

# **Remote Treatment (Telehealth) for Allied Health Professions during the Coronavirus Outbreak (COVID-19): A Global Perspective**

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## **Acknowledgements**

We are very thankful to the national and international organizations that assisted in supporting and distributing this survey. We are also grateful to the external readers of this report who commented and supported us in its writing.

The COVID-19 pandemic has struck worldwide, but it has also opened new options and opportunities. We hope this study increases the understanding of the needs for more accessible treatment and support opportunities for those in need across the globe.

## **Research Executive Summary: Remote Treatment (Telehealth) for Allied Health Professions during the Coronavirus Outbreak (COVID-19): A Global Perspective**

### **Background:**

The coronavirus (COVID-19) pandemic erupted worldwide in 2020, with far-reaching consequences for all aspects of life, including public services, trade, the economy, education, culture, and naturally, the health system. Because of lockdown restrictions and limitations, healthcare professionals had to face a new reality, in which they became reliant on technology and digital communications to deliver services (“telehealth”). Allied health professionals found themselves confused and lacking the knowledge on how to provide remote treatment in an effective manner to their clients.

### **Research objective:**

The main objective of this study was to learn about the advantages and challenges allied health professionals experienced providing remote treatments. Whereas most published studies on this subject offer one perspective of one discipline, this study offers a wider perspective of professionals from three disciplines: physical therapists (PTs), occupational therapists (OTs), and speech voice and language therapists (SVLTs). Furthermore, as COVID-19 is a global pandemic, an international perspective provides information about the similarities and differences between the professions across nations and cultures. The findings of this study will assist in developing tools and training programs that will better meet the needs of allied health professionals in offering optimal professional services for their clients.

### **Study Sample and Research Method:**

A questionnaire was developed in collaboration with allied health professionals, consisting of open and closed questions. Data were digitally collected using web-survey software. The questionnaire was distributed internationally. The survey included 443 professionals: 96 PTs, 189 OTs, and 158 SVLTs from 48 countries. Data collection lasted from mid-June until the end of October 2020.

## Main findings:

- Using telehealth: usage rates have tripled since the outbreak: 66.6% of the sample reported providing treatment by telehealth after the COVID-19 outbreak, as opposed to 23% before the outbreak. The highest usage rates were measured among SVLTs (74.1% vs. 20.3% before the outbreak), followed by OTs (65.6% vs. 20.6%), and PTs (56.3% vs. 32.3%). When examining telehealth usage after the outbreak based on country income, as defined by the World Bank, the highest usage rates were found in upper-middle income countries (83.1%), followed by high-income countries (77.3%), middle-low income countries (69%), and low-income countries (36.8%).
- Starting to use telehealth: 41.7% of those using telehealth after the COVID-19 outbreak reported that their workplace initiated their use of telehealth, 29.2% initiated the use themselves in their private practice, and 19.7% initiated it as employees in their workplace.
- Modes of usage: Real-time synchronic on-line modes (such as "Zoom") were used most frequently (68.5% vs. 37.3% before the outbreak). This increase seems to reflect the fact that this mode offers the closest option to conventional face-to-face therapy mode, emphasizing the importance of the interpersonal aspects. The second most frequently used telehealth mode after the outbreak was written information (48.8% vs. 47.1% before), followed by the phone conversation (38.3% vs. 45.1% before). The a-synchronic off-line mode (e.g., by submitted video) was still the least popular mode (22% vs. 20.6% before).
- Main use of telehealth: Before the COVID-19 outbreak, telehealth was used primarily for guidance and consultation (48%), or to treat children or adults with permanent disabilities (47%). After the outbreak, telehealth has been used mainly as an alternative to conventional treatment in the clinic (55.3%), and less as means of guidance and consultation (25.4%). These findings are similar across all three professions, but PTs use telehealth less than others as an alternative to the conventional clinic (44.4% vs. 51.6% of OTs and 64% of SVLTs). PTs also tend to use it more than the others as a means of guidance (38.9% vs. 25.8% of OTs and 18.8% of SVLTs).

- Professionals' perceptions of telehealth: Telehealth users were asked to rate telehealth on three parameters on a scale from 1 (Not at all) to 4 (To a very great extent). The parameters were: "Allows you to maintain your professional standards" (mean score - 2.81), "Allows you to provide appropriate support to your clients" (2.70), and "Is a channel with which you are satisfied" (2.50). These ratings suggest that professionals do not perceive telehealth as an optimal tool for treatment. Significant differences were found by profession (PTs rated telehealth significantly lower than did OTs and SVLTs). Significant differences were also found based on country income, with upper-middle income countries granting telehealth the highest scores on all examined parameters, and low-income countries giving it the lowest score.
- Training: 47.8% of professionals using telehealth did not receive any training, 23.4% received training (19% after the outbreak and 4.4% before it). Only 14.9% of PTs reported receiving training, as opposed to 29.1% of SVLTs and 21.7% of the OTs.
- Future intent of using telehealth (after the outbreak): 53.2% stated they would use telehealth, and 24.1% that they would not use it after the COVID-19 pandemic is over. The remaining 22.7% did not answer the question. The highest intent was among OTs (55.6%), followed by PTs (53.7%), and SVLTs (40.2%).

### **Recommendations:**

1. It is important to understand the differences and similarities between the three disciplines, and to further research the provision of telehealth, focusing on each area of expertise and on the specific issues of concern for each. It is also important to tailor professional training for each discipline, and accompany it by evaluation studies, addressing also the emotional issues of the therapists.

2. It is important to examine the client's perspective to ensure that telehealth treatment is geared to better meet their needs.
3. It is important to examine a hybrid model of therapy that combines telehealth with face-to-face therapy.

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## **Introduction<sup>1</sup>**

The coronavirus (COVID-19) erupted in Wuhan, China, in December 2019, and quickly spread worldwide, with far-reaching consequences for the economy, education system, culture, transportation, and naturally, the healthcare system. Healthcare professionals had to face a new reality of relying almost entirely on technology and digital communications to deliver remote healthcare services (telehealth). Because of social distancing and lockdown strategies implemented to combat the virus, addressing the needs of clients became difficult and fraught with dilemmas. Using "remote" technologies quickly became part of daily life, including for healthcare provision.

The subject of health provision by remote digital technology has been written about and researched before the COVID-19 pandemic. But since the COVID-19 outbreak, hundreds of studies, reports, papers, and documents have been published and posted in professional and academic journals, social media, etc. There is also a variety in the use of terms: tele-medicine, tele-rehabilitation, tele-psychiatry, and tele-consultation, etc. all of them referring to "the delivery of healthcare services, where patient and providers are separated by distance" (WHO, 2016, <https://www.who.int/gho/goe/telehealth>).

Papers published over the years address a variety of issues related to telehealth, including ethical (Brennan et. al, 2010), legal (Cason and Brannon, 2011), and financial ones (Tindall and Huebner, 2009). The advantages of telehealth are its ability to offer treatment to

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<sup>1</sup> This study was conducted using a mixed methods design. This is the quantitative data report; the qualitative data report will be published in the near future.



people living in remote areas (Truter, Russell and Fary, 2014), its effectiveness in the various allied health professions (Mashima et. al., 2003; Odole and Ojo, 2013; Cason, 2014), and in the reducing the length and costs of hospitalization (Holland, 2013). The degree of effectiveness and efficiency of receiving therapy by telehealth has become an important and growing area of research. Can treatments such as physical therapy (PT), occupational therapy (OT), and speech, voice, and language therapy (SVLT) achieve their therapeutic goals when conducted from a distance? Can remote treatments improve patients' condition and function?

Studies from various health professions have used a variety of metrics and tools to examine the contribution and the effect of these treatments. These studies have used objective measurements from the field of PT, such as metrics for assessing the function of a particular organ, gait indices, and perimeter indices in studies focusing on hand and arm functions (Levy, Silverman, Jia, Geiss and Omura, 2015), knee function after surgery (Russel, Buttrum, Wootton and Gwendolen, 2011), and the like. In the fields of speech, voice, and language therapy and occupational therapy, studies also use metrics with objective characteristics, such as cognitive metrics that test comprehension, memory, and problem solving, as well as social metrics that examine expression and social interaction (Scheideman-Miller, et al., 2002). Additionally, subjective metrics measure therapist and patient satisfaction, which have received broad attention in the literature and have been found to be an important parameter in examining the effectiveness of treatment by telehealth.

The traditional treatment room or clinic includes only the therapist and the patient. By contrast, in the realm of telehealth, the technological component is a significant player. Several studies address the importance of these technological parameters for treatment effectiveness and patient satisfaction (Peretti Amenta, Tayebati, Nittari, and Mahdi. 2017; Jharomi and Ahmadianb, 2018). The technological parameters that affect satisfaction concern

the quality of Internet networks and bandwidth, the quality of the equipment, and user-friendliness of technological systems and interfaces (Parvin, 2018). In addition to technological infrastructures, there is currently a wide variety of platforms for providing telehealth services. In their study on PT treatment of the musculoskeletal system using telehealth, Cottrell and Russell (2020) reviewed an array of considerations to take into account when choosing a technology platform. Some platforms may affect patient experience in their adaptability, ease of access, and ease of use. The authors also listed several environmental elements that are important for the patient's experience when organizing the environment, including the physical environment, acoustics, lighting, clothing, and more.

Lopresti, Jinks and Simpson (2015) cited the World Health Organization (WHO), which recognized tele-practice as having similar clinical outcomes to practice in conventional treatment rooms, and at times, better outcomes. An array of studies have shown high levels of satisfaction in the use of telehealth in health profession treatments. The question is whether these positive findings can be also obtained when comparing telehealth with face-to-face conventional treatments. Comparative studies conducted between the two modes have demonstrated similar levels of satisfaction (Lopresti et al, 2015; Brennan, Georgeadis, Baron, Barker, 2005). For example, a study by Tousignant and colleagues (2011) examined the satisfaction of both patients and healthcare professionals with the technologies and the services provided by tele-rehabilitation as an alternative to conventional rehabilitation after discharge from knee arthroplasty. No significant difference was found between conventional and online tele-health rehabilitation services. Moreover, the PTs' satisfaction with regard to goal achievement, patient-therapist relationship, overall session satisfaction, and quality and performance of the technological platform was high. The research concluded that in-home tele-rehabilitation provides a promising alternative to conventional face-to-face conventional treatments. Furthermore, in other studies where a significant difference was noted between

the two treatment modes, the advantage was in favor of tele-rehabilitation (Fridler et al., 2012). By contrast, Hung and Fong (2019) reviewed 15 studies of OT and concluded that while most studies indicated positive effects of telehealth, there was no sufficient evidence to conclude that telehealth was more effective than the conventional face-to-face therapy. Whitten and Mair (2000) reviewed a large number of studies that found high satisfaction with telemedicine and no differences compared to face-to-face encounters. Yet, the authors were very skeptical about these findings because of information gaps regarding satisfaction with online services, as most studies failed to deploy consistent and uniform research approaches. They also questioned whether it was possible to infer from one study conducted in a particular health profession, about other health professions, and whether what was true for one field of specialization was accurate for other fields as well. This raises a question whether it is possible to conclude that research regarding telehealth for PT is applicable also to the realm of SVLT or OT.

Whitten and Mair's study conducted in 2000 remains relevant today in the discussion concerning patient and provider satisfaction with telemedicine and its therapeutic effectiveness, given that research lacks consistent methodological approaches. The study argued that to obtain specific knowledge that would inform the field of telemedicine as a whole, research should focus on unified and accurate tools, methods, and measurements rather than continue the tradition of generic satisfaction research. The study further noted that there was room for in-depth examination of the service recipient's characteristics. Do socio-demographic characteristics, such as gender, age, education, income, technological orientation, type of disability, and medical level of functioning of the client affect the responsiveness and satisfaction with telehealth interventions? Furthermore, it is important to examine the therapists' characteristics and how their field of expertise, number of years of

experience, technological orientation, age, etc. influence their openness and willingness to adopt telehealth as a service mode.

The technological-digital world has developed greatly in recent years, and we are witnessing children who from a very young age are strongly oriented toward this realm. At the same time, quite a few adults find tech-orientation problematic, and are experiencing difficulties with the new emerging technologies, which are becoming an integral part of healthcare. Studies suggest that age has an effect on satisfaction, and found that the older a person is, the greater the aversion toward technological elements, and that at times technology even has a negative effect on satisfaction (Tousignant et. al, 2018; Kruse et. al, 2017). By contrast, other studies have found no age difference, or that technology was a limiting issue in old age (Jahromi and Ahmadian, 2018; Brennan et al, 2005). The effect of age on patients' experience with telehealth is yet to receive a clear answer. Given the increase in the older population in society, it is necessary to pay attention to this issue. At the same time, it is also important to examine populations with disabilities, to understand their unique needs, and how telehealth is adapted and accessed to address those needs.

In sum, although COVID-19 has shocked and destabilized nearly every domain in our lives across the globe, in the area of health provision, it has also opened a window of new opportunities, with higher equality healthcare for people with disabilities, financial limitations, and living in remote areas.

### **Purpose of Research**

This research was initiated by the allied health professionals working in Beit Issie Shapiro (Israel), a 40-year-old social start-up in the field of disabilities. Our expertise is in scaling up programs, interventions, and methods, which we develop, research, and validate

on-site, enabling us to promote systemic change in the quality of life of people with disabilities in Israel and internationally.

Because of the lockdown restrictions and limitations in force since the COVID-19 outbreak, professionals have been forced" to provide remote treatment. They were initially confused and lacked tools and skills needed to provide effective and efficient treatment by telehealth. This prompted two studies that were conducted in Israel during the first few months of the COVID-19 outbreak. The first study, "Remote Treatment (Telehealth) for Allied Health Professions in Israel during the Coronavirus Outbreak (COVID-19)" (Roth, Raviv-Carmi and Refua, 2020a) focused on the professionals' perspective of providing therapy by telehealth. The second study, "Client Experience of Remote Allied Health Treatment (Telehealth) during the Coronavirus outbreak (COVID-19) in Israel" (Roth, Raviv-Carmi and Refua, 2020b) focused on the client/patient perspective of the therapy received by telehealth. These two studies laid the groundwork for the present international study.

The main objective of this research was to learn about remote allied health treatment (telehealth) from the perspective of physical therapists (PTs), occupational therapists (OTs), and speech, voice and language therapists (SVLTs), in order to understand the strengths and advantages, as well as the challenges presented by this mode of treatment. Most studies in the realm of telehealth are conducted from the perspective of either PTs, OTs, or SVLTs on a given treatment. The purpose of the present study is to offer an additional and unique perspective, by reaching out to all three professions and exploring the areas in which they resemble and differ from one another. The findings improve treatment through telehealth by building and developing tools and training programs to promote optimal professional service that better meets the needs of both the professionals and their clients.

COVID-19 is a global pandemic with worldwide implications for all, including healthcare professionals. Therefore, we examined provision of health services by telehealth from a global perspective, to reveal the similarities and differences between the allied health professions across nations and cultures.

### **Data collection**

Data were collected through a web survey (Survey Monkey) that was internationally distributed. The survey targeted PTs, OTs, and SVLTs, using social networks, forums, and professional organizations in the fields of health and disabilities. Respondents were recruited through non-probability sampling. Data collection lasted from mid-June to the end of October, 2020.

### **Participants**

The sample was composed of 443 professionals: 96 PTs (21.7%), 189 OTs (42.7%), and 158 SVLTs (35.6%) from 48 countries: 92 from Africa (20.7%), 73 from Europe (16.5%), 51 from the US and Canada (11.5%), 41 from Asia (9.2%), 11 from South America (2.5%), and 7 from Australia and the Fiji Islands (1.5%). Note that 168 participants (37.9%) did not answer any of the socio-demographic questions, which were located at the end of the survey. It is likely that these participants did not reach the end of the survey. Nevertheless, they were not excluded from the analysis.

Table 1: Socio-demographic characteristics of survey respondents.

|                                       | <b>N</b> | <b>percent %</b> |
|---------------------------------------|----------|------------------|
| <b><u>Gender</u></b>                  |          |                  |
| Male                                  | 45       | 10.1             |
| Female                                | 230      | 51.9             |
| No answer                             | 168      | 37.9             |
| <b><u>Age of respondent</u></b>       |          |                  |
| Up to 29                              | 51       | 11.5             |
| 30-39                                 | 101      | 22.8             |
| 40-49                                 | 49       | 11.1             |
| 50-59                                 | 51       | 11.5             |
| 60+                                   | 23       | 5.2              |
| No answer                             | 168      | 37.9             |
| Estimated average                     |          | <b>40.6</b>      |
| <b><u>Years of experience</u></b>     |          |                  |
| Less than 5                           | 48       | 10.8             |
| 5-10                                  | 71       | 16.0             |
| 11-14                                 | 39       | 8.8              |
| 15-19                                 | 26       | 5.9              |
| 20+                                   | 91       | 20.5             |
| No answer                             | 168      | 37.9             |
| Estimated average                     |          | <b>12.04</b>     |
| <b><u>Form of employment</u></b>      |          |                  |
| Self-employment                       | 57       | 12.9             |
| Employee                              | 168      | 37.9             |
| Both self-employed and an employee    | 50       | 11.3             |
| No answer                             | 168      | 37.9             |
| <b><u>Population working with</u></b> |          |                  |
| Children aged 0-6                     | 194      | 43.7             |
| Children 7-12                         | 181      | 40.8             |
| Youths 13-18                          | 126      | 28.4             |

|  | <b>N</b>   | <b>percent %</b> |
|--|------------|------------------|
| Young adults 19-29   | 92         | 20.7             |
| Adults 30-59   | 106        | 23.9             |
| Aged 60+   | 87         | 19.6             |
| No answer  | 168        | 37.9             |
| <b><u>No. of respondents by country<br/>income level *</u></b> |            |                  |
| Lower income   | 19         | 4.3              |
| Lower-middle   | 42         | 9.5              |
| Upper-middle   | 77         | 17.4             |
| High income  | 137        | 30.9             |
| No answer  | 168        | 37.9             |
| <b>No. of respondents</b>                                      | <b>443</b> |                  |

\* Country income category is based on income as defined by World Bank (see Data Analysis, pg. 10 for further information).

## **Tools**

A digital survey questionnaire was developed in collaboration with healthcare professionals teams from Beit Issie Shapiro and other organizations in the field of disability. The questionnaire, composed of open-ended and closed-ended questions, contained three parts: (a) questions relating to usage and perceptions of telehealth; (b) a list of therapeutic goals for each of the allied health profession, PT, OT, and SVLT, with respondents being asked to rank the extent to which telehealth was an adequate tool for their professional responsibilities; and (c) socio-demographic questions. The questions were preceded by a description of the purpose of the study and a declaration assuring that the questionnaire was anonymous. (See Appendix A for the full English version of the questionnaire). The questionnaire was pilot tested to ensure content validity.



Internal reliability was calculated as a mean score for the items relating to the general perceptions of telehealth, with higher scores reflecting a more positive attitude. Cronbach's alpha for these items was very high ( $\alpha=.875$ ). A similar process was conducted with regard to individual items presented to professionals in each of the three fields, to examine the extent to which the therapist believed that adequate therapy can be provided by telehealth. Cronbach's alpha scores were high: for PT items ( $\alpha=.917$ ), for OT items ( $\alpha=.829$ ), and for SVLT items ( $\alpha=.791$ ).

### **Data analysis**

Analyses were carried out by using SPSS, version 24. We conducted a comparison between the three allied health professions, the age groups of the clients/patients treated by telehealth (children only, adults only, both adults and children), therapist age and therapist continent of residence (because of the wide range of countries, respondents were grouped by continents). Further analysis was conducted based on the economic classification of the World Bank, which categorizes countries into four income groups: low, lower middle, upper-middle, and high. The most updated classification of countries does not yet reflect the effect of COVID-19 (<https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups>).

The present study examined the four modes of telehealth: (a) written information and instruction such as e-mail, WhatsApp messages, SMS texting, etc.; (b) phone conversation without the parties seeing each other or any visual contact; (c) synchronic modes, using real time and on-line platforms, such as Zoom; and (d) a-synchronic modes, in which visuals and videos are transferred off-line.

All comparisons were conducted by one-way ANOVA.

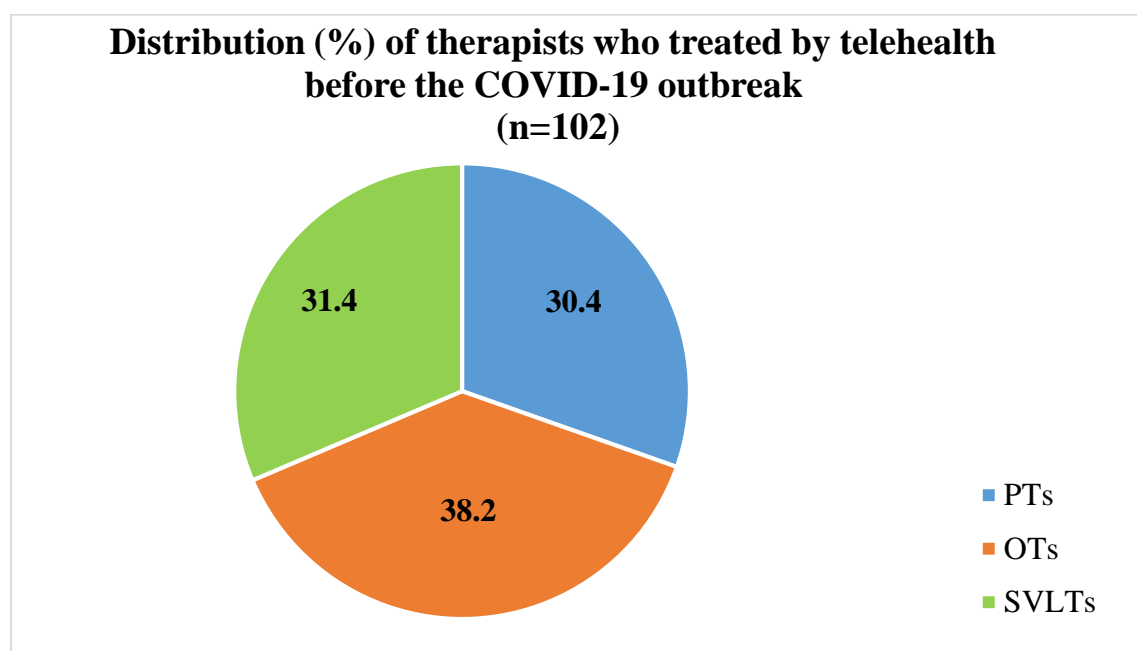
## Main Results

### 1. Treatment by telehealth before the COVID-19 outbreak

#### 1.1 Use of telehealth treatment by groups

Of the 443 professionals who responded to the questionnaire, 23% (n=102) reported that they provided treatment by telehealth before the COVID-19 outbreak: 32.3% of the PTs, 20.6% of the OTs, and 20.3% of the SVLTs. No significant differences in telehealth usage were found based on therapist age, age of client treated (children only, adults only, or both), continent (Europe, Asia, Africa, South America, North America, and Australia) or on country income, as defined by the World Bank (low, low-middle, middle-upper, and high).

Figure1 presents the distribution of the allied health therapists who provided treatment by telehealth before the COVID-19 outbreak.

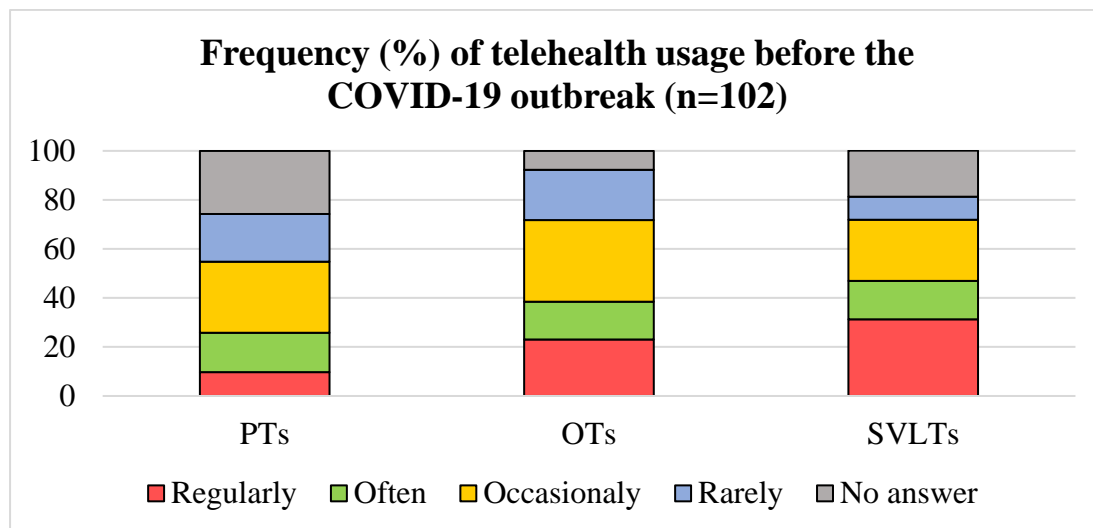


#### 1.2 Frequency of telehealth usage by therapists before COVID-19 outbreak

Of the therapists, 21.6% reported using telehealth before the outbreak (n=102) on a regular basis: 15.7% reported that they used it often, 29.4% used it occasionally, 16.7% used

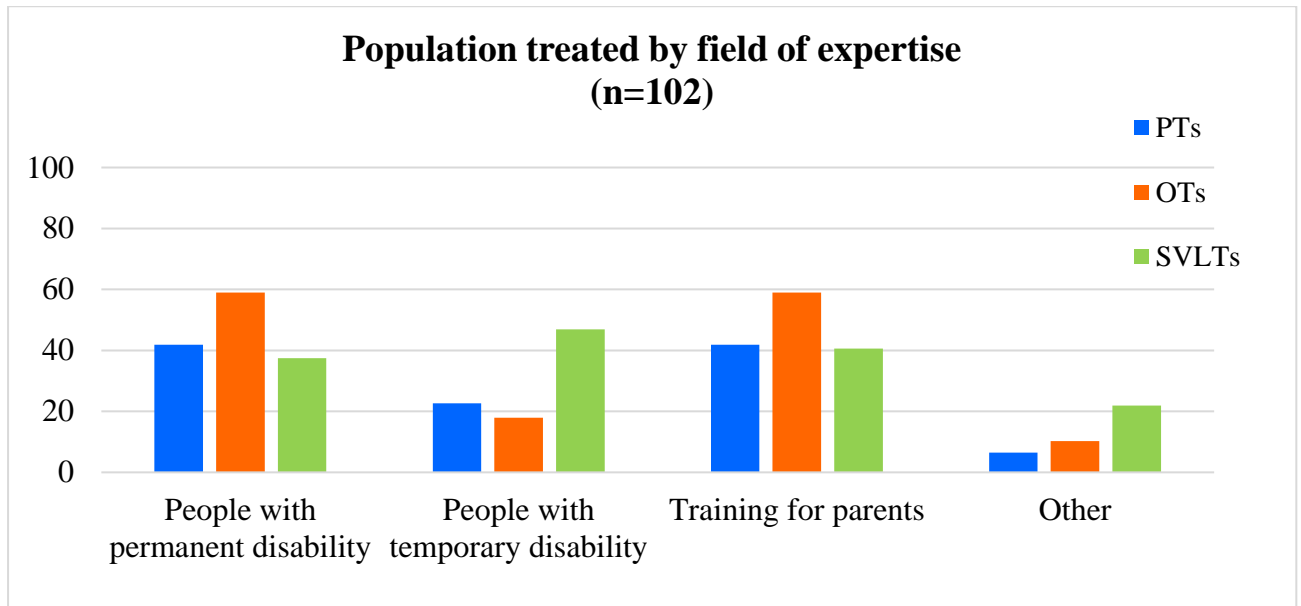
it rarely, 16.7% did not respond. SVLTs tended to use telehealth on a regular basis more frequently than did PTs and OTs (31% vs. 9.7% and 23.1%, respectively).

Figure 2 shows the frequency of the usage of telehealth before the COVID-19 outbreak.



### 1.3 Population treated

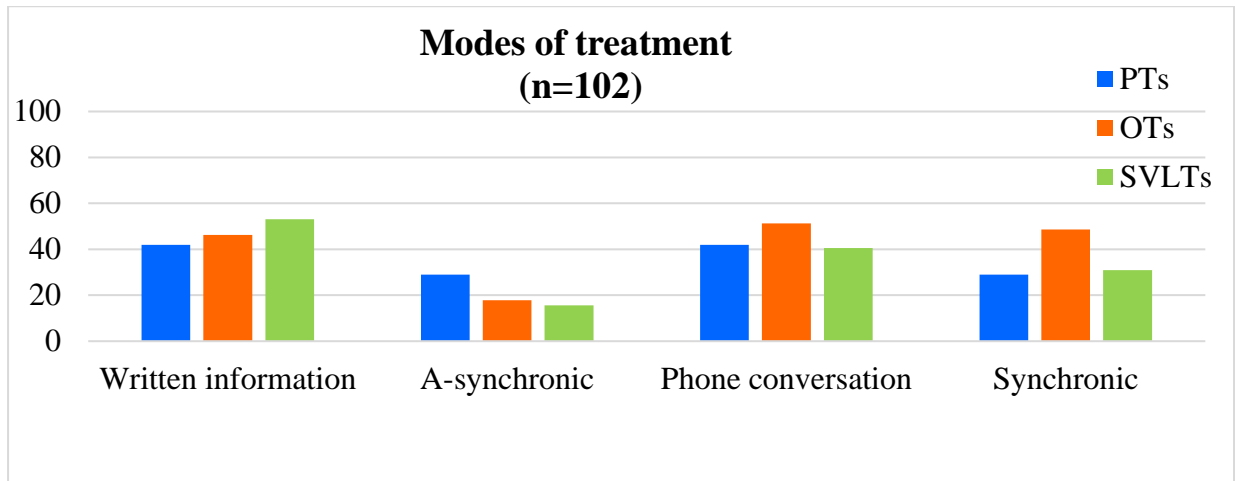
Respondents who treated by telehealth before the COVID-19 outbreak (n=102) were asked which groups they treated primarily: children or adults with permanent or temporary disabilities or parents and clients for training and guidance purposes. More than one answer was possible. Of respondents, 48% stated that they trained and provided guidance and consultations to parents and clients, 47% stated that they treated children or adults with a permanent disability, and 28.4% stated that they treated children or adults with a temporary disability. SVLTs provided more therapies by telehealth to people with temporary disabilities (46.9%) than did OTs (17.9%) and PTs (22.6%).



#### 1.4 Telehealth modes of treatment

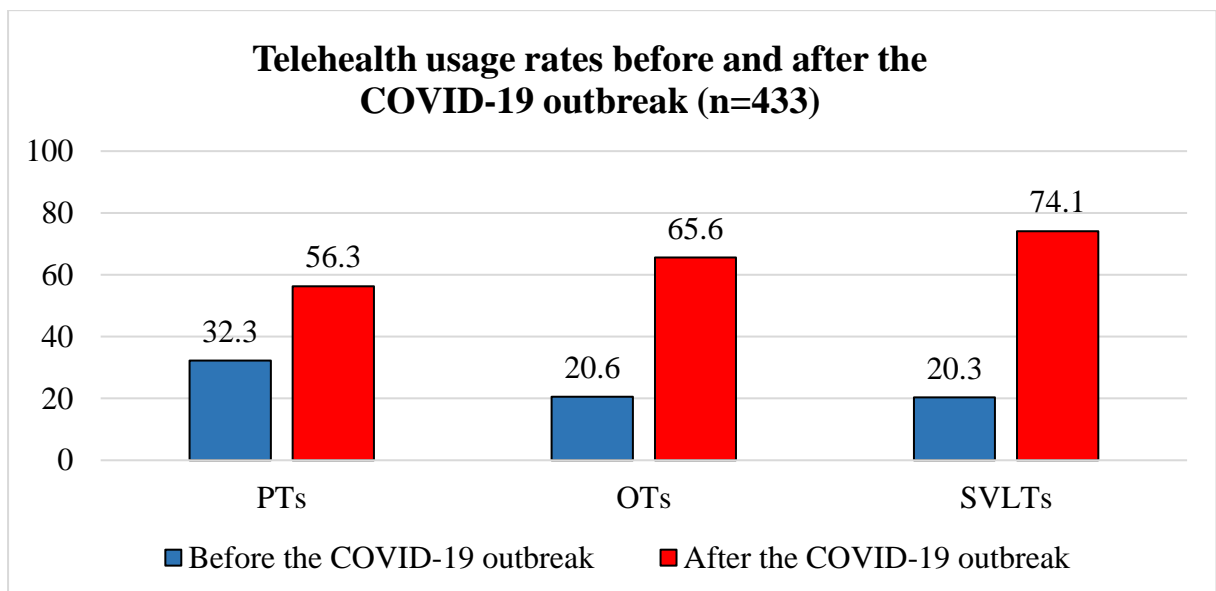
Professionals were asked to state what modes of telehealth they used before the COVID-19 outbreak. Respondents were presented with four options:

(a) written information and instruction such as e-mails, WhatsApp messages, SMS texting, etc.; (b) phone conversation without the parties seeing each other or any visual contact; (c) synchronic modes, using real time and on-line platforms, such as Zoom; and (d) a-synchronic modes, in which visuals and videos are transferred off-line. Respondents were also given the option to answer "other" and to select more than one mode. The most popular mode of providing telehealth before the COVID-19 outbreak was by written information and instructions, with 47.1% of the therapists reporting that they used e-mails, WhatsApp messages, SMS, etc. The second most popular mode was the phone (45.1%), followed synchronic/real time on-line visuals (37.3%). The least used mode was the a-synchronic channel (20.6%).



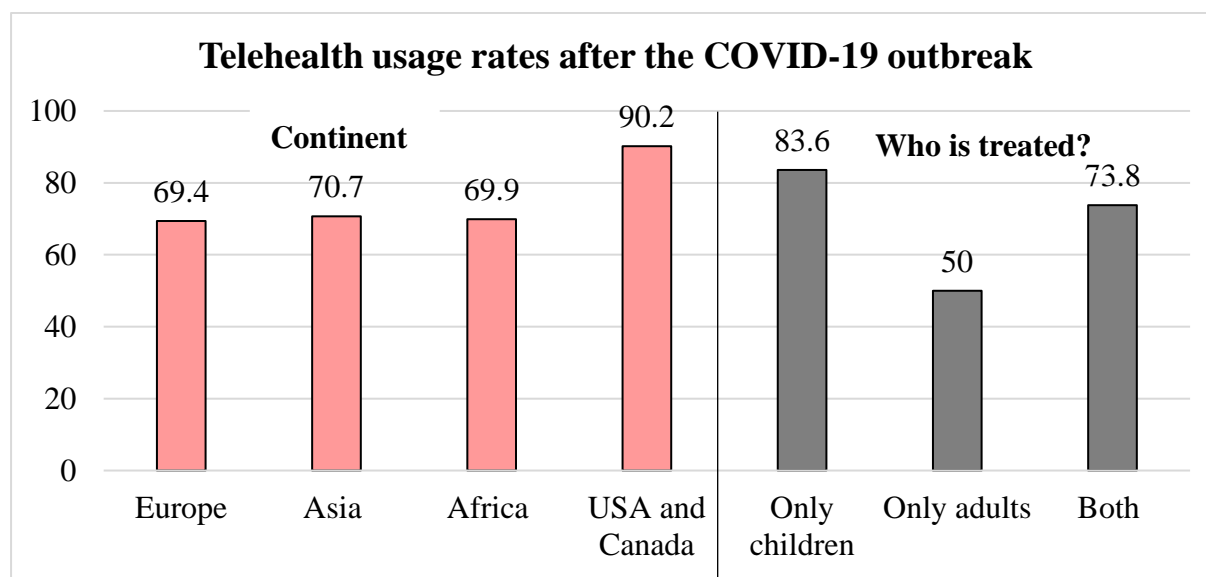
## 2. Telehealth treatment usage frequencies after the COVID-19 outbreak

All participants (n=433) were asked about their telehealth usage after the COVID-19 outbreak. Rates of telehealth usage tripled since the COVID-19 outbreak, with 23% of the total sample reporting providing treatment before the outbreak, vs. 66.6% providing treatment after the outbreak. The highest telehealth usage rate was by SVLTs (74.1%), followed by OTs (65.6%) and PTs (56.3%).



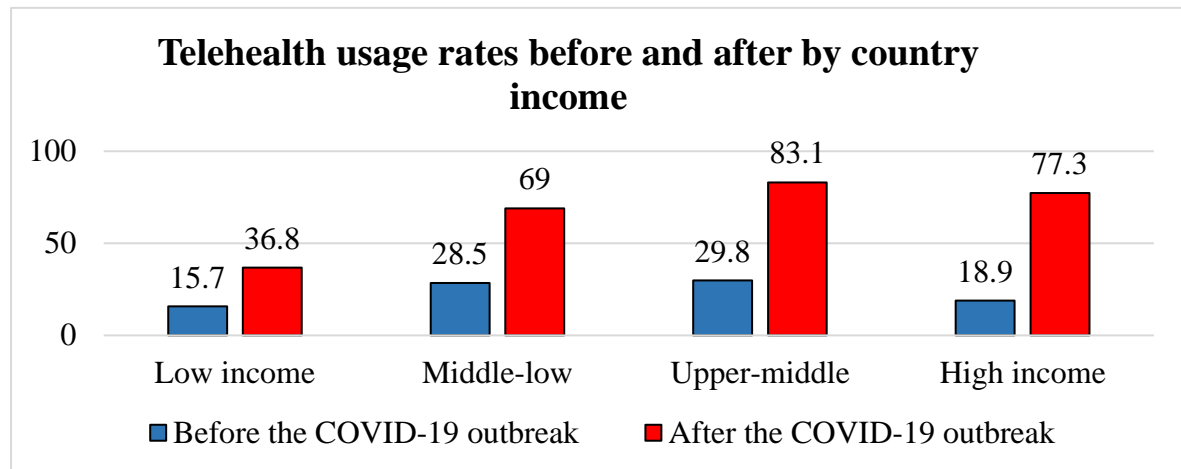
Telehealth usage after the COVID-19 outbreak was higher in the USA and Canada (90.2%) than in Europe (69.4%), Africa (69.9%), and Asia (70.5%) (the number of respondents from South America and Australia was too small to include in the analysis). The

highest telehealth usage after the outbreak was by therapists who treated children only (83.6%), in comparison to those who treated adults only (50%) or those who treated both groups (73.8%). The analysis by continent could not include the 168 respondents who did not answer the sociodemographic section of the questionnaire.



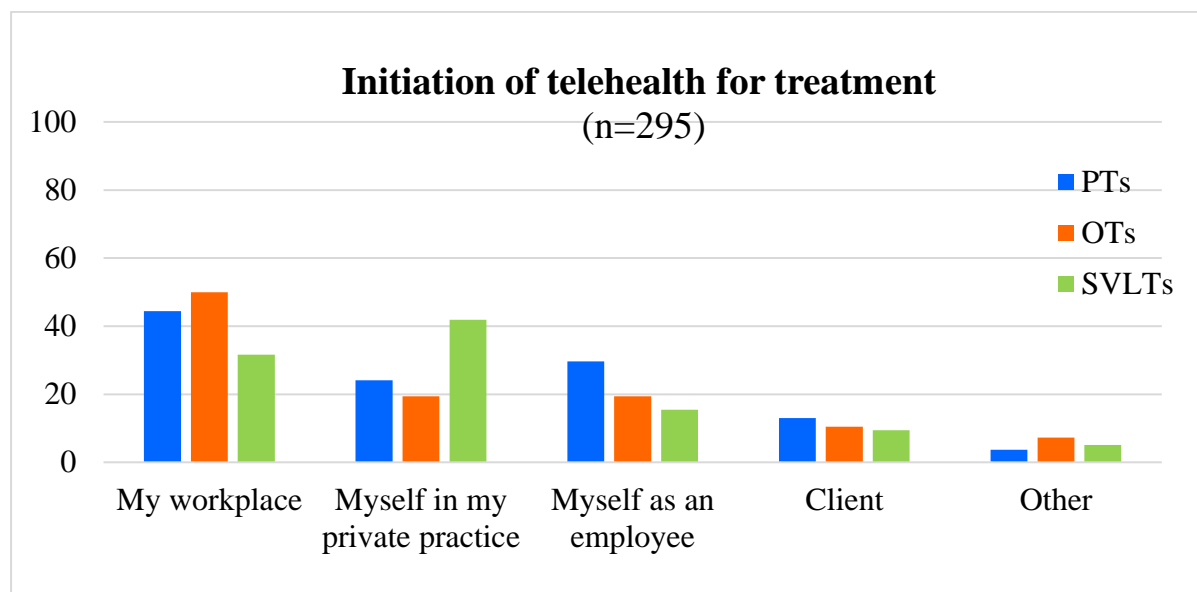
Analyzing telehealth usage rates by country income based on the World Bank, reveals a rise in usage in all sectors. Usage rates of telehealth in low and low-middle income countries were nearly 2.5 times higher than before the outbreak (from 15.7% to 36.8% in low-income countries, and from 28.5% to 69% in middle-low income). In upper-middle income countries

usage nearly tripled and in high-income countries it quadrupled after the COVID-19 outbreak.



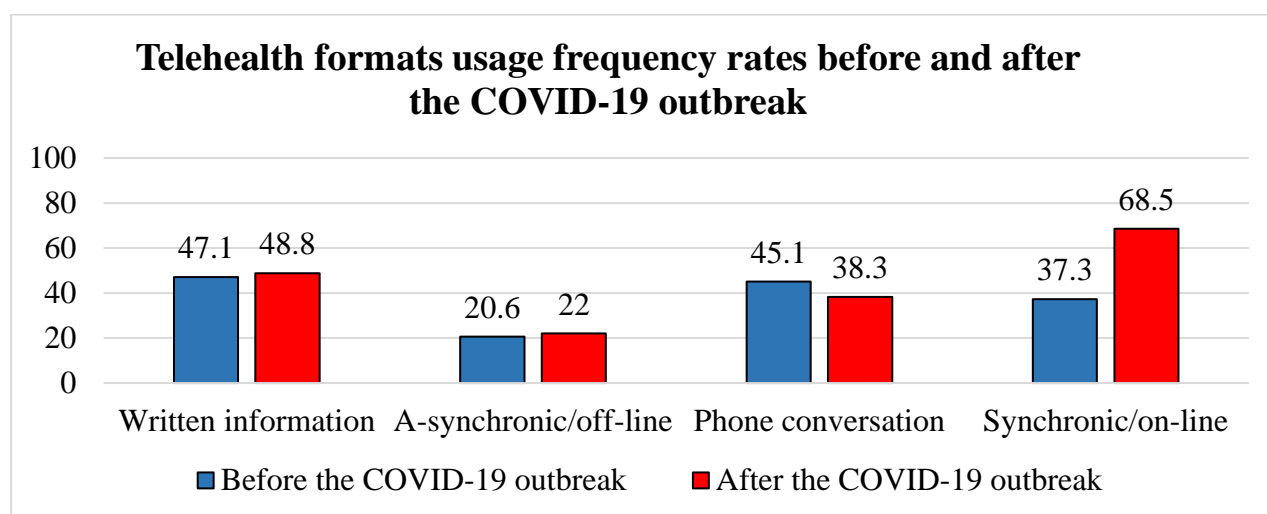
### 3. Initiation of the use of telehealth treatments

Therapists who reported providing therapy by telehealth since the COVID-19 outbreak (n=295) were asked who initiated the use of telehealth? More than one answer was possible. Of the therapists using telehealth, 41.7%) reported that their workplace initiated the use of telehealth; 29.2% initiated telehealth use themselves in their private practice, and 19.7% as employees in their workplace; 10.5% reported that their clients/patients initiated the use of telehealth.



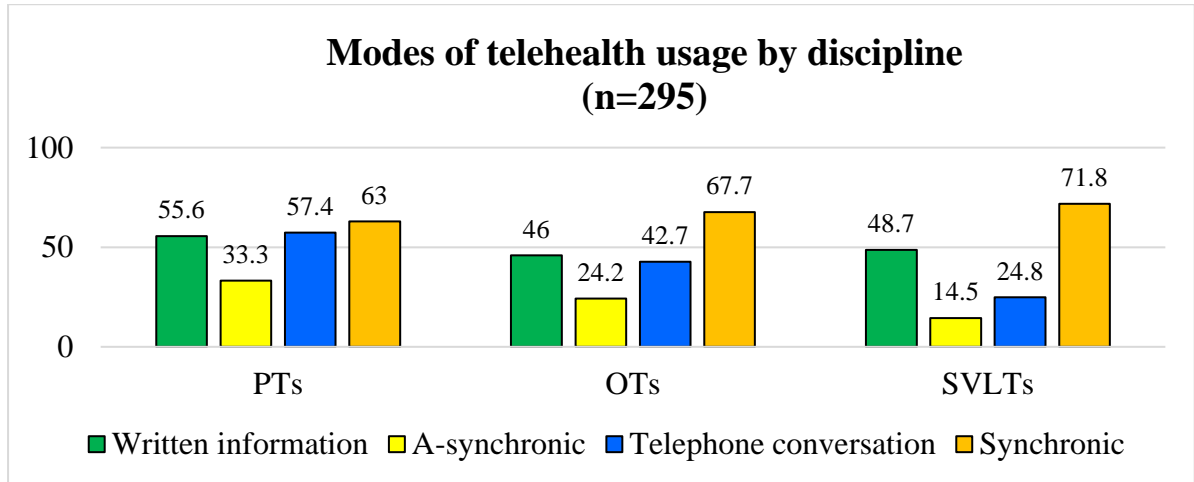
#### 4. Telehealth modes of treatment

Real-time synchronic on-line modes (such as Zoom) were the ones used most frequently (68.5%). This was a clear rise compared to the 37.3% of professionals who reported using synchronic modes before the COVID-19 outbreak. The second most frequently used mode after the outbreak was written information (48.8%), followed by phone conversation (38.3%). The a-synchronic off-line mode was the least popular one (22%).



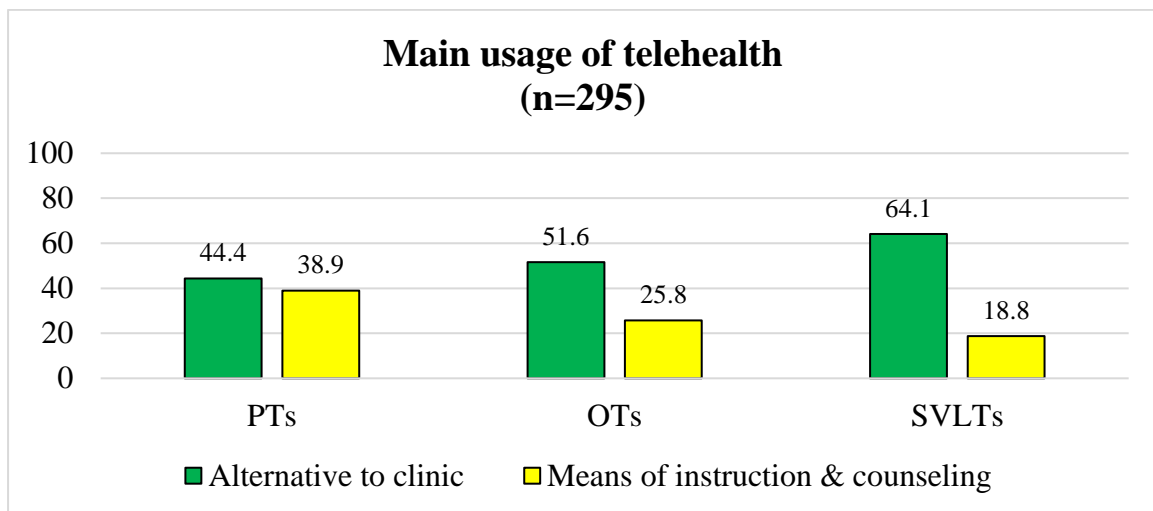
This general order of preference was similar for PTs, OTs, and SVLTs. Yet, PTs used the synchronic mode less than did their colleagues from the other disciplines (63% vs. 67.7% of OTs and 71.8% of SVLTs). PTs tended to use phone conversations more than others (57.4% vs. 42.7% of OTs and 24.8% of SVLTs), as well as a-synchronic modes (33.3% vs. 24.2% and 14.5%, respectively).





### 5. Main usage of telehealth

Allied health professionals who used telehealth (n=295), did so mainly as an alternative to conventional treatment in the clinic (55.3%). Of these, 25.4% used telehealth as a means of instruction and consulting for patients, parents, or caregivers. PTs also reported using telehealth mainly as an alternative to conventional treatment in the clinic (44.4%), but they used telehealth less than did OTs (51.6%) and SVLTs (64.1%), but they used telehealth as a means of instruction more than did their colleagues (38.9% vs. 25.8% of OTs and 18.8% of SVLTs).



## 6. Professionals' perceptions of telehealth

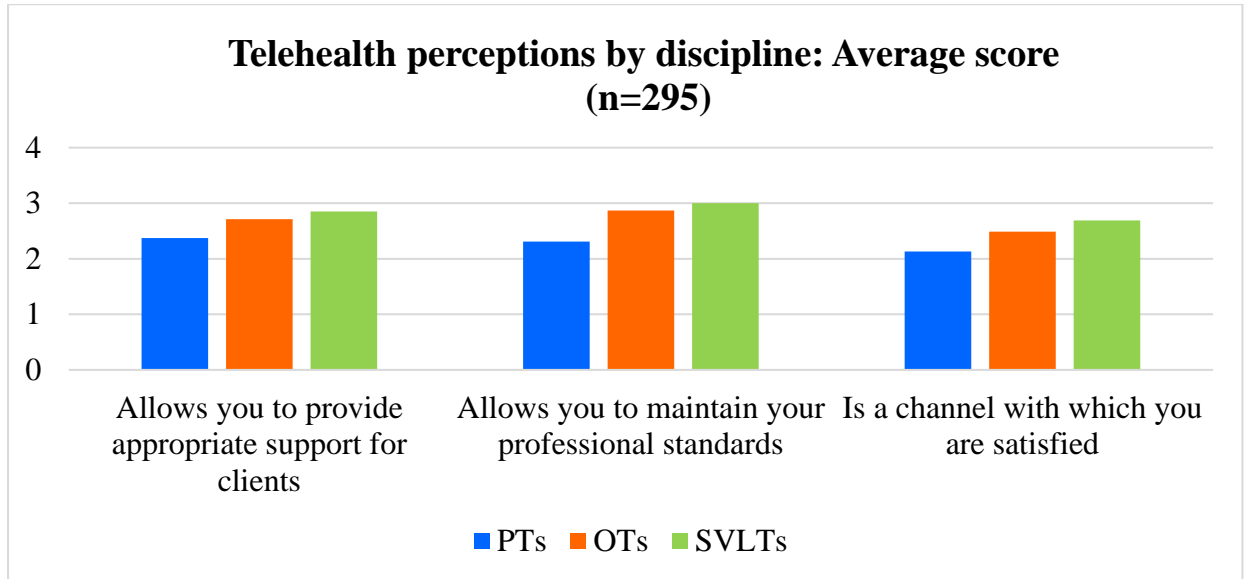
Respondents who stated they used telehealth after the COVID 19 outbreak (n=295) were asked to rate telehealth on a scale from 1 (Not at all) to 4 (To a very great extent) on three parameters: "Allows you to provide appropriate support to your clients," "Allows you to maintain your professional standards," and "Is a channel with which you are satisfied." An average score was calculated for each parameter. The weighted average of all three parameters was 2.67, indicating that telehealth was perceived a little above average as means of treatment. Below are the percentages each parameter received. The two positive rankings ("To a great extent" and "To a very great extent") were combined into one positive parameter, and the two remaining rankings ("Not at all" and "To a small extent") were also combined into one negative parameter.

"Allows you to maintain your professional standards:" 50.9% answered "To a great/very great extent" and 25.7% "To a small extent/not at all" (Average score 2.81).

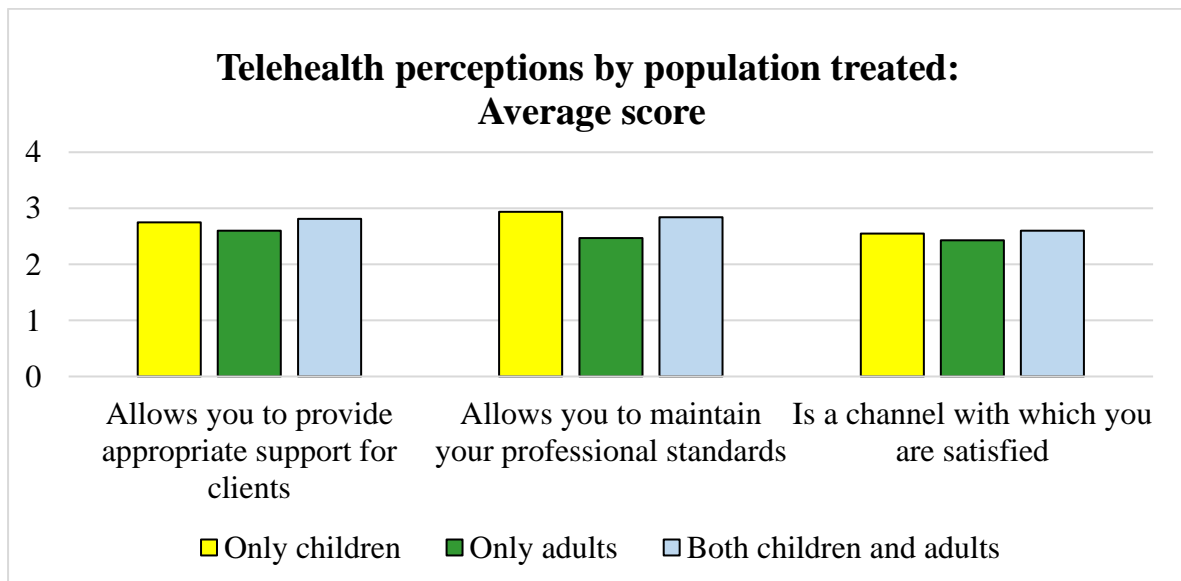
"Allows you to provide appropriate support to your clients:" 47.4% answered "To a great/very great extent," and 29.8% "To a small extent/not at all" (Average score 2.70).

"Is a channel with which you are satisfied:" 38% answered "To a great/very great extent," and 39.4% "To a small extent/not at all" (Average score 2.50).

A one-way analysis of variance (ANOVA) indicated significant differences by profession. *Post hoc* analysis (Scheffe) showed that PTs ranked significantly lower than did OTs and SVLTs their perceptions of telehealth as allowing one to maintain professional standards ( $f=6.4$ ,  $df=2$ ,  $p<0.05$ ), enabling the provision of appropriate support for clients ( $f=12.0$ ,  $df=2$ ,  $p<0.05$ ), and being a channel with which one is satisfied ( $f=7.61$ ,  $df=2$ ,  $p<0.05$ ).

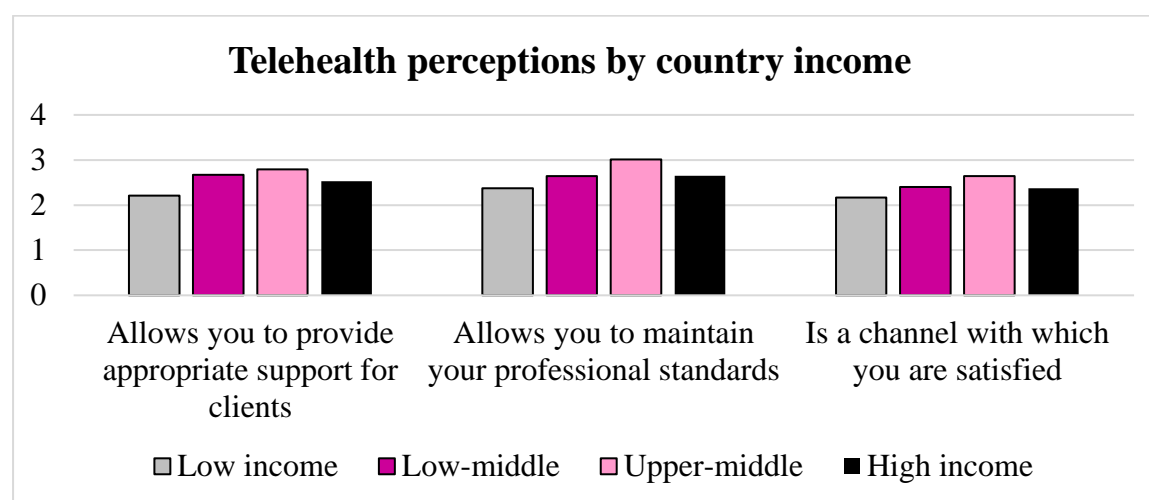


We analyzed these statements to compare the different populations that the professionals treated: those who treated only children (from birth age 18), those who treated only adults (18+), and those who treat both children and adults. The only significant difference was found with regard to "maintaining professional standards;" those who treated only children scored significantly higher than those who treat only adults ( $f=3.60$ ,  $df=2$ ,  $p<0.01$ ).



Examination of the ranking of telehealth by country income reveals that upper-middle income countries granted telehealth the highest scores on all examined parameters, whereas low-income countries granted it the lowest scores.

A one-way analysis of variance (ANOVA) indicated a significant difference by country income, as defined by The World Bank. On the statement "Telehealth allows you to provide appropriate support for your clients," upper-middle-income countries scored significantly higher than did low-middle-income countries and high-income countries ( $f=3.03$ ,  $df=3$ ,  $p<0.05$ ). On the statement "Tele-health is a channel with which the therapist is satisfied," upper-middle-income countries score significantly higher than did high-income countries ( $f=5.94$ ,  $df=3$ ,  $p<0.05$ ).



## 7. Perceiving telehealth by subgroups of allied health professionals

The following questions related to each professional discipline.

### 7.1 PTs' perception of telehealth

PTs who reported using telehealth were presented with several therapeutic objectives in their areas of expertise and were asked to rank on a scale of 1 (Not at all) to 4 (To a very great extent) the extent to which they felt that they could provide adequate therapy by telehealth.

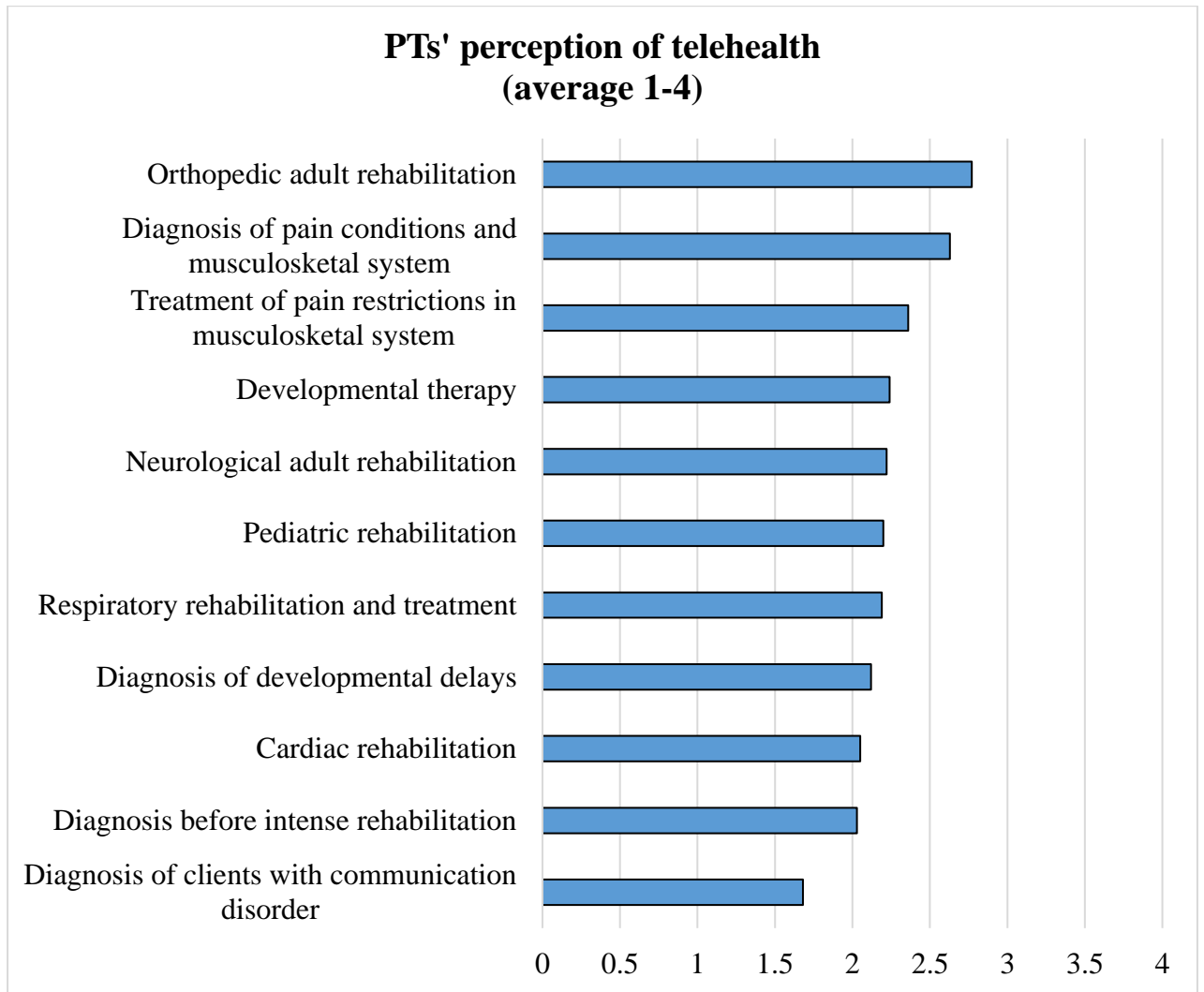
PTs perceived telehealth as a mediocre tool for most physical therapy objectives (weighted score = 2.22).

**Areas of expertise in which telehealth is perceived as providing the most adequate treatment:**

- 47.3% listed orthopedic adult rehabilitation (10.5% to very great extent, 36.8% to a great extent);
- 40.5% listed diagnosis of pain conditions of the musculoskeletal system (16.2% to a very great extent, 24.3% to a great extent);
- 26.3% listed treatment of pain and restrictions in the musculoskeletal system (10.5% to a very great extent, 15.8% to a great extent).

**Areas of expertise in which telehealth is perceived as providing the least adequate treatment:**

- 7.9% listed diagnosis in situations of clients with a communication disorder (5.3% to a very great extent, 2.6% to a great extent);
- 10.5% listed cardiac rehabilitation (2.6% to a very great extent, 7.9% to a great extent)
- 15.8% listed diagnosis before intense rehabilitation (15.8% to a great extent).



## 7.2 OTs' perception of telehealth

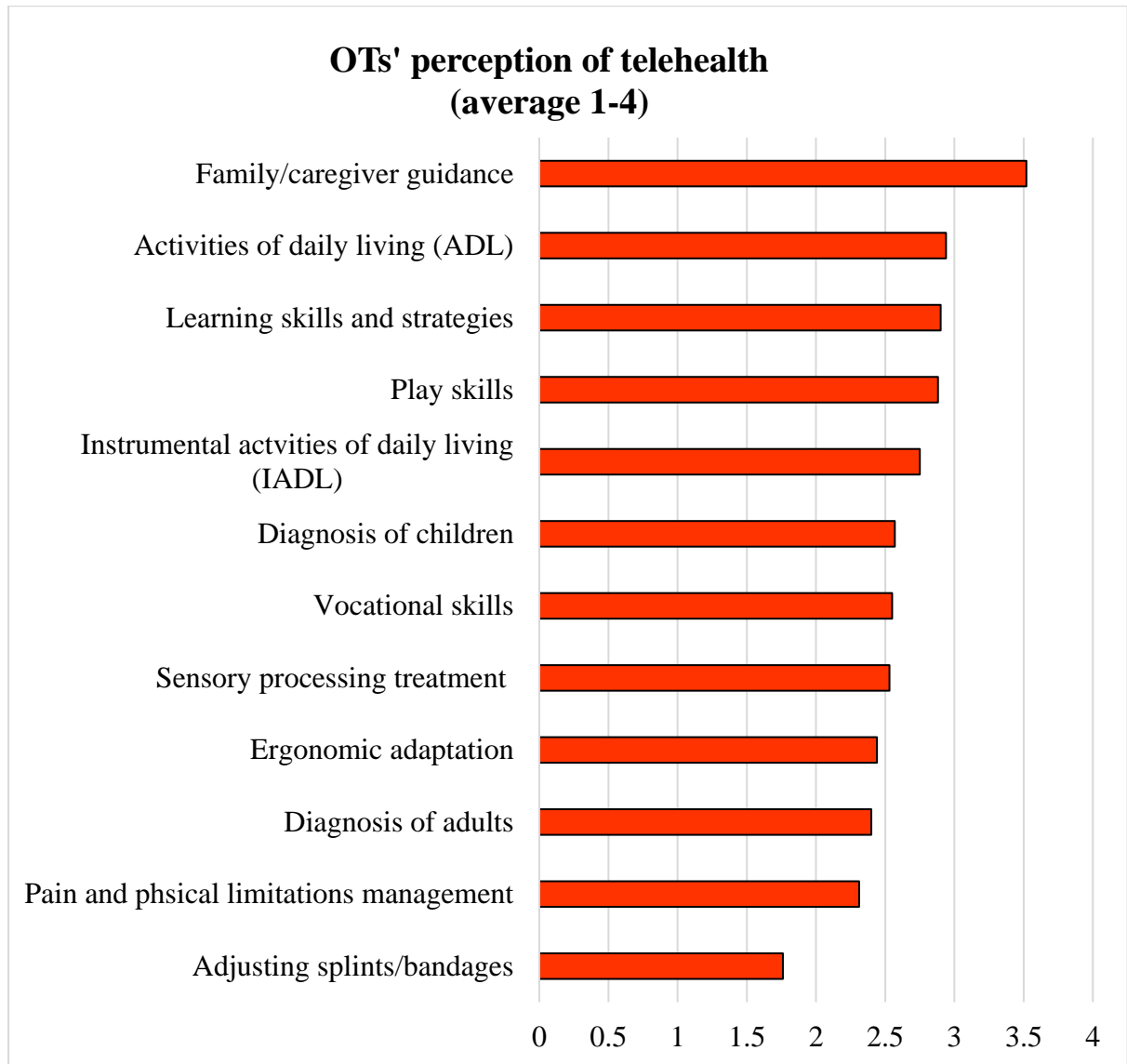
OTs who reported using telehealth were presented with several therapeutic objectives in their areas of expertise and asked to rank on a scale of 1 (Not at all) to 4 (To a very great extent) the extent to which they felt that they could provide adequate therapy by telehealth. OTs perception of telehealth was better than that of PTs, but still in the mediocre range (weighted score = 2.62).

**Areas of expertise in which telehealth was perceived as providing the best adequate treatment:**

- 85.3% listed family/caregiver guidance (57.3% to a very great extent, 28% to a great extent);
- 62.2% listed activities of daily living (31.7% to a very great extent, 30.5% to a great extent);
- 62.2% listed learning skills and strategies (30.5% to a very great extent, to a 31.7% great extent);
- 53.7% listed play skills (22% to a very great extent, 31.7% to a great extent)

**Areas of expertise in which telehealth was perceived as providing the least adequate treatment:**

- 9.8% listed adjusting splints/bandages (3.7% to a very great extent, 6.1% to a great extent);
- 25.6% listed diagnosis of adults (6.1% to a very great extent, 19.5% to a great extent);
- 29.6% listed pain and physical limitations and management (4.9% to a very great extent, 24.7% to a great extent).



### 7.3 SVLTs perception of telehealth

SVLTs who reported using telehealth were presented with a number of therapeutic objectives in their areas of expertise. Similarly, they were also asked to rank on a scale between 1 (Not at all) to 4 (To a very great extent), to what extent they felt they could provide adequate therapy by telehealth. SVLT also perceive telehealth as mediocre and their weighted score is similar to that of the OT (2.61).

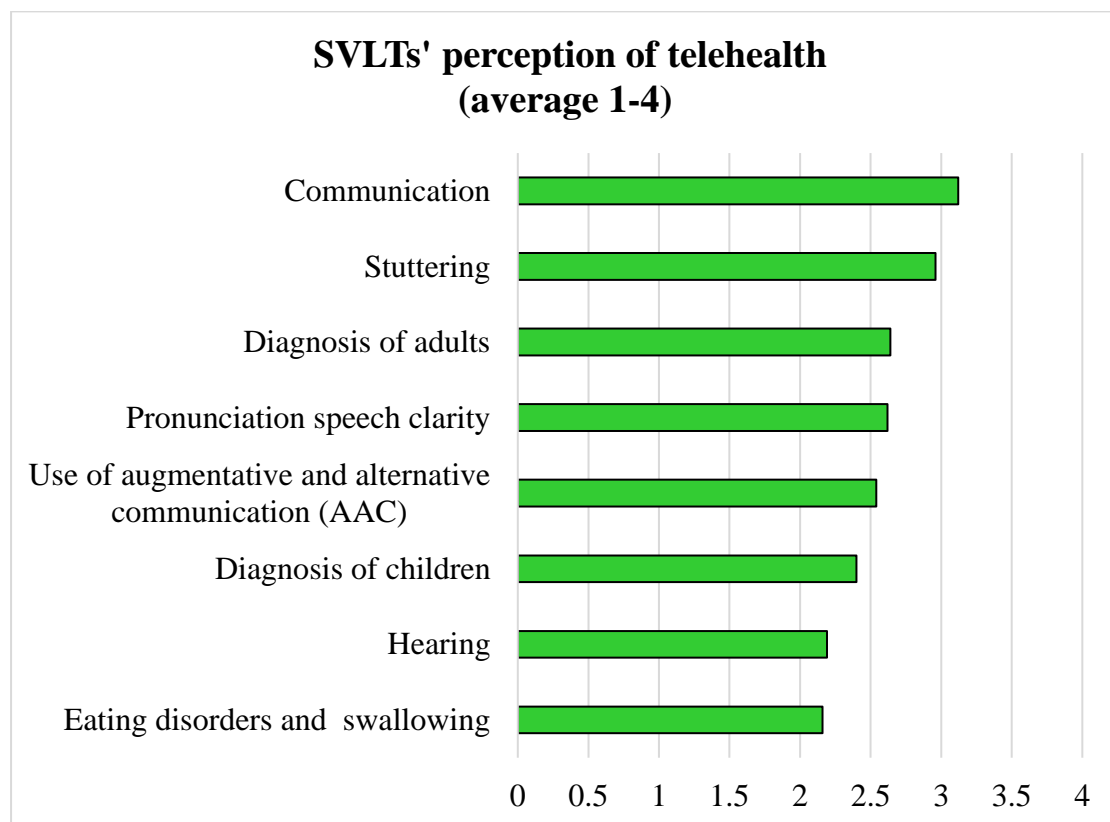


**Areas of expertise in which telehealth is perceived as providing the best adequate treatment:**

- 68.6% listed communication (27.9% very great extent, 40.7% great extent);
- 48.2% listed stuttering (17.6% very great extent, 30.6% great extent);
- 45.4% listed pronunciation speech clarity (16.3% very great extent, 29.1% great extent).

**Areas of expertise in which telehealth was perceived as providing the least adequate treatment:**

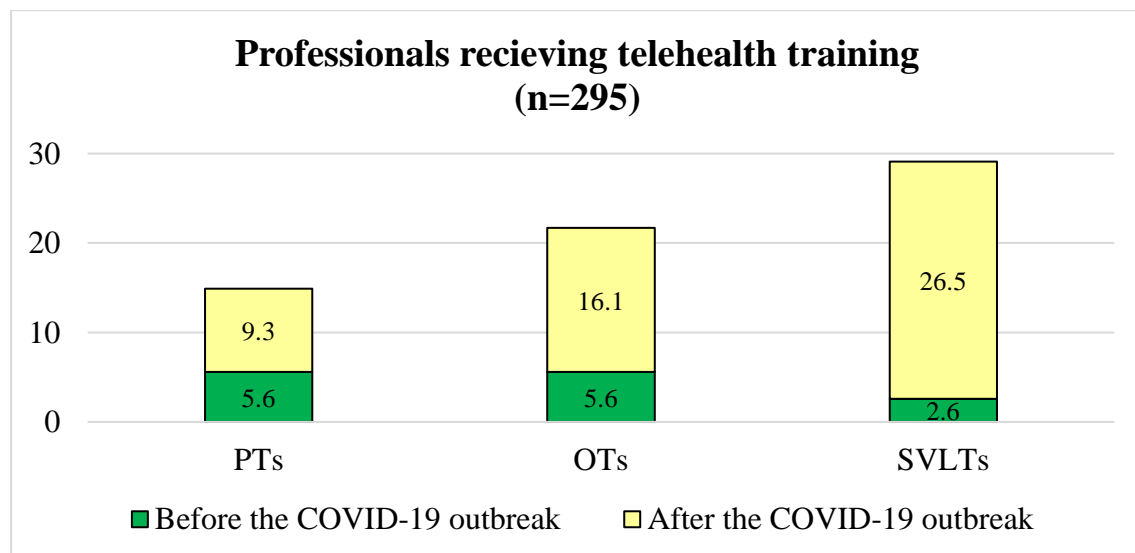
- 13.7% listed hearing (3.4% very great extent, 10.3% great extent);
- 18.7% listed eating disorders and swallowing (4.7% very great extent, 14% great extent).



## 8. Training

Respondents who reported using telehealth after the outbreak of COVID-19 (n=295) were asked whether they received any formal training in the provision of therapy by telehealth:

- 47.8% did not receive any training.
- 23.4% received training (19% after the COVID-19 outbreak and 4.4% before it).
- 28.8% did not answer the question.
- 14.9% of PTs reported receiving telehealth training before or after the outbreak. This percentage is lower than that reported by SVLTs (29.1%) and OTs (21.7%).



Respondents were asked how they learned how to provide therapy by telehealth. More than half the professionals using telehealth reported that they learned it independently (54.2%); 37.5% stated that they consulted colleagues; 23.4% worked intuitively; 12.5% reported that they were trained at their workplace; and 10.2% stated that they have not learned how to use telehealth.

SVLTs reported more independent learning (66.7%) than did OTs (46.8%) and PTs (44.4%).

## 9. Formal telehealth policies and documentation

Before and after the COVID-19 outbreak, many countries issued documents outlining policies regarding telehealth.

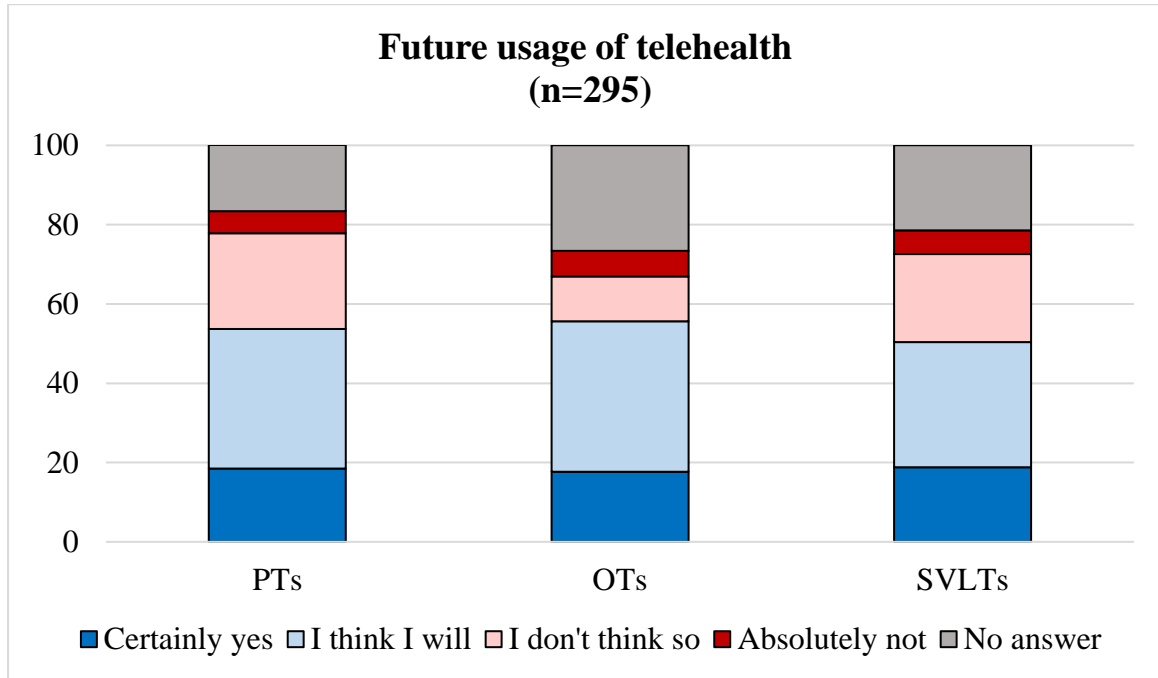
- 45.8% of the professionals using telehealth reported that they were aware of such a document, 22.7% reporting that they read the document carefully, 13.6% saw the document but just skimmed through it, and 9.5% were aware of its existence but did not see it.
- SVLTs were generally more aware of such documents and policies (55.6%) than were OTs (41.2%) and PTs (45.8%).
- 25.4% of all telehealth users reported that they were not aware of such a document. 28.8% did not answer the question.

## 10. Future usage of telehealth

Professionals using telehealth after the outbreak of COVID-19 (n=295) were asked whether they would continue using it after the pandemic was over.

- 53.2% responded that they would (18.3% said certainly; 34.9% said that they thought so);
- 24.1% responded that they would not (18% said that they did not think so; 6.1% said absolutely not).
- 22.7% did not answer this question.

Higher intent of future usage of telehealth was reported by OTs (55.6%) and PTs (53.7%) than by SVLTs (40.2%).



When examining intentions to use telehealth in the future based on the age of clients (children, adults, or both), higher intent was reported by those who treated only adults or both adults and children (82.6% and 81.5%, respectively). Of the therapists who treated children, only 61.9% stated that they would use telehealth in the future.

When examining future intentions based on country income, the highest intent of future use of telehealth was reported by therapists from low-middle-income countries (73.8%), followed by low-income countries (68.4%), and middle-upper-income countries (61%). Lowest future intent of use of telehealth was reported in high-income countries (56.2%).

## Discussion

The COVID-19 outbreak has brought on many changes in the allied health therapeutic field. Based on the sample of this study, telehealth has become a prevalent tool among therapists, tripling its usage rates from before the outbreak. The synchronic mode of treatment (i.e., Zoom and similar) became the most dominant one, perhaps because this mode offers an environment that is closest to conventional face-to-face therapy, emphasizing the importance

of the interpersonal connection. Furthermore, whereas before the COVID-19 outbreak telehealth was mainly a tool for consultation and instruction, after the outbreak served as an alternative for conventional treatment in the clinic.

Exposure to telehealth was forced upon many therapists because of medical and social restrictions imposed worldwide, and by the understanding that the virus was here to stay for some time. The rise in the use of telehealth, together with the fact that more than half of the sample considered using it in the future usage, even after the end of the COVID-19 pandemic, suggests the high potential of this modality. Nevertheless, there is still work to be done to overcome the different barriers and challenges that lie ahead. Although telehealth is becoming a relatively common tool for therapists, it is perceived as mediocre in general, and as providing adequate treatment only for specific areas of expertise within each of the disciplines in this study. There is still much to learn from what happened in the months since this survey was conducted, and it is necessary to take into account technological and infrastructure issues, to adjust objectives and expectations, and to learn how to address barriers faced by therapists and clients. At the same time, it is important to find ways to develop and maintain the interpersonal connection between therapist and client to ensure the full potential of telehealth, and to improve its image and practice. Telehealth training is an important issue that must be addressed as soon as possible. Despite the rise in the use of telehealth, training does not seem to be easily available. Although most respondents stated that although their workplace initiated telehealth, it did not offer formal training. Training was mostly mainly intuitive and informal, rather than structured and comprehensive.

Participants in the present study came from three allied health professions, contrary to most studies in the professional literature, which focus on one discipline only. This revealed that PTs, OTs, and SVLTs have much in common with regard to telehealth, but that in some aspects they were different. Findings reveal that PTs use of telehealth differed from that of

their colleagues from the other allied health professions in usage rates, preferred modes, and usage purposes. Moreover, PTs ranked telehealth lower than the other professionals, both with regard to their general perception of telehealth and to how adequate therapy provided by telehealth in given areas of expertise in their field was. Perhaps these differences were the result of the fact that PT is a "hands on" profession, making therapy by telehealth more difficult to provide than in the two other professions.

SVLTs were found to have the most experience with telehealth, showing the highest usage rates. More than the other professionals, SVLTs tended to use telehealth as an alternative to the conventional therapy setting. They reported that they received training more than did the other professionals, and they granted telehealth the highest scores. Nevertheless, they reported the lowest intent to use telehealth in the future, after the end of the COVID-19 pandemic. Future studies should further investigate this finding.

The difference between the three allied health professions is consistent with the findings of Whitten and Mair's (2000) paper, in which they question whether it is possible to infer from one study conducted in a particular field, to another, and whether what is true for one field of specialization is also accurate for other fields. Therefore, a more detailed research of each allied health profession is necessary to tailor telehealth training specifically to each area of expertise.

Finally, the findings of our Israeli study of professionals' perspective of telehealth (Roth, Raviv-Carmi, and Refua, 2020a) are similar to those of this global study. They both show a clear rise in telehealth use after the COVID19 outbreak, with telehealth largely replacing the conventional clinic room by synchronic modes. Similarly, telehealth was perceived as mediocre both generally and when examined in each area of expertise separately. In our second study (Roth, Raviv-Carmi, and Refua, 2020b) in Israel, which examined telehealth from the clients' perspective, the main findings also show that telehealth was perceived as

mediocre, and it was therefore less preferred than treatment in the conventional clinic. The findings by Roth, Raviv-Carmi, and Refua (2020 a and b) reveal that although there is considerable agreement between professionals and clients, clients appear to have a stronger sense of mixed feelings and challenges to overcome than the professionals do. This stresses the importance of providing training and tools to both the clients (parents) and therapists, to make them full partners in the treatment, helping them fully benefit from the advantages offered by telehealth services and cope with the difficulties and barriers they present.

It is reasonable to assume that technology and the level of Internet service infrastructure correlates with the level of income of the countries. Because technology is a significant player in telehealth, the differences found between low-income, low-middle, upper-middle, and high-income countries in use and perception of telehealth are not surprising. The relatively higher positive future intentions to use telehealth in low- and middle-income countries provide an opportunity to reduce inequality between nations by assisting these countries in developing their technological and internet infrastructure.

### **Recommendations**

1. There is a need for further research of telehealth provision, focusing on each area of expertise separately. The present study has shown that although allied health professions are similar in many aspects, they each face specific issues and challenges. It is important to tailor professional training for each domain, and accompanied it by evaluation studies, to learn more about how to provide telehealth effectively.
2. Similarly, to our earlier Israeli study, the present study focused on telehealth usage rates, goals, perceptions, satisfaction, and future usage intentions. These studies addressed only minimally the emotional parameters of the therapists when providing treatment by

telehealth. It is important to evaluate the professionals' emotional experience with regard to the provision of telehealth services.

3. It is also important to examine the clients' perspectives and point of view, similarly to the study conducted in Israel with clients, to ensure that telehealth training and provision better meet their needs. Although telehealth has become common worldwide, there many cultural differences remain in the manner in which it is provided and accepted. Therefore, training should be tailored to cultural norms.
4. To date, many studies have compared therapy provisions by telehealth with conventional face-to-face therapy in the clinic. These models should also be compared with a third, hybrid model, which combines the two.

### **Limitations**

The COVID-19 outbreak has presented humanity with limitations in many realms and aspects of life. The negative experiences and their effects have also produced positive outcomes, resulting in many changes and developments that are likely to stay. This research is one of the many efforts to collect information, learn, and increase the understanding of the needs of allied health therapists and clients, so that solutions can be developed to increase the wellbeing and quality of life.

This study has several limitations:

1. The study offers a global perspective, but the sample is not representative of the participating communities and nations (i.e., response was relatively large from small countries, whereas large and influential countries produced few or no participants). Nevertheless, the study provides a general picture of the state of telehealth in the allied health professions during the COVID-19 outbreak worldwide.



2. Although cultural parameters may have affected the findings, they were not examined. The study was conducted in English, therefore only English-speaking professionals could respond. Furthermore, although COVID-19 is a worldwide pandemic, its outbreaks, severity, and the ways in which governments handled the situation differed between countries and between the repeating outbreaks. These may also have influenced the adjustment, acceptance, and perceptions of telehealth, and thus the manner in which the questionnaire was answered.
3. Technological parameters play a significant role in telehealth. There are many differences between the level of technological development and of the infrastructure of the various countries. Moreover, in some countries there is censorship and surveillance. Because this was an Internet-based on-line research, countries with low technological access might have been excluded.

## References

- Brennan, D. M., Georgeadis, A. C., Baron, C. R., and Barker, L. M. (2005). The Effect of Videoconference-Based Tele-rehabilitation on Story Retelling Performance by Brain-Injured Subjects and Its Implications for Remote Speech-Language Therapy. *Telemedicine Journal and e-health*, 10 (2).
- Brennan, D., Tindall, L., Theodoros, D., Brown, J., Campell, M., Christiana, D., Smith, D., Cason, and J., Lee, A. (2010). A Blueprint for Telerehabilitation Guidelines. *International Journal of Rehabilitation*. 2(2). 31-34.
- Cason, J. (2014). Telehealth: A Rapidly Developing Service Delivery Model for Occupational Therapy. *International Journal of Rehabilitation*. 6(1). 29-35.
- Cason, J., and Brannon, J. (2011). Telehealth Regulatory and Legal Considerations: Frequently Asked Questions. *International Journal of Rehabilitation*. 3(2). 15-18.
- Cottrell, M. A. and Russell, T. G. (2020). Telehealth for musculoskeletal physiotherapy. *Musculoskeletal Science and practice*, 48 (102193). 1-5.  
DOI: 10.1016/j.msksp.2020.102193
- Fridler, N., Rosen, K., Herzberg, O., Lev, A., Kaplan, D., Hildesheimer, M. and Shani, M. (2012). Tele-rehabilitation therapy vs. face-to-face therapy for aphasic patients. In *eTELEMED 2012: The Fourth International Conference on eHealth, Telemedicine, and Social Medicine* (pp. 18-23). Valencia: IARIA.  
[https://www.researchgate.net/publication/274713926\\_Tele-Rehabilitation\\_Therapy\\_vs\\_Face-to-Face\\_Therapy\\_for\\_Aphasic\\_Patients](https://www.researchgate.net/publication/274713926_Tele-Rehabilitation_Therapy_vs_Face-to-Face_Therapy_for_Aphasic_Patients)
- Holland, A. (2013). Telehealth Reduces Hospital Admission Rates in Patients With COPD. *Journal of Physiotherapy*, 59(2). 129.
- Hung, G. and Fong, K. (2019). Effects of tele-rehabilitation in occupational therapy practice: A systematic review. *Hong Kong Journal of Occupational Therapy*, 32(1) 3–21.
- Jahromi, M.E., and Ahmadian, L. (2018). Evaluating satisfaction of patients with stutter regarding tele-speech therapy method and infrastructure. *International Journal of Medical Informatics* 115, 128-133.
- Kruse, C.S., Krowski, N., Rodriguez, B., Tran, L., Vela, J., and Brooks, M. (2017). Telehealth and patient satisfaction: a systematic review and narrative analysis. *BMJ*

*Open Access Journals*, 7(8).

<https://bmjopen.bmj.com/content/bmjopen/7/8/e016242.full.pdf>

Levy, C.E., Silverman, E., Jia, H., Geiss, M., and Omura, D. (2015). Effects of physical therapy delivery by home video tele-rehabilitation on functional and health-related quality of life outcomes. *Journal of Rehabilitation Research and Development; Washington*, 52(3), 361-370.

Lopresti, E.F., Jinks, A., and Simpson, R.C. (2015). Consumer satisfaction with tele-rehabilitation service provision of alternative computer access and augmentative and alternative communication. *International Journal of Tele-rehabilitation*, 17(2), 3-14.

Mashima. P. A., Birkmire-Peters, D.P., Syms, M., Holtel, M.R., Burgess, L.P.A. and Peters, L.J. (2003). Voice Therapy using Telecommunication Technology *12*(24).

[https://doi.org/10.1044/1058-0360\(2003/089\)](https://doi.org/10.1044/1058-0360(2003/089))

Odole, A.C. and Ojo, O.D. (2013). A Telephone-based Physiotherapy Intervention for Patients with Osteoarthritis of the Knee. *International Journal of Rehabilitation*, 5(2), 11-20.

Parvin, R. (2018). *Perception of the patients and providers regarding telehealth service of disabled people's organizations (DPO) through center for the rehabilitation of paralyzed (CRP)*. (Doctoral dissertation, (Bangladesh Health Profession Institute, Faculty of Medicine, the University of Dhaka, Bangladesh: 2018-06-30).

Peretti, A., Amenta, F., Tayebati, S.K., Nittari, G., and Mahdi, S.S. (2017). Tele-rehabilitation: Review of the State-of-the-Art and Areas of application. *JMIR Rehabilitation and Assistive Technologies*, 4(2).

Roth, D., Raviv-Carmi, D., and Refua, M. (2020a). "Remote Treatment (Telehealth) for Allied Health Professions in Israel during the Coronavirus Outbreak (COVID-19)", *Beit Issie Shapiro knowledge base* (<https://tinyurl.com/yxjca94z>).

Roth, D., Raviv-Carmi, D., and Refua, M. (2020b). "Client experience of Remote Allied Health Treatment (Telehealth) during the Coronavirus outbreak (COVID-19) in Israel", *Beit Issie Shapiro knowledge base* (<https://tinyurl.com/yyy6ad9g>).

- Russell, T., Buttrum, P., Wootton, R., and Gwendolen A. (2011). Internet-Based Outpatient Tele-rehabilitation for Patients Following Total Knee Arthroplasty - A Randomized Controlled Trial. *Journal of Bone and Joint Surgery*, 93 (2), 113-120.
- Scheideman-Miller, C., Clark, P.G., Smeltzer, S.S., Carpenter, J., Hodge, B., and Prouty, D. (2002). Two-year results of a pilot study delivering speech therapy to students in a rural Oklahoma school by Telemedicine. In *Proceedings of the 35th Annual Hawaii International Conference on System Sciences* (9-pp). IEEE.  
<https://ieeexplore.ieee.org/document/994136>
- Tindall, L.R., and Huebner, R.A. (2009). The Impact of an Application of Tele-rehabilitation Technology on Caregiver Burden. *International Journal of Rehabilitation*. 1(1). 3-8.
- Truter, P., Russell, T., and Fary, R. (2014). The Validity of Physical Therapy Assessment of Low Back Pain by Tele-rehabilitation in a Clinical Setting. *Telemed J E Health*, 20(2). 161-167. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/24283249/#affiliation-1>
- Tousignant, M., Boissy, P., Moffet, H., Corriveau, H., Cabana, F., Marquis, F., and Simard, J. (2011). Patients' Satisfaction of Healthcare Services and Perception with In-Home Tele-rehabilitation and Physiotherapists' Satisfaction toward Technology for Post-Knee Arthroplasty: An Embedded Study in a Randomized Trial. *Telemedicine and e-Health*, 17(5), 376-382. <https://www.liebertpub.com/doi/full/10.1089/tmj.2010.0198>
- Tousignant, M., Macoir, J., Martel-Sauvageau, V., Boissy, P., Corriveau H., Gosselin, S., Dubois, M.F., Tousignant, M., and Page, C. (2018). Satisfaction with in-home speech rehabilitation in chronic post-stroke aphasia: an exploratory analysis. *Journal of the international society of telemedicine and e-health*, 6, e11-1.  
<https://journals.ukzn.ac.za/index.php/JISfTeH/article/view/362/937>
- Whitten, P. S. and Mair, F. (2000). Telemedicine and Patient Satisfaction: Current Status and Future Directions. *Telemedicine Journal and e-health*, 6 (4), 417-423.
- WHO, 2016, <https://www.who.int/gho/goe/telehealth>
- World Bank Internet Site, (2020)  
<https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups>

## **Appendix A: The Survey**

### **Telehealth Services by Health Professionals during the Coronavirus Outbreak**

This Survey addresses health professionals' intervention during the Coronavirus outbreak. It is directed to professionals in the fields of: physical therapy, occupational therapy, and speech, voice and language therapy.

In the last few months, the spread of the coronavirus (COVID-19) has promoted health and rehabilitation service provision by Telehealth. Telehealth involves the use of telecommunication and virtual technology to deliver healthcare outside of traditional health care facilities. **The "before" period of the outbreak of the coronavirus refers to the period before February 1st, 2020.**

Participation in this study is voluntary and anonymous. Answering this questionnaire constitutes consent to the use of data for learning and research purposes. Publication of the findings will not reveal any personal or identifying information.

Completion of the survey takes about 15 minutes. We are grateful to you for participating in the survey.

For any questions, please contact:

Dr. Dana Roth, Director of Research and Evaluation, Beit Issie Shapiro, Israel

[danar@beitissie.org.il](mailto:danar@beitissie.org.il)

**What is your professional training?**

*More than one answer is possible*

- 1. Physical therapy
- 2. Occupational therapy
- 3. Speech, voice and language therapy

**Did you provide treatment by telehealth before the outbreak of the coronavirus?**

- Yes
- No

**For those who treated by telehealth before the coronavirus outbreak:**

**How often did you treat by telehealth?**

- 1. Rarely
- 2. Occasionally
- 3. Often
- 4. Regularly

**Which groups did you primarily treat by telehealth before the coronavirus outbreak?**

*More than one answer is possible*

- 1. Children or adults with permanent disability
- 2. Children or adults with a temporary disability (e.g., pronunciation difficulties, stuttering, post-surgery rehabilitation, strengthening of shoulder girdle, etc.)
- 3. Training for parents, consultations, and guidance to clients.
- 4. Other (please describe): \_\_\_\_\_

**What means did you use before the coronavirus outbreak to treat, guide, or give advice by telehealth?**

*More than one answer is possible*

- 1. Written information and instructions (e-mail, WhatsApp, SMS, etc.).
- 2. Phone conversations (without seeing each other)
- 3. Visual/offline video (e.g., sharing of videos)
- 4. Real-time/on-line video (e.g., Zoom)
- 5. Other (please describe)\_\_\_\_\_

**Since the coronavirus outbreak, have you been treating by means of telehealth?**

- Yes
- No

**If you are not using telehealth, why not? Please answer in detail:**

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**If you are using telehealth, what are the benefits and advantages from your experience?**

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**What are the disadvantages of using telehealth?**

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**Who initiated your use of Telehealth?**

*More than one answer is possible*

- 1. I initiated it (in my private practice)
- 2. I initiated it (at my place of work as an employee)
- 3. It was initiate by my workplace

- 4. It was initiated by my clients/patients
- 5. Other, please describe \_\_\_\_\_

**Which means do you presently use to treat by telehealth?**

*More than one answer is possible*

- 1. Written information and instructions (by e-mail, WhatsApp, SMS, etc.).
- 2. Phone conversations (without seeing each other)
- 3. Visual/offline video (e.g., sharing of videos)
- 4. Real-time/on-line video (e.g., Zoom)
- 5. Other (please describe) \_\_\_\_\_

**Do you presently use telehealth mainly as:**

*Please check only one answer*

- 1. An alternative to traditional treatment in the clinic
- 2. A means of instruction and counseling (patients/parents/are givers)

**On a scale of 1 ("Not at all") to 4 ("To a very great extent"), telehealth:**

|   | Not at all | To a small extent | To a great extent | To a very great extent |
|---|------------|-------------------|-------------------|------------------------|
| Allows you to provide appropriate support to your clients | 1          | 2                 | 3                 | 4                      |
| Allows you to maintain your professional standards        | 1          | 2                 | 3                 | 4                      |
| Is a channel with which you are satisfied                 | 1          | 2                 | 3                 | 4                      |

**Do you think that you will continue to use telehealth after the coronavirus outbreak ends?**

- 1. Absolutely not
- 2. I don't think so



- 3. I think I will
- 4. Certainly yes

**If not, why not?** (Answers 1 / 2)

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**If yes** (answers 3, 4), in which cases, and why precisely in those?

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**What do you think you require (need) to provide optimal treatment to your clients by telehealth?**

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**What are your concerns about using telehealth?**

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### **Physical Therapy**

The following statements refer to some of the areas of expertise of physical therapy: To what extent do you think you can provide adequate therapy by telehealth? Please rate each domain on a scale ranging from 1 ("Not at all") to 4 ("To a very great extent"). Select 5 if this is not your area of expertise.

|   | Not at all | To a small extent | To a great extent | To a very great extent | Not my area of expertise |
|---|------------|-------------------|-------------------|------------------------|--------------------------|
| Diagnosis before intense rehabilitation                           | 1          | 2                 | 3                 | 4                      | 5                        |
| Diagnosis in situations of a client with a communication disorder | 1          | 2                 | 3                 | 4                      | 5                        |

|  |   |   |   |   |   |
|--|---|---|---|---|---|
| Diagnosis of developmental delays (with and without known diagnosis) | 1 | 2 | 3 | 4 | 5 |
| Developmental therapy  | 1 | 2 | 3 | 4 | 5 |
| Pediatric rehabilitation   | 1 | 2 | 3 | 4 | 5 |
| Orthopedic adult rehabilitation                                      | 1 | 2 | 3 | 4 | 5 |
| Neurological adult rehabilitation                                    | 1 | 2 | 3 | 4 | 5 |
| Cardiac rehabilitation   | 1 | 2 | 3 | 4 | 5 |
| Respiratory rehabilitation and treatment                             | 1 | 2 | 3 | 4 | 5 |
| Diagnosis of pain conditions and of the musculoskeletal system       | 1 | 2 | 3 | 4 | 5 |
| Treatment of pain and restrictions in the musculoskeletal system     | 1 | 2 | 3 | 4 | 5 |

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

### Occupational Therapy

The following statements refer to some of the areas of expertise of occupational therapy. To what extent do you think you can provide adequate therapy by telehealth? Please rate each domain on a scale ranging from 1 ("Not at all") to 4 ("To a very great extent"). Select 5 if this is not your area of expertise.

|                                  | Not at all | To a small extent | To a great extent | To a very great extent | Not my area of expertise |
|----------------------------------|------------|-------------------|-------------------|------------------------|--------------------------|
| Diagnosis of children            | 1          | 2                 | 3                 | 4                      | 5                        |
| Diagnosis of adults              | 1          | 2                 | 3                 | 4                      | 5                        |
| Activities of daily living (ADL) | 1          | 2                 | 3                 | 4                      | 5                        |

|  |   |   |   |   |   |
|--|---|---|---|---|---|
| Instrumental ADL (IADL)                  | 1 | 2 | 3 | 4 | 5 |
| Learning skills and strategies           | 1 | 2 | 3 | 4 | 5 |
| Vocational skills                        | 1 | 2 | 3 | 4 | 5 |
| Play skills                              | 1 | 2 | 3 | 4 | 5 |
| Pain and physical limitations management | 1 | 2 | 3 | 4 | 5 |
| Sensory processing treatment             | 1 | 2 | 3 | 4 | 5 |
| Adjusting splints/bandages               | 1 | 2 | 3 | 4 | 5 |
| Ergonomic adaptation                     | 1 | 2 | 3 | 4 | 5 |
| Family/caregiver guidance                | 1 | 2 | 3 | 4 | 5 |

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Speech, voice and language therapy**

The following statements refer to some of the areas of expertise of SVLTs. To what extent do you think you can provide adequate therapy by telehealth? Please rate each domain on a scale ranging from 1 ("Not at all") to 4 ("To a very great extent"). Select 5 if this is not your area of expertise.

|                                | Not at all | To a small extent | To a great extent | To a very great extent | Not my area of expertise |
|--------------------------------|------------|-------------------|-------------------|------------------------|--------------------------|
| Diagnosis of children          | 1          | 2                 | 3                 | 4                      | 5                        |
| Diagnosis of adults            | 1          | 2                 | 3                 | 4                      | 5                        |
| Pronunciation / speech clarity | 1          | 2                 | 3                 | 4                      | 5                        |
| Language                       | 1          | 2                 | 3                 | 4                      | 5                        |
| Communication                  | 1          | 2                 | 3                 | 4                      | 5                        |
| Stuttering                     | 1          | 2                 | 3                 | 4                      | 5                        |

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| Hearing   | 1 | 2 | 3 | 4 | 5 |
| Eating and swallowing disorders                         | 1 | 2 | 3 | 4 | 5 |
| Use of alternative and augmentative communication (AAC) | 1 | 2 | 3 | 4 | 5 |

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Have you received any formal training to provide therapy by telehealth?**

- 1. I did not receive any training
- 2. I received training before the coronavirus outbreak
- 3. I received training after the coronavirus outbreak

**How have you learned to provide therapy by telehealth?**

*More than one answer possible*

- 1. Have not learned
- 2. I was trained at my workplace
- 3. By consulting with colleagues
- 4. Independent learning
- 5. I work intuitively
- 6. Other, describe \_\_\_\_\_

**Are you familiar with any document outlining the policies of your country?**

- 1. I am not aware that there is such a document
- 2. I am aware of the existence of a document, but I didn't see it
- 3. I saw a document referring to it, but I just skimmed through it

- 4. I read the document carefully

**Personal Information:**

**Gender:**

- Male
- Female
- Other

**Your age:**

- 1. Up to 29
- 2. 30-39
- 3. 40-49
- 4. 50-59
- 5. 60-69
- 6. 70+

**How many years of experience do you have in your profession?**

- 1. Less than 5
- 2. 5-10
- 3. 11-14 s
- 4. 15-19
- 5. 20+ years

**Form of employment**

- 1. Self-employed
- 2. Employee
- 3. Both 1 and 2

**Which population are you working with (more than one answer is possible?)**

- 1. Young children 0-6
- 2. Children 7-12
- 3. Youths 13-18
- 4. Young people 19-29
- 5. Adults 30-59
- 6. Age 60+

**Which country are you from?**

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## Appendix B: Categorization by income according to World Bank Internet Site (2020)

| <b>N=48</b>                 | <b>Countries</b>  |
|-----------------------------|---|
| <b>Low-income<br/>(6)</b>   | Malawi, Mozambique, Rwanda, South Sudan, Tajikistan, Uganda   |
| <b>Low-middle<br/>(10)</b>  | Bangladesh, India, Kenya, Myanmar, Nepal, Nigeria, Philippines, Sri-Lanka, Tanzania, Ukraine  |
| <b>Middle-upper<br/>(9)</b> | Albania, Argentina, Brazil, Fiji, Georgia, Mexico, Paraguay, Russia, South Africa   |
| <b>High-income<br/>(23)</b> | Australia, Austria, Belgium, Canada, Chile, Croatia, Denmark, Germany, Ireland, Israel, Lithuania, Malta, Poland, Portugal, Qatar, Romania, Seychelles, Singapore, Slovenia, Spain, Sweden, UK, USA |

The number in parentheses represent the number of countries that participated in this survey that belong to this category, as defined by the World Bank.