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Review Article

The Role of Artificial Intelligence in Enhancing Nursing Care for Patients with Invasive Ductal Carcinoma of the Breast: An Integrative Review

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Abstract

Background and aims: In recent years, artificial intelligence (AI) has been considered a useful tool for the diagnosis and treatment of diseases. This study aimed to investigate the role and impact of AI in the nursing care of cancer patients. Caring for cancer patients presents many challenges. These challenges include timely interventions, high accuracy, and interdisciplinary coordination. Given the complexities of cancer care, nurses have an increasing need for accurate and rapid decision-making. The present study was conducted to investigate the role of AI in improving nursing care for cancer patients and the challenges and opportunities in this field. This article considers the new methods and techniques used in this area.

Methods: We searched and screened studies published between January 2015 and March 2025. Titles, abstracts, and then full texts were screened in Scopus, PubMed, Web of Science, and Google Scholar databases. A total of 80 studies were reviewed using the search strategy for each database, and 40 articles were included. Critical evaluation was then performed.

Results: The findings show that AI technologies have been used in areas such as early detection, symptom monitoring, predicting complications, assisting in nursing decision-making, and patient education. Although the results are promising, challenges such as maintaining privacy, clarifying algorithm performance, and ethical concerns remain.

Conclusion: AI appears to have the potential to improve the quality of nursing care and support personalized treatment, provided that it is developed under appropriate ethical and professional supervision.

Keywords: Artificial intelligence, Breast cancer, Invasive ductal carcinoma, Nursing care, Cancer

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Introduction

Considering the global incidence and mortality rates of cancer, it can be said that cancer was one of the most terrifying diseases of the twentieth century and it is becoming more prevalent with the continuation and increase in cases in the twenty-first century. The risk of developing cancer is high; in other words, approximately 1 in 4 people develop cancer during their lifetime (1). The most up-to-date information on the outcomes and occurrence of cancer based on the population is collected using mortality data and incidence data collected by central cancer registries (until 2021) and by the National Center for Health Statistics (until 2022). Projections indicate that there will be 2041910 new cancer cases and 618120 cancer deaths in the United States by 2025. The downward trend in cancer mortality continued until 2022 and is still decreasing. Nearly 4.5 million deaths have been prevented due to early detection of some cancers,

improved treatments, and reduced smoking since 1991. The overall incidence of cancer has generally decreased in men but increased in women (2). Advances in cancer treatment and population aging have led to a rising prevalence of cancer. Long-term care for cancer patients is a complex process involving multiple and cyclical treatments and diagnoses. Patients and their families should cope with various aspects of the disease, including symptoms, disabilities, and outcome uncertainty, and experience different care environments, receiving information from various medical specialists, including oncologists, surgeons, and gastroenterologists, as well as care and support from interprofessional teams over time, such as nurses, psychologists, and therapists (3). Managing the care and treatment of cancer patients is complex, and chronic care requires the involvement of a wide range of healthcare professionals who work to address patient needs and optimize outcomes, alongside nurses, oncologists, and counselors. A comprehensive care solution for cancer patients will be possible through coordination, shared decision-making across various medical specialties, and supportive initiatives (4). Medical advancements have resulted in more people living with cancer due to increased lifespans, emphasizing the importance of improving quality of life throughout their cancer journey. In this endeavor to improve quality of life, the role of the oncology nurse in uniting diverse healthcare professionals and ensuring cohesive patient-centered care is crucial (5).

Artificial intelligence (AI) is a technology that enables computers and machines to learn like humans and simulate human understanding, problem-solving, decision-making, creativity, and autonomy (6). The integration of AI into healthcare delivery is increasingly common and offers the potential to significantly increase diagnostic accuracy, treatment effectiveness, and overall patient care. One of the areas where AI is used in healthcare is the creation of diagnostic tools. For example, AI algorithms can be trained to analyze and better interpret medical images, such as X-rays and CT scans, for disease or injury (7). Cancer and clinical care should be planned in a personalized manner. Access to large datasets, coupled with advancements in high-performance computing and emerging deep learning architectures, has increased the potential of using AI in various aspects of cancer research. These applications include cancer detection and classification, molecular characterization of tumors and their microenvironment, drug discovery and repurposing, and prediction of treatment outcomes for patients (8).

Advancements in digital technologies and AI are reshaping healthcare delivery, and AI is increasingly being integrated into nursing practice. These innovations provide the potential for increased diagnostic accuracy, improved operational workflow, and more personalized patient care (9). AI and language models are two factors simplifying medical record documentation. Other benefits include automating administrative tasks, improving operational efficiency, and enabling healthcare professionals to focus more on direct care. AI-based systems, including wearable devices, improve remote patient monitoring and enable continuous and real-time assessment of vital signs, timely detection of cardiovascular events, and development of a proactive approach to healthcare. AI improves clinical decision support systems (CDSSs) and diagnostic accuracy and assists in treatment planning in cardiovascular health (10). Despite all the advantages of using AI, many challenges remain, including data privacy, algorithm bias, ethical issues, and a lack of training for nurses. These challenges represent 3 types of challenges related to the implementation of AI in healthcare: (1) conditions outside the healthcare system, (2) capacity for strategic change management, and (3) transformation of healthcare professions and healthcare practices that can facilitate or address these challenges (11). Ethical issues, such as data privacy and bias, are among the most important challenges encountered when using AI in healthcare. Ensuring the protection of patient data and preventing the perpetuation of societal biases are crucial for the responsible and equitable implementation of AI in healthcare (12). Despite extensive advancements in AI and extensive research in this field, research gaps exist, which will be addressed in the conclusion section of this article.

Focus of Most Studies on Medical (not Nursing) Aspects

Although AI has significant potential in the field of cancer patient care, its application in nursing practice has not yet been well-investigated. One of the main reasons for this failure is the lack of real-world data in the field of nursing care, as well as the limited number of studies that have evaluated the implementation of these technologies in real clinical settings (13).

Lack of Comprehensive Interdisciplinary Review

In addition, most studies in previous reviews have had a one-dimensional view and examined the care of a single discipline. They have rarely comprehensively addressed the interdisciplinary relationship between nursing, the specific needs of cancer patients, and AI-based solutions (13).

Lack of Analytical and Critical Reviews

Many of the reviews conducted have focused more on descriptive reviews of existing studies and less on critical and comprehensive analysis of the effectiveness, challenges, and limitations of using AI in the nursing care of cancer patients (14).

Lack of Focus on AI Performance in Improving Nursing Care for One Type of Cancer

Most existing studies have focused on the application of AI in cancer, while different types of cancer can have their own specific care and treatment conditions (15).

The aim of this article is to analytically review existing

studies on the applications, advantages, and challenges of AI in the nursing care of cancer patients. This study can clarify the understanding of oncology nursing regarding AI and emerging technologies. The areas under review include AI tools, the role of AI in decision-making, improving the quality of care, and clinical effectiveness, which will cover existing research gaps.

Materials and Methods

Research Strategy

The literature search was conducted between January 2015 and March 2025 across 4 major databases, including PubMed, Scopus, Web of Science, and Google Scholar.

The search strategy combined the following keywords and Boolean operators:

("Artificial Intelligence" OR "AI" OR "Machine Learning" OR "Deep Learning") AND ("Nursing Care" OR "Oncology Nursing" OR "Cancer Care") AND ("Breast Cancer" OR "Invasive Ductal Carcinoma (IDC)").

The search was restricted to English-language studies involving patients receiving nursing care related to cancer or breast cancer. Additional sources were identified by reviewing the reference lists of the selected articles.

Selection Process

The selection process followed the framework proposed by Whittemore and Knafl for integrative reviews. The process included four steps: (1) identification, (2) screening, (3) eligibility, and (4) inclusion. Two authors independently screened the titles and abstracts for relevance to the topic. Studies were included if they focused on the role or impact of AI in nursing care of cancer or breast cancer patients, regardless of study design (quantitative, qualitative, or mixed methods). Studies were excluded if they focused solely on medical or surgical outcomes, were not in English, or lacked full text. Initially, the identified studies from the databases were entered into EndNote X9 software. Duplicate studies were removed before screening, and only one copy remained. Then, a list of titles of the remaining studies was prepared. Next, the title and abstract of the remaining articles were carefully reviewed, and irrelevant articles were removed. Finally, the remaining studies were included in the review.

Quality Appraisal

The methodological quality of the included studies was appraised using the Critical Appraisal Skills Program (CASP) checklist, adapted for the study type (quantitative, qualitative, or mixed-methods). Two reviewers independently assessed each study for clarity of aims, appropriateness of methodology, data collection, validity of findings, and relevance to nursing care. Any disagreements were resolved through discussion and consensus. The purpose of this appraisal was to ensure credibility and depth of the evidence, not to exclude studies based on numerical scores. A summary of the appraisal results is presented narratively in the Results section, highlighting the strengths and limitations of the included studies.

Overall, 35 studies (75%) demonstrated high methodological quality, 12 studies (20%) had moderate quality, and 8 studies (5%) showed low quality, mainly due to limited sample size or unclear analytic methods.

Inclusion Criteria

Language: English articles

Type of Study: Valid experimental, clinical, and review studies

Time Frame: Studies published between 2015 and 2025

Target Population: Patients in need of nursing care for cancer

Full-text Accessibility: Studies must have accessible full texts

Exclusion Criteria

Language: Non-English articles

Type of Study: Theoretical studies or empirical reports without documented data

Target Population: Studies focusing on non-cancer patients or unrelated conditions

Type of Intervention: Studies in which AI did not play a role in improving cancer nursing care

Data Extraction

Information such as authors, year of publication, sample size, sample characteristics, research setting, study design, and tools used to assess the role of rehabilitation nurses was extracted from the articles. Any discrepancies in the extracted data were resolved through discussion among the authors. Remaining disagreements were resolved by the opinion and judgment of the fourth reviewer. In interventional studies, information related to the pre-intervention phase was considered.

Synthesis Approach

The extracted data were analyzed and synthesized following the framework proposed by Whittemore and Knafl for integrative reviews. This approach involves data reduction, data display, comparison, conclusion drawing, and verification. After extracting relevant findings from each study, data were grouped according to thematic similarity, such as Al applications in early detection, pain management, decision support, and patient education. The synthesis was conducted narratively and thematically, integrating both quantitative and qualitative evidence to identify common patterns, divergences, and gaps across studies. Through an iterative reading and coding process by 2 reviewers, recurrent concepts were organized into themes that formed the basis for the results and discussion sections.

Results

Based on the thematic synthesis, 4 main domains emerged regarding the use of AI in nursing care: early detection

and screening, symptom and pain management, decision-making support, and patient empowerment. The overall quality of the included studies was moderate to high. Most studies demonstrated clear objectives, appropriate use of AI tools, and adequate methodological transparency. However, several studies lacked detailed reporting on ethical considerations and data privacy, which may limit generalizability of the findings. AI has gradually become an important tool in the care of breast cancer patients. The use of this technology helps nurses to assess patients' conditions, monitor symptoms, and make better decisions in the care process with greater accuracy and speed. Accordingly, the quality of care is increased, and patients' treatment experience is improved.

Applications and Role of AI in Nursing IDC

Early Detection and Screening

Machine learning algorithms for faster and more accurate AI diagnosis help radiologists find lesions; however, concerns about false positive results persist. AI has been explored for its potential to transform breast imaging by assisting in the evaluation of biomarkers, accurate mammography image interpretation, lymph node detection, and outcome prediction. Genetic perspectives on risk and treatment response are expanding through AI, especially via deep learning algorithms. Interdisciplinary collaborative treatment approaches benefit from AI-guided radiotherapy planning (16). Based on recent research findings, the majority of cancer cases identified by the AI-assisted additional-reader process were invasive (83.3%) and small in size (10 mm, 47.0%). This indicates that AI can accurately detect invasive cases of 10 mm and smaller (17).

IDC Mammography Image Identification Algorithm

One of the challenges in the treatment of breast cancer is its early detection due to the absence of early warning signs. The use of machine learning via a convolutional neural network pattern significantly increases the effectiveness of malignancy and mortality determination and cancer-induced vulnerability by up to 25%. Results show excellent performance with an average accuracy of 95% in classifying metastatic cells versus benign cells, and 89% accuracy was achieved in detecting IDC (18).

Pain Monitoring and Management

AI can also be used in warning systems, applications, and sensors, along with data analysis algorithms, by examining patterns recorded in patient records. AI-based systems may assist the nursing team in making more accurate decisions regarding pain management; however, their effectiveness depends on the reliability of underlying data and the transparency of the model. In the field of machine learning, models can be used to teach these intelligent systems how to better detect pain. Many machine learning models exist for this purpose, including Random Forest, Lasso, and Support Vector Machine (SVM), for classification, prediction, and decision-making in the management of pain in cancer patients. The Random Forest machine learning model showed the best performance among the models with an average AUC of 0.81. One of the benefits of AI for healthcare providers is to provide timely care and assistance to cancer patients through remote monitoring and telehealth services by reviewing data obtained from facial expressions, contact sensors, and biological approaches, even when patients are not present (19).

Clinical Decision-Making and Care Planning

AI-based CDSSs are essentially software for computer systems. The basic principle of this software is that in the early stages, the knowledge base is built through key information and prognosis in structured medical records or scientific sources. AI enables computers to reconstruct human reasoning by collecting and expressing learned knowledge content through generating suggestions, thereby reducing reliance on memory, decision-making error rates, and response time (20).

Patient Education and Empowerment

Chatbots and smart interactive deep learning tools, as new research focal points in AI, have been widely used in cancer risk assessment, symptom detection, and tumor detection. Therefore, one of the benefits of applying deep learning in cancer patient care is resolving nursing care problems in terms of time and energy consumption, lower accuracy, and lower efficiency. Deep Learning + Augmented Reality (DL + AR) can help cancer patients experience a completely modern nursing care model that is more adaptable, intelligent, and mobile in the information age compared to past nursing (21).

Anxiety Management and Quality of Life

AI systems can also be used for emotional care. Many cancer patients face psychosocial challenges. Conventional nursing interventions often include psychological counseling, patient education, exercise, spending time with family, healthy eating, and other strategies. However, these interventions are not always easy to implement, and psychosocial challenges often occur in the most inappropriate situations. Patients can access mental health resources on demand, and generative AI platforms (such as ChatGPT) can provide real-time intervention solutions for the management of stress (22).

Reported Benefits and Achievements

Improved Quality of Care

AI has been explored for its potential to transform healthcare, offering new tools for treatment planning and disease diagnosis. Advances have occurred in pathology and deep learning models, such as the NAFNet model. These advances demonstrate the potential of AI to accurately predict clinical outcomes and provide non-invasive and reliable methods that can transform clinical

decision-making (23).

Reduced Nurse Workload

Two examples of AI applications that simplify nursing work are robotics and remote care. AI-based robotics and telehealth solutions expand the field of nursing care. Another benefit of these applications is that they enhance access to healthcare services and remote monitoring capabilities for patient health status (24).

Increased Patient Satisfaction

Patients reported higher satisfaction when AI improved diagnostic accuracy and increased healthcare efficiency (25).

Personalized Nursing Services

AI is creating and expanding nursing care practices in various ways. Nurses, as the central point of patient care, should be educators in the development and use of these tools to personalize their application for each patient (26).

Challenges of Implementation of AI in Nursing

Despite its growing promise, the implementation of AI in nursing care faces several critical challenges that affect its practical integration and sustainability.

Ethical and Privacy Issues

The appropriate use of AI can support and enhance the core values and ethical commitments of the nursing profession. In some cases, AI appears to undermine or disrupt these core values and commitments. Al has the potential to support ethical nursing practice by reducing errors and enhancing patient safety; however, without clear ethical guidelines and adequate training, it may also risk undermining core nursing values such as autonomy and compassion (27). While AI can support decision-making and improve patient outcomes, it raises significant ethical and privacy concerns (28). Many AI systems rely on large volumes of sensitive patient data, and inadequate data protection frameworks can lead to breaches of confidentiality (29). Furthermore, algorithmic opacity ("black box" models) limits the ability of nurses to understand or justify AI-based recommendations (30). These issues can erode patient trust and professional accountability. To address these concerns, healthcare institutions should adopt transparent data governance policies, involve nurses in the ethical design of AI systems, and ensure compliance with privacy laws such as HIPAA or GDPR equivalents (31).

Insufficient Nurse Training in Technology

Despite rapid advances in AI technologies, many training programs are emerging phenomena that many nurses are unaware of, and practical nursing courses have not yet fully integrated these technologies into their curricula, leading to confusion in preparing nurses for effective and ethical use of these tools (32).

Weak IT Infrastructure in Some Healthcare Centers

Most participating nurses identified technical challenges and a lack of facilities as a major barrier to the adoption of AI in nursing practice. These challenges include outdated systems and a lack of proper integration between existing systems, as well as inadequate IT infrastructure. Consequently, to effectively utilize AI in nursing care, improvements in IT infrastructure and upgrades to existing systems must occur. Without considering appropriate AI infrastructure and facilities, the successful integration of new technologies into nursing care may face serious obstacles (33). A recurring challenge identified in several studies is the limited training of nurses in AI and digital technologies (30). Many nurses report a lack of confidence in interpreting AI outputs or integrating AI tools into clinical workflows (33). This gap can reduce acceptance of AI systems and increase the risk of misuse. Therefore, targeted educational programs should be included in nursing curricula and professional development should be continued. Interdisciplinary coordination between nurses, IT specialists, and data scientists can bridge the knowledge gap and foster user trust (34).

Weak IT Infrastructure and Organizational Readiness

Inadequate technical infrastructure, such as outdated hospital information systems, lack of interoperability, and limited internet bandwidth, significantly hinders the adoption of AI in healthcare centers (35).

Moreover, resistance to change within organizations and insufficient management support exacerbate these issues (36). To enhance readiness, healthcare administrators should invest in scalable infrastructure, provide pilot programs before full implementation, and cultivate a culture that values innovation and collaboration between nurses and technical teams (37).

Regulatory and Legal Uncertainty

Another emerging challenge is the lack of clear regulatory guidance on the legal accountability of AI-driven decisions in nursing care (38). When AI-generated recommendations lead to adverse outcomes, responsibility boundaries between nurses, developers, and institutions remain ambiguous (38). Addressing this issue requires the development of comprehensive legal frameworks and ethical standards that define liability, ensure fairness, and promote safe deployment of Al tools in nursing (39). AI plays a highly effective role in improving the quality of nursing care for patients with IDC and patients with breast cancer in general.

Discussion

1. Interpretation of Results and Comparison with Previous Studies

A review of recent studies shows that AI is increasingly being explored for its potential role in supporting nursing care for patients with IDC. One prominent application

of AI lies in symptom monitoring and complication management. AI-based systems, such as wearable sensors and real-time alert systems, enable nurses to identify physiological changes in patients earlier and implement timely interventions, leading to reduced complications and hospital stays (19). In the context of personalized nursing care, studies have shown that personalized care provided by nurses is associated with increased patient satisfaction and reduced negative emotional symptoms. This type of care includes health education, individualized care plans, and dedicated nursing teams (26). Furthermore, the use of AI in clinical decision-making helps nurses make data-driven decisions regarding medication, supportive care, and risk assessment by leveraging decision support systems (20). In the area of patient education and empowerment, AI-based tools, such as personalized educational applications, help increase patient awareness and participation in the care process (21). Finally, studies have reported that these technologies can potentially lead to reduced nurse workload, increased patient satisfaction, and enhanced quality of care, although some challenges remain, including ethical issues, data reliability, and the need for nurse training in working with these tools. The findings of this study showed that the application of AI in breast cancer screening can contribute to early diagnosis and reduction of nurse workload (40).

2. Comparison with Similar Studies

The results of this study are consistent with those of the study conducted by Zhang et al, which showed that AI-based tools can be effectively used in managing clinical complications and improving the quality of care (41). The results are consistent with the findings of the study by Pailaha, indicating that AI can help improve nursing care, increase accuracy in diagnosis and treatment, and enhance the patient experience (42). The results are consistent with those of the study conducted by Abadir et al, showing that AI is capable of real-time screening of the patient and providing personalized services. This approach demonstrated that AI performance can be effective in improving nursing care (43).

Comparison with Different Studies

The results contradict the findings of Becze et al, indicating that there is insufficient evidence regarding ethical considerations and their effectiveness in clinical practice (44). The results contradict the findings of Kucking et al. This study shows that under time pressure, pathologists may trust incorrect recommendations from the AI system without sufficient review, which can lead to erroneous decisions (45). The results contradict the findings of Clusmann et al. This study shows that large language models used in oncology, such as GPT-40, can be vulnerable to prompt injection attacks. These attacks can lead to the generation of incorrect or harmful outputs, which can have serious consequences for patients in the medical context (46).

Similarities Reason Among Reviewed Studies

A significant portion of the reviewed studies reported similar results, which can be attributed to several factors. First, many of these studies focused on breast cancer patients, especially IDC, and used similar data, such as mammography images. This convergence in the target population and data led to consistent results (18, 40). In addition, most studies used similar machine learning algorithms, such as Convolutional Neural Networks (CNN) or SVM, tools that have shown good performance in early cancer detection. Furthermore, the similar design of the studies, often review or descriptive, resulted in consistent findings focusing on the positive potentials of AI (19, 40).

Differences and Their Potential Reasons

Differences in Study Objectives

However, some studies presented different results. One reason for this difference is the variation in study objectives. For instance, some research aimed to evaluate the accuracy of algorithms, while others investigated their actual impact on care quality or patient satisfaction (47).

Differences in Data Type (Real Clinical versus Simulated)

Diversity in data and research platforms also played a role in these differences. Some studies used real clinical data, while others were based on simulated or pre-processed data (48).

Differences in Research Environment

The research environments also differed; in other words, some studies were conducted only in laboratory settings, while others were performed in real healthcare centers. Naturally, results in real-world settings might be affected by factors such as resistance of nurses or patients to adopting new technologies (49).

Differences in Research Timing

Differences in the timing of the research can also be influential. Newer studies typically use more up-to-date algorithms and more advanced models, which may yield different results from older research (50).

3. Relevance of Results to Clinical Practice or Policy Making

The use of AI in nursing care and monitoring systems for patients with IDC can play a crucial role in reducing nurse workload, improving the quality of care, and increasing patient satisfaction. However, for the effective and safe use of this technology, it is essential to establish appropriate supportive policies, provide specialized training for oncology nurses, and consider clear ethical frameworks (9).

4. Ethical and Practical Considerations

The integration of AI into nursing practice introduces significant ethical and operational implications. From an

ethical standpoint, AI systems handle sensitive patient data and therefore must adhere to fundamental principles such as autonomy, beneficence, non-maleficence, and justice (51). Maintaining patient privacy and informed consent is crucial, as algorithmic decisions may be opaque and difficult for nurses to explain (52). Furthermore, the potential for algorithmic bias, stemming from non-representative datasets, can lead to inequitable care outcomes, particularly for minority or vulnerable populations (53).

To uphold ethical integrity, it is essential that nurses participate in the design, evaluation, and monitoring of AI tools, ensuring that these technologies complement rather than replace human judgment and compassion. Establishing clear accountability frameworks is also necessary to determine professional responsibility when AI systems influence clinical decisions. From an implementation perspective, practical challenges in AI include insufficient training, unclear policies, and organizational resistance (54). Many healthcare institutions lack standardized guidelines on how AI should be introduced, monitored, and evaluated within nursing workflows (32).

To address these gaps, policymakers and healthcare leaders should develop institutional policies that define data governance, clarify legal responsibilities, and ensure ongoing professional development. Embedding AI ethics and literacy into nursing education curricula can prepare future nurses to critically engage with these tools (55).

Furthermore, pilot programs and multidisciplinary collaborations between nurses, IT experts, and ethicists can facilitate responsible and sustainable AI integration.

Limitations of the Study

Despite efforts to provide a comprehensive analysis of the emerging applications of AI in nursing care for patients with IDC, this study had several limitations. First, the diversity in the design and objectives of the included studies (from narrative reviews to experimental studies) made data homogenization difficult. Second, the diverse applications of AI, from early diagnosis to pain management, limited in-depth analysis for each area separately. Additionally, due to the search being limited to English language and a specific time frame, some relevant studies may have been excluded. The lack of complete information about the methods used in some articles and the absence of precise performance indicators for AI models were other challenges that reduced the accuracy of the analysis. Finally, the inability to perform a numerical meta-analysis due to data heterogeneity limited this review to qualitative analysis. Although the reviewed studies indicate that Al-based technologies can positively influence various aspects of cancer nursing, the evidence base remains preliminary. Most studies are limited in sample size, design, or generalizability. Therefore, the clinical claims derived from current literature should be interpreted with caution, and future empirical studies are required to establish causal effects.

Conclusion

AI has demonstrated promising potential in enhancing the quality of nursing care for patients with IDC. While the evidence indicates promising trends, further research and ethical oversight are required to confirm these effects in real-world clinical settings. The implementation challenges identified in this review, including ethical concerns, lack of training, infrastructural limitations, and regulatory ambiguity, highlight that successful adoption of AI in nursing requires not only technological advancement but also organizational, educational, and policy-level reform. By conducting this comprehensive review, we were able to demonstrate the importance of the role of AI in this area, as well as the challenges ahead. Despite challenges such as ethical and privacy issues, insufficient nurse training in technology, and weak IT infrastructure in some healthcare centers, this field can be significantly transformed with technological advancements. Promoting technological literacy among nurses and integrating AI tools may contribute to improving the quality of care and optimizing healthcare costs, though further real-world studies are needed to validate these outcomes. Given that the number of cancer patients is increasing, addressing solutions to improve care, especially through AI, is of high importance. Based on the findings of this review, it seems that the future direction of research should move towards designing and investigating AI applications that are not only technically accurate but also truly contribute to improving the quality of nursing care. It is recommended that nurses should be involved in the development process of these tools so that technologies can be designed based on the actual needs of patients and healthcare professionals. In terms of policymaking, it is also necessary to develop clear frameworks for the proper, ethical, and safe use of these technologies. In addition, training nurses to work with these tools, especially in complex diseases like cancer, can play a significant role in their success and acceptance in clinical settings.

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Competing Interests

The authors declare that they have no conflict of interests in relation to this research.

Data Availability Statement

The data for the results reported in this article can be obtained by submitting a request to the corresponding author.

Ethical Approval

Not applicable.

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