

A REVIEW FROM DIFFERENT VIRTUAL CARE STUDIES WITH THE ASPECTS ON THE CLINICAL BENEFIT AND HEALTH CARE MANAGEMENT EFFECTIVENESS DURING THE COVID-19 PERIOD

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ABSTRACT

The medical devices which include the virtual care technology are playing key role in this Covid-19 pandemic period. Due to the main issue of the access to healthcare professionals, the virtual healthcare platform facilitated by digital technologies that could support alleviate overstretched healthcare systems, minimize the spread of infection, and foster patient-clinician relationships. In our research, we have reviewed the latest articles, publications and related issues on the virtual care combining with the clinical benefits and health care management and making an analyze the latest outcome on the effectiveness. Although during the pandemic period the situation was impossible to manage for physician access, hospital side communication and health care side managing the issues, the outcomes by virtual activities & technological solutions have shown significant benefits on the access of the requested therapies such as cognitive impairment, geriatric, pediatric care, diabetes, neurological disorders, orthopedic surgery, movement science and sport psychology, ENT surgery, rehabilitation, cardiology, pulmonary disease, cancer research, however some difficulties especially in urology area with antibiotic usage management, in ophthalmology area older patient communication barriers.

Keywords: Virtual Care, Covid-19, Healthcare Management, Clinical Benefit, Effectiveness

1. INTRODUCTION

Concept of Digitalization of Healthcare:

The digitalization of healthcare has been evolving for many years – from telemedicine and remote patient engagement to new digital approaches for diagnostic, information exchange, clinical field activities& supports. The novel coronavirus disease-19 (COVID-19) pandemic has alerted the economies, societies and the healthcare system. With face to face contact between patients and healthcare providers (HCPs) strictly limited and the pandemic has catalyzed rapid adoption of telehealth and the virtual care has started to come into its own [1].

What is the Virtual Care?:

Virtual health is a broad term that refers to healthcare delivery using means other than face-to-face, in-person appointments. This term encompasses a variety of care delivery methods, including telemedicine, e-health (secure messaging between patients and providers, e-consultations, etc.),

mHealth (health care delivery using mobile devices), remote home monitoring (RHM), and telementoring. There are many factors driving the adoption of virtual health, including dramatic improvements in technology, increases in patient demand, restructuring of healthcare systems, accommodations in state and national health policies, and major improvements in health insurance coverage for virtual visits. Virtual health augmented with artificial intelligence (AI) promises to increase doctors' diagnostic accuracy, improves access to care, reduces costs, and alleviates provider shortages. AI in combination with virtual health creates a number of opportunities for unique interactions between physicians, patients, and technology [2].

Why Virtual Care should be a Solution?

It was firstly explained that China's virtual care transformation was unleashed when the country's national health insurance agency agreed to pay for virtual care consultations because the hospitals and clinics were full.

“For the first time, Chinese physicians have really embraced virtual care”, says Xu. “Thanks to these technologies physicians can consult with upwards of a hundred patients a day, which is a very significant increase in the daily caseloads they handled in person in the past” [3].

Like the technologies themselves, the term virtual healthcare – or digital health – is continually evolving to encompass new approaches and digital developments. While there are no officially agreed definitions, the terms virtual-, tele-, digital- and e-healthcare all tend to have a wide scope that includes technologies for remote patient communication, education, diagnosis and monitoring. Perhaps unsurprisingly in light of the COVID-19 pandemic, the global digital health market is expected to witness a 37.1% spike in growth in 2021 [3]. With continued integration of digital communications and medical services, this market growth is forecast to continue and reach 508.8 billion USD (equivalent to approximately 420 billion EUR) by the year 2027 [4].

According to a research with a capability approach on the sequence of qualitative, quantitative and qualitative methods, For adoption studies on digital technologies in healthcare and beyond, our study poses two major theoretical implications: (1) when considering how outcome expectations affect adoption, scholars should consider how digital technologies allow people to live their lives in ways that are valuable to them, rather than considering how technologies help to execute predefined tasks, jobs, or activities; (2) the availability of digital technologies should be considered as a mediator between outcome expectations and intention to use technologies [5] .

2. METHODS AND DESIGN

In our study, we have reviewed 12 different specialties research such as; Pediatric, Urology, Geriatric Medicine, Neurology, Cardiology, Primary Care and General Internal Medicine, Orthopedic Surgery, Chronic Pulmonary Disease, Movement Science and Sport Psychology, Oncology, Ophthalmology and ENT surgery. The outcomes from these distinguished studies have been reviewed with virtual care effects on the clinical aspects and healthcare management purpose.

We have also created a table with the obtained outcome from these 12 articles on the categorization such as; Article Name-Published year, Scope of Study Area, The Main Outcome of the study, healthcare management solution as Table 1 below.

Table 1: Analyzing The Virtual Care Effects on Clinical and Healthcare Management

Article Name – Published Year	Scope of Study Area	The Main outcome of the study	Healthcare system & management solution
D. Roland, and et all, Every cloud: how the Covid-19 pandemic may benefit for child health, <i>Pediatric Research</i> (2021)	Pediatric Research	Remote rounding using virtual platforms may allow great numbers of learners to participate in the care of children	Administration the delivery of care; health care provider, physicians, patients
K. J. Bruxvoort and et all, Outpatient Urinary Tract Infections in an Era of Virtual Healthcare Trends from 2008 to 2017, <i>Clinical Infection Disease</i> (2020)	Urology Research	Outpatient UTI rates increased from 2008 to 2017, especially in virtual care and among older adults. Virtual care is important for expanding access to health services, but strategies are needed in all outpatient care settings to ensure accurate UTI diagnosis and reduce inappropriate antibiotic treatment.	It is unknown how the growth of virtual healthcare delivery affects outpatient UTI management and trends in the United States.
L. Appel and et al, Older Adult with Cognitive and or Physical Impairments Can Benefit from Immersive Virtual Reality Experiences: A Feasibility Study, <i>Frontiers in Medicine</i> , (2020)	Geriatric Medicine	It is feasible and safe to expose older adults with various levels of cognitive and physical impairments to immersive Virtul care within these settings.	Further research should evaluate the potential benefits of Virtual Care in different settings (e.g., home/community based) and explore better customization/optimization of the Virtual Care content and equipment for the targeted populations
R. Appireddy and et all, Tackling the Burden of Neurological Diseases in Canada with Virtual Care during Covid-19 Pandemic and Beyond, <i>Canadian Journal of Neurological Sciences</i> , (2021)	Neurology Research	the current COVID-19 pandemic is projected to last for a few more months, it is imperative for the neurology community to embrace virtual care to continue to provide care to patients affected by neurological conditions.	Many of the chronic neurological diseases need long term, and regular follow up for clinical activities like symptom management, medication titration, review of investigations, patient education and counselling. As a community of healthcare providers caring for the people and families affected by neurological diseases, it is our duty and responsibility to leverage the existing technologies available to reduce the burden on the patients, families, healthcare system and ultimately society.
S.Adam and et all, Covid-19 pandemic and its impact on service provision: A cardiology prospect, <i>Acta Cardiologica</i> , (2020)	Cardiology Research	COVID-19 has caused an enormous impact on cardiac healthcare services worldwide. The pandemic has accelerated the movement towards telemedicine due to the rising demand for remote healthcare.	Further research and financial investment are required for the development of effective telemedicine services. Ultimately, it will be necessary to follow-up and risk stratify patient’s post-pandemic to evaluate the long-term impact of the delays in diagnosis and treatment on overall patient health.

<p>J. F. Spelman and et all, A Model for Rapid Transition to Virtual Care, VA Connecticut Primary Care Response to Covid-19, <i>Journal of General Internal Medicine</i>, (2020)</p>	<p>Primary Care, General Internal Medicine</p>	<p>The shift from in-person to virtual care has been driven by the premise that this may reduce disease transmission, maintain the safety of the health care work force, reduce burden to emergency rooms/urgent care centers, and conserve personal protective equipment</p>	<p>Much work remains to be done to match individual patient needs with the safest and most effective visit modality. Finally, for virtual care to be sustainable, reimbursement models must be sufficient to allow providers to remain solvent.</p>
<p>M.C. Makhini and et all, Telemedicine in Orthopedic Surgery Challenges and Opportunities, <i>The Journal of Bone and Joint Surgery</i>, (2020)</p>	<p>Orthopedic Surgery Research</p>	<p>Overall, there are substantial benefits to the use of telemedicine in orthopedic surgery. The most promising benefits include (1) high patient satisfaction rates, (2) increased patient convenience, (3) increased access to care, (4) decreased overhead for providers, and (5) societal cost savings</p>	<p>The widespread use of telemedicine in orthopedic surgery is feasible. In addition to improving the cost and quality of care, developing virtual care pathways would prepare health systems for future public-health crises. However, successful adoption of telemedicine is contingent on coordinated initiatives between doctors, patients, insurance companies, private enterprises, and health-care systems.</p>
<p>S.Rutkowski, Management Challenges in Chronic Obstructive Pulmonary Disease in the COVID-19 Pandemic: Telehealth and Virtual Reality, <i>Journal of Clinical Medicine</i>, (2021)</p>	<p>Chronic Pulmonary Disease Research</p>	<p>High patient acceptance, and high motivations to undertake physical activity with the use of such a solution.</p>	<p>The management of patients with Chronic Obstructive Pulmonary Disease during the COVID-19 pandemic should include options for remote delivery of pulmonary rehabilitation, including home-based, telerehabilitation, and computer-based virtual programs.</p>
<p>T. D. Silva and et all, Comparison between conventional Intervention and non-immersive Virtual Reality in the Rehabilitation of Individuals in an Inpatient Unit for the Treatment of Covid-19: A Study Protocol for Randomized Controlled Crossover Trial, <i>Frontiers Psychology</i>, (2021).</p>	<p>Movement Science and Sport Psychology</p>	<p>Considering the importance of benefits from physical activity during hospitalization, Virtual Reality software shows promise as a potential mechanism for improving physical activity.</p>	<p>The results of this study may provide new insights into hospital rehabilitation</p>
<p>Q.Pham and et all, Virtual Care model for cancer survivorship, <i>NPJ Digital Medicine</i>, (2020).</p>	<p>Oncology Research</p>	<p>This review reveals important information regarding the characteristics of virtual care models for cancer survivorship</p>	<p>Virtual care models may benefit from integrating with existing health systems and services, repurposing common technologies, involving allied health professionals, and engaging patients and caregivers from diverse communities in the design of virtual services.</p>

P. J. G. Gunn, and et all, Virtual clinics for glaucoma care – Patients’ and clinicians’ experiences and perceptions: a qualitative evaluation, <i>Eye</i> , (2021)	Ophthalmology Research	Glaucoma virtual clinics can be acceptable to both clinicians and patients, including those with a varied complexity of glaucoma and glaucoma- related disease	Dissatisfaction seemed to relate to poor communication or processes and systems within the service rather than complexity of disease.
N. C. Monteoliva, and et all, Improving the management of suspected tonsillitis and peritonsillar abscess referred to ENT – a coronavirus disease 2019 service improvement, <i>Journal of Laryngology & Otology</i> , (2021)	ENT Research	Assessment of the impact of Covid-19 on otolaryngology services provides a unique opportunity to improve clinical practice	The findings can inform further emergency management protocols amidst ongoing regional and global outbreaks. The changes to peritonsillar abscess management should now be applied to patients (who are otherwise systemically well) in an out- patient setting.

3. DISCUSSIONS

Virtual care will likely have many benefits that we do not yet have the knowledge. Perhaps virtual care will be more tailored to the pedagogical demands of today’s digital generation, and benefit health-care outcomes more profoundly than in-person visits, in which patients may be less inclined to engage. However, it will also introduce new barriers related to technology, connectivity, communication and relationship building that risk perpetuating care inequities [6]. Virtual care concept has provided helpful tools for follow upping the patient during pandemic period and this technology in our reviewed study telehealth allows the pediatrician to triage minor contagious illnesses more efficiently and confidently while allowing the ill child to remain at home [7].

Telemedicine is currently viable option and feels an unmet need for most practicing urologists [8], in reviewed study on Urology area, Urology Tract Infection and anti-biotic usage management also plays very significant role and virtual care on this area should be needed to have more knowledge on health care systems side [9].

The stunning, pandemic-related expansion of virtual care has also had the unexpected consequence of offering clinicians humbling insights into the lives of patients [10]. On the reviewed search about geriatric area there were no negative effects on Virtual Reality usage by the participants and 76% wanted to try Virtual platform again, and the better equipment and customization from health systems provider side needed [11]. On Neurological assessment such as the study related with Stroke patients has been tried to manage the follow-up procedure through virtual care platform [12]. In our reviewed neurology research, also obtained positive feedbacks for patient and care giver side however, the disease management needed to be evaluated in long-term for healthcare systems and management side [13].

Cardiac rehabilitation related programs show progressive feedbacks with using virtual care platform in some research [14] and further research are needed to implement this virtual care concept to cardiological disease management side [15]. In the reviewed study of virtual care related with primary care has been explained that the virtual platforms may reduce disease transmission, maintain the safety of the health care work force, reduce burden to emergency rooms/urgent care centers, and conserve personal protective equipment [16].

Orthopedic surgeons have started to adapt the virtual examination platforms and beneficial feedbacks have been collected by patients and physicians’ side [17]. In the reviewed study on orthopedic surgery; virtual care usage and satisfactory by physician and healthcare provider side have been successfully observed, however the cost and quality of care, developing virtual care pathways would prepare health systems for future public-health crises [18].

Diabetes, chronic obstructive pulmonary disease, and hypertension were the most impacted conditions due to reduction in access to care during covid 19 pandemic period [19]. As it could be observed with obstructive pulmonary disease related study review, the virtual care feedbacks are resulted with high patient acceptance, and high motivations to undertake physical activity with use of digital solutions such as; home based telecommunication and computer based virtual program [20]. The review from Movement Science and Sport Psychology supported virtual reality positive outcome as a potential mechanism on physical activities [21].

On the cancer survivorship via virtual care platform has been reviewed with the Oncology study and the outcomes were may benefit from integrating with existing health systems and services [22]. With another study which has been reviewed in USA about the virtual care usage for cancer patients, have obtained opposite outcome who were older patients, lower education, weak English knowledge situation [23]. Both outcomes present the system integration need and cooperation between caregiver and patient. Same dissatisfaction outcome has been obtained in Ophthalmology review from the reason of communication issue with the provided virtual system, even though the main outcome with Glaucoma virtual clinics can be acceptable to both clinicians and patients, including those with a varied complexity of glaucoma and glaucoma related disease [24]. On the other hand; in ENT surgery side aspect, the new system alignments in treatment protocol with virtual care concept should be applied to patients in an out-patient setting [25]. The wearable medical device technologies could be also useful for virtual care platform on emergency, remote control diagnosed systems, providing the proper communication between caregiver and patients [26].

4. CONCLUSION

In this Covid-19 pandemic period, Virtual Care concept have been evaluated by different specialties and it became a necessity to build health systems infrastructures after creating appropriate communication system between care giver and patients and legal infrastructures.

Insurance systems (government or private) of each country should have the coverage and synchronize with virtual care especially in emergency & primary care, cardiology, oncology, pediatric care, geriatric care, orthopedic surgery and neurology areas.

Further studies and financial investment are required for the development of effective virtual care systems and the coordination is also necessary between physicians, patients, insurance companies, private enterprises, and health care systems.

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