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Telehealth and Virtual Nurse Teams: Literature Review

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Abstract

Telehealth has changed health care access, especially with the implementation of virtual nurse teams who use technology to provide remote healthcare management. This literature review explores more recent literature (2018-2024) related to telehealth management and virtual nurse teams and discusses the impacts of telehealth and virtual nurse teams related to patient outcomes, access to healthcare, and nursing practice. It includes the historical growth of telehealth, the use of telehealth for chronic disease management, mental health, critical care, and the involvement of virtual nurse teams to assist in the better delivery of care. Subsequent studies show how telehealth increases access to care, lowers health care costs, and increases patient satisfaction, while also discussing the barriers to telehealth that still exist, which include limited training, technology issues, and the lack of regulation. The literature found that virtual nurse teams are effective in-service and monitoring patients, but have barriers to implementation, such as resistance to change and privacy concerns. Data suggests that there are limitations of nurse-led telehealth interventions from a systematic literature review; there were also issues of developing standardized training and acceptance of telehealth interventions. Future research should explore the best use of the telehealth space, address health care access disparities, and, if possible, try to make changes to standardized telehealth practices to ensure equitable access to all clients. This review presented how telehealth and virtual nurse teams can transform health care systems.

Keywords: Telehealth, virtual nursing teams, remote patient monitoring, healthcare access, nurse-led interventions

Introduction

Telehealth delivery, through various digital and telecommunication technologies, has changed the world of modern healthcare as consumers and education providers engage in completely new ways, making it a key factor in expanding access and improving delivery of care (Dzau et al., 2020; Ezeamii et al., 2024). This change was given unparalleled emphasis and ultimate rapid adoption of telehealth care during the COVID-19 pandemic, where the continued provision of remote services addressed continuity of care while adhering to safety protocols (Bashshur et al., 2020). Alternatives to in-person appointments have been focused through telehealth platforms with video conferencing, mobile health, and remote patient monitoring (RPM) that allowed healthcare providers to deliver an array of services, such as routine visits, consultation, and complex chronic disease management with or without an appointment (Rutledge & Gustin, 2021).

Telehealth challenges healthcare workers to provide services innovatively (Barnett et al., 2021). During the pandemic, the emerging virtual nursing teams went from concept to essential, experiencing rapid deployment with ready deployments. They provided services like patient monitoring, triage, health education, and care coordination through telecommunication technologies (Rincon, 2023). Virtual nursing teams are interdisciplinary teams of registered nurses (RNs) and advanced practice nurses (APNs) who deliver care remotely using telemedicine technologies. Virtual nursing teams are responsible for the full scope of practice or develop specific telehealth programs with connecting with collaborating disciplines as needed, in providing unit-based, telehealth patient services. Virtual nursing teams have become a new category of nursing practice, expanding where nurses can provide patient care-based services, considering urban hospitals and rural communities' access (Powell et al., 2021; Fathi et al., 2022). The implementation of virtual nursing in telehealth systems has been especially beneficial to individuals with chronic illness, mental health needs, and critical care needs for individuals requiring timely intervention with sustained care, covariate monitoring (Bulto et al., 2023).

This literature review integrated literature from peer-reviewed studies between the years 2018 - 2024 to synthesize research on the management of telehealth systems and the role of virtual nursing teams. The literature review had three objectives: 1) Evaluate the use of telehealth systems by evaluating efficacy on patient outcomes, access to health care and management of nursing processes; 2) identify barriers to implementation of telehealth as triggers or impediments for broader adoption including factors like, technological capabilities, regulatory compliance, and training; and 3) identify key gaps in

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the literature are nurses, nurse leadership, standardization of training protocols, and access to telehealth services across populations.

The literature review was focused on the role of nurse-led interventions, the unique role of nurses in telehealth delivery, and the gaps in the literature regarding telehealth. Addressing the challenges of implementation and integrating telehealth to increase access to health care delivery from virtual nursing teams may lead to opportunities for nurses to combine the use of telehealth and integrate it into practice. In conclusion, the literature review emphasizes the opportunities telehealth and virtual nursing teams have to change the care delivery system and focuses on the future of telehealth and virtual nursing teams in routine clinical practice.

Methodology

A comprehensive search of the databases (PubMed, CINAHL, Scopus, Web of Science, and Google Scholar) was conducted using the keywords "telehealth," "virtual nursing teams," "remote patient monitoring," "nurse-led interventions," and "accessibility in healthcare." Articles published in English from 2018 to 2024 were eligible for inclusion if they were peer-reviewed articles, systematic reviews, or randomized controlled trials (RCTs). Studies were excluded if they were non-empirical studies, published in languages other than English, or focused on something other than nursing/telehealth.

Development of Telehealth in Nursing

The development of telehealth in nursing has ushered in a categorical shift in healthcare delivery, transitioning from a niche, largely a technology used to alleviate geographic boundaries in rural healthcare, to one of the mainstays of clinical practice (Rutledge & Gustin, 2021). Telehealth began as a simple mechanism to deliver basic consultations to remote and disadvantaged populations but has grown into a multifaceted ecosystem that includes multiple technologies like video conferencing, mHealth apps, wearable devices, and remote patient monitoring (RPM) systems (Powell et al., 2021). This evolution is attributed to improved digital infrastructure of health services, increased access to the internet, and the need for healthcare systems to respond to paradigm challenges, many of which were alarmingly revealed by the COVID-19 pandemic.

The worldwide health care emergency that started in 2020 was a positive accelerant of telehealth, resulting in a sudden increase in adoption, as health systems were searching for ways to maintain continuity of care in a socially distanced society. Medicaid telehealth claims increased by 15 times from 2019 to 2021, exemplifying its importance in providing access when access was challenged (Rincon, 2023). This was also a time of transformation for nursing practice. Nurses were able to quickly change roles within the telehealth realm, including remote patient monitoring, virtual triage, education, and teleconsultations. Engagement of technologies enabled high-quality care without needing to be next to the patient (Bulto et al., 2023).

Nurses have adapted a wide range of telehealth technologies in order to meet various patient needs. Video conferencing platforms or programs specific for telehealth expanded the utilization of real-time patient encounters, enabling nurses to evaluate the status of the patient, educate patients, and work to develop common care plans (Ezeamii et al., 2024). Mobile health applications have enabled yet another level of patient engagement by offering tools to assist patients with self-management, such as medication reminders, health tracking and measuring, and overall management of chronic conditions, such as diabetes and hypertension (Ben-Assuli, 2022). RPM tools, including wearable heart rate monitors and glucose sensors, enable nurses to collect patient data using real-time monitoring, facilitating needs as they arise, which can avert complications and prevent hospital readmissions (Wong et al., 2022).

Driving changes in telehealth, the necessity to address health disparities, particularly for patients from under-served and rural contexts, was an unexpected, positive consequence of the pandemic. Telehealth has permitted nurses to extend care to patients facing challenges with access due to lack of transportation, affordability, and geographical distance (Charalambous, 2024). The impact of this evolution has been improved access to care, but increasingly requires nurses to develop new skills, competently develop digital literacy, and learn clinical skills specific to telehealth (Rutledge & Gustin, 2021).

The development of telehealth was also possible due to the expansion of telehealth policies that continuously promote the use of telehealth (Anthony & Bui, 2020). As recently as 2021, the Centers for Medicare & Medicaid Services (CMS) expanded reimbursement for telehealth in favor of healthcare organizations integrating new telehealth services (Powell et al., 2021). Evidence from different sources suggests that telehealth has and will be part of healthcare delivery as nurses are engaged in the practice. As telehealth progresses, emerging technologies, such as artificial intelligence (AI) and predictive analytics, will increase nursing exponentially, allowing for a more personalized and data-informed approach to the profession (Booth et al., 2021; Zhang et al., 2021). This ongoing evolution affirms the transformative power of telehealth in nursing practice and establishes its ability to respond to persistent complexities in healthcare delivery.

Applications of Telehealth in Nursing

Telehealth has expanded the scope of nursing to allow nurses to work in various clinical areas, often facilitated through digital forms of communication. Nurses can provide care using digital communication modalities, such as video conferencing, mobile health (mHealth) applications, and remote patient monitoring

(RPM) applications. In this way, virtual nursing teams have been created to promote chronic disease management, maintain mental health, and provide urgent care and emergency services.

Table 1: Key Milestones in Telehealth Evolution

Year	Milestone	Impact on Nursing
2010	Introduction of telehealth for rural care	Expanded access to underserved populations
2020	COVID-19 pandemic accelerates telehealth adoption	Nurses trained for virtual care delivery
2021	CMS expands telehealth reimbursement	Increased nurse-led telehealth interventions
2024	Integration of AI and RPM in telehealth	Enhanced data-driven nursing care

Chronic Disease Management

Telehealth interventions led by nurses have been identified as a primary factor in the management of chronic conditions (such as hypertension, diabetes, and heart failure) by providing ongoing monitoring, patient education, or teaching self-management methods. Bulto et al. (2023) found a systematic review on the effectiveness of nurse-led telehealth programs found them to be beneficial in the management of systolic blood pressure in hypertensive patients, with patients reducing systolic blood pressure on average by 10 mmHg for a six-month interval. Telehealth programs consist of nurses, via a remote patient monitoring (RPM) device, taking a patient's vital signs including heart rate, blood pressure levels, and then providing education during a video visit to help improve patient adherence to medication and lifestyle modification plans, which are important in practice in managing hypertension (Bulto et al., 2023). For patients with diabetes and those on virtual nursing teams, there is evidence of improvement in glycemic control and a decrease in healthcare utilization.

Ben-Assuli (2022) reported that telehealth interventions by nurses, including RPM and behavioral coaching, were associated with a reduction of a 20% hospital readmission rate among diabetic patients over 12 months, indicating a positive impact on hospital utilization. Many telehealth programs employ mHealth applications to have patients input their blood glucose levels, and engage with reminders about their medications, allowing for a check-in once in a while, which the nurse can follow up on any issues. The nurse can help manage complications and empower the patient through self-efficacy through ongoing communication and education in the management of ongoing treatment plans with complex medication regarding insulin therapy and diet (Wong et al., 2022). The effectiveness of these programs arises from the juxtaposition of technology and nursing's empathetic, patient-centered approach, which promotes clinical effectiveness and maximizes patient engagement.

Mental Health Support

Telehealth has increased the accessibility of mental health services, and virtual nursing teams have been critical to telehealth delivery of triage, counseling, and psychoeducation. Hinterbuchner et al.'s (2024) study highlighted the effectiveness of telehealth in a team-based, multidisciplinary format, nursing in collaboration with psychiatrists and social workers to address care for patients living with psychosis. These care teams delivered psychoeducation through the telehealth platform that assisted patients and families in understanding mental health conditions and implementing coping strategies, and they provided telehealth facilitations of peer support groups that encouraged social connectedness (Hinterbuchner et al., 2024). In these mental health telehealth teams, nursing would carry out the initial assessments, monitor compliance with medications, engage in crisis intervention, and facilitate support groups, all delivered via secure video conferencing platforms so that patients who might not attend face-to-face appointments due to stigma or fear of a lack of privacy would feel safe to participate (Haleem et al., 2021). Patients often report high satisfaction with nurse-led telehealth and mental health care, and the flexibility for patient care in telehealth offers a convenient solution for patients to receive care (Fortney et al., 2018).

Charalambous (2024) reported that 90% of patients expressing virtual mental health support were satisfied because they were provided with less time in travel time and could schedule appointments at non-traditional times. However, data privacy remains a great hurdle, where they reported patients and nurses have concerns of worrying about data security on telehealth platforms also in areas that do not have the strongest cybersecurity (Charalambous, 2024), and despite such challenges the ability for virtual nursing teams to provide timely mental health support via telehealth is well-suited to help lessen the burden of increasing mental health disorders around the world, especially in under-served populations where psychiatric care is not readily available, is a well-known advantage of telehealth.

Critical Care and Emergency Services

Tele-critical care (TCC) programs provided a new perspective in critical care as the nurse's role shifted from being predominantly physical to providing assessment and consultation remotely, particularly in intensive care units (ICUs). In terms of TCC nursing practice, TCC nurses are frequently stationed in centralized command centres where they support bedside clinicians through the use of an advanced telehealth system that has high-definition cameras with real-time data feeds. Gonzalez et al. (2023), in their study completed on TCC nursing, reported that 15% of ICU mortality rates were reduced

during the COVID-19 pandemic through nursing interventions such as sonographer settings on ventilated patients and escalating care based on real-time vital signs. These nurses work beside a team on-site to assist in the management of complex patients, using their critical care experience while working in a virtual capacity and enabling on-site personnel to navigate staffing shortages (Rincon, 2023).

In the emergency space, virtual nursing teams have been highly effective when working to triage patients and dealing with non-acute presentations, relieving the burden on emergency departments (EDS). The virtualKIDS program in Australia shows how nurses can effectively utilize telehealth to assess paediatric patients while providing parents options to manage assessment and care at home or escalate to an in-person visit. To summarize, the virtualKIDS program effectively reduced non-acute visits by 30%, enabling health systems to deploy their resources expeditiously, rather than being consumed with non-acutely presenting patients (Ezeamii et al., 2024). Virtual nursing teams working in emergency settings provide a similar service by following up patients after discharge, which provides a continuum of care for patients, which is especially important when considering how to prevent readmissions for those at lower risk, including patients who are children with chronic conditions, and older patients with acute injuries (Anderson et al., 2023).

The emergence of telehealth in critical care and emergency services is a testament to nurses' ability to utilize technology to provide high-acuity care, but still there are hurdles to overcome such as the need for underlying technological infrastructure and advanced training for TCC nurses, particularly in low-resource settings where they do not have advanced telehealth options (Powell et al., 2021; Williams et al., 2022). These examples demonstrate the capacity for technology to revolutionize care that produces favorable clinical outcomes and less expense in a variety of healthcare environments.

Smart uses of telehealth and virtual nursing teams in healthcare systems create multiple gains to streamline the accessibility, transactions, and outcomes of care. They have allowed for care to be delivered in a different and better way, as the benefits help solve a longstanding access to care problem for people who have barriers to access (specifically, geographically).

Enhanced Accessibility to Healthcare

Telehealth has significantly enhanced accessibility to receive care by removing geographical and logistical barriers to care for many communities and not just urban areas (Gordon et al., 2020; Hanlon et al., 2018). Virtual nursing teams provided services to patients who might have to travel great distances, have mobility issues, and as well as economic constraints (Charalambous, 2024). A study by Charalambous (2024) stated that 85% of patients using telehealth services reported very high satisfaction and cited one of the highest-ranking reasons as they could schedule virtual appointments where they would not have to travel. With virtual visits, patients can find convenient times to meet from their homes without losing time and money related to travel. Rural communities especially find that they are limited to local providers, which makes accessing specialty care in fields like cardiology or endocrinology difficult to impossible (Gajarawala & Pelkowski, 2021; Ezeamii et al., 2024).

Virtual nursing teams have also reduced complications that may be experienced by elderly and immunocompromised patients when they are exposed to in-person visits, especially during public health emergencies such as COVID-19. Shifting to virtual consultations has eliminated barriers to care for immunocompromised patients by enabling the nurse to assess symptoms, adjust medications, and plan care remotely, resulting in continuity of care. In addition to improved access to care, virtual consultations have promoted improved health equity. Meanwhile, the intersectionality of care in virtual communities has helped to ensure that marginalized populations receive timely and appropriate care, which has historically had a disproportionate influence on healthcare (Hollander & Carr, 2020; Powell et al., 2021).

Cost-Effectiveness

Nurse-led telehealth interventions have demonstrated direct cost savings for healthcare systems and patients alike, resulting in a significant reduction in hospitalizations, emergency department visits, and unnecessary face-to-face consultations with a nurse. For instance, Niu et al. (2024) found that telehealth approaches, including remote patient monitoring (RPM) for postpartum hypertension care, had 30% lower healthcare costs than a traditional in-person care model. The significant cost savings are due to continuous monitoring and early identification of hypertensive episodes, allowing nurses to intervene at the earliest point of care and preventing costly events (e.g., hospitalization for preeclampsia or stroke) (Niu et al., 2024). Telehealth interventions also make more effective and efficient use of resources when there is a reduction in the need for hospital re-admissions and or unnecessary and unproductive diagnostic tests.

Telehealth provides patients with lower direct costs (i.e., greater access, travel, and lost wages coming from time away from work), as well as indirect costs caused by delays in care. Virtual nursing teams are able to manage chronic conditions (i.e., diabetes, etc.) with regular virtual check-ins, making it less likely that patients will require expensive interventions and emergent support (Ben-Assuli, 2022). Since telehealth is scalable, healthcare organizations can care for more patients with fewer resources; nurses may conduct numerous virtual consultations while sitting at their desk, while in-

person encounters require dedicated temporal resources (Rincon, 2023). In low- and limited-resource environments, the efficiencies that telehealth introduces to a healthcare system are profound, maximizing benefits to patients (with no compromise to care) while system resources are limited.

Improved Patient Outcomes

In such areas, patients have benefited significantly through the introduction of virtual nursing teams who provided continuous monitoring and timely interventions, and person-centered care planning through telehealth services. Some telehealth programs for heart failure patients account for a 25% reduction in emergency room visits (Hinterbuchner et al. 2024). These are nurse-led programs, which monitor blood pressure, heart rate, fluid status, and other vital signs using RPM devices, documenting their findings for a health care solution, and any changes to medication adherence and symptom management. Effective progression of care is also reliant on timely indications, such as weight gain or shortness of breath. Nurses can elevate care before illness progresses and acute exacerbation occurs, thereby lowering additional utilizations of the healthcare system related to hospitalizations (Hinterbuchner et al., 2024).

Another factor to consider that may impact the effectiveness of telehealth and the transition to technology-enabled care environments is patient engagement. Virtual nursing teams deliver education and support via digital platforms to build self-efficacy with the patient. Wong et al. (2022) explored nurse-led telehealth programs for community-dwelling older adults and found they generated positive outcomes through education on specific self-management strategies regarding their quality of life, diet, exercise, and medication adherence. For example, nurses can send patients reminders, educational videos, and interactive tools using mHealth applications to promote patient ownership of their health outcomes, increase adherence, and create positive clinical outcomes (Wong et al., 2022). Addressing the patient experience with a more patient-centered focus, in conjunction with facilitating access via telehealth, has resulted in high levels of patient satisfaction and effective long-term health plans versus traditional care delivery approaches, particularly for chronic disease management.

Telehealth Management Challenges

As compelling as the integration of telehealth and virtual nursing teams into the healthcare space has been, several challenges, both on a systemic and regulatory level, have made the adoption and integration of the practice difficult in various healthcare systems. The challenges are numerous and include inadequate training for nurses, limited technology, regulations, and reimbursement, and a general lack of acceptance of telehealth within the nursing profession as it strives to discover how best it can support patient care. These challenges must be addressed to realize the full potential of telehealth in improving healthcare delivery.

Table 2: Benefits of Telehealth and Virtual Nursing Teams

Benefit	Description	Supporting Evidence
Access	Reduces geographical barriers	Charalambous, 2024
Cost	Decreases healthcare expenditures	Niu et al., 2024
Outcomes	Improves clinical results	Hinterbuchner et al., 2024; Wong et al., 2022

Inadequate Training

Inadequate training for nurses has been one of the most significant challenges to effective adoption of telehealth, which limits nurses' ability to create the competencies required to deliver care with digital platforms. The literature review conducted in 2024 noted inadequate training as a primary barrier, indicating that a large number of nurses do not have access to organized education programs with telehealth-specific content, such as instructions related to telehealth software, protocols for patient assessment, and interpreting remote patient monitoring (RPM) data (Rutledge & Gustin, 2021). Notably, in rural healthcare settings where resources and infrastructure are limited, access to professional development is even more limited. These nurses often face competing demands from high patient volumes, a limited nursing workforce, and other structural limitations to both their time and to resources that would help facilitate education opportunities for telecare.

The lack of standardization of telehealth training protocols complicates this situation, as healthcare organizations are also often using ad hoc or organization-specific training programs to whitewash the gaps in their telehealth expertise, which are not necessarily comparable in quality and representation. For example, nurses may receive training on the institution's specific telehealth platform but not on the underlying competencies surrounding this, such as digital communication skills or working with patient privacy in a virtual platform (Charalambous, 2024). This limited training could result in mistakes due to insufficient training to engage in telehealth, poor confidence among nurses, and potentially reduced outcomes for patients. Therefore, resolving the issue of training telehealth staff needs development around a standard curriculum, accessible and focused on the combination of integrated technical skills, clinical decision-making, and patient engagement in the telehealth context.

Technological Barriers

Technological barriers of unreliable connectivity, availability of appropriate hardware, and a lack of interoperability all hinder the implementation of telehealth. Haimi et al. (2024) discussed the barriers facing elderly patients accessing telehealth, with low digital literacy, reliance on phones or computers, and, more recently been shown with virtual consultation. There is a digital gap, particularly pronounced for older adults and people without the means to be inclusive in telehealth. Patients who are limited in their ability to effectively use technology may have difficulty navigating a video conferencing tool or uploading health data to an mHealth app. Such frustrations can lead to poor engagement by the patient (Haimi et al., 2024).

For virtual nursing teams, technological barriers extend not simply to patients, but also to flaws in the digital healthcare system. Nurses frequently experience problems using interoperable systems in that the telehealth platform may not seamlessly interface with electronic health records (EHRs) or other clinical systems, leading to fragmented delivery of care and additional administrative burden (Dopelt et al., 2021). Data security is perhaps the most pressing issue, as virtual nursing teams must comply with statutes like the Health Insurance Portability and Accountability Act (HIPAA) while transmitting potentially vulnerable patient information through various networks. If data security is breached or if encryption protocols are not properly utilized by virtual nursing teams, we can lose the existing relationship and trust of our patients, but we also put the health organization at risk of litigation (Dopelt et al., 2021). Dealing with these technological barriers will require capital investment in digital infrastructure and platforms as well as digital literacy and training programs for patients and providers.

Barriers from Regulations and Reimbursement

Regulatory and reimbursement barriers complicate expanding telehealth and virtual nursing teams across various jurisdictions. Many states have inconsistent licensing regulations, making it difficult for nurses to perform telehealth across state lines because a lot of states require separate licenses for out-of-state providers (The Journal for Nurse Practitioners, 2020). As a result of this fragmentation, virtual nursing teams are limited in their ability to provide care to patients in other geographical areas, particularly in rural or underserved populations where telehealth is most impactful. Additionally, reimbursement approaches vary widely, where some payers provide limited or no coverage for nurse-driven telehealth interventions, which deters organizations from starting telehealth programs (Powell et al., 2021).

More recent federal legislation, such as the CONNECT for Health Act, has attempted to alleviate these barriers through the incorporation of telehealth reimbursement and easing interstate licensing requirements. There remain gaps in addressing differences in reimbursement for nurse-delivered telehealth services between public and private payers (Powell et al., 2021). As a result of the COVID-19 pandemic, while Medicare expanded its telehealth reimbursements, many commercial/private payers were slow to modify their policies to reflect this. This creates gaps in nurse-led virtual care (Rincon, 2023). These regulatory and financial challenges limit the extent telehealth can be scaled and can limit the telehealth option to help reduce health-care inequities—the need for systemic policy change cannot be overstated.

Resistance to Change

The opposition to nurses using telehealth persists, which is often associated with concerns regarding having personal interaction with patients, which is a fundamental component of traditional nursing practice. Some nurses see telehealth as less personal, and even as losing something, because the emotional engagement and nonverbal cues of the patient are not included in a virtual interaction (Mullen-Fortino et al., 2012). This perception can influence resistance towards telehealth technologies, particularly for nurses who find a therapeutic relationship when they are able to conduct the interaction in person. Furthermore, some nurses with strong concerns could consider telehealth assessments unreliable because they fear that they could miss critical clinical signs in a virtual intervention (Mullen-Fortino et al., 2012).

Addressing the resistance to telehealth means there will have to be a cultural shift within the nursing profession, which will require a robust change management strategy. These strategies need to engage nurses in the planning and implementation of telehealth programs, and provide an engaged opportunity for hands-on training, while promoting the advantages of telehealth, enhancing flexible schedules, and the benefit of reaching people without access (Rutledge & Gustin, 2021). Leadership support is also important as nurse managers and administrators have a critical role in creating a culture of innovation, and aiding staff in forgetting about job security issues or workflow changes that take place with telehealth adoption (Booth et al., 2021). When attitudinal barriers are eliminated, nurse managers are more likely to support nurse buy-in and telehealth, turning these virtual nursing teams into a lasting fixture of telehealth services.

Role of Virtual Nursing Teams

Virtual nursing teams have become a fixture of telehealth, and in many ways, they have transformed healthcare delivery with patient-centered care powered by digital technologies. These teams consist of registered nurses, nurse practitioners, and other nurse types using telecommunication platforms to perform functions including remote patient monitoring, triage, patient education, and care

coordination. Their intended purpose is based on adapted telehealth systems that add new dimensions to nursing practice; enable nurses to engage patients in many potential settings, from urban hospitals to rural locations; foster interdisciplinary collaboration; and adapt to precision care that is moving toward "real time" in health practice.

Table 3: Challenges with Telehealth Management

Challenge	Description	Supporting Evidence
Training	Lack of telehealth education	International Journal of Clinical Science and Medical Research, 2024
Technology	Connectivity and literacy issues	Haimi et al., 2024; Dopelt et al., 2021
Regulation	Inconsistent policies	The Journal for Nurse Practitioners, 2020; Powell et al., 2021
Resistance	Nurses reluctance to adopt	Mullen-Fortino et al., 2012

Remote Patient Monitoring

Remote patient monitoring (RPM) is one of the most common roles of a virtual nursing team, using digital solutions to track patients' vital signs and other health data in real time. RPM consists of using technology to collect data from a variety of devices while patients remain at home. RPM technology, including wearables, blood pressure cuffs, glucose monitors, and smart scales, allows nurses to collect information on one or more parameters, such as heart rate, blood pressure, oxygen saturation, and blood glucose levels. In Rincon's research (2023), virtual nurses demonstrated the effectiveness of RPM for identifying early clinical deterioration in patients experiencing chronic illness, including heart failure and diabetes, demonstrating a 15% decrease in hospital readmission by facilitating early identification of patients' disparate pathways. RPM for heart failure patients could allow nurses to view a dashboard of a patient's health data and see that weight gain is a cause for concern. The nurses could initiate care, such as adjusting medications or recommending lifestyle changes, while potentially meeting with patients virtually.

RPM has the potential to help nurses provide proactive clinical care, especially with higher-risk populations, including the elderly and certain immune-compromised patients. RPM is by nature, ongoing and allows virtual nursing teams to identify patients who may need support, especially in instances of health data that indicate deterioration. Real-time RPM data allows a nurse to identify the patients who take priority for care. This allows clinicians to optimize resources for more than 1 patient and can help lessen the stress healthcare facilities have for seeing patients in person (Powell & Asch, 2021). The role requires nurses to develop technical competence to interpret RPM data and to communicate their findings with patients and interdisciplinary team members, ensuring that telehealth is transferred into clinical practice and achievable workflows.

Triage and Clinical Decision Support

Virtual nursing teams serve a critical role in triaging patients by determining the acuity of their needs and assisting them in the best pathway to care. Through telehealth platforms, nurses are able to complete a virtual assessment using video conferencing or telephone consultations to assess symptomology, past medical history, and severity of care, while determining if patients need in-person care, specialty referrals, or if self-management options need to be supported. A recent qualitative analysis conducted in Australia identified the success of the virtualKIDS program, in which nurses triaged pediatric patients in a virtual way, decreasing non-urgent emergency visits by 30% during the pandemic (Ezeamii et al., 2024). The implemented triaging process is invaluable in high-stress scenarios, such as public health crises, and areas of limited access to emergency services, because the use of telehealth increases the efficiency of health services, to ensure that care is delivered to patients who require it (Ezeamii et al, 2024)

In addition to triaging, virtual nurses also provide clinical decision support for patients and interprofessional health teams. In tele-critical care (TCC) contexts, nurses situated in centralized command centers monitor real-time data feeds and high-definition video to support bedside clinicians as they care for critically ill patients. Gonzalez et al. (2023) found that TCC nurses improved measurable outcomes in the ICU by providing real-time reference points for ventilator administration and medication changes. The study reported as much as a 15% reduction in mortality rates during the COVID-19 pandemic. This case study demonstrates how virtual nursing teams are able to positively impact clinical decision-making by linking technological tools to the knowledge and expertise of nursing professionals.

Patient Education and Engagement

One of the more valuable components of virtual nursing is patient education; virtual nursing teams provide personalized health education through telehealth, promoting patient knowledge and agency over their health. Nurses communicate individualized education utilizing video calls, mHealth applications, and secure messaging to support medication adherence, lifestyle modifications, and establish appropriate self-monitoring practices. In radiation oncology, virtual nurses are able to adjust to telehealth by managing treatment-related symptoms (e.g., fatigue or skin reactions) through remote education

sessions, resulting in a higher percentage decrease in in-person visits (ScienceDirect, 2024). This type of intervention has more outcomes than just increased patient understanding related to their treatment plan; it helps to foster self-efficacy and build positive health engagement by empowering the patient to participate in the care planning process.

Virtual nursing teams utilize telehealth for patient engagement on chronic disease management. In a study by Wong et al. (2022), they found that nurse-led telehealth programs for community-dwelling older adults improved their quality of life by providing tailored education with interactive tools like video education and medication reminders on mobile applications. Regular communication from nurses allows them to develop therapeutic relationships which foster patient trust and adherence without impairment from the lack of physical contact (Charalambous, 2024). This demonstrates nurses' ability to balance their clinical knowledge with an empathetic and kind communication style, honoring a patient-centered approach to care during telehealth encounters.

Interdisciplinary Collaboration

Nursing virtual teams are part of an interdisciplinary collaboration that provides a holistic approach to patient care. Virtual nurses collaborate within a team consisting of physicians, specialist physicians, pharmacists, and other healthcare team members to provide a united front for patient health. According to Rincon's (2023) study, which surveyed 172 clinical staff working in direct patient care, virtual nurses provide an enhancement to team-based care by managing communication and data sharing through telehealth processes. Rincon's (2023) identified the positive outcomes with telehealth models by conveying real-time patient health data to the whole team, and simultaneously includes virtual nurses that personal communicate with patients. In complex care situations such as cancer care and management of patients with multi-morbidity, virtual nurses provide the link to the care plan by communicating care steps to the patient, organizing the multidisciplinary team involvement with the process notes and scheduling, and continual updates about the patient, reinforcing productive workflows and continuity of care.

As mentioned earlier, virtual nursing is truly collaborative in many different ways. One example may be the specialization of the work between nurses and oncologists in radiation oncology. A radiation oncology nurse is involved in collaborating with the oncologists to continue monitoring the patient's treatment progression and side effects even from a distance (ScienceDirect, 2024). In this situation, nurses are involved as a "bridge" between the patients and specialists, providing a person-centred care plan to their individual needs. This collaboration is not only the case in oncology; in mental health nursing, for example, nurses are collaborating with psychiatrists and social workers to provide the most holistic care possible, including psychoeducation and crisis intervention (Hinterbuchner et al., 2024).

Alignment with Precision Healthcare

Like other healthcare sectors, virtual nursing teams are increasingly using data analytics and new technologies to deliver personalized predictive care, consistent with the shift towards more precise healthcare, using real and objective data (Kitsiou et al., 2021). The use of RPM data and predictive analytics provides nurses with specific patterns and risk factors for each patient, and as such, they are able to tailor their care as and when needed. Booth et al. (2021) discussed the role of artificial intelligence (AI) in telehealth and indicated that with telehealth, virtual nurses use AI tools to interpret patient data and predict outcomes such as readmission for patients with heart failure, among other things. The virtual nursing team can then prioritize care plans for the high-risk patients and tailor care plans accordingly, which ultimately improves clinical outcomes and better use of resources.

In the case of diabetes management, virtual nurses utilize data obtained from continuous glucose monitors to modify insulin therapy by responding to the data in real time, to promote optimal glycemic control (Ben-Assuli, 2022). This precision allows for better outcomes for patients and saves healthcare dollars by preventing complications. While the use of data analytical strategies implies that nurses will develop new competencies in data interpretation and artificial intelligence tools, it also demonstrates the need for continuous training and IT support (Booth et. al, 2021)

Gaps in the Literature

Despite the vast expansion of telehealth, numerous gaps exist. There are no standardized training processes in place for virtual nursing, with the majority of manuscripts, including studies, systematic reviews, and stakeholder analyses, mainly focusing on clinical competencies as opposed to operational competencies (Charalambous, 2024). Despite the proliferation of research into telehealth and workforce pressures, only a small number of studies consider the impact of telehealth on long-term workloads and burnout. There appears to be little literature on telehealth in low-resource settings, and most of the available peer-reviewed literature is limited to HIC contexts. Finally, a review of the literature has identified the need for more RCTs around the efficacy of nurse-led telehealth interventions in outcomes that address diverse populations.

Future Directions

Further research should focus on creating standardized telehealth training programs for nurses that determine the technical and operational components. Research must also be done to explore solutions for technological and regulatory barriers to implementation, with particular focus on underserved

communities. Though there is research about the use of artificial intelligence (AI) and big data analytics in virtual nursing teams, which also provide opportunities to offer the personalization of care, further research still needs to be done to uncover the benefit versus impact, which includes ethical and privacy implications (Booth et al., 2021). Policymakers should address the normative issues of aligning regulations and developing reimbursement options to promote sustainability for telehealth.

Conclusion

Telehealth and virtual nursing teams have changed the way we deliver care. Access, cost, positive outcomes, and quality have improved. There was no shortage of challenges with implementation; lack of training, barriers with technology, and regulatory challenges that should continue to be addressed if the power of virtual nursing is to be maximized. Virtual nursing teams represent and adopt a collaborative model across multiple sectors of collaborative/research-focused interdisciplinary care, providing opportunities for standardized and advancing our collective knowledge. As telehealth and virtual nursing continue to flourish, there will be opportunities for nursing practice in conducting research and making meaningful contributions towards global health challenges.

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