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## **The Dark Side of Telemedicine. A Review on Patient Safety in Telemedicine Healthcare.**

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### **ABSTRACT**

Technology is changing the healthcare landscape. Telehealth and telemedicine are rapidly being incorporated into patient care. While there are many benefits including increased accessibility to remote and underserved areas, there is also numerous concerns that may affect the quality of the care provided and adversely affect patient safety. This brief review will address issues regarding the quality of telemedicine and patient care, as well as their potential ethical pitfalls from the perspective of the physician and the patient.

### **INTRODUCTION**

As technology continues to advance at lightning speed its application to the practice of medicine is evolving and rapidly reshaping the healthcare landscape. Technology is being integrated within all fields of medicine, with particular emphasis in radiology, surgery, oncology, radiation therapy, and transfusion/laboratory medicine. These innovations are improving patient care with better survival rates, shorter hospital stays and fewer complications (1, 2). The rapid growth of technology in medicine has resulted in the development, implementation and practice of telehealth and telemedicine. Telehealth and telemedicine have been widely encouraged by

administrators and used in patient care, yet they differ in how they impact patient safety and quality of care. As with any new medical innovation, it is imperative that a rigorous review of patient safety and standards of care be conducted. As discussion of both telehealth and telemedicine would mandate a more comprehensive review, for the purpose of this paper, a brief review on the “dark-side” of telemedicine, in particular, patient safety in telemedicine, will be discussed.

Telehealth and telemedicine are defined differently. Telehealth includes the electronic and telecommunications technologies, which support and promote long-distance patient care, professional continuing education, public health and healthcare administration. Conversely, telemedicine involves two-way, real-time interactive virtual communication between patient and physician (3). While millions of patients globally have received telehealth services directly or indirectly (1), it can be noted that telemedicine has not been readily adopted. In 2017, Chaet determined that the vast majority of health-related technology was cloud-based imaging systems and electronic medical records (EMR) facilitating healthcare provider communication, while less than 7% of patient visits were telemedicine visits (3). Despite this, telemedicine is increasingly being incorporated into patient care. Factors leading to this include, the internet’s rapid expansion, an increase in digital communication and cost reduction (1). Additionally, the COVID-19 pandemic has exponentially accelerated the use of telemedicine in most practice settings.

Beginning in late 2019, the rapidly infectious coronavirus caused a worldwide pandemic leaving millions infected and global healthcare systems reeling (4). This pandemic forced healthcare systems into crisis management. There was an urgent need to allocate resources towards the critical care of COVID patients and prevention of further viral exposure while still maintaining quality continuity of care for other patients. As such, the unprecedented strain on the healthcare system accelerated the transition of telemedicine as an integral part of patient management (2). However, concerns remain that in rapidly establishing telemedicine as a new patient care model, healthcare quality and patient safety may be compromised.

## **DARK-SIDE OF TELEMEDICINE**

Over the last number of decades, retrospective studies on patient safety have reported failures in communication, medication errors and system processes. This has resulted in numerous

interventions being developed and implemented thereby reducing errors and rendering processes more reliable (5). The influence of technology has had a massive impact on healthcare with the potential to improve the quality and the safety of patient care (6). Studies have demonstrated that telehealth has resulted in effective and timely clinical decisions, improved communication amongst healthcare practitioners, reduced medication errors and improved patient outcomes (5, 6, 7, 8, 9). Nonetheless, it is important to be cognizant that the telemedicine healthcare model will have new safety risks that must be evaluated. The delivery of safe and high-quality patient care via this modality will still require that we aim for optimal care as mandated by guidelines and standards (5).

The reality of healthcare and its ideal “error-free” version are often incongruent. While it would be ideal to have a healthcare system that has 100% reliable patient safety, system failures remain at close to 20% (5). Unfortunately, given the rapid nature by which telemedicine has been incorporated into mainstream healthcare, information regarding the patient safety risks directly relating to telemedicine is either sparse or inconclusive (7). This may be due to the lack of insight regarding patient safety risks with telemedicine, failure to report incidences as “safety risks” and failure to standardize reporting of telemedicine errors (6). These factors define the crux of the telemedicine’s dark side; while issues that may be problematic in successfully establishing a safe and quality telemedicine healthcare system can be discussed and studied, the standards on reporting and implementation of guidelines are a necessity.

To date studies have reviewed only some of the factors necessary to provide high quality telemedicine care. Aside from the obvious technological prerequisites, such as having appropriate informatics compatible with pre-existing EMR, it is important to consider the human factors involved in both the physician, the patient and their relationship (2).

When moving from any standard practice to a new method of providing patient care, there is an increase in safety risk, and healthcare providers will need to undergo telemedicine training to mitigate these risks (7). Provider education is crucial; literature reviews report that while close to 55% of clinicians are increasingly aware of the importance of telemedicine, paradoxically only about 15% of clinicians were aware of its advantages and disadvantages, and less than 10% of clinicians have had formal training (11).

In addition, the change from in-person, face-to-face care to telemedicine may hinder thorough clinical assessments and physical examinations. Systematic reviews have reported physicians

expressing concerns regarding an increased risk in inappropriate clinical decision-making, particularly in acutely ill patients, as the patient's physical examination is limited or absent (1, 3). It can thus be argued that if the quality care provided by telemedicine does not meet the established clinical standards (including a physical examination) then the safety of the patient may be at higher risk (3).

The other human factor influencing patient safety are the patients, themselves. As patients are living longer, previously fatal diseases, such as diabetes, heart disease and some cancers, can now be managed chronically at home. It is estimated that up to a 1/3 of patients will have chronic diseases by 2030 (5), and as primary care moves increasingly into the community, more of the burden of care will be placed on the patients and their caregivers (3, 6, 7). Patient safety in telemedicine is related to safety in the homecare setting and a predominant concern regarding safety will involve the capability of the patient (or caregiver) to actively understand, participate and manage their healthcare needs (5). For telemedicine care to be successful, patients will be increasingly expected to work collaboratively with their providers; they will need to have enough language proficiency to express their concerns; be compliant with medical recommendations; and, be sufficiently tech-savvy to use the remote telehealth devices or proceed with the virtual visit. Yet in the primary care setting where patients are increasingly older, frail and have multiple medical issues, this might not be feasible. Therefore, telemedicine patient care is not a "One Size Fits All" approach. In fact, the most appropriate telemedicine patients reportedly include younger patients (average ages between 40-65yrs) with minimal chronic conditions and who are tech savvy (2); a demographic vastly different from the older co-morbid primary care patients. Thus, the idea that the quality and degree of patient safety will be maintained across the spectrum of telemedicine patients must be investigated.

Another key component in quality patient care involves the patient-physician relationship. This relationship, whether it be a single Emergency Department visit or a relationship nurtured over many years in the primary care setting, requires the foundation of mutual trust and collaborative communication. Reviews have reported, that both physicians and patients alike, found establishing and/or maintaining a patient-physician relationship via telemedicine was more difficult compared to when these relationships developed during in-person visits (6,12,13). This is concerning as significant ethical issues may arise if this relationship is compromised.

The ethical aspects of telemedicine are being increasingly reviewed. In this regard the ethics of competency, transparency, mutual trust, communication and reliability will still need to be maintained within the physician and the patient relationship, regardless of the modality of care. Yet, if the relationship between a patient and physician is compromised, these may be at stake. Additionally, patients will need to understand that telemedicine visits may have inherent safety risks and may not be standard of care. Thus, their autonomy will need to be considered and their informed consent will need to be explicitly stated (14, 15).

Finally, another important ethical and medico-legal issue includes maintaining patient confidentiality. This is of increasing concern, as data security over the internet is highly susceptible to threat and attack on patient's private information (9, 16). Recognizing this issue, hospital information systems supporting telemedicine applications will need to comply with the US Health Insurance Portability and Accountability Act (HIPPA) and the Canadian Personal Information Protection and Electronic Document Act. Additionally, the use of security risk assessments on hardware and software, including programs, mobile applications, mobile devices and computers, as well as, backup servers and wireless encryption, should help mitigate these issues (9, 16).

## **THE BENEFITS OF TELEMEDICINE**

While there are issues with telemedicine, there are also many benefits. The predominant advantageous feature is the increased accessibility of medical care, particularly, for patients in underserved or remote areas. Considering that half of the Canadian population live in remote areas, it is an achievement that patients are now able to consult with physicians virtually. Furthermore, patients who are homebound, have medical or psychiatric impediments that limit their access to care, or who have rare (or uncommon) medical disorders can also be cared for by physician specialists (3, 17, 18). Lastly, remote monitoring of chronic medical conditions, such as diabetes, via virtual peripheral medical devices (for example, a digital point-of-care device remotely linked to an endocrinology database) can further ensure high quality continuity of care (16, 17, 18).

It has been argued that telemedicine will improve patient quality of care. In a systematic review of 22 studies, the reported benefits of oncology telemedicine care, included 1) improved quality of life (less hospital visits, increased convenience and more independence); 2) virtual

personalized care; and 3) remote reassurance by providing patients a “virtual medical safety net” (12, 13).

Telemedicine will be utilized in an increasing fashion in an attempt to reduce the high financial burden of healthcare while still maintaining care. Telemedicine may be able to offset the financial costs of recurrent hospital visits, Emergency Department visits and/or clinical visits, especially if chronic conditions can be managed and monitored remotely. However, while the actual per-episode cost of a telehealth visit has been reportedly lower than an in-person visit, the long-term financial impact of telemedicine still needs to be analyzed and determined (1).

## **CONCLUSION**

The practice of medicine and the delivery of healthcare will continue to evolve and, undoubtedly, telemedicine will be part of its landscape. While there is a need with many reported benefits, there are new risks that necessitate evaluation and mitigating interventions. It will be crucial to establish guidelines on telemedicine care, as well as, standards on reporting safety risks in order to provide the highest quality of care. Having these standards would address ethical and medico-legal issues while providing guidance for physicians, medical associations and other stakeholders in establishing successful telemedicine care.

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