



## Artificial Intelligence Applications in Community and Home Nursing Care: A Systematic Literature Review

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### ABSTRACT

*Healthcare systems experience increasing demand for community and home nursing services due to population aging, the rising prevalence of chronic diseases, and limited hospital resources. Artificial intelligence (AI) represents a supportive technology with the potential to enhance nursing practice in decentralized care environments. This systematic literature review synthesizes recent evidence on the use of AI in community and home nursing care. The review follows the PRISMA 2020 guideline and analyzes fifteen peer-reviewed studies published between 2022 and 2025. The analysis indicates that machine learning-based predictive analytics and clinical decision support systems represent the most frequently implemented technologies. These AI applications support several nursing functions, including risk prediction, remote patient monitoring, chronic disease management, and workflow optimization within community-based care settings. The reviewed studies report several positive outcomes. AI-supported systems improve clinical vigilance, strengthen care coordination, and increase operational efficiency in community and home care services. At the same time, several implementation barriers remain evident. Healthcare organizations face challenges related to infrastructure readiness, limited digital literacy among healthcare personnel, ethical governance concerns, and potential data privacy risks. AI functions as an augmentative tool that supports professional nursing judgment rather than replacing clinical expertise. Sustainable integration of AI in community and home nursing care requires adequate digital competence among healthcare professionals, regulatory alignment across healthcare systems, and implementation strategies that prioritize human-centered care delivery..*

**Keywords:** *artificial intelligence; community nursing; digital health; home care; nursing practice*

### 1. INTRODUCTION

Healthcare systems worldwide are undergoing significant transformation as a consequence of population aging, the rising prevalence of chronic diseases, and increasing constraints on hospital-based resources (Abuzaid et al., 2022). These demographic and epidemiological trends expand the demand for community and home nursing services. Community and home care models emphasize continuity of

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care, preventive interventions, long-term condition management, and patient-centered support delivered outside hospital environments (Ruksakulpiwat et al., 2025). Nurses working in decentralized settings consequently assume broader responsibilities that include patient monitoring, care coordination, and clinical decision-making.

Digital health technologies continue to evolve rapidly in parallel with these changes. Artificial intelligence (AI), particularly machine learning and clinical decision-support systems, represents a transformative technology in healthcare delivery (O'Connor et al., 2023; Wei et al., 2025). AI-based systems support predictive analytics, real-time patient monitoring, and data-driven clinical decision support (Ventura-Silva et al., 2024). In community and home nursing practice, these technologies support early detection of patient deterioration, improve workflow efficiency, and strengthen care coordination among healthcare providers (Martinez-Ortigosa et al., 2023; Thomas, 2025).

Current scholarly discussion on AI in nursing shows a strong concentration on hospital-based applications or broad conceptual discussions of digital health in nursing (Ng et al., 2022). Many systematic reviews published in recent years focus on acute-care environments or general digital health frameworks. These studies seldom examine the structural, infrastructural, and ethical characteristics that define decentralized community and home care environments (El Arab et al., 2025). Community nursing practice operates within autonomous and resource-variable contexts that demand adaptive decision-making and a preventive orientation. Limited synthesis addressing AI implementation within decentralized nursing environments indicates the presence of a significant knowledge gap in the current literature (Namdar Areshtanab et al., 2025).

A systematic literature review (SLR) provides an appropriate approach to synthesize contemporary evidence and clarify the role of AI in community and home nursing care. Existing systematic reviews on AI in nursing concentrate predominantly on hospital or acute-care contexts, while decentralized care environments receive minimal attention (Lifshits & Rosenberg, 2024). The present study contributes to the literature through an explicit focus on decentralized nursing environments, particularly community and home care services. The review maps AI technologies, identifies nursing domains supported by these technologies, evaluates reported clinical outcomes, and examines implementation barriers in non-hospital settings. The synthesis generates contextualized insights that support digital health policy development, technological innovation, and the strengthening of autonomous nursing roles within the ongoing digital transformation of healthcare systems (Abuzaid et al., 2022).

## 2. RESEARCH QUESTIONS

The systematic literature review followed a set of clearly defined research questions that guided the identification, selection, and synthesis of relevant studies. These questions aimed to examine the scope of artificial intelligence implementation in community and home nursing care, as well as the practical implications of these technologies for nursing practice. The research questions were formulated as follows.

1. What types of artificial intelligence applications are implemented in community and home nursing care services? This question examines the range of AI technologies adopted in decentralized care environments, including machine learning models, predictive analytics systems, remote monitoring technologies, and clinical decision-support tools.
2. Which nursing practice domains receive the greatest support from artificial intelligence technologies in community and home care contexts? This question explores the functional areas of nursing practice where AI contributes to care delivery, including patient monitoring, early risk detection, chronic disease management, care coordination, and clinical documentation.
3. What impacts do artificial intelligence applications generate in relation to care quality, patient safety, clinical decision-making, and nursing workflow efficiency? This question

evaluates reported outcomes associated with AI implementation and assesses how these technologies influence clinical performance and patient care processes.

4. What challenges, barriers, and limitations are reported in the implementation of artificial intelligence within community and home nursing care settings? This question identifies structural, technological, ethical, and organizational constraints that influence the adoption and integration of AI in decentralized nursing practice.

These research questions provide a structured analytical framework for examining how artificial intelligence technologies contribute to the development of community and home nursing care, while also identifying the practical and contextual factors that influence their implementation.

### 3. METHODS

#### 3.1 Review Protocol and Reporting Standard

This review followed the PRISMA 2020 guidelines as the primary reporting framework (Page et al., 2021). The PRISMA statement organized the study selection process into four sequential stages: identification, screening, eligibility assessment, and final inclusion. Each decision during the selection process was documented systematically to ensure methodological transparency and reproducibility. The overall selection procedure was summarized using a PRISMA flow diagram to provide a clear representation of the review process and to reduce the risk of selection bias.

#### 3.2 Data Sources and Search Strategy

A comprehensive literature search was performed using two major electronic databases: Scopus and PubMed. These databases were selected because they provide extensive coverage of peer-reviewed literature in nursing, healthcare, and digital health research.

The search strategy combined controlled vocabulary with free-text keywords related to artificial intelligence and nursing care. Core search terms included “artificial intelligence,” “machine learning,” “deep learning,” “clinical decision support,” “nursing,” “community nursing,” “home care,” and “home healthcare.” Boolean operators (AND, OR) were applied to structure and refine the search process in accordance with systematic review recommendations (Page et al., 2021).

The complete Boolean search string applied across the databases was formulated as follows: ("artificial intelligence" OR "machine learning" OR "deep learning" OR "clinical decision support") AND ("nursing" OR "community nursing" OR "home care" OR "home healthcare"). This standardized query structure ensured reproducibility of the search procedure and supported methodological transparency in the review process.

The search was restricted to peer-reviewed journal articles published in English between January 2022 and December 2025. This timeframe was selected to capture recent developments in artificial intelligence applications in healthcare, particularly the accelerated adoption of digital and remote care technologies following the COVID-19 pandemic. The selected period reflects a phase in which decentralized care models, including community and home-based services, received increased attention in digital health innovation and implementation.

#### 3.3 Inclusion and Exclusion Criteria

Inclusion and exclusion criteria were defined prior to the screening stage to ensure methodological rigor and alignment with the objectives of the review. The review included peer-reviewed empirical studies that examined the implementation or evaluation of artificial intelligence applications within nursing practice in community care, home healthcare, primary care, or long-term care settings.

The review also incorporated selected secondary studies, including systematic reviews, scoping reviews, and conceptual analyses that discussed the development, integration, or strategic implications of AI within decentralized nursing environments. The inclusion of these sources aimed to capture emerging theoretical perspectives and broader implementation frameworks relevant to community and

home nursing practice. The presence of both empirical and conceptual literature introduced methodological heterogeneity. The synthesis process addressed this issue by distinguishing conceptual insights and secondary evidence from empirical implementation outcomes during data analysis in order to preserve analytical clarity.

Studies conducted in broader nursing or healthcare contexts remained eligible when the AI application demonstrated clear transferability to community or home nursing environments. Transferability referred to the practical applicability of the AI system to support nursing activities outside hospital settings. Examples included remote patient monitoring, chronic disease management, clinical risk prediction, decision-support systems, documentation assistance, triage support, and care coordination.

The review excluded studies that lacked a clearly defined AI component, focused exclusively on hospital inpatient environments without contextual relevance to decentralized care, did not involve nursing practice, or represented non-empirical publication types such as editorials, commentaries, or opinion papers. The detailed inclusion and exclusion criteria are presented in [Table 1](#).

**Table 1. Inclusion and Exclusion Criteria**

<b>Inclusion Criteria</b>	<b>Exclusion Criteria</b>
Peer-reviewed journal articles	Non-nursing studies
Articles focusing on artificial intelligence applications	Editorials, commentaries, or opinion papers
Studies conducted in community or home nursing care settings	Articles without a clearly defined AI application
Articles published in English	Hospital-only studies

### 3.4 Study Selection Process

The study selection process followed the PRISMA 2020 framework, which consists of four stages: identification, screening, eligibility assessment, and final inclusion. The initial database search identified 412 records. The dataset was refined through duplicate removal and preliminary filtering. Ninety-six duplicate records and eight records removed for other reasons were excluded. A total of 308 records remained for title and abstract screening.

The screening stage applied the predefined inclusion and exclusion criteria. This stage resulted in the exclusion of 246 records. Sixty-two reports were considered potentially relevant and proceeded to the full-text retrieval stage. Seven reports could not be retrieved. Fifty-five full-text articles were subsequently assessed for eligibility.

The eligibility assessment resulted in the exclusion of 40 studies. Seventeen studies did not address community or home nursing contexts. Eleven studies lacked a clearly defined artificial intelligence application. Eight studies focused exclusively on hospital-based environments without contextual relevance to decentralized nursing care. Four studies represented non-empirical publication types.

Fifteen studies satisfied all eligibility criteria and were included in the final synthesis. The entire selection process was documented using the PRISMA 2020 flow diagram to ensure transparency in study identification and selection. The diagram illustrates the identification, screening, eligibility assessment, and inclusion stages of the review process. The complete selection pathway is presented in [Figure 1](#).

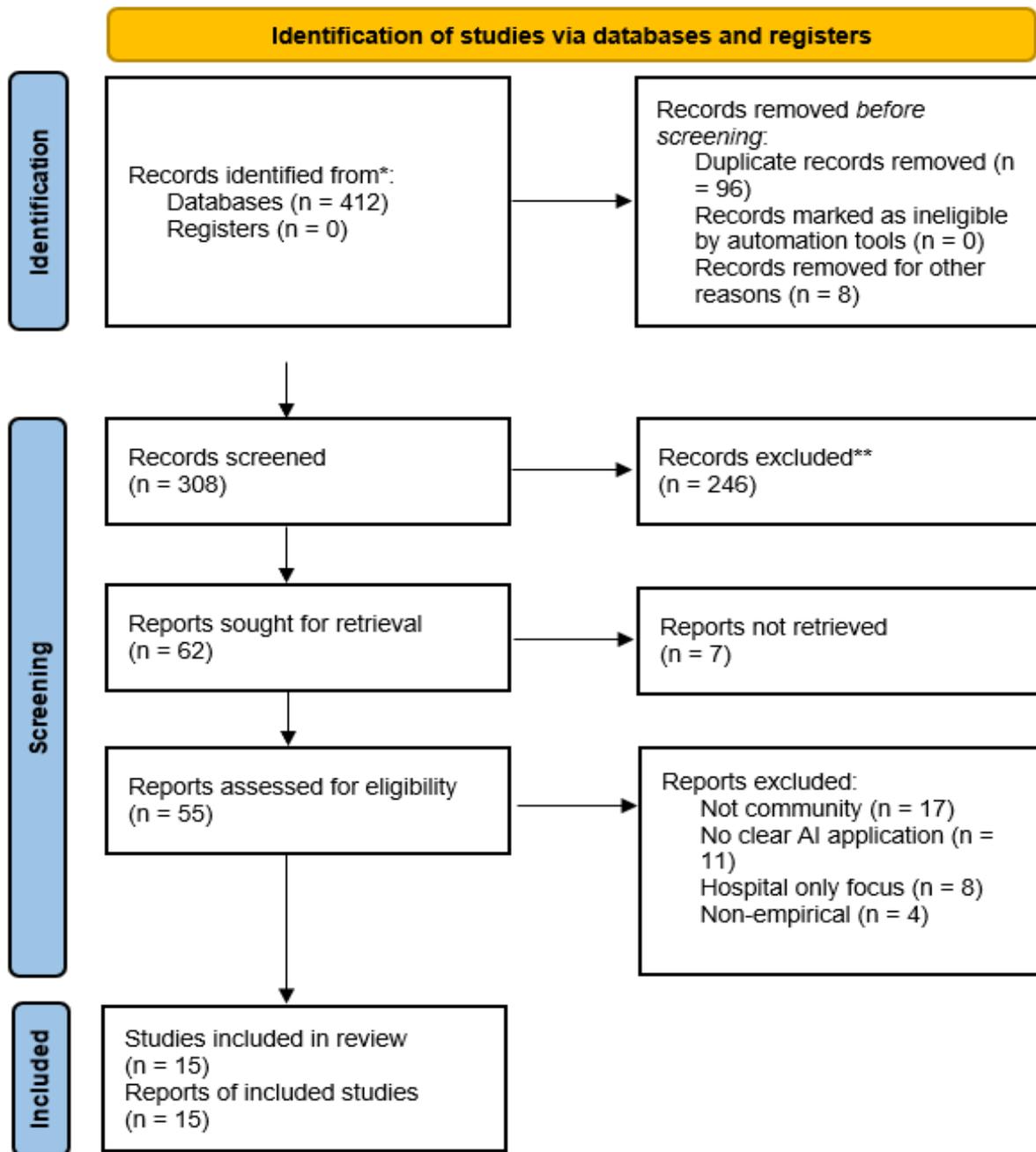


Fig. 1. PRISMA 2020 Flow Diagram

### 3.5 Quality Assessment

Methodological quality assessment was conducted to ensure the credibility, rigor, and reliability of the evidence synthesized in this review. The appraisal process applied the Joanna Briggs Institute (JBI) critical appraisal tools, with the specific checklist selected according to the research design of each included study. The appropriate JBI instruments were used for systematic reviews, scoping reviews, qualitative studies, cross-sectional studies, mixed-methods research, and other relevant methodological designs.

The assessment examined several key methodological dimensions. These dimensions included the clarity of research objectives, the appropriateness of the study design, the transparency of data collection

procedures, the rigor of analytical methods, and the validity and consistency of the reported conclusions. The purpose of this appraisal was to evaluate the strength of the available evidence and to inform the interpretation of findings during synthesis. The appraisal results were not used as strict criteria for automatic study exclusion.

The structured results of the quality appraisal for all fifteen included studies are presented in [Table 2](#). The overall methodological quality ranged from moderate to high. Empirical studies, including qualitative and cross-sectional designs, demonstrated strong methodological rigor, clear research procedures, and transparent reporting of outcomes. Narrative reviews and perspective articles contributed important conceptual and strategic insights related to artificial intelligence in decentralized nursing care. These studies displayed lower levels of methodological structure due to the nature of their design.

The presentation of appraisal outcomes in tabular format strengthens methodological transparency and allows readers to evaluate the quality and reliability of evidence across heterogeneous study designs included in this review.

**Table 2. Structured Quality Appraisal Results (JBI)**

Study (Author, Year)	Design	JBI Criteria Met	Quality Level
(Chang et al., 2022)	Quantitative bibliometric study	8/9	High
(Ng et al., 2022)	Scoping review	8/10	High
(Ren et al., 2022)	Scoping review	8/10	High
(Abuzaid et al., 2022)	Integrative review	9/11	High
(Van Bulck et al., 2023)	Commentary / review	7/9	Moderate–High
(O’Connor et al., 2023)	Systematic review	9/11	High
(Martinez-Ortigosa et al., 2023)	Systematic review	10/11	High
(Mohanasundari et al., 2023)	Conceptual paper	7/9	Moderate–High
(Wangpitipanit et al., 2024)	Concept analysis	8/10	High
(Ahmed, 2024)	Narrative review	7/9	Moderate–High
(Emami Zeydi & Karkhah, 2024)	Perspective article	7/9	Moderate–High
(Rony et al., 2024)	Qualitative study	8/10	High
(Ramírez-Baraldes et al., 2025)	Review article	9/11	High
(Choi et al., 2025)	Scoping review	8/10	High
(Mohammed et al., 2025)	Systematic review	10/11	High

### 3.6 Data Extraction and Synthesis

A structured data extraction form was developed to ensure consistency and comparability across the included studies. The extracted variables included author, publication year, country of study, research design, type of artificial intelligence technology, nursing context, reported outcomes, and implementation challenges identified in each study.

The extracted data were organized thematically according to the type of AI technology and the application domains relevant to community and home nursing care. The thematic synthesis followed a structured three-stage coding procedure to enhance analytical transparency and conceptual coherence.

The first stage involved open coding. Key AI functions, technological characteristics, and reported outcomes were identified directly from each included study. This stage allowed the initial mapping of technological applications and their practical roles in nursing activities.

The second stage applied axial coding. Similar technological functions and clinical applications were grouped into broader analytical categories. These categories included risk prediction, remote patient

monitoring, chronic disease management, workflow optimization, clinical decision support, and governance or strategic frameworks supporting AI integration in healthcare systems.

The third stage involved selective categorization. The previously identified domains were interpreted within the contextual characteristics of decentralized care environments. The analysis emphasized features that distinguish community and home nursing practice from hospital settings, including preventive care orientation, autonomous nursing decision-making, and direct patient interaction within home environments.

This systematic coding process enabled conceptual integration across heterogeneous study designs while maintaining the contextual specificity required for decentralized nursing practice. The included studies displayed substantial variability in research design, methodological approaches, and outcome indicators. Quantitative meta-analysis was therefore not appropriate. The review applied a narrative synthesis approach that prioritized contextual relevance, practical transferability to non-hospital settings, and alignment with the predefined research questions guiding the study.

## 4. RESULT

### 4.1 Study Characteristics

The studies included in this review were published between 2022 and 2025, indicating a recent and increasing scholarly interest in the application of artificial intelligence within nursing practice (Chang et al., 2022). The geographical distribution of the studies shows contributions primarily from Europe and Asia, with additional research conducted in North America and Australia. This distribution reflects the growing global engagement in exploring AI-driven innovations in healthcare and nursing services. The detailed characteristics of the included studies are summarized in Table 3.

The methodological designs of the included studies demonstrated considerable variation. The reviewed literature comprised qualitative studies, observational research, quasi-experimental studies, scoping reviews, and systematic reviews (Ruksakulpiwat et al., 2025). This methodological diversity reflects the exploratory nature of current research examining AI integration within nursing practice. The methodological characteristics of each study are also presented in Table 3.

Most studies were conducted in decentralized care environments, including community nursing, home healthcare, primary care, and long-term care settings (Van Bulck et al., 2023). Several studies were situated within broader nursing contexts yet demonstrated clear transferability to non-hospital environments, particularly in applications related to remote monitoring, decision support, and patient management outside hospital settings (Abuzaid et al., 2022). The distribution of study contexts presented in Table 3 illustrates both methodological diversity and geographic variation in the implementation and investigation of artificial intelligence technologies within decentralized nursing care.

**Table 3. Characteristics of Included Studies**

Author (Year)	Title	Sample	Method	Key Results
(Chang et al., 2022)	Trends in Artificial Intelligence in Nursing: Impacts on Nursing Management	Bibliometric dataset of AI-related nursing publications	Quantitative bibliometric study	The study identified emerging trends in artificial intelligence research within nursing management and highlighted its potential for improving clinical decision support and healthcare communication systems.
(Ng et al., 2022)	The Role of Artificial Intelligence in Enhancing Clinical Nursing	37 included studies	Scoping review	The review demonstrated that artificial intelligence applications improved diagnostic accuracy and strengthened clinical decision-support processes in nursing practice.

	Care: A Scoping Review			
(Ren et al., 2022)	A Scoping Review of Deep Learning in Cancer Nursing Combined with Augmented Reality: The Era of Intelligent Nursing Is Coming	19 included studies	Scoping review	The review highlighted the application of deep learning technologies in oncology nursing, particularly for image analysis and improved patient monitoring.
(Abuzaid et al., 2022)	Integration of Artificial Intelligence into Nursing Practice	27 included studies	Integrative review	The study identified opportunities and barriers related to the integration of artificial intelligence into nursing practice and emphasized the importance of digital competency development.
(Van Bulck et al., 2023)	Applications of Artificial Intelligence for Nursing: Has a New Era Arrived	Not applicable	Commentary / review	The article discussed the emerging role of artificial intelligence in nursing practice and emphasized its potential for predictive monitoring and improved patient outcomes.
(O'Connor et al., 2023)	Artificial Intelligence in Nursing and Midwifery: A Systematic Review	45 included studies	Systematic review	The review synthesized evidence demonstrating that artificial intelligence can enhance risk prediction, clinical decision-making, and care coordination in nursing and midwifery practice.
(Martinez-Ortigosa et al., 2023)	Applications of Artificial Intelligence in Nursing Care: A Systematic Review	27 included studies	Systematic review	The study reported that artificial intelligence applications contribute to improved workflow efficiency and care optimization within nursing practice.
(Mohanasundari et al., 2023)	Can Artificial Intelligence Replace the Unique Nursing Role	Not applicable	Conceptual paper	The article emphasized that artificial intelligence should complement rather than replace the professional role of nurses in patient care.
(Wangpitipanit et al., 2024)	Exploring the Deep Learning of Artificial Intelligence in Nursing: A Concept Analysis with Walker and Avant's Approach	Not applicable	Concept analysis	The study clarified the conceptual meaning and implications of artificial intelligence and deep learning within contemporary nursing practice.
(Ahmed, 2024)	Artificial Intelligence in Nursing: Current Trends, Possibilities and Pitfalls	Literature sources synthesized	Narrative review	The review discussed current trends, benefits, and potential challenges associated with the adoption of artificial intelligence in nursing practice.

(Emami Zeydi & Karkhah, 2024)	Deep Learning During Nursing Care: An Evolving Perspective	Not applicable	Perspective article	The article highlighted the evolving role of deep learning technologies in enhancing patient monitoring, predictive analytics, and clinical decision-making in nursing care.
(Rony et al., 2024)	Artificial Intelligence in Future Nursing Care: Exploring Perspectives of Nursing Professionals	15 nursing professionals	Qualitative study	The study reported generally positive perceptions of artificial intelligence among nursing professionals while also identifying concerns related to ethics and training needs.
(Ramírez-Baraldes et al., 2025)	Artificial Intelligence in Nursing: New Opportunities and Challenges	Literature sources synthesized	Review article	The study discussed emerging opportunities and challenges related to artificial intelligence adoption in nursing practice and education.
(Choi et al., 2025)	Decoding Machine Learning in Nursing Research: A Scoping Review of Effective Algorithms	40 included studies	Scoping review	The review evaluated machine learning algorithms used in nursing research and identified common approaches for predictive modeling and performance evaluation.
(Mohammed et al., 2025)	Ethical and Regulatory Considerations in the Use of AI and Machine Learning in Nursing: A Systematic Review	30 included studies	Systematic review	The study clarified ethical, legal, and regulatory considerations surrounding the implementation of artificial intelligence and machine learning in nursing practice.

#### 4.2 Comparison with Previous Review Studies

A comparative analysis was conducted to clarify the novelty and scholarly contribution of the present systematic literature review. The comparison examined several previously published review studies that discussed artificial intelligence in nursing practice. The analysis considered three main dimensions: methodological approach, thematic research focus, and the principal findings reported in the literature. The detailed comparison between the current review and previous review studies is presented in [Table 4](#).

The purpose of this comparison was to identify how prior review studies conceptualized and examined AI within nursing contexts, as well as to determine the extent to which decentralized care environments were addressed. Many earlier reviews discussed AI adoption in nursing from a broad healthcare perspective or concentrated primarily on hospital-based clinical settings. These studies provided important insights into technological capabilities and clinical applications but offered limited attention to the specific structural and operational characteristics of community and home nursing environments.

The present review addresses this gap through an explicit focus on decentralized nursing practice, particularly community and home healthcare services. The comparative analysis summarized in [Table 4](#) demonstrates how the current study extends existing knowledge by synthesizing evidence related to AI technologies, supported nursing domains, reported outcomes, and implementation challenges within

non-hospital care contexts. This focused synthesis provides a more contextualized understanding of the role of artificial intelligence in supporting nursing activities within decentralized care environments.

**Table 4. Comparison of the Current Review with Similar Existing Review Studies**

Study (Author, Year)	Methodology	Focus (Care Setting)	Key Findings	Key Distinctions from Current Study
(Ng et al., 2022)	Scoping review	General clinical nursing care, predominantly hospital-based	AI improves diagnostic accuracy and supports clinical decision-making.	Provides a broad overview of AI in clinical nursing but does not specifically examine decentralized community or home care environments.
(O'Connor et al., 2023)	Systematic review	Nursing and midwifery practice	AI enhances risk prediction, clinical decision support, and care coordination.	Includes midwifery and focuses on general healthcare settings rather than decentralized nursing environments.
(Martinez-Ortigosa et al., 2023)	Systematic review	General nursing care and workflow optimization	AI contributes to improved workflow efficiency and nursing care optimization.	Focuses on general nursing workflow improvements without addressing infrastructure or ethical challenges specific to home care settings.
Current Study	Systematic Literature Review (SLR)	Community and home nursing care	AI supports remote monitoring, predictive analytics, and early detection of patient deterioration.	Specifically synthesizes AI implementation in decentralized nursing environments and highlights infrastructure readiness, ethical governance, and remote monitoring challenges.

### 4.3 Types of Artificial Intelligence Technologies

The reviewed literature reported several artificial intelligence technologies applied in nursing practice. Machine learning models represented the most frequently implemented approach. These models were commonly used for predictive analytics tasks, including fall risk prediction, hospitalization risk estimation, and early detection of patient deterioration (Ng et al., 2022).

Deep learning techniques appeared primarily in image-based clinical assessments. Several studies described the application of deep learning models for wound evaluation and clinical pattern recognition, particularly in situations that required automated interpretation of visual clinical data (Ren et al., 2022).

Clinical decision support systems were implemented to support triage prioritization and care planning within community and long-term care environments. These systems assisted nurses in interpreting patient data and supported structured clinical decision-making during routine care processes. Natural language processing applications also appeared in several studies. NLP technologies supported improvements in clinical documentation accuracy and enabled structured extraction of information from unstructured nursing records (O'Connor et al., 2023).

The distribution of technologies indicates that predictive systems and decision-support applications constitute the dominant categories of AI implementation in the reviewed studies. These technologies address key functions required in decentralized nursing environments, particularly patient risk monitoring and clinical decision assistance. This finding directly addresses the first research question concerning the types of artificial intelligence applications used in community and home nursing care.

#### 4.4 Application Domains in Community and Home Nursing Care

Artificial intelligence technologies supported several core domains of community and home nursing practice. Remote patient monitoring emerged as a major application area, particularly in the management of chronic conditions such as cardiovascular disease and diabetes (Van Bulck et al., 2023). AI-enabled monitoring systems facilitated continuous assessment of patient status and enabled early detection of clinical changes that required nursing intervention.

Risk prediction represented another important domain. AI-based tools identified potential fall risks, wound complications, and the likelihood of hospital admission. These predictive capabilities supported preventive nursing interventions and improved proactive care planning in decentralized care environments (Ng et al., 2022; Ren et al., 2022).

Documentation support and workflow optimization also appeared as relevant application areas. AI-assisted documentation systems improved the structuring and accuracy of clinical records, while workflow-support tools reduced administrative workload and strengthened care coordination within community-based nursing teams (Abuzaid et al., 2022).

The evidence indicates that AI technologies primarily support monitoring activities, predictive risk assessment, and clinical decision-support processes in decentralized care environments. These findings directly address the second research question concerning the nursing domains most frequently supported by artificial intelligence in community and home nursing care.

#### 4.5 Reported Outcomes and Benefits

The included studies reported improvements in clinical vigilance, patient safety, and support for clinical decision-making. Predictive algorithms enhanced the early detection of patient deterioration and enabled more timely nursing interventions. Several studies reported improved risk stratification and a reduction in avoidable hospital transfers after the implementation of AI-assisted assessment tools (Wangpitipanit et al., 2024).

Artificial intelligence implementation also contributed to improvements in operational efficiency. Automated documentation systems and AI-supported administrative tools reduced the time required for record management and routine reporting tasks. Reduced administrative workload allowed nurses to allocate more time to direct patient care activities.

Chronic disease management represents another area where AI technologies demonstrated practical benefits. AI-supported monitoring systems enabled continuous patient assessment and earlier identification of symptom changes. These capabilities supported better symptom control and strengthened continuity of care for patients receiving long-term treatment outside hospital settings (Rony et al., 2024).

The evidence indicates that artificial intelligence applications contribute to improvements in care quality, patient safety, and workflow efficiency in community and home nursing environments. These findings address the third research question concerning the impact of AI technologies on nursing practice in decentralized care settings.

#### 4.6 Challenges and Barriers

Several barriers emerged in the reviewed literature despite the reported benefits of artificial intelligence implementation. Technological challenges included interoperability limitations between digital health systems, inconsistent data quality, and limited digital infrastructure in community-based care environments. These constraints reduced the scalability of AI solutions and complicated their integration into existing healthcare information systems (Emami Zeydi & Karkhah, 2024).

Workforce-related challenges also appeared frequently. Limited digital literacy among nursing professionals and resistance toward technological adoption were identified as significant obstacles to implementation (Van Bulck et al., 2023). Several studies emphasized the importance of structured training programs, institutional support, and gradual technology integration to strengthen nurses' confidence and competence in using AI-assisted tools.

Ethical concerns received considerable attention in the reviewed studies. Key issues included data privacy protection, transparency of algorithmic decision-making, and the assignment of professional accountability when AI-supported recommendations influence clinical actions. These concerns became particularly relevant in home-based monitoring systems where continuous data collection occurs within private living environments.

The evidence indicates that successful integration of artificial intelligence in decentralized nursing practice depends on technological readiness, workforce preparedness, and strong ethical governance frameworks (O'Connor et al., 2023; Rony et al., 2024). These findings address the fourth research question concerning the challenges and limitations associated with AI implementation in community and home nursing care.

## 5. DISCUSSION

This review critically analyzed contemporary evidence concerning the application of artificial intelligence in community and home nursing care. The synthesis indicates that predictive analytics, machine learning models, and clinical decision-support systems represent the most frequently implemented technological approaches (Chang et al., 2022; O'Connor et al., 2023). These systems support functions such as risk identification, chronic disease monitoring, and early detection of patient deterioration. Such functions correspond closely with the preventive orientation and continuity-of-care principles that characterize community and home nursing practice (Van Bulck et al., 2023).

The prevalence of predictive and monitoring technologies reflects the structural characteristics of decentralized care environments. Nurses working in community and home settings frequently operate with a high level of professional autonomy and limited immediate access to interdisciplinary consultation. AI-supported systems strengthen clinical vigilance and enable earlier identification of potential health risks. These capabilities support anticipatory nursing interventions and improve coordination of care, which contributes to the reduction of avoidable hospital admissions (Mohammed et al., 2025).

The reviewed evidence consistently describes AI as an augmentative tool that supports professional practice rather than replacing clinical expertise. Algorithmic outputs assist nurses in interpreting patient data and identifying potential risks. Clinical judgment, ethical reasoning, contextual understanding, and therapeutic communication remain grounded in professional nursing competence (Chang et al., 2022; Ng et al., 2022). The integration of AI technologies therefore supports a human-centered model of care in which technological systems enhance rather than substitute professional nursing roles.

Several included studies consisted of conceptual analyses or secondary reviews rather than primary empirical investigations. Reported benefits in these studies sometimes reflect projected capabilities and theoretical potential rather than outcomes derived from extensive clinical implementation. This methodological diversity reduces the empirical strength of aggregated conclusions and indicates the need for additional real-world implementation studies that evaluate AI systems in community and home nursing environments (Chae et al., 2025).

The analysis also identifies governance structures, ethical oversight, and workforce preparedness as critical determinants of sustainable AI integration. Community and home care environments involve continuous patient data collection within private living spaces. Such conditions intensify concerns related to data protection, algorithm transparency, accountability for AI-supported decisions, and informed consent procedures (Badawy et al., 2025). Responsible implementation therefore requires alignment between technological capability, digital competency among healthcare professionals, institutional readiness, and regulatory safeguards (Rony et al., 2024).

A focus on decentralized care environments allows this review to extend beyond the hospital-centered orientation that characterizes much of the existing AI literature in nursing. The synthesis highlights implementation challenges and contextual considerations that are specific to community and home nursing systems (Karnehed et al., 2025). The findings indicate that successful AI adoption

depends not only on technological capability but also on context-sensitive integration strategies that reflect the operational realities of decentralized care.

Artificial intelligence demonstrates substantial potential to improve care quality, patient safety, and operational efficiency in community and home nursing practice. Effective implementation requires careful contextual adaptation and organizational readiness. Technological availability alone does not guarantee successful integration into routine nursing practice.

## 6. IMPLICATIONS FOR NURSING PRACTICE AND RESEARCH

The findings of this review provide both practical and scholarly implications for community and home nursing care. From a practice perspective, nursing education programs need to integrate structured digital literacy and artificial intelligence competency development into professional training (Hoelscher & Pugh, 2025). Educational preparation should enable nurses to interpret algorithmic recommendations critically while maintaining professional accountability for clinical decisions. Continuing professional education must also address ethical reasoning and responsible technology use in digitally supported care environments.

Healthcare organizations require strengthened digital infrastructure within decentralized care settings. Reliable implementation of AI-supported systems depends on interoperable health information platforms, secure data governance mechanisms, and accessible technical support services. Infrastructure development must proceed alongside workforce capacity building so that technological systems can be used effectively in routine nursing practice.

Policy development also plays an essential role in supporting responsible AI integration. Regulatory frameworks should establish clear standards for algorithm transparency, accountability mechanisms, and validation procedures for AI technologies used in community-based healthcare services. Well-defined governance structures strengthen public trust and reduce ethical risks associated with remote monitoring systems and continuous patient data collection.

Future research should prioritize empirical implementation studies conducted in real-world community and home nursing environments. Longitudinal investigations and mixed-method approaches can provide deeper understanding of patient outcomes, nursing workflow changes, cost-effectiveness, and technology acceptance among healthcare professionals. Research that incorporates patient and family perspectives is also necessary to ensure that AI implementation remains consistent with person-centered care principles in decentralized healthcare systems.

## 7. LIMITATIONS

This review presents several limitations that require careful consideration when interpreting the findings. The inclusion of fifteen studies limits the generalizability of the conclusions across diverse healthcare systems, resource environments, and cultural contexts. The reviewed studies represent several geographic regions; nevertheless, differences in healthcare infrastructure, technological readiness, and digital maturity may influence the applicability of the synthesized evidence.

Methodological heterogeneity across the included literature prevented the application of quantitative synthesis through meta-analysis. The dataset comprised qualitative studies, observational designs, scoping reviews, systematic reviews, and conceptual analyses. Such diversity required the application of narrative synthesis, an approach that emphasizes interpretative integration of findings rather than statistical aggregation.

The inclusion of secondary reviews and conceptual analyses alongside primary empirical studies also introduces variation in the strength of evidence. Some synthesized conclusions reflect theoretical interpretations, projected technological potential, or strategic perspectives rather than outcomes derived exclusively from validated clinical implementation. This characteristic moderates the empirical certainty of several aggregated findings.

Several included studies originated from broader nursing or healthcare contexts rather than exclusively from community or home nursing environments. Transferability to decentralized care

settings was evaluated during the synthesis stage; nevertheless, structural differences between hospital-based systems and community-based services may influence interpretation.

The restriction to English-language peer-reviewed publications may introduce publication bias and reduce the representation of studies from non-English-speaking regions or healthcare systems with emerging digital health infrastructures.

## 8. CONCLUSION

Artificial intelligence applications are increasingly integrated into nursing practice in community and home care environments. The synthesized evidence indicates that AI technologies predominantly support predictive monitoring, clinical decision assistance, and workflow optimization. These technological functions contribute to improved care quality, strengthened patient safety, and greater operational efficiency within decentralized care settings.

Artificial intelligence functions as an augmentative instrument that supports professional nursing judgment rather than replacing it. Algorithmic outputs assist in identifying risks and interpreting patient data, while ethical reasoning, contextual assessment, and clinical accountability remain grounded in professional nursing expertise. Sustainable integration requires adequate digital competence among healthcare professionals, strong ethical governance, reliable technological infrastructure, and effective interdisciplinary collaboration.

The future development of artificial intelligence in community and home nursing care should emphasize human-centered system design, contextual adaptability to decentralized care environments, and rigorous empirical validation. These priorities are essential to ensure that technological innovation supports safe, equitable, and effective healthcare delivery.

## DECLARATION OF GENERATIVE AI

The authors declare that generative artificial intelligence tools were used solely to support the preparation of this manuscript. Specifically, ChatGPT was utilized to assist in improving the clarity, grammar, and readability of the English language in the manuscript. In addition, Scopus AI was used to help validate and verify the relevance of cited references.

These tools were employed only to enhance language quality and assist in reference validation. All intellectual content, interpretation of results, and scientific conclusions presented in this manuscript are the sole responsibility of the authors. The authors have carefully reviewed and edited the outputs generated by these tools to ensure accuracy, originality, and compliance with academic integrity standards.

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