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The Impact of Telehealth on Reducing Hospital Readmissions

Nyambura Achieng M.

School of Natural and Applied Sciences Kampala International University Uganda

ABSTRACT

Telehealth technology has altered healthcare delivery, increasing access, quality, and cost-effectiveness. This review investigates how telemedicine has affected hospital readmission rates, particularly among patients with chronic diseases. Telehealth enables real-time monitoring, video consultations, and remote data sharing between patients and healthcare providers, with the potential to significantly reduce readmissions. However, the evidence for its effectiveness is varied, with some studies indicating that specialized telehealth interventions, such as remote monitoring and follow-up care, successfully lower readmission rates. Despite technological difficulties, payment rules, and patient apprehension, telehealth is becoming an increasingly important tool in post-discharge treatment. The review also looks at the advantages and disadvantages of telehealth interventions and identifies areas where more research and innovation are needed to maximize their impact on reducing hospital readmissions.

Keywords: Telehealth, hospital readmissions, remote monitoring, healthcare technology, chronic conditions.

INTRODUCTION

The advent of telehealth technologies has ushered in a new era of healthcare delivery with the potential to enhance access, improve quality, and reduce costs. Telehealth encompasses a vast array of technologies, applications, services, and delivery models used to assist in the diagnosis and management of patients when they are not physically present with their healthcare providers. A wide variety of technologies can serve different telehealth purposes: simple (telephone, radio) to sophisticated (video, remote monitoring, data transfer), asynchronous (store-and-forward), or synchronous (real-time). As applications, technologies can be used for various services such as healthcare provider-to-provider consultations, patient-to-provider consultations, patient-to-patient contact, or provider education and training. Coverage limitations based on location, patient age, and/or service type hinder the private payer use of telehealth for some care protocols or population groups [1]. As a delivery model, telehealth can have a variety of venues and settings: from a single location with patients or providers communicating directly through a telecommunication medium to a hub-and-spoke model where consulting experts are at one site and satellite sites provide telehealth to multiple patients and the community. A virtual healthcare system can arise in telehealth, where all healthcare providers are linked to each other through telecommunication technologies, freeing it from reliance on brick-and-mortar facilities. New telehealth models can be utilized to deliver healthcare services and education, to expand the capacities of all healthcare professionals, and to provide safer, timely, timely, and more cost-effective care [2]. As the population ages, the number of hospitalizations and, consequently, the number of readmissions is expected to increase. The U.S. Department of Health and Human Services (HHS) is focused on finding ways to improve patients' transition from hospital care to home or other facilities. A key part of this process is reducing readmission rates. Hospitals that have high readmission rates will have their Medicare reimbursements adjusted accordingly, with possible reductions. From 2011 to 2015, hospitals will be penalized for having a higher-than-expected rate of readmissions. The Affordable Care Act also encourages hospitals and providers to participate in Accountable Care Organizations (ACOs), which rely on evaluating patient care across the continuum. Safe transitions from hospital care are essential as the number of hospitalized patients increases, as it is the time when patients are at high risk for adverse events. Inconsistencies in transitions

or the failure to pay adequate attention to patients' needs can complicate their care trajectory and lead to readmissions [3].

Telehealth: Definition and Technologies

Telehealth can be defined as the use of communication technologies to provide health care services. The American Telemedicine Association defines telehealth as "the use of medical information exchanged from one site to another via electronic communications to improve a patient's clinical health status." Telehealth takes many forms, including real-time visits with healthcare professionals via video and phone; remote monitoring of patient's health; secure messaging via encrypted email; and "store-and-forward" visits, where a patient's data is collected and sent to a remote health care provider for review. Telehealth is a broad and encompassing topic that includes anything related to care delivered via telecommunications technology. A narrower definition is focused on the use of technology to enhance care delivery, regardless of the physical distance between clinician and patient [4]. Health practitioners' access to telehealth technologies has increased dramatically since the late 1990s when video conferencing became more affordable, accessible, and reliable. The design and release of personal videophones spurred demand for telehealth consultations. Major commercial health insurers began covering telehealth consultations in the mid-1990s, driven by Medicaid reimbursement policies introduced in 1994. Following the introduction of MTEL products in 1999, interest surged in live-video home-based telehealth services for high-risk patients with multiple chronic conditions. In response, dozens of vendors began offering their own products. The dramatic evolution of telehealth technologies and systems in the past decade has far outpaced reimbursement policy, which remains a barrier to expansion in some markets. In 2008, nearly one in 10 hospitals provided care via telemedicine [5]. Patient and provider telecommunications technologies include a constantly evolving variety of smartphones, tablets, laptops, desktop computers, and wearable health devices. Medical-grade peripherals for remote physical exam and monitoring are commercially available, including digital stethoscopes, cameras, scales, blood pressure cuffs, medication dispensers, glucometers, spirometers, and ultrasound. These allow patients to collect and send health data to their providers for review and action. Video visits can be conducted via off-the-shelf video conferencing systems, such as Skype and FaceTime, or specialized telehealth exchange systems, which are more secure and comply with HIPAA regulations. Most digital health monitoring technologies were designed to be used by or within their own vendor's specialties. However, some technology vendors have developed interoperable modules for router-and-data-sharing platforms, enabling health data from various specialties and vendors to be aggregated into one comprehensive longitudinal patient record [6].

Hospital Readmissions: Causes and Consequences

Hospital readmission is a common measure of quality of care and has significant economic and social consequences. The Affordable Care Act has authorized the Centers for Medicare and Medicaid Services (CMS) to penalize hospitals with excessive readmissions for certain core conditions, such as heart attack or heart failure. Understanding the reasons behind readmissions is critical for developing effective intervention programs. A study performed by T.M. Jiang and P. P. Kuo of the M. H. DeeANJOfc-ISU on the association between self-reported changes in health status and 30-day hospital readmission found that among patients who were readmitted, the relative odds of higher health status decline was significantly higher compared with patients who were not readmitted. This relationship remained significant after controlling for several potential confounders, including demographics, health status, discharge conditions, and hospital characteristics. The findings suggest that changes in self-reported health status are correlated with changes in objective health status (hind complications), are theoretically consistent with the post-discharge period in which many hospitals have a significant change in patient condition, and can provide important insights into the categories that should be addressed in care management strategies [7]. Importance of this Topic for Society. With the advent of healthcare reimbursement models, which plan to bring divisions in payment and risk to the industry, come great stressors and enhancement opportunities. The healthcare industry must prepare for these models entirely or they will slowly watch themselves be out-maneuvered by more adaptable companies. The Readmission Penalty experience of some hospitals in NYC is examined, from the perspective of healthcare organization operations, market cap, and efficiency enhancement. To reduce readmission rates, the discharge process is a key component as well as patient education post-discharge. The goals of the project are to 1. Define the post-discharge interaction that characterizes the readmission process, 2. Derive macro-level state equations linking such events, 3. Apply the model to the NY metropolitan area readmission experience while exploring alternative non-pharmaceutical readmission risk factors' impact [8].

Studies and Research Findings

Research studies and analyses have been conducted that show the effectiveness of telehealth in reducing hospital readmissions. The findings of these studies, which encompass the need for additional research,

are reviewed below [9]. Results from a large randomized controlled trial evaluating the impact of telemonitoring on hospital readmission rates in 7,222 Medicare patients discharged from 407 hospitals in 2006 and 2007 were published in 2013. The study focused on heart failure patients, as approximately one-fourth of heart failure patients discharged from a hospital were readmitted within 30 days. Five health systems across the U.S. randomly assigned hospitals to continue usual care (UC group) or provide telemonitoring (TM group). UC included 43,933 patients discharged from 173 hospitals, 9055 of whom were readmitted within 30 days. Patients in TM hospitals were monitored using a cell phone or touchscreen monitor, with site-nurse availability 24 hours a day. The study consisted of a quasi-experimental design and a specialized telehealth service. Patients managed through the telehealth intervention were more likely to be readmitted within 30 days than those managed through usual care (27.2% vs. 25.2%, P<0.001). The effect of telemonitoring on 30-day hospital readmission rates was also comparable in models adjusted for both risk and propensity scores, suggesting that telemonitoring was not superior to usual care. A high-profile telemonitoring demonstration funded by the government was expected to be a cost-saving intervention, but the results from this study showed a significant increase in hospital readmissions and no significant impact on mortality. Furthermore, although telehealth readily accessible over the internet is considered a potential solution to reduce hospital readmissions, the effectiveness of home telehealth strategies on readmission rates and their cost-effectiveness for patients with multiple chronic conditions are unknown. Results from a large multicenter randomized controlled trial testing a freestanding federal telehealth policy support vigilance in the deployment of this technology to assist in transitioning care from hospitals to communities [1]. MPeer-reviewed studies published from January 1970 to February 2019 that examined the effects of telehealth strategies and their specific components on hospital readmission were identified. Only 31 studies out of 51,365 identified articles met the inclusion criteria. These findings suggest that data transmission, follow-up intensity, and home visits accounted for 52.6 percent, 14.0 percent, and 12.3 percent of the treatment effects, respectively. Furthermore, only 10 telehealth strategies (32.3%) yielded a statistically significant reduction in readmissions. This comprehensive review, the first to assess which specific telehealth strategies reduce hospital readmissions, surfaces new questions about how home telemonitoring should be implemented to achieve the desired effect [10]. A meta-analysis of 22 studies examining the use of telehealth to reduce hospital readmissions involved 6569 patients. Overall, telehealth was associated with a decrease in all-cause hospital readmissions, particularly through a home telemonitoring intervention. Subgroup analyses demonstrated that phone call follow-ups alone were effective, but phone follow-ups that also included coaching or education were more effective than care as usual. These findings suggest that telehealth is effective in reducing hospital readmissions in various populations and settings, although the effectiveness of specific telehealth strategies varies across populations, settings, and health conditions. Furthermore, strategies may be null or even increase the risk of readmission in certain patient cohorts, such as the high-risk elderly [10].

Benefits and Challenges of Telehealth in Reducing Hospital Readmissions

In recent times, telehealth has aroused much interest in addressing the issue of hospital readmission. The continuing growth of sophisticated telecommunications technology and the high expense of healthcare are the two key reasons for the surge in interest in telehealth. The main reasons that create obstacles for payers and providers of telehealth service systems include patient scepticism regarding telehealth efficacy, a lack of evidence of economic advantage, and difficulties associated with reimbursement and licencing problems. Although the rapid expansion in the scope of telehealth systems, particularly in the enhancement of complex decision support systems, patient-care monitoring systems, and the incorporation of telehealth in the electronic health record, offers hope for the long-term benefits of telehealth, it is critical to develop simple, clinically valid, and economic pilot telehealth and telemonitoring systems rapidly to tackle the problems of hospital readmission [11, 12]. Telehealth is described as the function of telecommunications and computer technologies in the delivery of healthcare to provide services to people at a distance. The intention is to provide efficient healthcare services not only to the urban area but also to the remote area where a physician is not available. The telehealth system comprises a web-based application and infrastructure that includes healthcare consumers, data centre, interface engines, and healthcare providers. This system collects the patient's symptom history using questionnaires and clinical vital signals using sensors. It preprocesses the data and provides it to the external service provider that will analyse the data. The findings are then forwarded to the physician. The health records are stored securely in a database and are made accessible to designated users upon request. The telehealth system has a dashboard that can track data flows, manage users, and set up interfaces [13]. Telehealth can work wonders in reducing hospital readmissions and supporting the healthcare sector. Although sceptical, telehealth is full of potential to ensure authentic patient monitoring

and supporting solutions for chronic patients. Various methods are proposed to alleviate the hospital re-admission issue that arises mostly after discharge from the healthcare facility. Telehealth systems are envisioned to be usable tomorrow without any hassles so that the conniving feature of new-age technology can be used to ensure better monitoring and support for patients [14, 13].

CONCLUSION

Telehealth offers a promising solution to address hospital readmissions, particularly for patients with chronic conditions. While the technology provides benefits such as enhanced patient monitoring, better communication, and improved post-discharge care, its impact on readmission rates varies depending on the specific intervention. Remote monitoring and timely follow-up care have shown the greatest success in reducing readmissions, but challenges related to reimbursement, patient engagement, and technological integration still exist. To fully realize the potential of telehealth, further research is needed to refine strategies and address the barriers that hinder its effectiveness in diverse healthcare settings. Ultimately, as telehealth technologies continue to evolve, they could play a critical role in improving patient outcomes and reducing the strain on healthcare systems.

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