Teleprehabilitation during COVID-19 pandemic: the essentials of "what" and "how"

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COMMENTARY

Teleprehabilitation during COVID-19 pandemic: the essentials of "what" and "how"

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Abstract

In view of the COVID-19 pandemic and recent global events, the healthcare system and its services have been negatively affected, contributing towards extensive surgical backlogs. Oncological surgical candidates have been the most impacted by these changes and recommended self-isolation practices, which could result in emotional distress, sedentary behavior, and poor lifestyle habits. Preoperative supportive intervention, prehabilitation, has been proven to improve patients' functional status and clinical trajectories. Presently, there is a critical need for prehabilitation to optimize patient health, as they experience extended wait times. However, in-hospital delivery may not be an ideal approach due to public health and safety measures. Telehealth is a field of research and practice, which has grown and evolved significantly in the last two decades, allowing for the remote delivery of health services. Therefore, the current commentary addresses the different modalities of telehealth delivery in perspective of their known feasibility and potential application in prehabilitation.

Keywords Prehabilitation · Telehealth · Videoconferencing · Teleprehabilitation · Isolation · Inactivity · Elderly · Frail · Exercise · Nutrition · Behavioral counseling

The COVID-19 pandemic has immensely impacted public health and the delivery of healthcare services around the world. In an effort to increase public safety, hospital traffic has been restricted by limiting non-essential medical visits and procedures. Consequently, a large majority of elective surgeries have been postponed indefinitely, imposing a strain on both patients and healthcare systems. All the while, patients are continuously placed on surgical waitlists resulting in extensive and growing surgical backlogs [1]. The oncological surgical candidates are high priority and often exhibit complex comorbidities, making them increasingly susceptible to postoperative complications [2]. In addition to extended wait times, oncological patients must self-isolate for their safety, which may have serious repercussions on lifestyle habits, negatively affecting physical condition, nutrition, and mental status [3]. Predictably, as surgeries begin to slowly resume, patients are likely to manifest cumulative health impairments, thereby aggravating prognosis and risk of postoperative morbidity and mortality [3]. In light of the growing surgical backlogs and anticipated health-related aftereffects of isolation, preoperative lifestyle interventions are more crucial now than ever.

Prehabilitation, defined as lifestyle interventions aimed to prepare patients for the physiological stress associated with major surgeries, has demonstrated to have clinical importance in enhancing perioperative function and recovery [4]. Prehabilitation interventions are personalized to patients' needs and typically include exercise, nutrition, and psychological support. Additionally, it provides an opportunity to empower patients in their care continuum and increase their resilience in view of future impairments. Naturally, the impact of prehabilitation on patient outcomes is largely dependent on their adherence. Supervision during exercise interventions has been demonstrated to be the preferred approach, as it is associated with a superior impact on adherence with sustained improvements in functional capacity [5].

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At the present time, we are facing a health paradigm; although prehabilitation is increasingly pertinent during these challenging times, in-hospital-supervised programs may not be widely accepted by patients [6]. Thus, many patients may not access the required supportive care. Other authors have elaborated on the possibility of using telehealth for distanced delivery of patient services in times of pandemic [6, 7]. Telehealth refers to a large variety of intervention modalities, either asynchronous or real-time applications, that can be used to complement and enhance the quality of care [8]. Telehealth includes all health services delivered using technologies and could be as simple as having healthcare providers call patients. Understandably, support provided via telephone has limitations in the context of prehabilitation, since objective functional assessments and personalized program prescriptions are not feasible.

A recent study by Cherid et al. [9] reported that elderly populations are becoming increasingly knowledgeable with the use of technologies, which has prompted significant satisfaction from patients and clinicians in the delivery of telehealth services [10]. Other telehealth approaches, like asynchronous interventions and remote monitoring, have become increasingly utilized since the beginning of the pandemic [11]. These would include the use of wearable devices (e.g., accelerometer, step counter, or heart rate monitor) and sending video-based exercise programs through Internet platforms (e.g., emails, websites, or applications). However, these types of interventions may not be recommended for high-risk patients, as they require more supervision and specific support. Also, they do not provide the mental well-being benefits of social interactions. Furthermore, wearable devices have also faced some scrutiny as to their clinical and scientific validity. This is notably due to some wearable devices' inaccurate data, such as estimations of caloric expenditure which are weakly correlated to standardized metabolic assessments and high inter-model variability. Modern wearable devices use optical sensor-based heart rate monitors and have been compared with electrocardiograms to assess their accuracy and validity; the literature reports strong correlations at rest, which decreases with increased exercise intensity [12]. Although noteworthy, this shortcoming is not concerning among the elderly and oncologic surgical candidates as most cannot tolerate high intensity exercise. Also, the accelerometer-based step counters included in wearable devices can largely underestimate the number of steps in slower walks speeds and have a lot of inter-model disparities [13]. The later emphasizes that even with technological advancements, appropriate product selection is important to acquire high-quality data. Commercial wearable technologies offer several benefits related to ease of use and remote acquisition of the data for monitoring; however, there is a need for clinicians to familiarize themselves with the technologies used in order to interpret the data with critical minds.

A better-targeted use of technologies to provide prehabilitation could be real-time videoconferencing. This would address many of the limitations of other telehealth methods, providing visual information for the patients and reciprocal feedback for clinicians, further providing safety in addition to the benefits of social interactions. Videoconferencing has proven to be effective and beneficial in the delivery of health services in a variety of clinical contexts [14–16]; however, due to the timely nature of prehabilitation, telehealth may prompt different barriers to other clinical contexts of intervention. The choice of the system requires consideration of technological accessibility and intuitiveness of the interfaces: previous studies utilized either innovative devices to be taken home and/or installation services for the technologies. Introducing new or innovative devices in patients' daily life may impose a learning curve barrier that could negatively impact adherence in the short-lived prehabilitation process. Therefore, usage of commercial devices (e.g., computers, tablets, smartphones) and applications, respecting governmental regulations, may be advantageous, as patients may already have access to similar technologies and would therefore facilitate their adoption [17]. In a similar vein, the cost of telecare may be decreased by the use of commercial devices, if patients are able to use their own technologies. Additionally, relating to the cost-efficiency of telehealth, a study demonstrated that teleprehabilitation became cost-effective for the healthcare system when patients lived further away from the tertiary healthcare center than 30 km [18].

Videoconferencing cannot replace essential hospital visits nevertheless can complement the delivery of health services and is largely accepted as an effective and non-inferior alternative to face-to-face therapy in the delivery of both postsurgical rehabilitation [14, 15] and prehabilitation [17, 19–21]. It has further proven to be feasible and effective to deliver nutritional and psychological counseling [16, 22]. Notably, from the patient perspective, the relationship with the therapist through videoconferencing was shown to foster a sense of safety and support. Patients have voiced satisfaction with telehealth programs, reporting feeling engaged in their continuity of care and more resilient both physically and mentally [23]. Another study reported that videoconferencing allowed for visual cues, helping to reduce risks of miscommunication and increasing focus of both patients and clinicians [24]. Granted, they reported the incidence of technical issues, in which case clinicians would resort back to phone appointments, which highlights the need for a reliable system. The later would be defined as a system easy to access for patients and clinicians, with smooth visual and audio communication and minimal time lag associated with Internet usage on both sides of the communication system [24]. There would be two ways to resolve the challenges of lag: (a) have the clinician use an Ethernet connection as it is more stable and reliable than WiFi and (b) provide technologies with data included (i.e., a tablet with a sim card in).

In programs using a unimodal videoconferencing system, it may be challenging to quantify functional improvements if patients are not seen in-hospital, as not all assessments are appropriate and reproducible in home-based settings. This would suggest the need to combine systems to access pertinent information, while providing support, using technologies that will not be overbearing for the patients. With the integration of videoconferencing, mobile and wearable devices, data acquisition, and clinical support can be facilitated, while avoiding the need to introduce foreign technologies. With technological advancements, training watches provide many tools to help users be more aware of their daily habits in order to improve their lifestyle. Quantifying their sleep [25], relaxation time, physical activity [26], or inactivity [27] can help patients attain their objectives. Acquiring such data, in addition to self-reported questionnaires, may lead to improvements in personalized counseling, patient motivation, and engagement.

A combined telehealth approach may be an appropriate set of tools for healthcare providers to properly support oncologic surgical candidates, while promoting patient safety and respecting governmental guidelines in view of the current and future pandemics. As these technologies become more accepted and continue to evolve, further research is crucial to align telehealth with effective perioperative health management strategies. Subjects such as (a) feasibility and effectiveness of remote functional assessments, (b) the optimal technologies and methodologies for multimodal tele-interventions, and (c) the acceptance and adherence to intervention programs would need to be explored for complete understanding of the feasibility and effectiveness of teleprehabilitation in elderly and adult oncologic populations.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

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