

# Implementation of physiotherapy telerehabilitation before and post Covid-19 outbreak: A comparative narrative between South American countries and Australia

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## Abstract

The continuous development in telecommunication technologies has created opportunities for health professionals to optimise healthcare delivery by adopting digital tools into rehabilitation programs (i.e., telerehabilitation). These technological advances, along with the demographic and social characteristics of each country, have made the implementation of telerehabilitation a disparate process across regions. We have gathered the experience of four countries (Australia,

## Resumen

El desarrollo continuo de las tecnologías en telecomunicaciones ha creado oportunidades para que los profesionales de la salud optimicen la prestación de atención médica mediante la adopción de herramientas digitales en los programas de rehabilitación (por ejemplo, telerrehabilitación). Estos avances tecnológicos, junto con las características demográficas y sociales de cada país, han hecho que la implementación de la telerrehabilitación sea un proceso dispar entre regiones.

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Chile, Brazil, and Colombia) in two different regions (Oceania and South America) to recompile the history pre- and post-Covid-19 outbreak until January of 2021, the barriers to, and facilitators of telerehabilitation, and outline the future challenges for these countries.

**Keywords:** telerehabilitation; physical therapy modalities; coronavirus infections; digital health; public health; South America; Australia

Hemos recopilado la experiencia de cuatro países (Australia, Chile, Brasil y Colombia) en dos regiones diferentes (Oceania y América del Sur) para presentar la historia previa y posterior al brote de Covid-19 hasta enero de 2021, junto con las barreras y facilitadores de la telerrehabilitación, y así delinear los desafíos futuros para estos países.

**Palabras clave:** telerrehabilitación; modalidades de fisioterapia; infecciones por coronavirus; salud digital; salud pública; América del Sur; Australia

## History of telerehabilitation and purpose of the article

The objective of this narrative review is to report the experiences of healthcare workers and researchers on the implementation of telerehabilitation in Australia and South America, creating a comparative narrative between them. This information was summarized from four individual manuscripts including history of telerehabilitation, specific barriers, facilitators and future challenges until December 2020. A summary of the history and implementation of telerehabilitation in Australia, Chile, Brazil and Colombia are presented on the history of telerehabilitation section for each country.

## History of telerehabilitation in Australia

Australia has a long history of research and practice in telerehabilitation (figure 1). Some of the earliest physiotherapy clinical services and research studies, dating back to the early 2000s, commenced in this country, and Australia has continued to be a global leader in the use of technology for clinical service provision. In Australia, the first telegraph message was sent in 1854, but it wasn't until 1874 that the telegraph was used for medical purposes, with Dr. Charles Gosse—a surgeon living in Alice Springs—using it to report a dying patient's condition to his wife in Adelaide.<sup>1</sup>

In 1998, more than 100 years later, the first worldwide scientific publication on telerehabilitation was published<sup>2</sup> and four years later, Dr. Trevor Russell

and his team at the University of Queensland published a series of studies focusing on the validation of physiotherapy assessments conducted remotely using telerehabilitation technology<sup>3-9</sup> and ultimately published the first Randomised Controlled Trial (RCT) in telerehabilitation.<sup>10</sup>

## History of telerehabilitation in Chile

Chile documented the use of telehealth in the early 30's to deliver treatment to sick patients on ships (figure 2), but it was not until 2011 that the first telerehabilitation session was documented by the Teletón Institute, a non-profit institution that currently treats more than 26 thousand children and adolescents annually throughout Chile. It was in 2016 that the home telerehabilitation program, "Teletón en tu Casa", was born, built to promote a telerehabilitation program that already by 2020 was reaching about 5 000 families. This was possible using a tablet with connection to mobile networks that the institution provided on loan for a defined period of time.

In the private sector, companies such as InnovaHope started using virtual reality technologies in 2017, which failed to be viable due to the lack of access to the internet and the need of high-end mobile devices to deliver such a service. Now in 2020, it uses electronic health records, videoconference assessment, remote care and chat.

Other institutional strategies at both public and private levels, have been systematized over time, but not widely disseminated and documented.

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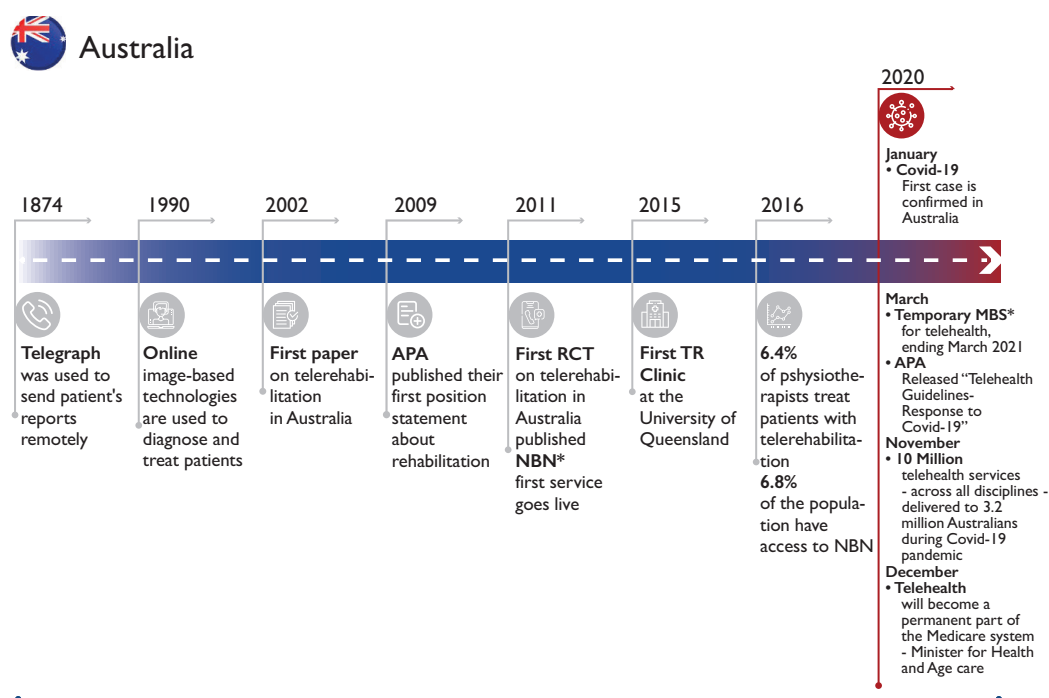


FIGURE 1. HISTORY OF TELEREHABILITATION IN AUSTRALIA

### History of telerehabilitation in Brazil

Telehealth was first implemented in Brazil in the 90's with the use of remote electrocardiogram diagnosis (figure 3). Although it was only in 2002 that the Federal Council of Medicine –*Conselho Federal de Medicina*– legalised telemedicine as a “medical practice performed by audio and visual methods for assistance, education and research purposes”.<sup>11</sup> In contrast, despite reports of telerehabilitation being used by allied health professionals since the 90s,<sup>2</sup> physiotherapists in Brazil were not legally able to provide this modality of care up to March 2020. The article 15, item II of the Brazilian Code of Ethics in Physiotherapy formulated by the Brazilian Federal Council of Physiotherapy and Occupational Therapy –*Conselho Federal de Fisioterapia e Terapia Ocupacional* (Coffito)– states that “it is forbidden for the physiotherapist to consult or prescribe physiotherapy treatment in a non-face-to-face manner”.<sup>12</sup> However, on March 23rd of 2020, the Coffito recognised non-face-to-face therapeutic modalities due to the unprecedented world health crisis.

### History of telerehabilitation in Colombia

According to Narváez and collaborators in 2017, Colombia had the largest number of scientific or academic documents published in Latin America on telerehabilitation.

<sup>13</sup> One of the first telerehabilitation implementations was performed in 2010 (figure 4), where remote treatment was carried out in three hospitals, all in areas with vulnerable populations.<sup>14</sup>

Most of the information showed the use of virtual reality combined with low-cost technologies for motion capture based on inertial devices and magnetic sensors, Kinect cameras and other devices.<sup>13</sup> This constitutes a joint strategy between institutional rehabilitation and the extramural care modalities offered to the population, especially in geographic areas with poor access to rehabilitation services.<sup>15</sup>

### Framework and regulation of telerehabilitation in Australia and South American countries

In 2009, telerehabilitation in Australia was formally recognised by the Australian Physiotherapy Association (APA) with the release of their first position statement on telerehabilitation, supporting this delivery of physiotherapy care under specific circumstances. These included adhering to the APA Code of Conduct, knowing the limitations of technology, recognising physiotherapist limitations to their scope of practice, implementing appropriate privacy and security measures, and aiming to provide the best possible services while reducing associated costs.<sup>16</sup> Recognising the need for training allied health students



## Chile

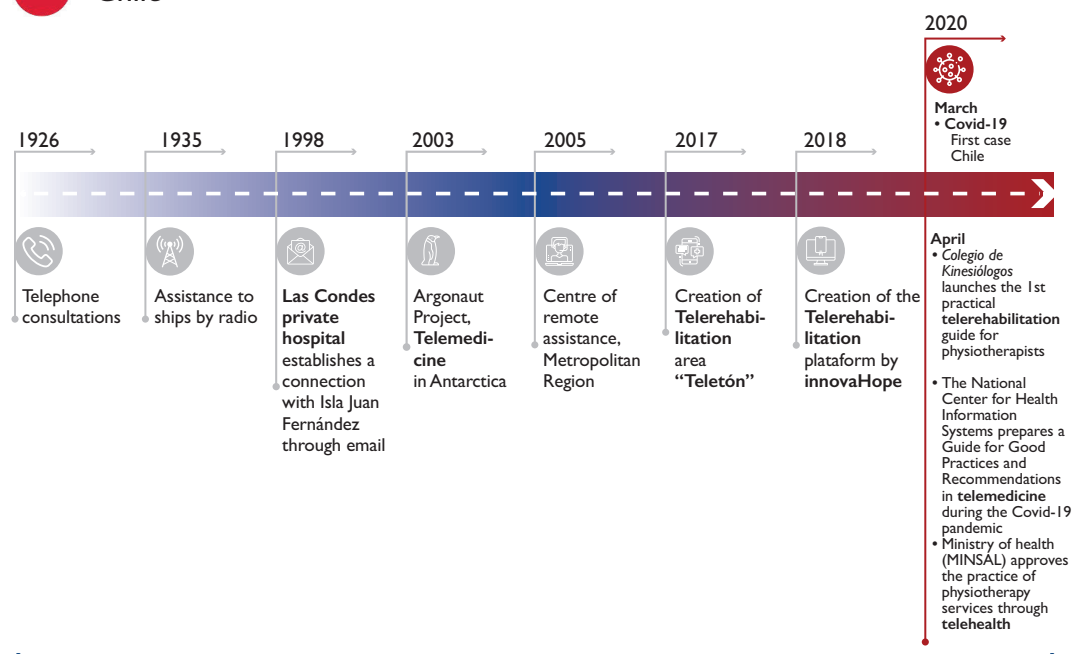


FIGURE 2. HISTORY OF TELEREHABILITATION IN CHILE



## Brazil

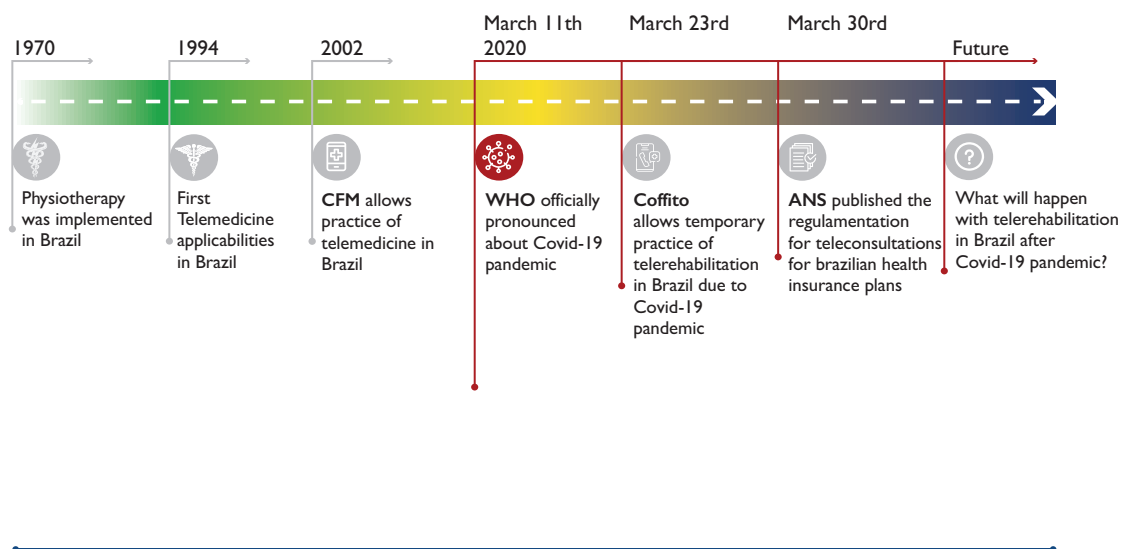


FIGURE 3. HISTORY OF TELEREHABILITATION IN BRAZIL

in this area, the University of Queensland created the first telerehabilitation multidisciplinary student clinic in Australia in 2015<sup>17</sup> to give students knowledge and hands-on clinical experience in using technology for clinical service provision. Despite advances in technology, limited access to publicly funded physiotherapy services has let to implementation of telerehabilitation being slow, not only in Australia but globally.

By the time Australia recognised telerehabilitation, Chile, Brazil and Colombia were lacking a regulated framework for its practice. But this changed when the Covid-19 pandemic started. Covid-19 brought unprecedented changes, forcing clinical practice to be delivered differently to comply with safety measures including social distancing. These changes positioned telerehabilitation as an attractive alternative to in-person care.

In Chile, given the measures of confinement and restriction of the population's mobility, added to the suspension of outpatient rehabilitation treatments, it became necessary to implement programs based on telerehabilitation in different cities across the country. This is how various institutional strategies were implemented in both the public and private health systems, highlighting experiences such as the *Regional Hospital of Antofagasta*, the *Clinica Alemana de Santiago*, the *Hospital del Trabajador*, among others. *Teletón* sought to maintain interaction with their users using their telerehabilitation

system, but with the knowledge that due to technical and human capacity it would not be enough to provide a service to the entire population.

In Brazil, the social isolation requirements caused by the Covid-19 pandemic interrupted the face-to-face assistance of most physiotherapy services, leading to unprecedented impairments to the functional capacity of patients requiring continuous care.

In Colombia, between January 1 and September 30, 2020, there was a 117% increase in telehealth consultations and 192% increase on overall remotely delivered services.<sup>18</sup>

### Telerehabilitation regulation during the Covid-19 pandemic

In March 2020, just two months after the first case of Covid-19 was diagnosed in Australia, government Medicare funding of telehealth was temporarily provided for eligible allied health encounters, and health insurers soon followed suit. During the same period, the APA published a document, "Telehealth Guidelines - Response to Covid-19" with the aim of providing a framework for practitioners to help ensure the safety and quality of their practice within the context of an emergency response to the pandemic.<sup>19</sup> According to Medicare data, despite the lack of a



Colombia

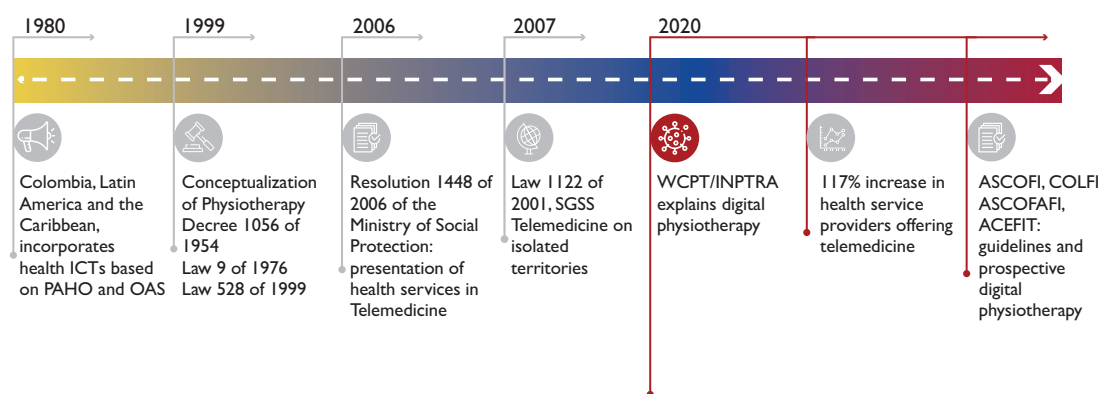


FIGURE 4. HISTORY OF TELEREHABILITATION IN COLOMBIA

broad structured clinician training program, three million telerehabilitation services across nationwide physiotherapists had been delivered to February 2021 since the start of the pandemic. In addition, according to data provided by the Centre for Health, Exercise and Sports Medicine from The University of Melbourne, a survey of 207 physiotherapists around Australia in private/community practice who offered care via videoconferencing during the pandemic, showed that physiotherapists gave moderate to high ratings (7 out of 10) for perceived effectiveness and satisfaction with care and 81% intended to continue offering video conferencing care after the pandemic ended.<sup>20</sup> The Federal government has now confirmed that, due to its success telehealth will become a permanent part of the Medicare system.<sup>21</sup>

Chile has faced its own challenges after 3 of March of 2020, the day the virus was confirmed to have reached the country. But by April 29, 2020, the exempt resolution of the Ministry of Health that approves the practice of telerehabilitation by physiotherapists was published in the official newspaper.<sup>22</sup> Along with this, support for the public financing system for this type of benefits was approved and applied during the period of the pandemic. Supporting this process, the Chilean Association of Physiotherapists (*Colegio de Kinesiólogos de Chile*) published a telerehabilitation practical guide to support the implementation of telerehabilitation<sup>23</sup> in a time when *Instituto Teletón* was delivering 73% of their 850 000 medical therapeutic services remotely.

At the same time, in March of 2020, the Coffito published the resolution n° 516 that regulated “the remote practice through modalities of teleconsultation, telemonitoring and teleconsulting as a measure to face the crisis caused by the Covid-19 pandemic”, temporarily suspending the article 15, item II of the Brazilian Code of Ethics in Physiotherapy, which stated that “it is forbidden for the physiotherapist to consult or prescribe physiotherapy treatment in a non-face-to-face manner”.<sup>24</sup> The National Agency of Supplementary Health,<sup>25</sup> which regulates private health insurance in Brazil, recommended that all health insurance organisations should ensure and support suitable conditions for teleconsultations. However, many health insurance organisations are ignoring these recommendations and have not been covering physiotherapy telerehabilitation consultations. Regarding public assistance, the Brazilian Government has temporarily included physiotherapy teleconsultations in the framework of procedures from the Brazilian Health System.<sup>26</sup> Although Brazilian’s health system offers such guidance, they all have a provisory aspect, which explains the fact that, in clinical practice, clinical environments often have poor techno-

logical support and professionals not trained to assist the patient using telerehabilitation.

Colombia has presented health system changes at a national level and transformations in the policies that regulate digital health, contemplating telehealth within the public health benefit plan scheme, including physiotherapy. However, this only applies to those services that are in the Special Registry of Health Service Providers (REPS).<sup>27</sup> According to the REPS data sent by the Colombian Ministry of Health,<sup>28</sup> the authorization of health service providers increased by 20% and the authorization of services by 45% between March and April 2020.

### Barriers to, and facilitators of, telerehabilitation

Several barriers to, and facilitators of, telerehabilitation have been identified, both prior to the Covid-19 pandemic<sup>29-31</sup> and during its rapid implementation.<sup>32,33</sup> Barriers and facilitators can be related to the service, clinician, and/or patient.<sup>34-36</sup> Common barriers or facilitators to all countries and others context-specific are presented in table I.

From the authors’ experiences, the lack of digital literacy is the most important barrier to patients in South American countries. Although Chile, Brazil and Colombia account for over two-thirds of the region’s total gross domestic product (GDP) at purchasing power parity (PPP) in 2019 (International Monetary Fund), these countries have a huge social inequality (Gini index Chile: 44.4%; Brazil: 53.9%; Colombia: 40.4%;), while Australia has substantial lower inequality (Gini 34.4%). Thus, while some people are familiar with several telecommunications technologies, such as computers and smartphones, others do not have access or do not know how to use them. Additionally, poor internet quality often leads to patients and health professionals being frustrated during synchronous telerehabilitation (e.g., poor quality of audio and video, loss of connection, and low-quality equipment). Despite the different trajectory of Australia and South American countries on telerehabilitation implementation, clinicians tend to perceive telehealth-delivered care as less effective than “hands-on treatment” and demonstrate some resistance to changing usual practice.<sup>37</sup>

Context-specific barriers are related to the legal framework and funding models introduced by each country. In Chile, public funding corporations from Corfo (*Corporación de Fomento de la Producción*) or Tecla (*Caja Los Andes Entrepreneur Talent*) have been essential but are still insufficient to promote technological and business development around digital health.

On the case of Brazil, physiotherapists have been practicing telerehabilitation on a temporary exception-

**Table I**  
**COMMON AND CONTEXT-RELATED BARRIERS AND FACILITATORS ON TELEREHABILITATION**  
**IMPLEMENTATION BY JANUARY OF 2021**

<i>Factors</i>	<i>Barriers</i>	<i>Facilitators</i>
Common barriers and facilitators		
Service	<ul style="list-style-type: none"> <li>- Cost of implementing telerehabilitation services.</li> <li>- Lack of reimbursement from healthcare funders.</li> </ul>	<ul style="list-style-type: none"> <li>- Pandemic infection control and lockdown forced people to transition from in-person care to online delivery.</li> </ul>
Clinician	<ul style="list-style-type: none"> <li>- Clinician perception about lack of effectiveness of telehealth-delivered care and resistance to changing usual practice.</li> <li>- Lack of training/skills in telehealth.</li> <li>- Perceived complexity of problem/condition or complexity of patient.</li> <li>- Perceived inability to adequately diagnose/assess patients.</li> <li>- Access to and quality of technology / internet.</li> <li>- Poor quality room/video conference setup (e.g., light, camera setup, noise).</li> </ul>	<ul style="list-style-type: none"> <li>- Use of patient resources including exercise applications for demonstration, online information, follow up emails.</li> <li>- Personal positive experience of benefits.</li> <li>- Drive to keep business afloat – income needs.</li> <li>- Appropriate setup and preparation ahead of appointment.</li> <li>- Reliable and appropriate technology setup.</li> <li>- Effectiveness of telerehabilitation in the literature.</li> </ul>
Patient	<ul style="list-style-type: none"> <li>- Access to and quality of technology/internet.</li> <li>- Technology/computer literacy.</li> <li>- Perception that health conditions require hands-on treatment.</li> </ul>	<ul style="list-style-type: none"> <li>- Willingness and engagement.</li> <li>- Trust and acceptance towards technology and telehealth, and dissatisfaction toward traditional healthcare.</li> <li>- Improved access to health care services.</li> <li>- Saving costs.</li> </ul>
Context-specific barriers and facilitators		
Australia	<ul style="list-style-type: none"> <li>- Lack of education in telerehabilitation practice.</li> </ul>	Service: <ul style="list-style-type: none"> <li>- Funding models introduced during Covid-19 pandemic.</li> </ul>
Chile	Services: <ul style="list-style-type: none"> <li>- Access to technology.</li> <li>- Availability of connection networks in remote places.</li> </ul> Clinician: <ul style="list-style-type: none"> <li>- Fear of losing the job.</li> </ul> Patient: <ul style="list-style-type: none"> <li>- Fear of new health care modalities.</li> </ul>	Services: <ul style="list-style-type: none"> <li>- Willingness of private companies to support implementation.</li> </ul> Clinician: <ul style="list-style-type: none"> <li>- Education to health care professionals from the government.</li> <li>- Scientific validation of the effectiveness of telerehabilitation.</li> </ul> Patient: <ul style="list-style-type: none"> <li>- Education from health care professionals in new modalities of digital health.</li> </ul>
Brazil	Service: <ul style="list-style-type: none"> <li>- Lack of regulatory support by Coffito and preparedness from physiotherapists.</li> </ul> Patient/Clinician: <ul style="list-style-type: none"> <li>- Privacy concerns.</li> </ul>	Patient: <ul style="list-style-type: none"> <li>- Family members' involvement.</li> </ul>
Colombia	Patient: <ul style="list-style-type: none"> <li>- Specific cultural considerations from multicultural diversity under data protection and security.</li> </ul>	

basis, as its practice was not allowed before the Covid-19 pandemic.

### Future challenges

Several challenges must be addressed for the wide-scale uptake and sustainability of telerehabilitation service. As the pandemic resolves and life returns to 'normal' there will be a tendency for physiotherapists to revert to their usual practice habits. For sustainability, several gradual adjustments and changes will have to be implemented at different levels.

The biggest challenge seems to be at a broader, structural level, in terms of laws, communications

infrastructure and current ethical norms. Sustainable implementation will be facilitated by permanent funding of telehealth by Governments, private health insurers, and other third-party payers for the delivery of physiotherapy care via telerehabilitation in the same model that face-to-face care is funded. An advantage of telerehabilitation is the opportunity to provide high-quality care to patients from remote areas. However, remote areas, especially in Latin American countries, also have issues with internet access, which limits the implementation of telerehabilitation. The creation of telerehabilitation hubs in key remote locations or the expansion of internet networks may be good strategies to facilitate large scale implementation of telerehabilitation.

tion. Current ethical norms, specifically in Brazil, is the need for a permanent modification of article 15, item II of the Brazilian Code of Ethics in Physiotherapy that does not allow physiotherapists to provide non-face-to-face care.

A second challenge is ensuring that clinicians have the knowledge and skills to optimally deliver telerehabilitation. A discipline-specific core capability framework is required to outline the important telerehabilitation knowledge and skills needed and to inform development of training courses and entry-to-practice curricula and readily accessible training programs must be developed.

At the user/patient level, the biggest challenge is the improvement of digital literacy, especially in Latin American countries. Along with this, user empowerment and a less paternalistic view of care are paradigmatic changes that need to be addressed.

Finally, although there is evidence of the effectiveness of telerehabilitation, a future challenge for both research and clinical settings is to overcome the knowledge gaps in terms of determining which patients or conditions are most suited to telerehabilitation models of care, when a telerehabilitation program can be implemented in full or in a hybrid modality and which methods or information and communication technologies (such as synchronous or asynchronous intervention, use of web platforms, telephone applications, coaching) are the most effective for specific interventions, conditions, users and settings.

## Conclusion

This narrative review is consistent with current evidence on global barriers and facilitators for telehealth implementation. However, some context-related barriers have been described in Australia, Chile, Brazil and Colombia, which suggests that the implementation of telerehabilitation, due to its complex implementation process, depends on the cultural and health characteristics of each country. The development and implementation of telerehabilitation in each country has also been determined by the local geography, choosing one technology over another accordingly.

Including a context of the healthcare systems or models in each country willing to implement digital technologies is extremely relevant, since the operationalization of telehealth may be different depending on the context and the view that is given from the public and / or private, such as is proposed for Chile.

More evidence is needed in South American countries to report and standardize the barriers and possible solutions for the use of digital technologies in the long term, including its political, health and legal framework

to provide high-quality and long-term telerehabilitation services.

*Declaration of conflict of interests.* The authors declare that they have no conflict of interests.

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