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READINESS OF HEALTH WORKERS TO IMPLEMENT DIGITAL INTEGRATED PATIENT PROGRESS NOTES FOR INTERPROFESSIONAL COLLABORATION: A CONCEPTUAL AND SYSTEMATIC REVIEW

Mera Delima[1], Tanti Anggreiniboti[1], Regidor III Dioso[2]
[1]Faculty of Health Sciences, Universitas Perintis Indonesia, Indonesia
[2]Faculty of Nursing, Lincoln University College, Malaysia.
meradelima72@gmail.com

Abstract

Digital transformation in healthcare services has accelerated the adoption of electronic clinical documentation, including digitally based Integrated Patient Progress Notes (IPPN). This system has the potential to enhance interprofessional collaboration through accurate and real-time access to patient information; however, its successful implementation is highly dependent on health workers' readiness. This study aimed to examine health workers' readiness in implementing digital IPPN to support interprofessional collaboration and to identify key supporting and inhibiting factors. A conceptual analysis combined with a systematic literature review was conducted using articles published between 2018 and 2025 from national and international databases, following the PRISMA 2020 guidelines. The findings indicate that digital literacy, technological competence, understanding of clinical documentation, attitude toward innovation, organizational support, training, and infrastructure availability are the main determinants of readiness for digital IPPN implementation. The use of digital documentation systems has been shown to strengthen interprofessional communication and improve data-driven clinical decision-making. These results highlight that digital IPPN can effectively support interprofessional collaboration when supported by adequate workforce readiness and organizational infrastructure, providing a conceptual framework to guide implementation strategies in healthcare facilities.

Keywords: *Digital IPPN, Interprofessional Collaboration, Health Worker Readiness, Digital Literacy, Electronic Documentation*

* Corresponding author : Mera Delima
Address : Universitas Perintis Indonesia
Email : meradelima72gmail.com
Phone : +6281363420560

INTRODUCTION

The digitalization of clinical documentation has become a central component of healthcare transformation, with the potential to improve patient safety, workflow efficiency, and continuity of care. Electronic documentation systems have been shown to reduce documentation errors by up to 30–40% and facilitate faster access to clinical information. However, despite these benefits, technology adoption in healthcare remains challenged by limited digital literacy, concerns about increased workload, and uneven readiness among health professionals (Dabas, 2020; Kharmi Juni Yanti & Dasrun Hidayat, 2024). Evidence from hospitals in Southeast Asia indicates that more than 40% of health workers lack confidence in optimally using digital documentation systems, particularly in supporting collaborative clinical decision-making (Kruse et al., 2022).

Integrated Patient Progress Notes (IPPN) are designed to support continuity of care through structured, interprofessional documentation involving nurses, physicians, pharmacists, nutritionists, and other health professionals. In practice, however, nurses often function as the primary users of IPPN, while other professions engage inconsistently, resulting in suboptimal interprofessional collaboration (Wu et al., 2024). Variations in technological competence and understanding across professional groups have led digital documentation systems to be utilized largely as administrative tools rather than as collaborative clinical instruments. Systematic reviews have further demonstrated that most studies on digital health implementation focus predominantly on technical outcomes such as error reduction and system efficiency, while giving limited attention to interprofessional collaboration dynamics and health worker readiness (Han et al., 2023; Robertson et al., 2022).

Existing research on IPPN implementation, including studies conducted in Indonesia, has primarily examined documentation compliance, facilitators, and barriers, without explicitly addressing digital readiness as a multidimensional construct encompassing individual competence, organizational support, and collaborative work culture (Kusumaningrum et al., 2018; Wardani, 2020). Although evidence from Electronic Health Record (EHR) studies suggests that digital systems can enhance interprofessional communication, there remains a lack of focused analysis on how digital IPPN specifically functions as a collaborative platform and what readiness factors are required to support its effective use (Adamson et al., 2020; Sugiart et al., 2024).

From a regulatory perspective, the implementation of digital documentation in Indonesia is reinforced by Minister of Health Regulation No. 24 of 2022 on Medical Records, which mandates the adoption of electronic medical records and establishes standards for data governance and accessibility (Permenkes RI, 2022). This policy framework creates both an opportunity and an obligation for healthcare facilities to ensure that digital IPPN implementation is supported by adequate human resource readiness, organizational policies, and information technology infrastructure. National and local studies continue to report variability in IPPN documentation quality, highlighting the critical role of education, training, and organizational capacity in ensuring that digital transformation meaningfully enhances collaborative clinical practice (Fadillah et al., 2025).

Despite the growing body of literature on digital health systems, a clear research gap remains regarding the systematic examination of health workers' readiness for digital IPPN implementation within the context of interprofessional collaboration. Addressing this gap is essential to ensure that digital IPPN serves not only as a documentation mechanism but also as a strategic foundation for strengthening clinical team coordination and integrated care delivery.

Therefore, this study aims to systematically review and conceptually analyze health workers' readiness for implementing digital Integrated Patient Progress Notes to support interprofessional collaboration. Specifically, this review seeks to identify key readiness dimensions, including digital literacy, organizational support, and collaborative work culture, and to develop a conceptual framework that can inform implementation strategies, policy development, and future research in the digital transformation of nursing and interprofessional documentation.

METHODS

This study employed a conceptual analysis combined with a systematic review to examine healthcare professionals' readiness to implement digital Integrated Patient Progress Notes (IPPN) in supporting interprofessional collaboration. The systematic review was conducted following the

Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guidelines.

Research Question and Framework

A PICO framework guided the review: Population (P): healthcare professionals involved in clinical documentation; Intervention (I): implementation of digital IPPN or equivalent digital interprofessional documentation systems; Comparison (C): paper-based documentation or non-integrated digital systems (when applicable); Outcome (O): readiness dimensions, including digital literacy, organizational support, and interprofessional collaboration.

The main research question was: How is healthcare professionals' readiness conceptualized and addressed in the implementation of digital IPPN to support interprofessional collaboration?

Search Strategy

A comprehensive literature search was conducted in January 2025 across five electronic databases: PubMed, Scopus, ScienceDirect, Wiley Online Library, and Google Scholar. The search covered publications from January 2018 to December 2025 to capture recent developments in digital clinical documentation.

Database-specific search strategies were adapted to each platform using controlled vocabulary and Boolean operators. The core search terms included combinations of: "digital documentation" or "electronic medical records" or "electronic health records" and "Integrated Patient Progress Notes" or "IPPN" and "interprofessional collaboration" and "readiness" or "digital literacy" or "healthcare professionals".

Eligibility Criteria

Inclusion criteria were:

1. Empirical studies, reviews, or conceptual papers addressing digital documentation in healthcare;
2. Studies examining interprofessional collaboration, healthcare professional readiness, or digital competencies;
3. Studies explicitly discussing digital IPPN or interprofessional digital documentation (studies focusing solely on generic EHR without collaborative context were excluded);
4. Peer-reviewed articles published in English or Indonesian with full-text availability.

Exclusion criteria included:

1. Studies unrelated to clinical collaboration or nursing documentation;
2. Articles focusing exclusively on technical system performance without human or organizational dimensions;
3. Non-scientific publications, conference abstracts, editorials, and studies without accessible full text.

Quality Appraisal

Study quality was assessed using the Critical Appraisal Skills Programme (CASP) for qualitative studies, the Joanna Briggs Institute (JBI) Critical Appraisal Tool for observational studies, and the Mixed Methods Appraisal Tool (MMAT) for mixed-methods research. Studies were categorized as high, moderate, or low quality based on tool-specific scoring criteria. Low-quality studies were not excluded but were critically appraised and interpreted with caution during the synthesis to preserve conceptual insights.

Two independent reviewers conducted the screening and appraisal process. Discrepancies were resolved through discussion with the principal investigator.

Study Selection and Data Synthesis

The selection process followed PRISMA 2020 guidelines. A total of 472 records were identified, with 108 duplicates removed. After title and abstract screening of 364 records, 268 articles were excluded. Ninety-six full-text articles were assessed, of which 83 were excluded for not meeting the eligibility criteria. Thirteen studies were included in the final synthesis.

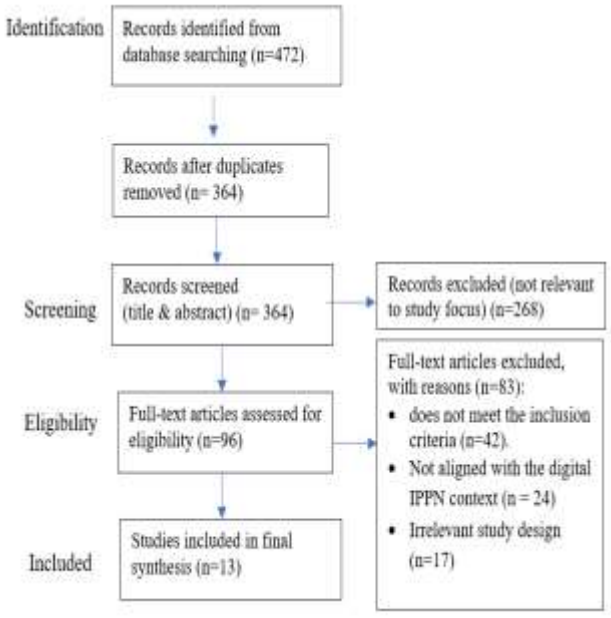

Figure 1. PRISMA Flow Diagram of the Literature Review Process on the Conceptual Analysis and Systematic Review of Healthcare Professionals' Readiness for Digital IPPN Implementation in Supporting Interprofessional Collaboration.

Data were analyzed using thematic synthesis to identify patterns related to digital readiness, organizational support, and interprofessional collaboration. The findings informed the development of a conceptual framework for healthcare professionals' readiness in digital IPPN implementation.

The review protocol was not registered in PROSPERO, which is acknowledged as a methodological limitation.

RESULTS

A total of 13 studies met the inclusion criteria and were included in this systematic review. The included articles were published between 2018 and 2025 and originated from diverse geographical contexts, encompassing both developed and developing countries, such as the United States, Australia, several European countries, the Middle East, Africa, and Indonesia. This diversity provides a comprehensive overview of healthcare professionals' readiness for digital documentation implementation across various healthcare systems.

Regarding study design, most of the included studies employed a systematic review approach (n = 6), followed by cross-sectional studies (n = 3), mixed-methods studies (n = 2), and one Delphi study and one quantitative–qualitative study. The healthcare professions examined across the studies included nurses, physicians, and multidisciplinary healthcare teams, with nurses identified as the primary users of integrated clinical documentation systems. The digital systems investigated comprised Electronic Health Records (EHR)**,** digital Integrated Patient Progress Notes (IPPN), and other interprofessional digital documentation platforms.

An overview of the characteristics of the included studies covering authors, year of publication, country, study objectives, research design, sample, and key findings is presented in **Table 1**.

Table 1. Characteristics of Included Studies

Author(s) (Year)	Country	Study Objective	Study Design	Sample / Participants	Key Findings
Robertson et al. (2022)	United States	To examine the impact of Electronic Health Records (EHR) on interprofessional practice	Systematic review	Multidisciplinary healthcare professionals	Standard EHR systems may limit collaboration, while advanced features (e.g., dashboards, decision support) enhance team communication and coordination.
Ngusie et al. (2022)	Ethiopia	To assess healthcare professionals' readiness before EHR implementation	Cross-sectional survey	Healthcare professionals	Approximately 52.8% demonstrated good readiness; computer literacy, attitude, and self-efficacy were key determinants.
Afrizal et al. (2019)	Indonesia	To explore barriers and facilitators of EHR readiness in primary healthcare	Narrative review	Primary healthcare professionals	Major barriers included limited human resources, insufficient managerial support, and weak team interaction.
Saoudite et al. (2023)	France	To analyze HER implementation within an interprofessional collaboration model of care	Systematic review	Multidisciplinary care teams	Integrated HER systems strengthened team coordination, shared decision-making, and patient outcomes.
Vaseghi et al.	Iran	To identify the required	Systematic	Multidisciplinary	Six core competency

Author(s) (Year)	Country	Study Objective	Study Design	Sample / Participants	Key Findings
(2022)		competencies for interprofessional collaboration in healthcare systems	review	healthcare professionals	domains were identified, including communication, leadership, and teamwork.
Wynne et al. (2024)	Australia	To assess readiness for professional practice among health professions graduates	Systematic review	Health professions graduates	Readiness was influenced by interpersonal skills, interprofessional education, and teamwork integration.
Kusumaningrum et al. (2018)	Indonesia	To evaluate the implementation of Integrated Patient Progress Notes (IPPN) in interprofessional practice	Mixed-methods study	Nurses and other healthcare professionals	IPPN improved communication among professionals; challenges included inconsistent documentation practices.
Alotaibi et al. (2025)	Multinational	To identify interventions, barriers, and facilitators for enhancing digital readiness among healthcare professionals	Mixed-methods systematic review	Healthcare professionals	Digital readiness was influenced by digital literacy, organizational support, and continuous training.
Isidori et al. (2022)	Germany	To explore nurses' roles and competencies in the digital healthcare era	Scoping review	Nurses	Effective digital readiness requires integration of technical, managerial, and communication competencies.
Kollmann et al. (2025)	Austria	To explore requirements for interdisciplinary digital health data exchange in mobile care settings	Delphi study	Healthcare and nursing experts	Interoperability, usability, and context-sensitive access were identified as essential requirements.
Livesay et al. (2024)	United States	To identify gaps in digital health capabilities within nursing education curricula	Gap analysis study	Nursing educators	Significant gaps were identified, highlighting the need for curriculum enhancement in digital health.
Mohamed et al. (2025)	Egypt	To examine the relationship between nurses' e-health literacy and technology-mediated clinical practice	Cross-sectional study	NICU nurses	Higher e-health literacy was associated with more effective technology-mediated clinical practice.
Wulandari et al. (2023)	Indonesia	To review innovation strategies for IPPN based on accreditation standards	Literature review	Nurses	Many documentation tools were misaligned with accreditation standards, indicating the need for IPPN innovation.

Main Thematic Findings

Based on the thematic synthesis**,** the findings were organized into four main themes representing key dimensions of healthcare professionals' readiness for implementing digital IPPN to support interprofessional collaboration.

***Theme 1**. Digital Readiness and Technological Literacy of Healthcare Professionals*

Most studies reported considerable variability in healthcare professionals' levels of digital readiness. Evidence from cross-sectional studies and systematic reviews indicated that digital literacy, confidence in using electronic systems, and prior exposure to health information technology were critical individual-level factors influencing readiness. Healthcare professionals with higher technological competence were generally more prepared to adopt digital documentation systems effectively.

***Theme 2.** Organizational Support and Implementation Policies*

Several studies emphasized the importance of organizational support in facilitating successful digital documentation implementation. Key elements of organizational readiness included institutional policies, continuous training programs, managerial leadership, and the availability of technological infrastructure. Studies conducted in developing countries consistently identified limited resources and inadequate organizational support as major barriers to effective implementation.

***Theme 3**. Interprofessional Collaboration in Digital Documentation*

The findings indicated that integrated digital documentation systems have the potential to enhance interprofessional communication and coordination. Shared access to real-time clinical information was reported to support collaborative decision-making and continuity of care. However, differences in professional roles, documentation practices, and levels of system understanding across disciplines were noted as ongoing challenges to optimal interprofessional collaboration.

***Theme 4**. Implementation Challenges and Capacity-Building Needs*

The final theme highlighted several challenges associated with digital documentation implementation, including user resistance, perceived increases in workload, and limited system interoperability. Multiple studies underscored the need for capacity-building strategies, such as targeted training, workflow adaptation, and the development of more user-friendly systems, to ensure the sustainability of digital IPPN. implementation.

DISCUSSION

The digitalization of healthcare documentation systems has been widely recognized as a key strategy for enhancing interprofessional collaboration and clinical decision-making. Evidence from previous studies indicates that the implementation of Electronic Health Records (EHR) facilitates coordination among healthcare professionals by improving access to patient information and supporting integrated clinical workflows (Robertson et al., 2022). Similarly, the integration of electronic documentation within interprofessional models of care has been shown to strengthen team communication and improve clinical outcomes (Saoudite, 2023). These findings are consistent with local evidence demonstrating that Integrated Patient Progress Notes (IPPN) function as an effective communication tool that supports multidisciplinary care planning and alignment of clinical interventions (Afrizal et al., 2019; Saoudite, 2023).

From a readiness perspective, the adoption of digital documentation systems is closely associated with healthcare professionals' preparedness to adapt to changes in clinical workflows. Several studies report positive attitudes toward electronic documentation, particularly among professionals who possess adequate technological literacy and have been exposed to interprofessional learning environments during their education (Ngusie et al., 2022; Wynne et al., 2024). However, resistance to change, limited technical training, and insufficient organizational support remain significant barriers, especially in primary healthcare and resource-limited settings such as those found in Indonesia (Afrizal et al., 2019). These findings align with organizational readiness and technology adoption theories, which emphasize the interaction between individual capability, motivation, and institutional support in determining successful implementation.

Digital competence emerges as a critical determinant of effective documentation adoption and utilization. International studies highlight that e-health literacy and adaptability to digital systems directly influence technology-mediated clinical practice and patient safety outcomes (Mohamed et al., 2025). Competencies related to digital communication, system usability, and interoperability are essential for enabling real-time information exchange across professional

boundaries (Kollmann et al., 2025; Vaseghi et al., 2022). In the context of interprofessional collaboration, these competencies support not only technical documentation processes but also the integration of clinical information required for shared decision-making.

Several intervention strategies have been identified as effective in enhancing healthcare professionals' readiness for digital system implementation. Structured digital technology training has been shown to improve user confidence and adaptability (Alotaibi et al., 2025). In addition, the integration of digital health competencies into healthcare education curricula contributes to improved readiness among future professionals (Livesay et al., 2024). Mentoring and peer support during the early stages of system implementation have also been recommended as practical strategies to reduce resistance and strengthen collaborative documentation practices (Saoudite, 2023).

Despite its potential benefits, the implementation of digital documentation systems presents ongoing technical and managerial challenges. Major barriers include limited infrastructure capacity, variability in human resource readiness, resistance to change, and insufficient organizational support (Afrizal et al., 2019). At the international level, issues related to system interoperability and data governance remain critical concerns affecting sustainability and scalability (Kollmann et al., 2025). Conversely, strong managerial commitment, continuous training programs, supportive organizational culture, and user-friendly system design have been consistently identified as key facilitators of successful implementation (Alotaibi et al., 2025; Livesay et al., 2024; Wynne et al., 2024).

In particular, the implementation of digital IPPN has demonstrated potential to enhance interprofessional collaboration and patient safety through more accurate, standardized, and simultaneously accessible clinical documentation (Kusumaningrum et al., 2018). Beyond improving professional coordination, digital IPPN supports more responsive and predictive clinical processes by enabling timely information sharing among care team members (Robertson et al., 2022). Local studies further emphasize the importance of aligning digital documentation systems with accreditation standards to ensure integration into routine professional practice (Evi Wulandari & Rizki Fitryasari, 2023).

Overall, this literature synthesis indicates that digital documentation—especially through the implementation of IPPN—contributes positively to strengthening interprofessional collaboration, optimizing clinical communication, and enhancing digital readiness among healthcare professionals. Successful implementation is influenced by a combination of individual readiness, digital competence, organizational support, and continuous education and training (Ngusie et al., 2022; Alotaibi et al., 2025). Although the findings demonstrate promising trends, further research is required to evaluate the effectiveness of digital IPPN implementation across different healthcare facility levels and to examine its impact on clinical outcomes and interprofessional dynamics in greater depth.

Strengths and Limitations

This review integrates systematic evidence with conceptual analysis, allowing a comprehensive understanding of healthcare professionals' readiness in digital IPPN implementation. However, several limitations should be acknowledged. The inclusion of studies published only in English and Indonesian may have limited the scope of evidence. In addition, the heterogeneity of study designs and the predominance of studies from developed countries may affect the generalizability of findings to low- and middle-income healthcare settings. Furthermore, as the review protocol was not registered in PROSPERO, transparency may be limited, although the review process followed PRISMA 2020 guidelines.

Practical Implications and Directions for Future Research

From a practical perspective, healthcare facilities—particularly nursing services in Indonesia—should prioritize structured and continuous digital literacy training for nurses, focusing on the use of IPPN as a collaborative documentation tool. Mentoring mechanisms involving senior nurses or designated digital facilitators may help reduce resistance and support sustainable implementation. At the organizational level, integrating digital IPPN into nursing standard operating procedures and accreditation-based documentation standards is essential to ensure alignment with national policies, including Minister of Health Regulation No. 24 of 2022 on electronic medical records.

Future research should focus on intervention-based and implementation studies, such as evaluating digital readiness models in Indonesian hospitals of different service levels (e.g., Type B and C hospitals), assessing the effectiveness of digital training interventions for nurses, and conducting qualitative studies exploring barriers to digital IPPN adoption in specific clinical units. Longitudinal and mixed-methods approaches are recommended to capture changes in documentation practices and interprofessional collaboration over time.

CONCLUSION

This conceptual analysis and systematic review indicate that healthcare professionals' readiness is a key determinant in the successful implementation of digital Integrated Patient Progress Notes (IPPN) as a collaborative documentation instrument. Digital literacy, technological competence, organizational support, and training interventions are essential to ensure effective integration of digital IPPN into clinical nursing practice and interprofessional collaboration. The findings highlight that digital IPPN should be positioned not only as a documentation system but also as a strategic foundation for strengthening coordinated, evidence-based clinical care. This review proposes a conceptual framework of digital readiness that may serve as a reference for implementing digital IPPN across healthcare settings. Further research is recommended to empirically test this framework and evaluate its impact on nursing practice quality and interprofessional collaboration outcomes.

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