The Virtual Post Discharge Nursing Clinic and Hospital Readmission: Systematic Review

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Abstract

Hospital readmissions pose a persistent challenge to healthcare systems worldwide, signaling gaps in transitional care and contributing to increased costs and poor patient outcomes. In response, virtual post-discharge nursing clinics have emerged as an innovative telehealth-based intervention aimed at reducing preventable readmissions by providing remote follow-up, symptom monitoring, patient education, and early clinical intervention. This systematic literature review (SLR) synthesizes evidence from 2000 to 2024 to evaluate the effectiveness of virtual nursing clinics in minimizing hospital readmissions. The review draws from Scopus and Web of Science, using defined inclusion criteria targeting peer-reviewed, open-access studies focused on virtual nursing interventions in the post-discharge phase. The findings highlight both the potential benefits and limitations of such interventions, including variations in care models, technology integration, patient engagement, and outcomes across healthcare systems. While many studies report positive results particularly in managing chronic diseases and elderly populations gaps remain regarding standardization, scalability, cost-effectiveness, and equity in digital care access. This review contributes to the existing knowledge by identifying critical success factors, highlighting research gaps, and offering insights for healthcare policymakers and clinicians aiming to optimize transitional care through virtual nursing innovations.

Keywords*:* Virtual nursing clinic, hospital readmission, telehealth follow-up, post-discharge care, transitional nursing interventions

1.Introduction

Hospital readmissions continue to present a major challenge to healthcare systems globally, both in terms of clinical outcomes and financial implications. These unplanned readmissions often signify failures in the transition from hospital to home and are commonly linked to insufficient post-discharge support. Reducing preventable readmissions has become a strategic priority across many health systems, as they represent a critical indicator of healthcare quality and cost efficiency (Duncan et al., 2021; Baldino et al., 2021). In this context, virtual post-discharge nursing clinics have emerged as a promising intervention, leveraging telehealth technologies to provide follow-up care, clinical assessments, patient education, and early detection of complications in the post-acute phase (Chauhan & McAlister, 2022; Perpetua et al., 2023). The rapid expansion of telehealth during the COVID-19 pandemic further catalyzed the adoption of these virtual models, demonstrating their feasibility and potential in maintaining continuity of care

while minimizing exposure risks (DeLong et al., 2023; Tudorache et al., 2022). Virtual post-discharge nursing clinics provide structured support for patients recently discharged from hospital by enabling remote monitoring and communication between nurses and patients. This model is particularly critical during the first 30 days post-discharge, a period often associated with increased vulnerability to adverse events and rehospitalization (Coppa et al., 2021; King et al., 2023). Through virtual clinics, nurses conduct follow-up assessments, reinforce discharge instructions, monitor symptoms, and address concerns, thereby facilitating timely interventions that can prevent clinical deterioration. The incorporation of telemonitoring tools further enhances the scope of care by allowing real-time surveillance of vital signs and early identification of clinical warning signs (Stergiopoulos et al., 2024; Santos et al., 2024). Despite these benefits, implementation remains variable, with differences in delivery models, frequency of contact, and integration with broader care systems. Factors such as staffing capacity, digital literacy, technology infrastructure, and patient case mix all influence the design and outcomes of these interventions (Krzesiński, 2023; Bamforth et al., 2021).

The current literature on virtual post-discharge nursing clinics demonstrates mixed outcomes. While several studies report reductions in readmission rates, others present limited or inconsistent effects, reflecting heterogeneity in both intervention components and study contexts (Thompson et al., 2021; Wray, 2022). Additionally, contextual factors such as geographic region, healthcare financing models, and patient population characteristics affect the scalability and efficacy of these programs. For example, fee-for-service systems in North America may incentivize innovation in transitional care more than publicly funded systems in Europe, where cost containment and standardization often dominate care delivery (Griffith et al., 2022). Vulnerable populations such as elderly patients, those with chronic diseases like heart failure or COPD, and individuals transitioning to skilled nursing facilities have been primary targets of virtual nursing interventions due to their elevated risk of readmission (Stergiopoulos et al., 2024; Teo & Wright, 2023). Tailoring virtual care approaches to meet the needs of these groups is essential, especially where comorbidities and social determinants of health complicate recovery. Although the evidence base is expanding, substantial knowledge gaps remain. Uncertainty persists regarding the most effective formats and intensities of virtual nursing follow-up, optimal timing of interventions, and integration of technologies such as AI-driven risk stratification or remote automated monitoring (Santos et al., 2024; Saeed et al., 2022). Furthermore, few studies have thoroughly evaluated cost-effectiveness, long-term outcomes, or patient and provider satisfaction. Disparities in outcomes across regions also point to the influence of digital infrastructure, socioeconomic status, and health system maturity on implementation success (Alshammari et al., 2024; Liang et al., 2021). Without a comprehensive synthesis of the evidence, it remains difficult to draw definitive conclusions or establish evidence-based guidelines for virtual post-discharge nursing clinics. To address these gaps, this systematic review critically examines the available literature on virtual post-discharge nursing clinics and their impact on hospital readmission. By analyzing study characteristics, intervention components, patient outcomes, and contextual factors, the review aims to identify effective models and inform the development of best practices in transitional care. The findings are intended to support healthcare providers, nurse leaders, and policymakers in enhancing post-discharge care delivery and improving patient outcomes through the strategic use of virtual nursing clinics.

2.Methodology

SLR was conducted to comprehensively examine the impact of virtual post-discharge nursing clinics on hospital readmission rates. The review focused on studies published between the years 2000 and 2024 to capture contemporary evidence related to the evolution and application of virtual nursing care in post-discharge settings. Two leading academic databases, Scopus and Web of Science (WOS), were selected to ensure extensive coverage of peer-reviewed literature, given their broad indexing of health sciences, nursing, and telehealth research. The search strategy employed a combination of keywords including "virtual nursing clinic," "post-discharge care," "hospital readmission," "telehealth nursing," and "transitional care," thereby targeting studies specifically addressing the intersection of virtual nursing interventions and hospital readmission outcomes. Inclusion criteria were established to refine the search results and enhance relevance and accessibility. Only articles that were open access were considered to ensure that the full texts were available for thorough analysis. Moreover, studies had to be directly relevant to the scope of the review, encompassing virtual nursing clinics or telehealth nursing interventions applied during the post-discharge phase, with explicit examination of hospital readmission metrics. Conversely, studies were excluded if their focus did not align with the defined scope, such as those that addressed virtual care outside of nursing-led models or post-discharge contexts unrelated to hospital readmissions. The methodological rigor of this review was supported by systematic screening and selection processes. Titles and abstracts of retrieved articles were initially screened to exclude duplicates and irrelevant studies. Subsequently, full-text reviews were conducted to assess eligibility against the inclusion and exclusion criteria. This step ensured that the synthesis included high-quality, pertinent evidence capable of addressing the research objectives comprehensively.

The selected studies encompass diverse methodological designs, including randomized controlled trials, retrospective cohort studies, systematic reviews, and meta-analyses. This variety allowed for a multifaceted understanding of virtual nursing interventions' efficacy in reducing hospital readmissions, as evidenced by significant contributions in the literature (Uminski et al., 2018; Chauhan & McAlister, 2022). The data extraction process captured essential study characteristics such as population demographics, intervention modalities, outcome measures related to readmissions, and key findings. Quality assessment and critical appraisal were performed to evaluate the validity and reliability of included studies, with particular attention to study design, sample size, and risk of bias, following established systematic review standards. This methodological approach enables a comprehensive synthesis of existing evidence on the role and effectiveness of virtual post-discharge nursing clinics in reducing hospital readmissions. The review draws on a robust corpus of recent research, including emerging telehealth models and AI-driven follow-up interventions, thereby situating the findings within the context of contemporary digital health advances and nursing practices (Perpetua et al., 2023; Santos, Peyroteo, & Lapão, 2024). Ultimately, this rigorous and transparent methodology supports the generation of meaningful insights and practical implications for healthcare providers, policymakers, and nursing leadership aiming to optimize post-discharge care and minimize avoidable hospital readmissions. Figure 1 shows the step-by-step process of article selection, including identification, screening, and inclusion criteria used in this systematic literature review.

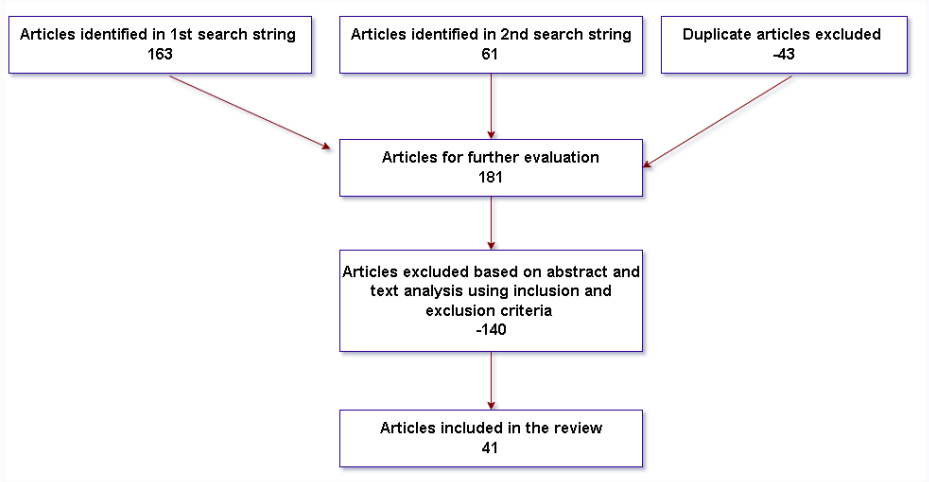

Figure 1: The Systematic Review Process

3.Impact of Virtual Post Discharge Nursing Clinics on Hospital Readmission

The impact of virtual post-discharge nursing clinics on hospital readmission has been the focus of increasing scholarly attention, with numerous studies highlighting their potential to reduce readmission rates. Key components of these interventions commonly include telephonic follow-up, remote monitoring, and video consultations, which collectively aim to provide timely patient support after discharge (Chauhan & McAlister, 2022; Nguyen et al., 2021). Research indicates that the timing and frequency of nursing contacts are critical factors influencing patient outcomes, with early follow-up particularly within the first week post-discharge associated with lower readmission risks (Coppa et al., 2021; Tak et al., 2021). Patient adherence and engagement with virtual clinic protocols also play a significant role, as successful implementation depends on patients' ability to interact with digital platforms and comply with care recommendations (King et al., 2023; Liang et al., 2021).

Studies reveal a range of facilitators and barriers affecting the effectiveness of virtual nursing interventions. Facilitators include robust communication strategies, integration with multidisciplinary teams, and accessibility of technology, while barriers often encompass digital literacy challenges, socioeconomic disparities, and concerns related to data privacy (Tudorache et al., 2022; Wray, 2022). Comparisons between virtual nursing interventions and usual care or alternative post-discharge strategies demonstrate mixed results, with some evidence favoring virtual care models for certain chronic conditions, notably heart failure, yet highlighting the need for further rigorous trials to establish comparative effectiveness across diverse patient populations (Friedman et al., 2021; Paulson et al., 2023). Table 1 presents a literature review matrix summarizing study characteristics, intervention modalities, and reported readmission outcomes, offering a comprehensive overview of current evidence and guiding future research priorities in virtual post-discharge nursing care.

Table 1 : Literature Review Matrix

No	Author(s) and Year	Virtual Ward Impact	Transitional Care	Nurse-led Education	Video Follow-ups	Frailty Care	Discharge Clinic	Early Follow-up	Telephone Follow-up	AI Risk Prediction	Multidisciplinary Care	Telemonitoring	Virtual Nursing	Post-discharge Hotline	Geriatric Follow-up	Follow-up Timing	Self-Management	Tele-homecare	Hybrid Hospital-at-Home	Cost Reduction
1.	Chauhan & McAlister (2022)	✔	✔					✔	✔											✔
2.	Perpetua et al. (2023)			✔									✔							
3.	DeLong et al. (2023)				✔															
4.	Teo & Wright (2023)			✔		✔			✔											✔
5.	Sass et al. (2024)						✔		✔											✔
6.	Coppa et al. (2021)							✔								✔				
7.	Nguyen et al. (2021)							✔	✔											
8.	Santos et al., (2024 ICE)									✔										
9.	Baldino et al. (2020)		✔				✔	✔			✔									✔
10.	Santos et al., (2024 EJP)									✔										
11.	Krzesiński (2023)				✔				✔	✔		✔					✔			
12.	Wray (2022)								✔											
13.	Bermúdez et al. (2021)								✔	✔										
14.	Conroy et al., (2020)		✔																	
15.	Duncan et al. (2021)																✔			
16.	Bibi et al. (2021)								✔					✔						
17.	Thomsen et al. (2021)					✔					✔				✔					
18.	Tak et al. (2021)							✔								✔				
19.	Khera et al. (2020)																			
20.	Sarteschi et al. (2020)																			
21.	Thompson et al. (2021)				✔				✔											
22.	Griffith et al. (2022)																			
23.	Barber et al. (2023)	✔																		

No	Author(s) and Year	Virtual Ward Impact	Transitional Care	Nurse-led Education	Video Follow-ups	Frailty Care	Discharge Clinic	Early Follow-up	Telephone Follow-up	AI Risk Prediction	Multidisciplinary Care	Telemonitoring	Virtual Nursing	Post-discharge Hotline	Geriatric Follow-up	Follow-up Timing	Self-Management	Tele-homecare	Hybrid Hospital-at-Home	Cost Reduction
24.	Baldino et al. (2021)		✔				✔				✔									✔
25.	Kao et al. (2020)			✔																
26.	Morken et al. (2022)																✔			
27.	Adamuz Tomás et al. (2021)			✔					✔											
28.	Saeed et al. (2022)							✔		✔										
29.	Afridayani et al. (2020)								✔											
30.	Stergiopoulos et al. (2024)											✔								
31.	Ramzi (2022)							✔												
32.	Tudorache et al. (2022)												✔							
33.	Harkey et al. (2021)				✔															
34.	Friedman et al. (2021)																			✔
35.	Paulson et al. (2023)																		✔	✔
36.	Liang et al. (2021)			✔														✔		
37.	Griffin et al. (2021)		✔				✔		✔		✔									
38.	Bamforth et al. (2021)			✔							✔									
39.	McGillion et al. (2021)											✔								
40.	King et al. (2023)								✔								✔			
41.	Kuo et al. (2022)											✔								✔

Intervention Characteristics and Mechanisms

An examination of virtual post-discharge nursing interventions reveals a multifaceted spectrum of modalities and intensities designed to mitigate hospital readmission rates. These interventions are commonly categorized by their delivery method, ranging from telephonic follow-ups and remote symptom monitoring to video consultations and asynchronous digital communication platforms, each varying in frequency and clinical intensity (Chauhan & McAlister, 2022; Perpetua et al., 2023). The classification often distinguishes between low-intensity interventions, such as periodic telephone check-ins, and high-intensity models involving continuous remote monitoring combined with personalized telehealth consultations. This stratification underscores the tailoring of interventions to patient risk profiles and healthcare resource availability, thereby influencing effectiveness in reducing readmissions (Nguyen et al., 2021; Friedman et al., 2021). Central to the efficacy of these virtual nursing clinics is the role of comprehensive nursing assessments, targeted patient education, and vigilant symptom monitoring. Nursing assessments conducted remotely enable early identification of clinical deterioration, facilitating timely interventions that prevent avoidable hospital returns (Teo & Wright, 2023; Liang et al., 2021). Patient education delivered through virtual platforms focuses on enhancing understanding of discharge instructions, medication adherence, and self-management of chronic conditions, which collectively contribute to improved outcomes (Perpetua et al., 2023; King et al., 2023). Symptom monitoring, often supported by telemonitoring devices or structured telephone protocols, provides ongoing clinical surveillance, allowing nurses to detect subtle changes warranting clinical escalation (Stergiopoulos et al., 2024; Santos, Peyroteo, & Lapão, 2024).

The timing and personalization of communication within virtual nursing interventions are critical mechanisms that influence hospital readmission rates. Studies consistently highlight that early post-discharge contact, ideally within the first seven days, correlates with a significant reduction in readmission risk (Coppa et al., 2021; Tak et al., 2021). Personalized care plans, developed collaboratively between nurses and patients, address individual health needs, comorbidities, and social determinants, enhancing adherence to care recommendations and empowering patients in self-management (King et al., 2023; Baldino et al., 2021). Timely, patient-centered communication thus serves as both a preventive and supportive measure, mitigating gaps in transitional care. The acceptance and usability of the technology underpinning virtual nursing clinics are recognized as pivotal to intervention success. The degree to which patients engage with telehealth platforms depends on factors such as user-friendly interface design, reliable connectivity, and the provision of technical support (Tudorache et al., 2022; Wray, 2022). High usability reduces cognitive and operational burdens, fostering patient confidence and sustained participation in virtual care programs (Bermúdez et al., 2021). Conversely, technological challenges including platform complexity and connectivity issues undermine patient engagement and adherence, thereby diminishing intervention effectiveness (Nikou & Maslov, 2021). Several barriers constrain the optimal implementation of virtual post-discharge nursing interventions. Foremost among these are technological limitations, encompassing inadequate digital infrastructure, inconsistent internet access, and device unavailability, particularly pronounced in resource-poor settings (Alshammari et al., 2024; Santos, Peyroteo, & Lapão, 2024).

Patient digital literacy deficits represent another significant hurdle; patients unfamiliar or uncomfortable with digital technologies may exhibit resistance or face difficulties navigating virtual platforms (Tudorache et al., 2022). Resource constraints within healthcare systems, including insufficient nurse training in virtual care delivery and limited allocation of staff time for remote monitoring, further hinder program scalability and sustainability (Perpetua et al., 2023; Liang et al., 2021). Conversely, facilitators enhancing the effectiveness of virtual nursing clinics have been identified in the literature. Comprehensive nurse training programs aimed at building competencies in telehealth modalities improve the quality and consistency of care delivery (Tudorache et al., 2022). Patient motivation, often fostered through personalized education and positive reinforcement, drives engagement with virtual interventions (King et al., 2023). Robust healthcare infrastructure, including integrated electronic health records and interdisciplinary collaboration, supports seamless information flow and coordinated care, amplifying intervention impact (Chauhan & McAlister, 2022; Baldino et al., 2021). Together, these facilitators enable tailored, patient-centered post-discharge support, effectively reducing readmission risks. Table 2 synthesizes key intervention components and underlying mechanisms influencing hospital readmission outcomes within virtual post-discharge nursing clinics. It delineates modalities by communication channels and intensity, highlights nursing roles in assessment and education, details technology-related factors affecting usability and acceptance, and outlines barriers and facilitators shaping intervention success. This structured overview provides a consolidated framework to guide future program design and research aimed at optimizing virtual post-discharge nursing care.

Table 2 : Summary of Intervention Components and Mechanisms Affecting Hospital Readmission

Category	Key Elements Identified in Literature
Intervention Modalities	Telephonic follow-up, video consultations, remote monitoring, asynchronous communication (Chauhan & McAlister, 2022; Perpetua et al., 2023)
Intensity Levels	Low-frequency check-ins to continuous monitoring and multi-disciplinary telehealth (Nguyen et al., 2021; Friedman et al., 2021)
Nursing Roles	Assessment for early deterioration, patient education, symptom monitoring (Teo & Wright, 2023; Liang et al., 2021)
Communication & Care Planning	Timely contact (within 7 days), personalized care plans, patient empowerment (Coppa et al., 2021; King et al., 2023)
Technology Acceptance & Usability	User-friendly platforms, reliable connectivity, technical support (Tudorache et al., 2022; Bermúdez et al., 2021)
Barriers	Technological limitations, digital literacy deficits, resource constraints (Alshammari et al., 2024; Tudorache et al., 2022)
Facilitators	Nurse telehealth training, patient motivation, integrated healthcare infrastructure (Perpetua et al., 2023; Baldino et al., 2021)

3.1. Global Distribution of Studies in the SLR

The geographic distribution of studies included in this systematic review on virtual post-discharge nursing clinics and hospital readmission predominantly reflects research conducted in North America, which accounts for 41% of the total studies, as illustrated in Figure 2. This regional concentration is attributable to the advanced healthcare infrastructure and broad integration of telehealth technologies in the United States and Canada, enabling comprehensive implementation and evaluation of virtual nursing interventions (Chauhan & McAlister, 2022; Nguyen et al., 2021). The mixed public-private healthcare systems in North America, supported by extensive insurance coverage, facilitate innovation in transitional care models and allow for robust collection and analysis of outcome data. Moreover, the substantial burden of chronic illnesses such as heart failure, alongside dedicated funding for post-discharge care research, further explains the prominence of North American studies in this field. Europe accounts for 20% of the studies, indicating significant research activity, albeit to a lesser extent. European healthcare systems, largely funded through public or single-payer models, exhibit considerable heterogeneity in telemedicine adoption and virtual nursing integration across different countries (Griffith et al., 2021; DeLong et al., 2023). European studies tend to focus on structured follow-up protocols within national healthcare frameworks and address region-specific regulatory and privacy issues that influence virtual clinic implementation and scalability (Wray, 2022).

Asia contributes 17% of the studies, reflecting emerging interest and development of virtual nursing clinics in countries such as China, South Korea, and India (Liang et al., 2021; Tak et al., 2021). However, significant heterogeneity exists across the region in terms of healthcare infrastructure, digital literacy, and access to technology, resulting in variable implementation success and patient outcomes. Economic disparities and urban-rural divides pose challenges to equitable access and telehealth readiness, emphasizing the need for targeted capacity building in digital health literacy and infrastructure to optimize virtual care delivery. South America, representing 7% of the studies, demonstrates a relative paucity of empirical research despite growing enthusiasm for digital health interventions. Fragmented healthcare systems, constrained resources, inconsistent internet connectivity, and socioeconomic barriers collectively hinder the widespread adoption and evaluation of virtual post-discharge nursing clinics within this region (Paulson et al., 2023). Notably, no studies from Africa were identified, signifying a substantial gap in research despite a considerable burden of hospital readmissions and increasing deployment of mobile health technologies. Challenges such as limited funding, infrastructural deficits, and early-stage telehealth integration contribute to this underrepresentation (Alshammari et al., 2024).

Approximately 15% of studies included in this review are categorized as multi-regional, global, or of unclear geographic origin, typically encompassing multi-center trials or systematic reviews synthesizing data across various settings (Santos et al., 2024; Stergiopoulos et al., 2024). While these studies provide valuable cross-contextual insights, their findings may lack specificity due to heterogeneity in healthcare system characteristics and patient populations. The structural and organizational differences in healthcare financing across regions markedly influence the design, implementation, and outcomes of virtual post-discharge nursing clinics. For example, fee-for-service reimbursement models prevalent in North America incentivize efforts to reduce readmissions and foster innovation in care transitions, whereas publicly funded systems in Europe prioritize cost containment and standardization, shaping intervention

strategies accordingly (Griffith et al., 2021). Clinical populations studied are largely comprised of patients with chronic diseases such as heart failure and chronic obstructive pulmonary disease, surgical patients requiring postoperative monitoring, and elderly or frail individuals discharged to skilled nursing facilities (Chauhan & McAlister, 2022; DeLong et al., 2023; Teo & Wright, 2023). Regional disparities in technology adoption and accessibility significantly affect patient engagement and intervention efficacy; well-resourced regions report higher adherence and improved outcomes, while infrastructural and socioeconomic constraints in other areas limit the reach and effectiveness of virtual clinics (Nguyen et al., 2021; Alshammari et al., 2024). These findings underscore the imperative for tailored, context-sensitive approaches to implementation that consider regional healthcare landscapes to optimize the global expansion of virtual post-discharge nursing services.

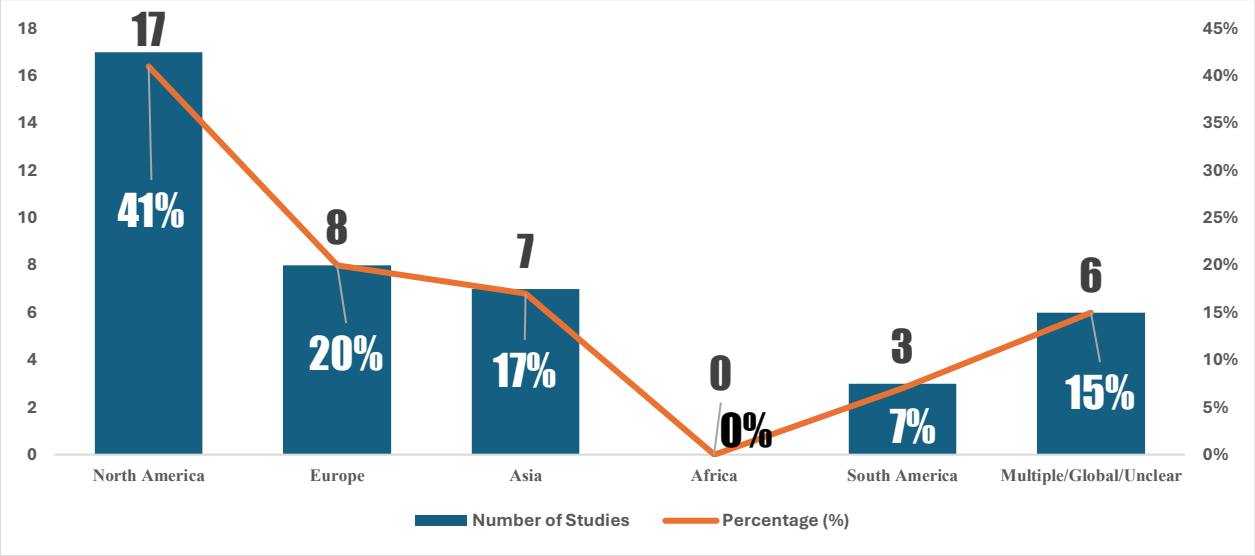

Figure 2: Distribution of Studies by Region in Virtual Post-Discharge Nursing Clinic Research

4.Discussion

The evidence from this systematic review supports the effectiveness of virtual post-discharge nursing clinics in reducing hospital readmission rates across various patient populations and clinical settings. Several high-quality studies, including meta-analyses and randomized controlled trials, have demonstrated that virtual nursing interventions ranging from telephonic follow-ups and video consultations to remote patient monitoring contribute to significant reductions in 30-day readmissions, particularly among patients with chronic conditions such as heart failure and chronic obstructive pulmonary disease (Chauhan & McAlister, 2022; Stergiopoulos et al., 2024; Liang et al., 2021). The heterogeneity in intervention components, including the intensity and modality of nursing contact, influences the extent of effectiveness observed. For example, early post-discharge contact within the first week is consistently associated with improved outcomes (Coppa et al., 2021; Tak et al., 2021), and interventions that combine multiple modalities such as telemonitoring with personalized nursing

education demonstrate greater efficacy. Patient engagement and adherence to virtual care protocols are critical determinants of success, emphasizing the need for user-friendly technologies and comprehensive patient education to enhance participation (King et al., 2023; Tudorache et al., 2022). Moreover, the integration of virtual nursing into multidisciplinary care pathways facilitates timely identification of clinical deterioration and prompt management, further contributing to the reduction of avoidable readmissions (Baldino et al., 2021; Perpetua et al., 2023). However, the implementation and scalability of virtual post-discharge nursing clinics are influenced by organizational and technological infrastructure. Robust healthcare systems with integrated electronic health records and interdisciplinary collaboration better support virtual care models, enabling efficient communication and resource allocation (Chauhan & McAlister, 2022; Griffith et al., 2021).

Conversely, challenges such as limited digital literacy, variable access to technology, and insufficient healthcare provider training impede effective adoption, particularly in resource-limited or rural settings (Alshammari et al., 2024; Liang et al., 2021). These barriers highlight the importance of context-specific strategies to enhance digital inclusion and ensure equitable access to virtual nursing services. Additionally, healthcare providers require ongoing education and training in telehealth delivery to maintain high-quality care and address technological challenges effectively (Tudorache et al., 2022). Addressing these challenges is essential for optimizing the feasibility and sustainability of virtual post-discharge nursing clinics globally. From a healthcare policy perspective, the findings underscore the imperative to formally integrate virtual nursing clinics into discharge planning and transitional care frameworks. Incorporating standardized intervention protocols can reduce variability in practice and improve outcome consistency (Sass et al., 2024; Griffith et al., 2021). Policy initiatives should prioritize resource allocation to support infrastructure development, workforce training, and patient education, thereby maximizing the benefits of virtual care models. Furthermore, the call for mixed-method and longitudinal research is evident to better understand long-term patient outcomes, cost-effectiveness, and contextual factors influencing implementation (Santos et al., 2024; Perpetua et al., 2023). Such studies will provide deeper insights into how virtual nursing interventions can be optimized and tailored to diverse healthcare settings and patient needs. In summary, virtual post-discharge nursing clinics represent a promising innovation for reducing hospital readmissions, with significant potential to enhance patient outcomes and alleviate healthcare system burdens when effectively implemented and supported.

5.Gap within the Literature

Despite the growing interest and implementation of virtual post-discharge nursing clinics as interventions aimed at reducing hospital readmissions, significant gaps remain in the current literature that limit a comprehensive understanding of their effectiveness, accessibility, and practical scalability. One prominent gap lies in the limited evidence surrounding standardized protocols for virtual post-discharge nursing interventions. Although various studies, such as the systematic review by Chauhan and McAlister (2022), demonstrate promising outcomes in virtual transitional care reducing mortality and readmissions, the heterogeneity of virtual care models, nurse-led follow-ups, and discharge protocols complicates direct comparisons and the establishment of best practices. For instance, Perpetua et al. (2023) introduced a

virtual discharge (VDC) protocol enhancing discharge education with positive patient satisfaction and readmission outcomes, yet such interventions lack a universally accepted framework or standardized operational guidelines that could facilitate widespread adoption across diverse healthcare systems. This absence hinders the reproducibility and scaling of these virtual nursing clinics beyond pilot studies or single-site implementations, as exemplified by various isolated studies that demonstrate efficacy but lack generalizability (Baldino et al., 2021; Sass et al., 2024). Another critical gap in the literature pertains to the underrepresentation of diverse patient populations and a narrow focus on specific chronic disease conditions. The majority of extant research predominantly targets populations with heart failure or post-surgical cases (Chauhan & McAlister, 2022; DeLong et al., 2023; Stergiopoulos et al., 2024), leaving a paucity of data on the applicability and effectiveness of virtual post-discharge nursing interventions for patients with other chronic diseases such as chronic kidney disease, diabetes, or multimorbidity scenarios. For example, although telehealth and virtual clinics have shown promising reductions in readmissions for heart failure (Krzesiński, 2023; Friedman et al., 2021) and chronic obstructive pulmonary disease (Stergiopoulos et al., 2024), less attention is given to neurological, oncology, or mental health patients who also represent substantial readmission risks. Moreover, socioeconomically and ethnically diverse patient cohorts remain largely unexplored in these virtual care studies, which typically focus on predominantly urban, insured populations. This gap restricts the generalizability of findings and limits the development of culturally sensitive and inclusive virtual nursing programs capable of addressing healthcare disparities (Nguyen et al., 2021; Griffith et al., 2022).

The literature also reveals insufficient data regarding the cost-effectiveness and scalability of virtual post-discharge nursing clinics. While some studies provide preliminary evidence on cost savings, such as Friedman et al. (2021) reporting reductions in hospital readmissions accompanied by estimated per-patient savings, these analyses are often limited to specific settings or small cohorts without comprehensive economic evaluations encompassing broader healthcare system perspectives. Furthermore, sustainability and resource allocation for virtual care programs remain underexplored. For example, Tudorache et al. (2022) discussed the feasibility of virtual nursing applications amid the COVID-19 pandemic but did not address long-term operational costs, workforce training, or integration challenges within existing care pathways. This absence of economic and operational data creates a barrier to convincing policymakers and healthcare administrators to invest in or mandate virtual post-discharge nursing clinics on a larger scale, especially in resource-constrained environments or rural settings (Griffin et al., 2021; Paulson et al., 2023). A related but distinct gap is the underexplored impact of socio-demographic factors on both the accessibility and outcomes of virtual post-discharge nursing interventions. Although some evidence highlights disparities in virtual care access linked to social determinants such as age, income, geographic location, and digital literacy (King et al., 2023; Barber et al., 2023), these variables are insufficiently integrated into studies evaluating virtual clinics' effectiveness. This results in an incomplete understanding of how factors like language barriers, technology affordability, internet availability, and cultural attitudes influence patient engagement and clinical outcomes. For instance, Wray (2022) cautions that telehealth follow-ups post emergency department discharge were associated with increased return visits and hospitalizations, suggesting that patient characteristics and social contexts may moderate virtual care effectiveness. Further, Bermúdez et

al. (2021) demonstrated high patient satisfaction with virtual assistant monitoring for COVID-19 patients, yet this intervention's scalability to vulnerable or marginalized groups remains unclear. A more nuanced examination of socio-demographic moderators could guide the tailoring of virtual nursing interventions to improve equity and optimize results.

Lastly, the literature lacks comprehensive studies evaluating technological barriers and facilitators across different healthcare settings. Many existing studies are conducted in well-resourced urban centers or integrated health systems with robust telehealth infrastructure (Nguyen et al., 2021; McGillion et al., 2021), but little is known about how these technologies perform in settings with variable digital readiness, such as rural hospitals, low-resource clinics, or developing countries. For example, Paulson et al. (2023) identified mHealth and teach-back communication as effective for readmission reduction in resource-limited settings, yet these studies are few and primarily descriptive. Additionally, technology usability, patient and provider digital literacy, and system interoperability issues are rarely addressed in depth, leaving significant gaps in understanding practical implementation challenges. The COVID-19 pandemic accelerated virtual care adoption, but as Krzesiński (2023) and Tudorache et al. (2022) suggest, long-term adoption requires robust evaluation of these technological factors to ensure consistent quality and patient safety. Addressing this gap would aid healthcare organizations in designing adaptable virtual post-discharge nursing clinics that are resilient to varying technological capabilities and infrastructure constraints.

6.Conclusion

This systematic literature review highlights the evolving role of virtual post-discharge nursing clinics as a strategic intervention to address the ongoing challenge of hospital readmissions. The analysis underscores that virtual nursing models, especially those incorporating early follow-up, telemonitoring, and individualized patient education, offer promising outcomes in preventing unnecessary readmissions across high-risk populations such as elderly patients and individuals with chronic conditions. The flexibility of delivery ranging from telephone check-ins to video consultations enables tailored support during the vulnerable post-discharge period. However, the review reveals considerable heterogeneity in intervention design, frequency of contact, and integration with broader healthcare systems, making it difficult to generalize findings. Additionally, the effectiveness of virtual clinics is influenced by digital literacy, accessibility of telehealth technologies, and organizational readiness, all of which vary significantly across healthcare contexts. Although the COVID-19 pandemic accelerated the global uptake of telehealth, this review identifies persistent gaps in standardization, scalability, and equity in access to virtual nursing care. Limited research from low- and middle-income regions, particularly in Africa and parts of South America, reflects disparities in digital infrastructure and health system capacity. Moreover, the absence of consistent cost-effectiveness evaluations and limited data on long-term patient outcomes highlight the need for more rigorous, comparative studies. Addressing these gaps requires a comprehensive, context-sensitive approach that prioritizes technology usability, health system integration, and support for both patients and providers. Future initiatives should focus on developing robust implementation frameworks and policy-level strategies to enable sustainable, inclusive, and

impactful virtual post-discharge nursing care globally. These findings serve as a foundation for guiding healthcare leaders, researchers, and policymakers in enhancing transitional care pathways through innovative digital nursing solutions.

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