Review of Contemporary Philosophy
ISSN: 1841-5261, e-ISSN: 2471-089X
Vol 23 (2), 2024
Pp 728 - 744

Ethical Considerations and Challenges in The Integration of AI in Nursing Practice: A Systematic Literature Review

[1]Alotaibi Nourah Obaid S,[2]Mohammed Abed Aloufi,[3]Dalal Othman Adawi,[4]Alqurashi, Hayat Mohammed A,[5]Alqurashi Mona Mudhayyif R,[6]Jamilah Mohammed Almuqati,[7]Saeed Atiah H Almalki,[8]Maged Sharar Alharthi,[9]Fatimah Thaar Alsubaie,[10]Alshehri, Abdulrahman Saad A,[11]Khaled Ahmed Alzhrani

1. Taif Health Cluster
2. ERADA and Mental Health Complex, Taif Health Cluster
3. King Salman Medical City in Medina
4. Taif Health Cluster
5. Taif Health Cluster
6. Taif Health Cluster
7. Children's Hospital in Taif
8. Children's Hospital
9. Taif Health Cluster
10. Aseer Health Cluster
11. King Abdulaziz Specialist Hospital

Abstract

Background: Advancements in the incorporation of artificial intelligence (AI) solutions to the nursing profession and more specifically to the critical care units (CCUs) present a considerable opportunity toward enhancing essential tenets of the nursing profession. Nevertheless, this paper has identified the following challenges that could still act as a barrier towards the successful integration of AI in healthcare; Challenges in training, technical issues as well as ethical issues.

Aim: The purpose of this research is also to investigate the effect of adopting AI-based DSS with critical care units, find out the difficulties nurses experience in doing their job, and determine how useful AI is in enhancing patient care.

Method: Cross-sectional study was employed by administering self-developed questionnaires to 112 registered nurses working in CCUs in Amman, Jordan. Surveys were administered in relation to their interactions with these smart technologies, the perceived advantages, difficulties and training requirements.

Results: The study showed that implementations of AI technologies are beneficial for nursing workflows by increasing time optimization, patients' observation, and choosing the most effective treatment. However, the nurses stated some of the problems encountered including lack of adequate training time, technical issues and issues to do with the confidentiality of the information collected. Furthermore, the literature studies focused on several aspects such as highlighting that AI technology in nursing is still at a developing stage and few of these papers provided real-life usage and effectiveness data.

Conclusion: The use of AI-based DSS seems to have benefits in augmenting callous scripting of the nursing's peak tasks in critical care contexts. However, questions and concerns such as training for using

AI and other technical issues, or concern for the ethics involved must be solved for the AI to be optimally used for practice of nursing. Further studies should examine the subsequent beneficial effects of AI, the involving of nurses in AI advancement, and the integration of the course on the benefits of AI application in nursing to prepare future nurses.

Keywords: Artificial Intelligence, Decision Support Systems, Nursing Critical Care, Healthcare Technology, Workflows, Nurse Training, Ethical Considerations

Received: 10 September2024 Revised: 20 October2024 Accepted: 1 November 2024 Published: 10 November 2024

Introduction

Since the application of artificial intelligence AI in determining patient care, especially in nursing, it has been positive as it provides new strategies in catering for the patient care, cutting down on time, and making of more informed decisions (De Gagne, 2023). The thought process that AI uses to process significant amounts of data within a short span of time proves relevant for healthcare stakeholders in that they are able to predict patient requirements, recognize high risk categories of patients, and even meet patient demands (O'Connor et al., 2023). From the aspect of the clinical standpoint in nursing, it covers the use of an AI system as a tool to forecast patient status or deterioration, and the use of AI in the administrative sense to help utilize nurse's time alleviating documentation and enabling patient care (Naik et al., 2022). As the AI technology spreads further into the field, AI that supports evidence for interventions and will lead to the improved efficiency and quality of the nursing services will take the healthcare practices to new levels (Vakili-Ojarood et al., 2024). However, all these, have brought up major ethical concerns and practical concerns that have to be scrutinized so as to improve how artificial intelligence is used and to check if conforms to the cardinal values of healthcare services (Rubeis, 2020; Alharthi et al., 2023; Sharahili et al., 2023; Ahmad et al., 2024).

The first main ethical concern is one related to patient information and its protection. Deep learning applications demand large data sets to work efficiently and effective; this means they need to interface with patient data, which is usually private (Abdulai & Hung, 2023). However, AI can extract important information from such data, but then there are potential breaches to patient privacy and misuse of the data that can lead to a violation of privacy and patient's self- determination rights (Mensah & Addy, 2024). All of these issues are rather sensitive and important where confidentiality is of uttermost priority, for instance in nursing (Kwak et al., 2022). Some of the ethical issues include when an algorithm ends up leaking information, or when measures toward data safety are ineffective, thereby violating patient's privacy (Qayyum et al., 2023). The conflict between population data to improve the quality of care for patients and patient data privacy is an issue on how much data a patient can make available for use and who has the right to use it (Kooli, 2023; Albasri et al., 2022; AL ALI et al., 2022).

In the same regard, privacy issues remain vital when incorporating AI in nursing, but the major impacts include patient; autonomy and informed consent (Ijiga et al., 2024). Historically, the framework of nursing was based on the set of human rights that recognizes patient's authority for decision-making regarding their treatment. However, with the growing use of AI systems to make or at least participate in clinical decisions, these procedurals complicate patient autonomy (Yusuf et al., 2024). The patient may not necessarily be fully informed as to how artificial intelligence factor in to their diagnosis or treatment process leading to major concern as to whether or not they can truly consent to the use of such a technique (Lal et al., 2022). For instance, if an AI electronic health decision support system suggests an intervention plan, patients are not in a position to compare the benefits and harms, as they have no idea of the basic algorithms behind the suggestion (Dwivedi et al., 2023).

The last of the difficult ethical dilemmas for discussion is the issue of responsibility and compensations (Younis et al., 2024). When the AI systems are involved in rendering clinical decisions, it becomes hard to assign blame in the case of an adverse event. Nurses the patient front-line caregivers are likely to be legally responsible for an AI's recommendations that they act on even if the AI mainly drove the choice (Martinez-Martin et al., 2021). This challenge raises a fundamental issue in medical-legal systems

today, because there is room for disagreement over whether a certain level of blame can be placed on the automated systems involved (Abdulai & Hung, 2023). Lacking such demarcation, this uncertainty could perpetuate a lack of AI deployment or breed decision-making disputes where errors are costly (Alzamily et al., 2024).

Algorithmic bias is one more ethical concern that emerged in the course of using AI in nursing (Abbasi et al., 2023). AI systems try to learn from data, therefore the effect of such learning is to replicate such sentiments in the output and if the training data was biased, the output from this AI is likely to be equally biased (Du & Xie, 2021). For instance, AI algorithm for evaluating nursing assessments may rely on data obtained from the groups of patients that do not represent a diverse population; as a result, they may offer untruthful or prejudice information that will harm the excluded groups of patients (Mirbabaie et al., 2022). In an area as diverse as nursing that requires fairness and equal treatment for everyone, prejudice from a model as mathematical as an algorithm threatens core ethical principles of the nursing vocation (Dwivedi et al., 2023).

However, there are issues of practical concern in integrating an AI system into heath care, not to mention ethical dilemmas including constraints on the professional independence of nurses. Nursing is a technical profession and as such the decision made by the nurses are crucial to the overall management of the patient (Yusuf et al., 2024). Nevertheless, these historically instrumental understandings of reasons and rationality threaten to reemerge as AI systems are tasked with helping to clinically assess and advise nursing staff (Saheb et al., 2021). Because nurses might force themselves to follow AI advice even when they know that it is wrong, the therapeutic outcomes of patients may suffer (Mulukuntla & Pamulaparthyvenkata, 2022). Firstly, this shift may influence the incumbents' confidence in their own clinical judgment; and, secondly, it may result in overdependence on the technology under development and loss of autonomy decision-making ability among nurses (Chen et al., 2022).

One of the many ways that AV can be used in nurse practice is through training and education as a source of substantial concerns (Vakili-Ojarood et al., 2024). It can be postulated that a significant number of nurses may not have the background or the knowledge regarding AI algorithms that might be used in their daily work (Dwivedi et al., 2023). Therefore, they can misinterpret or misuse the specific tools. If nurses fail to gain adequate experience in the execution of AI, they may fail to make adequate use of it or may end up using it a lot, though they do not understand its shortcoming (Lal et al., 2022). There is a potential for education programs, which seek to bring AI literacy to nursing curricula, to reduce some of these issues, in order to help nurses leverage AI tools more appropriately (Abdulai & Hung, 2023). However, the administration of such programs takes a lot of time and there might be a lot of avenues that may not be able to support this kind of program (Dwivedi et al., 2023).

Lastly, it is important to enhance inter-professional collaboration since AI use in nursing is implemented with the help of technologist, data scientist, and nurses. What is more important for the effective subsequent tailoring of the AI tools to the needs and demands of nursing is the constant communication between these disciplines (Vakili-Ojarood et al., 2024). Nursing knowledge enables practicality and ethical appropriateness of the applications of AI resulting to clinically relevant and workable results (Lal et al., 2022). However, such collaborations can be difficult to set up due to differences in goals and objectives, or simply due to lack of knowledge of the ethical considerations in the area of healthcare of the representatives of the two fields that are different (Vakili-Ojarood et al., 2024). Making sure that developers integrate effectively with healthcare providers is thus another complex strategic success factor for overcoming the various ethical and practical issues regarding AI systems implementation (Abdulai & Hung, 2023).

Problem Statement

In this paper, the benefits of incorporating AI in nursing practice are highlighted given that AI offers promising prospects for developing the field and improving both patient outcomes and organizational productivity (Dwivedi et al., 2023). While also identifying specific ethical concerns and

potential problems. As health care organizations continue to implement AI, problems to do with data ownership, responsibility, patient's right to self-determination, and prejudice of the AI systems used become contentious, more so in nursing that is built on trust and person-centered care. However, the availability of an appropriate training framework, threats to professional autonomy resulting in increased vulnerability to management decisions, and interdisciplinary collaboration also form the practical barriers towards AI in nursing. The work shows the opportunity that AI can bring to change current and future nursing practices, however, the overall knowledge of these ethical as well as practical concerns is still lacking. This paper, therefore, seeks to presents a systematic review of the current literature concerning these ideas in order to gain understanding into the consequences of AI incorporation and to discover areas requiring further research to ensure the success and responsible adoption of this technology in nursing.

Significance of the Study

This research is important as it captures some of the ethical and technical issues around the introduction of AI into a profession that relies on patient-trust, compassion, and individualized patient attention – nursing. This study concept is based on the systematic literature review that intends to offer health care practitioners, policy makers and AI developers to have enhance knowledge of ethical considerations that is required to preserve patient centered care model in an AI supported ecosystem. It is imperative to meet such challenges to develop norms and standards that concern ethical norms to defend patient rights and the professional status of nurses as well as to ensure patients a fair chance for receiving equitable treatment. The conclusions made in this research can contribute towards shaping frameworks and courses so that AI technologies are utilized appropriately hence promoting convenient, safe, and ethically sound practices in the volatile nursing work environment in the ecosystem.

Aim of the Study

This work therefore proposes to systematically review the current literature to review, compare and contrast the ethical issues and concern arising from the implementation of AI in nursing practices. In undertaking the assessment of current literature on the application of AI in nursing care, the study aims at advancing understanding of the most important ethical challenges that include data protection, patient's rights and autonomies, responsibility, and algorithm bias and fairness amongst other areas of ethical concern. Secondly, the study also aims at identifying practical implementation challenges such as the training needs in the application of AI and the level of collaboration required between various professions. It is aimed to give a clear depiction of various issues and to present an approach to the challenges intrinsic to the integration of AI in the provision of health care, consequently promoting the responsible and ethical use of AI in effective nursing care.

Methodology

The present systematic literature review takes a sequential method to examine and compare ethical issues and concerns in the transition towards the use of AI within nursing. According to the PRISMA guidelines, the search for relevant sources was carried out only among articles published within the period from 2020 to 2024 because the article aims to analyze the modern tendencies in the aspect of technology and ethics. The research question was developed based on the PICO(T) model, whereby potential ethical issues and implementation concerns depending on AI were elaborated. This procedure enables us to uncover features, such as trends and gaps, within the existing literature and provide recommendations for the appropriate use of AI in nursing.

Selection Criteria

Inclusion Criteria

1. Scholarly articles that are peer reviewed and especially where AI is of interest within the sphere of nursing.
2. Publication Material focusing on or related to ethical issues or concerns of AI in healthcare.
3. The research articles analyzed were published between the years 2020 and 2024.
4. Use only sources in English language.
5. Original articles with method descriptions and brief findings sections.

Exclusion Criteria (in bullet points)

1. Literature that is not related to nursing or health care ethical issues.
2. From the stage articles that do not have any nursing implication to the overall development of article on Artificial Intelligence technical advancement.

Research Question

Research Question		What are the primary ethical considerations and challenges involved in the integration of AI in nursing practice, based on recent studies from 2020 to 2024?
Population	P	Nursing practice and professionals using AI technology
Intervention	I	Integration of AI applications in clinical and administrative nursing tasks
Comparison	C	Traditional nursing practices without AI involvement
Outcome	O	Ethical considerations, challenges, and implementation barriers
Timeframe	T	Studies published over the past five years (2020–2024)

3. All the articles used in this dissertation were published before the year 2020.
4. Other sources are personal views, anonymous articles, conference papers, editorials without peer review.

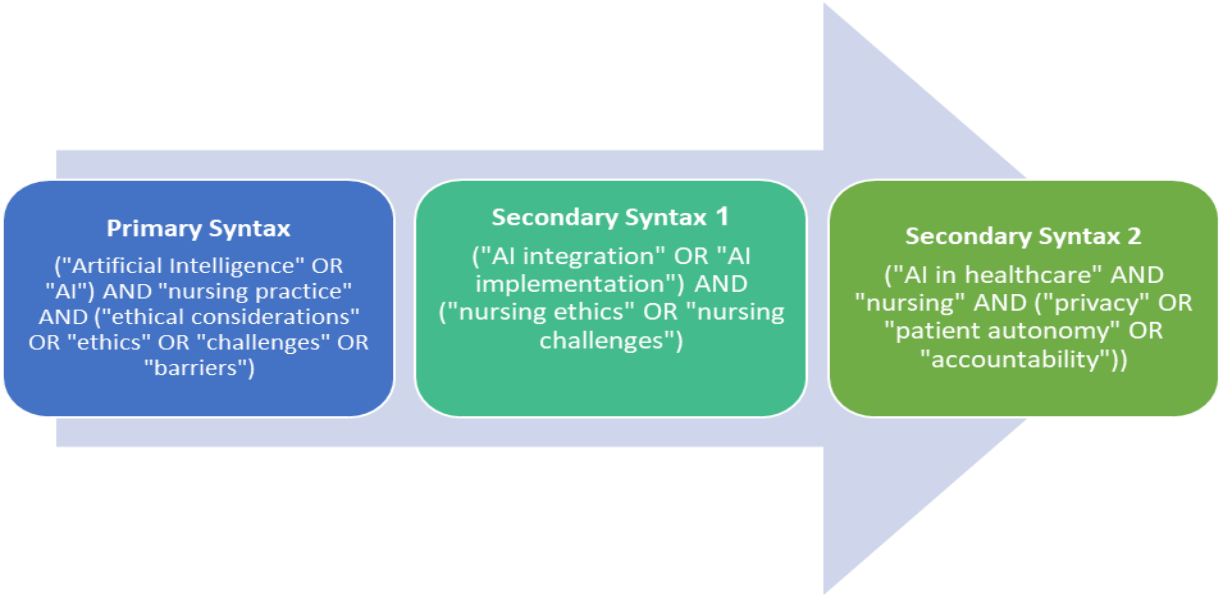
Database Selection

The literature search featured the databases PubMed, CINAHL, Scopus, and IEEE Xplore to compare results and locate Interdisciplinary and healthcare studies. These databases were selected because they are known to index a wide variety of medical, technological, and nursing literature, with the combination of which provides general access to a broad scope of studies concerning AI effects on nursing ethic and practice.

Data Extracted

Data Extracted: The basic information from each of the selected papers in question include the authors, the publication date, as well as the country, information that gives a background into the origin of the study and its age. Furthermore, information on the most detailed level completed using AI frameworks, for example, decision making support tools, clinical observation, or clerical work automation, along with the description of their practical utility in nursing environments were noted. The ethical concerns discussed in the studies, such as data privacy, patient outcome e control, data oversight, and other possible biases, were logged down and organized into six ethical themes . Last, the implementation barriers highlighted included Issues of training, interdisciplinary collaboration, as well as the state of infrastructural readiness were used to encompass actionable impediments to Artificial Intelligence implementation. For this reason, a systematic extraction was possible to conduct a comprehensive thematic analysis and provide insights into the ethical applications and pragmatics of incorporating AI in nursing.

Syntax



The primary syntax was used to search a wide spectrum of literature regards to AI in nursing focusing on ethical and pragmatic concerns. Secondary syntaxes gave further criteria to enhance the refinement in the sense that the studies screened were also concerned with ethical concepts such as privacy, autonomy, accountability and implementation concerns peculiar to the specialty of nursing.

Literature Search

The databases were searched systematically to identify key points of ethical concerns and issues on AI in nursing. Employing Syntax 1 of the search (search type primary) and Syntax 2 of the search (search type secondary), we set our time span between 2020 and 2024, considering it more relevant to include the most recent publications. Furthermore, the filters and keywords were produced in order to identify different AI applications, ethical issues, and skill-based troubles in the nursing practice. Titles and abstracts of the studies were initially scanned to exclude studies that were irrelevant, and afterwards those that passed through the first level of scrutiny were thoroughly examined in terms of the inclusion criteria presented in this study. This process let us choose the most appropriate articles that form the basis for analysis and included high quality information.

Table 2: *Databases Selection*

No	Database	Syntax	Year	No of Researches
1	PubMed	Syntax 1	2020 – 2024	125
2	CINAHL	(Primary)		135
3	Scopus	and 2 (Secondary)		95
4	IEEE Xplore			110

Table 2: Database Selection gives a general discussion of the methods of discussion in objective and comprehensive strategies for searching the four main databases of PubMed, CINAHL, Scopus, and IEEE Xplore. The two databases were Syntax 1, (Primary DATABASE) and Syntax 2, (Secondary DATABASE) each of which returned papers published between 2020 and 2024, with the view to providing relatively contemporary information regarding the ethos of Artificial Intelligence most appropriate in nursing practice and an indication of the ethical issues involved. PubMed returned 125 articles, CINAHL 135, Scopus 95, and IEEE Xplore search 110. These databases were chosen as they provided a wide spectrum of healthcare, nursing and technology research articles to form the basis of the systematic review. This

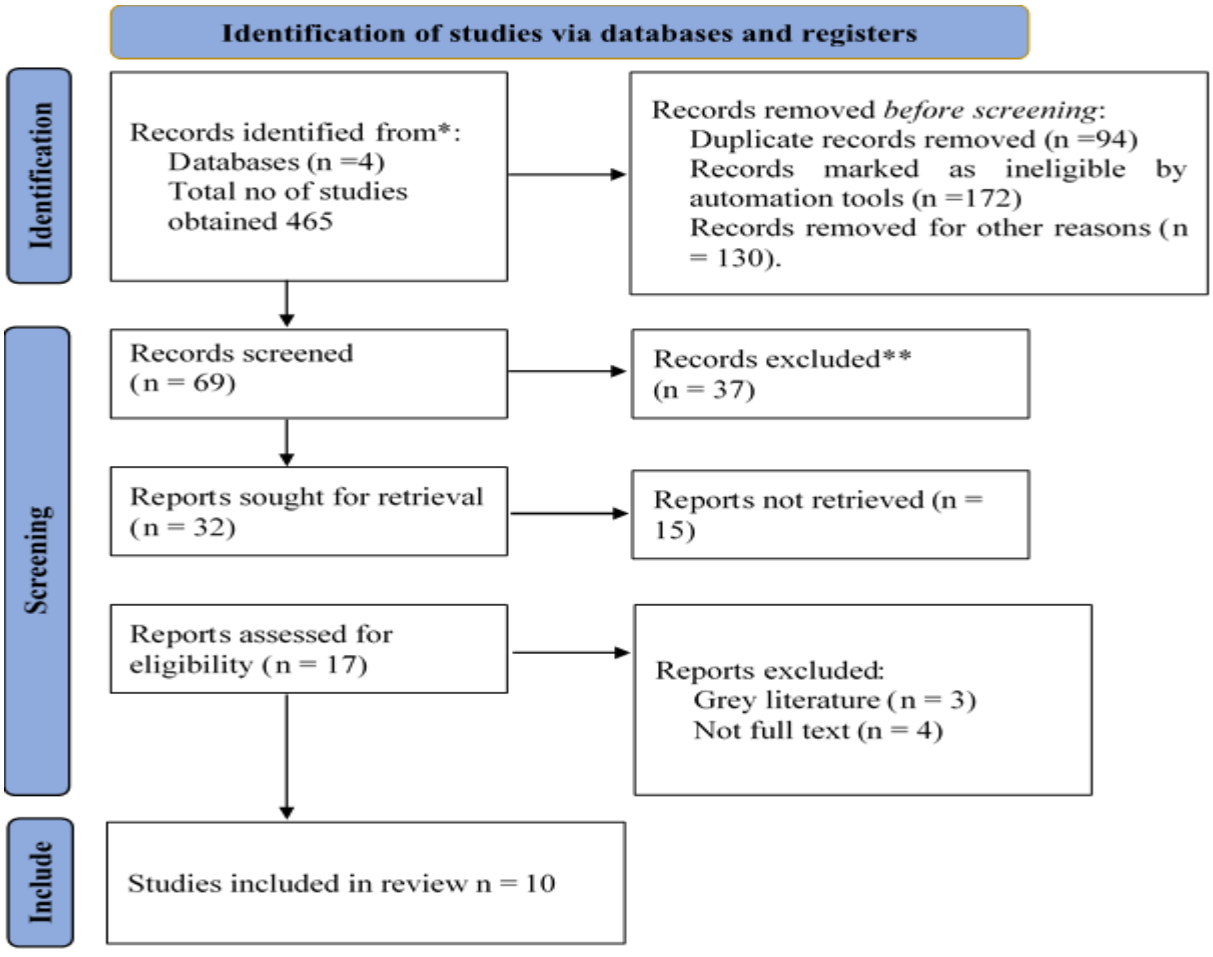
resulted in 465 studies that the authors considered to be sufficient to investigate the ethical and pragmatic issues better to implement AI into nursing.

Selection of Studies

Identification of studies was done systematically as follows. Following the first search, articles were screened based on the year of publication, potential applicability to current nursing practice, and more specifically if they dealt with ethical or practical issues related to AI. The titles and abstracts from studies that fit these criteria were further analyzed and studies that successfully passed this initial filter were then analyzed in terms of content quality and appropriateness of inclusion in the final sample. Finally, there was a review of only the studies that met the criteria of adequate addressing. The ethical and practical issues of using AI in nursing to maintain the relevance and direction of systematic review.

Figure 1 PRISMA Flowchart (1 paragraph)

PRISMA flowchart depicted in the below figure 1. Selecting from medical database articles that met specified criteria, an initial set of articles was obtained, then duplicates were deleted and the subject appropriate articles were selected. This was then succeeded by the method of abstract and full text screening based on the inclusion and exclusion criteria. This systematic approach limited the final selection to the studies that focused on the research questions pertaining to ethical and practical issues of the AI in nursing, which in return provides a refined literature to draw conclusions.



The PRISMA 2020 flow diagram below displays the process of including and excluding studies in this review. The study began with 465 records from four databases, out of which 94 had duplicates, later, 172 records that were marked ineligible by automated tools and 130 records that were ineligible on other grounds were excluded. This reduced the sample to 69 records for screening for which 37 records were excluded for irrelevance to the topic of study. From 32 reports that have been searched for, only 17 reports

could be subjected to further evaluation because 15 of the reports could not be found. Excluded from among them were 7 articles which were grey literature (n=3) and failed to produce the full text (n = 4). In total, 10 papers of the 15 screened were selected in the final review to provide a more detailed view of the ethical dilemmas and issues emerging from the application of AI in nursing practice.

Quality Assessment of Studies (1 paragraph**)**

It is imperative that quality assessment of the studies included in this review was done in order to only allow for strong, rigorous methodological analysis of the current state of AI integration into nursing. Papers were rated according to clear identification of research problems and questions, methods selection and justification, discussion of ethical issues, and work's methodological reliability. Considering the study type and type of findings, assessment checklists, CASP for qualitative studies, and Newcastle-Ottawa Scale for quantitative studies, were used to evaluate the study design, sample, data validity, and bias control parameters. Therefore, in this review, only the studies that provided a clear rationale of the study, well-defined ethical principles, and the detailed reporting of the findings are included so that this review reveals the suitable quality evidence regarding the ethical and practical issues associated with the AI integrated nursing practices.

Table 3: The Assessment of the Literature Quality Matrix as presented in Table 2 provides a synthesis of the quality assessment of the chosen studies in the current review as follows. Ten studies were evaluated based on key characteristics such as the rational used in selecting studies, literature reviewed, methods provided and, the manner in which results were reported. In these categories, most of the studies were found to meet most quality guidelines with some limitations. For instance, De Gagne and his peers and Tilala and his peers have some issues that include the lack clear description of study selection hence

Table 3: *Assessment of the literature quality matrix*

#	Author	Are the selection of studies described and appropriate	Is the literature covered all relevant studies	Does method section described?	Was findings clearly described?	Quality rating
1	De Gagne et al	Yes	Yes	No	Yes	Fair
2	Abuzaid et al	Yes	Yes	Yes	Yes	Good
3	De Gagne	Yes	Yes	Yes	Yes	Good
4	Karimian et al	Yes	Yes	Yes	Yes	Good
5	Tilala et al	No	Yes	Yes	Yes	Fair
6	Katirai et al	Yes	Yes	Yes	Yes	Good
7	Stokes & Palmer	Yes	Yes	Yes	Yes	Good
8	Buchanan et al	NO	Yes	Yes	Yes	Good
9	Almagharbeh	Yes	Yes	Yes	Yes	Good
10	von Gerich et al	Yes	Yes	Yes	Yes	Good

they were rated "Fair". However, all the rest were found to have all the corresponding scores in their respective studies and were rated 'Good due to their clear and well methodologies findings. In general, the quality of the papers was considered sufficient to address the questions of ethical concern and dilemmas when implementing AI in nursing.

Data Synthesis

Synthesis means that all of the findings of high-quality studies were analyzed, with special attention paid to the constant themes that showed how ethical and practical concerns of AI in nursing are mentioned. The themes as identified were data privacy concerns, patient self-ownership, identification of responsibilities, and factors arising from training needs and physical setup for integration. The results were then compared across different investigations for the purposes of making such comparisons, thus providing a better sense of combined practices concerning the main challenges and ethical work on investigations. It let for a synthesis that pointed both towards the areas of coherence as well as towards the areas of further research of AI in healthcare which may be useful for advancing the knowledge in the subject matter.

Table 4: *Research Matrix*

Author, Year	Aim	Research Design	Type of Studies Included	Data Collection Tool	Result	Conclusion	Study Supports Present Study
De Gagne, J. C., Hwang, H., & Jung, D., 2024	To explore the ethical implications of AI in nursing education.	Literature review	Ethical issues in AI in nursing education.	Review of existing literature.	Ethical dilemmas related to autonomy, nonmaleficence, beneficence, justice, and explicability in nursing education.	Integration of ethical principles in nursing education is essential for responsible AI usage in education.	Yes, discusses AI integration in nursing education and ethics, relevant to the present study.
Abuzaid, M. M., Elshami, W., & Fadden, S. M., 2022	To assess knowledge, attitude, willingness, and readiness of nurses towards AI integration in practice.	Cross-sectional survey	Nurses' perceptions and readiness in AI integration.	Survey questionnaire.	75% agreed nursing curriculum should include AI knowledge; 51% learned about AI informally.	Lack of understanding of AI among nurses. Further education and training needed for integration.	Yes, examines nurse readiness for AI in practice, relevant for AI integration in nursing.
De Gagne, J. C., 2023	To integrate values clarification to prepare nursing students	Literature review and conceptual analysis	Role of values clarification in AI integration in nursing.	Review of literature and conceptual analysis.	Values clarification prepares nursing students for AI integration by aligning	Values clarification is vital for ethical AI integration into nursing practice	Yes, supports the ethical AI integration framework in

	for AI in nursing practice.				nursing values with AI ethics.	and education.	nursing education.
Karimian, G., Petelos, E., & Evers, S. M., 2022	To identify and address ethical issues of AI in healthcare.	Systematic scoping review	Ethical aspects of AI in healthcare.	Literature review from databases (PubMed, OVID).	Found gaps in addressing ethical principles such as fairness, autonomy, and explicability.	There is a need for practical tools to uphold ethical principles throughout AI's lifecycle in healthcare.	Yes, highlights ethical gaps in AI healthcare, relevant for AI ethics in nursing.
Tilala, M. H., Chenchala, P. K., et al., 2024	To explore the ethical considerations in AI and machine learning in healthcare.	Comprehensive review	Ethical implications of AI and ML in healthcare.	Review of literature.	Identified issues like privacy, algorithmic bias, and transparency in AI/ML in healthcare.	Ethical best practices are essential for responsible AI/ML integration in healthcare.	Yes, discusses ethical challenges in AI healthcare that support nursing education ethics.
Katirai, A., 2023	To analyze the ethical considerations of Japan's AI hospital system.	Content analysis	Ethical issues in AI healthcare policies.	Content analysis using ethical framework.	Found uneven attention to ethical principles in Japan's AI hospital system, such as lack of focus on sustainability.	Ethical considerations must be prioritized in AI healthcare planning and implementation.	Yes, critiques AI policies in healthcare, supporting AI ethics discussion in nursing.
Stokes, F., & Palmer, A., 2020	To examine the role of AI in nursing and its ethical challenges.	Theoretical analysis and review	Ethical concerns of AI in nursing tasks.	Review of literature and theoretical analysis.	AI in nursing is incapable of providing compassionate care, and its role should support human	AI must not replace core nursing values and should enhance human nursing capabilities.	Yes, provides insights into balancing AI and human roles in nursing practice.

					nursing practice.		
Buchanan, C., Howitt, M. L., et al., 2020	To predict the impact of AI on nursing roles and person-centered care.	Scoping review	Emerging trends in AI and their effects on nursing practice.	Review of literature and database searches.	AI technologies like predictive analytics and virtual assistants are predicted to impact various nursing domains.	AI's impact on nursing practice and compassionate care will require adaptation and thoughtful integration.	Yes, supports understanding AI's impact on nursing roles, relevant to integration in practice.
Almagharbeh, W. T., 2024	To examine the effects of AI-based decision support systems on nursing workflows in critical care units (CCUs) in Amman, Jordan.	Cross-sectional analysis	Studies on AI technology adoption in healthcare, focusing on nursing workflows.	Surveys examining nursing workflows, AI use, encountered problems, and training sufficiency.	AI technology improves time management, patient monitoring, and decision-making, but nurses face issues such as insufficient training and technical difficulties.	The study emphasizes the need for training programs and support mechanisms to improve nurses' use of AI and optimize patient care.	Supports present study by highlighting the role of AI in improving nursing workflows and the importance of addressing training and technical challenges.
von Gerich, H., Moen, H., Block, L. J., Chu, C. H., DeForest, H., Hobensack, M., ... & Peltonen, L. M., 2022	To synthesize state-of-the-art research on AI-based technologies applied in nursing practice.	Scoping review	Research on AI technologies in nursing, particularly focusing on development, validation, and impact.	Literature search from PubMed, CINAHL, Web of Science, and IEEE Xplore.	93 studies reviewed; most studies focused on technology development (59.1%) and testing (30.1%). Many studies lacked detailed descriptions and ethical	Research on AI in nursing is mostly in the early stages, with insufficient evidence on the impact and implementation in practice.	Supports present study by emphasizing the early-stage nature of AI technology research and the need for further development, evidence,

	considerations.		and nurse inclusion in research.

These sources help to get significant information about the state of AI and its application in the nursing environment and its work processes. Almagharbeh (2024) pointed that the application of AI based DSSs can enhance time management and coordination, patient surveillance and the decision making process in the care of critical patients but the resettled nurses have different problems like inadequate training in the use of the systems and technical hitches. First, the authors underlined the importance of specific training and support interventions to improve the use of AI in nursing. Similarly, von Gerich et al. (2022) noted a dearth of practical outcomes of AI technology's positive impact on nursing noting that many of the studies on the subject are at a developmental or trial stage. The review recommended improvement in the ways researchers report their work, increase nurse engagement in AI design, and promote increased AI literacy among nursing students. The two papers reinforce the call for training deficits and further development of AI disentanglement to enhance the advanced use of AI in the nursing profession.

Results

Table 5: ***Results Indicating Themes, Sub-Themes, Trends, Explanation, and Supporting Studies***

Themes	Sub-Themes	Trends	Explanation	Supporting Studies
AI in Nursing Workflows	Impact on time management, patient monitoring, and decision-making	Positive influence of AI technology on nursing workflows	AI-based decision support systems (DSS) are reported to enhance efficiency in critical care units by improving time management, patient monitoring, and clinical decision-making.	Almagharbeh (2024)
AI Challenges in Nursing	Training inadequacies, technical difficulties, privacy concerns	Persistent challenges despite AI adoption	Nurses face significant challenges such as insufficient training on AI systems, technical difficulties, and concerns over data privacy.	Almagharbeh (2024)
Research on AI in Nursing	Early-stage development, limited practical application	Limited evidence of implementation, focus on technology development	A large portion of AI research in nursing focuses on technology development and testing, with minimal evidence regarding its practical impact or implementation in clinical settings.	von Gerich et al. (2022)
Ethical Considerations in AI	Lack of ethical discussions in AI nursing studies	Insufficient attention to ethical issues	Many studies neglect to address the ethical implications of implementing AI technologies in nursing	von Gerich et al. (2022)

			practice, which needs further exploration and attention.	
Integration of AI in Nursing Education	Need for increased integration of AI in nursing curricula	Growing need for AI knowledge in nursing education	There is an increasing call for integrating AI-related technologies into nursing education to ensure that nurses are prepared to use these technologies effectively.	von Gerich et al. (2022)
Nurse Involvement in AI Research	Limited nurse involvement in AI technology studies	Lack of nurse representation in AI research	A significant number of AI research studies in nursing are conducted without the active involvement of nurses, which limits the relevance and applicability of the research.	von Gerich et al. (2022)

Presented below are some of the themes that emerged from the selected studies on AI in nursing together with the advantages and disadvantages of incorporating AI technologies. It demonstrates that introductions of AI-based DSSs have found the application for improvements in nursing work processes specifically in critical care environments in relation to time and patient management, and decision support. Yet, nurses still experience the following barriers that include; inadequate training, technical issues, and privacy restrictions. Investigations on familiarization of artificial intelligence in the nursing discipline remains restricted to technology advancement than operational use within the clinical facilities. However, it is still necessary to admit that ethical concerns and AI application in nursing curricula are insufficiently investigated; the majority of the studied articles either do not address the problem at all or fail to consider these factors sufficiently. Besides, nurses are somehow sidelined in AI research and studies, which subsequently offers a narrow lens through which studies can be implemented within the practice of nursing. It is about these issues that there is a need for enhanced research and development and even nursing education concerned with AI to broaden its horizon.

Discussion

Currently, the use of AI in many industries has been seen to have much promise in the future in the near future especially in the health sector. One particular area of focus has been how best to implement these AI centered technologies into the work of nurses. Research has shown that there is capacity for detail rich aspects of nursing practice to be enhanced particularly in terms of time, patient, and decisional management. Almagharbeh (2024) opines that artificial intelligence (AI) DSS have a constructive overall impact on the two nursing workflows in essential critical care units in terms of enhancing the provision of care. These systems offer current data evaluation and help the nurses transform their clinical decisions to improve patient care and results.

However, challenges that are surrounding the implementation of AI in nursing are still evident to date. Almagharbeh (2024) explains that although the application of AI in nursing has been progressive, the challenges persist and many employees experience them including lack of adequate training in the application of AI systems, technical problems on some of the systems and privacy issues. These are issues that hamper the AI integration and impact in delivering clinical services. Restricted access to proper training and organizational frameworks, related to the nursing profession reduce the utilization of available AI tools by nurses, though they are one of the most important contributors to the healthcare

system. All these challenges should be overcome to help reach the full potential of this technology in the nursing industry.

Currently, the literature on AI for nursing is relatively limited, with the majority of studies informing the creation of testing of sophisticated AI technologies, rather than their application on Mainstream clinical practice. Von Gerich et al. (2022) argue that many of the existing papers in this area are affiliated with the technological advancement stage while scanty research captures the real-world application of AI within nursing practice. The discrepancy between HI and innovation in clinical settings implies a literature with more studies to identify how HI can optimally be implemented in the work context of nurses.

Issues of ethical practice of AI in nursing also present a major factor. In their most recent article published in the year 2022 Von Gerich et al. note that a huge number of publications and investigations overlook the ethical aspects of using the AI technologies in the health care sector. Concerns that arise include privacy, fairness, and the creational displacement of human touch in patient relationships. AI ethics in AI research and addressing the practical use of the technology in nursing is critical to ensure AI was adopted correctly, patients' rights protected, and the public has trust in the AI systems introduced.

Another equally vital need is the preparation of nursing curriculum to incorporate AI education. With advancing technologies in the application of artificial intelligence, there is a challenge of nurses to well train in the technologies to foster its use in practice settings. Thus, in view of Von Gerich et al. (2022), prospective students in nursing should be offered corresponding subjects and courses in order to gain the necessary level of awareness and preparedness concerning AI. Integrating AI into the curriculum will help equip the nursing graduates on the changes and possibilities that AI presents within healthcare so that nurses assume far more proactive roles in applying the technology in patient care.

Lastly, the participation of nurses in AI research to find better and effective solution is a significant parameter in making more convenient ideas and technology efficient for nursing practice. Von Gerich et al. (2022) state that nurses have a relatively small role in the design and the evaluation of AI technologies. Such a situation means that there could be technologies developed that do not meet the actual requirements and priorities of the direct care nurses. Specifically, increased contributions of nurses in AI research would improve the ideal and operational utility of the AI solutions proposed for nursing practice hence the overall efficiency of AI in patient care improvement.

AI technologies can create prospects for improvement of the existing working processes of nurses and the quality of the patients' care, but they also issues concerning training, technical problems and ethical worries arise. These findings indicate that, although AI technologies at the early developmental stage are currently applied in nursing studies, there is identified the necessity for further investigation on the application and effect of AI. However, ways must be found to get this knowledge to put into practice in nursing courses and fostering the participation of nurses in AI studies are the essential elements that can guarantee integration of innovations into infirmity and enhance the quality of the services being delivered to patients.

Future Direction

Therefore, future studies should investigate more the sustained implication of the AI integration to nursing practice in various healthcare systems. There is no sufficient data to present a comprehensive short- and long-term perspective of AI prospects in different healthcare facilities; therefore, more research focusing on that matter needs to be conducted. Moreover, more attention has to be paid to the lack of training and technical problems revealed in the current research. Ideally, subsequent research should also explore the following aspects of ethics in the employment of AI technology in health care, including issues to do with privacy, bias, and social substitution. In addition, qualification of AI into curriculum for nursing colleges will be key important for training nurses to cope with change in technology within the health facilities. There should be active involves of AI developers and frontline nurses in the design and development of the AI systems so that what is developed will effectively support the nursing practice.

Limitations

However, as mentioned in this paper, there also some issues that should be taken into account due to the following limitations that are found in the selected studies. Most of the research done on AI in nursing is still pre-studies with few that have produced actual data of AI in clinical practice. However, it is noteworthy that many of the reviewed studies use small samples as well as are performed in certain geographical contexts, which do not allow speaking about the results' generalization for other populations or healthcare systems. Another limitation experienced is the limited amount of extension and variety both in the kind of studies conducted and a lack of long-term data on the use of AI on the nursing processes and its particular effects on nursing patients. Thirdly, there is a lack of appropriate attention to the problems of ethics in the use of artificial intelligence for decision-making such as data privacy and algorithmic bias, which are expected to present major issues as adoption of A.I solutions rises in the field of health care.

Conclusion

Therefore, focusing on the present review, it is elucidated that the effective implementation of AI technologies has the potential to enhance the nursing flow and the delivery of the care to critical care patients. Nevertheless, the issues associated with AI training, technical issues, and ethical issues should be resolved to optimize AI contribution to the nursing practice. The existing literature on the utilization of AI in nursing. Therefore, closely aligned with technology advancements with little emphasis on adequate deployment. Therefore, the future studies need to close the gap in knowledge by addressing the practical implementation, the effects in the long-run, and adoption of AI in nursing curricula. More engagement of nurses in AI innovation is vital to guarantee that the developed AI frameworks address the practice requirements of nursing. Appropriate continued investment in AI research, education, and training are available, great potential for achieving advances in meaning of new nursing practice and improving patients' quality exist.

References

1. Abbasi, N., Nizamullah, F. N. U., & Zeb, S. (2023). AI in Healthcare: Integrating Advanced Technologies with Traditional Practices for Enhanced Patient Care. *BULLET: Jurnal Multidisiplin Ilmu*, *2*(3), 546-556.
2. Abdulai, A. F., & Hung, L. (2023). Will ChatGPT undermine ethical values in nursing education, research, and practice. *Nurs Inq*, *30*(3), e12556.
3. Abuzaid, M. M., Elshami, W., & Fadden, S. M. (2022). Integration of artificial intelligence into nursing practice. *Health and Technology*, *12*(6), 1109-1115.
4. Ahmad, Z., Khalid, F., Aljanabi, H. M., Alshahrani, M. M. R., Jahlan, I., Bakarman, S. S., Kehlini, M. A., Aljanabi, A. M., & Shahbal, S. (2024). Occupational stress, job performance and role overload among nurses working in the healthcare sector: A mediational model. *Kurdish Studies, 12*(1), 2883–2894.
5. AL ALI, YAHYA TALEA, ABDULLAH AYIDH AL QAHTANI, HUSSAM YAHYA ASSIRI, ABDULLAH MOHAMMED ALYAHYA, FAHAD SALEH AL ALKHARSH, ALI YAHYA ASSIRI, MOHAMMED SALEH ALGHAMDI, ABDULLAH QUDSI SAEED, FAHAD MOHAMMED ALSHEHRI, and YASSER HUSSAIN ALASIRI. "Effectiveness of technology on organizational development and services in the Saudi health sector." *Journal of Pharmaceutical Negative Results* (2022): 2144-2155.
6. Albasri, Q. M., Shahbal, S., Alhamadah, A. M., Almebar, M. F., Aloufi, Y. A. M., Al Khalaf, K. M., ... & Albrahim, A. E. H. (2022). Synthesizing The Evidence Of Practice Research The Impact Of Nursing Care On Patients' Safety; Systematic Review. *Journal of Namibian Studies: History Politics Culture*, *32*, 1649-1676.
7. Alharthi, A. M., Shahbal, S., Almotery, R. A., Alomrani, R. S. S., Alamrani, F. S. S., Almoteri, B. A., Alsuqayri, M. O. A., Alharthi, A. A. A., Matar, H. A., Alharthi, M. A. K., & others. (2023). Exploring nurse-to-patient ratios in Saudi Arabian hospitals: Effects on the quality of care; A systematic review. *Journal of Namibian Studies: History Politics Culture, 37*, 533–559.
8. Almagharbeh, W. T. (2024). The impact of AI-based decision support systems on nursing workflows in critical care units. *International Nursing Review*.

9. Alzamily, J. Y., Bakeer, H., Almadhoun, H., Abunasser, B. S., & Abu-Naser, S. S. (2024). Artificial Intelligence in Healthcare: Transforming Patient Care and Medical Practices.
10. Buchanan, C., Howitt, M. L., Wilson, R., Booth, R. G., Risling, T., & Bamford, M. (2020). Predicted influences of artificial intelligence on the domains of nursing: scoping review. *JMIR nursing*, *3*(1), e23939.
11. Chen, Y., Moreira, P., Liu, W. W., Monachino, M., Nguyen, T. L. H., & Wang, A. (2022). Is there a gap between artificial intelligence applications and priorities in health care and nursing management?. *Journal of Nursing Management*, *30*(8), 3736-3742.
12. De Gagne, J. C. (2023). The state of artificial intelligence in nursing education: Past, present, and future directions. *International journal of environmental research and public health*, *20*(6), 4884.
13. De Gagne, J. C., Hwang, H., & Jung, D. (2024). Cyberethics in nursing education: Ethical implications of artificial intelligence. *Nursing ethics*, *31*(6), 1021-1030.
14. Du, S., & Xie, C. (2021). Paradoxes of artificial intelligence in consumer markets: Ethical challenges and opportunities. *Journal of Business Research*, *129*, 961-974.
15. Dwivedi, Y. K., Kshetri, N., Hughes, L., Slade, E. L., Jeyaraj, A., Kar, A. K., ... & Wright, R. (2023). Opinion Paper:"So what if ChatGPT wrote it?" Multidisciplinary perspectives on opportunities, challenges and implications of generative conversational AI for research, practice and policy. *International Journal of Information Management*, *71*, 102642.
16. Ijiga, A. C., Peace, A. E., Idoko, I. P., Agbo, D. O., Harry, K. D., Ezebuka, C. I., & Ukatu, I. E. (2024). Ethical considerations in implementing generative AI for healthcare supply chain optimization: A cross-country analysis across India, the United Kingdom, and the United States of America. *International Journal of Biological and Pharmaceutical Sciences Archive*, *7*(01), 048-063.
17. Karimian, G., Petelos, E., & Evers, S. M. (2022). The ethical issues of the application of artificial intelligence in healthcare: a systematic scoping review. *AI and Ethics*, *2*(4), 539-551.
18. Katirai, A. (2023). The ethics of advancing artificial intelligence in healthcare: analyzing ethical considerations for Japan's innovative AI hospital system. *Frontiers in Public Health*, *11*, 1142062.
19. Kooli, C. (2023). Chatbots in education and research: A critical examination of ethical implications and solutions. *Sustainability*, *15*(7), 5614.
20. Kwak, Y., Ahn, J. W., & Seo, Y. H. (2022). Influence of AI ethics awareness, attitude, anxiety, and self-efficacy on nursing students' behavioral intentions. *BMC nursing*, *21*(1), 267.
21. Lal, A., Dang, J., Nabzdyk, C., Gajic, O., & Herasevich, V. (2022). Regulatory oversight and ethical concerns surrounding software as medical device (SaMD) and digital twin technology in healthcare. *Annals of Translational Medicine*, *10*(18).
22. Martinez-Martin, N., Luo, Z., Kaushal, A., Adeli, E., Haque, A., Kelly, S. S., ... & Milstein, A. (2021). Ethical issues in using ambient intelligence in health-care settings. *The lancet digital health*, *3*(2), e115-e123.
23. Mensah, G. B., & Addy, A. (2024). Critical issues for Regulating AI Use in Mental Healthcare and Medical Negligence. *Preprint. https//doi. org/: 0.13140/RG*, *2*(30853.97768).
24. Mirbabaie, M., Hofeditz, L., Frick, N. R., & Stieglitz, S. (2022). Artificial intelligence in hospitals: providing a status quo of ethical considerations in academia to guide future research. *AI & society*, *37*(4), 1361-1382.
25. Mulukuntla, S., & Pamulaparthyvenkata, S. (2022). Realizing the Potential of AI in Improving Health Outcomes: Strategies for Effective Implementation. *ESP Journal of Engineering and Technology Advancements*, *2*(3), 32-40.
26. Naik, N., Hameed, B. Z., Shetty, D. K., Swain, D., Shah, M., Paul, R., ... & Somani, B. K. (2022). Legal and ethical consideration in artificial intelligence in healthcare: who takes responsibility?. *Frontiers in surgery*, *9*, 862322.
27. O'Connor, S., Yan, Y., Thilo, F. J., Felzmann, H., Dowding, D., & Lee, J. J. (2023). Artificial intelligence in nursing and midwifery: A systematic review. *Journal of Clinical Nursing*, *32*(13-14), 2951-2968.
28. Qayyum, M. U., Sherani, A. M. K., Khan, M., & Hussain, H. K. (2023). Revolutionizing Healthcare: The Transformative Impact of Artificial Intelligence in Medicine. *BIN: Bulletin Of Informatics*, *1*(2), 71-83.

29. Rubeis, G. (2020). The disruptive power of Artificial Intelligence. Ethical aspects of gerontechnology in elderly care. *Archives of gerontology and geriatrics*, *91*, 104186.
30. Saheb, T., Saheb, T., & Carpenter, D. O. (2021). Mapping research strands of ethics of artificial intelligence in healthcare: a bibliometric and content analysis. *Computers in Biology and Medicine*, *135*, 104660.
31. Sharahili, A. A. A., Hazzazi, J. A., Ogdi, A. S. M., Ayashi, M. A. M., Getini, F. M., Tohary, I. S., Aljabri, M. A., Tohari, M. S., Amery, A. M., Tohary, H. M., & others. (2023). Assessing knowledge and attitude of HCWs on inter-professional education and collaboration in Jizan Region: A cross-sectional study. *Journal of Namibian Studies: History Politics Culture, 38*, 508–531.
32. Stokes, F., & Palmer, A. (2020). Artificial intelligence and robotics in nursing: ethics of caring as a guide to dividing tasks between AI and humans. *Nursing Philosophy*, *21*(4), e12306.
33. Tilala, M. H., Chenchala, P. K., Choppadandi, A., Kaur, J., Naguri, S., Saoji, R., & Devaguptapu, B. (2024). Ethical considerations in the use of artificial intelligence and machine learning in health care: a comprehensive review. *Cureus*, *16*(6).
34. Vakili-Ojarood, M., Naseri, A., Shirinzadeh-Dastgiri, A., Saberi, A., HaghighiKian, S. M., Rahmani, A., ... & Neamatzadeh, H. (2024). Ethical considerations and equipoise in cancer surgery. *Indian Journal of Surgical Oncology*, *15*(Suppl 3), 363-373.
35. von Gerich, H., Moen, H., Block, L. J., Chu, C. H., DeForest, H., Hobensack, M., ... & Peltonen, L. M. (2022). Artificial Intelligence-based technologies in nursing: A scoping literature review of the evidence. *International journal of nursing studies*, *127*, 104153.
36. Younis, H. A., Eisa, T. A. E., Nasser, M., Sahib, T. M., Noor, A. A., Alyasiri, O. M., ... & Younis, H. A. (2024). A systematic review and meta-analysis of artificial intelligence tools in medicine and healthcare: applications, considerations, limitations, motivation and challenges. *Diagnostics*, *14*(1), 109.
37. Yusuf, A., Pervin, N., Román-González, M., & Noor, N. M. (2024). Generative AI in education and research: A systematic mapping review. *Review of Education*, *12*(2), e3489.