

## ORIGINAL RESEARCH

## Physical therapists and public perceptions of telerehabilitation: An online open survey on acceptability, preferences, and needs



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### Abstract

**Background:** During the COVID-19 pandemic, telerehabilitation allowed the continuation of physical therapy care in parallel with public health measures to prevent the virus spread. However, in low- and middle-income countries including Brazil, telerehabilitation was unfamiliar to most of the population.

**Objective:** To investigate acceptability, preferences, and needs in telerehabilitation by Brazilian physical therapists and the general population.

**Methods:** We conducted an observational cross-sectional study with an online survey consisting of 13 multiple-choice items. Items were distributed among acceptability, preferences, and needs sections, and encompassed confidence in delivering or receiving telerehabilitation, its perceived efficacy and costs, and suitable content.

**Results:** A total of 1107 responses were registered, 717 from physical therapists. Half of them self-reported confidence in conducting telerehabilitation through the internet (synchronous or asynchronous). The same proportion disagreed that telerehabilitation is as effective as in-person interventions. Physical therapists agreed telerehabilitation should contain educational, self-management strategies, and exercises information, but the general population endorsed the provision of technical advice on exercise execution. The general population mostly reported that telerehabilitation could help their specific health condition (86%), but only 14% of respondents would pay the same as they pay for in-person consultations. Participants reported an overall preference for synchronous communication and concern about the lack of a hands-on approach.

**Conclusion:** Physical therapists and the general population appear to demonstrate apprehension towards telerehabilitation. Insufficient preparation or inadequate knowledge might influence participants' acceptance, preferences, and needs.

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## Background

Telehealth is a broad term used to address the exchange of patients' health information or delivery of health-related care through information and telecommunication means.<sup>1,2</sup> Telerehabilitation can be employed as an analogous term to telehealth in physical therapy.<sup>3</sup> The potential of overcoming geographical barriers is one of the greatest advantages of telerehabilitation because ease of access contributes to the care continuum.<sup>4,5</sup>

High-income countries such as Australia, United States, and the United Kingdom, have issued specific policies for the uptake of telehealth and telerehabilitation over the last decade, but a different scenario was experienced by lower and upper-middle-income countries.<sup>6,7</sup> Forced by the COVID-19 outbreak, countries such as Brazil and India issued unprecedented regulations for telerehabilitation,<sup>8,9</sup> leading physical therapists to suddenly rely on this new mode of delivering care with neither gradual exposure nor appropriate training or guidance.<sup>5</sup> The general population in these countries was also exposed to this new mode of receiving care without prior assessment of their acceptability or needs.<sup>10</sup> Suboptimal assessment before implementation may hamper telerehabilitation adoption.<sup>11</sup>

Current evidence demonstrates that telerehabilitation is increasingly associated with satisfactory pain and function outcomes for the musculoskeletal pain patient population, often presenting similar results to in-person programs.<sup>12,13</sup> Furthermore, telerehabilitation appears to be effective for neurological,<sup>14</sup> cardiorespiratory,<sup>15,16</sup> and post-surgical conditions.<sup>17,18</sup> Despite an initial discomfort with the "hands-off" approach and dependence on patients' subjective history,<sup>19</sup> Australian physical therapists reported overall satisfaction with videoconference-based sessions.<sup>20,21</sup> Similar acceptance outcomes were reported by physical therapists in the United Kingdom and Australia delivering their services through telephone<sup>22,23</sup> or using a combination of synchronous (or real-time, including videoconferences) and asynchronous (or store-and-forward, including apps and websites) communication with patients.<sup>24</sup> From the patient perspective, telerehabilitation delivered by videoconference or phone was classified as "as good as" in-person consultations.<sup>20,25</sup>

Considering that context plays a critical role in translating evidence into practice,<sup>26,27</sup> evidence from countries in which telerehabilitation is more advanced should not be directly applied to different settings and cultures. There is a gap in the literature focusing on acceptability, preferences, and needs in telerehabilitation by physical therapists and general population from low- and middle-income countries. The unique educational, sociopolitical, cultural, and economic circumstances of countries such as Brazil, in addition to the sudden regulation of telerehabilitation in response to the COVID-19 pandemic, might interfere with how individuals interact with telerehabilitation.<sup>5</sup> Therefore, the aim of this study was to understand the acceptability, preferences, and needs in telerehabilitation by Brazilian physical therapists and the general population.

## Methods

### Design

We conducted an observational cross-sectional study with an online survey and collected data from May to June 2020. Ethical approval was obtained from the Research Ethics Committee of the *Universidade Cidade de São Paulo* (UNICID), CAAE: 30,119,120.3.0000.0064. The study is reported in accordance with the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology)<sup>28</sup> statement and the CHERRIES (Checklist for Reporting Results of Internet E-Surveys).<sup>29</sup> We drew from Sekhon et al.<sup>30</sup> as a theoretical framework. According to this framework, core elements to assess the acceptability of healthcare interventions include the domains of affective attitude, perceived effort, perceived efficacy of the intervention, ethics, costs of intervention, and coherence of intervention. The survey development process and final structure are presented in [Table 1](#). The participant information sheet and the consent form could be downloaded by participants. Electronic consent was obtained in the first question of the survey.

### Participants

We employed a snowball sampling method to recruit Brazilian physical therapists and members of the general population via social media posting (Facebook, Instagram, and WhatsApp). Anyone could respond to the survey. Because we aimed to reflect early perspectives on telerehabilitation and considering that the national regulation of telerehabilitation was released on March 20th, 2020, we defined an *a priori* period of 4 weeks (from May to June 2020) for the survey to be available online. Therefore, no sample size calculation was performed. Participation was entirely voluntary; no incentives were offered.

### Procedures

The survey was opened and accessible through a link. The invitation headline was "We want to know your opinion about telerehabilitation!" A brief introduction about research aims and what telerehabilitation was given along with the survey's access link. Following the consent question, the survey was logically organized to appear slightly different for 1) physical therapists, and for 2) the general population. The survey was organized into four sections: demographic data, acceptability, needs, and a final open-ended question. The "acceptability" section drew from the framework proposed by Sekhon et al.<sup>30</sup> and consisted of a 5-point Likert score ranging from 1 ('strongly disagree' / 'not confident at all') to 5 ('strongly agree' / 'completely confident'), with the exception to the item related to costs, which response options were 'yes'; 'no, it should be cheaper'; 'no, it should be more expensive' when compared to in-person physical therapy. [Table 2](#) presents further

**Table 1** The online survey: development process and final structure.

Development phase	Despite the use of a theoretical framework that served as a starting point, the acceptability domains were explored in the absence of a validated and reliable questionnaire. Questions were designed considering the very specific context of Brazil during the pandemic and the new regulation allowing telerehabilitation. The available evidence on implementation research reinforces the possibility of measuring acceptability tailored to the context and setting. <sup>67,68</sup> Questions were revised by all authors for relevance, appropriateness, readability, and wording; Questions were displayed in the TypeForm® platform (accessible through smartphone, tablet, or computer with internet access)	
Sections	<p><i>Section I</i> <i>Demographic data</i></p> <p><i>Section II</i> <i>Acceptability of telerehabilitation</i></p> <p><i>Section III</i> <i>Needs in telerehabilitation interventions</i></p> <p><i>Section IV</i> <i>Open-ended question</i></p>	<p>Personal and professional information</p> <p>Scoring system: 5-point Likert scale ranging from 1 ('strongly disagree' / 'not confident at all') to 5 ('strongly agree' / 'completely confident');</p> <p>Multiple-choice items.</p> <p>Preference and needs with regards: mode of delivery, frequency per week, communication with patients/communication with clinicians, content of intervention, and patient interaction within telerehabilitation.</p> <p>Open-ended question asking if participants had extra information or suggestion to share with regards to their perception towards telerehabilitation. Answering this question was not mandatory.</p>

details on each survey section. The “needs” section consisted of five multiple-choice questions shown in [Table 3](#). We piloted the survey within the research group and adjusted wording and sequencing of items according to feedback.

### Variables and statistical methods

The survey responses were exported to a Microsoft Excel sheet and all data were numerically codified. The results were analyzed descriptively. The dichotomous variables

**Table 2** Acceptability questionnaire based on acceptability theoretical framework developed by Sekhon et al.<sup>30</sup>

Affective attitude
PT: How confident do you feel in offering your services through telerehabilitation?
C: I) How do you feel towards the idea of participating in telerehabilitation?
II) Would you participate in a telerehabilitation program?
Perceived effort
PT: Do you believe having the appropriate infra-structure to deliver telerehabilitation to your patients?
C: I) Do you believe you could adhere to a telerehabilitation program?
II) Do you think you have the adequate infra-structure to participate in telerehabilitation?
Perceived efficacy of intervention
PT: Do you believe a telerehabilitation program is as effective as an in-person program?
C: Do you believe a telerehabilitation program can be as effective as an in-person program?
Ethics
PT: Do you believe telerehabilitation is ethical with Brazilian health system?
Costs of intervention
PT: As a clinician, do you believe telerehabilitation is expensive?
C: I) Do you believe telerehabilitation is expensive?
II) Would you pay for telerehabilitation in the same way you pay for an in-person consultation?
Coherence of intervention
PT: Do you believe telerehabilitation could fit the profile of patients you work with?
C: I) Do you believe a telerehabilitation program would fit the needs of a general musculoskeletal condition (e.g., osteoarthritis)?
II) Do you believe a telerehabilitation program would fit the needs of your condition?

PT: physical therapists.  
C: consumers.

**Table 3** Preferences and needs in telerehabilitation.

Questions and multiple options		Physical Therapists		General Population	
		N	% (95% CI)	N	% (95% CI)
Which of the following mode of delivery would better fit the population you work with?	Websites	9	1.3 (0.6, 2)	16	4 (2, 6)
	Telephone-based	14	2 (1, 3)	3	0.8 (0.2, 2)
	Message-based (SMS, e-mail)	57	8.1 (6, 10)	37	9.3 (6, 12)
	Specific apps	35	5 (3.5, 6)	42	10.5 (7, 13)
	Videoconference	246	34.8 (31, 38)	164	41 (36, 45)
	Combination of previous technologies	321	42.4 (41, 49)	128	32 (27, 36)
	None of the previous	25	3.5 (2, 5)	7	1.8 (0.8, 3)
Which frequency of follow-up of your patients would you consider ideal?	Daily	41	5.8 (4, 7)	–	–
	Weekly (once a week) / Previously scheduled	191	27 (23, 30)	206	51 (46, 56)
	Up to 3 times a week	233	33 (29, 36)	–	–
	Once every 2 weeks	17	2.4 (1, 3)	92	23 (19, 27)
	Monthly (once a month) / Single session	3	0.4 (0, 1)	26	6.5 (4, 9)
	According to patients' needs	221	31.3 (27, 34)	64	16 (12, 19)
	None of the previous	–	–	10	2.5 (1.3, 4)
Which way of communicating with patients would you consider the most appropriate?	Always synchronous, i.e., real-time (via videoconference, telephone, for example)	214	30.3 (27, 33)	156	39 (24, 43)
	Always asynchronous, i.e., store-forward (via apps, websites, for example)	7	1 (0, 2)	40	10 (7, 13)
	Combination between synchronous and asynchronous	466	64.9 (62, 69)	198	48 (43, 52)
	I don't know	20	2.8 (1, 4)	9	2 (1, 4)
Do you consider telerehabilitation could be used to deliver the following contents?	Health information, patient education (e.g., pain neuroscience)				
	YES	475	67.2 (63, 70)	201	50.2 (45, 55)
	NO	232	32.8 (28, 36)	199	49.7 (44, 54)
	Self-management strategies (e.g., breathing, guided meditations, basis of mindfulness)				
	YES	413	58.4 (54, 61)	186	46.5 (41, 51)
	NO	294	41.6 (38, 45)	214	53.5 (48, 58)
	Exercise prescription and orientations on the correct execution (e.g., positioning, series, repetitions)				
	YES	578	81.8 (78, 84)	313	78.2 (73, 82)
	NO	129	18.2 (15, 21)	87	21.8 (17, 26)
	Orientations to third parties (i.e., family members, caregivers)				
	YES	415	58.7 (55, 62)	114	28.5 (24, 33)
	NO	292	41.3 (37, 44)	286	71.5 (66, 75)
Do you think patients could interact among them in a telerehabilitation program?	None of the previous	13	1.8 (1, 3)	7	1.8 (0.8, 3)
	Yes, using forums, groups and common spaces to exchange experiences (e.g., using social media)	442	62.5 (58, 66)	226	56.5 (51, 61)
	No, there should not be a space for interaction among patients	113	16 (13, 18)	89	22.4 (18, 26)
	I don't know	149	21.2 (18, 24)	83	20.8 (17, 24)

\*\* Questions in this table are based on the questionnaire available to physical therapists. Wording was slightly different for the general population (available on Appendix).

were summarized using frequency (n) and percentage (%). Numerical variables with an approximately normal distribution were summarized using mean and standard deviation (SD). Numerical variables without a normal distribution were summarized using median and interquartile ranges (25% to 75%). The 95% confidence interval (95%CI) was calculated around proportions. Analysis was conducted using SPSS version 20.0 (IBM Corp., Armonk, NY, USA). The answer to the open-ended question was analyzed qualitatively following an inductive thematic analysis method described by Thomas and Harden.<sup>31</sup> Thematic analysis was performed by LF (a healthcare professional and qualitative researcher) and discussed among co-authors (health professionals and researchers in musculoskeletal and telehealth fields).

## Results

### Sample characteristics

A total of 717 physical therapists and 400 individuals from the general population completed the online survey. Ten undergraduate students were excluded from physical

therapists' participants. The response rate was 90–100% for each item. Missing data per item were considered a non-response and were not used in the analysis. Respondents were mostly women (72% of physical therapists and 65% of general population) with a mean age of 33 and 34 years, respectively. A small percentage of physical therapists (9%) were recently graduated (<1 year). Characteristics of the sample are presented in [Table 4](#).

### Descriptive data analysis

#### Acceptability of telerehabilitation (physical therapists)

When asked how confident physical therapists felt towards providing telerehabilitation using the internet, about half of clinicians (52%, 95%CI: 48, 55) self-rated being confident or highly confident, 35% (95%CI: 32, 39) were not confident, and 11% (95%CI: 9, 14) were indifferent. Sixty-one percent (95%CI: 57, 64) agreed on having the adequate infrastructure to provide telerehabilitation services to their patients (e.g., computer or smartphone for videoconferencing, enough physical space, good internet connection, and adequate digital literacy skills). With regards to the effectiveness of telerehabilitation interventions, 388 clinicians (55%, 95%CI: 51,

**Table 4** Characterization of the sample.

		Physical Therapists	General Population
Sex, n (%)	Female	506 (71.6%)	260 (65%)
	Male	200 (28.3%)	139 (34.8%)
	N/A	1	1 (0.3%)
Mean age (in years), mean $\pm$ SD		33.6 $\pm$ 7.6	34.2 $\pm$ 12.6
Clinical experience, n (%)	1 year	63 (8.9%)	–
	< 5 years	117 (16.5%)	–
	5 – 10 years	168 (23.8%)	–
	10 – 20 years	264 (37.3%)	–
	>20 years	79 (11.2%)	–
Education, n (%)	Elementary school	–	3 (0.8%)
	High school	–	46 (11.5%)
	Graduation (uncompleted)	–	105 (26.3%)
	Graduation (completed)	–	123 (30.8%)
	Post-graduation	–	123 (30.8%)
Area of expertise, n (%) *	Cardiothoracics	64 (9%)	–
	Continance and Women's Health	37 (5.2%)	–
	Ergonomics and Occupational Health	5 (0.7%)	–
	Gerontology	27 (3.8%)	–
	Musculoskeletal	54 (7.6%)	–
	Neurology	84 (11.8%)	–
	Oncology	1 (0.1%)	–
	Orthopaedics	266 (37.6%)	–
	Paediatrics	29 (4.1%)	–
	Sports	70 (9.9%)	–
	Others	128 (18.1%)	–
	N/A	45 (6.3%)	–

Was the participant enrolled in any physical therapy program before pandemic?

\*Respondents could choose more than one area of expertise.

N/A: not applicable (not reported or declared no area of expertise).

58) reported not agreeing that telerehabilitation is as effective as in-person interventions. Almost 45% (95%CI: 41, 48) of the sample totally or partially agreed with telerehabilitation being ethical in the Brazilian health system. Most clinicians (53%, 95%CI: 48, 56) disagreed that telerehabilitation services are expensive to provide, but a quarter of them was not sure (25%, 95%CI: 21, 27). When asked about pricing options for telerehabilitation consultations, 55% (95%CI: 51, 58) reported that it should be less expensive than in-person consultations, 42% (95%CI: 38, 45) agreed it should have the same cost, and 3% (95%CI: 1, 4) reported it should be more expensive. Around two-thirds of clinicians (65%, 95%CI: 61, 68) selected the option indicating telerehabilitation as suitable for the population they work with.

#### Acceptability of telerehabilitation (general population)

Sixty percent of the general population (95%CI 55, 65) selected the options “confident” or “highly confident” about telerehabilitation delivered by the internet, and 77% (95%CI: 73, 81) selected they would participate in telerehabilitation. Around one-quarter (43%, 95%CI: 38, 47) selected the option “agree” or “totally agree” with telerehabilitation leading to similar outcomes to in-person programs; but 27% chose the option “disagree” (95%CI: 23, 32). Seventy-three percent (95% CI: 69, 77) of the general population disagreed telerehabilitation was expensive, and 14% (95%CI: 11, 18) would pay the same as for in-person consultations. When asked about the perceived utility of telerehabilitation for a general musculoskeletal condition (e.g., osteoarthritis), 73% (95%CI: 69, 77) agreed it could be helpful; and when asked about the perceived utility of telerehabilitation concerning individual’s specific context, 86% (95%CI: 82, 89) selected the options “agree” or “totally agree” that telerehabilitation could help. More than two-thirds selected the options “agree” and “totally agree” with regards to self-perceiving as having the adequate infrastructure (e.g., internet access, devices) (73%, 95%CI: 68, 77) and the necessary behavior (e.g., discipline) (68%, 95%CI: 64, 73) to engage with telerehabilitation.

Results regarding needs in telerehabilitation by physical therapists and general population are provided in [Table 3](#).

#### Thematic analysis

Two main themes synthesized the concerns raised by the physical therapists: “*data privacy*” and “*(clinician and patient) readiness*.” Clinicians showed some apprehension towards the first assessment being done remotely. Telerehabilitation was overall seen as a complement to in-person physical therapy treatment, not as the main mode for delivering care. The patients’ digital literacy and access to technology were also pointed out as barriers to good outcomes using telerehabilitation. For the general population, an extra theme emerged: “*I need a hand*.” Participants demonstrated concerns with regards to performing the proposed activities in the wrong way and lacking adequate corrections (especially guided by the “hands-on” approach of physical therapists), which could lead to a worsened condition. Synchronous consultations were highlighted to reduce the feeling of distance from clinicians. Recommendations on adequate materials to have at home and practical ways to develop discipline and engagement were deemed necessary by the general population.

## Discussion

The present cross-sectional study revealed that half of physical therapists were not confident in delivering telerehabilitation through internet. In contrast, individuals from the general population appeared confident and inclined to participate in telerehabilitation if necessary, but few would pay for it the same as they pay for in-person consultations. Both groups reported a preference for synchronous over asynchronous technology, especially videoconference. Despite general agreement among physical therapists towards the provision of educational, self-management strategies, and exercise-based content in telerehabilitation, the general population put greater emphasis on needing technical advice for exercise execution. We observed an overall concern about the “hands-off” nature of telerehabilitation, indicating how participants seem to value “hands-on” approaches.

When compared to the available evidence on clinicians’ acceptability and needs in telerehabilitation,<sup>21,24</sup> the strength of our study is the large sample size. Likely, our sample was most representative of the state of São Paulo given it is the state where the authors are based, but physical therapists from the entire country were the target of the survey. In this sense, our sample showed a similar distribution to previous studies characterizing physical therapists from the state of São Paulo, which are predominantly women having orthopedic, neurology, and cardiothoracic physical therapy as main areas of expertise.<sup>32</sup> Nonetheless, no information on participants’ region was collected in our survey.

#### Acceptability to telerehabilitation

Despite contemporary regulation and rapid uptake of telerehabilitation in Brazil,<sup>33,34</sup> our findings revealed existing barriers for physical therapists and general population to accept this new mode of delivering care. Barriers might include lack of preparation for telerehabilitation, namely poor confidence, difficulty to change, lack of digital literacy, concerns towards a successful therapeutic alliance, and lack of guidance.<sup>24,35,36</sup> Despite 52% of our sample of clinicians self-rating as being confident to deliver their services through internet, 47% did not; and this might be of concern when telerehabilitation becomes the only alternative to deliver physical therapy care in the context of a pandemic. Specific training, familiarity with digital environment in clinical practice, or previous experience appears to increase clinicians’ confidence and trust within telerehabilitation.<sup>21,24,37</sup> For the general population, alternate in-person and synchronous/asynchronous consultations may be a way of performing gradual exposure to telerehabilitation.<sup>38,39</sup>

According to more than half of physical therapists, their services delivered remotely should cost less. Individuals from the general population also appear to judge telerehabilitation as a less expensive therapy, and only 14% reported they would pay for telerehabilitation the same as they pay for an in-person consultation. The adequate use of telerehabilitation requires proficient verbal and non-verbal communication,<sup>40</sup> skills not always included in the physical therapy curricula.<sup>41,42</sup> Furthermore, clinicians’ responsibility remains the same and includes therapeutic alliance and patients’ safety and education.<sup>37,40,43</sup> Payment policies and

reimbursement are also identified as barriers to the uptake of telerehabilitation because insurance does not always cover remotely delivered physical therapy.<sup>33,44</sup> As an emergency response to the COVID-19 outbreak, the USA have expanded the benefits covered by Center for Medicare and Medicaid Services, and some telerehabilitation consultations are now reimbursed.<sup>43,45</sup> Yet, it remains a challenge in low- and middle-income countries. Most countries releasing emergency regulations to telehealth in response to the pandemic still do not have fixed reimbursement policies.<sup>5,46,47</sup>

A total of 55% of physical therapists and 39% of general population stated not agreeing with telerehabilitation being as effective as in-person programs. Both groups have highlighted their perception of telerehabilitation being an adjunct to in-person programs, not designed to be used solely. Although the choice of telerehabilitation solely or within a hybrid model is context- and resource-dependent, a 2017 systematic review with meta-analysis including 14 trials showed that synchronous telerehabilitation can be as effective as in-person programs in a variety of musculoskeletal conditions.<sup>13</sup> For the outcome physical function and disability, aggregated information from 774 patients indicated a moderate effect favoring telerehabilitation over usual care (i.e., in-person program or information packet).<sup>13</sup> Furthermore, a non-inferiority analysis of two studies indicated that telerehabilitation is not inferior to usual in-person program for individuals after total knee arthroplasty.<sup>13</sup>

### Needs in telerehabilitation

Interesting findings of our study captured the nuances linked to the value of “hands-on” approaches from participants’ perspectives. Our sample showed a preference for synchronous clinician-patient communication, predominantly using videoconferencing. Video-mediated services also appear to be more acceptable than telephone-mediated services according to Lawford et al.<sup>21</sup> and Malliaras et al.<sup>19</sup> Moreover, although the digital environment and telecommunication means are particularly interesting for promoting self-management and self-efficacy,<sup>48-50</sup> individuals from the general population appear to attribute physical therapists to exercise prescription only. Self-management and self-efficacy can be understood as “hands-off” approaches and are endorsed by the main guidelines addressing the management of chronic musculoskeletal pain.<sup>51-53</sup> Given their emancipatory nature, self-management and self-efficacy can also be relevant to all profiles of patients. Adaptation to a “hands-off” approach may take time but may contribute to the shift from diagnosis-focused rehabilitation to an integral understanding of the person and relevant context (e.g., family, relationships, culture, hobbies), encouraging collaborative treatment programs.<sup>54,55</sup>

Extra concern was identified by physical therapists in performing the initial assessment remotely. However, recent evidence supports the possibility of performing the initial assessment validly and reliably.<sup>56,57</sup> Despite the methodological diversity within studies, Mani et al.<sup>56</sup> observed that measuring range of motion is highly feasible via telerehabilitation, and so is the use of specific scales such as Tinetti, Timed Up and Go, and Berg. Further, the Oswestry Disability Index, SF-12, and Tampa scales demonstrated excellent reliability when applied remotely in a population of individuals with low back pain.<sup>58</sup> Orthopaedics’ special tests for elbow,

shoulder, and ankle joints, and non-articular lower musculoskeletal injuries also present a high percentage of agreement (75–99.3%) between remotely and in-person performances.<sup>56</sup> If proven reliable and effective, the broader availability of and accessibility to devices, platforms, and possibly algorithms and artificial intelligence in the near future might support clinicians during remote initial assessments.

Our study provides unique evidence from a middle-income country immersed in a very particular context due to COVID-19, where poor management and lack of adoption of recommended protective measures put Brazil at the epicenter of the pandemic one year after its onset.<sup>5,59,60</sup> At that point in history, the rapid implementation of telerehabilitation consisted of the only alternative for continuing care and delivering physical therapy services.<sup>5,47</sup>

### Limitations

Our results should be interpreted cautiously because the pool of physical therapists and general population who participated in our survey might have presented context bias. Our data collection was performed during the initial physical distancing period of pandemic implemented in Brazil, endorsed by state governments. It is possible that none or not all participants had tried telerehabilitation when data were collected, thus some might still be naïve to this technology and may show some resistance to change. On the other hand, the online nature of our survey might have promoted the participation of a group of individuals who were already used to the digital environment. Telerehabilitation was the only way of providing care at that moment, which could evoke the feeling of both higher or lessened resistance, and the understanding of telerehabilitation as an emergency response only.<sup>33</sup> Cross-sectional studies are susceptible to social desirability and acquiescence bias. It is also conceivable that our sample presents response bias because the survey was initially distributed among colleagues, who potentially share similar opinions. Further research should examine Brazilian physical therapist acceptance after a period of experience delivering telerehabilitation and focus on further implementation outcomes (i.e., effectiveness, adoption, and maintenance) using mixed methods study designs.

Another limitation of our study comprised the inclusion of a privileged and relatively young sample. Most participants were enrolled on or held a higher education degree, but only 17.4% of the Brazilian population older than 25 years had a higher education degree in 2019.<sup>61</sup> Therefore, our sample may depict individuals with easier access to technology and health resources and higher digital health literacy.<sup>62,63</sup> From physical therapists, the majority worked in the orthopedics field. It is likely that the perceptions presented by our study are linked to a field of physical therapy where telerehabilitation resources have been more researched than others.<sup>4</sup>

Lastly, because our survey went online when telerehabilitation was entirely new to everyone, we did not distinguish between physical therapists’ workplaces (i.e., private vs public). Of note, both public and private sectors are part of the Brazilian public health system (Unified Health System), and physical therapy is present in primary, secondary, and tertiary levels of care.<sup>64,65</sup> However, the private sector is

avored by the imbalance in workforce availability when compared to the public sector, which remarkably affects the secondary level (i.e., specialized care).<sup>64</sup> We acknowledge that the private sector may have more flexibility in budget and resources, which may accelerate telerehabilitation implementation.<sup>66</sup> Future research should focus on the Brazilian public health system, to what extent telerehabilitation is implemented in this context, and include perspectives from users and health professionals.

## Conclusion

Physical therapists and individuals from the general population who participated in our survey demonstrated hesitation concerning the “hands-off” approach needed in telerehabilitation. Clinicians appear to lack confidence to deliver their services using telerehabilitation and most disagree that telerehabilitation is as effective as in-person programs. However, individuals from the general population appear to be more open to engaging with telerehabilitation. Videoconferencing was selected as the preferred communication means to exchange education, self-management strategies, and exercise-based content in telerehabilitation.

## Conflict of Interest

Dr Fagundes is the CEO of the startup Hi! Healthcare Intelligence, which develops solutions in telerehabilitation for insurance companies. Dr Fagundes was not involved in the data collection or data analysis; he contributed as a stakeholder perspective to validate the research question and design of the study. Dr Saragiotto is advisor of the startup but he did not receive any financial support from the company. The remaining authors have no conflicts of interest to declare.

## Supplementary materials

Supplementary material associated with this article can be found in the online version at [doi:10.1016/j.bjpt.2022.100464](https://doi.org/10.1016/j.bjpt.2022.100464).

## APPENDIX. Identified needs – questionnaire designed for consumers

Which of the following modes of delivery of telerehabilitation would best fit your needs and the needs of your health condition?

*Options:* websites – telephone calls – messaging (SMS, e-mail) - apps – videoconference - combination of previous options - none of the previous.

As a patient engaged with telerehabilitation, which frequency of contact with your clinician would you consider ideal?

*Options:* according to patients’/my needs – previously scheduled - once every two weeks - single session – none of the previous

Would you consider ideal if you could contact the physical therapist:

*Options:* always synchronous, i.e., real-time (via videoconferencing, telephone, for example) - always asynchronous, i.e., store-forward (via apps, websites, for example) – using a combination between synchronous and asynchronous - I don’t know

With regards to the contents available in telerehabilitation, would you find it interesting if the following were available: (Check all the options you judge interesting)

*Options:* health information, patient education (e.g., pain neuroscience) - self-management strategies (e.g., breathing, guided meditations, mindfulness) – exercise prescription and orientations on the correct execution (e.g., positioning, series, repetitions) - orientations to third parties (i.e., family members, caregivers) – none of the previous

Imagine you are participating in a telerehabilitation program and there are more participants with you. Would you consider interesting:

*Options:* To use forums, groups, and common spaces to exchange experiences (e.g., using social media) – I don’t think there should be a space for interaction among patients – I don’t know.

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