces the burden on outpatient and inpatient departments in tertiary care hospitals, provides specialized care for the rural population, avoids confusion and connects peripheral hospitals with tertiary level hospitals through the electronic referral system [10]. AI also plays an important role in drug discovery [11], optimization of administrative tasks, and data analysis in clinical trials and research. These applications highlight the transformative impact of artificial intelligence on the provision of medical services [12]. Also, artificial intelligence systems can facilitate the integration and exchange of patient data between members of the medical team. This promotes a more holistic and coordinated approach to patient care, reducing the risk of information gaps. AI can provide decision support tools that help healthcare professionals make informed decisions. This can improve collaboration by guaranteeing team members access to evidence-based information and recommendations. Artificial intelligence technologies can automate routine tasks, allowing healthcare workers, including nurses, to focus more on collaborative aspects of care. This can optimize work processes and increase the overall efficiency of the team [5].

Nursing is not only a practical activity, but also has features of science. Nurses combine their scientific knowledge and skills in patient care in their daily work in various situations [13]. Nurses, as first-line medical workers, play a key role in the implementation and use of artificial intelligence systems in clinical settings [14]. AI can assist in critical thinking and clinical decision-making by analyzing patient data to identify trends and potential risk factors, as well as providing decision support tools that offer evidence-based nursing care recommendations. AI algorithms can analyze data for early detection of subtle changes in the patient's condition, which potentially allows for early intervention and prevention of complications. Predictive analytics can help predict patient outcomes and plan appropriate interventions. Technologies can automate routine tasks, allowing nurses to focus more on critical thinking and solving complex problems [12,15]. The application of AI in nursing practice covers a wide range of areas. For example, support systems for clinical decision-making based on artificial intelligence are highlighted as an example. These systems analyze patient data, provide evidence-based recommendations, and assist nurses in achieving accurate diagnoses and treatment plans [16]. In addition, AI also finds its place in patient monitoring, with algorithms constantly studying vital signs, identifying patterns and notifying nurses of potential changes or deterioration [3]. It should be noted that artificial intelligence is able to reduce the burden associated with document processing, improve the quality of medical care and strengthen the interaction between various stakeholders in the field of health care. These examples clearly illustrate how AI can improve nursing practice and improve patient outcomes [17].

The use of artificial intelligence in clinical nursing gives several favorable results. First, AI provides nurses with statistical information and evidence-based recommendations, thereby improving their decision-making processes and contributing to more accurate assessments and therapeutic strategies [18]. Secondly, the role of AI in patient monitoring facilitates rapid interventions, which leads to improved patient treatment outcomes [19]. In addition, automation with the help of artificial intelligence simplifies administrative tasks, giving nurses more time to focus on patient care [20]. Artificial intelligence technologies also facilitate care coordination, strengthening communication and teamwork in the medical sector [21]. Artificial intelligence tools can balance the workload of the entire team of nurses, taking into account factors such as patient complexity, nurse experience, and time-sensitive needs [22]. This helps prevent burnout, reduces the risk of errors, and improves the overall quality of care. Optimizing the distribution of nurses' workload using tools based on artificial intelligence increases job satisfaction, allows nurses to focus on direct patient care, and ultimately improves patient treatment outcomes [23].

The integration of artificial intelligence into the healthcare system solves critical challenges facing the Indian healthcare system, such as shortage of skilled professionals and infrastructure, limited access and uneven access. The AI contribution goes beyond administrative tasks to early detection of diseases, personalized treatment plans, predictive analytics and even surgical interventions, demonstrating its transformative impact on the provision of medical services [24]. As AI becomes more widespread in the Canadian health care system, it is predicted that nurses will perform completely different roles and models of health care delivery [25]. These new roles and models require changes in the basic competencies and educational requirements of nurses.

In Turkey, the authors conducted a study to find out the opinions of nurses about artificial intelligence. According to the results of this study, 66.9% of nurse managers reported that they had previously heard the concepts of artificial intelligence and robot nurses. 67.2% said that, in their opinion, robot-nurses will benefit professional nurses, but 86.2% expressed disbelief that robots will replace nurses. Most of the participating nurses reported that artificial intelligence will not replace nurses, but will be useful for nurses and reduce their workload [26].

In Germany, a study was conducted on the understanding and use of AI in the nursing process. Among the respondents, 74.8% of nurses have no reliable understanding of AI. 65.7% perceive AI positively as an opportunity. Only 25.2% of respondents consider themselves experts in artificial intelligence, emphasizing the need to expand education and raise awareness of artificial intelligence in nursing. Mixed reactions, including positive views along with rare concerns about occupational safety and changes in patient care, further emphasize the importance of nurse involvement and education in the development of artificial intelligence [27].

In China, a cross-sectional online study was conducted among nursing students, nurses' knowledge and attitudes towards AI, which was conducted from March to April 2024. According to the results, 64.7% of respondents knew little about AI in nursing, and 13.4% knew nothing about artificial intelligence in nursing. Regarding problems and ethical issues related to AI in nursing, every participant expressed concern about AI in nursing, and 95.7% of participants believed that it is necessary to strengthen medical ethics in relation to AI in nursing. According to the authors of this study, nursing students and nurses did not have enough knowledge about artificial intelligence or its application in nursing, but they had a positive attitude towards artificial intelligence. It is necessary to strengthen medical ethics in relation to artificial intelligence in nursing [28].

A study conducted in South Korea among nursing students analyzed perceptions, concerns, and intentions to use artificial intelligence in medical practice. The main results show that a positive perception of AI is associated with a more positive attitude towards its adoption and a greater probability of its use in the future. At the same time, anxiety about AI negatively affects the adoption of technology and the intention to use it. This emphasizes the importance of working with students' perceptions and concerns to improve their attitudes toward AI and increase their willingness to use it. In addition, the study showed that both anxiety and attitude towards AI influence the relationship between perception of AI and intentions to use it, which indicates the importance of developing educational programs that can improve the perception of AI among students. Systematic education will help increase the competence of nursing students and improve their professionalism in the context of using AI in health care [30].

In Iran, a study was conducted aimed at studying the level of knowledge, attitudes and acceptance of AI technologies among doctors and nurses. The results showed that 65.3% of medical workers support the use of clinical AI, and 84.7% believe that AI can lead to positive changes in medicine. However, among the answers, concerns were expressed about possible errors associated with the use of these technologies. Knowledge and acceptance of AI among the study participants was at an average level, while the attitude towards the technology turned out to be relatively favorable, which contrasts with the rapid and inevitable development of AI. Despite awareness of the growing use of AI in medicine, participants approached this technology with caution. The results of the study emphasize that raising awareness can effectively solve many of these problems and uncertainties. In this regard, the authors of the study strongly recommend the development of educational programs aimed at increasing knowledge about AI. Such programs can not only reduce fear and uncertainty regarding the use of AI, but also contribute to more effective and safer implementation of clinical AI technologies [30].

The introduction of medical technologies related to artificial intelligence by medical workers may be closely related to such factors as their knowledge, acceptance and attitude. Therefore, it is necessary to consider these factors and measure them for healthcare systems and AI developers [31]. It is also necessary to pay attention to the current status of AI and its level of acceptance among medical workers. Specialists in the field of nursing may lack the necessary knowledge, skills and confidence to realize the potential of using artificial intelligence and digital technologies in healthcare, which explains the low use of these resources or their perception as ineffective. Therefore, for the successful integration of AI into clinical practice, it is necessary first of all to understand how nurses, as end users, perceive current and future tools based on AI, and how they interact with them. Since nurses work directly with patients and use technology, it is extremely important to assess their current understanding of AI to determine future training needs [32]. Studies conducted in this area have shown that, although medical workers have a positive attitude towards AI, their level of awareness of AI and its applications is not at a favorable level. *Ahmed Z et al. (2022)* in the study came to the conclusion that the majority of participants, despite their positive attitude towards artificial intelligence in medicine and readiness to accept it, do not have sufficient knowledge [33]. In addition, *Swed et al. (2022)* stated in their study that although the majority of doctors and medical students do not have sufficient understanding of AI and its importance in medicine, they are favorable to its use [34]. In another study, *Chen M et al. (2022)* came to the conclusion that most doctors and medical students are aware of the growing use of clinical AI and have a positive view of it, but they lack practical experience and knowledge [35].

Research conducted by authors *Labrague L.J. et al. (2023)* provided valuable information on nurses' perception of ChatGPT and other artificial intelligence applications, as well as their integration into nursing practice. The results showed that approximately half of the surveyed nurses had knowledge about ChatGPT and other AI-programs, while those who were familiar with these technologies showed a more positive attitude towards AI than those who had no such experience. Moreover, those who used AI-programs demonstrated higher indicators of positive attitude towards artificial intelligence than those who did not use these applications. The study also showed that nurses with postgraduate education have a more positive attitude towards artificial intelligence, which confirms the importance of the level of education for the formation of a positive perception of AI. Similarly, raising the level of education among nurses contributed to a more positive perception of AI technologies. Higher education can make nurses more aware of current trends, develop their critical thinking and contribute to the implementation of this knowledge in healthcare practice, which, in turn, positively affects the attitude towards the use of AI in medical practice. Therefore, the integration and use of AI-programs should be expanded within nursing education [36].

Rony MKK et al. (2024) in their study described that practicing nurses, during interviews, positively perceived artificial intelligence, considering it as a transformative tool for personalized treatment and patient care. It is considered AI as a virtual assistant, which contributes to the improvement of communication and optimization of medical services. However, concerns were expressed about dehumanization, data security and the threat of job losses. Specialists emphasized that AI should complement and not replace their role, and called for attention to possible biases. They also advocated for the development of broad guidelines that would align the use of AI with health care regulations, ensure ethical integration of technologies, and eliminate potential inequities. Despite these concerns, AI has been perceived as a valuable tool for improving decision-making processes in healthcare [37].

Over the past five years, many studies and explanatory activities have been conducted, aimed at studying the current and expected impact of artificial intelligence on teachers, students and practicing specialists in nursing [38]. Considering the forecast that new technological advances are expected to transform aspects of nursing and its education [39], nurse educators should increase their knowledge and comfort level both with the concept and with the realities that will be provided by new AI. In addition, nurses in clinical practice urgently need new knowledge and skills to effectively implement AI in their practice [40].

Sharts-Hopko NC (2014) wrote in his research that nursing students respond positively to learning methods using virtual reality, which in certain situations can be more effective than traditional approaches, and the use of AI to support learning in undergraduate programs Nursing practice can positively affect the transition of nurses to practice, improving their clinical thinking skills [41]. It is predicted that the acquaintance of students with AI in their clinical experience at the undergraduate level can help prepare them for work in technological clinical conditions. For example, artificial intelligence technologies, including virtual and augmented reality, offer students innovative ways to gain experience in a clinical environment [20]. Taking into account these potential advantages, a number of authors urge nursing educators to consider the feasibility of

introducing new pedagogical approaches that allow nursing students to actively interact with new technologies [42]. It is expected that the implementation of artificial intelligence in nursing will lead teachers to a more interdisciplinary approach to education, where nurses will collaborate with specialists in information technology, robotics and programming [43]. *Fritz RL et al.* (2019) emphasize the need for purposeful transformation of nursing curricula in order to prepare future nurses to work in a clinical environment where artificial intelligence technologies are increasingly used [44]. *Risling T.* (2017) claims that informatics should be a mandatory nursing competency and that nursing curricula include basic courses on this topic [39]. Other researchers suggest that nursing curricula should be redesigned to include topics such as AI data literacy, technological literacy, systems and critical thinking, genomics and artificial intelligence algorithms, ethical issues related to AI, and analysis and consequences of working with big data [42]. Nursing teachers, both in clinical practice and in academic institutions, play a key role in preparing nurses and nursing students for the future, in which artificial intelligence will play an important role. In order to support the development of technologically competent nursing staff, educators must create a learning environment that promotes the development of nurses' understanding of new interactions between nurses, patients, and AI [45].

According to the author, *Abuzaid MM et al.* (2022) lack of understanding of AI and technical potential among nurses. Also, the author strongly recommends universities and professional organizations to implement appropriate educational and training programs. Nurses should expand their knowledge about the basics of artificial intelligence and understand how it is integrated into the practice of nursing [32]. The results of the study conducted by *Alruwaili MM and co-authors* (2024) indicate that a significant part of nurses shows a conservative attitude towards artificial intelligence, which varies from moderate caution to expressed resistance to the integration of AI technologies into the practice of patient care [46]. These conservative views are especially pronounced among women and older nurses, which indicates a significant influence of demographic factors on the perception of technological achievements [47]. Conservative attitudes toward artificial intelligence may be due to a number of factors, including concerns about job substitution, doubts about the reliability and accuracy of AI technologies, as well as ethical issues related to the confidentiality of patient data and the risks of depersonalization in care [48]. Addressing these issues through targeted education about the benefits and ethical use of AI, as well as providing empirical evidence of the positive impact of AI on patient outcomes and workflow efficiency, can be vital strategies for developing a more receptive relationship.

The current results of research on conservative attitudes and concerns about the technology of artificial intelligence contradict the results reported by *Kwak Y et al.* (2022) [49], because they studied the attitude of nursing students to the technology of artificial intelligence and led to a positive readiness of students to easily work with applications integrated with artificial intelligence in the practice of nursing. These results may be related to generational differences among nurses [48]. Young nurses, as a rule, have a more positive attitude towards technology in general than older nurses [50]. This involves the adaptation of educational and administrative measures in this regard on the basis of different generations of nurses found in the workforce of healthcare organizations. Nurses, health policy makers and educators should jointly develop and update policies aimed at solving problems or opportunities among nurses, including initiatives to promote education and the formation of positive attitudes towards the integration of AI [47]. In addition, understanding the conservative attitude of nurses towards artificial intelligence technologies provides healthcare administrators and policymakers with valuable information for the development and implementation of AI technologies, taking into account the values and concerns of nurses [51]. Ensuring the introduction of artificial intelligence tools with proper support and training, as well as their compliance with professional values and ethics of nurses, is a key factor for overcoming resistance and successful integration of these technologies into practice [50].

Conclusion.

Artificial intelligence has a significant impact on various aspects of the healthcare system, including improving the quality of patient care, optimizing work processes and reducing the burden on medical staff. AI has the potential to revolutionize healthcare through the introduction of such technologies as predictive analytics, remote monitoring, clinical decision support systems, and automation of routine tasks. Nurses play a key role in the integration of AI into clinical practice, which emphasizes the importance of their educational training and readiness to use such technologies in everyday work. Despite the positive trends in the perception of AI among medical workers, there are still problems associated with insufficient awareness and concern about the safety and ethical aspects of its use. Studies show that the level of knowledge and acceptance of AI among nurses is at an average level, which indicates the need to develop educational programs to improve their competencies in this area. The introduction of AI in nursing requires revision of educational programs, introduction of new educational approaches and active cooperation of nurses with experts in the field of information technologies, which will open new opportunities for improving the efficiency of health care and improving the professional skills of nurses.

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Authors' Contribution. All authors equally contributed to the writing of this article.

No conflicts of interest have been declared.

This material has not been previously submitted for publication in other journals and is not under consideration by other publishers. No external organizations or medical representatives funded this work.

Funding. No funding was provided.

Авторлардың үлесі. Барлық авторлар осы мақаланы жазуға тең дәрежеде қатысты.

Мүдделер қақтығысы- мәлімделген жоқ

Бұл материал басқа басылымдарда жариялау үшін бұрын мәлімделмеген және басқа басылымдардың қарауына ұсынылмаған.

Қаржыландыру- жүргізілмеді.

Вклад авторов. Все авторы принимали равное участие при написании данной статьи.

Конфликт интересов- не заявлен.

Данный материал не был заявлен ранее, для публикации в других изданиях и не находится на рассмотрении другими издательствами. При проведении данной работы не было финансирования сторонними организациями и медицинскими представительствами.

Финансирование- не проводилось.

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